

Energy Chain Systems® ...



chainflex®
cable works.



igus®.com
Plastics for longer life.

2012

Turn to
Section
10 for our
complete
Chainflex®
product line

Contents

igus® Plastics for longer life®

On the following pages you will find application examples, design specifications, and more than 70,000 Energy Chain® products, which are ready for delivery to you from stock. They are arranged in 12 chapters, and an index is provided for locating products quickly.

The most important innovations of this catalog are:

- More selection in all product lines, including selected specialists for ESD, cleanroom, and noise reduction, etc.
- More accessories
- More solutions and practical tips
- More detailed selection possibilities
- Assembly Instructions

www.igus.com

This catalog by no means covers the entire igus® product range. Visit our website www.igus.com to discover further products, new developments and benefit from our online program – 24 hours a day.

Legal Information:

The information in this catalog, and the data in the Design section in particular, is based on our current knowledge of the products described. No legally binding assurance in respect of characteristics or suitability for a specific intended application can be derived from it. igus® is unable to assume liability of any damages, loss or injury resulting from application of the products. We recommend that you always check the suitability of the products for a specific intended application in a practical-oriented test (please consult igus®). For reasons relating to ongoing technical developments, we reserve the right to implement technical modifications and improvement of the products at any time. Subject to printing errors.

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Designing with Energy Chains®

Design and calculation information, Applications, Diagrams

1

E-Z Chain®

Low-priced Energy Chains®, easy to fit.
1-part per link

2

Zipper Chains® Zipper Energy Tubes

Quick opening and closing of lids due to "Zipper-design"

3

E2 micro, mini, medium, E2/000

Small and medium size Energy Chains®
1- and 2-parts per link

4

E2 Tubes, RX Tubes

Dirt- and chip protection, fully closed. 2-parts per link
RX Tube - Full chip protection
Round contour

5

System E4

Standard E4 modular system for nearly all applications. 4-parts per link Energy Chains® and Energy Tubes

6

System E6

Extremely low-noise and low vibration Energy Chains®.
3-parts and 6-parts per link

7

Triflex® R, E-Z Triflex®, Triflex® TwisterChain®

3-D axis Energy Chains® for Robots or 3-D movements

8

Guide Troughs Accessories

Solutions for Long travels with or without Guide Troughs

9

Chainflex® Chainfix Strain Relief

Continuous-flex cables and strain relief to length the life of your cables

10

PMA Cable Protection

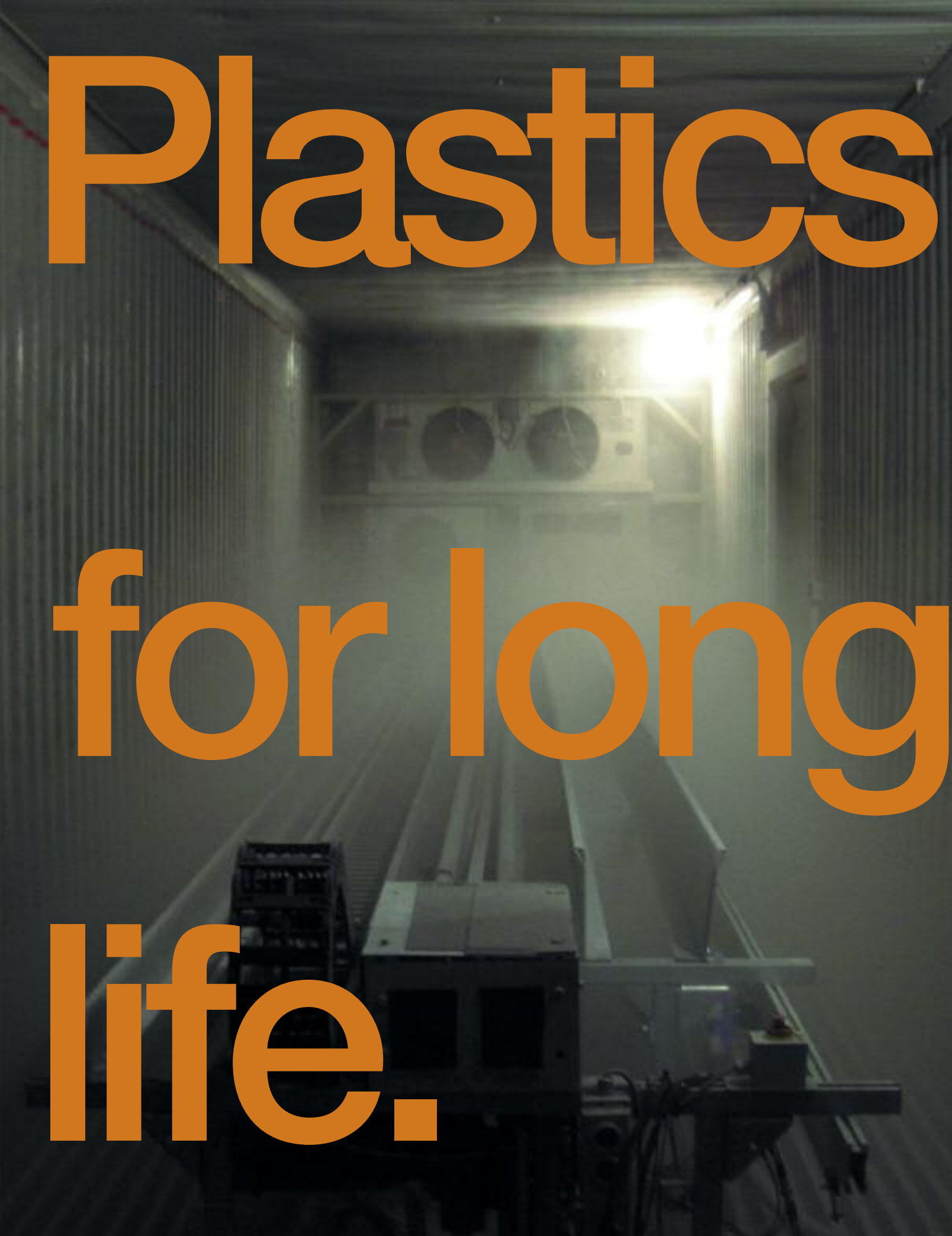
Cable protection for static applications

11

ReadyChain®

Energy Chain® completely harnessed systems

12



Plastics

for long

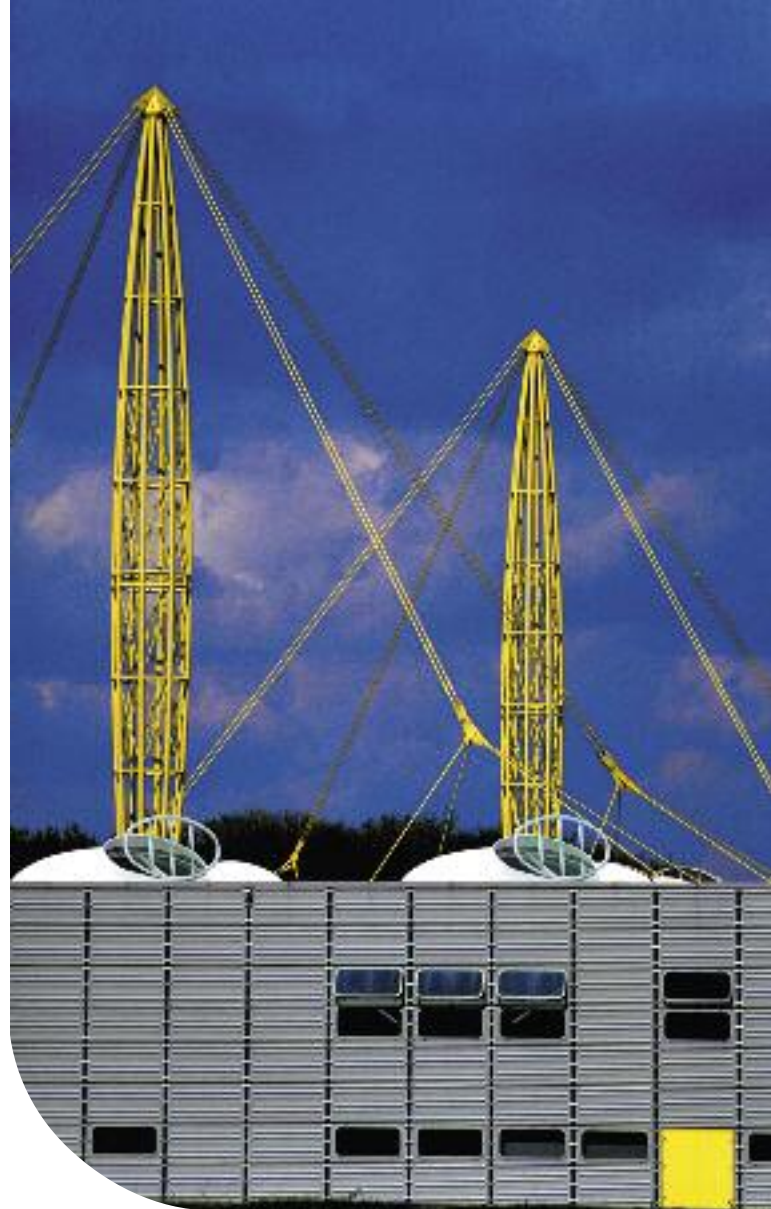
life.

Plastics for longer life® – make your machines more durable with plastics

Less maintenance, lower costs, longer life cycles, ready availability from stock - these key principles formulated by us apply to all igus® products, systems and services.

Tried and tested in terms of durability, friction properties and stability. igus® plastics are the technological core of the igus® range.

This catalog lists more than 70,000 products available in stock from our smallest batch size upward. We are looking forward to your phone call or e-mail.



igus® headquarters in Cologne

er

Orders can be placed until 8:00 pm local time.

Phone: 1-800-521-2747

Ordering at igus®

No minimum order quantity and no surcharge.

70,000 Energy Chain® products from stock

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e-mail: sales@igus.com

igus® GmbH, Germany

20:00

Energy Chains® are lifelines to automated systems

Energy Chains® are the umbilical cord of modern machines. igus® has been developing, producing and testing polymer Energy Chains® since 1971. Our expert knowledge is being refined continuously with the help of our customers, and is then incorporated into our production time.

Universal applications for igus® Energy Chains®

- Multitude of possibilities in terms of movement and length
- Carry sensitive bus, data cables and fibre optics cables and energy sources such as electricity, gas, air and liquids
- Accommodate very high dynamic loads and stringent service life requirements
- Handle very different environments and climatic zones
- Space-saving installation
- High levels of acceleration can be achieved
- Simple assembly of modular system on site and rapid retrofitting of cables possible

Save time and money when purchasing and utilizing Energy Chains®!

To achieve this, our focus is as follows:

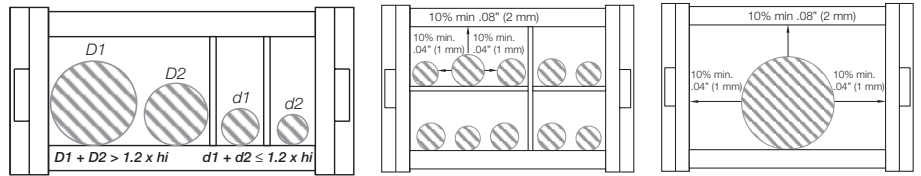
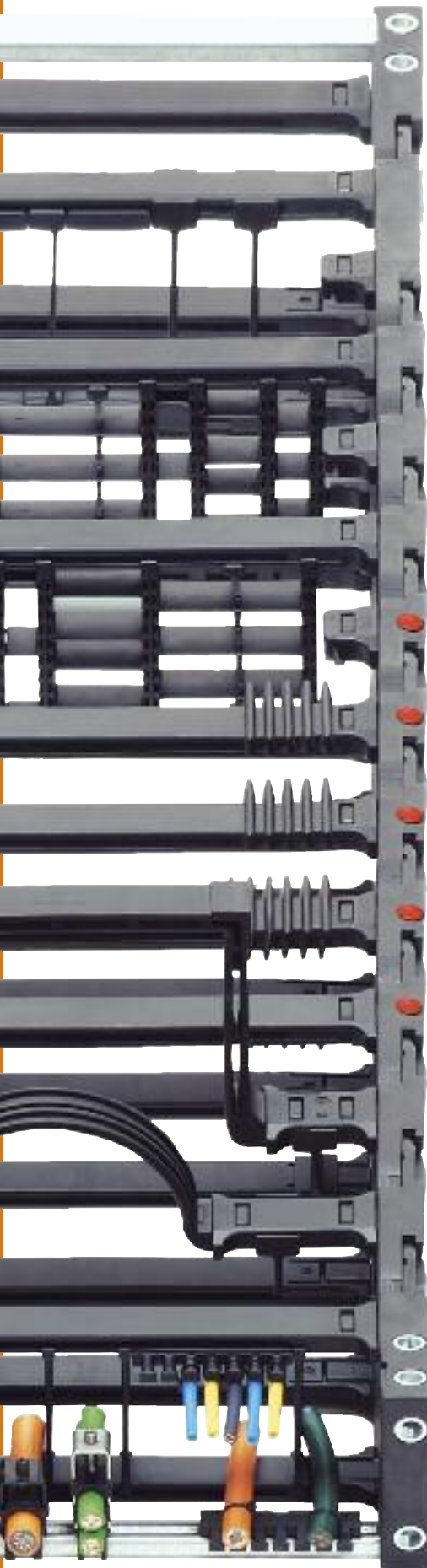
- Innovative products that can be assembled quickly
- Rapid delivery time – saves you storage costs
- Large range of products – find the right solution immediately
- System quotes, including made-to-measure production and "turnkey" assembly
- Rapid system design and support with an ever-growing close-knit network of local sales engineers in Germany and worldwide



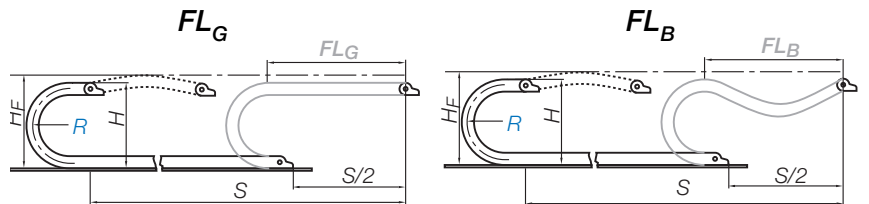
The award-winning igus® Energy Chain Systems® are certified and tested

Assembled, just as
your design requires
► Chapter 12

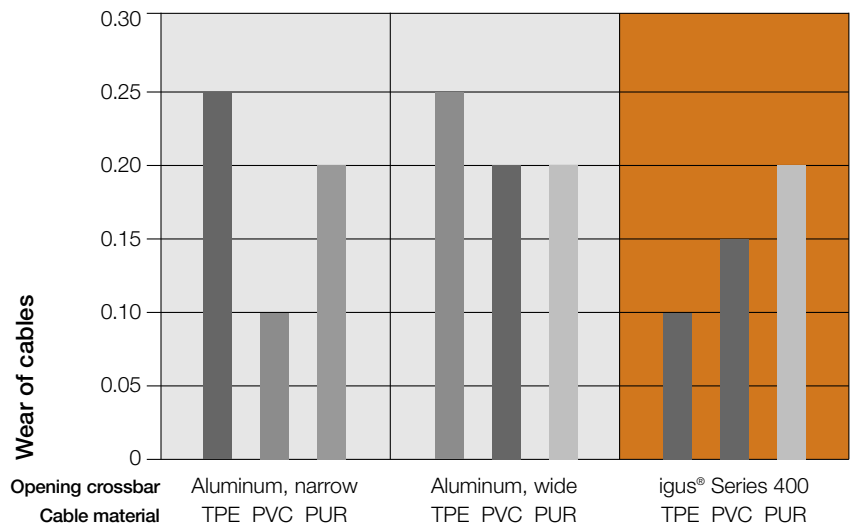




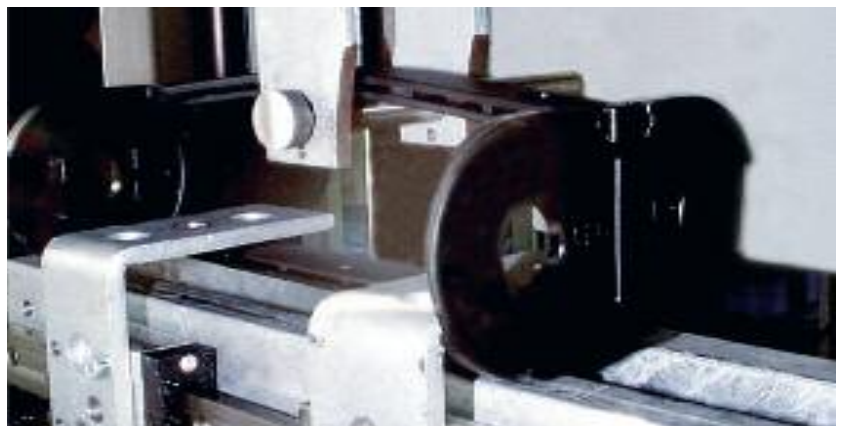
igus® interior separation systems significantly lengthen the life cycle of cables and enable neat separation of Energy Chains®. Filling standards are described ► Design, Chapter 1



Large unsupported lengths with igus® Energy Chains®. Notes, calculations and load diagrams are provided ► Design, Chapter 1



Optimum service life for cables
Reduce cable wear with igus® polymer separators



Proven toughness – strength tests during fabrication in the igus® laboratory

Triflex[®] R 3-dimensional Energy Chains[®] for Robots





Triflex® R is the third generation of 3-axis Energy Chains® from igus®. Significant design features include:

- optional fiber rod for partial bracing of the Triflex® R
- approximately $\pm 10^\circ$ torsion per chain link
- high tensile strength afforded by a ball-and-socket joint.
- easy assembly and dismantling afforded by a single, injection molded component. No support elements (steel cables, spring suspensions etc.) are necessary along the tensile force vectors

The Triflex® R product family now comprises more than 100 components meeting all requirements ranging from those of small palleting robots to large welding robots. Triflex® R has received the iF-Design award.

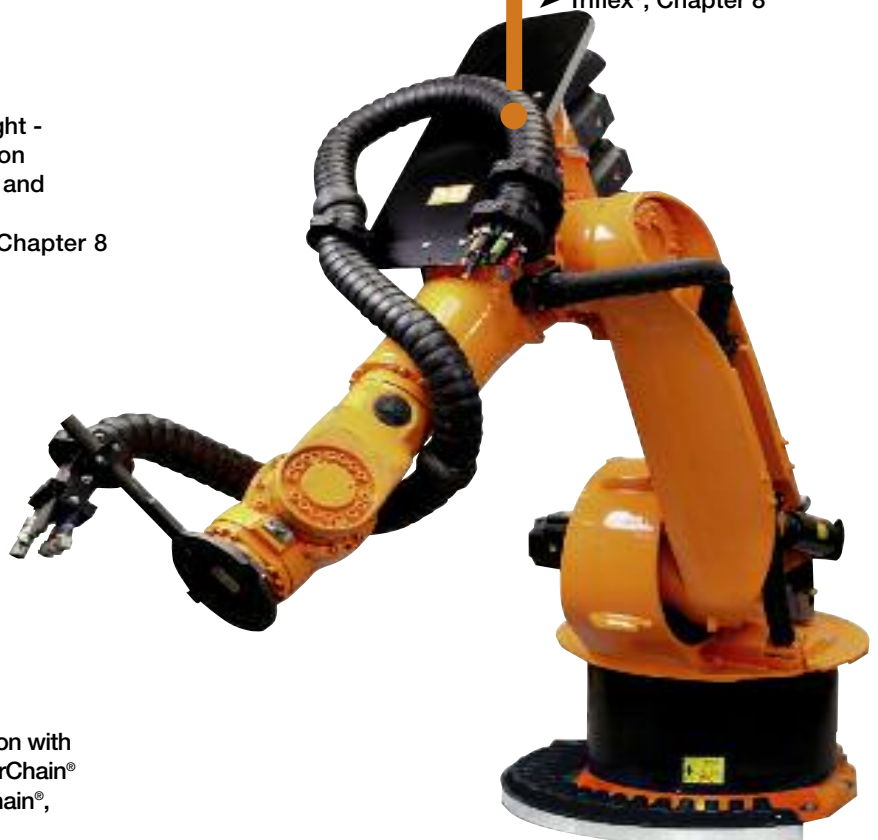


Triflex® R light -
save twice on
purchasing and
installation
► Triflex®, Chapter 8



Rotary motion with
igus® TwisterChain®
► TwisterChain®,
Chapter 8

Robot with Triflex® RS
universal module
► Triflex®, Chapter 8



E-Z Chain[®] – easy to fill and very cost effective



E-Z Chains[®] are available with exterior (E) press-in-access, as well as interior (Z) access. The assembly time reductions are a primary reason to choose E-Z Chains[®]. Their elastic and tough material, igumid NB, presents more application reasons: Same optimal elasticity, UL94-V2 classification and excellent cleanroom qualities. Their one-piece design makes the E-Z Chain[®] very price-attractive.

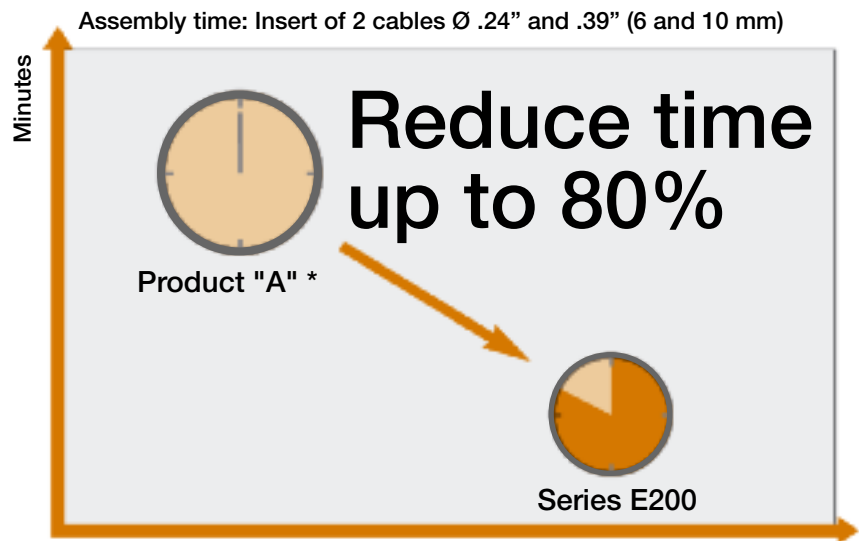


Machinery of all kinds feature Easy Chains®- and reduce assembly time

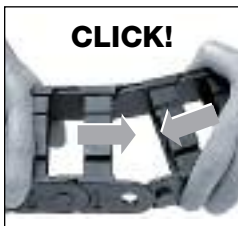


Typical industries & applications

- General machinery
- Cleanroom applications
- Electronic apparatuses
- Office equipment
- Vending machines
- Packaging machines



* We can present you with more details about this and other tests



Push and snap in



Release side link



Twist and separate



Press in cable



Pull out cable

Zipper – zip fastening Energy Chains® with iF-Design Award

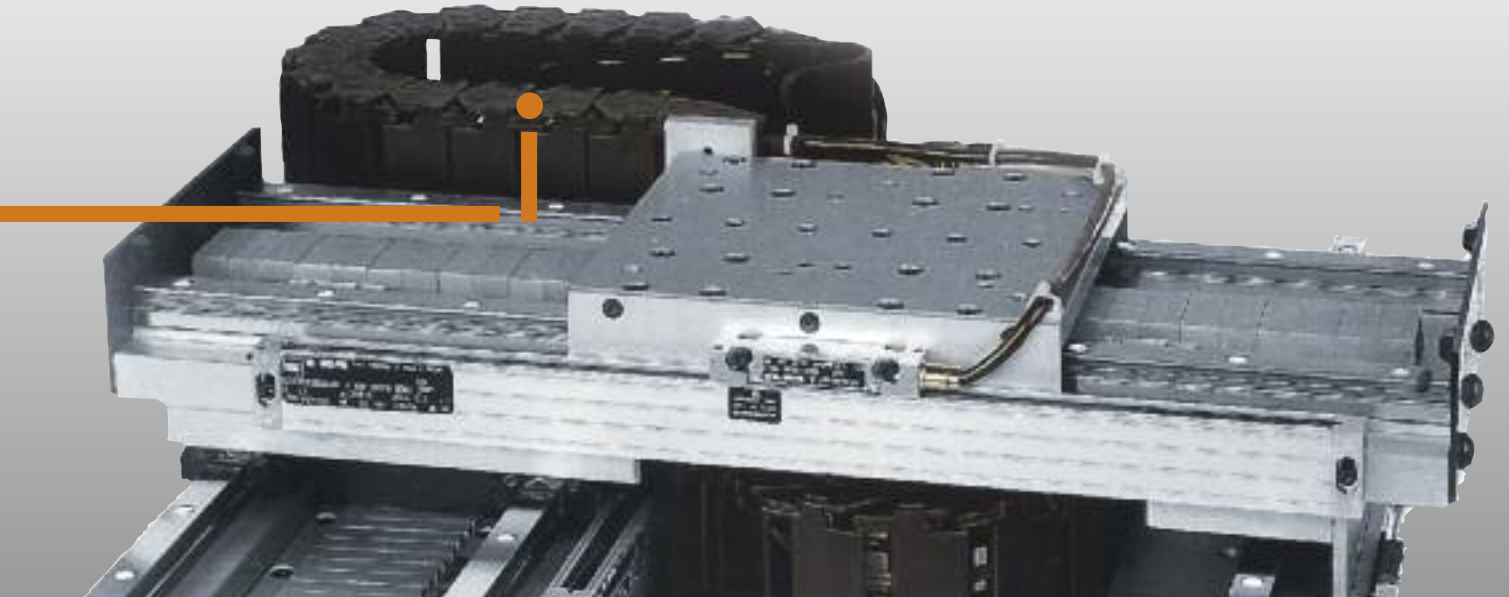
Lightning-fast opening and closing with Zipper Energy Chains® and Energy Tubes

The "Zipper" Series is one of the most popular Energy Chain® Series for demanding industries. The "Zipper" function makes them a very useful product to reduce assembly time. The small pitch, tough-elastic zipper-band and the sturdy link work wonders in high-acceleration environments.

Typical industries & applications

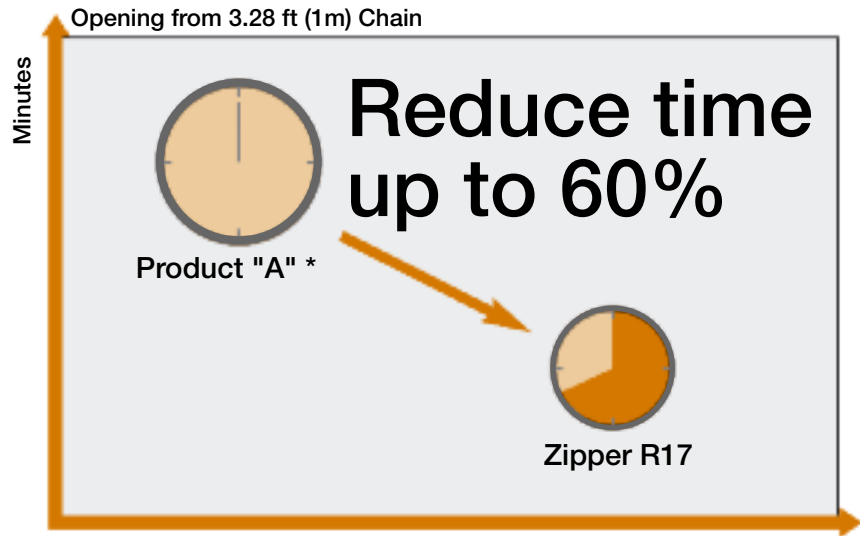
- Pick & place robots
- Semiconductor machines
- Linear motors, actuators
- Measuring equipment
- Machine tools (Zipper Energy Tube)





Lightening fast opening and closing with "Zipper"

- Reduced assembly-time
- Zipper-like design for quick opening and closing of lids
- Zipper lids can be separated and joined at each chain link
- Small pitch for low noise and smooth operation
- High accelerations: 328 ft/s² (100 m/s²) and more
- Interior separation possible for larger versions



* We can present you with more details about this and other tests



Opening the zip – pull the lid at the end of the chain upward and outward



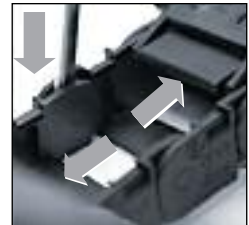
Closing the zip – press the lid carefully downward and inward till it lock



In every chain link, the lids have to be detached ...



...and attached

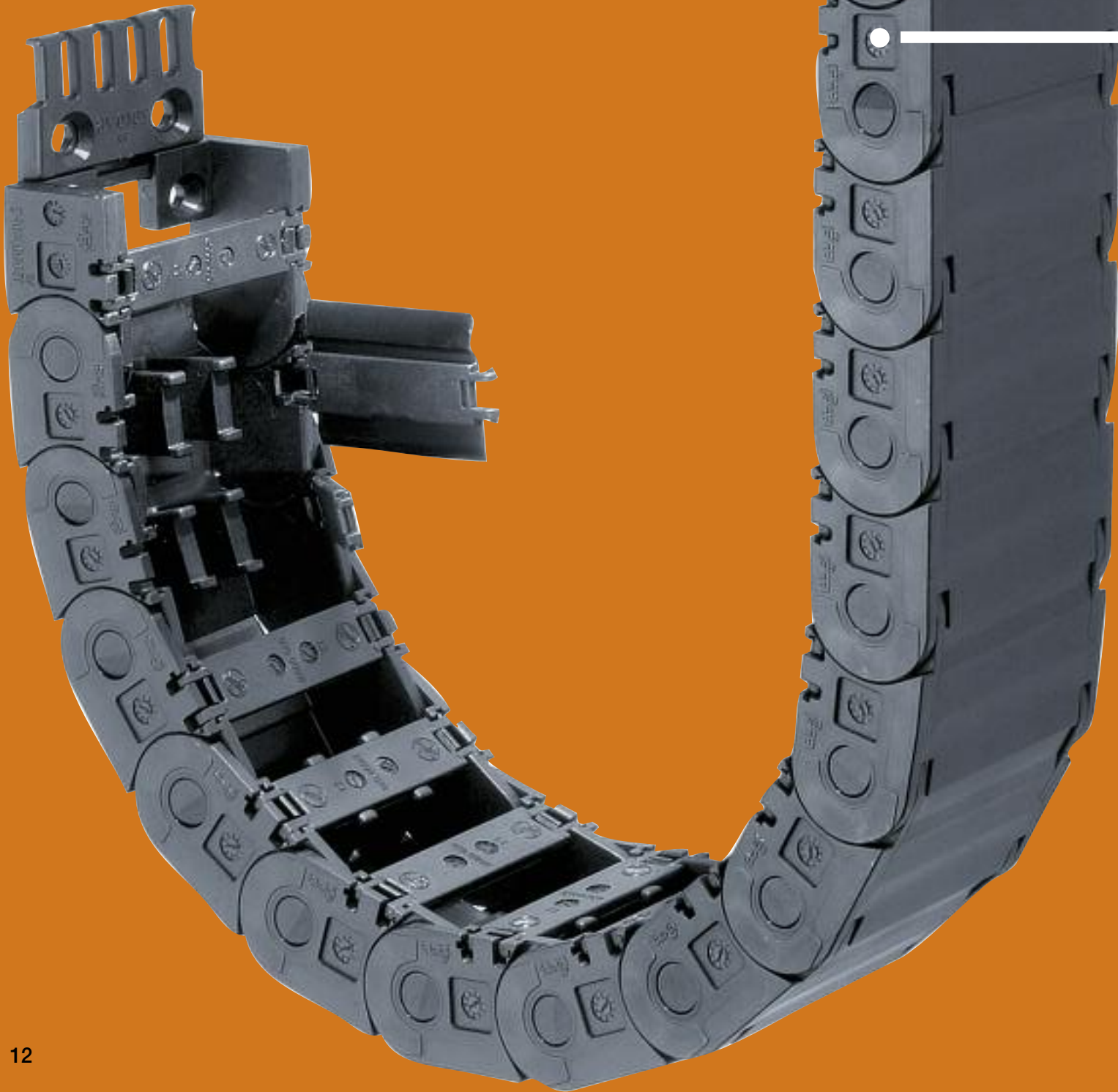


For separation release side link, twist and pull out

E2 - Energy Chains® with 2 part link design for a wide application range

E2: Energy Chains® with a 2-piece link design

The E2 Series is igus® fourth generation in this popular size range. Easy and versatile assembly combined with ruggedness - high stability paired with quieter motion; long cable life parallel with many bracket options. The design is consistent within all E2 variations. It is the trusted program of machine builders around the world.





Harnessed E2 Energy Chain® turnkey delivered with cables and sheet metal parts directly to the machine

- Open crossbar left or right quickly with screwdriver or by hand
- Opening mechanism accessible from above - important in tight spaces
- Lightning-fast closing with the touch of a thumb - Secure fit without additional locking devices
- Secure fit of separators and interior separation even when Energy Chain® is open
- Excellent mechanical stability and long life due to design and material
- Available as Energy Chain® and Energy Tube



ESD/ATEX Energy Chains® with PTB-certification as well as cleanroom materials with IPA-certification available
 ▶ Design, Chapter 1



Special snap-open mechanism, choice of snap-open on left or right. Hinged crossbar can be swiveled by more than 180° on both sides

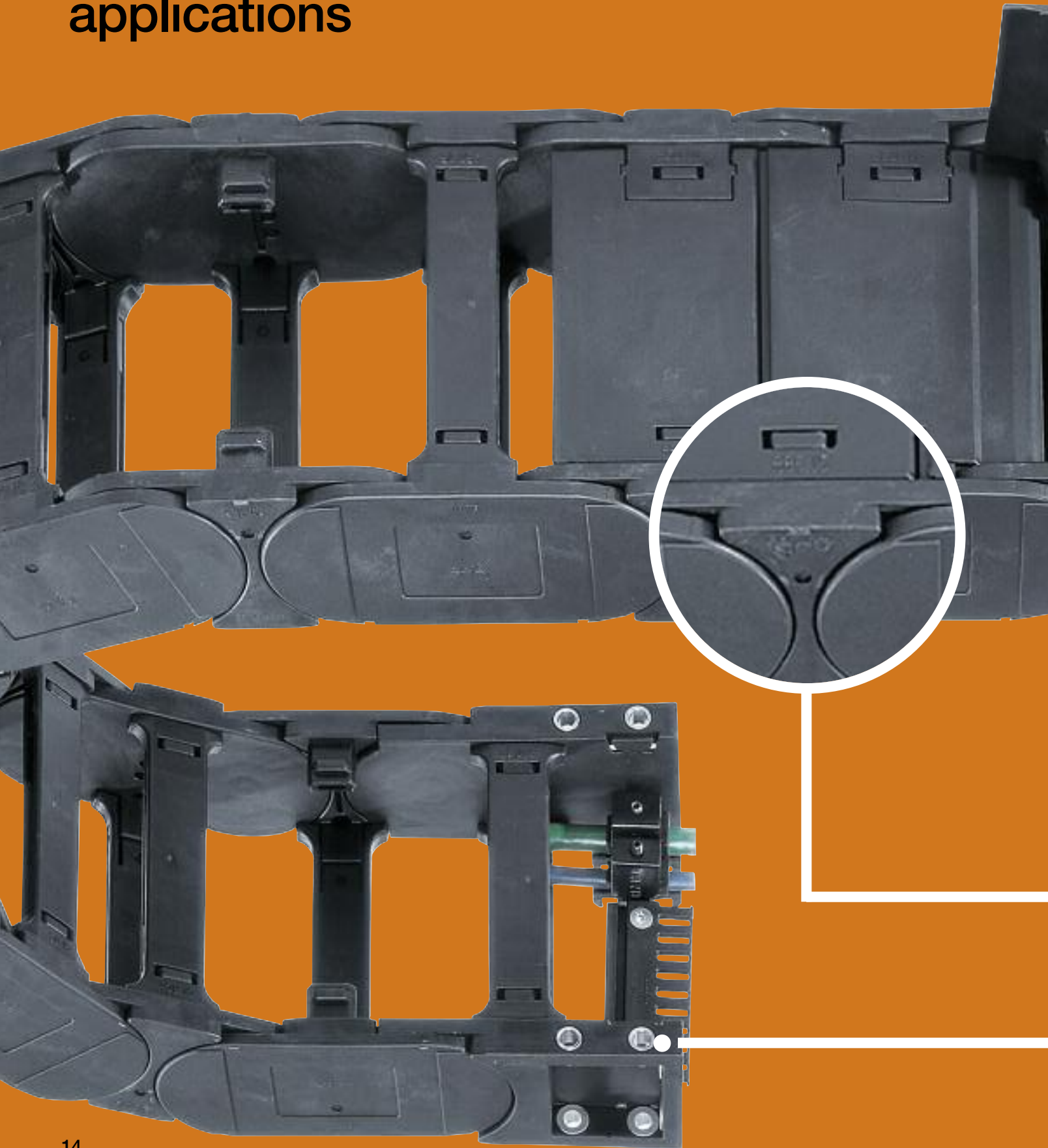


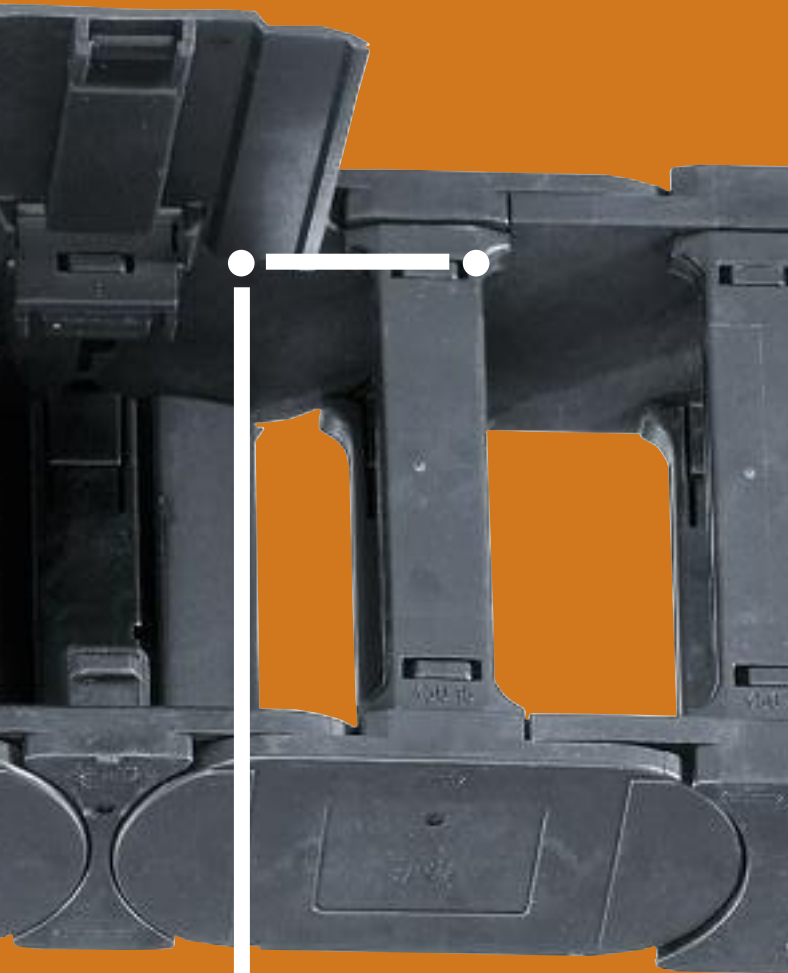
Series 1450 "Half" Energy Tube Version. Fully enclosed in outer radius. Choice of swiveling interior radius to the left or right.



Secure fit of separators and interior separation even when Energy Chain® is open.

**System E4/00 - robust and modular,
to open from both sides for nearly all
applications**



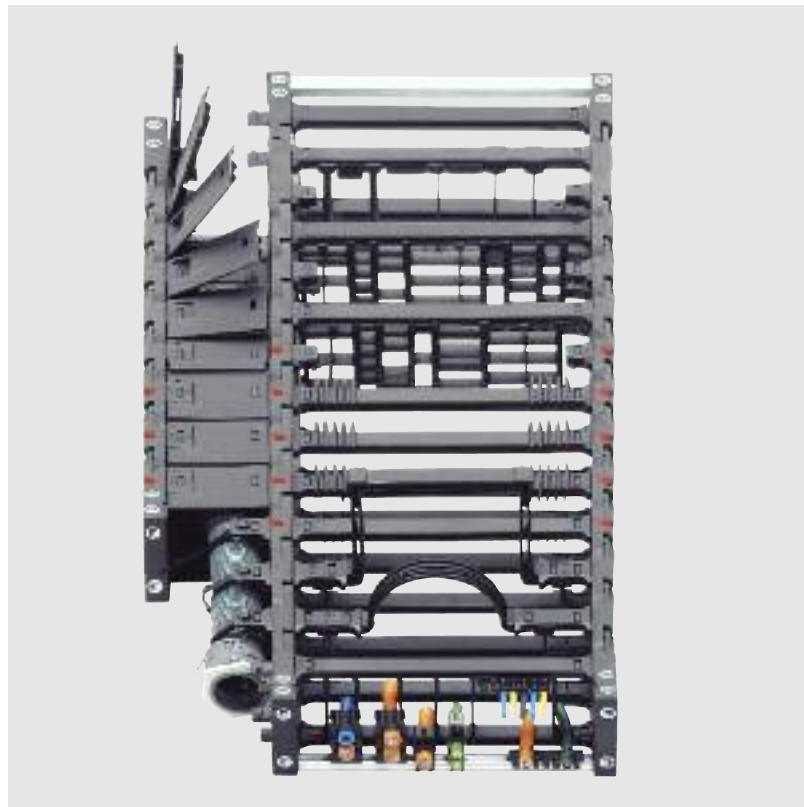


- Crossbars on Energy Chains® are removable along both radii. Wide, rounded plastic crossbars - cable friendly. Secure fit due to double lock

- Double, stable stopdog with "brake" for noise-reduction. Glide-pads and wear-pads for a high lifetime of the Energy Chain®

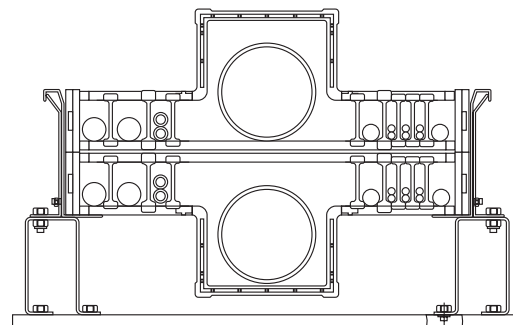
- Many accessories for different kinds of applications. Mounting brackets, strain reliefs, interior separators and more

Modular E4-construction set



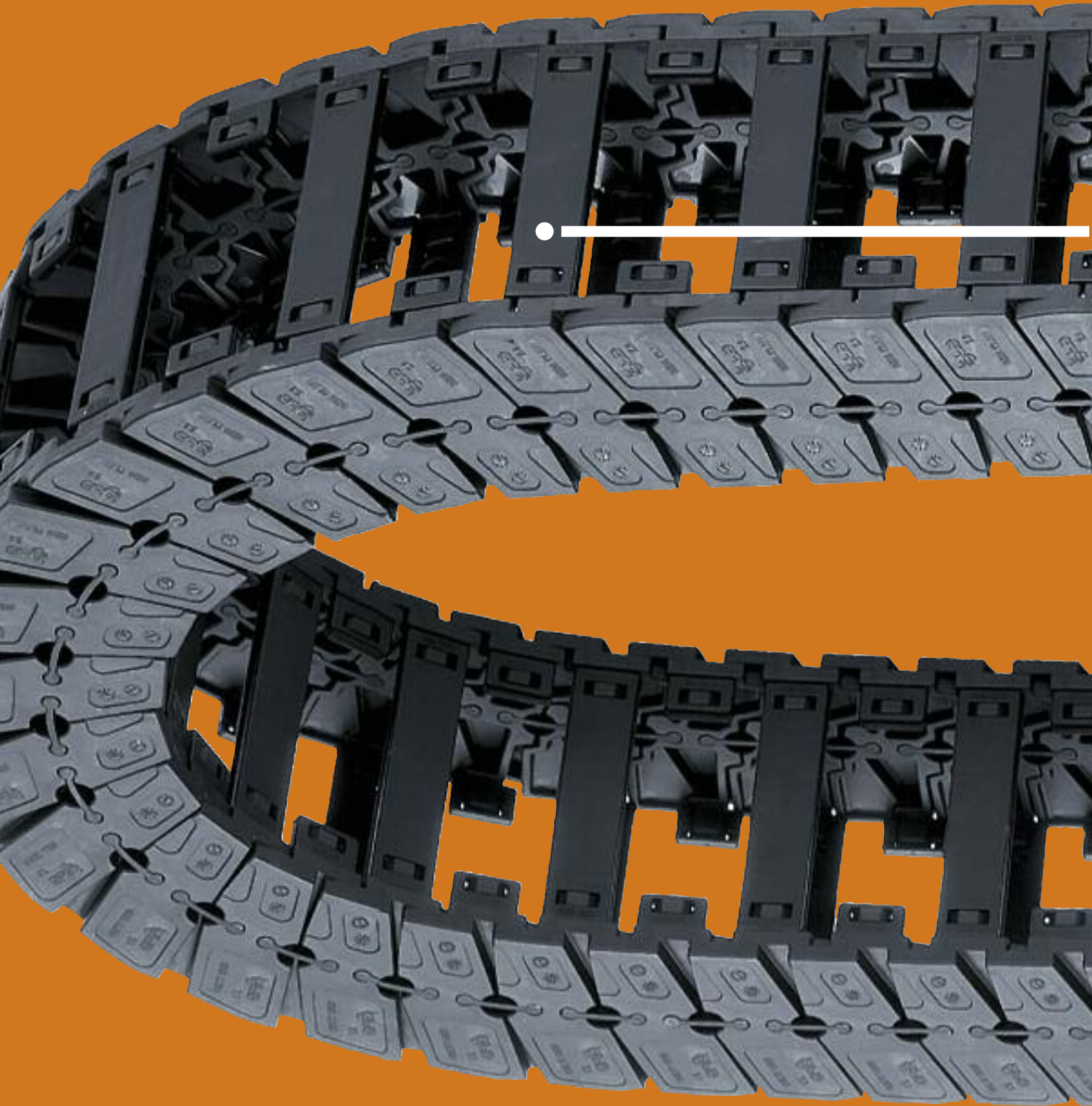
Features that apply to E4 Energy Chains®:

- Openable from both sides - reduces assembly time
- Maximum robustness and life
- Wide smooth interior surface - cable and hose friendly
- Excellent in all environments
- Basic design proven & re-proven for 20 years
- Innovative designs added every year



Long travels with huge hoses possible with special extender crossbars

System E6 – 6-piece Energy Chains[®], extremely low-noise, minimum vibrations



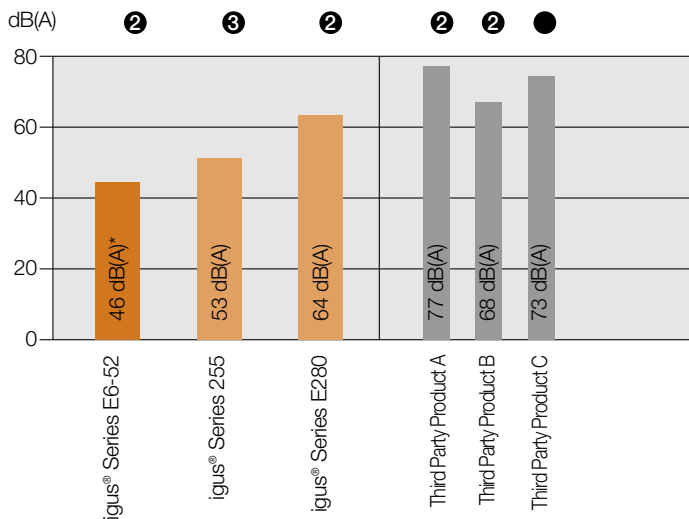


In addition to long life cycles, the E6 series offers numerous advantages. It provides extremely quiet, low-vibration operation, and minimizes the polygon effect which can occur during rolling of energy supply mechanisms. The ultra-low noise levels have been confirmed in a recent report by the Rheinland Technical Inspection Agency. Our extensive delivery program offers the right chain size for each application; a wide range of interior separators and mounting brackets are also available to designers.

A linear drive provides for highly dynamic feed of PCBs. This system is twice as fast as handling units with a toothed-belt drive; designed to withstand high dynamic loads, the Energy Chains® ensure a supply of power, coolant and control data.



Life-cycle test of the E6 connector system; 220,000,000 strokes have been tested successfully so far



Averaging of the corrected sound pressure levels in dB(A), rounded

- unsupported 5.91 ft/s (1.8 m/s)
- unsupported 6.56 ft/s (2.0 m/s)
- unsupported 4.92 ft/s (1.5 m/s)

* Measurement by the TÜV Rheinland 46 dB(A) with 10 dB(A) outer noise
 ** Values permitted in the igus® laboratory according to DIN45635

Matching accessories for your igus® Energy Chain System®



Ranging from reliable strain-relief systems for cables through interior separators for proper division of Energy Chains® to AUTO-GLIDE crossbars for long travels without guide troughs or special igus® guide troughs for extra-long travels. igus® offers the right solution for every application.

The large accessory kit from igus® permits upgrading of your Energy Chain® to a high-tech solution. Matched specially with igus® Energy Chains®, igus® accessories have been tried and tested in practical applications for many years now.





Tiewrap plates for engagement on the C-rail of a KMA mounting bracket. Quicker and more compact assembly
 ▶ Strain Relief, Chapter 10



Triflex® RS universal assembly for secure and standardized mounting of Triflex® R Energy Chain® on robots
 ▶ Triflex®, Chapter 8



Special connecting elements with strain-relief for the Triflex® R Energy Chain® (3D-robot)
 ▶ Triflex®, Chapter 8



Chainfix strain-relief systems. Various strain-relief systems for individual use
 ▶ Strain Relief, Chapter 10



TwisterChain® guide trough systems permit Energy Chain® rotation as far as 520°
 ▶ TwisterChain®, Chapter 8



PMA protective hoses for predominantly static applications in Energy Chains® and for protecting cables
 ▶ PMA, Chapter 11

Super-Aluminum guide trough. The igus® standard Aluminum guide trough in two designs - lightning fast assembly ▶ Trough, Chapter 9

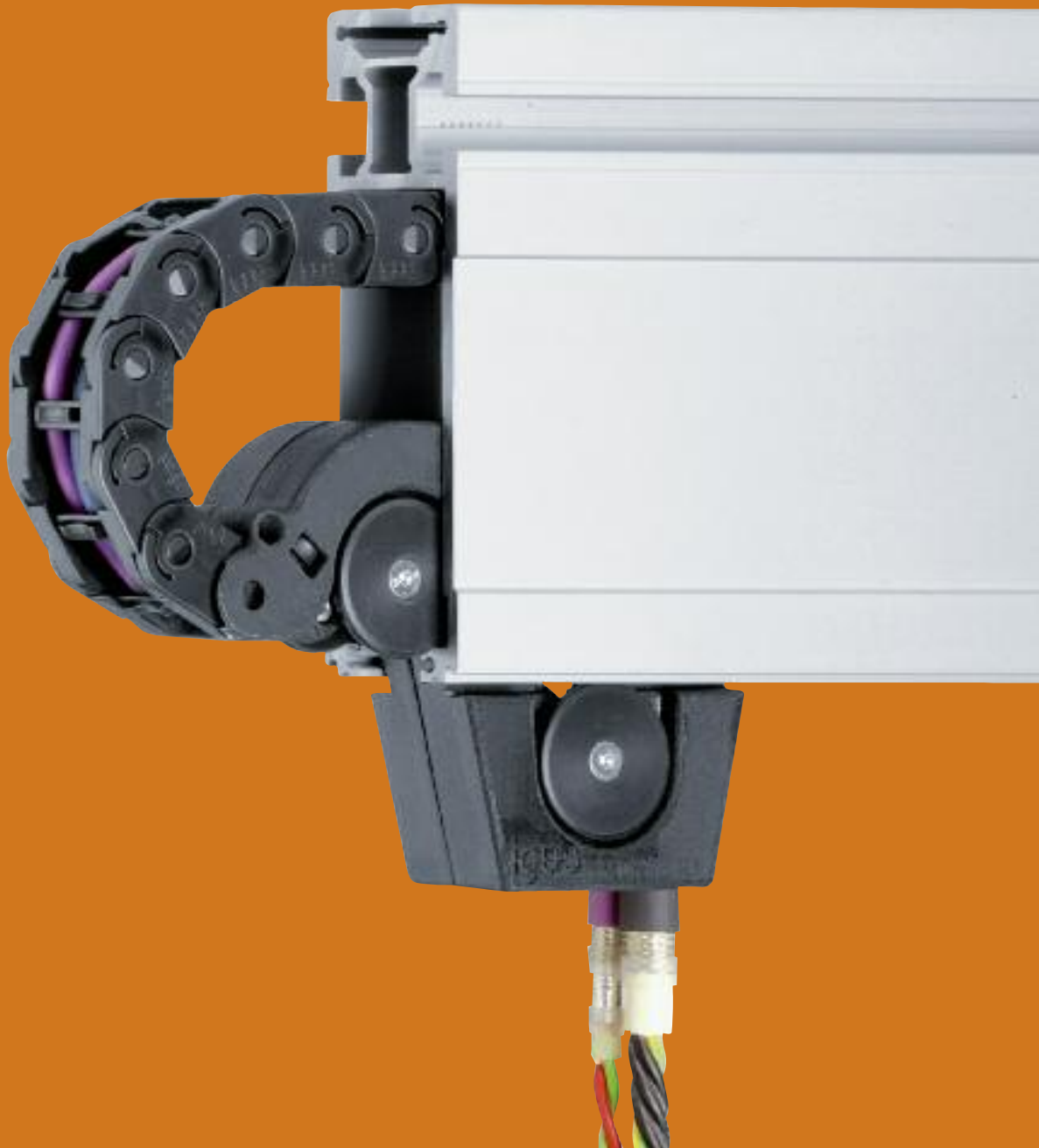
Special solutions: Ready-to-install, reduce guide troughs, electronic monitoring

Micro Flizz® – ready-to-install guide-rail profiles

igus® MicroFlizz® is a sealed, self-contained energy guide system. The component parts of the system comprise: an aluminum guide, igus® Energy Chain®, guide carriage, sealing washers, Chainflex® cables or media hoses. The sealing washers seal the system, protecting against dirt and pollution and thereby lengthening its service life and saving costs.

- Protection for cables and Energy Chain® against debris or hostile climate
- Very quiet

- Suits high speeds
- Application examples: Storage/Retrieval Systems, sliding gates, etc.
- Universal attachment options through 3 T-grooves
- Energy Chain® to tow arm attachment through roller cart, gliding element or locking
- Opposed Energy Chains® possible for double load capacity or 2 independent travels
- Multiple parallel systems possible



AUTO-GLIDE - Long travels without guide troughs

Long travels always place quite exceptional stresses on an Energy Chain System®. For example, the top half needs to be able to glide over the bottom half or on glide bars. In most cases, this is provided for by means of a guide trough. For applications where a guide trough is not desirable, in 1995 igus® developed

the AUTO-GLIDE system.

Possible uses:

- Travels up to 164 ft (50 m)
- Travel speeds up to 4.92 ft/s (1.5 m/s)



A slider and ground guidance every 6.56 - 9.84 (2 - 3 m) replace a complete guide trough, in this case an AUTO-GLIDE solution for the E4/00 system

Remote condition monitoring system for Energy Chain Systems® in large scale applications

Used in down time sensitive applications on cranes, material handling systems, power plants, chemical plants, etc., where safe and reliable function is of the essence and where unplanned down time means outrageous costs. The PPDS online monitoring system, monitors the push/pull forces of the Energy Chain® and improves operational safety through preventative maintenance and fine tuning of the system. Prevents damage to equipment and down time. Push-/pull force data are compared 4 times per second with an individually pre-determined value. If failures occur, instant alert messages are automatically generated, i.e. through e-mail or SMS, and can immediately be analyzed in any remote location. Saved data can be analyzed retro-actively for a period of up to 3 months.



Long travels with electronics...



...Push/Pull-force monitoring with the igus® PPDS System



ReadyChain® - prefabricated Energy Chain Systems®

Eliminate storage costs for cables, Energy Chains® and plugs

Our short and guaranteed delivery periods enable you to dispense entirely with a storage of ultra-flexible cables, Energy Chain® and accessories.

Shorten turnaround times by half

Thanks to sophisticated logistics, igus® is able to supply complete systems within 10 days of order to almost any part of the world.

Flexible response to order fluctuations

With ReadyChains® you remain prepared for all phases of an economic cycle. Fluctuations in your capacity utilization are absorbed by our product logistics.

Reduce the number of subcontractors and related orders by 75%

One order, one invoice, one delivery, one partner. You no longer need to procure countless individual components from a host of subcontractors; we know how to acquire the right parts quickly and economically.



Minimize your machine downtimes

Play safe - the devil is in the detail. External purchases of numerous individual components not only make your systems more susceptible to malfunction but also make trouble-shooting more difficult. ReadyChains® provide you with standardized systems. Every system is tested at our facility prior to delivery. igus® is certified according to ISO 9001.



"Basic" ReadyChain®
Simple, prefabricated Energy Chain Systems® including installed cables without plug connections, labeled and furnished with projections according to your specifications.



"Standard" ReadyChain®
Simple, prefabricated Energy Chain Systems® including installed cables with all plug connections, labeled and furnished with projections according to your specifications.

Chainflex® lasts. Or your money back.

Customers' production processes must remain trouble-free, which includes reliable operation by related energy supply systems, including cables too. igus® was the first company to develop complete Energy Chain Systems®. Chainflex® cables and Energy Chains® are offered together from a single source with a system guarantee depending on the application involved – our "Chain, Cable, Guarantee" Design principles are based on our knowledge of cables and exhaustive testing used to prevent machine downtimes at plants all over the world since 1989.

7 rules for making a good cable

1. Strain-relieving Core

Clear space is created in the center of a cable depending on the number of conductors and cross sections. The center should be filled with a genuine center core (not dummy cores of waste materials) to protect the stranded structure above and prevent the conductors from falling into the center.

2. Conductor Structure

The copper stranding in Chainflex® is chosen in accordance with tested and proven designs. Igus' test results indicate that a medium to fine strand diameter is preferable. Most typical flexing cable designs will employ an extra-fine conductor strand, and have a tendency to kink when subjected to high-duty cycles. As a result of long-term testing, igus® uses a combination of single-wire diameter, pitch length and pitch direction to achieve the best flex life performance in even the most demanding applications.

3. Core Insulation

Insulation materials must be adhesion-resistant to one another within the cable. The insulation must also support the stranded individual wires of the conductor. Only the highest-quality, high-pressure-extruded PVC or TPE materials should be used.





4. Cable Core

Individual conductors are bundled in groups. These bundles are cabled together in a single layer around the core. This design enables the pulling and compressing forces of the bending motion to balance and cancels torsional forces. Special attention is given to pitch length and pitch direction. Cables that are not bundled are not suitable for long-travel applications.

5. Inner Jacket

A gusset-filling extruded inner jacket should be used instead of inexpensive fleece wrap or filler to ensure that the structure is efficiently guided in longitudinal direction. The inner jacket will also maintain the integrity of the cable core and provide a continuous base for the shield.

6. Shield Design

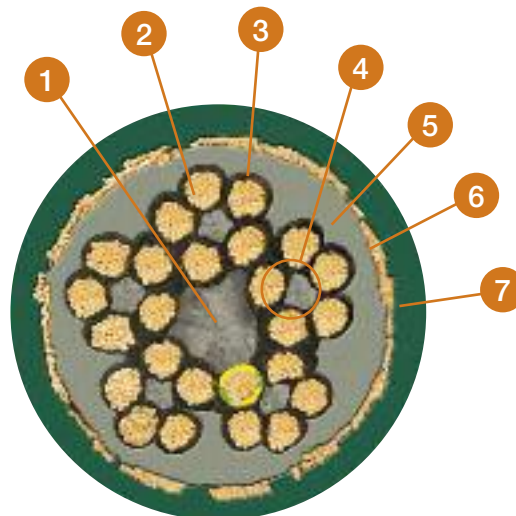
A high-quality braided shield protects cables from external interference and shields any interference before it is transmitted to the outside environment. An optimized braid angle prevents the shield strands from breaking over the linear axis and increases torsional stability. The shield has an optical coverage of approximately 90%, providing maximum shield effectiveness.

7. Outer Jacket

The outer jacket material must be UV-resistant, abrasion-resistant and resistant to oils and chemicals, as well as cost-effective. However, it must not adhere to anything and be flexible while providing support. It should also be extruded under pressure (gusset-filled).



Conventional
"chain suitable" cable



igus® Chainflex® – special cable

Solutions with igus®

Energy Chain Systems®

igus® Energy Chain Systems® guide and protect moving cables and hoses on automated equipment. They can be used in a wide variety of applications. Please see the next page for examples.

Malaysian ship unloading crane

One of the longest igus® travels with 1,448 ft (441.3m) for two ship unloaders in Malaysia with igus® Series 5050R. The integrated rollers reduce shearing and tractive loads by more than 75%.





Unsupported, side-mounted application with Series E4/4 - higher stability due to "undercut-principle"



Automatic PC board component insertion unit with igus® Zipper Series 15. Accelerations up to 328 ft/s² (100 m/s²)



Drive simulator. High fill weights 40.3 lbs/ft (60 kg/m) with E4 System



Multi-axis Easy Triflex® on a production line



ReadyChain® under water. Treasure Island, Las Vegas. System E4 and Chainflex® CF9



Energy supply for live transmission at the Olympic Games at -40°F (-40°C), Series 200



ReadyChain® with combined motions on tooling machines. Turnkey delivered with special parts for your machines



Hanging application with Series 2400 on a storage/retrieval system

Solutions with igus[®] Energy Chain Systems[®]



Crash test unit: 72 ft/s (22 m/s) and 2,572 ft/s² (784 m/s²) acceleration for (36 m) travel



Circular movement with series E4/4 - safe energy supply on cranes



The Rol E-Chain[®] Energy Chains[®] require 75 % less drive power (gliding operation)



Complex movements with Triflex[®] R, combined movements



Extension links for E2 and E4 for large conduits up to Ø 9.84" (250 mm)



Cleanroom and Triflex[®] R with special color white



Zig-Zag movements, 36m height with E4/4 ReadyChains[®]



igus[®] System E6 - High acceleration (8g) and ESD safety



Robots with Triflex® Energy Chains®
Assembly line, Ford Cologne

Quality from the igus® laboratory: Tested thousands of times, proven millions of times

igus® test laboratory

When it comes to energy chains, cables, polymer slide bearings and linear systems, applications involving high cycle counts, speeds and accelerations or demanding environmental conditions require proven systems providing durable and reliable operation. igus® regularly conducts tests at its own laboratory under realistic conditions. Every year, we conduct more than 2,000 tests on Energy Chains® and cables, and over 5,000 tests on plain bearings. These tests focus on

push/pull forces, friction values, wear rates, drive forces and abrasion under all possible conditions at diverse speeds. Influential factors like soiling, weathering, cold and impact are examined. Tests are also performed on electric cables, hydraulic and pneumatic hoses of all kinds. Our laboratory is at your disposal. Should we happen to lack a ready solution for your special problems, we will gladly conduct tests according to your requirements.

ESD-test position into the production



igus® system warranty
 Every application is different. igus®
 warranty certificates will be issued
 for your application individually.
 Ask for igus warranty:
 "chain, cable, warranty"



igus® laboratories in Cologne



Travels of up to 394 ft (120 m)



Cables are also tested for torsion properties



Electronic check and archiving
 for every chain production



Push Pull forces speed up to 32.8
 ft/s (10 m/s), acceleration up to 656
 ft/s² (200 m/s²) are tested by igus®



Noise level test inside
 an acoustic cabin

All products are tested and available from a single source.
 Examples of test certificates and quality seals for igus® products:



...more instances are
 available on request

igus® Online & CD



3D Files - Now Online

- Download of 3D files off the Internet - free!
- More than 20 CAD formats and almost all part drawings available
- Time savings for the designer
- Design your own - new expert system 2.1
- Expert systems for iglide®, igubal® and DryLin®

Fully Searchable CD-Rom for Cable Carrier, Continuous-flex cables and Plastic Bearings



First-ever, fully searchable CD-Rom provides complete product and design information about Energy Chain Systems®, iglide® bearings and DryLin® linear guide systems. At the click of a button, more than one-thousand pages of technical specifications, product numbers, dimensions and application tips on 28,000 products are fully searchable by keyword or product number. Customers can use the self-contained CD (no files are written to or installed on the host machine) to easily reorder parts, choose new parts or to learn how and what plastic machinery components can benefit their application. Products range from plastic-based Energy Chains® and Energy Tubes to guide and protect automated cables and hoses, to Chainflex® continuous-flex cables, to iglide bearings, which are self-lubricating and maintenance-free.

The information in this catalog and the data in the "Design" section in particular, is based on our current knowledge of the products described. No legally binding assurance in respect of characteristics or suitability for a specific intended application can be derived from it. igus® is unable to assume liability of any nature for suitability of the products for a specific intended application in a practically-oriented test. Please consult igus®. For reasons relating to ongoing technical developments, we reserve the right to implement technical modifications and improvement of the products at any time.



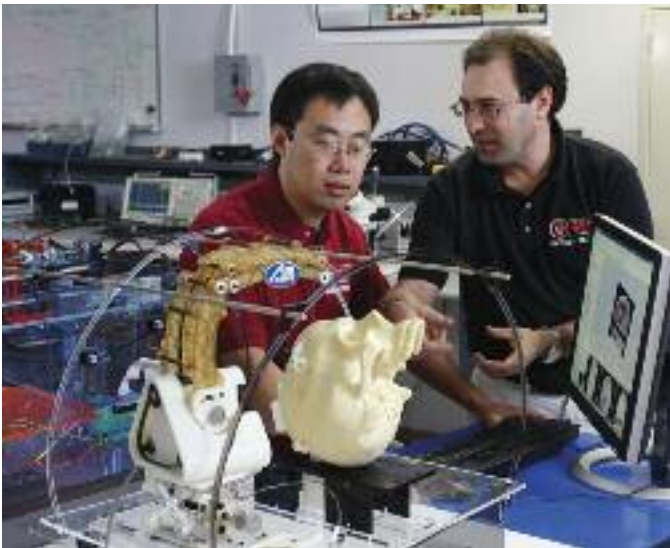
The Y.E.S. Program is designed to foster the mechanical design ideas of students and to educate them on the merits and benefits of plastic components. Through Y.E.S., igus® donates its products to students, competitions and engineering programs from across the United States, Canada and Mexico.

Through the Y.E.S. Program, igus®:

- ✓ offers free product donations to students, engineers and professors for use in various design competitions, school projects and engineering curriculums;
- ✓ supports the visions of various robotics competitions by donating products, technical support and other resources;
- ✓ revitalizes students' interest in engineering; and
- ✓ helps make the design ideas of students and engineers a reality.

Y.E.S. Facts

- ✓ The Y.E.S. Program is open to students of all ages and grade levels, as well as teams and engineers competing in robotics competitions.
- ✓ The Y.E.S. Program sponsors competitions such as *FIRST*® Robotics, BEST™ Robotics, the SAE Collegiate Design Series, Botball and Rube Goldberg.
- ✓ The Y.E.S. Program offers lecture engagements presented by bearings and cable carrier experts at schools and universities.



Hao Su, PhD candidate, and Professor Gregory Fischer from the Worcester Polytechnic Institute used iglide® plastic bushings and a DryLin® linear guide system for their MRI-guided needle placement robot, which will improve the way prostate cancer is detected and treated.



Students competing in the RASC-AL Exploration Robo-Ops competition, which took place at NASA's Rock Yard at the Johnson Space Center, used iglide® PRT slewing ring bearings in the turret of the robot's arm.

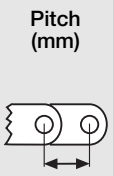
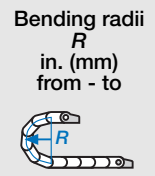
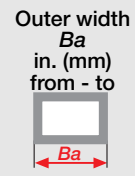
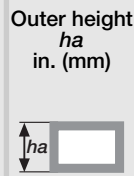
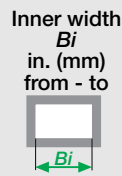
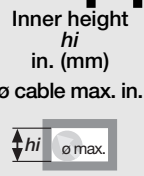
Interested in becoming part of the Y.E.S. Program?
Contact Courtney Toomey at ctoomey@igus.com

E-Z Chain® and Zipper Chain

Legend

- Standard
- Suitable to only a limited extent
- ▲ Optional
- Especially suitable
- * In preparation / on request

Series



E-Z Chain® - easy to fit - simply press cables in by hand!

E-Z Chain®, split crossbar along the **outer** radius



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
E03	.20 (5)	ø.12	.20-.39 (5-10)	.31 (8)	.34-.54 (8.7-13.7)	.39 (10)
E04	.28 (7)	ø.18	.28 (7)	.39 (10)	.51 (13)	.66 (16.7)
E045	.37 (9.4)	ø.22	.63 (16)	.49 (12.5)	.91 (23)	.51 (13)
E06	.42 (10.7)	ø.26	.39-.63 (10-16)	.59 (15)	.65-.86 (16.5-22.5)	.79 (20)
E08	.57 (14.5)	ø.39	.39-1.97 (10-50)	.76 (19.3)	.72-2.29 (18.2-58.2)	.79 (20)
E14	.96 (24.3)	ø.51	.59-1.57 (15-50)	.98 (25)	1.06-2.44 (27-62)	1.20 (30.5)
E200	.96 (24.3)	ø.79	2.24 (57)	1.38 (35)	2.93 (74.4)	1.81 (46)
E200-2	1.26 (32)	ø.71	1.46-1.97 (37-50)	1.38 (35)	3.72-4.74 (94.4-120.4)	1.81 (46)
E16	1.44 (36.5)	ø.98	.91-3.94 (23-100)	1.54 (39)	1.48-4.54 (37.5-115.3)	1.20 (30.5)
E26	1.44 (36.5)	ø1.10	2.95 (75)	1.97 (50)	3.62 (92)	2.20 (56)
E26-2	1.46 (37.1)	ø.79	1.89 (48)	1.97 (50)	4.6 (117)	2.20 (56)
E26-3	1.46 (37.1)	ø.79	1.85 (47)	1.97 (50)	6.57 (167)	2.20 (56)
E300	1.91 (48.5)	ø1.38	2.95 (75)	2.52 (64)	3.74 (95)	2.64 (67)
E300-2	1.91 (48.5)	ø.71	1.89 (48)	2.52 (64)	4.72 (120)	2.64 (67)
E300-3	1.91 (48.5)	ø.71	1.81 (46)	2.52 (64)	6.69 (170)	2.64 (67)

E-Z Chain®, split crossbar along the **inner** radius



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
Z045	.37 (9.4)	ø.22	.63 (16)	.49 (12.5)	.91 (23)	.51 (13)
Z06	.41 (10.5)	ø.26	.39-.63 (10-16)	.59 (15)	.65-.86 (16.5-22.5)	.79 (20)
Z08	.58 (14.7)	ø.39	.39-1.97 (10-50)	.76 (19.3)	.72-2.29 (18.2-58.2)	.79 (20)
Z14	.75 (19)	ø.51	.59-1.97 (15-50)	.98 (25)	1.06-2.44 (27-62)	1.20 (30.5)
Z200	.96 (24.3)	ø.79	2.24 (57)	1.38 (35)	2.93 (74.4)	1.81 (46)
Z200-2	.96 (24.3)	ø.71	1.46-1.97 (37-50)	1.38 (35)	3.72-4.74 (94.4-120.4)	1.81 (46)
Z16	1.26 (32)	ø.98	.91-3.94 (23-100)	1.54 (39)	1.48-4.54 (37.5-115.3)	1.20 (30.5)
Z26	1.44 (36.5)	ø1.10	2.95 (75)	1.97 (50)	3.62 (92)	2.20 (56)
Z26-2	1.46 (37.1)	ø.79	1.89 (48)	1.97 (50)	4.6 (117)	2.20 (56)
Z26-3	1.46 (37.1)	ø.79	1.85 (47)	1.97 (50)	6.57 (167)	2.20 (56)
Z300	1.91 (48.5)	ø1.38	2.95 (75)	2.52 (64)	3.74 (95)	2.64 (67)
Z300-2	1.91 (48.5)	ø.71	1.89 (48)	2.52 (64)	4.72 (120)	2.64 (67)
Z300-3	1.91 (48.5)	ø.71	1.81 (46)	2.52 (64)	6.69 (170)	2.64 (67)

Zipper E-Chain® and E-Tubes - lightning-fast opening and closing




Zipper, zip-open along the **outer** radius



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
047	.35 (9)	ø.28	.39-.63 (10-16)	.49 (12.5)	.63-.87 (16-22)	.51 (13)
07	.41 (10.3)	ø.31	.24-2.52 (6-64)	.59 (15)	.49-2.80 (12.5-71)	.79 (20)
09	.59 (15)	ø.51	.39-1.97 (10-50)	.76 (19.3)	.72-2.29 (18.2-58.2)	.79 (20)
15	.67 (17)	ø.59	.59-3.94 (15-100)	.94 (24)	1.02-4.45 (26-113)	1.20 (30.5)
17	1.26 (32)	ø1.10	.59-3.94 (15-100)	1.54 (39)	1.02-4.45 (26-113)	1.20 (30.5)

Quick Selection



	Unsupported fill weight max lbs/ft (kg/m)	Unsupported length max ft. (m)	Long travel max ft. (m)	Opening principle	Interior separation possibilities...			ESD/ATEX	Cleanroom	UL-V2	Low noise	Price index	Page	
					Separators	Full-width shelves	Shelves							
	.154 (0.23)	1.31 (0.40)	-	 To fill from outer radius	-	-	-	▲	■	●	■	●●●●	2.7	
	.188 (0.28)	1.80 (0.55)	-		-	-	-	▲	■	●	●	■	●●●●	2.11
	.168 (0.25)	1.31 (0.40)	-		-	-	-	▲	■	●	■	■	●●●●	2.15
	.302 (0.45)	1.80 (0.55)	-		-	-	-	▲	■	●	●	■	●●●●	2.21
	.504 (0.75)	3.28 (1.00)	-		-	-	-	▲	■	●	●	■	●●●●	2.25
	.336 (0.5)	2.13 (0.65)	-		-	-	-	▲	■	●	●	■	●●●●	2.29
	1.34 (2.0)	5.74 (1.75)	-		-	-	-	▲	■	●	●	■	●●●●	2.33
	1.34 (2.0)	5.74 (1.75)	-		●	-	-	▲	■	●	●	■	●●●●	2.33
	.504 (0.75)	3.28 (1.00)	-		-	-	-	▲	■	●	●	■	●●●●	2.39
	2.69 (4.0)	7.87 (2.00)	-		-	-	-	▲	■	●	●	■	●●●●	2.43
	2.69 (4.0)	7.87 (2.00)	-		●	-	-	▲	■	●	●	■	●●●●	2.43
	2.69 (4.0)	7.87 (2.00)	-		●	-	-	▲	■	●	●	■	●●●●	2.43
	5.38 (8.0)	7.38 (2.25)	-		-	-	-	▲	■	●	●	■	●●●●	2.49
	5.38 (8.0)	7.38 (2.25)	-		●	-	-	▲	■	●	●	■	●●●●	2.49
	5.38 (8.0)	7.38 (2.25)	-	●	-	●	▲	■	●	●	■	●●●●	2.49	
	.168 (0.25)	1.31 (0.40)	-	 To fill from inner radius	-	-	-	▲	■	●	■	●●●●	2.15	
	.302 (0.45)	1.80 (0.55)	-		-	-	-	▲	■	●	●	■	●●●●	2.21
	.504 (0.75)	3.28 (1.00)	-		-	-	-	▲	■	●	●	■	●●●●	2.25
	.336 (0.5)	2.13 (0.65)	-		-	-	-	▲	■	●	●	■	●●●●	2.29
	1.34 (2.0)	5.74 (1.75)	-		-	-	-	▲	■	●	●	■	●●●●	2.33
	1.34 (2.0)	5.74 (1.75)	-		●	-	-	▲	■	●	●	■	●●●●	2.33
	.504 (0.75)	3.28 (1.00)	-		-	-	-	▲	■	●	●	■	●●●●	2.39
	2.69 (4.0)	7.87 (2.00)	-		-	-	-	▲	■	●	●	■	●●●●	2.43
	2.69 (4.0)	7.87 (2.00)	-		●	-	-	▲	■	●	●	■	●●●●	2.43
	2.69 (4.0)	7.87 (2.00)	-		●	-	-	▲	■	●	●	■	●●●●	2.43
	5.38 (8.0)	7.38 (2.25)	-		-	-	-	▲	■	●	●	■	●●●●	2.49
	5.38 (8.0)	7.38 (2.25)	-		●	-	-	▲	■	●	●	■	●●●●	2.49
	5.38 (8.0)	7.38 (2.25)	-		●	-	●	▲	■	●	●	■	●●●●	2.49
	.168 (0.25)	1.31 (0.40)	-		 Zip-open	-	-	-	▲	●	▲	■	●●●●	3.7
	.27 (0.4)	1.80 (0.55)	-	-		-	-	▲	●	▲	■	●●●●	3.11	
	.504 (0.75)	3.28 (1.00)	-	-		-	-	▲	●	▲	■	●●●●	3.15	
	1.01 (1.5)	3.94 (1.20)	-	●		●	-	▲	■	▲	■	●●●●	3.19	
	.67 (1.0)	3.28 (1.00)	-	●		●	-	▲	●	▲	■	●●●●	3.25	

E2 micro, mini and E2/000

Legend

- Standard
- Suitable to only a limited extent
- ▲ Optional
- Especially suitable
- * In preparation / on request

Series

Inner height
hi
in. (mm)
ø cable max. in.



Inner width
Bi
in. (mm)
from - to



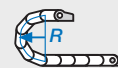
Outer height
ha
in. (mm)



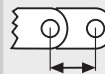
Outer width
Ba
in. (mm)
from - to



Bending radii
R
in. (mm)
from - to



Pitch
(mm)



E2 micro - one-piece Energy Chains® - small sizes

E2 micro, non snap-open



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
03	.20 (5) ø .14	.20-.39 (5 - 10)	.31 (8)	.34-.54 (8.7-13.7)	.39-1.10 (10-28)	.39 (10)
04	.28 (7) ø .20	.28-1.18 (7 -30)	.39 (10)	.47-1.38 (12-35)	.59-1.89 (15-48)	.66 (16.7)
045	.41 (10.3) ø .31	.24-2.52 (6-64)	.49 (12.5)	.47-2.76 (12-70)	.71-1.50 (18-38)	.51 (13)
05	.39 (10) ø .31	.24-2.52 (6-64)	.47 (12)	.39-2.68 (10-68)	.71-1.50 (18-38)	.79 (20)
06	.41 (10.5) ø .31	.24-2.52 (6-64)	.59 (15)	.49-2.80 (12.5-71)	.71-1.50 (18-38)	.79 (20)
08	.59 (15) ø .47	.39-1.97 (10-50)	.76 (19.3)	.72-2.29 (18.2-58.2)	1.10-1.89 (28-48)	.79 (20)

E2 mini - one/two-piece Energy Chains® - small and medium sizes

E2 mini, non snap-open



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
10	.71 (18) ø .63	.59-3.94 (15-100)	.91 (23)	1.02-4.45 (26-113)	1.10-7.09 (28-180)	1.20 (30.5)

E2 mini, snap-open along inner radius



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
B15i	.67 (17) ø .55	.59-3.94 (15-100)	.91 (23)	1.02-4.45 (26-113)	1.50-7.09 (38-180)	1.20 (30.5)

E2 mini, snap-open along outer radius



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
B15	.67 (17) ø .55	.59-3.94 (15-100)	.91 (23)	1.02-4.45 (26-113)	1.50-7.09 (38-180)	1.20 (30.5)
B17	1.26 (32) ø 1.10	.59-3.94 (15-100)	1.54 (39)	1.00-1.40 (25.5-113)	1.89-4.92 (48-125)	1.20 (30.5)

E2 medium Energy Chain® - two-piece Energy Chains®

E2 medium, closed design



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
200	.98 (25) ø .91	.98-4.92 (25-125)	1.38 (35)	1.61-5.55 (41-141)	2.16-9.84 (55-250)	1.81 (46)
26	1.38 (35) ø 1.26	1.97-7.87 (50-200)	1.97 (50)	2.60-8.62 (66-219)	2.48-9.84 (63-250)	2.20 (56)

E2 medium, snap-open along inner radius



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
1400	.83 (21) ø .71	.59-4.92 (15-125)	1.10 (28)	1.12-5.45 (28.5-138.5)	1.38-7.09 (35-180)	1.31 (33.3)
1450	.83 (21) ø .71	.59-4.92 (15-125)	1.10 (28)	1.12-5.45 (28.5-138.5)	2.95-7.09 (75-180)	1.31 (33.3)
240	.98 (25) ø .91	.98-4.92 (25-125)	1.38 (35)	1.61-5.55 (41-141)	2.16-9.84 (55-250)	1.81 (46)
27i	1.38 (35) ø 1.26	1.97-7.87 (50-200)	1.97 (50)	2.60-8.62 (66-219)	2.48-9.84 (63-250)	2.20 (56)
340	1.77 (45) ø 1.65	1.97-9.84 (50-250)	2.52 (64)	2.76-10.63 (70-270)	2.95-11.81 (75-300)	2.64 (67)








E2 medium, snap-open along outer radius



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
1500	.83 (21) ø .71	.59-4.92 (15-125)	1.10 (28)	1.12-5.45 (28.5-138.5)	1.38-7.09 (35-180)	1.31 (33.3)
250	.98 (25) ø .91	.98-4.92 (25-125)	1.38 (35)	1.61-5.55 (41-141)	2.16-9.84 (55-250)	1.81 (46)
27	1.38 (35) ø 1.26	1.97-7.87 (50-200)	1.97 (50)	2.60-8.62 (66-219)	2.48-9.84 (63-250)	2.20 (56)
350	1.77 (45) ø 1.65	1.97-9.84 (50-250)	2.52 (64)	2.76-10.63 (70-270)	2.95-11.81 (75-300)	2.64 (67)

Quick Selection



	Unsupported fill weight max lbs/ft (kg/m)	Unsupported length max ft. (m)	Long travel max ft. (m)	Opening principle	Interior separation possibilities...			ESD/ATEX	Cleanroom	UL-V2	Low noise	Price index	Page
					Separators	Full-width shelves	Shelves						
	.16 (0.24)	1.31 (0.40)	-	 Closed	-	-	-	▲	○	▲	■	●●●	4.7
	.25 (0.375)	1.64 (0.50)	-		-	-	-	▲	○	▲	●	●●●	4.11
	.17 (0.25)	1.64 (0.50)	-		-	-	-	▲	○	▲	■	●●●	4.15
	.25 (0.375)	1.64 (0.50)	-		-	-	-	▲	○	▲	●	●●●	4.19
	.32 (0.48)	1.97 (0.60)	-		-	-	-	▲	○	▲	●	●●●	4.23
	.50 (0.74)	3.28 (1.00)	-		-	-	-	▲	○	▲	●	●●●	4.27
	1.01 (1.5)	4.26 (1.30)	-	 Closed	●	-	-	▲	●	▲	●	●●●	4.37
	1.01 (1.5)	4.26 (1.30)	-	 Snap-open along inner radius	●	●	-	▲	●	▲	●	●●●	4.43
	1.01 (1.5)	4.26 (1.30)	-	 Snap-open along outer radius	●	●	-	▲	●	▲	●	●●●	4.43
	.67 (1)	3.28 (1.00)	-		●	●	-	▲	○	▲	●	●●●	4.49
	2.69 (4.0)	6.56 (2.00)	328 (100)	 Closed	●	●	●	-	-	-	-	●●●	4.69
	5.38 (8.0)	7.22 (2.20)	394 (120)		●	●	●	-	-	-	-	●●●	4.79
	1.68 (2.5)	6.56 (2.00)	246 (75)	 Snap-open along inner radius	●	●	-	▲	○	-	●	●●●	4.61
	1.68 (2.5)	6.56 (2.00)	246 (75)		●	●	-	▲	○	-	●	●●●	4.61
	2.69 (4.0)	6.56 (2.00)	328 (100)		●	●	●	-	-	-	-	●●●	4.69
	5.38 (8.0)	7.22 (2.20)	394 (120)		●	●	●	-	-	-	-	●●●	4.79
	6.72 (10.0)	8.20 (2.50)	492 (150)		●	●	●	-	-	-	-	●●●	4.89
	1.68 (2.5)	6.56 (2.00)	246 (75)	 Snap-open along outer radius	●	●	-	▲	○	-	●	●●●	4.61
	2.69 (4.0)	6.56 (2.00)	328 (100)		●	●	●	-	-	-	-	●●●	4.69
	5.38 (8.0)	7.22 (2.20)	394 (120)		●	●	●	-	-	-	-	●●●	4.79
	6.72 (10)	8.20 (2.50)	492 (150)		●	●	●	-	-	-	-	●●●	4.89

E2 Tubes

Legend

- Standard
- Suitable to only a limited extent
- ▲ Optional
- Especially suitable
- * In preparation / on request

Series

Inner height
hi
in. (mm)
ø cable max. in.



Inner width
Bi
in. (mm)
from - to



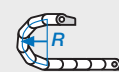
Outer height
ha
in. (mm)



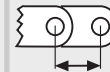
Outer width
Ba
in. (mm)
from - to



Bending radii
R
in. (mm)
from - to



Pitch
(mm)



E2 R - two-piece Energy Tubes - small pitch

Zipper Energy Tube. zip-open along the **outer** radius



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
R07	.41 (10.3) ø.31	.39-1.97 (10-50)	.59 (15)	.65-2.24 (16.5-57)	1.50-1.89 (38-48)	.79 (20)
R09	.59 (15) ø.49	.39-1.97 (10-50)	.76 (19.3)	.72-2.29 (18.2-58.2)	1.89-3.94 (48-100)	.79 (20)

E2 R - two-piece Energy Tubes - small pitch

E2 Energy Tubes, snap-open along outer radius



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
R48	.98 (25) ø .87	.98-5.12 (25-130)	1.42 (36)	1.42-5.55 (36-141)	2.36-9.84 (60-250)	1.19 (30.3)
R58	1.38 (35) ø 1.26	1.97-7.87 (50-200)	1.97 (50)	2.60-8.50 (66-216)	2.95-9.84 (75-250)	1.31 (33.3)
R68	1.77 (45) ø 1.65	1.97-9.84 (50-250)	2.52 (64)	2.68-10.55 (68-268)	3.94-11.81 (100-300)	1.42 (36)

E2 R100 - two-piece Energy Tube - hinged lids

E2 Energy Tubes, hinged, snap-open along the inner radius



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
R117	.83 (21) ø .67	.79-3.94 (20-100)	1.10 (28)	1.26-4.41 (32-112)	2.48-7.09 (63-180)	1.20 (30.5)
R157	1.57 (40) ø 1.46	1.57-7.87 (40-200)	1.97 (50)	2.20-8.50 (56-216)	3.94-9.84 (100-250)	1.81 (46)
R167	1.97 (50) ø 1.81	1.97-9.84 (50-250)	2.52 (64)	2.67-10.55 (68-268)	3.94-11.81 (100-300)	2.31 (58.8)
R1480	.83 (21) ø .71	1.50-1.97 (38-50)	1.10 (28)	2.03-2.50 (51.5-63.5)	2.95-7.09 (75-180)	1.31 (33.3)
R2480	.98 (25) ø .91	1.50-4.06 (38-103)	1.38 (35)	2.13-4.69 (54-119)	3.94-9.84 (100-250)	1.81 (46)
R2680	1.38 (35) ø 1.25	1.97-3.94 (50-100)	1.97 (50)	2.60-4.57 (66-116)	3.94-9.84 (100-250)	2.20 (56)
R3480	1.77 (45) ø 1.65	2.95-6.89 (75-175)	2.52 (64)	3.74-7.68 (95-195)	4.92-11.81 (125-300)	2.64 (67)

E2 Energy Tubes, hinged, snap-open along the outer radius



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
R118	.83 (21) ø .67	.79-3.94 (20-100)	1.10 (28)	1.26-4.41 (32-112)	2.48-7.09 (63-180)	1.20 (30.5)
R158	1.57 (40) ø 1.46	1.57-7.87 (40-200)	1.97 (50)	2.20-8.50 (56-216)	3.94-9.84 (100-250)	1.81 (46)
R168	1.97 (50) ø 1.81	1.97-9.84 (50-250)	2.52 (64)	2.67-10.55 (68-268)	3.94-11.81 (100-300)	2.31 (58.8)

RX - full chip protection without undercuts, projecting edges or gaps

E2 RX, snap-open along outer radius



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
RX40	2.05 (52) ø 1.89	3.94 (100)	2.76 (70)	4.84 (123)	3.94 (100)	1.57 (40)

E4-1 and E4/4

Legend

- Standard
- Suitable to only a limited extent
- ▲ Optional
- Especially suitable
- * In preparation / on request

Series

Inner height
hi
in. (mm)
ø cable max. in.



Inner width
Bi
in. (mm)
from - to



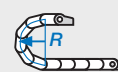
Outer height
ha
in. (mm)



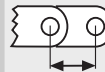
Outer width
Ba
in. (mm)
from - to



Bending radii
R
in. (mm)
from - to



Pitch
(mm)



E4-1 - the new standard - E4 modular system

E4-1, with crossbars every link



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
E4-21	.83 (21) ø .71	1.18-4.72 (30-120)	1.10 (28)	1.73-5.27 (44-134)	1.50-7.87 (38-200)	1.20 (30.5)
E4-28	1.10 (28) ø .98	1.57-11.81 (40-300)	1.65 (42)	2.36-12.60 (60-320)	2.16-9.84 (55-250)	1.81 (46)
E4-32	1.26 (32) ø 1.10	1.97-15.75 (50-400)	2.13 (54)	2.87-16.65 (73-423)	2.48-11.81 (63-300)	2.20 (56)
E4-42	(42) ø 1.50	1.97-15.75 (50-400)	2.52 (64)	2.99-16.77 (76-426)	2.95-13.78 (75-350)	2.64 (67)
E4-56	(56) ø 1.97	1.97-23.62 (50-600)	3.31 (84)	3.31-24.96 (84-634)	5.31-19.69 (135-500)	3.58 (91)
E4-80	(80) ø 2.91	1.97-23.62 (50-600)	4.25 (108)	3.94-25.59 (100-650)	5.91-39.37 (150-1000)	4.37 (111)
840	(204) ø 7.24	3.94-22.17 (100-563)	9.29 (236)	6.30-24.53 (160-623)	12.79-39.37 (325-1000)	9.84 (250)

E4-1, with crossbars every other link



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
H4-32	(32) ø 1.10	1.97-15.75 (50-400)	2.13 (54)	2.87-16.65 (73-423)	2.48-11.81 (63-300)	2.20 (56)
H4-42	(42) ø 1.50	1.97-15.75 (50-400)	2.52 (64)	2.99-16.77 (76-426)	2.95-13.78 (75-350)	2.64 (67)
H4-56	(56) ø 1.97	1.97-23.62 (50-600)	3.31 (84)	3.31-24.96 (84-634)	5.31-19.69 (135-500)	3.58 (91)
H4-80	(80) ø 2.91	1.97-23.62 (50-600)	4.25 (108)	3.94-25.59 (100-650)	5.91-39.37 (150-1000)	4.37 (111)

E4-1, Energy Tube - fully enclosed



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
R4-28	(28) ø .98	1.97-11.81 (50-300)	1.65 (42)	2.76-12.60 (70-320)	2.95-9.84 (75-250)	1.81 (46)
R4-32	(32) ø 1.10	1.97-11.81 (50-300)	2.13 (54)	2.87-16.65 (73-323)	4.92-11.81 (125-300)	2.20 (56)
R4-42	(42) ø 1.50	1.97-11.81 (50-300)	2.52 (64)	2.99-16.77 (76-326)	4.92-13.78 (125-350)	2.64 (67)
R4-56	(56) ø 1.97	2.95-18.19 (75-462)	3.31 (84)	4.29-19.57 (109-497)	5.91-19.69 (150-500)	3.58 (91)
R4-80	(80) ø 2.91	7.87-15.75 (200-400)	4.25 (108)	9.84-15.75 (250-450)	7.87-39.37 (200-1000)	4.37 (111)

E4/4 - High stability "on the side" - very long travels

E4/4 - with crossbars every link



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
2828	1.26 (32) ø 1.10	1.97-15.75 (50-400)	2.13 (54)	2.87-16.65 (73-423)	2.48-11.81 (63-300)	2.20 (56)
3838	1.65 (42) ø 1.50	1.97-15.75 (50-400)	2.52 (64)	3.03-16.81 (77-427)	2.95-13.78 (75-350)	2.64 (67)
4040	2.20 (56) ø 1.97	1.97-23.62 (50-600)	3.31 (84)	3.39-25.04 (86-636)	5.31-19.69 (135-500)	3.58 (91)
5050	3.15 (80) ø 2.91	1.97-23.62 (50-600)	4.25 (108)	3.94-25.59 (100-650)	5.91-39.37 (150-1000)	3.58 (91)

E4/4 - with crossbars every other link



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
2928	1.26 (32) ø 1.10	1.97-15.75 (50-400)	2.13 (54)	2.87-16.65 (73-423)	2.48-11.81 (63-300)	2.20 (56)
3938	1.65 (42) ø 1.50	1.97-15.75 (50-400)	2.52 (64)	3.03-16.81 (77-427)	2.95-13.78 (75-350)	2.64 (67)
4140	2.20 (56) ø 1.97	1.97-23.62 (50-600)	3.31 (84)	3.39-25.04 (86-636)	5.31-19.69 (135-500)	3.58 (91)
5150	3.15 (80) ø 2.91	1.97-23.62 (50-600)	4.25 (108)	3.94-25.59 (100-650)	5.91-39.37 (150-1000)	3.58 (91)







E4/4, Energy Tube - fully enclosed



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
R7728	1.26 (32) ø 1.10	1.97-11.81 (50-300)	2.13 (54)	2.87-12.72 (73-323)	4.92-11.81 (125-300)	2.20 (56)
R7838	1.65 (42) ø 1.50	1.97-11.81 (50-300)	2.52 (64)	3.03-12.87 (77-327)	4.92-13.78 (125-350)	2.64 (67)
R8840	2.20 (56) ø 1.97	2.95-18.19 (75-462)	3.31 (84)	4.37-19.65 (111-499)	5.91-19.69 (150-500)	3.58 (91)
R9850	3.15 (80) ø 2.91	2.95-18.19 (75-462)	4.25 (108)	4.92-20.20 (125-513)	7.87-39.37 (200-1000)	3.58 (91)

Quick Selection



	Unsupported fill weight max lbs/ft (kg/m)	Unsupported length max ft. (m)	Long travel max ft. (m)	Opening principle	Interior separation possibilities...			ESD/ATEX	Cleanroom	UL-V2	Low noise	Price index	Page
					Separators	Full-width shelves	Shelves						
	2.69 (4)	8.20 (2.5)	394 (120)	 Open from both sides	●	●	-	▲■	*	-	▲■	●●●	6.9
	6.72 (10)	8.20 (2.5)	656 (200)		●	●	●	▲■	*	-	▲■	●●●	6.15
	10.08 (15)	10.83 (3.3)	656 (200)		●	-	●	▲■	*	-	▲■	●●●	6.23
	24.86 (37)	13.12 (4)	984 (300)		●	-	●	▲■	*	-	▲■	●●●	6.33
	42.00 (62.5)	16.41 (5)	1312 (400)		●	-	●	▲■	*	-	▲■	●●●	6.43
	53.76 (80)	20.34 (6.2)	1312 (400)		●	-	●	▲■	*	-	▲■	●●●	6.53
	60.48 (90)	26.25 (8)	1476 (450)		●	-	-	▲	○	-	■	●●●	6.63
	10.08 (15)	10.83 (3.3)	656 (200)		 Open from both sides	●	-	●	▲■	*	-	▲■	●●●
	24.86 (37)	13.12 (4)	984 (300)	●		-	●	▲■	*	-	▲■	●●●	6.33
	42.00 (62.5)	16.41 (5)	1312 (400)	●		-	●	▲■	*	-	▲■	●●●	6.43
	53.76 (80)	20.34 (6.2)	1312 (400)	●		-	●	▲■	*	-	▲■	●●●	6.53
	6.72 (10)	8.20 (2.5)	656 (200)	 Lids can be hinge-opened	●	●	●	▲■	*	-	▲■	●●●	6.15
	10.08 (15)	10.83 (3.3)	656 (200)		●	-	●	▲■	*	-	▲■	●●●	6.23
	24.86 (37)	13.12 (4)	984 (300)		●	-	●	▲■	*	-	▲■	●●●	6.33
	42.00 (62.5)	16.41 (5)	1312 (400)		●	-	●	▲■	*	-	▲■	●●●	6.43
	53.76 (80)	20.34 (6.2)	1312 (400)		●	-	●	▲■	○	-	▲■	●●●	6.53
	6.72 (10.0)	11.48 (3.50)	656 (200)	 Open from both sides	●	-	●	▲■	○	-	●	●●●	6.77
	20.16 (30.0)	12.47 (3.80)	919 (280)		●	-	●	▲■	○	-	●	●●●	6.89
	33.60 (50.0)	14.76 (4.50)	984 (300)		●	-	●	▲■	○	-	●	●●●	6.101
	33.60 (60.0)	19.69 (6.00)	1312 (400)		●	-	●	▲■	○	-	●	●●●	6.113
	6.72 (10.0)	11.48 (3.50)	656 (200)	 Open from both sides	●	-	●	▲■	○	-	●	●●●	6.77
	20.16 (30.0)	12.47 (3.80)	919 (280)		●	-	●	▲■	○	-	●	●●●	6.89
	33.60 (50.0)	14.76 (4.50)	984 (300)		●	-	●	▲■	○	-	●	●●●	6.101
	33.60 (60.0)	19.69 (6.00)	1312 (400)		●	-	●	▲■	○	-	●	●●●	6.113
	6.72 (10.0)	11.48 (3.50)	656 (200)	 Lids can be hinge-opened	●	-	●	▲■	○	-	●	●●●	6.77
	20.16 (30.0)	12.47 (3.80)	919 (280)		●	-	●	▲■	○	-	●	●●●	6.89
	33.60 (50.0)	14.76 (4.50)	984 (300)		●	-	●	▲■	○	-	●	●●●	6.101
	33.60 (60.0)	19.69 (6.00)	1312 (400)		●	-	●	▲■	○	-	●	●●●	6.113

E4/00, E4/light and E6

Legend

- Standard
- Suitable to only a limited extent
- ▲ Optional
- Especially suitable
- * In preparation / on request

Series

Inner height
hi
in. (mm)
ø cable max. in.



Inner width
Bi
in. (mm)
from - to



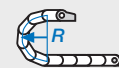
Outer height
ha
in. (mm)



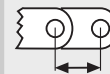
Outer width
Ba
in. (mm)
from - to



Bending radii
R
in. (mm)
from - to



Pitch
(mm)



E4/00 - the standard - E4 modular system

E4/00, with crossbars every link



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
220	1.10 (28) ø .98	1.57-11.81 (40-300)	1.65 (42)	2.36-12.60 (60-320)	2.16-9.84 (55-250)	1.81 (46)
280	1.26 (32) ø 1.10	1.97-15.75 (50-400)	2.13 (54)	2.87-16.65 (73-423)	2.48-11.81 (63-300)	2.20 (56)
380	1.65 (42) ø 1.50	1.97-15.75 (50-400)	2.52 (64)	2.99-16.77 (76-426)	2.95-13.78 (75-350)	2.64 (67)
400	2.20 (56) ø 1.97	1.97-23.62 (50-600)	3.31 (84)	3.31-24.96 (84-634)	5.31-19.69 (135-500)	3.58 (91)
600	4.25 (108) ø 3.92	7.87-23.62 (200-600)	5.51 (140)	9.92-25.67 (252-652)	7.87-39.37 (200-1000)	5.63 (143)
640	4.41 (112) ø 3.94	3.43-22.13 (87-562)	5.51 (140)	5.47-24.17 (139-614)	7.87-39.37 (200-1000)	5.63 (143)
800	7.87 (200) ø 7.44	7.87-23.62 (200-600)	9.29 (236)	10.23-25.98 (260-660)	12.80-39.37 (325-1000)	9.84 (250)

E4/00 - with crossbars every other link



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
290	1.26 (32) ø 1.10	1.97-15.75 (50-400)	2.13 (54)	2.87-16.65 (73-423)	2.48-11.81 (63-300)	2.20 (56)
390	1.65 (42) ø 1.50	1.97-15.75 (50-400)	2.52 (64)	2.99-16.77 (76-426)	2.95-13.78 (75-350)	2.64 (67)
410	2.20 (56) ø 1.97	1.97-23.62 (50-600)	3.31 (84)	3.31-24.96 (84-634)	5.31-19.69 (135-500)	3.58 (91)
601	4.25 (108) ø 3.82	7.87-23.62 (200-600)	5.51 (140)	9.92-25.67 (252-652)	7.87-39.37 (200-1000)	5.63 (143)

E4/00 - Energy Tube - fully enclosed



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
R760	1.10 (28) ø .98	1.97-11.81 (50-300)	1.65 (42)	2.76-12.60 (70-320)	2.48-9.84 (63-250)	1.81 (46)
R770	1.26 (32) ø 1.10	1.97-11.81 (50-300)	2.13 (54)	2.87-12.72 (73-323)	4.92-11.81 (125-300)	2.20 (56)
R780	1.65 (42) ø 1.50	1.97-11.81 (50-300)	2.52 (64)	2.99-12.83 (76-326)	4.92-13.78 (125-350)	2.64 (67)
R880	2.20 (56) ø 1.97	2.95-18.19 (75-462)	3.31 (84)	4.29-19.57 (109-497)	5.91-19.69 (150-500)	3.58 (91)
R608	4.25 (108) ø 3.92	7.87-15.75 (200-400)	5.51 (140)	9.92-17.80 (252-452)	9.84-39.37 (250-1000)	5.63 (143)

E4/light - Lightweight - low price

E4/light - with crossbars every link



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
14040	2.20 (56) ø 1.97	1.97-23.62 (50-600)	3.31 (84)	2.99-24.65 (76-626)	5.31-19.69 (135-500)	3.58 (91)
14240	2.44 (62) ø 2.20	1.97-15.75 (50-400)	3.31 (84)	2.99-16.77 (76-426)	5.31-19.69 (135-500)	3.58 (91)
15050	3.15 (80) ø 2.91	1.97-23.62 (50-600)	4.25 (108)	3.15-24.80 (80-630)	5.91-19.69 (150-500)	3.58 (91)
1640	4.41 (112) ø 3.94	1.97-23.62 (50-600)	5.51 (140)	3.31-24.96 (84-634)	7.87-23.62 (200-600)	5.63 (143)

E4/light - with crossbars every other link



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
14140	2.20 (56) ø 1.97	1.97-23.62 (50-600)	3.31 (84)	2.99-24.65 (76-626)	5.31-19.69 (135-500)	3.58 (91)
14340	2.44 (62) ø 2.20	1.97-15.75 (50-400)	3.31 (84)	2.99-16.77 (76-426)	5.31-19.69 (135-500)	3.58 (91)
15150	3.15 (80) ø 2.91	1.97-23.62 (50-600)	4.25 (108)	3.15-24.80 (80-630)	5.91-19.69 (150-500)	3.58 (91)

E4/light Energy Tube - fully enclosed



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
R18840	2.20 (56) ø 1.97	2.95-18.19 (75-462)	3.31 (84)	3.98-19.25 (101-489)	5.91-19.69 (150-500)	3.58 (91)
R19850	3.15 (80) ø 2.91	2.95-18.19 (75-462)	4.25 (108)	4.13-19.41 (105-493)	7.87-19.69 (200-500)	3.58 (91)
R1608	4.41 (112) ø 3.94	7.87-15.75 (200-400)	5.51 (140)	9.21-17.09 (234-434)	7.87-23.62 (250-600)	5.63 (143)

E6 -6-piece Energy Chain® - for extremely low-noise operations

E6, crossbars every other link



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
E6-29	1.14 (29) ø .98	1.18-4.72 (30-120)	1.38 (35)	1.81-5.35 (46-136)	2.17-5.91 (55-150)	.87 (22)
E6-35	1.38 (35) ø 1.22	1.18-4.72 (30-120)	1.65 (42)	1.97-5.51 (50-140)	2.17-3.94 (55-150)	.98 (25)
E6-40	1.57 (40) ø 1.42	1.57-11.81 (40-300)	2.13 (54)	2.36-12.60 (60-320)	2.48-7.87 (63-200)	1.09 (27.8)
E6-52	2.05 (52) ø 1.81	1.57-11.81 (40-300)	2.56 (65)	2.52-12.76 (64-324)	2.95-9.84 (75-250)	1.18 (30)
E6-62	2.44 (62) ø 2.13	1.97-15.75 (50-400)	3.31 (84)	3.39-17.17 (86-436)	4.53-13.78 (115-350)	1.97 (50)
E6-80	3.15 (80) ø 2.83	1.97-23.62 (50-600)	4.25 (108)	3.94-25.59 (100-650)	5.91-17.72 (150-450)	2.56 (65)
E6-80L	3.15 (80) ø 2.83	4.41-21.65 (112-550)	4.25 (108)	5.51-22.76 (140-578)	5.91-17.72 (150-450)	2.56 (65)

E6 Tube - fully enclosed



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Bending radii <i>R</i> in. (mm)	Pitch (mm)
R6-29	1.10 (28) ø .98	1.18-4.72 (30-120)	1.38 (35)	1.81-5.35 (46-136)	2.17-5.91 (55-150)	.87 (22)
R6-40	1.57 (40) ø 1.42	2.44 (62)	2.13 (54)	3.23 (82)	2.48-7.87 (63-200)	1.09 (27.8)
R6-52	2.05 (52) ø 1.81	1.97-6.89 (50-175)	2.56 (65)	2.91-7.83 (74-199)	2.95-9.84 (75-250)	1.18 (30)

Quick Selection



Unsupported fill weight max lbs/ft (kg/m)	Unsupported length max ft. (m)	Long travel max ft. (m)	Opening principle	Interior separation possibilities...			ESD/ATEX	Cleanroom	UL-V2	Low noise	Price index	Page
				Separators	Full-width shelves	Shelves						
5.38 (8.0)	9.02 (2.75)	656 (200)		●	●	●	▲	●	-	■	●●●	6.131
6.72 (10.0)	11.48 (3.50)	656 (200)		●	-	●	▲	●	-	■	●●●	6.139
20.16 (30.0)	12.47 (3.80)	984 (300)		●	-	●	▲	○	-	■	●●●	6.149
33.60 (50.0)	14.76 (4.50)	1312 (400)		●	-	●	▲	○	-	■	●●●	6.159
43.68 (65.0)	22.97 (7.00)	1476 (450)		●	-	●	▲	○	-	■	●●●	6.169
43.68 (65.0)	22.97 (7.00)	1476 (450)		●	-	●	▲	○	-	■	●●●	6.177
60.48 (90.0)	26.25 (8.00)	1476 (450)		●	-	●	▲	○	-	■	●●●	6.187
6.72 (10.0)	11.48 (3.50)	656 (200)		●	-	●	▲	●	-	■	●●●	6.139
20.16 (30.0)	12.47 (3.80)	984 (300)		●	-	●	▲	○	-	■	●●●	6.149
33.60 (50.0)	14.76 (4.50)	1312 (400)		●	-	●	▲	○	-	■	●●●	6.159
43.68 (65.0)	22.97 (7.00)	1476 (450)		●	-	●	▲	○	-	■	●●●	6.169
5.38 (8.0)	9.02 (2.75)	656 (200)		●	●	●	▲	○	-	■	●●●	6.131
6.72 (10.0)	11.48 (3.50)	656 (200)		●	-	●	▲	○	-	■	●●●	6.139
20.16 (30.0)	12.47 (3.80)	984 (300)		●	-	●	▲	○	-	■	●●●	6.149
33.60 (50.0)	14.76 (4.50)	1312 (400)		●	-	●	▲	○	-	■	●●●	6.159
43.68 (65.0)	22.97 (7.00)	1476 (450)		●	-	●	▲	○	-	■	●●●	6.169
26.88 (40.0)	13.12 (4.00)	492 (150)		●	-	●	▲■	○	-	●	●●●	6.199
26.88 (40.0)	13.12 (4.00)	492 (150)		●	-	●	▲■	○	-	●	●●●	6.231
36.96 (55.0)	14.76 (4.50)	820 (250)		●	-	●	▲■	○	-	●	●●●	6.209
33.60 (50.0)	14.76 (4.50)	1312 (400)		●	-	●	▲■	○	-	●	●●●	6.221
26.88 (40.0)	13.12 (4.00)	492 (150)		●	-	●	▲■	○	-	●	●●●	6.199
26.88 (40.0)	13.12 (4.00)	492 (150)		●	-	●	▲■	○	-	●	●●●	6.231
36.96 (55.0)	14.76 (4.50)	820 (250)		●	-	●	▲■	○	-	●	●●●	6.209
26.88 (40.0)	13.12 (4.00)	492 (150)		●	-	●	▲■	○	-	●	●●●	6.199
36.96 (55.0)	14.76 (4.50)	820 (250)		●	-	●	▲■	○	-	●	●●●	6.209
33.60 (50.0)	14.76 (4.50)	1312 (400)		●	-	●	▲■	○	-	●	●●●	6.221
2.02 (3.0)	4.92 (1.50)	-		●	●	●	▲	■	▲	■	●●●	7.7
4.03 (6)	6.23 (1.9)	-		●	●	●	▲	■	▲	■	●●●	7.21
6.72 (10)	9.02 (2.75)	197 (60)*		●	●	-	▲	■	▲	■	●●●	7.27
10.08 (15)	9.84 (3.00)	262 (80)*		●	●	●	▲	■	▲	■	●●●	7.39
28.90 (43)	13.12 (4.00)	328 (100)		●	●	●	▲	■	▲	■	●●●	7.51
37.63 (56)	17.23 (5.25)	-		●	-	●	▲	■	▲	■	●●●	7.67
16.80 (25)	8.20 (2.50)	394 (120)		●	-	●	▲	■	▲	■	●●●	7.59
2.02 (3.0)	4.92 (1.50)	-		●	-	-	▲	■	▲	■	●●●	7.15
6.72 (10)	9.02 (2.75)	*up to 197 (60) test		●	-	-	▲	■	▲	■	●●●	7.33
10.08 (15)	9.84 (3.00)	262 (80)*		●	-	-	▲	■	▲	■	●●●	7.45

Legend

- Standard
- Suitable to only a limited extent
- ▲ Optional
- Especially suitable
- * In preparation / on request

Series

Inner height
hi
in. (mm)
ø cable max. in.



Inner width
Bi
in. (mm)
from - to



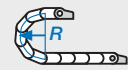
Outer height
ha
in. (mm)



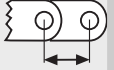
Outer width
Ba
in. (mm)
from - to



Bending radii
R
in. (mm)
from - to



Pitch
(mm)



Triflex® R - 3-D Energy Chain® for robot applications

TRC - Triflex®, R closed design



Series	Inner height <i>hi</i> in. (mm) ø cable max. in.	Inner width <i>Bi</i> in. (mm) from - to	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm) from - to	Bending radii <i>R</i> in. (mm) from - to	Pitch (mm)
TRC-30	1.20 (30.5) ø .39	1.20 (30.5)	1.36 (34.5)	1.36 (34.5)	1.97 (50)	.44 (11.3)
TRC-40	1.50 (38) ø .51	1.50 (38)	1.69 (43)	1.69 (43)	2.28 (58)	.55 (13.9)
TRC-60	2.24 (57) ø .81	2.24 (57)	2.56 (65)	2.56 (65)	3.43 (87)	.80 (20.4)
TRC-70	2.81 (71.5) ø 1.02	2.81 (71.5)	3.19 (81)	3.19 (81)	4.33 (110)	1.01 (25.6)
TRC-85	3.27 (83) ø 1.22	3.27 (83)	3.72 (94.5)	3.72 (94.5)	5.31 (135)	1.20 (30.6)
TRC-100	3.75 (95.3) ø 1.40	3.75 (95.3)	4.25 (108)	4.25 (108)	5.71 (145)	1.41 (35.7)
TRC-125	1.70 (43.3) ø 1.40	1.70 (43.3)	5.31 (135)	5.31 (135)	7.17 (182)	1.76 (44.6)

TRE - Triflex® R, "E-Z" design for fast installation of conduits



Series	Inner height <i>hi</i> in. (mm) ø cable max. in.	Inner width <i>Bi</i> in. (mm) from - to	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm) from - to	Bending radii <i>R</i> in. (mm) from - to	Pitch (mm)
TRE-30	1.20 (30.5) ø .39	1.20 (30.5)	1.36 (34.5)	1.36 (34.5)	1.97 (50)	.44 (11.3)
TRE-40	1.50 (38) ø .51	1.50 (38)	1.69 (43)	1.69 (43)	2.28 (58)	.55 (13.9)
TRE-60	2.24 (57) ø .81	2.24 (57)	2.56 (65)	2.56 (65)	3.43 (87)	.80 (20.4)
TRE-70	2.81 (71.5) ø 1.02	2.81 (71.5)	3.19 (81)	3.19 (81)	4.33 (110)	1.01 (25.6)
TRE-85	3.27 (83) ø 1.22	3.27 (83)	3.72 (94.5)	3.72 (94.5)	5.31 (135)	1.20 (30.6)
TRE-100	3.75 (95.3) ø 1.40	3.75 (95.3)	4.25 (108)	4.25 (108)	5.71 (145)	1.41 (35.7)
TRE-125	1.70 (43.3) ø 1.40	1.70 (43.3)	5.31 (135)	5.31 (135)	7.17 (182)	1.76 (44.6)

TRL - Triflex® R, light version with "E-Z" Design



Series	Inner height <i>hi</i> in. (mm) ø cable max. in.	Inner width <i>Bi</i> in. (mm) from - to	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm) from - to	Bending radii <i>R</i> in. (mm) from - to	Pitch (mm)
TRL-40	1.50 (38) ø .51	1.50 (38)	1.77 (45)	1.77 (45)	2.28 (58)	.55 (13.9)
TRL-60	2.24 (57) ø .83	2.24 (57)	2.56 (65)	2.56 (65)	3.43 (87)	.80 (20.4)
TRL-70	2.81 (71.5) ø 1.02	2.81 (71.5)	3.19 (81)	3.19 (81)	4.33 (110)	1.01 (25.6)
TRL-100	3.75 (95.3) ø 1.40	3.75 (95.3)	4.25 (108)	4.25 (108)	5.71 (145)	1.41 (35.7)

E-Z Triflex® - for 3-D motion - simple filling from 2 sides



Series	Inner height <i>hi</i> in. (mm) ø cable max. in.	Inner width <i>Bi</i> in. (mm) from - to	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm) from - to	Bending radii <i>R</i> in. (mm) from - to	Pitch (mm)
E332-25	.98 (25) ø .35	.98 (25)	1.34 (34)	1.34 (34)	1.89-7.87 (48-200)	.57 (14.5)
E332-32	1.26 (32) ø .47	1.26 (32)	1.97 (50)	1.97 (50)	2.95-9.84 (75-250)	.98 (25)
E332-50	1.97 (50) ø .83	1.97 (50)	2.68 (68)	2.68 (68)	3.94-9.84 (100-250)	1.18 (30)
E332-75	2.95 (75) ø 1.30	2.95 (75)	3.78 (96)	3.78 (96)	5.51-11.81 (140-300)	1.42 (36)
E333-25	.98 (25) ø .35	.98 (25)	1.34 (34)	1.34 (34)	1.89-7.87 (48-200)	.57 (14.5)
E333-32	1.26 (32) ø .47	1.26 (32)	1.97 (50)	1.97 (50)	2.95-9.84 (75-250)	.98 (25)
E333-50	1.97 (50) ø .83	1.97 (50)	2.68 (68)	2.68 (68)	3.94-9.84 (100-250)	1.18 (30)
E333-75	2.95 (75) ø 1.30	2.95 (75)	3.78 (96)	3.78 (96)	5.51-11.81 (140-300)	1.42 (36)

Triflex® - for 3-D motion - closed

Triflex®, closed design



Series	Inner height <i>hi</i> in. (mm) ø cable max. in.	Inner width <i>Bi</i> in. (mm) from - to	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm) from - to	Bending radii <i>R</i> in. (mm) from - to	Pitch (mm)
332-16	.63 (16) ø .55	.63 (16)	1.02 (26)	1.02 (26)	1.50-3.94 (38-100)	.52 (13.3)
332-32	1.26 (32) ø 1.10	1.26 (32)	1.97 (50)	1.97 (50)	2.95-9.84 (75-250)	.98 (25)
332-50	1.97 (50) ø 1.77	1.97 (50)	2.68 (68)	2.68 (68)	3.94-9.84 (100-250)	1.18 (30)
332-75	2.95 (75) ø 2.64	2.95 (75)	3.78 (96)	3.78 (96)	5.51-11.81 (140-300)	1.42 (36)
333-16	.63 (16) ø .55	.63 (16)	1.02 (26)	1.02 (26)	1.50-3.94 (38-100)	.52 (13.3)
333-32	1.26 (32) ø 1.10	1.26 (32)	1.97 (50)	1.97 (50)	2.95-9.84 (75-250)	.98 (25)
333-50	1.97 (50) ø 1.77	1.97 (50)	2.68 (68)	2.68 (68)	3.94-9.84 (100-250)	1.18 (30)
333-75	2.95 (75) ø 2.64	2.95 (75)	3.78 (96)	3.78 (96)	5.51-11.81 (140-300)	1.42 (36)

Triflex®, snap open



Series	Inner height <i>hi</i> in. (mm) ø cable max. in.	Inner width <i>Bi</i> in. (mm) from - to	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm) from - to	Bending radii <i>R</i> in. (mm) from - to	Pitch (mm)
352-50	1.97 (50) ø 1.77	1.97 (50)	2.68 (68)	2.68 (68)	3.94-9.84 (100-250)	1.18 (30)
353-50	1.97 (50) ø 1.77	1.97 (50)	2.68 (68)	2.68 (68)	3.94-9.84 (100-250)	1.18 (30)

Quick Selection



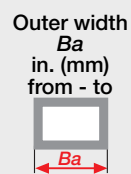
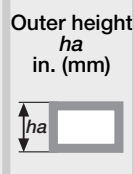
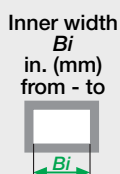
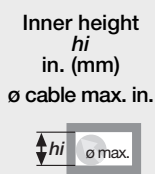
Unsupported fill weight lbs/ft (kg/m)	Unsupported length max ft. (m)	Long travel max ft. (m)	Opening principle	Interior separation possibilities...			ESD/ATEX	Cleanroom	UL-V2	Low noise	Price index	Page
				Separators	Full-width shelves	Shelves						
-	-	-	 Closed	-	-	-	▲	○	●	●	●●●	8.13
-	-	-		●	-	-	▲	○	●	●	●●●	8.13
-	-	-		●	-	-	▲	○	●	●	●●●	8.13
-	-	-		●	-	-	▲	○	●	●	●●●	8.13
-	-	-		●	-	-	▲	○	●	●	●●●	8.13
-	-	-		●	-	-	▲	○	●	●	●●●	8.13
-	-	-	 Easy to fill from both sides	-	-	-	▲	○	●	●	●●●	8.15
-	-	-		●	-	-	▲	○	●	●	●●●	8.15
-	-	-		●	-	-	▲	○	●	●	●●●	8.15
-	-	-		●	-	-	▲	○	●	●	●●●	8.15
-	-	-		●	-	-	▲	○	●	●	●●●	8.15
-	-	-		●	-	-	▲	○	●	●	●●●	8.15
-	-	-	 Light version "E-Z"-Principle	●	-	-	▲	○	●	●	●●●	8.17
-	-	-		●	-	-	▲	○	●	●	●●●	8.17
-	-	-		●	-	-	▲	○	●	●	●●●	8.17
-	-	-		●	-	-	▲	○	●	●	●●●	8.17
-	-	-	 Easy to fill from both sides	●	-	-	▲	○	●	●	●●●	8.39
-	-	-		●	-	-	▲	○	●	●	●●●	8.39
-	-	-		●	-	-	▲	○	●	●	●●●	8.39
-	-	-		●	-	-	▲	○	●	●	●●●	8.40
-	-	-		●	-	-	▲	○	●	●	●●●	8.40
-	-	-		●	-	-	▲	○	●	●	●●●	8.40
-	-	-		●	-	-	▲	○	●	●	●●●	8.40
-	-	-	 Closed	-	-	-	▲	○	▲	○	●●●	8.52
-	-	-		●	-	-	▲	○	▲	○	●●●	8.52
-	-	-		●	-	-	▲	○	▲	○	●●●	8.52
-	-	-		●	-	-	▲	○	▲	○	●●●	8.52
-	-	-		-	-	-	▲	○	▲	○	●●●	8.53
-	-	-		●	-	-	▲	○	▲	○	●●●	8.53
-	-	-		●	-	-	▲	○	▲	○	●●●	8.53
-	-	-		●	-	-	▲	○	▲	○	●●●	8.53
-	-	-	 Lids snap open	●	-	-	▲	○	▲	○	●●●	8.52
-	-	-		●	-	-	▲	○	▲	○	●●●	8.53

TwisterChain®

Legend

- Standard
- Suitable to only a limited extent
- ▲ Optional
- Especially suitable
- * In preparation / on request

Series



TwisterChain® - for circular and spiral movements



Series	Inner height <i>hi</i> in. (mm) ø cable max. in.	Inner width <i>Bi</i> in. (mm) from - to	Outer height <i>ha</i> in. (mm)	Outer width <i>Ba</i> in. (mm) from - to	Bending radii <i>R</i> in. (mm) from - to	Pitch (mm)
2208	1.10 (28) ø .98	2.07-4.43 (52.5-112.5)	1.65 (42)	(80-140)	2.17-5.91 (55-150)	1.73 (44)
2808	1.26 (32) ø 1.14	1.97-5.91 (50-150)	2.13 (54)	(81-181)	3.94-9.84 (100-250)	2.20 (56)
3808	1.65 (42) ø 1.53	1.97-7.87 (50-200)	2.52 (64)	(85-235)	3.94-9.84 (100-250)	2.64 (67)
4008	2.20 (56) ø 2.07	1.97-7.87 (50-200)	3.31 (84)	(93-243)	5.91-15.75 (150-400)	3.58 (91)

igus® Guide Troughs - for Long Travels

Can be used in the following igus® Energy Chain Systems®

Guide Troughs
for long travels

Series

Outer height
Trough side
part (mm)

Zipper
Chains

System
E2 mini

System
E2/000 Tubes

System
E2 Tubes

Super-aluminum trough, basic version - for general machinery



Series	Outer height Trough side part (mm)	Zipper Chains	System E2 mini	System E2/000 Tubes	System E2 Tubes
970-30-SL / 970-31-SL	3.03 (77)	15	10/B15	-	-
970-30-SL / 970-32-SL	3.03 (77)	-	-	1400/1450/1480/1500	-
971-30-SL / 971-31-SL	3.43 (87)	-	-	2480	-
972-30-SL / 972-31-SL	4.61 (117)	-	-	-	-
972-30-SL / 972-32-SL	4.61 (117)	-	-	2680	R58
973-30-SL / 973-31-SL	5.67 (144)	-	-	3480	R68
974-30-SL / 974-31-SL	7.24 (184)	-	-	-	-
975-30-SL / 975-31-SL	9.29 (236)	-	-	-	-

Steel guide trough - for harsh environments



Trough/Glide Bars	Outer height Trough side part (mm)	Zipper Chains	System E2 mini	System E2/000 Tubes	System E2 Tubes
91-10 / 91-11	1.89 (48)	15-015	10/B15-015	-	-
91-20 / 91-21	1.89 (48)	15-025	10/B15-025	-	-
91-30 / 91-31	1.89 (48)	15-038	10/B15-038	-	-
91-40 / 91-41	1.89 (48)	15-050	10/B15-050	-	-
91-50 / 91-51	1.89 (48)	15-5	10-5	-	-
91-60 / 91-61	1.89 (48)	15-6	10-6	-	-
91-70 / 91-71	1.89 (48)	15-7	10-7	-	-
92-30 / 92-01	2.76 (70)	-	-	2480	-
95-30 / 92-01	3.94 (100)	-	-	2680	R58
96-30 / 92-01	3.94 (100)	-	-	-	-
98-30 / 92-01	5.12 (130)	-	-	-	-
93-30 / 93-01	5.12 (130)	-	-	3480	R68
94-30 / 93-01	6.69 (170)	-	-	-	-
99-30 / 93-01	6.69 (170)	-	-	-	-
97-30 / 93-01	11.81 (300)	-	-	-	-
90-30 / 90-20	18.90 (480)	-	-	-	-

Quick Selection



Unsupported fill weight max lbs/ft (kg/m)	Unsupported length max ft. (m)	Long travel max ft. (m)	Opening principle	Interior separation possibilities...			ESD/ATEX	Cleanroom	UL-V2	Low noise	Price index	Page	
				Separators	Full-width shelves	Shelves							
 Max Fill weight lbs/ft (kg/m) 180° 360°													
1.01 (1.5)	.67 (1.0)	-	360°	 Open from both sides	●	●	●	▲	○	▲	●	●●●	8.65
1.34 (2.0)	.67 (1.0)	-	360°		●	●	●	▲	○	▲	●	●●●	8.66
2.02 (3.0)	1.21 (1.8)	-	360°		●	●	●	▲	○	▲	●	●●●	8.67
2.68 (4.0)	1.68 (2.5)	-	360°		●	●	●	▲	○	▲	●	●●●	8.69

Quick Selection



System E4/00	System E4/4	System E4/light	System E6	Materials of side parts	Price index	Page
-	-	-	-		●●●	9.15
-	-	-	-	Aluminum	●●●	9.17
-	-	-	E6-29	Aluminum	●●●	9.19
E4-32/H4-32/R4-32/280/290/R770	2828/2928/R7728	-	E6-40	Aluminum	●●●	9.21
-	-	-	-	Aluminum	●●●	9.23
E4-42/H4-42/R4-42/380/390/R780	3838/3938/R7838	-	E6-52/R6-52	Aluminum	●●●	9.25
E4-56/H4-56/R4-56/400/410/R880	4040/4140/R8840	14040/14140/R18840/14240/14340	E6-62	Aluminum	●●●	9.27
-	5050/5150/R9850	15050/15150/R19850	E6-80/E6-80L	Aluminum	●●●	9.29
-	-	-	-			
-	-	-	-	Galvanized steel**	●●●	9.32
-	-	-	-			9.32
-	-	-	-	**Stainless steel		9.32
-	-	-	-	on request		9.32
-	-	-	-			9.32
-	-	-	-			9.32
-	-	-	E6-29	Galvanized steel**	●●●	9.33
-	-	-	-	Galvanized steel**	●●●	9.35
E4-28/R4-28//220/R760	-	-	-	Galvanized steel**	●●●	9.37
E4-32/H4-32/R4-32/280/290/R770	2828/2928/R7728	-	E6-40	Galvanized steel**	●●●	9.39
E4-42/H4-42/R4-42/380/390/R780	3838/3938/R7838	-	E6-52/R6-52	Galvanized steel**	●●●	9.41
E4-56/H4-56/R4-56/400/410/R880	4040/4140/R8840	14040/14140/14240/14340/R18840	E6-62	Galvanized steel**	●●●	9.43
E4-80	5050/5150/R9850	15050/15150/R19850	E6-80/E6-80L	Galvanized steel**	●●●	9.45
600/601/R608/640	-	1640/R1608	-	Galvanized steel**	●●●	9.47
800/840	-	-	-	Galvanized steel**	●●●	9.49

igus[®] Special Solutions - for Long Travels

Description

Support Tray[®] - For support of the lower run



For support of the lower run - **Support tray**

Simple one-piece support trays for the lower Energy Chain[®] run, according with your requirements and specification. Your width, height and color - we supply the fitting Energy Chain[®], together with the support tray system. Ready to install onto your machine or application. Save on procurement and design time.

RoI E-Chain[®] Rolling instead of gliding



Reduction of driving power down to 25% to move the Energy Chain[®]. For very long travels with high fill weights. Due to the rollers, the coefficient of friction of the system is very low - save money and energy.

AUTO-GLIDE - Long travels without guide troughs



AUTO-GLIDE - special solutions for long travels without guide troughs.

Guidelok horizontal - upper run support, unsupported up to 164 ft. (50 m)



Upper run support for long travels, self-supporting in chip areas. Unsupported travels up to 164 ft. (50 m) are possible. Chips cannot get stuck between upper and lower run. Modular system with few parts.






Micro Flizz[®] - Small Energy Chains[®] in aluminum profile












Compact, cost-saving complete system for safe guidance of energy, data and air. Maintenance-free alternative for power bar.

Micro Flizz[®] - Small Energy Chains[®] in aluminum profile
































Quick Selection

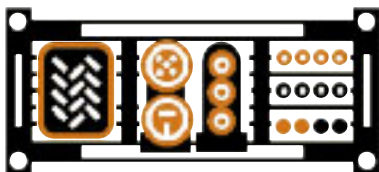
Typical industries and applications	Travel Max. in. (mm)	Travel Speed Max. ft/s (m/s)	Inner Height in. (mm)	Price index 	Page
					9.51
<ul style="list-style-type: none"> • Outdoor applications • Cranes • Mining industry • Road building • Steel plants 	≈ 31.50 (800)	≈ 32.8 (10)	1.26 - 3.15 (32 - 80)		9.59
<ul style="list-style-type: none"> • Steel mills • Applications with long travels, rough environments and high fill weights 					
<ul style="list-style-type: none"> • Indoor/outdoor applications • Cranes • Industrial trucks 	1.97 (50)	4.92 (1.5)	.83 - 3.15 (21 - 80) (4 options)		9.63
<ul style="list-style-type: none"> • Storage and retrieval machines 					
<ul style="list-style-type: none"> • Machine tools • Applications in chip areas 	1.97 (50)	6.56 (2)	2.20 (56)		9.69
<ul style="list-style-type: none"> • When a gliding application is not recommended 					
<ul style="list-style-type: none"> • Indoor cranes • Storage and retrieval machines • Industry gates 		19.69 (6)	.43/.51 (11/13) Inner height of the applied Energy Chain®		9.71
<ul style="list-style-type: none"> • Control panels • Studio equipment (lighting) 					

Chainflex® cable	Jacket	Shield	Minimum bending radius, (factor x d)		Temperature		Price index	
			moving	fixed	moving	fixed		
Control cables								
	CF130	PVC		7.5-10	5	+23°F to +158°F (-5°C to +70°C)	-4°F to +158°F (-20°C to +70°C)	●●●
	CF140	PVC	✓	7.5-15	5	+23°F to +158°F (-5°C to +70°C)	-4°F to +158°F (-20°C to +70°C)	●●●
	CF130US	PVC		8	5	+23°F to +176°F (-5°C to +80°C)	-4°F to +194°F (-20°C to +90°C)	●●●
	CF140US	PVC	✓	10	7.5	+23°F to +176°F (-5°C to +80°C)	-4°F to +194°F (-20°C to +90°C)	●●●
	CF5	PVC		6.8-7.5	4	+23°F to +158°F (-5°C to +70°C)	-4°F to +158°F (-20°C to +70°C)	●●●
	CF6	PVC	✓	6.8-7.5	4	+23°F to +158°F (-5°C to +70°C)	-4°F to +158°F (-20°C to +70°C)	●●●
	CF170-D	PUR		7.5-10	5	-31°F to +176°F (-35°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	●●●
	CF77-UL-D	PUR		6.8-7.5	4	-31°F to +176°F (-35°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	●●●
	CF78-UL	PUR	✓	6.8-7.5	4	-31°F to +176°F (-35°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	●●●
	CF2	PUR	✓	5	4	-31°F to +176°F (-20°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	●●●
	CF98	TPE		4	3	-31°F to +194°F (-35°C to +90°C)	-40°F to +194°F (-40°C to +90°C)	●●●
	CF99	TPE	✓	4	3	-31°F to +194°F (-35°C to +90°C)	-40°F to +194°F (-40°C to +90°C)	●●●
	CF9	TPE		5	3	-31°F to +212°F (-35°C to +100°C)	-40°F to +212°F (-40°C to +100°C)	●●●
	CF10	TPE	✓	5	3	-31°F to +212°F (-35°C to +100°C)	-40°F to +212°F (-40°C to +100°C)	●●●
	CF9-UL	TPE		5	3	-31°F to +212°F (-35°C to +100°C)	-40°F to +212°F (-40°C to +100°C)	●●●
	CF10-UL	TPE	✓	5	3	-31°F to +212°F (-35°C to +100°C)	-40°F to +212°F (-40°C to +100°C)	●●●

No Minimum Order!
No Cut Charges on up to 10 cuts of the same part number!



















Quick Selection

Approvals and standards		Flame-retardant	Oil-resistant	Halogen-free	UV-resistant	Torsion resistant	v max. unsupported	v max. gliding	a max. [m/s ²]	Number of conductors	AWG range	Page
CE		✓				✓	9.84 ft/s (3 m/s)	6.56 ft/s (2 m/s)	65.6 ft/s ² (20 m/s ²)	2 - 30	24 - 10	10.64
CE		✓					9.84 ft/s (3 m/s)	6.56 ft/s (2 m/s)	65.6 ft/s ² (20 m/s ²)	3 - 36	24 - 14	10.66
CE	  	✓	✓		✓	✓	9.84 ft/s (3 m/s)	6.56 ft/s (2 m/s)	65.6 ft/s ² (20 m/s ²)	2 - 33	20 - 10	10.68
CE	  	✓	✓		✓		9.84 ft/s (3 m/s)	6.56 ft/s (2 m/s)	65.6 ft/s ² (20 m/s ²)	2 - 33	20 - 10	10.70
CE	  	✓	✓		✓	✓	32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s ² (80 m/s ²)	2 - 42	24 - 14	10.72
CE	  	✓	✓		✓		32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s ² (80 m/s ²)	2 - 36	24 - 14	10.74
CE			✓	✓	✓		9.84 ft/s (3 m/s)	6.56 ft/s (2 m/s)	65.6 ft/s ² (20 m/s ²)	3 - 30	20 - 8	10.76
CE	 	✓	✓	✓	✓	✓	32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s ² (80 m/s ²)	2 - 36	24 - 12	10.78
CE		✓	✓	✓	✓		32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s ² (80 m/s ²)	3 - 25	20 - 12	10.80
CE		✓	✓		✓		32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s ² (80 m/s ²)	3 - 48	26 - 16	10.82
CE	 		✓	✓	✓	✓	32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	2 - 8	26 - 20	10.84
CE	 		✓	✓	✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	2 - 8	26 - 22	10.85
CE			✓	✓	✓	✓	32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	2 - 36	24 - 2	10.86
CE			✓	✓	✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	2 - 25	26 - 12	10.88
CE	  	✓	✓		✓	✓	32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	2 - 36	24 - 10	10.90
CE	  	✓	✓		✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	2 - 25	24 - 12	10.92



































Chain – cable – guarantee!

Ask for fully harnessed and preassembled ReadyChains® – increase your cash-flow and profit immediately. The igus® system guarantee also covers individually delivered components.





Chainflex® cable	Jacket	Shield	Minimum bending radius, (factor x d)		Temperature		Price index	
			moving	fixed	moving	fixed		
Data cables								
	CF240	PVC	✓	10-12	5	+23°F to +158°F (-5°C to +70°C)	-4°F to +158°F (-20°C to +70°C)	●●●
	CF211	PVC	✓	7.5	5	+23°F to +158°F (-5°C to +70°C)	-4°F to +158°F (-20°C to +70°C)	●●●
	CF112	PUR	✓	10	5	-31°F to +176°F (-35°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	●●●
	CF113	PUR	✓	10	5	-31°F to +176°F (-35°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	●●●
	CF11	TPE	✓	6.8	5	-31°F to +212°F (-35°C to +100°C)	-40°F to +212°F (-40°C to +100°C)	●●●
	CF12	TPE	✓	10	5	-31°F to +212°F (-35°C to +100°C)	-40°F to +212°F (-40°C to +100°C)	●●●
Bus cables								
	CFBUS-PVC	PVC	✓	6.8-7.5	4	+23°F to +158°F (-5°C to +70°C)	-4°F to +158°F (-20°C to +70°C)	●●●
	CFBUS-PUR	PUR	✓	6.8-7.5	4	-4°F to +158°F (-20°C to +70°C)	-40°F to +158°F (-40°C to +70°C)	●●●
	CFBUS	PUR	✓	6.8-7.5	4	-31°F to +158°F (-35°C to +70°C)	-40°F to +158°F (-40°C to +70°C)	●●●
	CF11-LC	PUR	✓	6.8 - 7.5	4	-31°F to +158°F (-35°C to +70°C)	-40°F to +158°F (-40°C to +70°C)	●●●
	CF11-LC-D	PUR	✓	6.8 - 7.5	4	-31°F to +158°F (-35°C to +70°C)	-40°F to +158°F (-40°C to +70°C)	●●●
	CF14US	PUR	✓	12.5	4	-31°F to +158°F (-35°C to +70°C)	-40°F to +158°F (-40°C to +70°C)	●●●
	CF14 CAT5	PUR	✓	12.5	4	-31°F to +158°F (-35°C to +70°C)	-40°F to +158°F (-40°C to +70°C)	●●●
Position feedback cables								
	CF211	PVC	✓	5	3	+23°F to +158°F (-5°C to +70°C)	-4°F to +158°F (-20°C to +70°C)	●●●
	CF113-D	PUR	✓	5	3	-4°F to +176°F (-20°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	●●●
	CF111-D	TPE	✓	5	3	-31°F to +212°F (-35°C to +100°C)	-40°F to +212°F (-40°C to +100°C)	●●●
	CF11-D	TPE	✓	5	3	-31°F to +212°F (-35°C to +100°C)	-40°F to +212°F (-40°C to +100°C)	●●●
Koax cables								
	CF Koax 1	TPE		10	7.5	-31°F to +212°F (-35°C to +100°C)	-40°F to +212°F (-40°C to +100°C)	●●●

Quick Selection





Approvals and standards			Flame-retardant	Oil-resistant	Halogen-free	UV-resistant	Torsion resistant	v max. unsupported	v max. gliding	a max. [m/s ²]	Number of conductors	AWG range	Page
CE			✓	✓				9.84 ft/s (3 m/s)	6.56 ft/s (2 m/s)	65.62 ft/s ² (20 m/s ²)	3 - 24	26 - 22	10.96
CE			✓	✓				16.41 ft/s (5 m/s)	9.84 ft/s (3 m/s)	164.0 ft/s ² (50 m/s ²)	2 - 28	24 - 20	10.97
CE			✓	✓	✓	✓		16.41 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s ² (80 m/s ²)	4 - 12	24 - 20	10.98
CE			✓	✓	✓	✓		9.84 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s ² (80 m/s ²)	4 - 12	24 - 20	10.99
CE				✓	✓	✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	4 - 36	26 - 14	10.100
CE				✓	✓	✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	4 - 28	24 - 17	10.101
CE			✓	✓		✓		6.56 ft/s (2 m/s)		98.43 ft/s ² (30 m/s ²)	2 - 8	26 - 20	10.106
CE			✓	✓	✓	✓		32.81 ft/s (10 m/s)		98.43 ft/s ² (30 m/s ²)	2 - 8	26 - 20	10.107
CE				✓	✓		✓	32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	2 - 13	28 - 16	10.108
CE				✓	✓	✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	2 - 9	24 - 17	10.110
CE				✓	✓	✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	2 - 6	24 - 16	10.111
CE				✓	✓	✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	8	26	10.112
CE				✓	✓	✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	4 - 10	24	10.113
CE			✓	✓				16.41 ft/s (5 m/s)	9.84 ft/s (3 m/s)	164.0 ft/s ² (50 m/s ²)	6 - 16	26 - 17	10.114
CE				✓	✓	✓	✓	16.41 ft/s (5 m/s)	9.84 ft/s (3 m/s)	164.0 ft/s ² (50 m/s ²)	4 - 17	26 - 17	10.116
CE				✓	✓		✓	6.56 ft/s (2 m/s)		98.43 ft/s ² (30 m/s ²)	7 - 16	26 - 20	10.118
CE				✓	✓	✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	4 - 17	26 - 17	10.120
CE			✓			✓		32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	328.1 ft/s ² (100 m/s ²)	1 - 5	26 - 22	10.122

Chainflex® cable	Jacket	Shield	Minimum bending radius, (factor x d)		Temperature		Price index
			moving	fixed	moving	fixed	







Fiber optic cables

	CFLG-2H	PUR		12.5	7.5	-4°F to +158°F (-20°C to +70°C)	-13°F to +158°F (-25°C to +70°C)	● ● ●
	CFLK	PUR		12.5	7.5	-4°F to +140°F (-20°C to +60°C)	-13°F to +140°F (-25°C to +60°C)	● ● ●
	CFLG-2LB	TPE		5	5	-40°F to +140°F (-40°C to +60°C)	-40°F to +140°F (-40°C to +60°C)	● ● ●
	CFLG-G	TPE		15	8.5	-40°F to +140°F (-40°C to +60°C)	-40°F to +140°F (-40°C to +60°C)	● ● ●

Servo cables














	CF210	PVC	✓	10	5	+23°F to +158°F (-5°C to +70°C)	-4°F to +158°F (-20°C to +70°C)	● ● ●
	CF21	PVC	✓	7.5	4	+23°F to +158°F (-5°C to +70°C)	-4°F to +158°F (-20°C to +70°C)	● ● ●
	CF270	PUR	✓	10	5	-4°F to +176°F (-20°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	● ● ●
	CF27	PUR	✓	7.5	4	-4°F to +176°F (-20°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	● ● ●

Power cables



	CF30	PVC		7.5	4	+23°F to +158°F (-5°C to +70°C)	-4°F to +158°F (-20°C to +70°C)	● ● ●
	CF31	PVC	✓	7.5	4	+23°F to +158°F (-35°C to +90°C)	-4°F to +158°F (-40°C to +70°C)	● ● ●
	CF34	TPE		7.5	4	-31°F to +194°F (-35°C to +90°C)	-40°F to +194°F (-40°C to +90°C)	● ● ●
	CF35	TPE	✓	7.5	4	-31°F to +194°F (-35°C to +90°C)	-40°F to +194°F (-40°C to +90°C)	● ● ●
	CF300	TPE		7.5	4	-31°F to +194°F (-35°C to +90°C)	-40°F to +194°F (-40°C to +90°C)	● ● ●
	CFPE	TPE		7.5	4	-31°F to +194°F (-35°C to +90°C)	-40°F to +194°F (-40°C to +90°C)	● ● ●
	CF310	TPE	✓	7.5	4	-31°F to +194°F (-35°C to +90°C)	-40°F to +194°F (-40°C to +90°C)	● ● ●
	CFCRANE	igupren		10	4	-4°F to +176°F (-20°C to +80°C)	-22°F to +176°F (-30°C to +80°C)	● ● ●

Quick Selection



















Approvals and standards	Flame-retardant	Oil-resistant	Halogen-free	UV-resistant	Torsion resistant	v max. unsupported	v max. gliding	a max. [m/s ²]	Number of conductors	AWG range	Page
CE		✓		✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	65.6 ft/s ² (20 m/s ²)	1	980/1000 µm	10.126
CE		✓	✓	✓		32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	65.6 ft/s ² (20 m/s ²)	2	50 62.5/125, 200/230 µm	10.127
CE		✓		✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	65.6 ft/s ² (20 m/s ²)	2	50 62.5/125	10.128
CE		✓	✓	✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	65.6 ft/s ² (20 m/s ²)	6 - 12	50 62.5/125 µm	10.129
CE	RU	✓	✓	✓		32.81 ft/s (10 m/s)		164.0 ft/s ² (50 m/s ²)	4 - 8	16 - 10 Pairs 18 - 16	10.134
CE	RU	✓	✓	✓		32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	65.6 ft/s ² (20 m/s ²)	6 - 8	18 - 2 Pairs 22 - 16	10.136
CE	RU	✓	✓	✓	✓	32.81 ft/s (10 m/s)		164.0 ft/s ² (50 m/s ²)	4 - 8	17 - 2 Pairs 20 - 16	10.138
CE	RU	✓	✓	✓	✓	32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s ² (80 m/s ²)	4 - 8	18 - 1 Pairs 22 - 16	10.140
CE	RU	✓	✓	✓	✓	32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s ² (80 m/s ²)	4 - 5	16 - 1	10.144
CE	RU	✓	✓	✓		32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s ² (80 m/s ²)	4 - 5	16 - 2/0	10.145
CE	RU	✓	✓	✓	✓	32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s ² (80 m/s ²)	3 - 5	16 - 1	10.146
CE	RU	✓	✓	✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	262.4 ft/s ² (80 m/s ²)	3 - 4	20 - 1	10.147
CE	RU	✓	✓	✓	✓	32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	262.4 ft/s ² (80 m/s ²)	1	10 - 350	10.148
CE	RU	✓	✓	✓	✓	32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	1	16 - 2	10.149
CE	RU	✓	✓	✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	1	12 - 350	10.150
CE		✓	✓	✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	164.0 ft/s ² (50 m/s ²)	8	4 - 3/0	10.151

Chainflex® cable	Jacket	Shield	Minimum bending radius, (factor x d)		Temperature		Price index	
			moving	fixed	moving	fixed		
Pneumatic hoses								
	CF AIR	PU	10	8	-13°F to +176°F (-25°C to +80°C)	-40°F to +185°F (-40°C to +85°C)	● ● ●	
	CF CleanAIR	PE	10	8	-13°F to +140°F (-25°C to +60°C)	-22°F to +149°F (-30°C to +65°C)	● ● ●	
Robot cables								
	CFROBOT9	PUR	10	4	+13°F to +176°F (-25°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	● ● ●	
	CFROBOT8	PUR	✓	10	7.5	-4°F to +158°F (-20°C to +70°C)	-13°F to +158°F (-25°C to +70°C)	● ● ●
	CFROBOT4	TPE	10	4	+13°F to +176°F (-25°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	● ● ●	
	CFROBOT5	TPE	✓	12.5	7.5	-4°F to +140°F (-20°C to +60°C)	-13°F to +140°F (-25°C to +60°C)	● ● ●
	CFROBOT6	PUR	✓	10	4	+13°F to +176°F (-25°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	● ● ●
	CFROBOT7	PUR	✓	10	4	+13°F to +176°F (-25°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	● ● ●
	CFROBOT	TPE	10	4	-31°F to +212°F (-35°C to +100°C)	-40°F to +212°F (-40°C to +100°C)	● ● ●	
Special cables								
	CFFLAT	TPE	5	4	-31°F to +194°F (-35°C to +90°C)	-40°F to +194°F (-40°C to +90°C)	● ● ●	
	CFBRAID	TPE	7.5	4	-31°F to +158°F (-35°C to +70°C)	-40°F to +158°F (-40°C to +70°C)	● ● ●	
	CFBRAID-C	TPE	✓	7.5	4	-31°F to +158°F (-35°C to +70°C)	-40°F to +158°F (-40°C to +70°C)	● ● ●
	CFTHERMO	PUR	10	7.5	-4°F to +176°F (-20°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	● ● ●	

Quick Selection

Approvals and standards		Flame-retardant	Oil-resistant	Halogen-free	UV-resistant	Torsion resistant	v max. unsupported	v max. gliding	a max. [m/s ²]	Number of conductors	AWG range	Page
			✓	✓			32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	164.0 ft/s ² (50 m/s ²)			10.152
			✓	✓			32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	164.0 ft/s ² (50 m/s ²)			10.153
CE			✓	✓		✓	32.81 ft/s (10 m/s)		32.81 ft/s ² (10 m/s ²)	4-34	24-17	10.158
CE			✓	✓		✓	32.81 ft/s (10 m/s)		32.81 ft/s ² (10 m/s ²)	2-8	26-22	10.160
CE			✓	✓		✓	32.81 ft/s (10 m/s)		32.81 ft/s ² (10 m/s ²)	6-12	26-20	10.161
CE				✓		✓	32.81 ft/s (10 m/s)		32.81 ft/s ² (10 m/s ²)	2	50/125 62.5/125	10.162
CE			✓	✓		✓	32.81 ft/s (10 m/s)		32.81 ft/s ² (10 m/s ²)	3	8-2	10.163
CE			✓	✓		✓	32.81 ft/s (10 m/s)		32.81 ft/s ² (10 m/s ²)	3-12	24-12	10.163
CE			✓	✓		✓	32.81 ft/s (10 m/s)		32.81 ft/s ² (10 m/s ²)	1	8-1	10.164
CE				✓	✓	✓	32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	1	14-12	10.168
CE			✓	✓		✓	32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	262.4 ft/s ² (80 m/s ²)	8	14	10.169
CE			✓	✓		✓	32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	262.4 ft/s ² (80 m/s ²)	8	14	10.169
CE			✓	✓	✓	✓	6.7 ft/s (2 m/s)	3.3 ft/s (1 m/s)	66 ft/s ² (20 m/s ²)	2-5	24-20	10.170

Chainflex® ReadyCable®

		Cable type	Jacket	Page
Video- vision engineering/bus technology				
	FireWire	Ready-made cable	TPE	10.174
	USB	Ready-made cable	TPE	10.176
	GigE	Ready-made cable	TPE	10.178
	LWL	Ready-made cable	PUR	10.180
	LWL	Ready-made cable (Robotics)	TPE	10.182
	Koax	Ready-made cable	TPE	10.184
Network-/Ethernet-/FOC-Cables				
	CFLG.6G	Gradient fibre glass cable, ready-made	TPE	10.188
	CFLG-12G	Gradient fibre glass cable, ready-made	TPE	10.189
	CAT5	Ethernet cable, ready-made	TPE	10.190
	CAT5	Ethernet cable, ready-made, L-/T-angle	TPE	10.192
	CAT6	Ethernet cable, ready-made	TPE	10.195
	Profibus	Field bus cable, ready-made	PVC/PUR/TPE	10.196
Industrial Automation Cordsets CF9 - CF-INI (minimum bending radius 5 x d)				
		Direct line/Connecting cable	TPE	10.204
Industrial Automation Cordsets CF10 - CF-INI (minimum bending radius 5 x d) 360° shielded				
		Direct line/Connecting cable	TPE	10.210
Industrial Automation Cordsets CF98 - CF-INI (minimum bending radius 4 x d)				
		Direct line/Connecting cable	TPE	10.212








Chainflex® ReadyCable®

Selection table according to Motor type
(Part No. and sheath materials)

Jacket

Page

Cables for Drive Technology







	Allen Bradley	TPE	10.222
	Danaher Motion	PVC/PUR/TPE	10.224
	Fanuc	PUR/TPE	10.236
	Heidenhain	PUR/TPE	10.242
	Lenze	PVC/PUR/TPE	10.246
	Rexroth	PVC/PUR/TPE	10.260
	Siemens	PVC/PUR/TPE	10.270

"Danaher Motion" is a registered trademark of "Danaher Motion Technology LLC, Delaware" / "Fanuc" is a registered trademark of "Fanuc Ltd., Tokyo/Yamanashi" / "Heidenhain" is a registered trademark of "Dr. Johannes Heidenhain GmbH, Traunreut" / "Lenze" is a registered trademark of "Lenze GmbH & Co. KG, Extertal" / "Rexroth" is a registered trademark of "Bosch Rexroth GmbH, Lohr" / "Siemens" is a registered trademark of "Siemens AG, München"

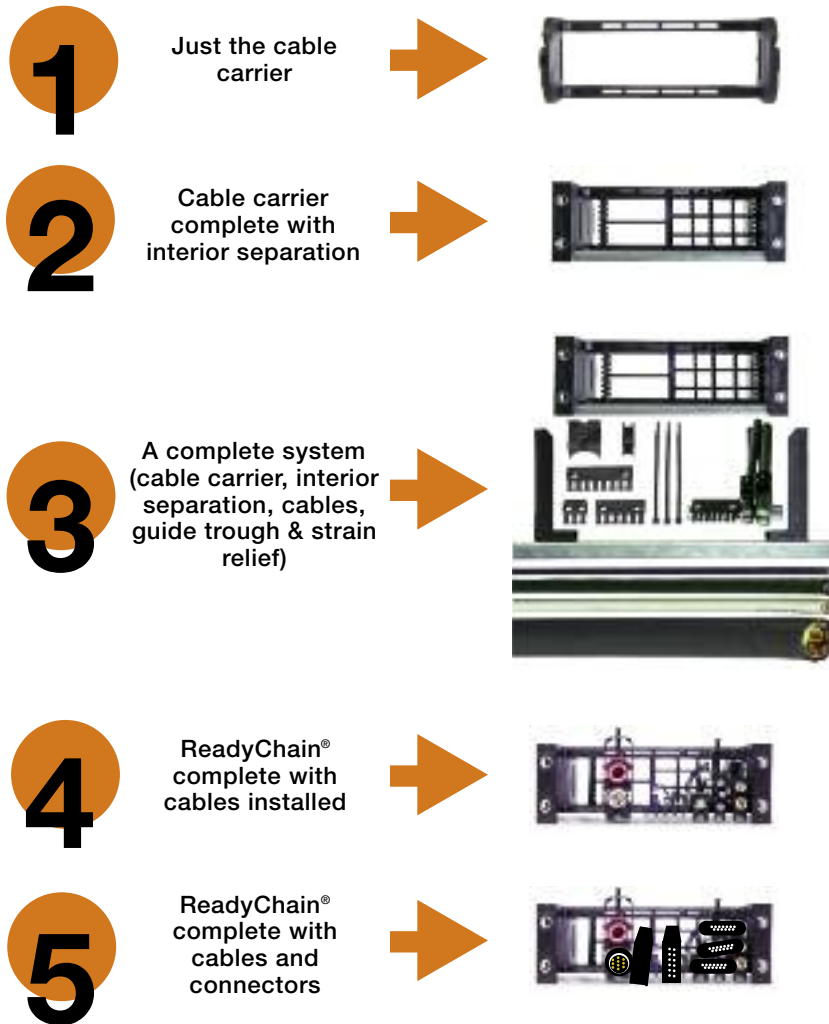
Chainflex® Strain Relief

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Strain Relief

	Chainfix steel clamps Adjustable with hexagon socket	10.290
	Tiewrap plates Bolted or clip-on	10.295
	Chainfix-tiewrap plates For Profile rail, clip-on	10.295
	Chainfix Clips Snap-on strain relief device	10.296
	Strain relief separator Separator with integrated teeth	10.297
	igus® blocks Strain relief for hoses	10.298

The Energy Chain System® you need



igus® system highlights:

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- The igus® system guarantee!
- Fast consultation on-site, if necessary
- Ordering and consultation between 8 am and 8 pm EST.
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Travel: _____
 Speed (approx.): _____
 Acceleration (approx.): _____
 Cycles/Year: _____

Cables:
 ø: _____ (mm) ø: _____ (mm)
 ø: _____ (mm) ø: _____ (mm)

Special Features: _____

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Reply in 24 hours!



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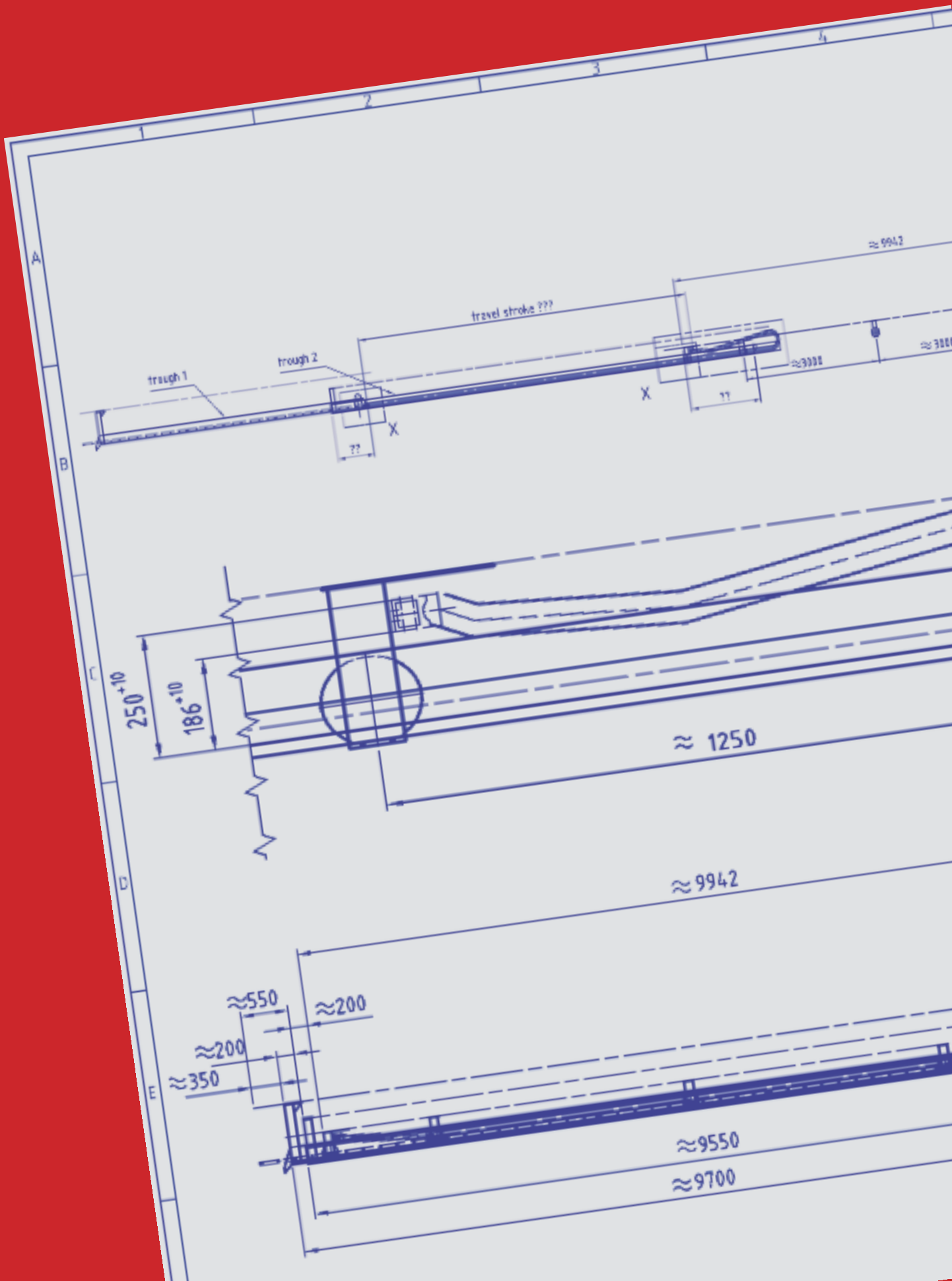
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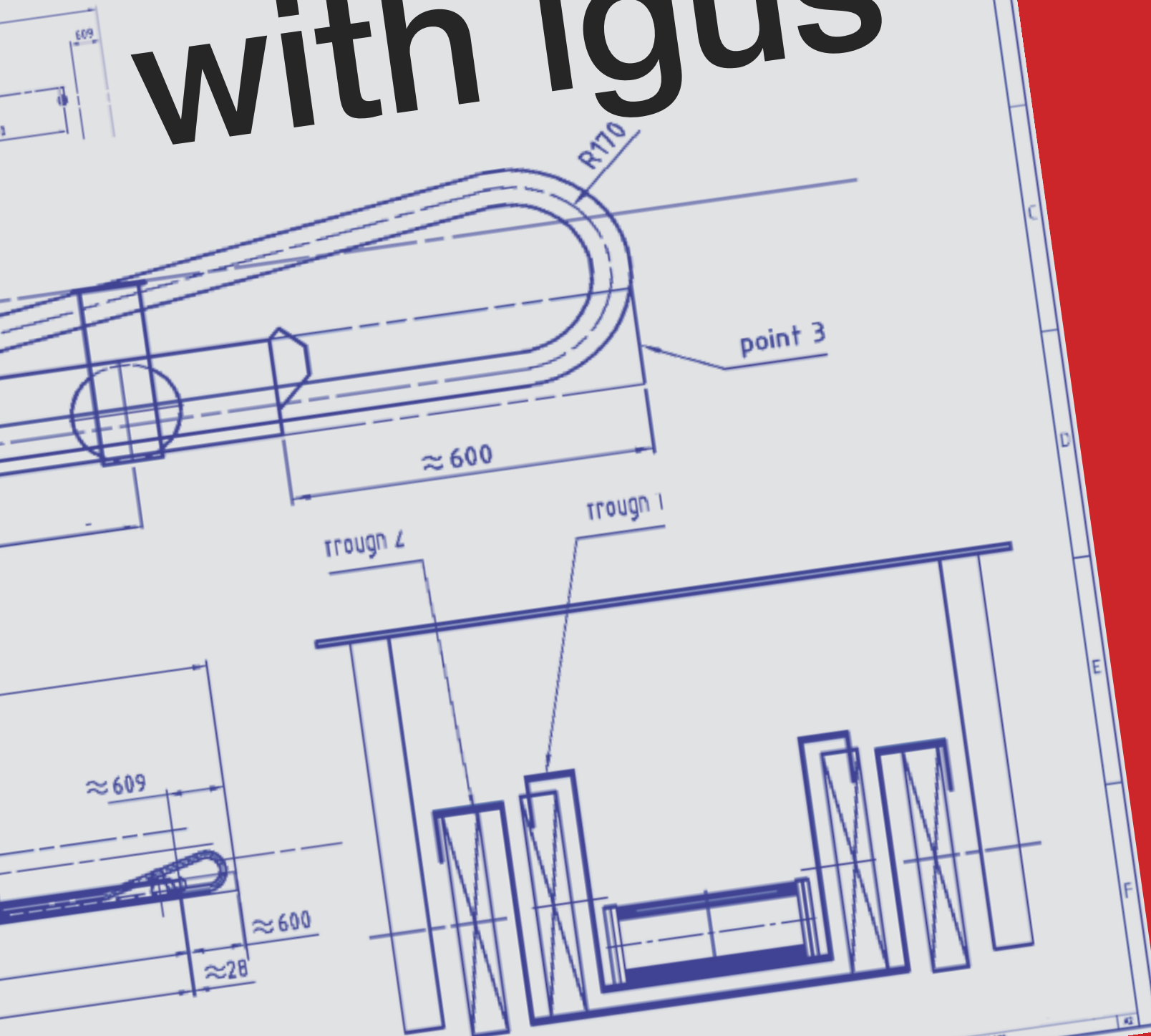
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Designing with igus[®]



Energy Chain System® Design

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Filling and Strain Relief

Filling

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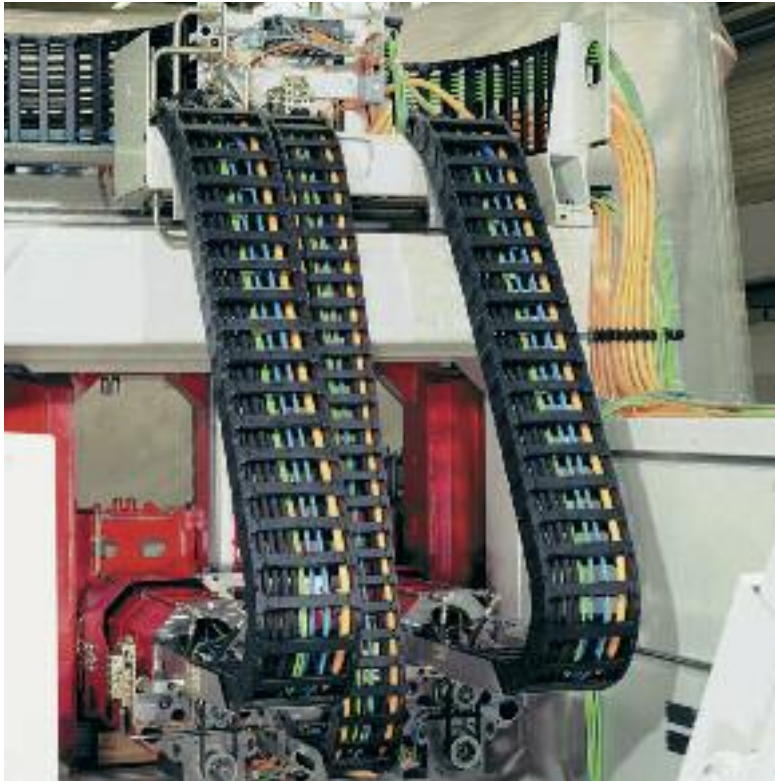
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Energy Chain System® Design

Designing with igus®

Introduction

About igus® Energy Chain Systems®



igus® Energy Chain Systems® guide and protect moving cables and hoses on automated equipment. They can be used in a wide variety of applications and possess the following capabilities:

- Use with various types of motion and travels
- Guidance of sensitive bus and data cables, as well as fiber optic cables, using the same techniques as with electric, gas, air and liquid hose guidance
- Long service life under very high loads and demanding requirements
- Smooth operation in a full range of environments and climates

On the following pages, we offer important guidelines which are to be taken into consideration when designing safe Energy Chain Systems®. All specifications are based on test results from the igus® laboratory and our field experience since 1971.

In addition, we strongly encourage you to take advantage of our free design service. Simply fill in the “igus® system design” fax sheet on page 1.5 of this catalog, log onto the igus web site at <http://www.igus.com> and e-mail us your technical specifications, or call us at 1-800-521-2747.

We will provide a comprehensive quote by the end of the next business day.

Laboratory tests and practical experience

Our calculations and analyses are based on the result of ongoing practical tests in our Technical Center and our experience with gliding applications. The focal points of our tests are push-pull forces, friction values and abrasion under widely varying conditions and speeds, as well as factors such as dirt, weathering or impact and bumps. We test all system components such as cables, hoses, strain relief and other accessories, in addition to the Energy Chains® or Energy Tubes and Guide Troughs.



The igus® test laboratory for Energy Chains® and Chain-flex® cables

Energy Chain System® Design Application Examples



Long travels 1,447 ft. (441 m) with igus® Rol E-Chain® long travel applications



High fill weights 40.3 lbs/ft (60 kg/m) with System E4. fill weights/load diagrams



Multi-axis Energy Chains® E-Z Triflex® on a production line, combined movements



ReadyChain® under water. System E4 and Chainflex® CF9, ReadyChain®



ReadyChain® with combined motions on tooling machines



Series E6-52 high speed 49.2 ft/s (15 m/s) low noise operation, optimized noise level



Crash test unit: 72.2 ft/s (22 m/s) speed and 2,572 ft/s² (784 m/s²) acceleration, travel speed



Complex movements with igus® Triflex®R, combined movements



Cleanroom and Triflex® R technical environment



Extension links for E2 and E4 for large conduits, cable and hoses



Zig-zag movements, 118 ft. (36 m) height with E4/4



igus® System E6 - High acceleration and ESD safety, ESD & ATEX

Energy Chain System® Design Application Examples



Unsupported application System E4, up to 164 ft/s (50 m/s) speed



Unsupported, side-mounted E4 Series R188



Unsupported nested application System E4



Gliding application System E4, up to 1641 ft (500 m) realized



Gliding, side-mounted Series E4/4



Gliding application System E4



Vertical, standing Series E4/light, up to 19.69 ft (6 m) possible



Rotary movement System E4



Energy Chains® side by side as individual or "multiband" Series "Zipper"



Vertical, hanging Series E4 up to 131 ft (40 m) possible



Spiral and rotary movement TwisterChain®



Combined movement Series Triflex®

Energy Chain System® Design igus Terminology and Formulas

Throughout this catalog you will find the following terms and formulas:

Application-Icons



Unsupported - short travels



Gliding - long travels



Vertical hanging



Vertical standing



Side-mounted



Rotary motion



Horizontal and vertical



Nested



Side by side

Short cut

Description

α	= The rotation angle of the rotating machine element	(°)
ΔM	= Deviation of the center point	(in.)
a	= Acceleration	(ft/s ²)
AR	= Outer radius, Energy Chain®	(in.)
Ba	= Outer Energy Chain® width	(in.)
Bi	= Inner Energy Chain® width	(in.)
B_{Ra}	= Guide trough outer width	(in.)
B_{Ri}	= Guide trough inner width	(in.)
D	= Over length Energy Chain® radius in final position	(in.)
D_2	= Over length for long travels gliding	(in.)
FL_B	= Unsupported length with sag	(ft)
FL_G	= Unsupported straight length	(ft)
FL_U	= Unsupported lower run	(ft)
FZ_{max}	= Maximum additional load	(lbs/ft)
H	= Nominal clearance height	(in.)
ha	= Outer Energy Chain® height	(in.)
H_F	= Required clearance height	(in.)
hi	= Inner Energy Chain® height	(in.)
H_{Ra}	= Outer trough height	(in.)
H_{Ri}	= Inner trough height	(in.)
IR	= Inner radius, Energy Chain®	(in.)
K	= Add-on for bending radius (K is taken from the data tables of the individual igus® Series)	(in.)
K_2	= Further add-on if the mounting bracket location is set lower (for long travels)	(in.)
L_K	= Energy Chain® length	(in.)
n	= Number of links	(1)
n_{Mon}	= Number of installation sets (left/right)	(1)
n_{Ri}	= Number of trough-sets (left/right)	(1)
R	= Bending radius	(in.)
RBR	= "Reverse bending radius"	(in.)
S	= Length of travel	(in.)
$S/2$	= Half length of travel	(in.)
T	= Pitch	(in.)
v	= Speed (travel)	(ft/s)
X_1	= Inner machine-construction space (TwisterChain®)	(in.)
X_2	= Outer radius chain, including clearance (TwisterChain®)	(in.)

Formula

Description

$2 \times FL_B$	= Calculation of maximum travel length, unsupported with sag
$2 \times FL_G$	= Calculation of maximum travel length, unsupported straight
$B_{Ri} \geq Ba + .20$ (5mm)	= Calculation of the minimum guide trough width
$H_{Ri} \geq 2 \times ha$	= Calculation of the minimum guide trough height
$K = \pi \times R$	= Add-on for bending radius
$L_K = S/2 + \Delta M + K$	= Calculation of chain lengths for all types of applications, fixed end is outside the center of travel, except rotary movements and most long travels
$L_K = S/2 + K$	= Calculation of chain lengths for all types of applications, fixed end in the center of travel, except rotary movements and most long travels
$L_K = S/2 + K_2$	= Calculation of chain lengths for long travel gliding applications fixed end in the center of travel

Energy Chain System® Design

Calculation of Energy Chain® Lengths

Camber

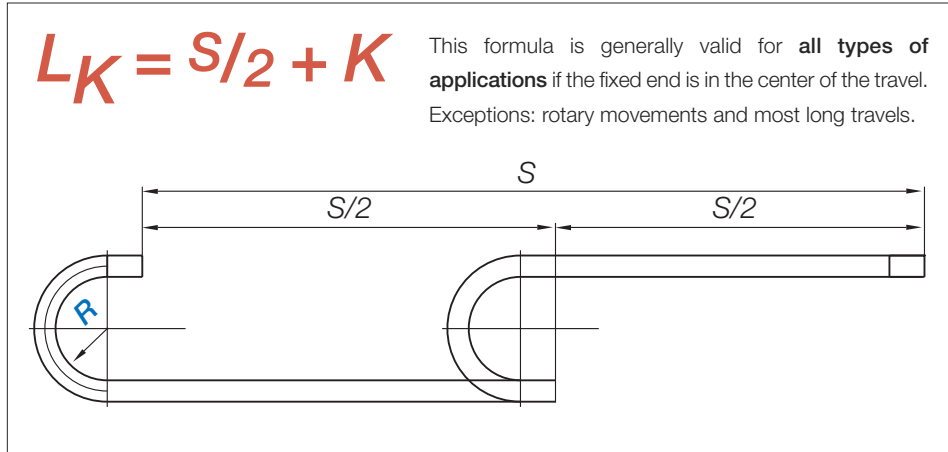


Calculation of Energy Chain® lengths

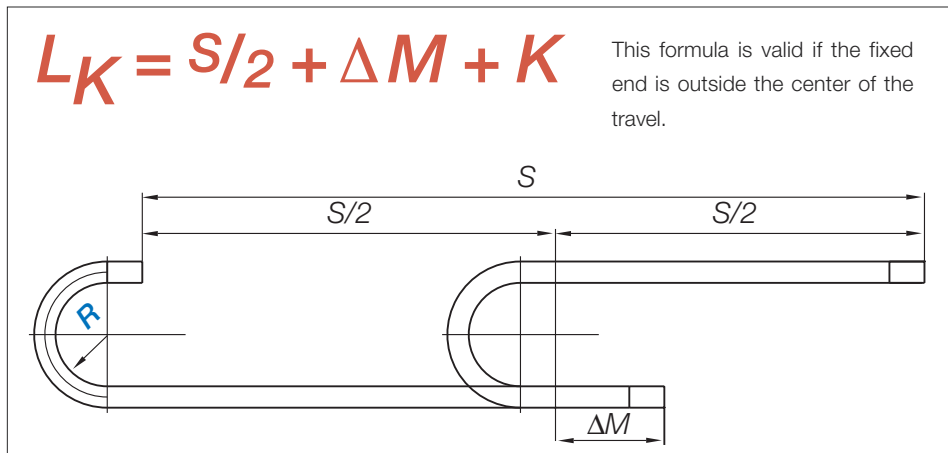
If the fixed end of the Energy Chain® is located in the center of the travel, the chain length “ L_K ” is calculated by using half the length of travel and adding the value “ K ” for the curve length. (You can obtain the value “ K ” from the tables in the catalog.) Placing the fixed end in the **center** of the travel is the most **cost-effective solution** because it requires the shortest Energy Chain®, cables and hoses.



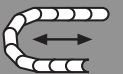
The fixed end in the center of the travel is the most favorable solution



- L_K = Energy Chain® length
 - S = Length of travel
 - R = Bending radius
 - ΔM = Deviation from the center point
 - $K = \pi \cdot R +$ "safety buffer"
- Add-on for bending radius (K is taken from the data tables of the individual igus® series)



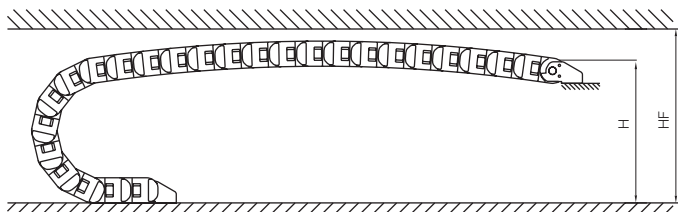
PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Camber

“Camber” is the curve of the upper run along its unsupported length. **All igus® Energy Chains are manufactured with camber, special “no camber” (NC) Energy Chains® are available upon request.** The camber allows for longer unsupported lengths and increases service life and operating safety. In the **Installation Dimensions** section of each respective Energy Chain® description, you will find the measurement H_F , which specifies the **necessary clearance height**, taking the camber into account. The camber allows for longer unsupported lengths and increases service life and operating safety. Upon request, we can deliver Energy Chains® without camber for restricted space applications; however, these “no camber” chains do not have the same load-bearing capacity. Please consult igus®.

- H = Nominal clearance height
- H_F = Required clearance height



Principle of camber for igus® Energy Chains® H_F = required installation height

Necessary clearance height depends on the camber of the Energy Chain®. Find values for necessary clearance height “ H_F ” on each product page.

Date:	Telephone: 1-800-521-2747 Fax: 1-401-438-7270
From:	To: igus®, inc. P.O. Box 14349 East Providence, RI 02914

Please supply us with as much application data as possible. Items highlighted in red must be filled out for analysis. You will receive a complete analysis with cable/hose layout proposal and quote by the end of the next business day. Please contact us if you have any questions.

Travel: _____ in. Fixed end: center of the travel yes or _____ inches from the center

Max. width permitted (if applicable): _____ in.

Installation space

R desired: _____ in. Max. installation height H_F : _____ in.

Assembly point (floor, wall, console, etc.): _____ in. Span (Standard = 6.5 ft.): _____ in.

Guide trough?
 yes; if yes, which:
Dimensions:
 B_{Ri} _____ in.
Dimensions:
 H_{Ri} _____ in.

Dynamics

Speed: _____ (f/s) Acceleration: _____ (f/s²)

Cycles/Day: _____ Days/Year: _____ Outer diameter: _____

Environment

Temperature (°F): _____ Humidity (%): _____ Dust, dirt, chips: _____

Special parameters: _____

Cables/Hoses

Number	Manufacturer/Type, No.	Conductor/AWG	Outer Dia.	Weight lbs/ft.	Bending radius

Further individual components desired:

<input type="checkbox"/> Energy Chains® / Energy Tubes	<input type="checkbox"/> Energy Chain®	<input type="checkbox"/>
<input type="checkbox"/> Chainflex® cables/special conduits	<input type="checkbox"/> Energy Tube	<input type="checkbox"/>
<input type="checkbox"/> Guide troughs	<input type="checkbox"/> To be opened:	
<input type="checkbox"/> Strain relief	<input type="checkbox"/> On both sides	<input type="checkbox"/>
<input type="checkbox"/> Harnessing	<input type="checkbox"/> Along the outer radius	<input type="checkbox"/>
<input type="checkbox"/> On-site assembly	<input type="checkbox"/> Along the inner radius	<input type="checkbox"/>
<input type="checkbox"/> Other: _____	Special requests: _____	
<input type="checkbox"/> Please copy, fill in and fax. Thank you.	igus® System guarantee?	<input type="checkbox"/>



Unsupported

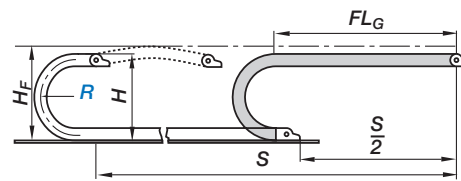
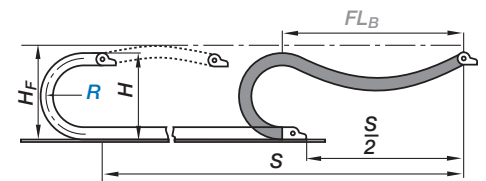
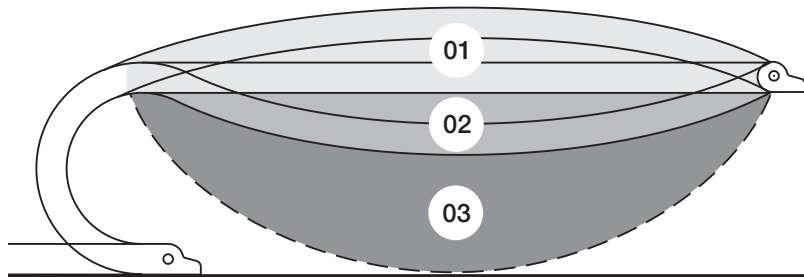
If the upper run of the Energy Chain® operates without touching the lower run over the entire travel, it is called an "unsupported" application.

Unsupported length

The distance between the carrier and the beginning of the radius curve of the Energy Chain® is called the "unsupported length." It is always dependent upon the type of chain and the fill weight.



The "FL_G" type of installation always generates the longest service life and can be operated with the maximum values for speed and acceleration.

FL_G unsupported straight lengthFL_B unsupported length with sag

01) Unsupported with "straight" upper run (FL_G)

The "FL_G" Energy Chain® applies when the upper run either has camber, is straight, or has a maximum of .39"-1.97" (10-50 mm) sag, depending on the size of the chain. The "FL_G" type of installation is always preferred. The Energy Chain® runs quietly and is not exposed to any additional vibration.

02) Unsupported with permitted sag (FL_B)

The "FL_B" Energy Chain® applies when the sag amounts to more than .39"-1.97" (10-50 mm), depending on the chain size, and less than a defined maximum sag. This maximum sag is dependent on the type of chain. The "FL_B" application is technically permissible in many cases. It becomes problematic if the acceleration and the travel frequency are high.

03) "Critical Sag"

If the sag is greater than permissible for "FL_B", then we refer to it as "critical sag." An installation with critical sag must be avoided or reserved for extreme circumstances. An Energy Chain® should never be installed with critical sag. There are applications which, after a very long period of use, reach the stage of "critical sag." The Energy Chain®/Tube should be replaced at that time.

Please contact us if your application reaches critical sag.

The following important factors should be considered to select the correct Energy Chain®:

- Unsupported length
- Speed
- Acceleration
- Service life
- Load bearing areas
- Noise level
- Technical environment



Example of unsupported with FL_B sag



Unsupported Length

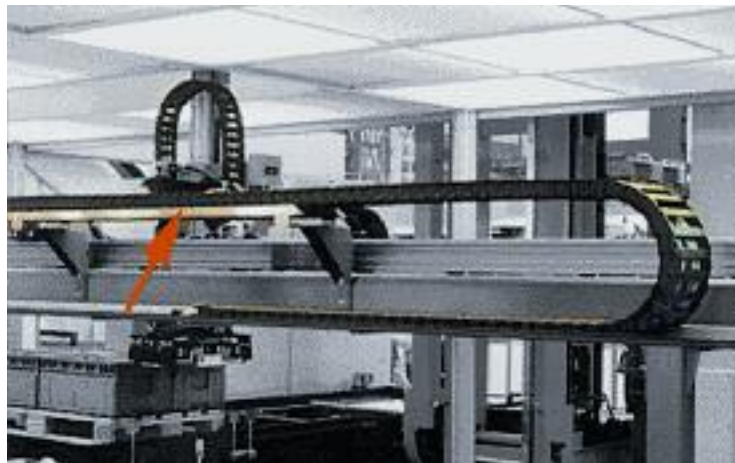
For every igus Energy Chain®/Tube, you will find the values for “ FL_G ” and “ FL_B ” in two locations: On the following pages in this chapter as an overview and within every individual series’ chapter. These values are essential for:

- Finding a suitable Energy Chain® for your fill weight and travel distance
 - Identifying the maximum load for the selected Energy Chain®
- Graphs of unsupported lengths on ► Pages 1.15 to 1.18

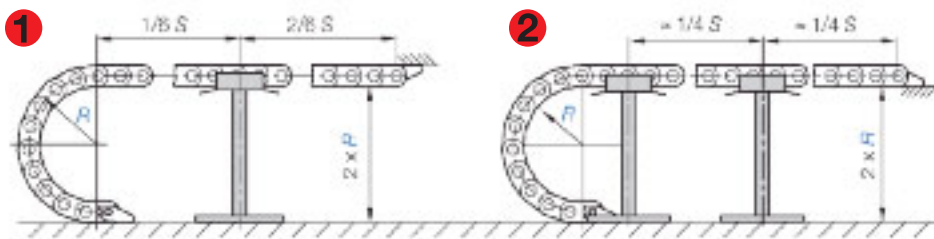
What to do if the unsupported length is insufficient:

If your application, fill weight and travel fall outside the “unsupported length” parameters of the desired Energy Chain®, you have the following options:

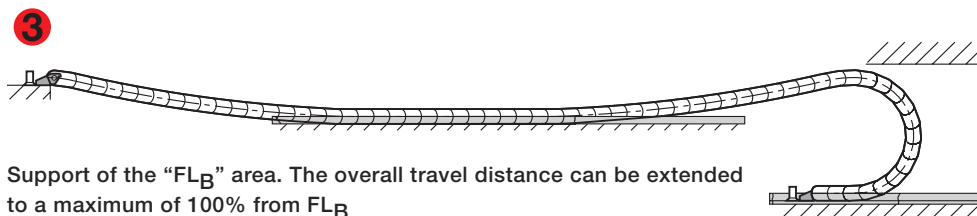
- Select a more stable igus® Energy Chain®
- Support the chain in the unsupported area (this possibility has restrictions for acceleration, speed and noise as a consequence; three fundamental examples are detailed below; please consult igus if you are considering this possibility we will gladly provide you with a detailed proposal)
- Use a “multiband” chain or “nest” two Energy Chains® inside one another (please consult igus regarding these options)
- Design the travel distance as a “gliding application” (see page 1.19).



Series 28 with support of the “ FL_B ” area

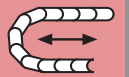


Support of the “ FL_G ” area. The overall “straight, unsupported travel can be increased along the upper run by a maximum of 50% of the FL_G and along the lower run by a maximum of 100%.



Support of the “ FL_B ” area. The overall travel distance can be extended to a maximum of 100% from FL_B .

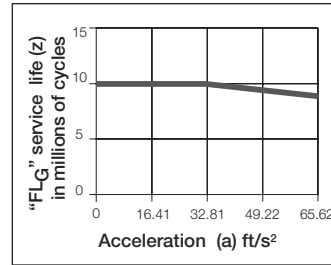
PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



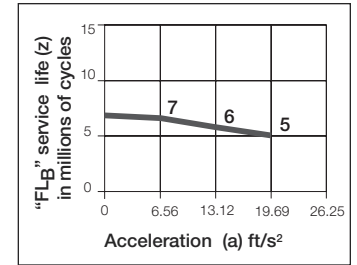


Max ft/s (m/s) Unsupported	FL _G	FL _B
v max ft/s (m/s)	65.6 (20)	9.84 (3)
v peak ft/s (m/s)	164 (50)	–
a max ft/s ² (m/s ²)	656 (200)	19.69 (6)
a peak ft/s ² (m/s ²)	2572 (784)	–

Standard values of maximum speed (v) and acceleration for unsupported lengths



Standard values on service life for "FL_G" dependent on acceleration



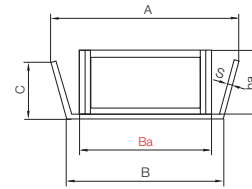
Standard values of service life for "FL_B" dependent on acceleration

Speed and acceleration, service life

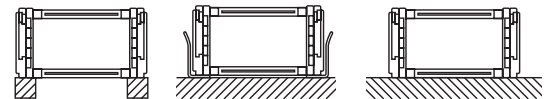
For unsupported applications, the acceleration (a), is the critical parameter. High acceleration can cause the Energy Chain® to vibrate and reduce its service life. This is a particular danger if the Energy Chain® already has a sag greater than the FL_G value. Maximum values for acceleration speed and service life are achieved only with Energy Chains® incorporating the FL_G (unsupported, straight) design. FL_G designed igus Energy Chain Systems® can sustain very high loads. To date, a peak acceleration of 2572 ft/s² (784 m/s²) has been achieved during continuous use. Through ongoing testing in the igus® laboratory and from practical experience, standard values for service life have been formulated (see graphs). Our tests confirm that these standard values apply to all igus Energy Chains® and Energy Tubes. It is crucial to determine whether the application will be designed as unsupported, straight (FL_G) or unsupported, with sag (FL_B).

Load-bearing surfaces

Unsupported Energy Chains® normally require some type of surface on which the lower portion of the chain runs. As the drawings on the right demonstrate, a wide range of configurations are available. Many material options are feasible: Metals, polymers, stone, wood, concrete, glass, etc. **We also have solutions to minimize the noise generated by the carrier's lower portion. Please consult igus®.** When selecting the running surface, be sure dirt and debris cannot collect in the Energy Chain® path.



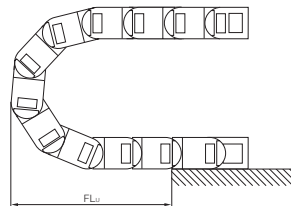
- Ba = chain outer width
- A = B + .39" (10)
- B = ba + .20" (5)
- C = ha/.08" (2)
- S = .06" - .12" (1.5 - 3)



Different surfaces and guide troughs are possible

Unsupported lower run

Energy Chains® without support along the lower run have restricted use. The FL_L value must be determined in a test by igus®. The maximum permissible amount of the projection depends on the fill weight, the selected Energy Chain®, the dynamics, and other factors. The various combinations of these parameters can produce very different results. **If the lower run of the Energy Chain® cannot be supported over the whole travel, please consult igus®.**



System E4 partially unsupported - please consult igus regarding this type of configuration.

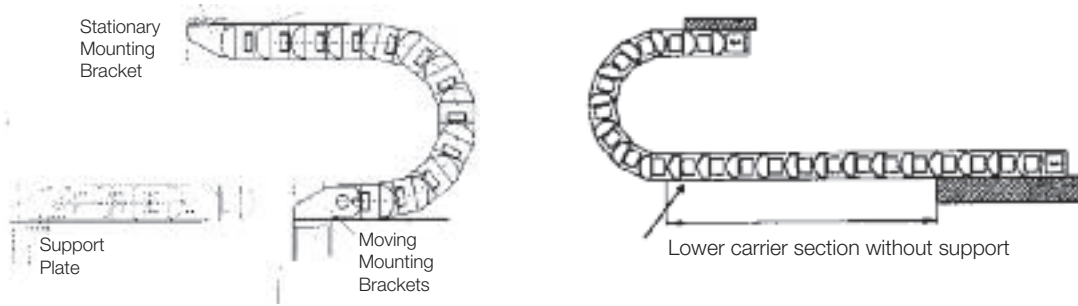
Mounting Brackets

We recommend **pivoting mounting brackets** as standard for unsupported applications. Pivoting mounting brackets compensate for the camber, can be installed more easily and decrease the load on the first Energy Chain® link in operation. **Exception:** If the acceleration is greater than 65.6 ft/s² (20 m/s²) or if the height is limited to the H_F measurement, locking mounting brackets keep the Energy Chain under the H_F measurement.

Horizontal Inverted

An Energy Chain System® is said to be horizontal “inverted” when the stationary end (fixed) is positioned on the top and the moving end is positioned on the bottom. Care must be taken to assure the maximum unsupported inverted span (FLu) is not exceeded. A support plate behind the moving end bracket may be necessary to prevent cantilevered loading and potential wear or breakage. Please contact igus® with your application information. We will be happy to spec a chain in for you.

Guidelines for unsupported lengths, lower section has no support.



Unsupported, noise optimized

The igus® program offers you optimal noise-reduction Energy Chain®. In addition to the Energy Chain®, the running surface, the dynamics and the cable and hose package all play a role in overall noise generation. Have our specialists design the quietest Energy Chain System® for your application.



System E4 ≤ 46 dB(A)

A measurement by the Rhineland Technical Inspection Authority (TÜV Rheinland) for **System E4/101, Series 221-10-200-0** indicates a value of 46 dB(A) at 4.92 ft/s (1.5 m/s) with an unsupported length.

Selected noise tests

External noise corrected measurement values

igus® Series	System	Average sound levels	Test method (unsupported)
E6-52	E6	=46 dB(A)	6.56 ft/sec
221	E4/101	=46 dB(A)	4.92 ft/sec
255	E2 Medium	=53 dB(A)	4.92 ft/sec
280	E4/100	=64 dB(A)	6.56 ft/sec



System E6 ≤ 46 dB(A)

A measurement conducted by the Rhineland Technical Inspection Authority (TÜV Rheinland) in May 2002 indicates a value of ≤ 46 dB(A) at 6.56 ft/s (2 m/s) and with an unsupported length of 4.92 ft (1.5 m) with **Series E6-52-10-100-0**, and all this with at least 10 dB(A) sound pressure level generated by external noise. The System E6 runs very smooth due to the short link pitch.

igus® Series	System	Average sound levels	Test method (unsupported)
381	E4/101	=66 dB(A)	9.84 ft/sec

Competitors Product	Average sound levels	Test method (unsupported)
Chain 1	=77 dB(A)	6.56 ft/sec
Chain 2	=68 dB(A)	6.56 ft/sec
Chain 3	=73 dB(A)	6.56 ft/sec

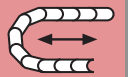


A reduction of 3 dB(A) sounds like a 50% reduction in the noise level to the human ear.



We have received an official comment from the Rhineland Technical Inspection Authority (TÜV Rheinland Berlin Brandenburg). A copy is available upon request.

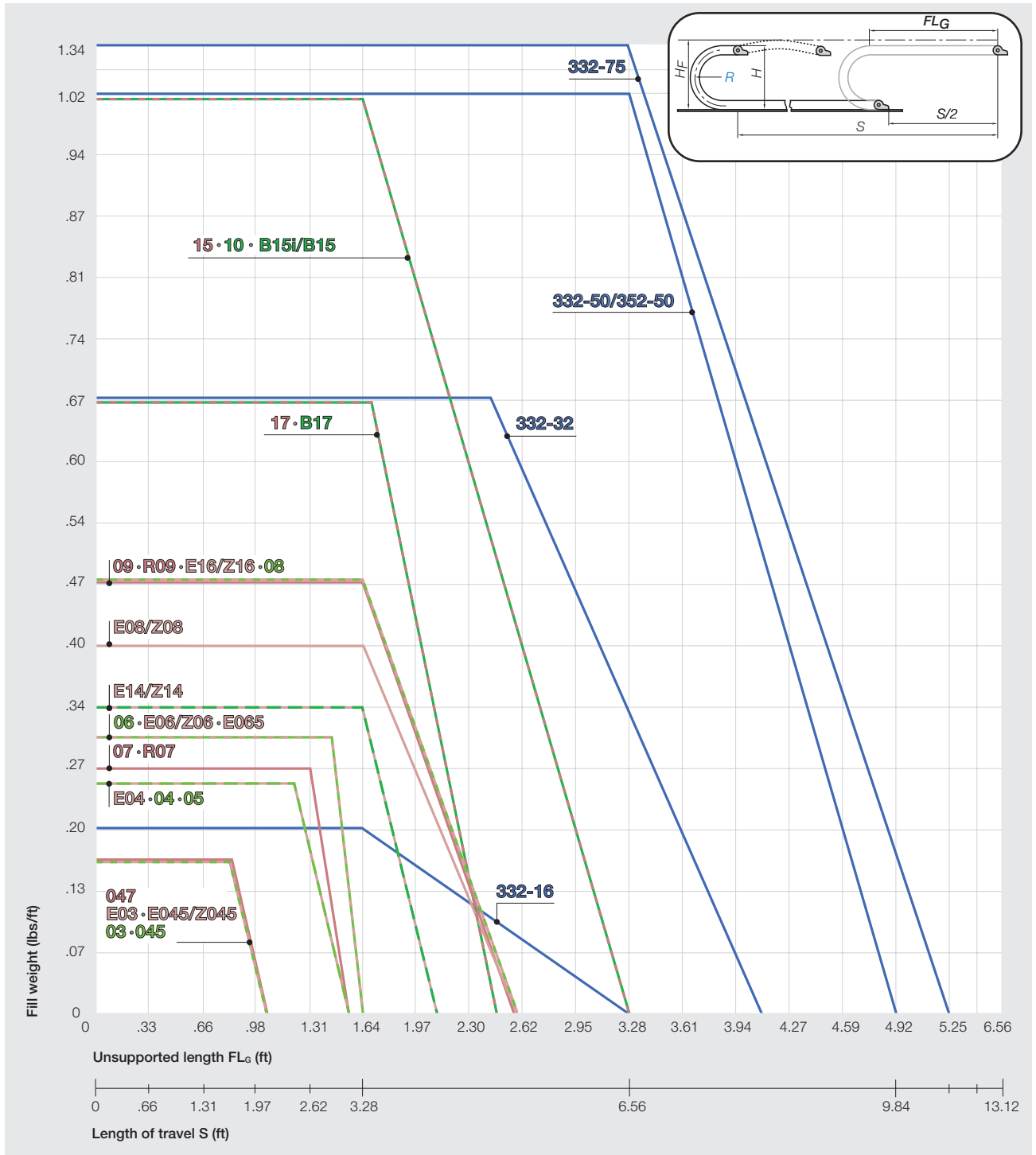
PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



igus® Energy Chain System®

Telephone 1-800-521-2747
 Fax 1-401-438-7270

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec: <http://www.igus.com/quickspec>



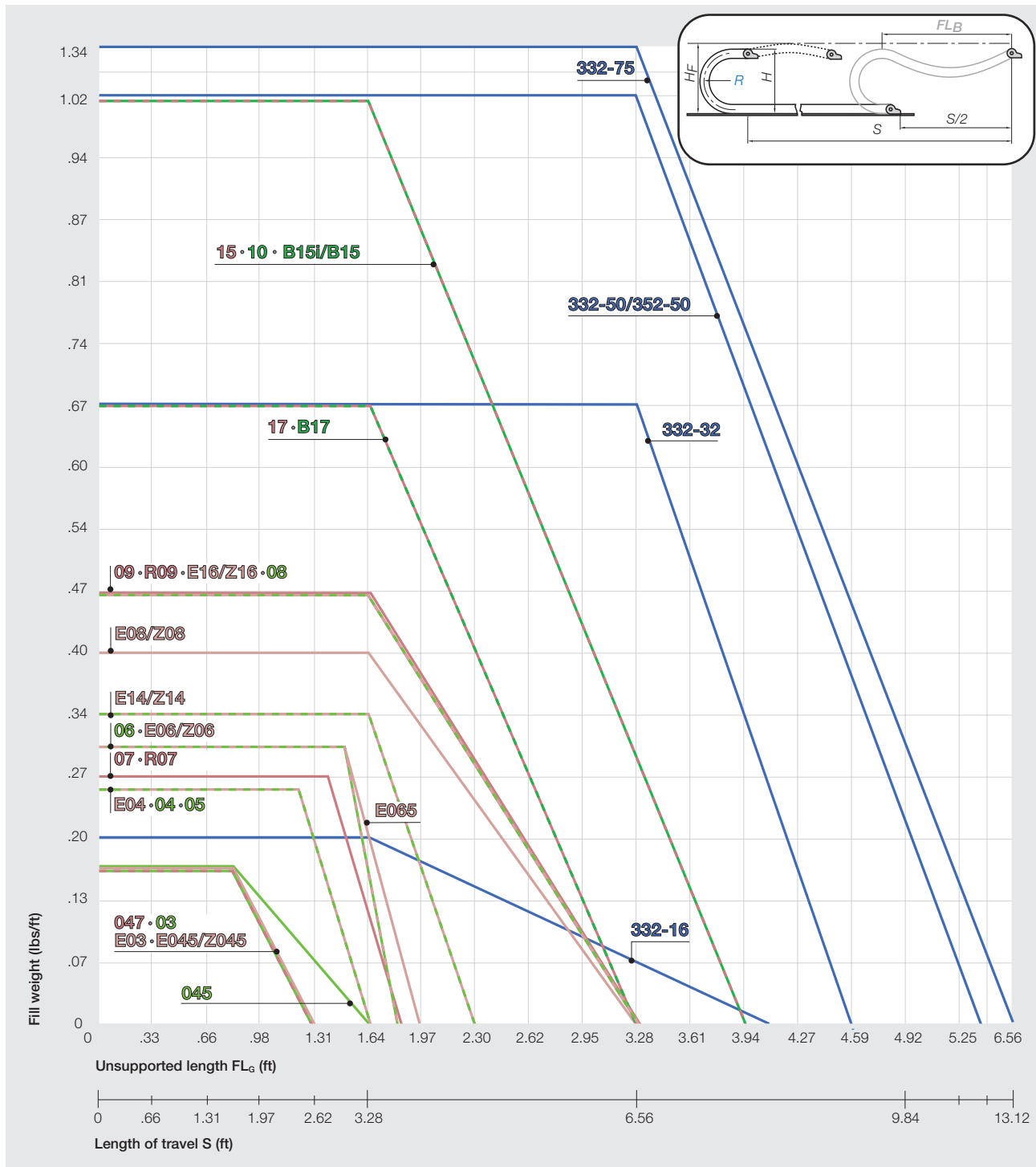
Important information

- Fill weight - Weight of all cables and hoses, including contents (for media hoses) within the Energy Chain®, typically given (lbs/ft)
- FL_G - unsupported Energy Chain® with straight upper run
- FL_B - unsupported Energy Chain® with permitted sag
- To the right of the FL_B graph of the diagram, the application is shown in "critical sag", which must be avoided!

These values are essential for:

- Finding a suitable Energy Chain® for your fill weight and travel distance
- Identifying the max. load for the selected Energy Chain®.

If you cannot meet your application demands using these parameters, keep in mind these specifications are conservative maximum values. In individual cases, they can be exceeded by up to 30%. Special solutions are also possible. Please consult igus®, we will be happy to assist you with your application.



PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



The maximum travel - $2 \times FL_G$ or FL_B

If the fixed end is in the center, then:

Energy Chain® length: $L_K = S/2 + K$

S = Length of travel

R = Bending radius

H = Nominal clearance height

H_F = Required clearance height

$K = \pi \cdot R +$ "safety buffer" Add-on for bending radius

(K is taken from the data tables of the individual igus® series)

Diagram Series

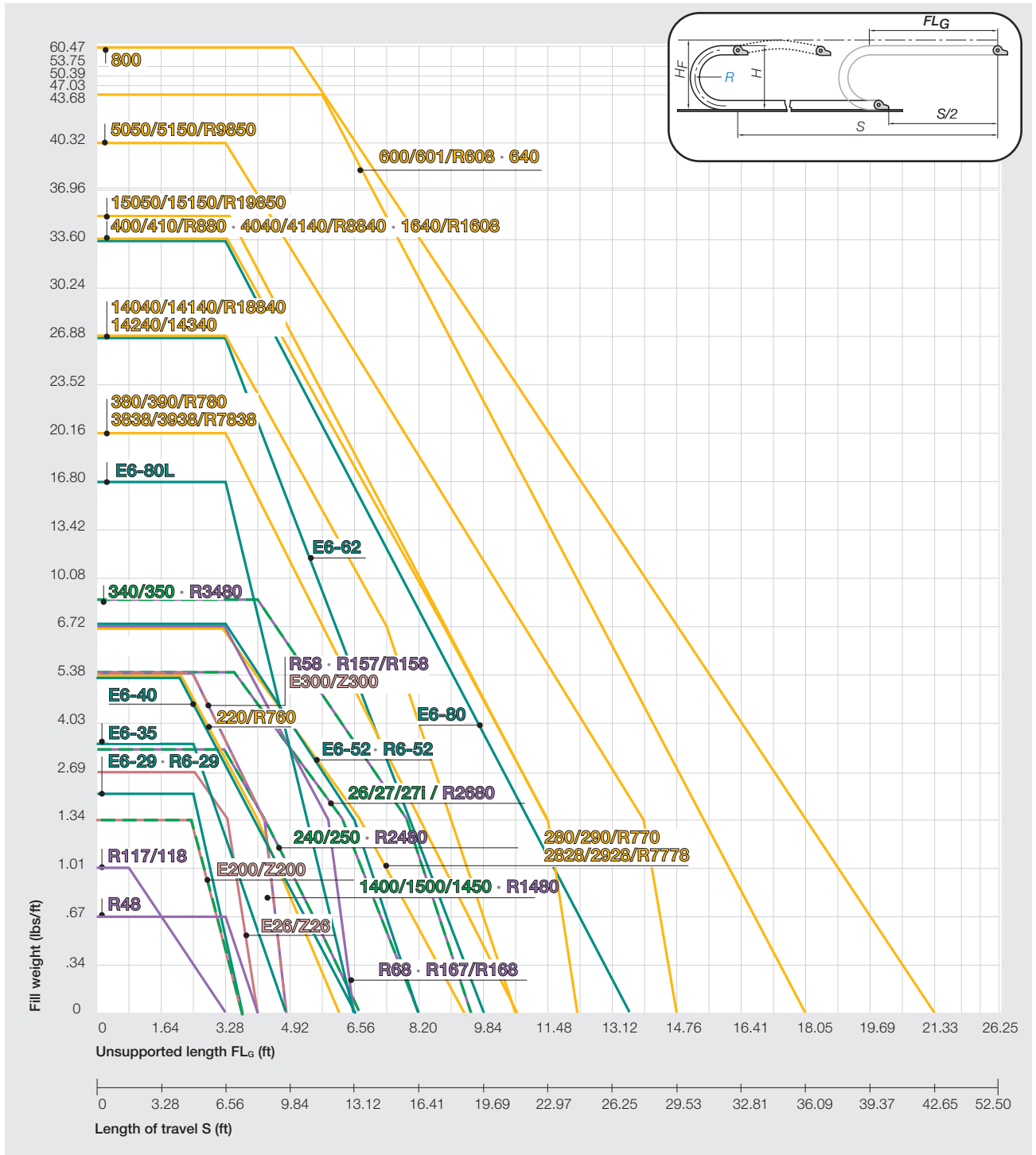
You will find both diagrams for each series listed individually in the catalog!

- E-Z Chain® chapter 2
- Zipper chapter 3
- E2 micro chapter 4
- E2 mini chapter 4
- Triflex® chapter 8

igus® Energy Chain System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>



Important information

- Fill weight - Weight of all cables and hoses, including contents (for media hoses) within the Energy Chain®, typically given (lbs/ft)
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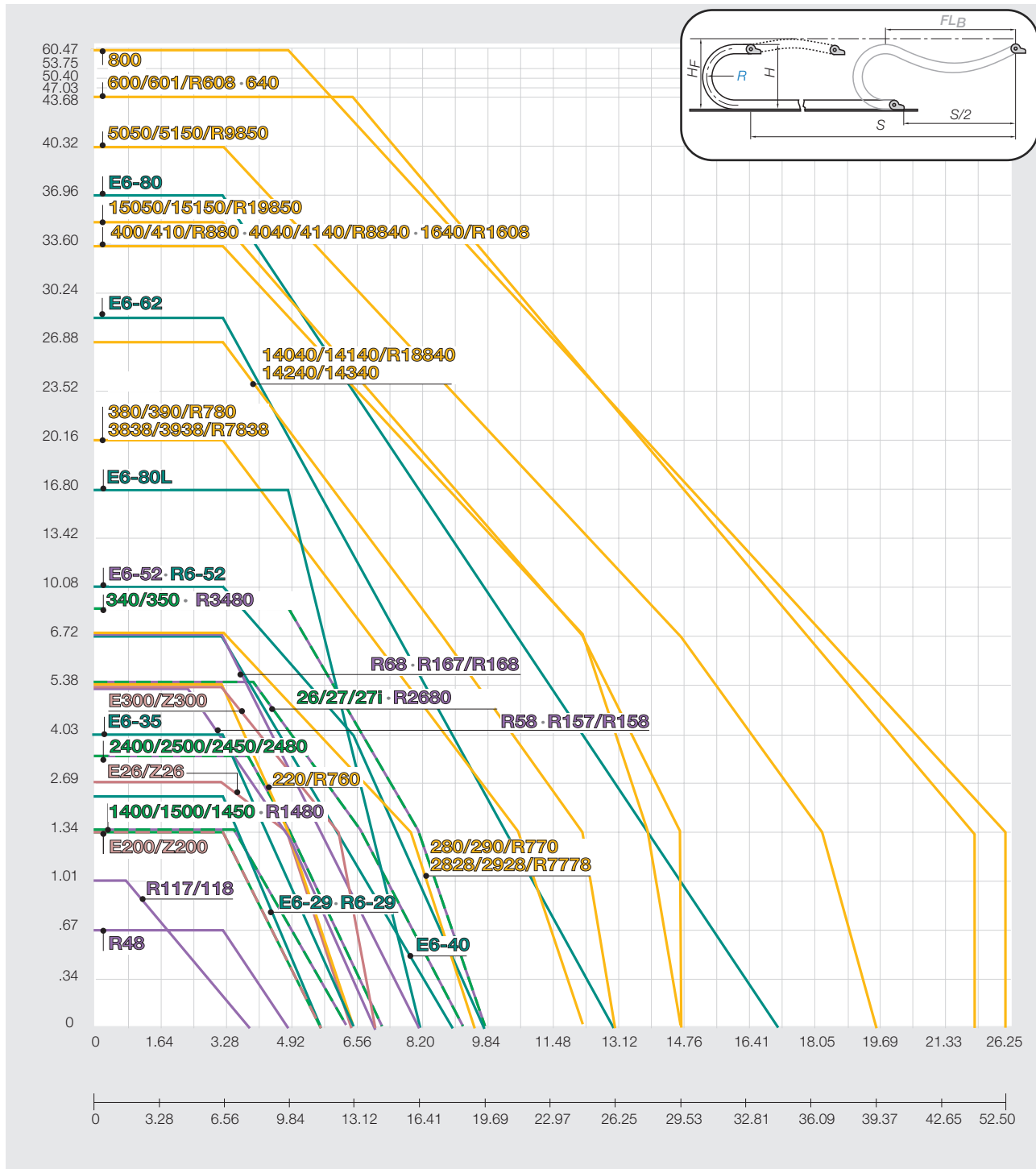
Energy Chain System® Design

Unsupported, Sag FL_B Short Travel Applications

Load diagram for large Energy Chains®



Design



The maximum travel -always amounts to $2 \times 2 \times FL_G$ or FL_B if the fixed end is in the center of the travel. In this case, the following applies:

Energy Chain® length: $L_K = S/2 + K$

S = Length of travel

R = Bending radius

H = Nominal clearance height

H_F = Required clearance height

$K = \pi \cdot R +$ "safety buffer" Add-on for bending radius

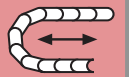
(K is taken from the data tables of the individual igus® series)

Diagram Series

You will find both diagrams for each series listed individually in the catalog!

- E-Z Chain® chapter 2
- E2/000 chapter 4
- E2 Tubes chapter 5
- E4 chapter 6
- E6 chapter 7

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS





Gliding application -

If the upper run of the Energy Chain® rests on the lower run, it is a gliding application



Preferred igus® Energy Chains® for gliding, long travels

- Rol-E-Chain®
- System E4
- E2/000

Gliding applications principle

For long travels, the upper run of the igus® Energy Chains® rests on the lower run. The upper run glides partially on the lower run and partially at the same height on a glide bar.

The illustrations shown below depict the gliding application principle. For lateral guidance, a guide trough is necessary. If the stationary mounting bracket and the fixed end of the cables and hoses can be placed in the center, the Energy Chain® length is calculated as follows:

$$L_K = S/2 + K_2$$

Depending on the technical data and the selected Energy Chain®, the mounting point of the moving end of the Energy Chain® must be lowered on some units.

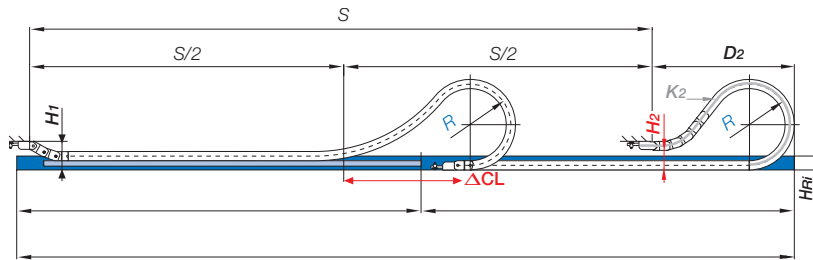
Lowered mounting height: In our system analysis for long travels, we give exact details for your specific application.

For center mounted applications,

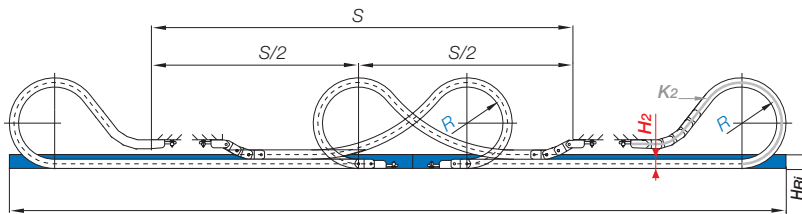
Energy Chain® length:

$$L_K = S/2 + K$$

- S = Length of travel
- R = Bending radius
- H_{Ri} = Trough inner height
- H_F = Required clearance height
- K_2 = Add-on if the mounting bracket location is set lower (specified by igus®)
- D_2 = Over length for long travels gliding
- H_2 = Installation height with lowered mounting



The function of an Energy Chain System® for gliding applications (schematically)
 The fixed end of the Energy Chain® is located in the center of the travel distance



For a configuration involving two opposed Energy Chains®, the travel is measured as shown and selected when these factors apply: ● Restricted space ● High loads

- Guide trough
- Glide bar

Advantages for long travel applications with igus® Energy Chains®



Example of lowered mounting height

- Travels over 1312 ft (400 m)
- Gliding speeds up to 16.4 ft/s (5 m/s) (more in individual cases)
- Service life of 10 years and more with igus® Energy Chain Systems®

Further advantages of the design are:

- Many different types of cables and hoses can operate side by side in the same system (i.e. electrical, data, fiber optic cables with hydraulic and pneumatic hoses)
- Space-saving installation
- Quiet operation
- High accelerations
- Durable in wind, weather, dirt, and chemicals
- Simple assembly of the modular system on the spot
- Rapid assembly and replacement of cables and hoses

Recommended ratio of Energy Chain® inner width B_i and bending radii R (on long travels)

The minimum inner widths of an Energy Chain® on long travels depends on the bending radii of the Energy Chain®.

igus® specifies: $B_{i_{min.}} = R/4$

Please contact igus® if you have large bending radii on long travel lengths.



Advantages lowered moving end:

- Space saving
- Longer travels possible
- Higher service life due to less wear

Trends in long travel applications

New developments are currently being tested:

- Travels up to 2,625 ft (800 m). We break through the 1,312 ft (400 m) barrier by means of special components. Please ask us for more specific information.
- Long travel systems "off the reel." Complete made-to-spec Energy Chain Systems® - with cables, connectors, strain relief - are delivered on the reel and "rolled off" into the pre-assembled guide troughs. Travel distances up to 328 ft (100 m) are delivered this way today, with longer travels possible.
- Long travel **without** guide troughs. Our AUTO-GLIDE system consists of self-guiding Energy Chains®. We have recently extended this technology to large Energy Chains® and currently offer travels up to 328 ft (100 m).
- Long travels with very small Energy Chains, for example, the igus "Flizz" offers the guidance of a single bus cable inside a small Energy Chain with high acceleration on long travel applications.



Longest igus® travel of 2,018 ft (615 m) with Rol-E-Chain and Chainflex® cables

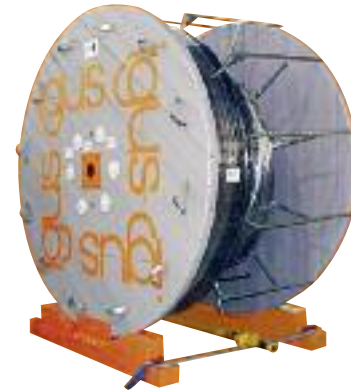
Design assistance, free of charge

We recommend that igus® calculate every gliding application for you. We will always offer the most cost-effective solution, taking the technical requirements and operating safety into consideration. The system solution designed by us is also automatically given an igus® system guarantee.

To be able to advise you accurately, we require the following specifications:

- Travel in (ft) or (m)
- Travel speed (ft/min) or (ft/s)
- Acceleration (ft/s²)
- Fill weight (lbs/ft)
- Maximum cable/hose outer diameter (in.) or (mm)
- Type and number of cables and hoses
- Required bending radius (in.) or (mm)
- Cycle frequency (n/day or n/hour)
- Technical environment.

Please call us and within hours you will receive a detailed system proposal!



Long travel "off the reel." Up to 328 ft (100 m) travel pre-assembled and ready to install



Mobile camera, live images, Olympic Games in Atlanta S = 328 ft (100 m) V = 32.8 ft (10 m/s) in push-pull operation

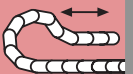


Robotics: quiet running, high acceleration; up to 10,000 cycles per day



Conveyor belt in quarry. Travel distance of 587 ft (179 m), travel speed 220 ft/min. (67 m/min.) and fill weight 5.38 lbs/ft (8 kg/m)

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS





Guide troughs are used for long travels, travels from 16.4 to 32.8 ft (5 to 10 m) and greater, depending on the chain type. They enable igus® Energy Chains® and Energy Tubes to deliver smooth, low-friction operation in long-travel situations. Various guide trough systems are available.

► **Guide Troughs, Section 9**

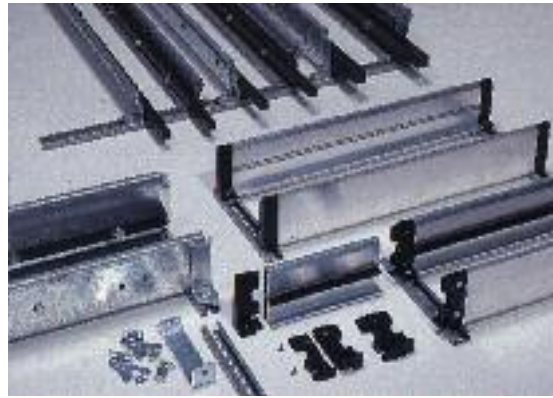
If the fixed point is in the center of the travel, use half of the guide trough with glide bars...

... and the other half of the guide trough without glide bars

$$H_{Ri} \geq 2 \times h_a$$

$$B_{Ri} \geq B_a + .20" (5 \text{ mm})$$

	= guide trough
	= assembly elements
	= glide bars



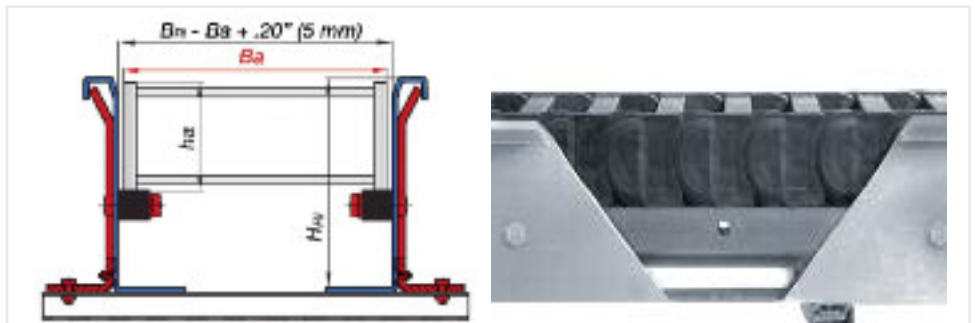
Guide troughs

A guide trough is an important element in long travel applications. Diagrams are shown below. The height of the trough must be at least twice the total chain link height. The sides must provide a chamfered opening. The trough inner width is the same as the chain outer width, plus .20" (5 mm). When the upper run cannot glide on the lower run, glide bars must be installed along the sides of the trough. igus®

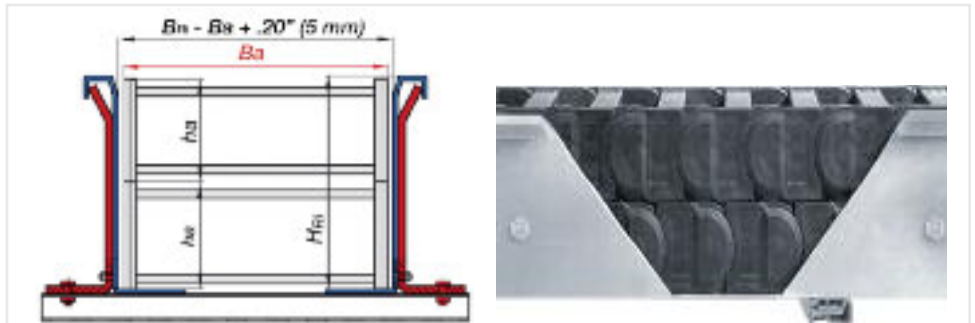
recommends the use of polymer glide bars. They are optimally matched to the chain material and achieve the lowest values for friction, noise and wear. Guide troughs with and without glide bars can be obtained for almost all igus Energy Chains®.

Important: When assembling the trough parts, the following points must be given particular attention:

- Properly align all trough parts upon installation
- All screw heads should be flush with the trough
- Smooth transition between the end of the chain and the glide bars
- Solid connection with the glide surface



Above: Guide troughs with glide bars. igus® recommends the use of polymer glide bars made of UHMW. They are optimally matched to the Energy Chain® material and achieve the lowest values for friction, noise and wear.



Above: Guide troughs without glide bars - upper run glides on the lower run.

Glide friction values for igus Energy Chains® made of igumid G and various glide bars:

igusid G	igus® Polymer Glide Bar	Galvanized Sheet Steel	Anodized Aluminum	Stainless Steel
Friction value (dynamic)	0.19	0.45	0.54	0.48

Source: igus® Laboratory

Travel speeds and accelerations

Travel speeds up to 16.4 ft/s (5 m/s) in continuous operation are possible and in use on current applications. In special cases, even higher speeds are possible. For example, igus® E4/100 and E4/4 Energy Chains® achieve speeds of 72 ft/s (22 m/s) and accelerations of 2,572 ft/s² (784 m/s²) in crash test units. (Only a few thousand cycles per year are required in this situation.) Acceleration plays a large role in the calculation. Differentiations must be made between normal operational acceleration and a sudden jolt of acceleration such as unexpected stops or so-called “E-stops.” Even in these situations, igus® Energy Chains® prove to be very durable.

Service Life

We offer service life calculations for your application based on our extensive gliding application experience. As developers of polymer plain bearings, we possess vast material behavior knowledge



Automated storage/retrieval system with System E2 and Chainflex® cables - travels up to 262 ft (80 m) and speed of 14.8 ft/s (4.5 m/s)

which we apply to the development of Energy Chains® as well. Units with 656 ft (200 m) travels have been in operation for 8 years with minimum maintenance. Units up to 197 ft (60 m) travels have been in operation for 12 years with almost no maintenance. (Please consult igus® for references and calculations for your project.) The maintenance-free aspects of igus® Energy Chain Systems® over long periods and under rough operating conditions is often the deciding factor in choosing igus. Our system guarantee provides additional peace of mind.

Technical environment

Long travel applications using igus Energy Chains® run in water, in dirt, in the tropics, in explosion risk areas (with special design features) and many other conditions. Guide troughs can be supplied in corrosion-free materials. You will find more details in the **Technical Environment** section of this chapter.

Calculation

Comprehensive tests place us in the position of knowing our products precisely. Important factors in these tests are:

- Push-pull forces under both ambient and extreme temperatures
- Humidity and dirt
- Friction values of the polymers, alone and against various glide surfaces
- Behavior of electrical cables under push-pull conditions
- Behavior of hydraulic and media hoses under push-pull conditions
- Service life, and noise generation.

If we cannot in fact calculate your application based on these factors, we will perform a practical test for you in our laboratory. Please consult igus®.



E4 in a pre-cast concrete plant with dust and concrete sediment

General data, long travels

Travel max	1,312 ft (400 m) / 2,625 ft (800m)
Travel speed max	16.4 ft/s (5 m/s)
Travel acceleration max	dependent on calculation, can be 164 ft/s ² (50 m/s ²) and more
Fill weight max	dependent on calculation, can be 47 lbs/ft (70 kg/m) and more



Corrosion-free guide troughs are available in the material:

- Normally galvanized
- Stainless steel
- Seawater resistant aluminum

Special properties - Long travel applications

Energy Chains® that are **nested** can be used in gliding applications. This type of installation is most often used when there is a width restriction. Guide troughs with special wall heights are necessary.

Energy Chains® **running side by side**, or in a “multiband” design can also be used in gliding applications. Higher fill weights often require special guide troughs which can be delivered either from stock or on short notice.

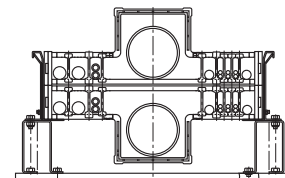
We have also developed standard parts for unconventional solutions involving **large hoses** in gliding applications.



Nested, gliding Energy Chains®

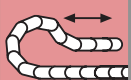


"Multiband" Energy Chain®

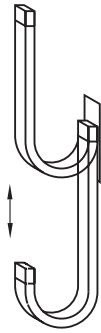


Large hose elements

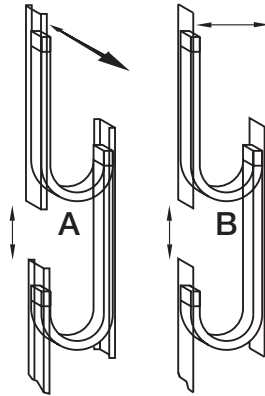
PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



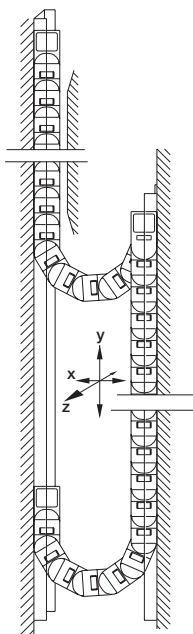
We recommend **locking mounting brackets** for hanging applications. In restricted spaces, other solutions are possible with consultation.



In most cases, vertical motion applications do not require lateral guidance



If lateral acceleration will occur in two directions, guidance is necessary



Vertical, hanging applications

In accordance with the principle of hanging applications, heights more than 328 ft (100 m) are possible with igus® Energy Chains®. Energy Chains® with interior separation allow many different types of cables/hoses to operate together in the same system without becoming entangled.

Cables and hoses

Two important factors in vertical hanging applications are how the cables/hoses lay in the chain and how they are secured at the end points:

- All cables and hoses must bear their own weight when hung. The Energy Chain® should house and protect the cables and should not absorb any further tensile forces.
- **igus® interior separation elements** should be used for distinct division of all cables and hoses.
- **The cables and hoses must be secured carefully to both end points of the Energy Chain®.**

The strain relief must be designed so that the opposite run cannot catch. Safe strain relief and clear separation of the cables/hoses are the basic prerequisites for hanging installations. Cables and hoses must be able to move freely and bear their own weight.

Camber

A normal igus Energy Chain® with camber is suitable for hanging use if enough space is available. If there is not enough room, a "no camber" Energy Chain® must be installed. This is frequently the case with storage and retrieval systems in narrow aisles.

Order example: 27-07-100-0-NC (No Camber)

Vertical motion without lateral acceleration

If the application involves vertical motion without lateral acceleration, the Energy Chain® can be installed without lateral support. If the space restrictions are severe, an igus Energy Chain® with no camber must be specified.

Vertical motion with lateral acceleration

In most cases where lateral acceleration occurs, lateral guidance of the Energy Chain® must be provided. The diagram to the right shows an example of such guidance. Partial guidance is also an option, however, it must at least cover the area in which the Energy Chain® may sway. Lateral acceleration can occur in two directions. Lateral guidance must be installed accordingly. **If you have a choice, the layout in Figure A is preferred.** Additional guidance along the side of the carrier helps to stabilize the chain further.

Guidelok vertical - no sideways swinging of the Energy Chain®

The problem: Suspended Energy Chains® swing out due to transverse acceleration -

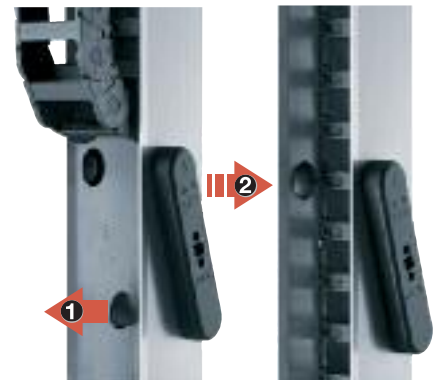
The solution: igus® "Guidelok" system. Energy Chain® stays on track even with acute trans-

verse acceleration! When the chain moves over the control button ① the fixing button ② is moved, the lower run of the Energy Chain® is held in place, preventing it swinging out. For elevators, racking units, material handling equipment. igus® Guidelok offers a simple, cost-effective and safe system solution for vertical applications with lateral motion. Please call us if you re interested in this product! .

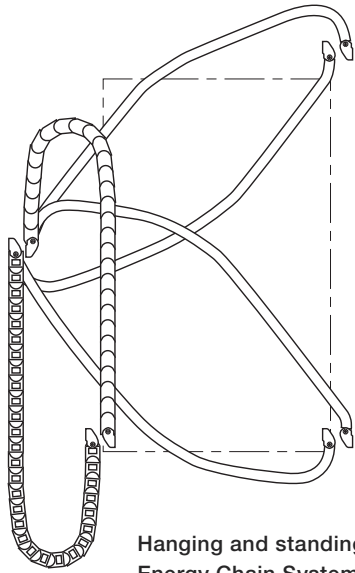
Typical applications

- Automated storage/retrieval systems
- Lifts
- Revolving storage systems
- Diagonal lifts
- All vertical applications

➤ Chapter 9



Energy Chain System® Design Vertical, Hanging Applications Zig-Zag Applications



Hanging and standing Energy Chain Systems® can reach to very different points



Hanging assembly with one-sided U profile



Due to the wide variety of combinations involving stroke height, cable/hose packages, dynamic values, and application environments, we strongly recommend you make use of our consulting services. Simply call, E-mail or fax us.



Preferred Series for vertical, hanging design

- E4/00
- E4/4
- E2/000
- E2 Energy Tubes

“Zig-zag” design

The modular design of igus® Energy Chains® facilitates this space-saving and unconventional solution. For modern platform technology, such as performance stages, a variety of cables/hoses which adjust the stage height must be accommodated. Lack of space almost invariably presents particular difficulties. The photo below shows an Energy Chain® in a “zig-zag” configuration produced by incorporating reverse bend radii or “RBR”. The unextended Energy Chain® is stored in a “basket” underneath the stage. If the stage is raised, the Energy Chain® unfolds, generating little to no noise. This construction is possible with System E4 and E4/4 Energy Chains® as well as many other types. Please consult igus® for these kinds of applications.



Preferred Series for “Zig-Zag” design

- E4/4

Technical data: vertical, hanging

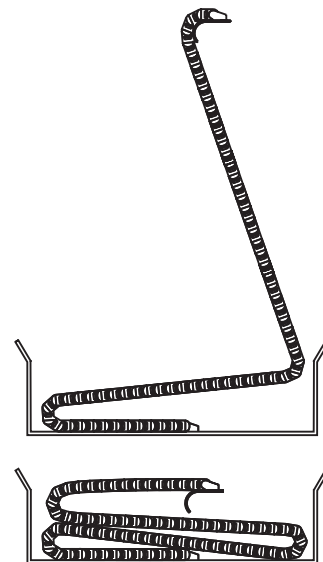
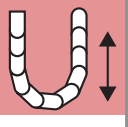
Travel Height Max: 328 ft (100 m)

v max:	65.6 ft/s (20 m/s) dependent on height and stability of the Energy Chain®
a max:	164 ft/s (50 m/s ²) dependent on height and stability of the Energy Chain®



With System E4 and E4/4 Energy Chains®, zig-zag solutions can be realized quickly and cost-effectively with standard parts

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Space-saving solution - stroke heights of over 65.6 ft. (20 m) are possible



Cables must be able to move freely and carry their own weight,



Side-mounted Energy Chains® - are strongly recommended if the installation height is restricted.



Standing application with support of the first chain links; R68 Energy Tube



Locking KMA mounting brackets can be directly attached flush to the machine; igus® Series 4040

Mounting brackets

The mounting brackets must be attached so that the Energy Chain® cannot bow out.

The igus® program offers locking or one-sided, locking mounting brackets for almost all types of carriers. Locking KMA mounting brackets are highly recommended because they can be attached flush to the machine.

Cables and hoses

Cables and hoses must be laid in the chain so that they can bend freely. For precise guidance of the cables and hoses, we strongly recommend igus interior spacer modules. Cables must be strain relieved at both ends.

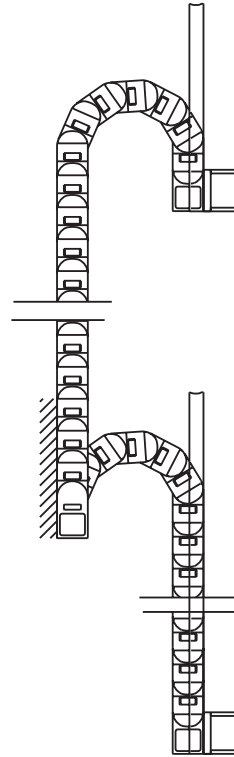


Preferred series for vertical standing design

- E4/00
- E4/4
- E2/000
- E2 Energy Tubes

Technical data: vertical, standing applications

Maximum Travel	
- without support	≈ 13 ft (4 m)
- with support	≈ 19.7 ft (6 m)
of the first chain links	
- with full support	≈ 65.6 ft (20 m)
v max	65.6 ft/s (20 m/s) (dependent upon travel and weight)
a max	164 ft/s ² (50 m/s ²) (dependent upon travel and weight)



Options for a standing application with support of the first chain links:
on the left, with U-shaped guidance; on the right, with the support of the first chain links



For higher Energy Chain® stroke heights, it is generally recommended that at least the first three links along the outer radius be supported. For maximum heights and strokes, the whole chain must often be supported.

With lateral acceleration, the Energy Chain® must be supported and, depending on the direction of this acceleration, be guided along the side.

Lateral acceleration

If lateral acceleration occurs, the Energy Chain® should be supported along the outer radius. For higher chain heights, it is generally recommended that at least the first three links on the outer radius be supported. For maximum heights and weights, the whole distance must often be supported. Due to the wide variety of combinations involving weights, stroke heights, chain types and bending radii, we strongly recommend you make use of our consulting services.

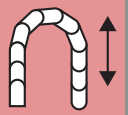
Combined movements

Combined vertical and horizontal movements are possible with igus Energy Chains® for a cost-saving solution.



Combined horizontal and vertical movements on a construction vehicle.

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS





Side-mounted Energy Chains® - are strongly recommended if the installation height is restricted.



System E4 Energy Tube in direct chip area E4/light



Standard values for unsupported lengths, side-mounted, upon request. The unsupported lengths can be extended by supporting the links next to the mounting brackets

Short travels with or without support

igus® Energy Chains® placed on their side can be used unsupported to a limited extent. The turned "unsupported length" in this case is dependent on the following factors:

- Fill weight
- Width of the Energy Chain®
- Bending radius
- Parallel placement

The greater the fill weight of the Energy Chain®, the shorter the available unsupported length. When placed on its side, the chain width, in effect, becomes the height. As this "height" increases, the Energy Chain System® becomes proportionally more stable. Small bending radii provide greater stability. If further movement in a second axis is added to the parallel motion of two chains, the unsupported length is impaired. For applications with low fill weight, the standard mounting brackets are adequate. If, however, the fill weight is high and the travels are long, the Energy Chain® must then be supported either in whole or in part. Due to the variety of application possibilities, we strongly recommend you make use of our consulting services.



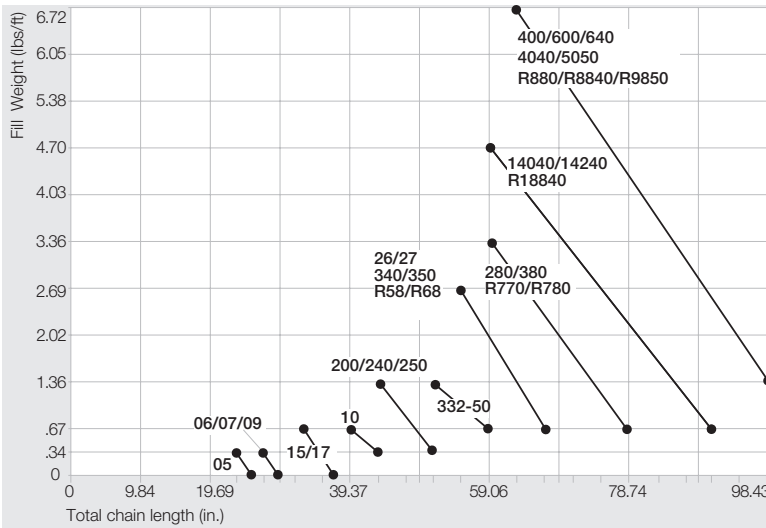
igus® - Series E4/4 with partial support



Unsupported - System E4



Energy Chain®, side-mounted, supported System E4



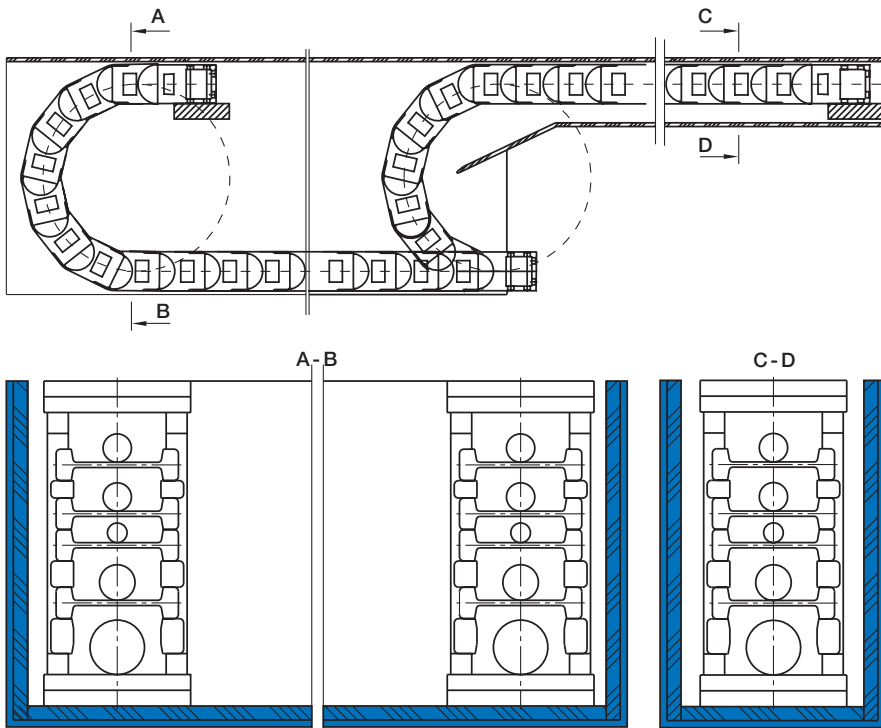
The unsupported lengths can be extended by supporting the links next to the mounting brackets. Please consult igus® for more details.

Long travel, gliding

Side-mounted Energy Chains® can travel over 328 ft (100 m) with adequate guidance. All chain types are designed to operate gliding on their side. The corresponding glide surface is usually an igus® polymer, stainless steel or galvanized steel, depending on how high the demands on the travel speed and service life are. Roller and ball bearings or additional gliding elements are not necessary for igus Energy Chains®. The diagram below shows the principle of a guide trough for side-mounted applications.

Cables and hoses

Cables and hoses must be guided so that the Energy Chain System® can move freely at all times. The igus® modular separation options offers numerous possibilities, such as separators and spacers, to keep these cables/hoses separated and bending freely for maximum service life. igus will gladly provide an application analysis, free of charge.



Principle of a guide trough for long travel, side-mounted

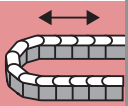


For a side-mounted gliding application, we recommend locking mounting brackets. The Energy Chain® is then pushed straight through the guidance



Cable and hose guidance with separators and spacers

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



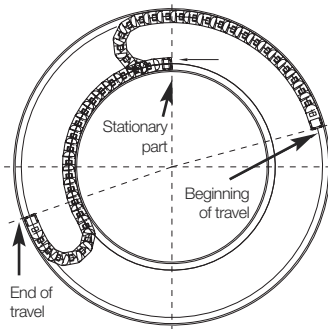
Preferred series for side-mounted applications

- E4/00
- E4/4
- E2 Energy Tube



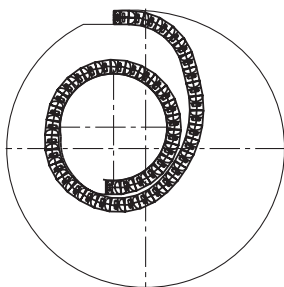
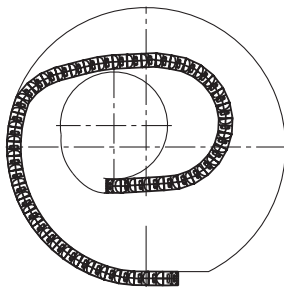
Options 2 and 3 for rotary movements require less installation height. The Energy Chains glide mostly on surfaces made of polymer, stainless steel or steel and are guided through channels into a rotary movement. (See “side mounted” for further design tips.)

Bending radii, circular radii and chain widths are variable with this product line.



Preferred series for rotary motion applications

- TwisterChain®
- All “RBR” Energy Chains®
- System E4
- System E2/000



Standard Energy Chain®
350-075-200-0,
angle of rotation 225°



Rotary motion with a “standard” Energy Chain®



“RBR”-rotary movement with Series 5050, installed on a crane



Series 250 with 360° RBR rotary motion on a robot

1. Rotary motion with TwisterChain®

The TwisterChain® product line offers the biggest selection for rotary movements. TwisterChain® solutions are particularly recommended for space-restricted applications such as articulated robots, revolving tables, etc. Further details can be found in the TwisterChain® chapter.

► TwisterChain®, Chapter 8

2. Rotary motion with standard Energy Chains®

The photo to the left shows an application which was achieved using “standard” Energy Chains® (standard, in this case, means that the Energy Chain® only bends in one direction). Such solutions are possible if a **great deal of space** is available and if the angles of rotation are limited to a maximum of 450°. All igus® Energy/Tubes and Chainflex® cables are appropriate for this situation.

3. Rotary motion with an “RBR” Energy Chain®

“RBR” is “reverse bending radius” and means that the Energy Chain® can bend in two directions. Each igus® Energy Chain® can incorporate RBR designs, with the exception of several radii, for the Energy Tubes R117 to R98 and for the Series 07, 09, 14, 15, and 17. The RBR does not necessarily need to be identical to the normal bending radius of an Energy Chain®. For example: Part No. 280-15-100/425-0, describes a Series 280 Chain with an inner width of 5.91 (150 mm), standard bending radius of 3.94 (100 mm) and RBR of 16.73 (425 mm). Most rotary motions can be achieved with the RBR option. **Angles of rotation up to 540°** have been achieved. To the left and below are examples of rotary motion using an RBR Energy Chain. Please consult igus for your particular application.

Guide troughs

Depending on the dynamics and load of the application, the guide troughs are made of steel or stainless steel. For applications with a high cycle frequency, we suggest coating the guide troughs with polymer. igus® Energy Chains® require no additional gliding elements for contact with the base or sidewalls. igus® offers complete systems including guide troughs, but we are pleased to offer support with drawings for your own construction.

Product range

Energy Chains® with "RBR" are available as standard from stock for the complete Triflex® range. In addition, we supply a number of Energy Chains® which are equipped as standard with "RBR". For all other types, "RBR" means custom-made, and we will be more than willing to offer you this option



Guide troughs for rotary applications



Rotary motion with RBR; diameter 236" (6000 mm); Series 50 with RBR; the inner ring rotates



Many igus® Energy Chains® are available with "RBR" -reverse bending radius. Please see the 'Product Range' for relevant series.

Example:
10-4-075/220



Technical data rotary motion:
max. angle of rotation = 540°
(larger angles possible)
v max. = 32.8 ft/s (10 m/s)
a max. = 65.6 ft/s² (20 m/s²)

igus® Energy Chains® with RBR available from stock

Part Number	Series	Part Number	Series
05-16-018/018	E2 micro	10-4-038/600	E2 mini
06-20-018/018	E2 micro	10-4-048/048	E2 mini
06-30-018/018	E2 micro	10-4-048/400	E2 mini
06-64-018/018	E2 micro	10-4-075/220	E2 mini
10-1-028/028	E2 mini	240-05-060/060	E2 medium
10-1-038/600	E2 mini	240-07-060/060	E2 medium
10-1-048/048	E2 mini	250-05-060/060	E2 medium
10-1-075/220	E2 mini	250-07-060/060	E2 medium
10-2-028/028	E2 mini	27-07-075/300	E2 medium
10-2-038/600	E2 mini	27i-12-125/400-0	E2 medium
10-2-048/048	E2 mini	5050-00-150/150	E4/4
10-2-075/220	E2 mini	B15i-050-100/460	E2 mini
10-3-028/028	E2 mini	E/Z14-1-038/038	E-Z Chain®
10-3-038/600	E2 mini	E/Z14-2-038/038	E-Z Chain®
10-3-048/048	E2 mini	E/Z14-3-038/038	E-Z Chain®
10-3-075/220	E2 mini	E/Z14-3-075/075	E-Z Chain®
10-4-028/028	E2 mini	E/Z14-4-038/038	E-Z Chain®

The Energy Chain® series appearing in the table at the left are "RBR" versions available from stock. Almost all other igus® Energy Chains® can be special ordered as "RBR". Please contact us for any special inquiry.

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



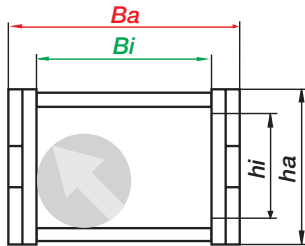


Rules for:

- Maximum cable/hoses diameters
- Shelving
- Bending radius



Electrical cables need at least 10% reserve space all around, hydraulic hoses, 20%



The maximum cable/hose diameter is specified for each series in its respective chapter



Neatly laid cables with igus® interior separation



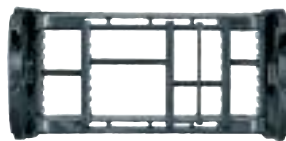
Hydraulics and electric cables are separated from one another in this example

and hydraulics in the same compartments. In addition to the quality of the cables used, the arrangement of each cable/hose within the chain and the space allowed, are important for the service life of the system. Various separation options enable the adaptation of the Energy Chains® to the specific requirements of each respective application. In this chapter, we give you detailed recommendations. Due to the variety of the application parameters, we strongly recommend you take advantage of our free consultation services. Simply give us a list of your cable requirements (or merely the required electrical or other services) and you will receive our recommendation by the end of the next business day.

Maximum cable and hose diameters

The maximum cable and/or hose diameter corresponds to the inner height of the selected Energy Chain®/Tube, with additional minimum clearance. This minimum clearance would be, for example, 10% for electrical round cables, 20% for hydraulic hoses. An Energy Chain® is ideal if a minimum lateral gap to the next cable or hose has been factored in. Depending on the nature of the cables, the dynamics, and the expected service life, more clearance must be allowed. In specific cases, clearances may be altered further. Please consult igus®.

Energy Chain® Distribution



Cables and hoses with very different diameters should be laid separately. The separation is achieved using modular separators. Cables and hoses must **under no circumstances** have the opportunity to tangle. Therefore, the clearance height of a compartment with several similar cables or hoses next to one another **must not amount to more than one and a half times the cable/hose diameter**.



The igus® modular Energy Chain System® solves all known requirements for interior separation

General rules for cables and hoses in Energy Chains®

Supply of data and energy in all forms within an Energy Chain System®

The key advantage of an igus® Energy Chain System® is the safe accommodation of various forms of data cables and energy suppliers in one system. We recommend the optimal separation layout of the cables/hoses in the carrier, but you, the customer, are still afforded the final choice. It is possible, for instance, to maintain minimum distances between bus and motor cables and mix pneumatics, electric

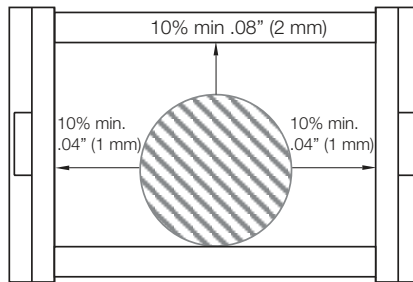
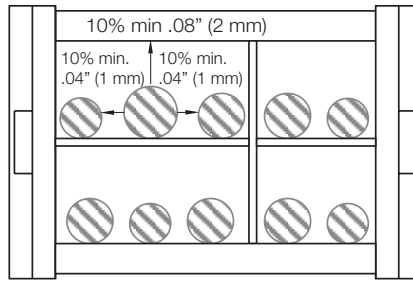
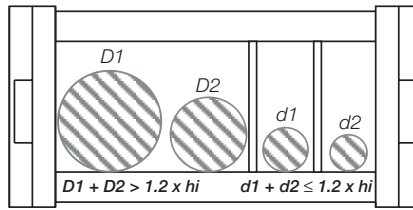
and mix pneumatics, electric

Reasons for distribution rules

The cables and hoses must be laid so that they can move freely at all times and so that no tensile force is exerted at the radius of the Energy Chains®. For high-speed applications and high cycles, cables or hoses must not be laid on top of each other without horizontal separation. The standard values for this are: Travel speed over 1.64 ft/s (0.5 m/s) and cycles over 10,000 per year. igus® interior separation offers a safe solution for this situation.

Further guidelines for distribution

The cable or hose weight should be symmetrically distributed along the width of the chain. Cables and hoses with different outer jacket materials must not be allowed to “stick” together. If necessary, they must be laid separately. All igus® Chainflex® cables can be combined with each other and all other brands of cable or hose. The cables and hoses should always be fixed at the moving end and the fixed end. Exceptions are made only for certain hydraulic hoses with length compensation issues or other high pressure hoses (i.e. hydraulic hoses). **Generally, the faster and more frequently the Energy Chain® operates, the more important the exact positioning of the cables and hoses inside the chain. Due to the wide variety of the possibilities, we strongly recommend you take advantage of our free consultation services for your specific applications.**



Clearance space “all-around” for round electrical cables

Distribution Rules

D1 + D2 > 1.2 x hi

Rule 1: If $D1 + D2 > 1.2 \times hi$ chain inner height, no separation between the two cables/hoses is necessary. Two cables or hoses should never be left unguided on top of one another or be allowed to become tangled.

D1 + D2 ≤ 1.2 x hi

Rule 2: If $d1 + d2 \leq 1.2 \times hi$ chain inner height, a vertical separator or a horizontal shelf must be used to reduce the inner height, thereby preventing the entanglement of $d1$ and $d2$.

All-around clearance space in % for various cables/hoses

- Electrical round cables: 10%
- Electrical flat cables: 10%
- Pneumatics: 5-10%
- Hydraulics: 20%
- Media hoses: 15-20%

Bending radius R

The bending radius of our Energy Chain® depends on the “thickest” or “stiffest” cable or hose in your application. The bending radii of the Energy Chains® should be adjusted to the recommendations of the cable or hose manufacturer. The selection of a larger radius than the minimum will positively affect service life. The specification of minimum bending radii for cables and hoses refers to use at normal temperatures; other bending radii may be recommended. Please ask your cable or hose supplier for details.

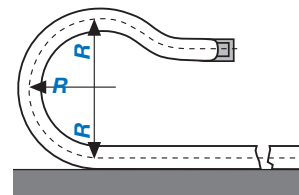


The igus® program offers up to 12 different bending radii from stock. Here, System E4 was used in the Storebaelt bridge project in Germany

We recommend complete Energy Chain Systems® - where bending radii for all cables and hoses, interior separation and service life are optimally matched.

Some igus® Chainflex® cables permit a small bending radius of $5 \times d$ for one million strokes

Some igus® Chainflex® cables permit a small bending radius of $5 \times d$ for one million strokes

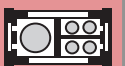
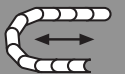


Pinciple sketch bending radius “R”



Chainflex® cables - smallest bending radius of $5 \times d$

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 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS





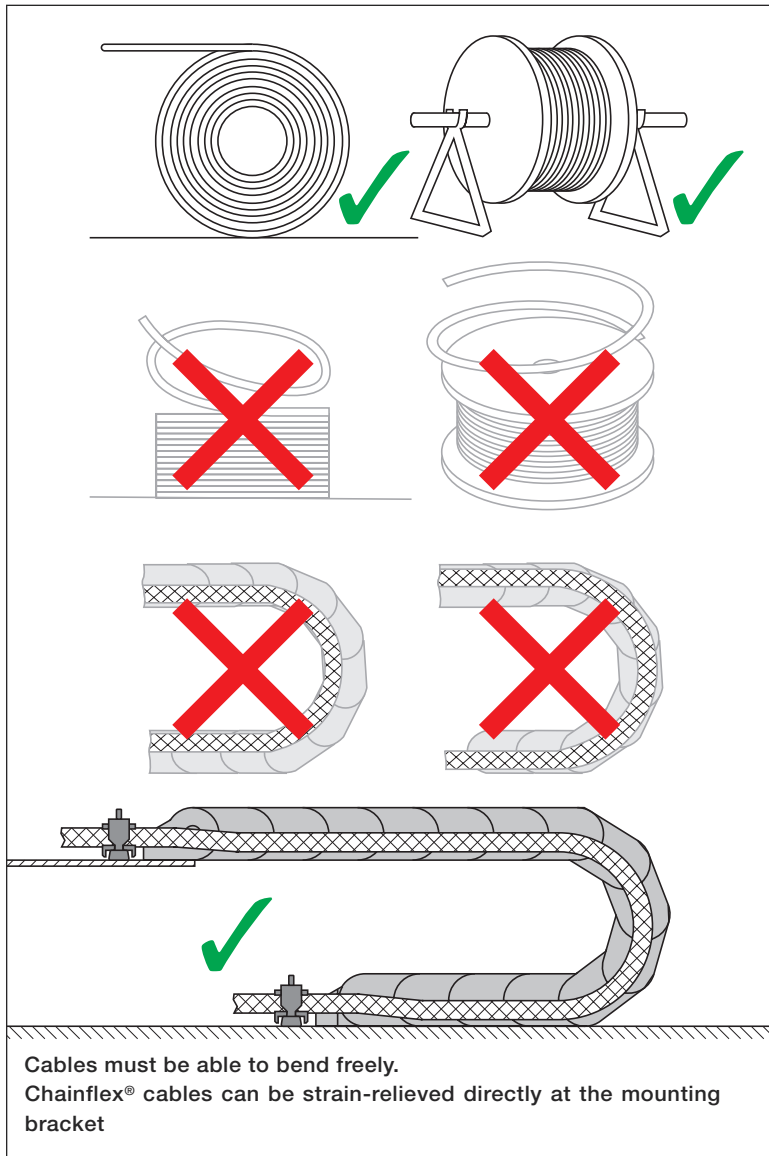
We will be pleased to provide you with recommendations for complete Energy Chain Systems® - where bending radii for all cables and hoses, interior separation and service life are optimally matched



Corkscrewing: an effect of improper cable and hose placement in an Energy Chain®



Example from igus® test laboratory: continuous development and testing of Chainflex® round electrical cables



Cables must be able to bend freely.
Chainflex® cables can be strain-relieved directly at the mounting bracket

Round Electrical Cables

For electrical cables, the round cable is a safe, modular and cost-effective solution for Energy Chain Systems®. We recommend the following criteria for selecting the proper round electrical cables:

- Small minimum bending radii and mounting heights
- Strain relief integrated directly into the mounting bracket
- Uncomplicated installation process - no hanging, laying out, etc., of cables
- Long service life at minimum bending radius
- Service life expectations for your application (short or long travel, hanging, etc.)
- Test data on service life from realistic tests
- Flexible shields for shielded cables
- Abrasion-resistant and non-adhesive outer jackets
- Large selection to avoid expensive custom designs

For bus cables and fiber optic cable, special attention must be paid to how effective transmission rates and shielding remain after millions of cycles at the minimum bending radius.

Installation and strain relief of round electrical cables

1. The cables must be laid straight, without twisting. Cables must not be uncoiled from the top of the spool. igus® Chainflex® cables are immediately ready for placement directly into the Energy Chain®. They need not be disconnected or laid out before installation.
2. The cables must be laid so that each individual cable can move freely from side to side.
3. The cables must be able to move freely along the radius. This must be double-checked if the upper run operates at the cable's maximum bending radius.
4. The division of the carrier's interior using shelves or igus® interior separators is necessary if several cables and/or hoses with varying diameters are laid out. It is important to prevent cables and hoses from tangling.
5. For cables and hoses with different jacket materials, it is important to prevent them from "sticking" to one another. If necessary, they should be separated. igus® Chainflex® cables can be combined with all others.
6. Round electrical cables must be secured with strain relief at both ends. In exceptional cases, the cables may be fixed with strain relief at the moving end of the Energy Chain® only. A gap of 10-30 x cable diameter between the end of the bending segment and the fixed point is recommended for most cables. Chainflex® cables can, on the other hand, be secured directly to the mounting bracket with strain relief (this has been confirmed with testing).

Pneumatic hoses

In principle, the same rules apply for pneumatic hoses as for round cables. In practice, it has been demonstrated that pneumatic hoses are less susceptible to wear. After consultation, they can be laid together more closely than the “10% clearance all-around” rule. A double-sided strain relief is required under these conditions. For pneumatic hoses made of rubber, we recommend strictly following the “10% clearance” rule because they tend to adhere to each other and to other cables/hoses.



Flat cables and pneumatic hoses installed in an Energy Chain® with full interior separation of all cables



Fully pre-assembled Energy Chain® System® with several pneumatic hoses next to and above each other

Flat cables

Flat cables must be able to move freely along the bending radius. Two flat cables next to one another should be kept apart with separators. If two flat cables are laid on top of one another, we strongly recommend the use of horizontal igus® shelving. Flat and round cables should be laid separately in the Energy Chain®. Strain relief should be attached at both ends. Flat cables are only conditionally recommended for use in Energy Chains®.



The igus® program also offers polymer pneumatic hoses called “Chainflex Air”.

Flat cables - Outer jackets made of rubber must be specified particularly carefully, because of potentially high static friction.

Hydraulic hoses

When designing hydraulic hoses in Energy Chains®, special attention should be paid to the expansion of the hoses when pressurized. Sufficient room must be left in the Energy Chain® for this as well as the possible larger external diameter of the hoses under pressure. It is important for selected hoses to be sufficiently flexible (i.e. meet bending radius specified by the Energy Chain®). The gliding ability and abrasion-resistant surface of the hoses are also important. All cross-bars and shelves in the igus Energy Chain® minimize abrasion of hoses through wide, rounded and smooth surfaces. Normally, hoses with textile braiding are more flexible than hoses made of steel wire, while maintaining smaller outer diameters and better fatigue strength under stress. As lateral movements of the hydraulic hoses within the chain can lead to increased abrasion of the hose material, they should be secured in position with vertical separators, but not forced. Special “locking” separators, which grip the opening crossbars of the chain, as well as the use of “spacers,” prevent lateral shifting of the separators; they also ensure the hoses stay put in cases of strong vibration and impact on the chain. Details about these accessories can be found in the description of various chain types.

Strain Relief - Hydraulic hoses are most often stretched lengthwise during operation. This must be taken into account when applying strain relief. More hose length is factored in to allow the hose to “breathe,” or “floating” strain relief must be implemented. In some cases, strain relief on the moving end only can be tolerated.

Rollclip - In almost all cases, the broad, smooth and rounded surfaces of all igus® Energy Chains® and Tubes are sufficient to protect hydraulic hoses from abrasion. In extreme cases, the igus Rollclip can be installed. The hoses come in contact with a series of polymer cylinders which rotate. “Extreme” cases include particularly soft materials, particularly narrow bending radii or highly dynamic loads. Over 95% of all applications can be solved without Rollclips.



igus® Energy Chains® with hydraulic hoses in a tree-stripping machine

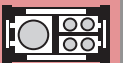
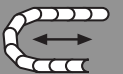


Hydraulic hoses need more space: 20% all-around clearance



igus® Rollclip, detachable

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS





Ideally, the cables/hoses should have strain relief at both ends of the Energy Chain®. At the very least, they must have strain relief at the moving end of the Energy Chain®.



For more information on all igus® strain relief elements,
▶ Chapter 10



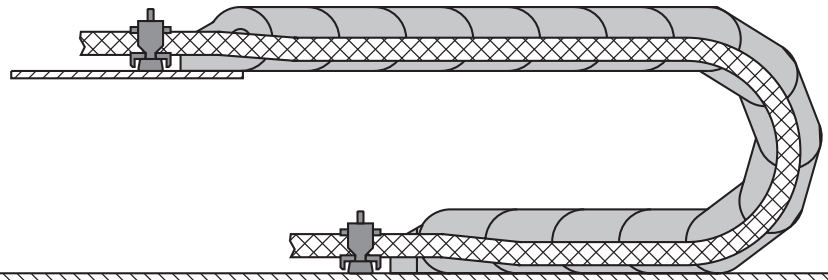
Strain relief in KMA mounting bracket with profile rail.

Strain relief for electrical cables

Strain relief can consist of standard elements or can be custom-made. For most applications, our standard program of profile rails in mounting brackets and space-saving Chainfix® clamps can be used. We also offer simple strain relief solutions using cable tie wraps and tie wrap plates. In ideal cases, the cables should be secured at both ends of the Energy Chain® with strain relief (in a few instances, strain relief at the moving end of the Energy Chain® is sufficient - please consult igus® for these cases).

Minimum gap of the strain relief and the beginning of the bending radius

Tests on our premises and in field applications have shown strain relief located at the last bending point of the Energy Chain® has no influence over the durability of igus® Chainflex® cables. It is possible, therefore, to integrate the strain relief with the mounting bracket. This space-saving option for strain relief is offered by igus® for almost all Energy Chains® (More details on this in the individual chapters).



Ideal installation of cables in Energy Chains®. Chainflex® cables can be directly strain-relieved in the mounting bracket (minimum gap to the last curved chain link is not necessary)!



Chainfix strain relief with KMA brackets; used here for cables and hoses



Features of chainfix clamp

- Optimal igus® Chainfix housing with reduced height
- Long service life for dynamic applications thanks to improved clamping elements
- Integration with KMA mounting brackets - saves both time and space during installation and available for complete systems with cables and strain relief
- Improved housing foot clamp for easy fit into the profile rail
- Black housing and setscrews for attractive appearance
- Setscrews, tightened with Allen wrench, for easy installation
- Mark of the installation direction
- Now with better fixation due to optimized design



Tiewrap plates as individual parts

- Strain relief accessory for igus® E-ChainSystems®
- Attachment to mounting brackets
- Integration into the profile rail of KMA (polymer/metal mounting brackets)



Tiewrap plates with clip-on connection for the profile rail

The plates **3050-ZC** and **3075-ZC** can be clipped directly into the profile rail without bolts or any extra hardware. Clip-on tiewrap plates can be released and repositioned with just a screwdriver used as a lever.



Chainfix clip - modular snap-on strain relief device

Chainfix clip is a series of clamps and bottom parts made of plastic for cable diameters ranging from .16 to .94 inches (4 to 24 mm). Chainfix Clip is available for C profiles, also suitable for assembly in the KMA mounting brackets and clip-on strain relief for cross bars.

Characteristic features:

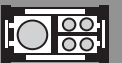
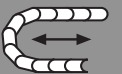
- Quick assembly without any tools
- 2 and 3 layers on top of one another possible
- Each layer can be detached and changed later on
- High tensile forces in case of single-layer installation, decreasing with the number of layers



Strain relief separator

- Can be integrated in mounting bracket
- Can be positioned as required
- Easy installation
- Cost-effective
- For series E6-29, 26/27/27i (other series upon request)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS





Technical environment:

- Fire resistance
- Radiation
- Weathering
- Cold, heat
- Explosion areas
- Vacuum
- Hot chips
- Dirt, dust
- Cleanroom
- Chemicals

Resistance to radiation

igumid G is very resistant to high-energy radiation. Under gamma radiation, in the range of 8×10^4 rd, the mechanical properties of igumid G change very little.



igumid G:
UL 94 HB

igumid NB:
UL 94 V2
UL 94 V0



igumid G:

- UV-resistant
- Temperature range from:
-40°F (-40°C) to
+248°F (+120°C)

Technical environment and igumid G

The igumid G material, from which igus® Energy Chains® are made, possesses the following wide-ranging features to cope with a variety of environments: the ability to handle pressure and strenuous loads, abrasion resistance, sturdiness, stable behavior at high and low temperatures, and suitability for outdoor use. Numerous application examples, from refrigerator blocks to steel mills, prove this. In extreme cases, we also offer modifications and other igus compounds as a solution. Please consult igus®.

Flammability of igumid G

The flame-retardant characteristics of igumid G can be described using various classifications: Test procedure VDE 0304 parts 3-5.70 - classification IIc. Tested according to UL 94 "Standard Tests for Flammability of Plastic Materials for Parts in Devices and Appliances" classification 94 HB for .13 and .06 in. (3.2 and 1.6 mm) thickness of the body. Tested according to DIN 4102 "Fire Behavior of Building Materials and Parts" classification materials class B-2. For further requirements, please consult igus® for special solutions, such as materials with self-extinguishing properties (UL V2 or UL V0). All Energy Chains® (except for the E-Z Chains and Series 14 Chains) are made of from igumid G.

Flammability of igumid NB

All E-Z Chains and Series 14 Chains are made from the flame-retardant igumid NB material. These chains have the following flame-retardant classifications:

- UL 94 classification - V2
- VDE 0304 Parts 3-5.70 classification - IIb
- DIN 4102 flammability of materials - B2

Please consult igus regarding material availability "V0."

Temperature resistance

igumid G is very suitable for outdoor applications. In our experience, the mechanical properties of the chain are not impaired. igumid G is also UV-resistant. igus® Energy Chains® are used in applications as cold as -40°F (-40°C). Installation may be eventually compromised at temperatures below -13°F (-25°C). In such cases, we offer special solutions made from cold-elastic materials. +248°F (+120°C) continuous temperatures are possible, however, the mechanical values are reduced and the service life is impaired. Please consult igus® if you have specific temperature requirements.



igus® factory; automatic compounding and conveyor belt for igumid G



igumid G has the classification UL 94 HB; igumid NB has the classification UL 94-V2; V0 upon request



This robot is used for test purposes in British nuclear power plants;



From the Winter Olympics in Lillehammer; 246 ft (75 m) travel at -13°F (-25°C)



ESD & ATEX

Special ESD products and ESD tools must be used in numerous industrial sectors in order to protect sensitive electronic components against electrostatic discharge. Consequently an electrostatic discharge function applies in particular to energy ducting systems with a central role in automated sequences. igus® has developed the ESD Energy Chain® for these demanding applications. They are made of material igumid ESD, which immediately discharges permanent electrostatic charges in a controlled manner.

igumid ESD is RAL 7015 slate-gray.

igumid ESD consists of the igus® Energy Chain® material with special additives. For instance, the higher rigidity and the 15% lower density can be used to implement a longer unsupported length, depending on the application. The ESD Energy Chain® features longer service life due to the material. Unlike temporarily applied conductive coatings or volatile antistatics, the additives used provide durable and maintenance-free conductivity. Another advantage is the resistance to adverse ambient conditions.

System E6 2nd generation ESD chains without pin and bores long-term conductivity guaranteed

For many years, safety in hazardous environments and ESD protection in sensitive production areas have been given high priority at igus®. Since 1992, Energy Chains® have been manufactured from igus' special "GC" material. Certified 12 years ago by German federal office for Physics and Technology (PTB), the material was modified in 2002. In spite of homogenous conductivity of the material, common pin/bore design chains can hardly maintain their conductivity within normal conductivity tolerances in the long term.

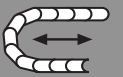
Benefits:

- Constant long term conductivity values
- No contact surface wear
- Proven standard product, now also conductive
- Cycle life in lab test ≥ 10 million cycles (more upon request)
- Adheres to heightened QC procedures with and without mounting brackets and in various install modes
- IPA Fraunhofer institute certifies "Level 1" discharge performance, according to SEMI E78-0998 ESD, even for off-the-shelf standard E6 material.



igumid ESD with PTB certificate: igumid ESD received an official comment from the German National Standards Laboratory (PTB). Copies available upon request.

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



igus® goes cleanroom - qualification of E6 and other igus® Energy Chains®

In many applications where cumbersome special solutions are used, a simple standard Energy Chain® can be used instead. A comprehensive test program was devised and performed for both gliding use and unsupported use. For many applications, the Energy Chains® in special materials are practically abrasion-free. Detailed test results are available upon request. IPA tests confirm that standard igus® Energy Chains® meet cleanroom requirements. "Tested and certified as very good!". Clean room applications demand very high wear-resistance of moving parts and Energy Chain® is able to meet this need, even in the extremely sensitive environment.

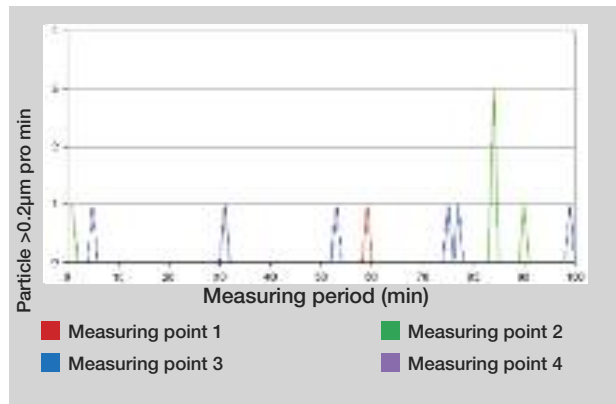
IPA Fraunhofer Institute has tested igus® Series E6 and E14 as follows:

- ISO class 2, as per stringent norm DIN EN ISO 14644-1 for Series E-Z Chain® E14-3-038 at v= 3.28 ft/s (1 m/s)
- ISO class 3, as per stringent norm DIN EN ISO 14644-1 for System E6, Series E6-29-050 at v= 3.28 and 6.56 ft/s (1 and 2 m/s)
- ISO class 4, as per stringent norm DIN EN ISO 14644-1 for System E4, Series 280-100 at v = 6.56 ft/s (2 m/s)

Test setup: particle generation measurement



Measurement result: Particle generation E14-3-038-0



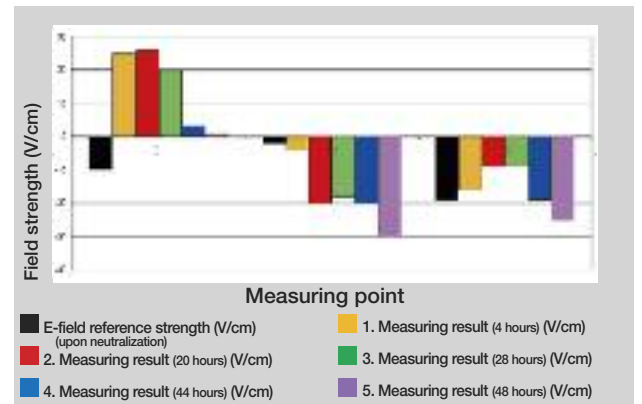
ISO Class 2

acc. to DIN EN ISO 14644-1
for E14-3-038-0

Test setup: field strength measurement



Measurement result: Field strength E6-29-050-055-0



Level 1

ESD-compatibility acc. to SEMI E78-0998
for E14-3-038-0 and E6-29-050-055-0

Classification chart

Class per DIN	Equivalent to VDI 2083	Equivalent to US Fed.Std. 209E	Classification Series	Speed (m/s)
EN ISO 14644-1	VDI 2083	US Fed.Std. 209E		
ISO class 1	no comparable classification	no comparable classification	E3-15-040-075-0	0.5 / 1.0 / 2.0
ISO class 1	no comparable classification	no comparable classification	E6-29-060-150-0-CR*	0.5 / 2.0
ISO class 2	no comparable classification	no comparable classification	E14-3-038-0	1.0
ISO class 3	class 1	class 1	E6-29-060-150-0	0.5 / 1.0 / 2.0
ISO class 4	class 2	class 10		
ISO class 5	class 3	class 100		
ISO class 6	class 4	class 1,000		
ISO class 7	class 5	class 10,000		
ISO class 8	class 6	class 100,000		

*special material "cleanroom"

Spatter, hot chips

Laboratory tests and numerous field applications over the past 20 years prove that igus® Energy Chains® and fully enclosed Energy Tubes protect cables used in welding robots and machine tools. For extreme-temperature applications, igus® offers Energy Tubes made from its igumid HT material, which repels hot chips and flying debris reaching 1,562°F (850°C). All standard E2 and E4 Energy Tubes are available made from igumid HT, upon request.

Dirt, dust, chips

Materials and design make igus Energy Chains® excellent problem-solvers in harsh environments. Experience and application references are available upon request. Please consult igus with your application.

Vacuum

igus® Energy Chains® made of igumid G can be used in vacuum applications. Very little outgassing occurs.

Chemical resistance

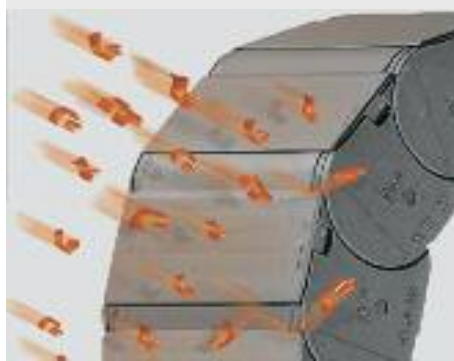
igumid G is resistant to fuel, lubricants, oils, fats, alcohol, ester, ketone, and aliphatic and aromatic hydrocarbons. Oxidants and acids are damaging. The **Material Data table on page 1.42** shows an excerpt of the precise details concerning resistance to chemicals. Acid-resistant Energy Chains® are available upon request.

Coolant resistance

Energy Chains®/Tubes have proven resistant to cooling agents. However, we are always willing to perform individual tests if you have particular problems or advanced developments.

Table on resistance to chemicals

► Page 1.42



Energy Tubes that repel hot chips, up to 1,562°F (850 °C) with the igus® "igumid HT" material.



igus® Energy Tubes in the chip area of machine tools



Also hot asphalt is no problem for igus® Energy Tubes, Series R48



Compost sludge - numerous related references available upon request



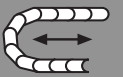
Tests with 1,562°F (850°C) hot chips



Particularly suitable Energy Chain® Series for dirt, dust, chips

- E4/4HD
- System E4
- E2 E-Tubes
- E2/000

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Plastics for longer life® - igus® know-how in plastic materials

Each year, igus® engineers develop more than one hundred new plastic compounds and test igus®-products in more than 5,000 experiments per year. That's how in recent years they have built an extensive database of the tribological properties of polymers. This database makes it possible for us to assess better most of the applications in advance and provide our customer with confidence during use. Our calculations and analyses are based on the result of ongoing practical tests in our Technical Center and our experience with gliding applications. The focal points of our tests are push-pull forces, friction values and abrasion under widely varying conditions and speeds, as well as factors such as dirt, weathering or impact and bumps. We test all system components such as cables, hoses, strain relief and other accessories, in addition to the Energy Chains® or Energy Tubes and Guide Troughs.



igumid material data table	Units of Measure	Values igumid G	Values igumid NB	Values igumid ESD	Values igumid TE
Yield stress	MPa	190/130	78/40	–	–
Elongation at break	%	004/006	20/210	–	–
Elasticity module (tensile test)	MPa	9000/7000	2900/1200	–	–
Impact strength +73°F (+23°C)	kJ/m ²	55/65/55	not broken	–	–
Impact strength -40°F (-40°C)	kJ/m ²	40	90	–	–
Ball indentation hardness H 961/30	MPa	230/160	150/60	–	–
Heat conductivity W/k * m	Ω/k * m	0.23	–	–	–
Dielectric constant	10 ^h Hz	3.9/6.2	–	–	–
Special transitional resistance	Ω*cm	>10 ¹¹	>10 ¹¹	<10 ⁹	–
Impact strength density 0.6-0.8 mm	kV/mm	80	16-18	–	–
Surface resistance ROA	Ω	>10 ¹¹	>10 ¹¹	<10 ⁹	–
Density	g/cm ³	1.37	1.14	1.2	1.02
Absorption of humidity 23/50 RF	%	1.4	3.4	1.9	1.1
Coefficient of sliding friction	–	0.3	0.3	0.3	0.3
Fire resistance as per VDE	–	FH2	–	–	–
Fire resistance as per UL	–	HB	V-2	HB	HB
Color	–	■ ≈ RAL 9004	■ ≈ RAL 9004	■ ≈ RAL 7015	■ ≈ RAL 9004
Maximum water absorption	–	5.6	7.6	7.3	–
Limit of elasticity in bending	MPa	7.800	3.000	9.500	–
Bending strength	MPa	240	120	230	–
Hardness Shore D	–	79	79	83	–
Upper long-term application temp	–	248°F (120°C)	176°F (80°C)	176°F (80°C)	158°F (70°C)
Upper short-term application temp.	–	356°F (180°C)	338°F (170°C)	302°F (150°C)	284°F (140°C)
Lower application temp.	–	-40°F (-40°C)	-40°F (-40°C)	-40°F (-40°C)	-40°F (-40°C)

Medium	Concentration Weight %	Material igumid G /NB
Acetone	100	+
Formic acid (aqueous)	2	○
Ammonia (aqueous)	10	+
Gasoline	100	+
Benzole	100	+
Bitumen	100	○
Boric acid (aqueous)	10	+
Butyric acid	100	○
Calcium chloride (aqueous)	Sat. aq. sol.	+
Chlorinated hydrocarbons		+
Chlorine water	Sat. aq. sol.	-
Chromic acid (aqueous)	1	○
Diesel oil	100	+
Iron II cyanide	30	○
Acetic acid	2	+
Color		+
Fats, cooking		+
Fluorinated hydrocarbons		+
Formaldehyde (aqueous)	30	○
Hydraulic oils		+
Caustic potash	10	+

Medium	Concentration Weight %	Material igumid G /NB
Potassium carbonate (aqueous)	60	+
Potassium sulphate (aqueous)	100	+
Methyl acetate	100	+
Milk		+
Mineral oil		+
Sodium carbonate (aqueous)	50	+
Oil, cooking		+
Oil, lubricating oil		+
Oleic acid	100	+
Paraffin oil		+
Perchlorethylene	100	+
Polyester resins (with styrene)		+
Propane gas		+
Mercury		+
Hydrochloric acid	pH2	○
Hydrochloric acid	2	-
Hydrochloric acid	10	-
Ink, printing ink		+
Vaseline		+
Tartaric acid		○
Zinc sulfate (aqueous)	10	+

Resistance classes

- + = resistant
- = conditionally resistant
- = non-resistant
- Sat. aq. sol. = saturated aqueous solution
- Conc. aq. sol. = concentrated aqueous solution

*The values specified are values determined by laboratory tests and are material-specific

Colors and special solutions

All Energy Chains® made from igumid G are available in the colors listed below. Additional colors are usually feasible. Colored Energy Chains® are not available from stock. Contact igus® for more information regarding colored Energy Chains®. Colored Energy Chains® may have altered characteristics. This also applies for all Energy Chains made from special materials (e.g. conductive Energy Chains® made from igumid ESD or other special materials).

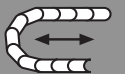
"RAL" Numbers

	Color	≈ RAL	Part No. Suffix
	Black	≈ RAL 9004	-0
	White	≈ RAL 9003	-1
	Magenta	≈ RAL 4010	-13
	Yellow	≈ RAL 1018	-4
	Orange	≈ RAL 2003	-2
	Red	≈ RAL 3002	-6
	Blue	≈ RAL 5005	-8
	Green	≈ RAL 6011	-7
	Grey	≈ RAL 7023	-3 for Chains
	Silver-grey	≈ RAL 7037	-3 for Tubes
	Grey	≈ RAL 7038	-11
	Light grey	≈ RAL 7035	-14
	Slate-grey	≈ RAL 7015	only ESD-E-Chain®
	Yellow/black	-	-9



Colors for design coding

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Examples for test certificates and approvals of igus®-products

Certified
ISO 9001:2008

ISO 9001:2008

igus® has been certified since May 2002



Quality inspection of every E-Chain® production



TÜV construction test

igus® Energy Chains® and Energy Tubes are construction-tested by TÜV Rheinland. igus® Energy Chains® were tested and passed by TÜV Rheinland in accordance with the valid machine guidelines. As a result, the user of igus® Energy Chains® need not worry about meeting CE requirements through testing for this portion of the machinery.

The construction test 2PFG 1036 / 10/97 for protective equipment includes the following:

- Application/safety
- Assembly
- Fatigue strength
- Resistance to external influences
- Sharp corners and edges

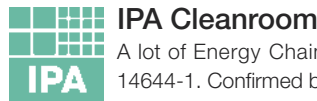


Test location for
ESD-E-Chains®



ESD/ATEX

igus® Energy Chains® made of standard material igumid G correspond to the German federal office of Physics and Technology (PTB) to classification Ex II 3 GD according to ATEX-RL 94/9/EG. igus® Energy Chains® made of igumid ESD correspond according to the German federal office of Physics and Technology (PTB) to classification Ex II 2 GD according to ATEX-RL 94/9/EC.



A lot of Energy Chains® are suitable for the use in cleanrooms according to DIN EN ISO 14644-1. Confirmed by the IPA Fraunhofer Institute.



Chainflex® cables with many
certificates for e.g. DESINA



**UL, CSA, CEI, CE, VDE,
Interbus and DESINA**

All igumid-materials for Energy Chains® and E-Tubes have got the UL-material approval. The material igumid NB has got the fire protection class approval IIb according to the test VDE 0304 Part 3/5.70, the approval V2 according UL 94 and the construction material class B2 according DIN 4102. Chainflex®-cables are produced according to a lot of international standards: **Interbus certification:** For Interbus certification of certain CF11 bus cables. **DESINA:** Many Chainflex® cables are Desina-compliant.



Noise level tests in igus®
own acoustic laboratory



Clearly quieter

igus® Energy Chain Systems® are clearly quieter. In the acoustic laboratory of the TÜV and the igus® GmbH different Energy Chains® were compared. The igus® System E3, E6 and E4/00 (Series E4/101) are measurably (and clearly) quieter than other products of comparable size (see also noise-optimized Energy Chains®)



igumid

The material igumid is free from toxins,
according 2002/95/EC (RoHS).



iF Design Award

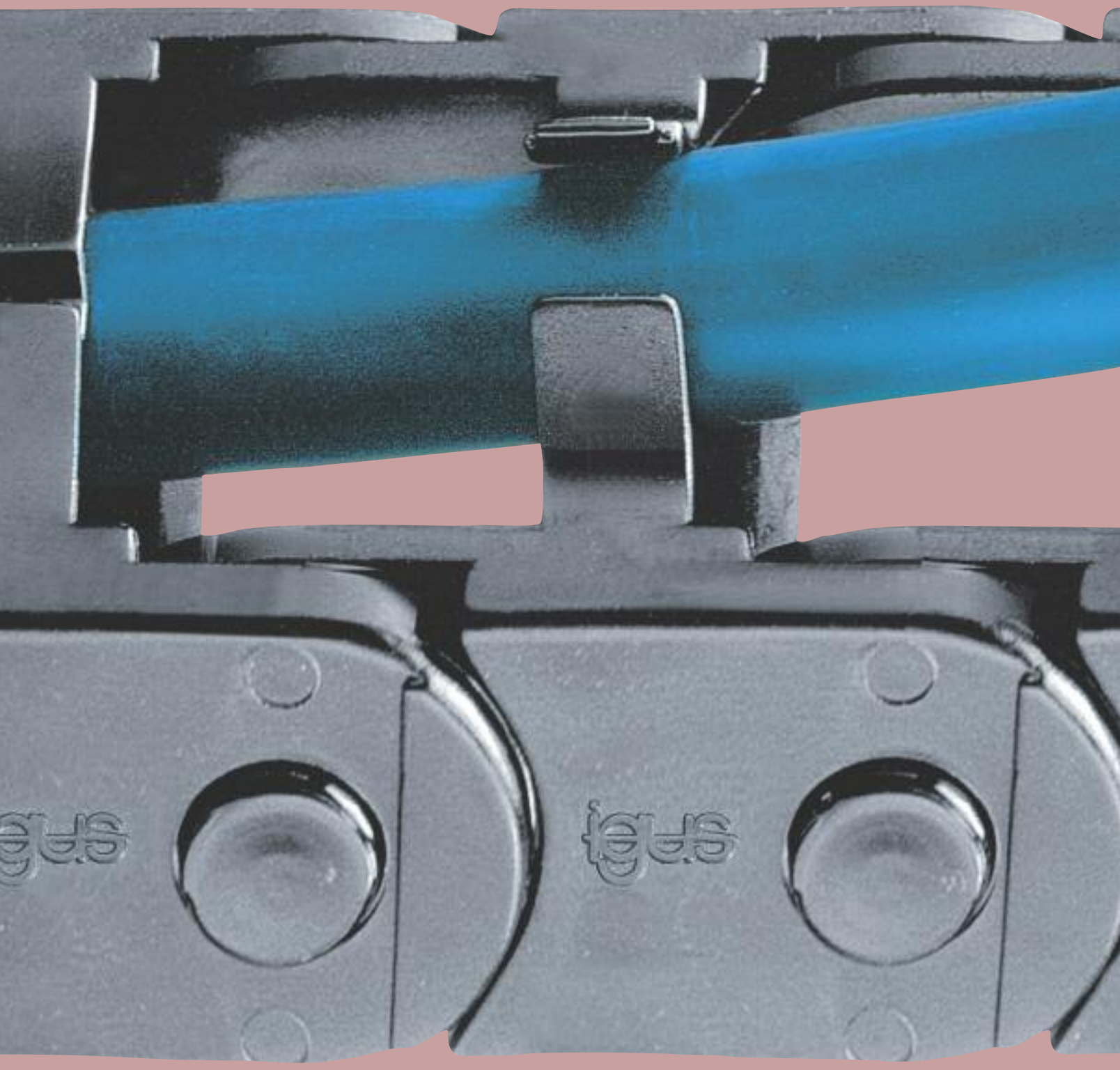
13 iF Design-Awards since 1984



igus® Energy Chain
System®

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Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>



igus

igus

E-Z Chain

CHAINFLEX®

igus

igus

E-Z Chain® - easy to fill and very cost-effective

E-Z Chain – cost effective cable carrier offers easy access to cables and hoses. E-Z Chain cable carriers are designed with a split crossbar along the outer radius for fast installation or removal of cables and hoses—without any tools. The split crossbars are flexible, but retain their shape and strength to provide secure protection and easy cable accessibility.

Typical industries and applications

- General machinery
- Cleanroom applications
- Electronic apparatus
- Office equipment
- Vending machines
- Packaging machines





Machinery of all kinds feature igus® E-Z Chains® - reduces assembly times



Clean room test acc. to Fraunhofer Institute IPA
 Standard material - ISO Class 2 acc. to ISO 14644-1
 Speed: $v = 3.28 \text{ ft/s}$ (1.0 m/s) and $a = 6.56 \text{ ft/s}$ (2.0 m/s) -
 Series E14-3-038



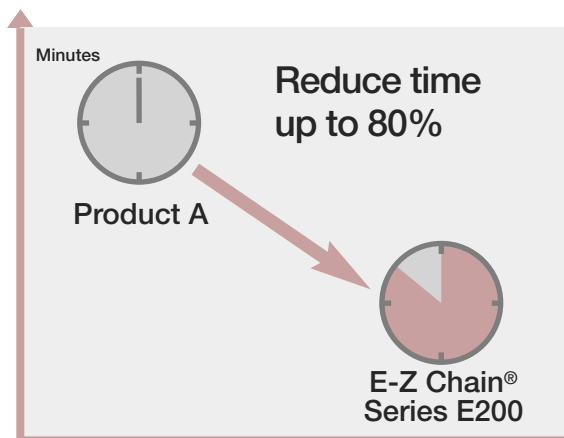
Special equipment: Electrically conductive ESD/ATEX version upon request.



Flammability Class
 VDE 0304 IIC UL94 V2



With E-Z Chain® rotatory and torsional motions are possible



Assembly time: Insertion of 2 cables Ø .24" and .39" (6 and 10 mm).

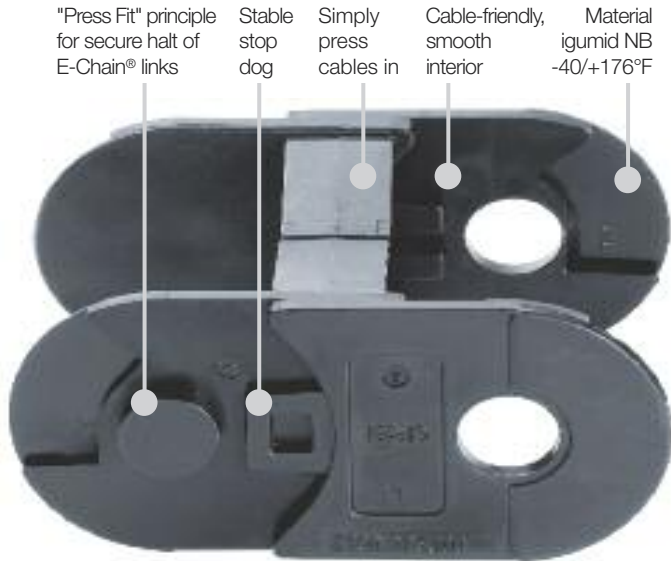
We can provide you with more details about this and other tests.



E-Z Chain® Series E14 on server unit, removable for maintenance purposes Cleanroom Class 2 ISO is standard



E-Z Chain® on adjustable office furniture with UL94 - V2 Classification



E-Z Chain®: "E" and "Z" makes "Easy"

- Easy to fill from the outer (exterior) radius (Version "E") or inner radius (Version "Z")
- Fast cable accessibility without opening and closing lids
- Easy to lengthen and shorten at any point
- Low price with one-piece design
- Dirt-repellent, contoured exterior
- Mounting brackets available with integrated strain relief
- Limited torsion tolerance
- Available with interior separation (some types)
- Flammability rating UL94-V2
- Suitable for clean-room applications
- You can find more technical data about the material, chemical resistance, temperatures ▶ **Chapter 1, Design**

Selection table

Series	Inner height <i>hi</i>		Inner width <i>Bi</i>		Outer width <i>Ba</i>		Outer height <i>ha</i>		Bending radius <i>R</i>	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
E03	.20	(5)	.20 - .39	(5-10)	.34 - .54	(8.7-13.7)	.31	(8)	.39 - 1.10	(10-28)
E04	.28	(7)	.28	(7)	.51	(13)	.39	(10)	.59 - 1.89	(15-48)
E045/Z045	.37	(9.4)	.39 - 1.06	(10-27)	.63 - 1.46	(16-37)	.49	(12.5)	.71 - 1.50	(18-38)
E06/Z06	.41/.42	(10.5 / 10.7)	.39 - .79	(10-20)	.65 - 1.04	(16.5-26.5)	.59	(15)	.71 - 1.50	(18-38)
E065	.44	(11.3)	.63 - 1.42	(16-36)	.98 - 1.94	(24.8-49.3)	.59	(15)	.71 - 1.50	(18-38)
E08/Z08	.57/.58	(14.6 / 14.7)	.39 - 1.97	(10-50)	.72 - 2.29	(18.2-58.2)	.76	(19.3)	1.10 - 1.89	(28-48)
E14/Z14	.75	(19)	.59 - 1.97	(15-50)	1.06 - 2.44	(27-62)	.98	(25)	1.10 - 4.92	(28-125)
E200/Z200	.96	(24.3)	1.46 - 2.24	(37-57)	2.93 - 4.74	(74.4-120.4)	1.38	(35)	2.17 - 7.87	(55-200)
E16/Z16	1.26	(32)	.91 - 3.94	(23-100)	1.48 - 4.54	(37.5-115.3)	1.54	(39)	1.57 - 3.94	(40-100)
E26/Z26	1.44/1.46	(36.5 / 37.1)	1.85 - 2.95	(47-75)	3.62 - 6.57	(92-167)	1.97	(50)	2.48 - 9.84	(63-250)
E300/Z300	1.91	(48.5)	1.81 - 2.95	(46-75)	3.74 - 6.69	(95-170)	2.52	(64)	2.95 - 11.81	(75-300)

Quick assembly with ESD!



E-Z Chain® now available as ESD version

- Easy to fill on the outer-/inner radius
- Accessible to the cables without opening and closing of lids
- Cost-effective one-piece design Energy Chain®
- Mounting brackets available

More information ▶ www.igus.com

Energy Chain System® E-Z Chain Series

Assembling | Separating | Filling | Series E03 · E04 · E/Z045



1 Twist and click or twist and divide



2 Press in cable

Assembling | Series E/Z06 · E065 · E/Z08 · E/Z14 · E/Z200 · E/Z16 · E/Z26 · E/Z300



1 Push and click...



2 Snap in pin

Separating | Series E/Z06 · E065 · E/Z08 · E/Z14 · E/Z200 · E/Z16 · E/Z26 · E/Z300



3 Release side link



4 Twist and pull apart

Filling | Series E/Z06 · E065 · E/Z08 · E/Z14 · E/Z200 · E/Z16 · E/Z26 · E/Z300



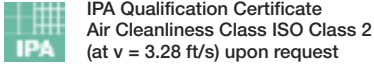
5 Press in cable



6 Pull out cable

Price Index


Series E03

Special Features / Options

 IPA Qualification Certificate
 Air Cleanliness Class ISO Class 2
 (at v = 3.28 ft/s) upon request

 Flammability Class
 VDE 0304 IIC UL94 V2

 Smallest inner heights .20" (5 mm)
 Series E03 E-Z Chain

Assembly Tips

 Just push the cables into the Energy Chain
 using your thumb

Usage Guidelines


- If filling is required without opening and closing
- If price is an issue
- If quiet operation is required



- If a non-opening Energy is needed
 ➤ **Series 03 E2 Micro**

Features & Benefits

- 1 Smallest Energy Chain® -
interior dimensions .20" x .20" (5 x 5 mm)
 - 2 Small pitch for low-noise and smooth operation
 - 3 Very easy to fill - ideal for harnessed cable assemblies,
without opening and closing lids
 - 4 Mounting bracket with integrated strain relief
 - 5 Very lightweight - ideal for low fill weight
 - 6 Patented push button principle holds the links together
 - 7 For smallest bending radii
- Chainflex® CF98/CF99 - 4 x d


Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

[energy chain® configurator](#)

 3.28 ft (1 m) **E03-05-010-0**
Energy Chain®

 1 Set **E03-05-12Z**
Mounting Bracket

Energy Chain System® E-Z Chain Series E03

Installation Dimensions

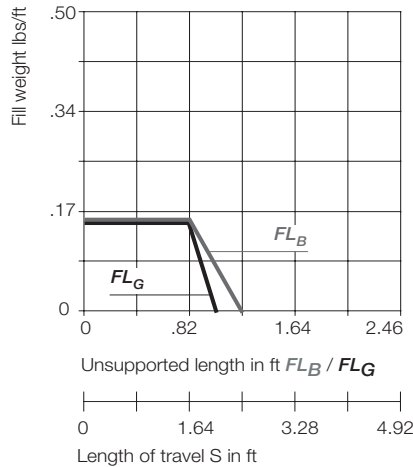
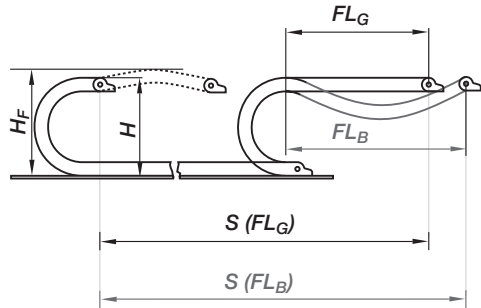
energy chain® configurator



E03

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1



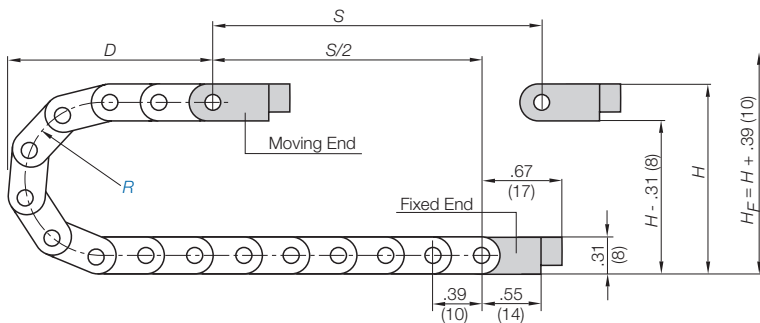
Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height



Pitch per link = .39" (10 mm)
 Links per ft (m) = 30.47 (100)
 For center mount applications:
 Chain length = $S/2 + K$

The required clearance height: $H_F = H + .39$ in. (10 mm) (with .067 lbs/ft (0.1 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	.39 (010)	.47 (012)	.59 (015)	.71 (018)	1.10 (028)
H	1.10 (28)	1.26 (32)	1.50 (38)	1.73 (44)	2.52 (64)
D	1.14 (29)	1.22 (31)	1.34 (34)	1.46 (37)	1.85 (47)
K	2.17 (55)	2.36 (60)	2.76 (70)	3.15 (80)	4.33 (110)

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 9.84 ft/s (3 m/s) / max. 32.8 ft/s ² (10 m/s ²)
Material (Energy Chain®) - permitted temperature	igumid NB / -40°F (-40°C) up to +176°F (+80° C)
Material (mounting brackets)* - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120° C)
Flammability Class (Energy Chain®), igumid NB	VDE 0304 IIC UL94 V2
Flammability Class (mounting brackets), igumid G*	VDE 0304 IIC UL94 HB

*Available in igumid NB upon request, please consult igus® for delivery time

Technical Data



Details of material properties

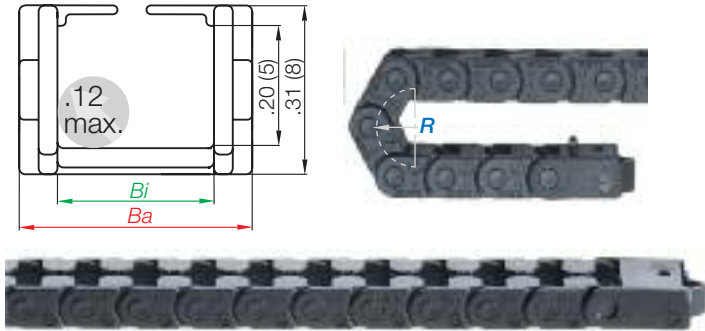
Chapter 1

igus® Energy Chain System®

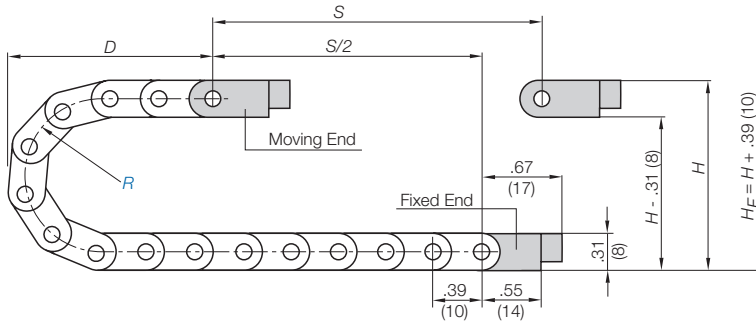
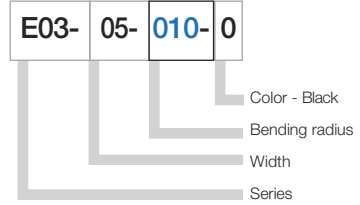
Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

Series E03 - Split crossbar along the outer radius



Part Number Structure



Supplement part number with required radius. Example: E03-05--0
Pitch: .39 in. (10 mm) per link links/ft (m) = 30.47 (100)

Part Number	Bi in. (mm)	Ba in. (mm)	Weight lbs/ft (kg/m)	Crossbar gap in. (mm)
E03-05- <input type="text"/> -0*	.20 (5)	.34 (8.7)	≈ 0.020 (0.03)	.04 (1)
E03-07- <input type="text"/> -0*	.28 (7)	.42 (10.7)	≈ 0.026 (0.04)	.08 (2)
E03-10- <input type="text"/> -0*	.39 (10)	.54 (13.7)	≈ 0.033 (0.05)	.08 (2)

Choose from the radii below for all of the above sizes

Radius (mm) Example: 03-05--0

	010	012	015	018	028
R	.39 (010)	.47 (012)	.59 (015)	.71 (018)	1.10 (028)
H	1.10 (28)	1.26 (32)	1.50 (38)	1.73 (44)	2.52 (64)
D	1.14 (29)	1.22 (31)	1.34 (34)	1.46 (37)	1.85 (47)
K	2.17 (55)	2.36 (60)	2.76 (70)	3.15 (80)	4.33 (110)

0=Standard color black. For other colors see Chapter 1

*Please note: For this series the crossbars do not overlap. Please see table for gap amount.

Energy Chain System® E-Z Chain Series E03 Mounting Brackets

energy chain® configurator ▶

igus®

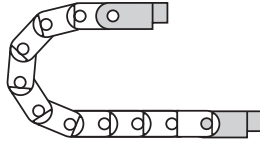
E03



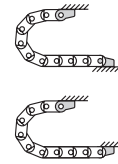
Polymer, one-piece

- One-piece mounting bracket
- Corrosion resistant
- Available preassembled
- Inner and outer attachment possible
- Adaptor plate for rapid installation

Moving end with bore
03 ...1Z



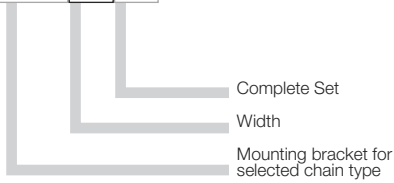
Fixed end with pin
03...2Z



Possible installation configurations -

Part Number Structure

03- 05- 12Z



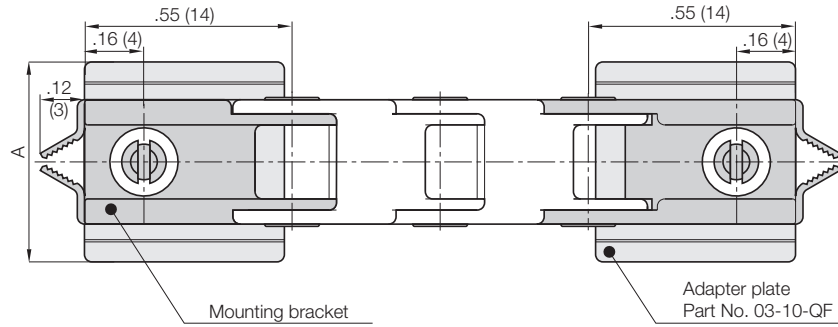
Full set, for both ends:

03- 05- 12Z Full set, each part with pin/bore

Single-part order:

03- 05- 1Z Mounting bracket with bore

03- 05- 2Z Mounting bracket with pin



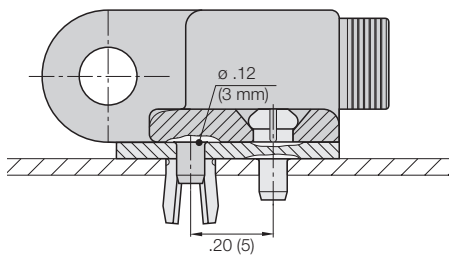
Chain Width	Part No. Full Set	Dimension A
		in. (mm)
-05	03-05-12Z	.34 (8.7)
-07	03-07-12Z	.42 (10.7)
-10	03-10-12Z	.54 (13.7)

Additional Accessories



03-10-QF = Adapter plate for all sizes

The adapter has broken edges, so that it can be adapted to the respective chain width. It is not absolutely necessary for attaching the mounting brackets. The mounting brackets can also be screwed on without the adapter plate.



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index


Series E04

Special Features / Options


IPA Qualification Certificate
Air Cleanliness Class ISO Class 2
(at v = 3.28 ft/s) upon request



Flammability Class
VDE 0304 IIC UL94 V2



Special equipment: Electrically
conductive ESD/ATEX version
upon request

Assembly Tips


Just push the cables into the Energy Chain
using your thumb



Special solution:
opening gap (0.8 mm)
Part No. E04-07-015-S

Usage Guidelines


- If filling is required without opening and closing
- If price is an issue
- If quiet operation is required



- If a non-opening Energy is needed
➤ **Series 04 E2 Micro**

Features & Benefits

- 1 Small pitch for low-noise and smooth operation
- 2 Very easy to fill - ideal for harnessed cable assemblies, without opening and closing lids
- 3 For high acceleration
- 4 Mounting brackets available
- 5 Limited torsion tolerance
- 6 Cable friendly smooth interior
- 7 Patented push button principle holds the links together


Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator

3.28 ft (1 m) **E04-07-038-0**



Energy Chain®

1 Set **040-07-12**



Mounting Bracket

Energy Chain System® E-Z Chain Series E04 Installation Dimensions

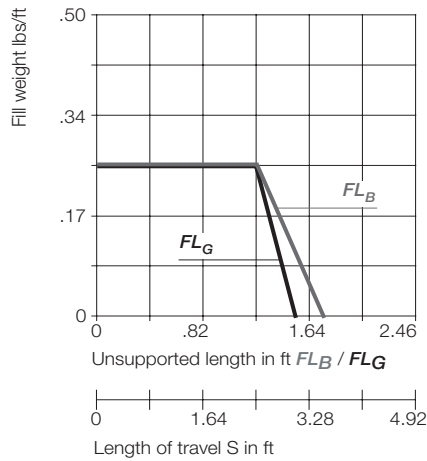
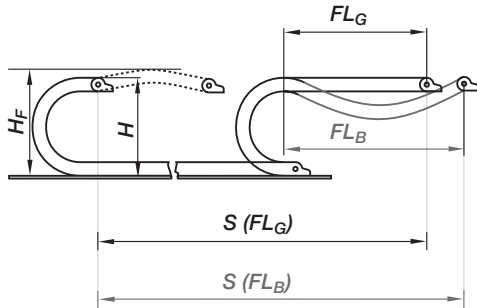
energy chain® configurator ▶



E04

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



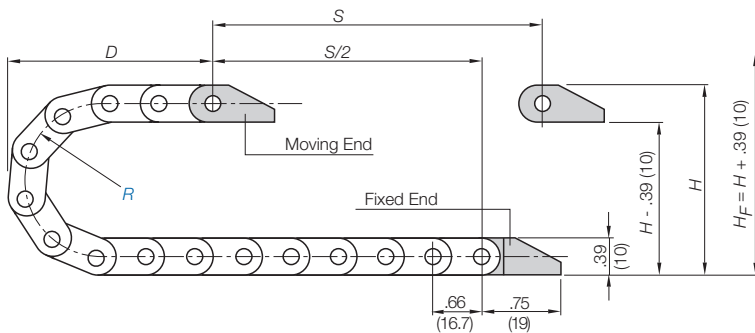
Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height



Pitch per link = .66" (16.7 mm)
Links per ft (m) = 18.28 (60)
For center mount applications:
Chain length = $S/2 + K$

The required clearance height: $H_F = H + .39$ in. (10 mm) (with .067 lbs/ft (0.1 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	.59 (015)	.71 (018)	1.10 (028)	1.50 (038)	1.89 (048)
H	1.57 (40)	1.81 (46)	2.60 (66)	3.39 (86)	4.17 (106)
D	1.77 (45)	1.89 (48)	2.28 (58)	2.68 (68)	3.07 (78)
K	3.35 (85)	3.54 (90)	4.92 (125)	6.10 (155)	7.28 (185)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Material (Energy Chain®) - permitted temperature	igumid NB / -40°F (-40°C) up to +176°F (+80°C)
Material (mounting brackets)* - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class (Energy Chain®), igumid NB	VDE 0304 IIC UL94 V2
Flammability Class (mounting brackets), igumid G	VDE 0304 IIC UL94 HB

Technical Data



Details of material properties

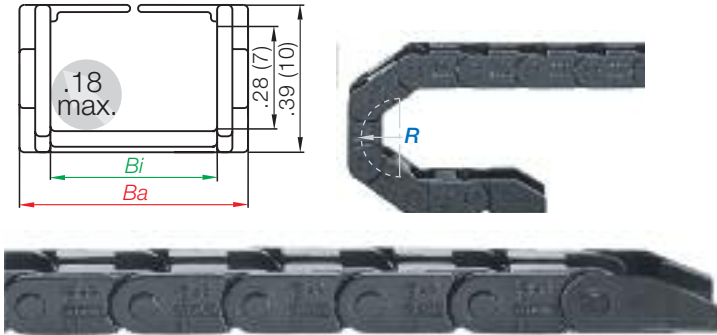
▶ Chapter 1

igus® Energy Chain System®

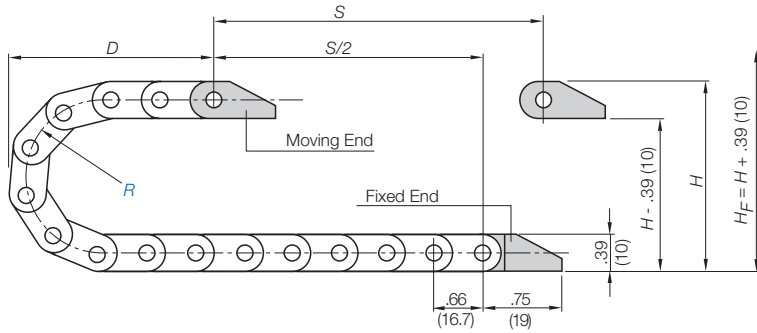
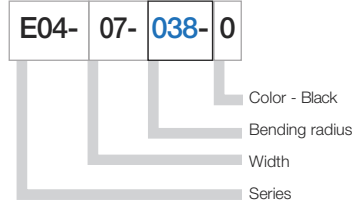
Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

Series E04 - Split crossbar along the outer radius



Part Number Structure



Supplement part number with required radius. Example: E04-07-**038**-0
Pitch: .66 in. (16.7 mm) per link links/ft (m) = 18.28 (60)

Part Number	Bi in. (mm)	Ba in. (mm)	Weight lbs/ft (kg/m)	Crossbar Gap in. (mm)
E04-07- <input type="text"/> -0*	.28 (7)	.47 (12)	≈ 0.053 (0.08)	.10 (2.5)

Choose from the radii below for all of the above sizes

Radius (mm) Example: E04-07-**038**-0

	015	018	028	038	048
R	.59 (015)	.71 (018)	1.10 (028)	1.50 (038)	1.89 (048)
H	1.57 (40)	1.81 (46)	2.60 (66)	3.39 (86)	4.17 (106)
D	1.77 (45)	1.89 (48)	2.28 (58)	2.68 (68)	3.07 (78)
K	3.35 (85)	3.54 (90)	4.92 (125)	6.10 (155)	7.28 (185)

0=Standard color black. For other colors see Chapter 1
*Please note: For this series the crossbars do not overlap. Please see table for gap amount.

Energy Chain System® E-Z Chain Series E04 Mounting Brackets

energy chain® configurator 

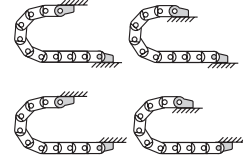
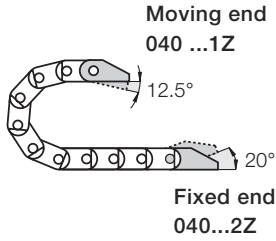
igus®

E04



Polymer, one-piece

- One-piece mounting bracket
- Corrosion resistant
- Available preassembled



Possible installation configurations -

Part Number Structure

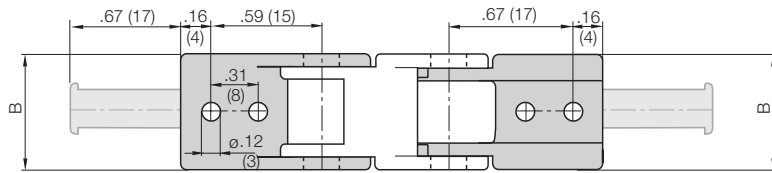
040- 07- 12 PZ

With tiewrap plates

Complete Set

Width

Mounting brackets for selected chain type



Full set, for both ends:

040-07-12 Full set, each part with pin/bore

Single-part order:

040-07-1 Mounting bracket with bore

040-07-2 Mounting bracket with pin

Chain Type	Part No.	Part No.	Dimension B in. (mm)	Number of Teeth
	Full set without Tiewrap Plate	Full set with Tiewrap Plate		
E04-07	040-07-12	040-07-12PZ	.47 (12)	1

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFG: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Additional accessories



Quicksnap - the complete, detachable mounting unit, upon request
Only available for the 040-07 Energy Chain - **Part No. 040-07-QS**

Price Index



Series E045

Special Features / Options

IPA Qualification Certificate
Air Cleanliness Class ISO Class 2
(at v = 3.28 ft/s) upon request

Flammability Class
VDE 0304 IIC UL94 V2

Special equipment: Electrically
conductive ESD/ATEX version
upon request

Assembly Tips



Just push the cables into the Energy Chain
using your thumb

Features & Benefits

- 1 Limited torsion tolerance
- 2 Small pitch for low-noise and smooth operation
- 3 Cable friendly interior
- 4 Patented push button principle holds the links together
- 5 Very easy to fill
- 6 Mounting brackets available
- 7 "E" Series features split crossbar along the outer radius
- 8 "Z" Series features split crossbar along the inner radius
- 9 1-, 2-, or 3-chamber system available



Usage Guidelines



- If filling is required without opening and closing
- If a very small pitch is required



- If smooth operation is required
➤ Series 045 E2 Micro
- If high stability is required
➤ Series 06 E2 Micro
- If non-opening is required
➤ Series 045 E2 Micro

Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator

3.28 ft (1 m) E045-16-038-0

Energy Chain®

1 Set 0450-16-12

Mounting Bracket

Energy Chain System® E-Z Chain Series E045/Z045 Installation Dimensions

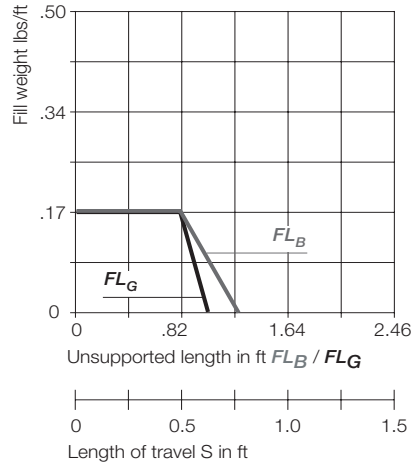
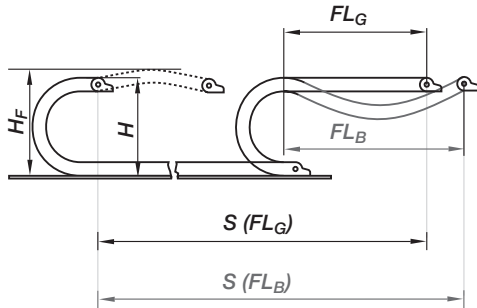
energy chain® configurator



E045
Z045

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1



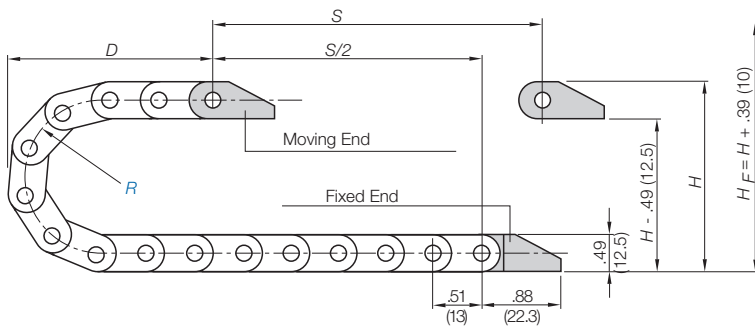
Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height



Pitch per link = .51" (13 mm)
Links per ft (m) = 23.47 (77)
For center mount applications:
Chain length = $S/2 + K$

The required clearance height: $H_F = H + .39$ in. (10 mm) (with .067 lbs/ft (0.1 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	.71 (018)	1.10 (028)	1.50 (038)
H	1.91 (48.5)	2.70 (68.5)	3.48 (88.5)
D	1.73 (44)	2.13 (54)	2.52 (64)
K	3.35 (85)	4.53 (115)	5.91 (150)



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Material (Energy Chain®) - permitted temperature	igumid NB / -40°F (-40°C) up to +176°F (+80° C)
Material (mounting brackets)* - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120° C)
Flammability Class (Energy Chain®), igumid NB	VDE 0304 IIC UL94 V2
Flammability Class (mounting brackets), igumid G	VDE 0304 IIC UL94 HB

Technical Data

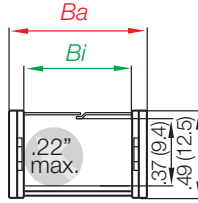


Details of material properties

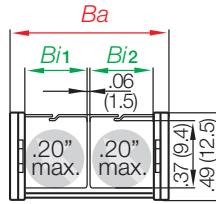
Chapter 1

Series E045 - Split crossbar along the outer radius

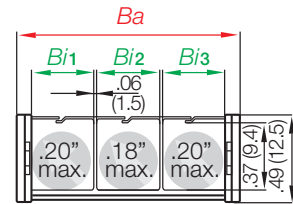
Single Chamber System



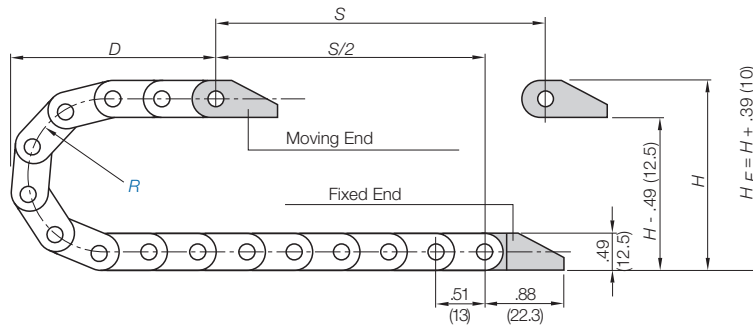
2 Chamber System



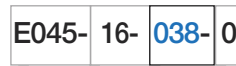
3 Chamber System



Supplement part number with required radius. Example: E045-16-**038**-0
Pitch: .51 in. (13 mm) per link links/ft (m) = 23.47 (77)



Part Number Structure



Color - Black
Bending radius
Width
Series

Part Number	Bi in. (mm)	Ba in. (mm)	Weight lbs/ft (kg/m)	Crossbar Gap in. (mm)
Single Chamber System				
E045-10- <input type="checkbox"/> -0*	.39 (10)	.63 (16)	≈ 0.06 (0.09)	.08 (2)
E045-16- <input type="checkbox"/> -0	.63 (16)	.91 (23)	≈ 0.07 (0.11)	-
2 Chamber System				
E045-2/7- <input type="checkbox"/> -0*	.28/.28 (7/7)	.91 (23)	≈ 0.09 (0.13)	.09 (2.25)
E045-2/9- <input type="checkbox"/> -0*	.35/.35 (9/9)	1.06 (27)	≈ 0.09 (0.14)	.09 (2.25)
3 Chamber System				
E045-3/9- <input type="checkbox"/> -0*	.35/.35/.35 (9/9/9)	1.46 (37)	≈ 0.11 (0.17)	.09 (2.25)

Choose from the radii below for all of the above sizes

Radius (mm) Example: E045-16-**038**-0

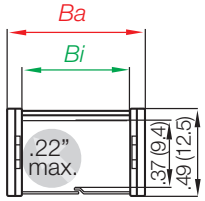
	018	028	038
R	.71 (018)	1.10 (028)	1.50 (038)
H	1.91 (48.5)	2.70 (68.5)	3.48 (88.5)
D	1.73 (44)	2.13 (54)	2.52 (64)
K	3.35 (85)	4.53 (115)	5.91 (150)

0=Standard color black. For other colors see Chapter 1

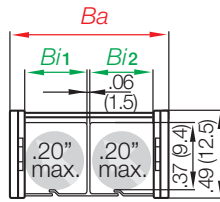
*Please note: For this series the crossbars do not overlap. Please see table for gap amount.

Series Z045 - Split crossbar along the inner radius

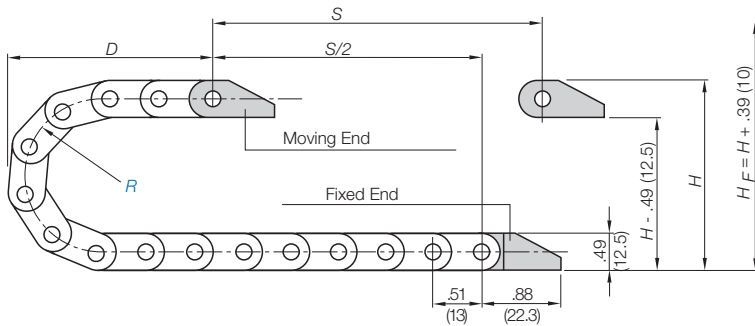
Single Chamber System



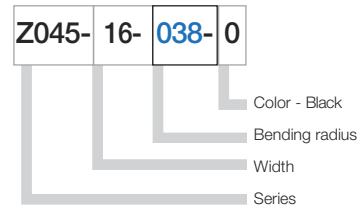
2 Chamber System



Supplement part number with required radius. Example: Z045-16-038-0
Pitch: .51 in. (13 mm) per link links/ft (m) = 23.47 (77)



Part Number Structure



Part Number	Bi	Ba	Weight	Crossbar Gap
Single Chamber System	in. (mm)	in. (mm)	lbs/ft (kg/m)	in. (mm)
Z045-16- <input type="text"/> -0*	.63 (16)	.91 (23)	≈ 0.07 (0.11)	.08 (2)

2 Chamber System	Bi	Ba	Weight	Crossbar Gap
	in. (mm)	in. (mm)	lbs/ft (kg/m)	in. (mm)
Z045-2/7- <input type="text"/> -0*	.28/.28 (7/7)	.91 (23)	≈ 0.09 (0.13)	.09 (2.25)

Choose from the radii below for all of the above sizes

Radius (mm) Example: Z045-16-038-0

	018	028	038
R	.71 (018)	1.10 (028)	1.50 (038)
H	1.91 (48.5)	2.70 (68.5)	3.48 (88.5)
D	1.73 (44)	2.13 (54)	2.52 (64)
K	3.35 (85)	4.53 (115)	5.91 (150)

0=Standard color black. For other colors see Chapter 1

*Please note: For this series the crossbars do not overlap. Please see table for gap amount.

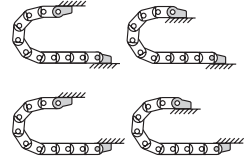
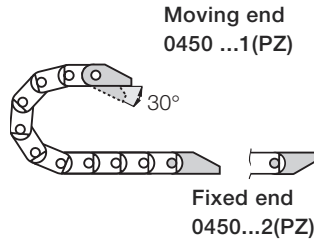
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS





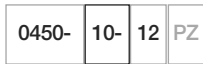
Polymer, one-piece

- One-piece mounting bracket
- Corrosion resistant
- Available preassembled



Possible installation configurations -

Part Number Structure



- With tiewrap plates
- Complete Set
- Width
- Mounting brackets for selected chain type

Full set, for both ends:

0450-10-12-PZ

Full set, each part with pin/bore + tiewrap plate

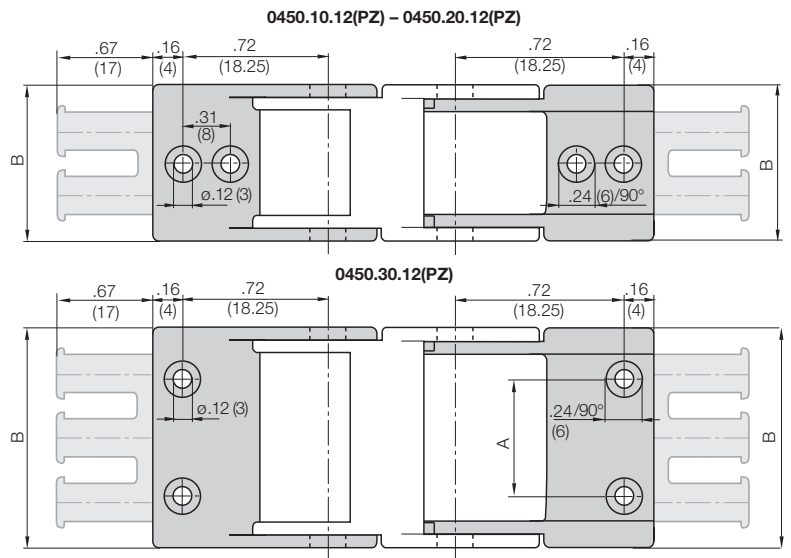
Single-part order:

0450-10-1-PZ

Mounting bracket with bore + tiewrap plate

0450-10-2-PZ

Mounting bracket with pin + tiewrap plate



Chain Type	Part No.		Dimension A in. (mm)	Dimensions B in. (mm)		Number of Teeth
	Full set with Tiewrap Plate	Full Set without Tiewrap Plate				
E045/Z045-10	0450-10-12PZ	0450-10-12	—	.63 (16)	1	
E045/Z045-16	0450-16-12PZ	0450-16-12	—	.87 (22)	2	
E045/Z045-2/7	0450-16-12PZ	0450-16-12	—	.87 (22)	2	
E045/Z045-2/9	0450-20-12PZ	0450-20-12	—	1.02 (26)	2	
E045/Z045-3/9	0450-30-12PZ	0450-30-12	.87 (22)	1.42 (36)	3	

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS





Price Index



Series E06/Z06

Special Features / Options



IPA Qualification Certificate
Air Cleanliness Class ISO Class 2
(at v = 3.28 ft/s) upon request



Flammability Class
VDE 0304 IIC UL94 V2



Special equipment: Electrically
conductive ESD/ATEX version
upon request

Assembly Tips



Just push the cables into the Energy Chain using your thumb



Special solution -
opening gap 0.14 (3.5 mm)
Part No. E06-10-018S3

Usage Guidelines



- If filling is required without opening and closing
- If price is an issue
- If quiet operation is required



- "Z" Series is unsuitable for gliding applications
➤ Series 07 Zipper
- If non-opening is required
➤ Series 06 E2 Micro

Features & Benefits

- 1 Small pitch for low-noise and smooth operation
- 2 Cable friendly - smooth interior
- 3 Very lightweight
- 4 Patented push button principle holds the links together
- 5 Very easy to fill - ideal for harnessed cable assemblies
- 6 Integrated strain relief option
- 7 "E" Series features split crossbar along the outer radius
- 8 "Z" Series features split crossbar along the inner radius
- 9 Limited torsion tolerance



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator

3.28 ft (1 m) E06-10-038-0



Energy Chain®

1 Set 060-10-12



Mounting Bracket

Energy Chain System® E-Z Chain Series E06/Z06

Installation Dimensions

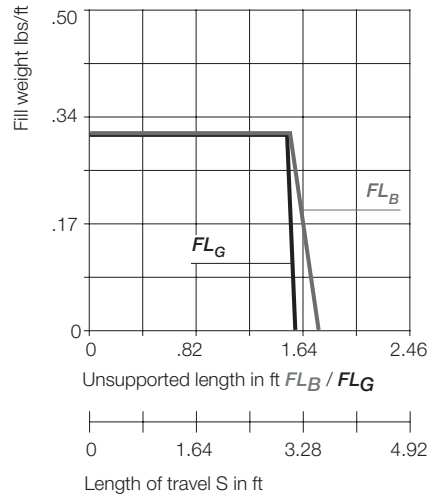
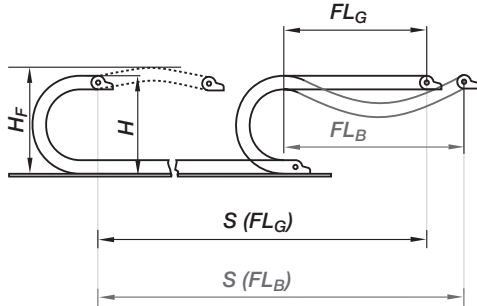
energy chain® configurator



E06
Z06

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1



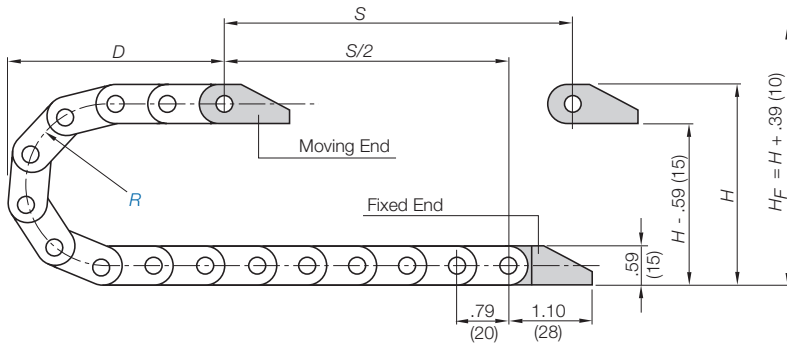
Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height



Pitch per link = .79" (20 mm)
Links per ft (m) = 15.24 (50)
For center mount applications:
Chain length = $S/2 + K$

The required clearance height: $H_F = H + .39$ in. (10 mm) (with .13 lbs/ft (0.2 kg/m) fill weight. Please consult igus® if space is particularly restricted.

R	.71 (018)	1.10 (028)	1.50 (038)
H*	2.01 (51)	2.80 (71)	3.58 (91)
D	2.20 (56)	2.60 (66)	2.99 (76)
K	3.94 (100)	5.12 (130)	6.30 (160)



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Material (Energy Chain®) - permitted temperature	igumid NB / -40°F (-40°C) up to +176°F (+80°C)
Material (mounting brackets)* - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class (Energy Chain®), igumid NB	VDE 0304 IIC UL94 V2
Flammability Class (mounting brackets), igumid G	VDE 0304 IIC UL94 HB

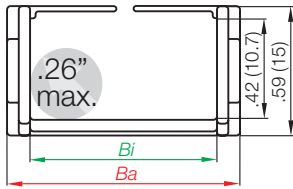
Technical Data



Details of material properties

Chapter 1

Series E06 - Split crossbar along the outer radius



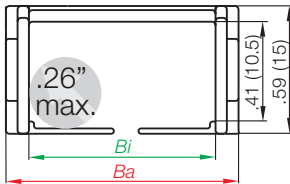
Part Number Structure



- Color - Black
- Bending radius
- Width
- Series



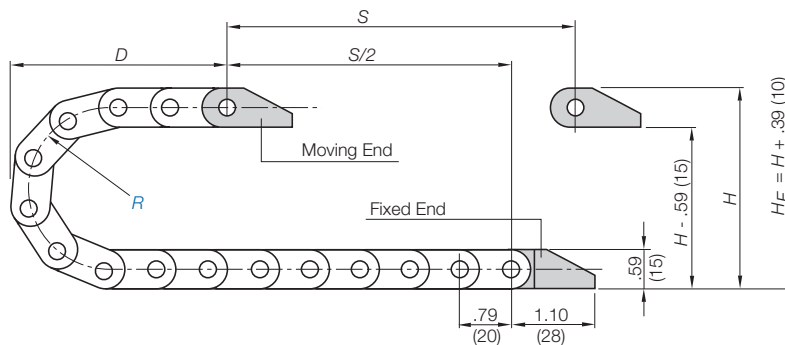
Series Z06 - Split crossbar along the inner radius



Part Number Structure



- Color - Black
- Bending radius
- Width
- Series



Supplement part number with required radius. Example: E06-10-038-0
Pitch: .79 in. (20 mm) per link links/ft (m) = 15.24 (50)

Part Number			Bi	Ba	Weight	Crossbar Gap
Split Crossbar Outer Radius	Split Crossbar Inner Radius		in. (mm)	in. (mm)	lbs/ft (kg/m)	in. (mm)
E06-10	Z06-10*	<input type="text" value="0"/>	.39 (10)	.65 (16.5)	≈ 0.09 (0.14)	.22 (5.5)
E06-16-	Z06-16*	<input type="text" value="0"/>	.63 (16)	.86 (22.5)	≈ 0.11 (0.16)	.22 (5.5)
E06-20-	Z06-20	<input type="text" value="0"/>	.79 (20)	1.04 (26.5)	≈ 0.12 (0.18)	-

Choose from the radii below for all of the above sizes
Radius (mm) Example: E06-10-038-0

	018	028	038
R	.71 (018)	1.10 (028)	1.50 (038)
H*	2.01 (51)	2.80 (71)	3.58 (91)
D	2.20 (56)	2.60 (66)	2.99 (76)
K	3.94 (100)	5.12 (130)	6.30 (160)

0=Standard color black. For other colors see Chapter 1
*Please note: For this series the crossbars do not overlap. Please see table for gap amount.

Energy Chain System® E-Z Chain Series E06/Z06 Mounting Brackets

energy chain® configurator ▶

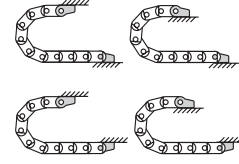
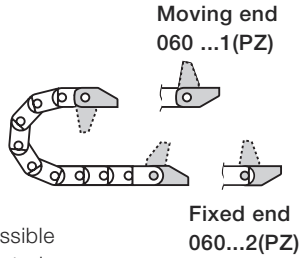


E06
Z06



Polymer, one-piece

- One-piece mounting bracket
- Corrosion resistant
- Available preassembled
- Inner and outer attachment possible
- Available with or without integrated strain relief tiwrap plates



Possible installation configurations -

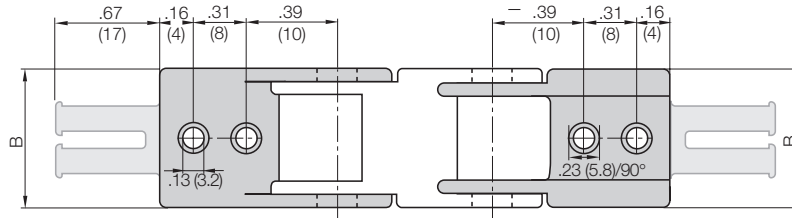
Dimensions and order configurations

Strain relief is possible on the moving end and/or the fixed end.

Part Number Structure

060-	20-	12	PZ
------	-----	----	----

- With assembled strain relief tiwrap plates
- Complete Set
- Width
- Mounting brackets for selected chain type



Full set, for both ends:

060- 20- 12 PZ Full set, each part with pin/bore

Single-part order:

060- 20- 1 PZ Mounting bracket with bore

060- 20- 2 PZ Mounting bracket with pin

Chain Type	Part No. Full set with Tiewrap Plate	Part No. Full Set without Tiewrap Plate	Dimensions B		Number of Teeth
			in.	(mm)	
E06/Z06-10	060-10-12PZ	060-10-12	.65	(16.5)	1
E06/Z06-16	060-16-12PZ	060-16-12	.89	(22.5)	2
E06/Z06-20	060-20-12PZ	060-20-12	1.06	(27.0)	2

Additional Accessories



Quicksnap - the complete, detachable mounting unit, upon request

Part No.

060-10-QS

060-16-QS

060-20-QS



Quickfix - mounting bracket with dowel, upon request

Part No. 060-20-4-QZ

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Price Index



Series E08/Z08

Special Features / Options



IPA Qualification Certificate
Air Cleanliness Class ISO Class 2
(at v = 3.28 ft/s) upon request



Flammability Class
VDE 0304 IIC UL94 V2



Special equipment: Electrically
conductive ESD/ATEX version
upon request

Assembly Tips



Just push the cables into the Energy Chain
using your thumb

Usage Guidelines



- If filling is required without opening and closing
- If price is an issue
- If quiet operation is required



- "Z" Series is unsuitable for gliding applications
➤ Series 09 Zipper

Features & Benefits

- 1 Cable-friendly interior
- 2 Small pitch for low-noise and smooth operation
- 3 Lightweight
- 4 Patented push button principle holds the links together
- 5 Integrated strain relief option
- 6 Very easy to fill - ideal for harnessed cable assemblies
- 7 "E" Series features split crossbar along the outer radius
- 8 "Z" Series features split crossbar along the inner radius
- 9 Limited torsion tolerance



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator ▶

3.28 ft (1 m) E08-30-038-0



Energy Chain®

1 Set 080-30-12PZ



Mounting Bracket

Energy Chain System® E-Z Chain Series E08/Z08 Installation Dimensions

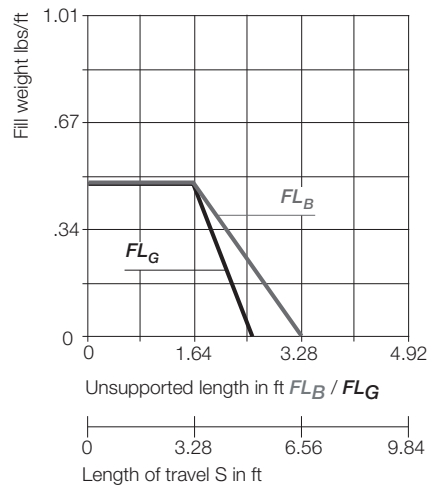
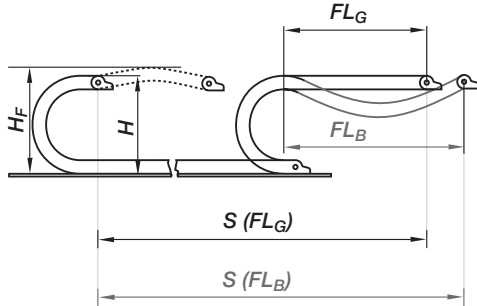
energy chain® configurator



E08
Z08

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ► Design, Chapter 1



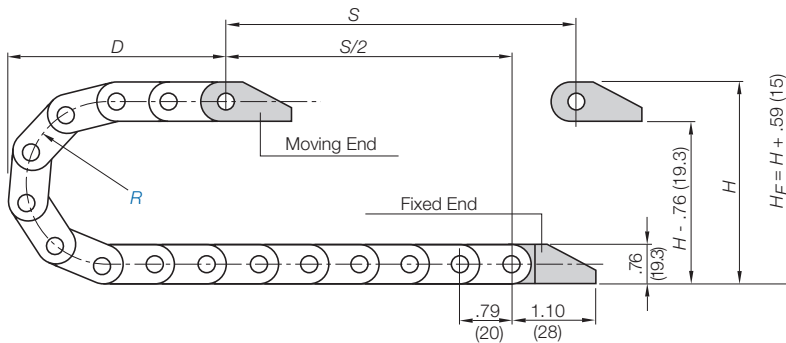
Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height



Pitch per link: = .79" (20 mm)
Links per ft (m): = 15.24 (50)
For center mount applications:
Chain length = $S/2 + K$

The required clearance height: $H_F = H + .59$ in. (15 mm) (with .20 lbs/ft (0.3 kg/m) fill weight. Please consult igus® if space is particularly restricted.

R	1.10 (028)	1.50 (038)	1.89 (048)
H	2.95 (75)	3.74 (95)	4.53 (115)
D	2.68 (68)	3.07 (78)	3.46 (88)
K	5.12 (130)	6.30 (160)	7.68 (195)

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 9.84 ft/s (3 m/s) / max. 32.8 ft/s ² (10 m/s ²)
Material (Energy Chain®) - permitted temperature	igumid NB / -40°F (-40°C) up to +176°F (+80°C)
Material (mounting brackets)* - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class (Energy Chain®), igumid NB	VDE 0304 IIC UL94 V2
Flammability Class (mounting brackets), igumid G*	VDE 0304 IIC UL94 HB

Technical Data



Details of material properties

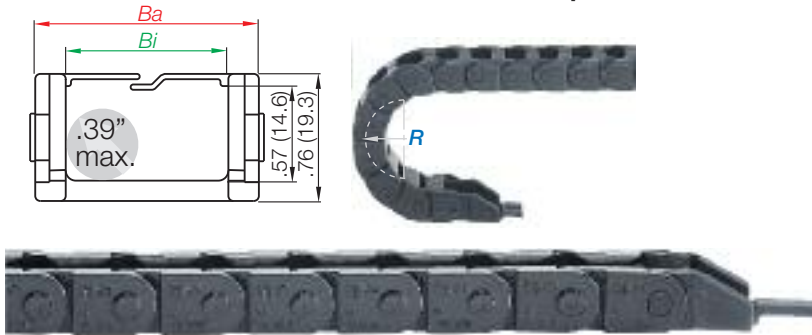
► Chapter 1



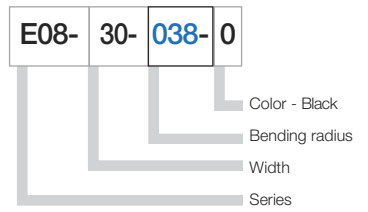
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



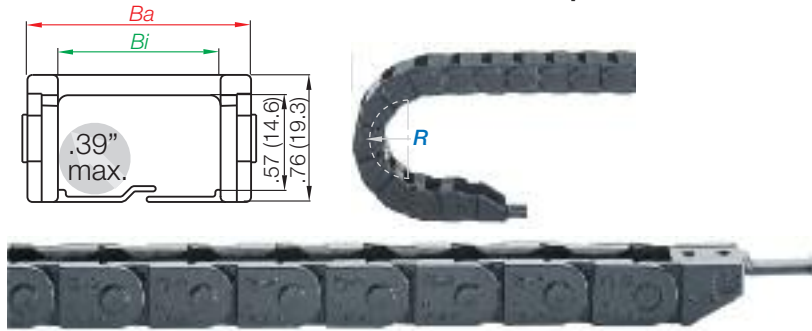
Series E08 - Split crossbar along the outer radius



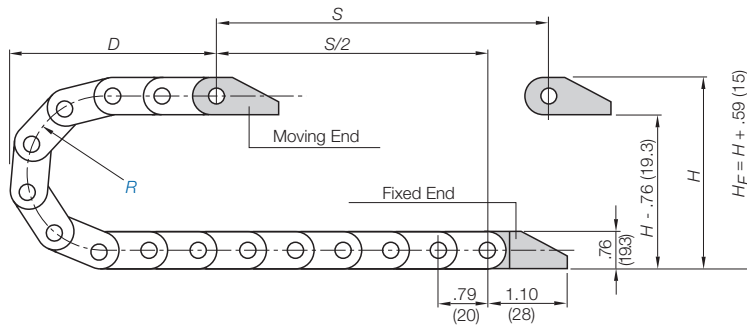
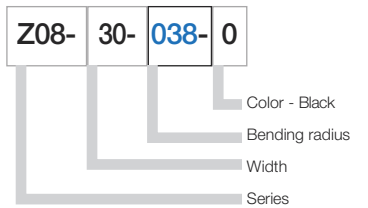
Part Number Structure



Series Z08 - Split crossbar along the inner radius



Part Number Structure



Supplement part number with required radius. Example: E08-10-038-0
Pitch: .79 in. (20 mm) per link links/ft (m) = 15.24 (50)

Part Number				<i>Bi</i>	<i>Ba</i>	Weight
Split Crossbar	Split Crossbar			in. (mm)	in. (mm)	lbs/ft (kg/m)
Outer Radius	Inner Radius					
E08-10	Z08-10	<input type="checkbox"/>	-0	.39 (10)	.72 (18.2)	≈ 0.14 (0.21)
E08-16	Z08-16	<input type="checkbox"/>	-0	.63 (16)	.95 (24.2)	≈ 0.16 (0.24)
E08-20	Z08-20	<input type="checkbox"/>	-0	.79 (20)	1.11 (28.2)	≈ 0.17 (0.25)
E08-30	Z08-30	<input type="checkbox"/>	-0	1.18 (30)	1.50 (38.2)	≈ 0.19 (0.28)
E08-40	Z08-40	<input type="checkbox"/>	-0	1.57 (40)	1.90 (48.2)	≈ 0.21 (0.31)
E08-50	Z08-50	<input type="checkbox"/>	-0	1.97 (50)	2.29 (58.2)	≈ 0.25 (0.37)

Choose from the radii below for all of the above sizes

Radius (mm) Example: E08-10-038-0

	028	038	048
R	1.10 (28)	1.50 (38)	1.89 (48)
H	2.95 (75)	3.74 (95)	4.53 (115)
D	2.68 (68)	3.07 (78)	3.46 (88)
K	5.12 (130)	6.30 (160)	7.68 (195)

0=Standard color black. For other colors see Chapter 1

Energy Chain System® E-Z Chain Series E08/Z08 Mounting Brackets

energy chain® configurator 

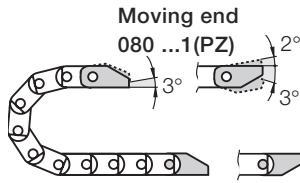


E08
Z08

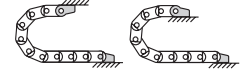


Plastic, one-piece

- One-piece mounting bracket
- Corrosion resistant
- Available preassembled
- Inner and outer attachment possible
- Available with or without integrated strain relief tiwrap plates



Fixed end
080...2(PZ)



Possible installation configurations -

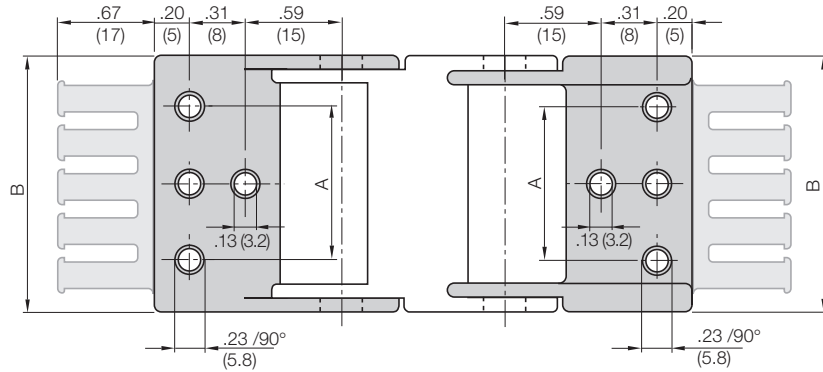
Dimensions and order configurations

Strain relief is possible on the moving end and/or the fixed end.

Part Number Structure

080- 20- 12 PZ

- With assembled strain relief tiwrap plates
- Complete Set
- Width
- Mounting brackets for selected chain type



Full set, for both ends:

080- 20- 12 PZ Full set, each part with pin/bore

Single-part order:

- 080- 20- 1 PZ Mounting bracket with bore
- 080- 20- 2 PZ Mounting bracket with pin

080-10-12 - 080-20-12:

Center bores only

080-30-12 - 080-50-12:

Outer bores only

Chain Type	Part No. Full set with Tiewrap Plate	Part No. Full Set without Tiewrap Plate	Dimension A in. (mm)	Dimensions B in. (mm)	Number of Teeth
E08/Z08-10	080-10-12PZ	080-10-12	— —	.72 (18.2)	1
E08/Z08-16	080-16-12PZ	080-16-12	— —	.95 (24.2)	2
E08/Z08-20	080-20-12PZ	080-20-12	— —	1.11 (28.2)	2
E08/Z08-30	080-30-12PZ	080-30-12	.87 (22)	1.50 (38.2)	3
E08/Z08-40	080-40-12PZ	080-40-12	1.26 (32)	1.90 (48.2)	4
E08/Z08-50	080-50-12PZ	080-50-12	1.65 (42)	2.29 (58.2)	5

Additional Accessories



Quicksnap - the complete, detachable mounting unit, upon request

Part No.
080-20-QS
080-30-QS



Quickfix - mounting bracket with dowel, upon request

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS







Price Index




Series E14/Z14

Special Features / Options

 IPA Qualification Certificate
Air Cleanliness Class ISO Class 2
(at v = 3.28 ft/s) upon request

 Flammability Class
VDE 0304 IIC UL94 V2

 IPA Qualification Certificate: ESD
Classification Level 1 (for Series
E14-3-038). Special equipment:
Electrically conductive ESD/ATEX
version upon request

Assembly Tips



Just push the cables into the Energy Chain using your thumb

Usage Guidelines



- If filling is required without opening and closing
- If price is an issue
- If quiet operation is required



- “Z” Series is unsuitable for gliding applications
➤ Series B15 E2 Mini
- If a long unsupported length is required
➤ Series B15 E2 Mini

Features & Benefits

- 1 Small pitch for low-noise and smooth operation
- 2 Cable-friendly interior
- 3 Limited torsion tolerance
- 4 Very easy to fill - ideal for harnessed cable assemblies
- 5 Integrated strain relief option
- 6 Patented push button principle holds the links together
- 7 “E” Series features split crossbar along the outer radius
- 8 “Z” Series features split crossbar along the inner radius



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator 

3.28 ft (1 m) E14-3-038-0

 Energy Chain®

1 Set 114-3-12PZ

 Mounting Bracket

Energy Chain System® E-Z Chain Series E14/Z14 Installation Dimensions

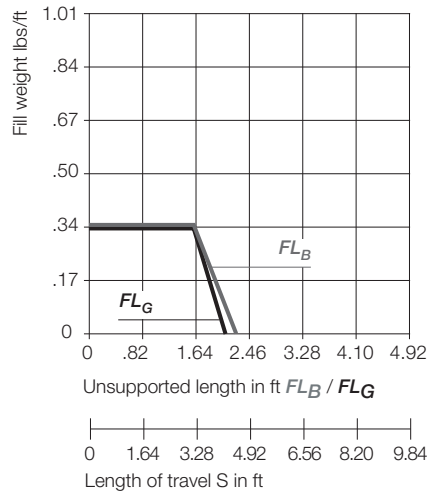
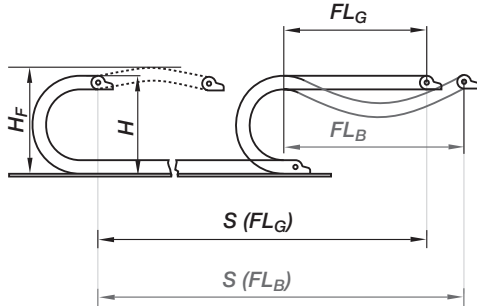
energy chain® configurator



E14
Z14

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1



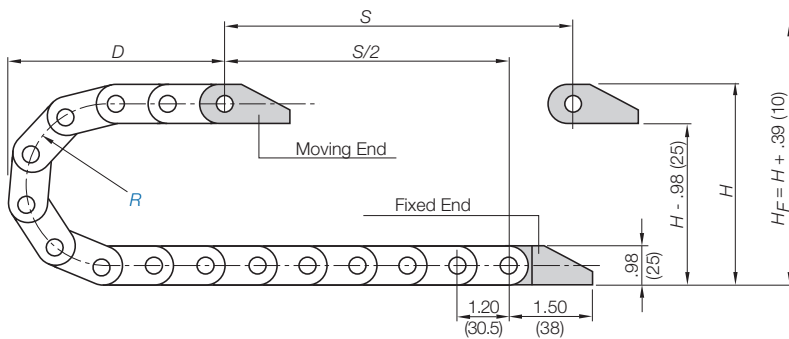
Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height



Pitch per link: = 1.20" (30.5 mm)
Links per ft (m): = 10.06 (33)
For center mount applications:
Chain length = $S/2 + K$

The required clearance height: $H_F = H + .39$ in. (10 mm) (with .13 lbs/ft (0.2 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	1.10 (028)	1.50 (038)	1.89 (048)	2.95 (075)	3.94 (100)	4.92 (125)
H	3.19 (81)	3.98 (101)	4.76 (121)	6.89 (175)	8.86 (225)	10.83 (275)
D	3.35 (86)	3.78 (96)	4.17 (106)	5.24 (133)	6.22 (158)	7.20 (183)
K	5.91 (150)	7.28 (185)	8.46 (215)	11.81 (300)	14.96 (380)	17.91 (455)



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 9.84 ft/s (3 m/s) / max. 32.8 ft/s ² (10 m/s ²)
Material (Energy Chain®) - permitted temperature	igumid NB / -40°F (-40°C) up to +176°F (+80° C)
Material (mounting brackets)* - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120° C)
Flammability Class (Energy Chain®), igumid NB	VDE 0304 IIC UL94 V2
Flammability Class (mounting brackets), igumid G*	VDE 0304 IIC UL94 HB

*Available in igumid NB upon request, please consult igus® for delivery time

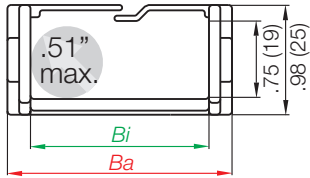
Technical Data



Details of material properties

Chapter 1

Series E14 - Split crossbar along the outer radius



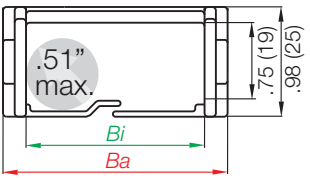
Part Number Structure



Color - Black
Bending radius
Width
Series



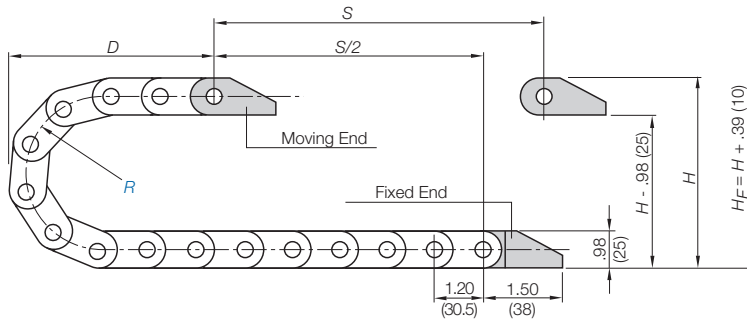
Series Z14 - Split crossbar along the inner radius



Part Number Structure



Color - Black
Bending radius
Width
Series



Supplement part number with required radius. Example: E14-3--0
Pitch: 1.20 in. (30.5 mm) per link links/ft (m) = 10.06 (33)

Part Number				Bi	Ba	Weight
Split Crossbar	Split Crossbar			in. (mm)	in. (mm)	lbs/ft (kg/m)
Outer Radius	Inner Radius					
E14-1-	Z14-1-	<input type="text" value=""/>	-0	.59 (15)	1.06 (27)	≈ 0.21 (0.31)
E14-2-	Z14-2-	<input type="text" value=""/>	-0	.98 (25)	1.46 (37)	≈ 0.22 (0.32)
E14-3-	Z14-3-	<input type="text" value=""/>	-0	1.50 (38)	1.97 (50)	≈ 0.27 (0.40)
E14-4-	Z14-4-	<input type="text" value=""/>	-0	1.97 (50)	2.44 (62)	≈ 0.30 (0.44)

Choose from the radii below for all of the above sizes
Radius (mm) Example: E14-3--0

	<input type="text" value="028"/>	<input type="text" value="038"/>	<input type="text" value="048"/>	<input type="text" value="075"/>	<input type="text" value="100"/>	<input type="text" value="125"/>
R	1.10 (028)	1.50 (038)	1.89 (048)	2.95 (075)	3.94 (100)	4.92 (125)
H	3.19 (81)	3.98 (101)	4.76 (121)	6.89 (175)	8.86 (225)	10.83 (275)
D	3.35 (86)	3.78 (96)	4.17 (106)	5.24 (133)	6.22 (158)	7.20 (183)
K	5.91 (150)	7.28 (185)	8.46 (215)	11.81 (300)	14.96 (380)	17.91 (455)

0=Standard color black. For other colors see Chapter 1

Energy Chain System® E-Z Chain Series E14/Z14 Mounting Brackets

energy chain® configurator ▶

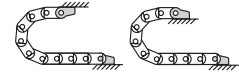
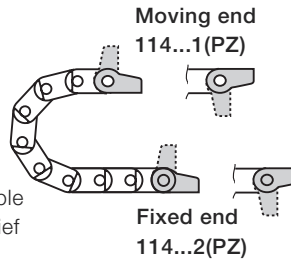


E14
Z14



Plastic, one-piece

- One-piece mounting bracket
- Corrosion resistant
- Available preassembled
- Inner and outer attachment possible
- Available with or without strain relief tiewrap plates



Possible installation configurations -

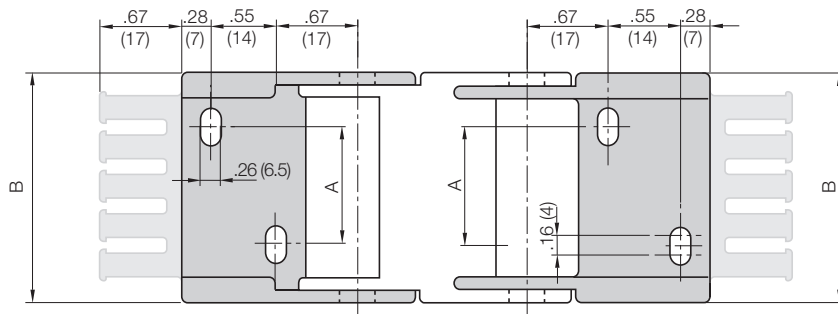
Dimensions and order configurations

Strain relief is possible on the moving end and/or the fixed end.

Part Number Structure

114- 20- 12 P PZ

- With assembled strain relief tiewrap plates
- Without assembled strain relief tiewrap plates
- Complete Set
- Width
- Mounting brackets for selected chain type



Full set, for both ends:

114- 20- 12 PZ

Full set, each part with pin/bore + tiewrap plate

Single-part order:

114- 20- 1 PZ

Mounting bracket with bore + tiewrap plate

114- 20- 2 PZ

Mounting bracket with pin + tiewrap plate

Chain Type	Part No.	Part No.	Dimension A		Dimensions B		Number of Teeth
	Full set with Tiewrap Plate	Full Set without Tiewrap Plate	in.	(mm)	in.	(mm)	
E14/Z14-1	114-1-12PZ	114-1-12P	—	—	1.04	(26.3)	2
E14/Z14-2	114-2-12PZ	114-2-12P	.39	(10)	1.43	(36.3)	3
E14/Z14-3	114-3-12PZ	114-3-12P	.91	(23)	1.94	(49.3)	4
E14/Z14-4	114-4-12PZ	114-4-12P	1.38	(35)	2.45	(62.3)	5

Additional Accessories



Quicksnap - the complete, detachable mounting unit, upon request



Quickfix - mounting bracket with dowel, upon request

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



E200
Z200



Energy Chain System® E-Z Chain Series E200/Z200



Price Index



Series E200/Z200

Special Features / Options



IPA Qualification Certificate
Air Cleanliness Class ISO Class 2
(at v = 3.28 ft/s) upon request



Flammability Class
VDE 0304 IIC UL94 V2

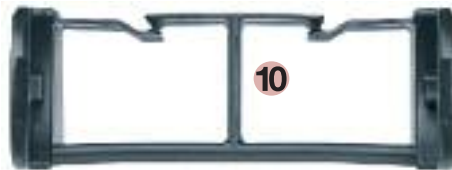


Special equipment: Electrically
conductive ESD/ATEX version
upon request

Assembly Tips



Just push the cables into the Energy Chain using your thumb



Other Installation Methods

- Vertical, hanging ≤ 32.8 ft (10 m)
- Vertical, standing ≤ 4.92 ft (1.5 m)
- Side-mounted, un supp. ≤ 1.64 ft (0.5 m)
- Rotary requires further calculation

Usage Guidelines



- If filling is required without opening and closing
- If price is an issue
- If quiet operation is required



- If a long unsupported length is required
 - Series 200/240/250 E2 Medium
- If single extrusion crossbars are required
 - Series 200/240/250 E2 Medium

Features & Benefits

- 1 Mounting bracket with integrated strain relief
- 2 Large pins for long service life
- 3 Patented push button principle holds the links together
- 4 Limited torsion tolerance
- 5 "E" Series features split crossbar along the outer radius
- 6 Dirt-repellant exterior
- 7 Cable-friendly interior
- 8 "Z" Series features split crossbar along the inner radius
- 9 Very easy to fill - cables only have to be pushed in
- 10 1- or 2-chamber system available



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

[energy chain® configurator](#) ▶

3.28 ft (1 m) E200-05-100-0



Energy Chain®

1 Set 2050-34PZB



Mounting Bracket

Energy Chain System® E-Z Chain Series E200/Z200 Installation Dimensions

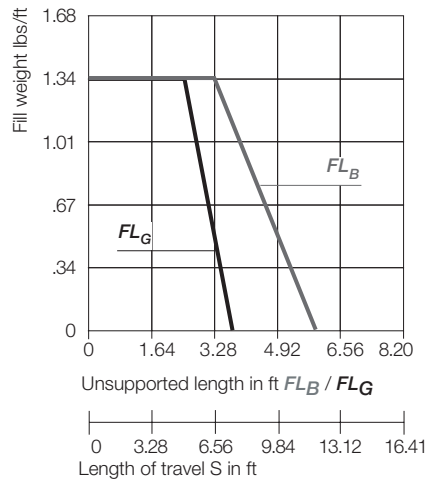
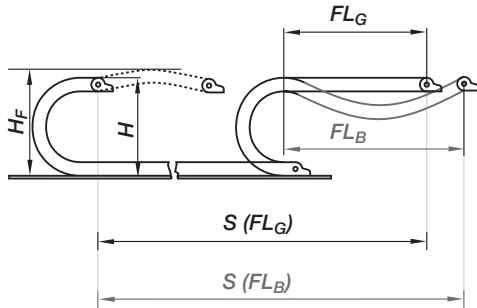
energy chain® configurator

igus®

E200
Z200

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1



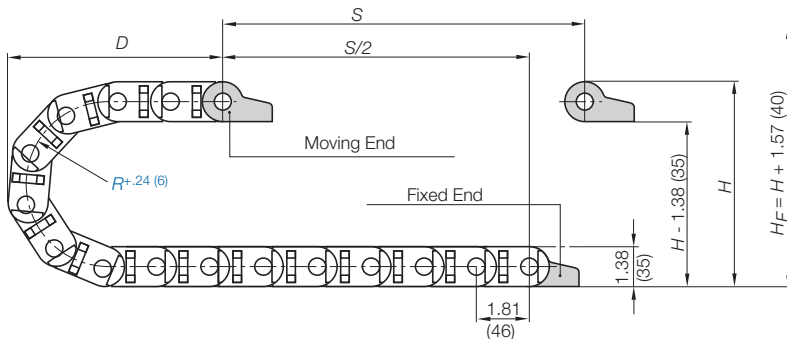
Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height



Pitch per link: = 1.81" (46 mm)
Links per ft (m): = 6.71 (22)
For center mount applications:
Chain length = $S/2 + K$

The required clearance height: $H_F = H + 1.57$ in. (40 mm) (with 1.68 lbs/ft (2.5 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	2.16 (055)	2.95 (075)	3.94 (100)	5.91 (150)	7.87 (200)
H^{*4}	5.71 (145)	7.28 (185)	9.25 (235)	13.19 (335)	17.12 (435)
D	5.59 (142)	6.38 (162)	7.36 (187)	9.33 (237)	11.30 (287)
K	10.43 (265)	12.99 (330)	16.14 (410)	22.24 (565)	28.54 (725)

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 9.84 ft/s (3 m/s) / max. 32.8 ft/s ² (10 m/s ²)
Material (Energy Chain®) - permitted temperature	igumid NB / -40°F (-40°C) up to +176°F (+80°C)
Material (mounting brackets)* - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class (Energy Chain®), igumid NB	VDE 0304 IIC UL94 V2
Flammability Class (mounting brackets), igumid G*	VDE 0304 IIC UL94 HB

*Available in igumid NB upon request, please consult igus® for delivery time

Technical Data



Details of material properties

Chapter 1



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



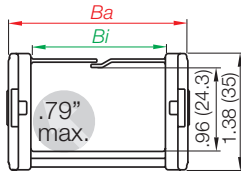
Series E200
Split crossbar along the outer radius



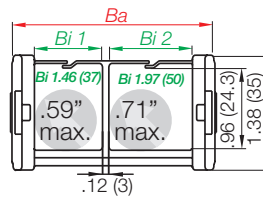
Series Z200
Split crossbar along the inner radius



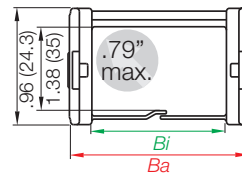
Single Chamber System



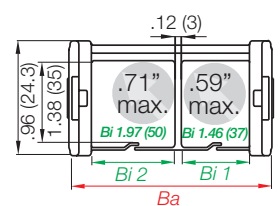
2 Chamber System
1 chamber from each width is shown
Actual carrier will have 2 chambers of the same size.



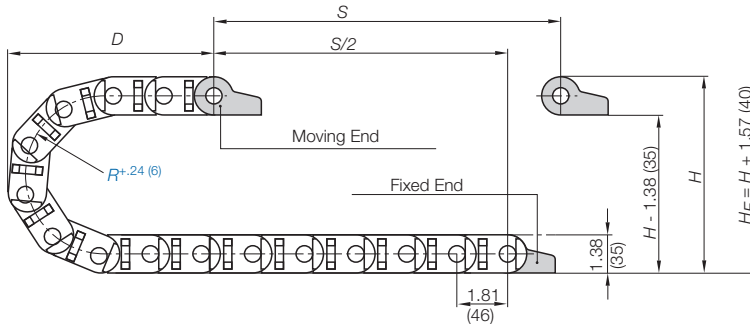
Single Chamber System



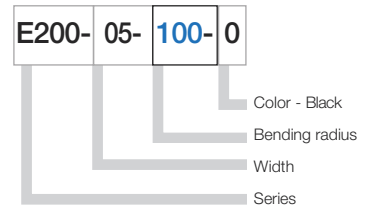
2 Chamber System
1 chamber from each width is shown
Actual carrier will have 2 chambers of the same size.



Supplement part number with required radius. Example: E200-05--0
Pitch: 1.81 in. (46 mm) per link links/ft (m) = 6.71 (22)



Part Number Structure



Part Number
Single Chamber System

Split Crossbar	Split Crossbar	<i>Bi</i>	<i>Ba</i>	Weight	
Outer radius	Inner Radius	in. (mm)	in. (mm)	lbs/ft (kg/m)	
E200-05-	Z200-05-	<input type="text" value="100"/> -0	2.24 (57)	2.93 (74.4)	≈ 0.47 (0.70)

Part Number
2 Chamber System

Split Crossbar	Split Crossbar	<i>Bi 1</i>	<i>Bi 2</i>	<i>Ba</i>	Weight	
Outer radius	Inner Radius	in. (mm)	in. (mm)	in. (mm)	lbs/ft (kg/m)	
E200-2/35-	Z200-2/35-	<input type="text" value="100"/> -0	1.46 (37)	1.46 (37)	3.72 (94.4)	≈ 0.53 (0.79)
E200-2/50-	Z200-2/50-	<input type="text" value="100"/> -0	1.97 (50)	1.97 (50)	4.74 (120.4)	≈ 0.55 (0.82)

Choose from the radii below for all of the above sizes

Radius (mm) Example: E200-05--0

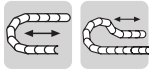
	055	075	100	150	200
R	2.16 (055)	2.95 (075)	3.94 (100)	5.91 (150)	7.87 (200)
H +4	5.71 (145)	7.28 (185)	9.25 (235)	13.19 (335)	17.12 (435)
D	5.59 (142)	6.38 (162)	7.36 (187)	9.33 (237)	11.30 (287)
K	10.43 (265)	12.99 (330)	16.14 (410)	22.24 (565)	28.54 (725)

Energy Chain System® E-Z Chain Series E200/Z200 Mounting Brackets

energy chain® configurator



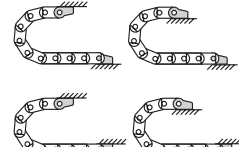
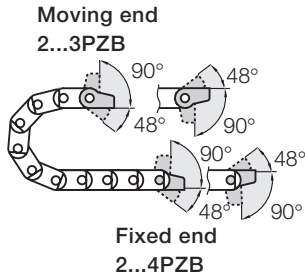
E200
Z200



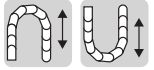
Standard

Option 1: pivoting

- Short and long travels
- Space-restricted conditions
- Corrosion resistant

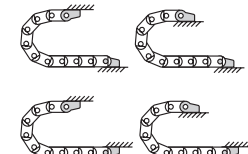
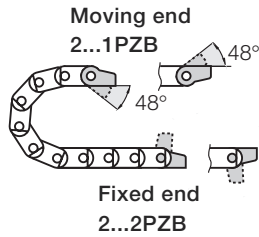


Possible installation configurations -



Option 2: locking

- Vertical hanging/standing travels
- High accelerations
- Corrosion resistant



Possible installation configurations -

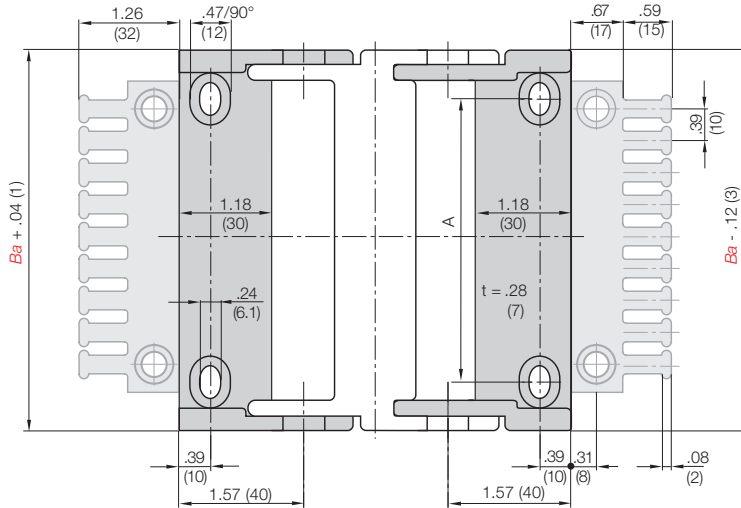
Dimensions and order configurations

Strain relief is possible on the moving end and/or the fixed end.

Part Number Structure

2050- 34 PZ B K1

- With 10 cable tieswraps
- With tiewrap plates
- Without tiewrap plates
- Complete Set
34 = Pivoting
12 = Locking
- Mounting brackets for selected chain type



Full set, for both ends:

2050- 34 PZB Full set, each part with pin/bore + tiewrap plate

Single-part order:

2050- 3 PZB Mounting bracket with bore + tiewrap plate

2050- 4 PZB Mounting bracket with pin + tiewrap plate

For Chain Type	Part No. Full Set with Tiewrap Plate	Part No. Full Set with Tiewrap Plate + 10 cable ties	Part No. Full Set without Tiewrap Plate	Dimension A in. (mm)	Number of teeth
E200/Z200-05	2050- <input type="checkbox"/> PZB	2050- <input type="checkbox"/> PZBK1	2050- <input type="checkbox"/> PZ	1.73 (44)	6
E200/Z200-2/35	2070- <input type="checkbox"/> PZB	2070- <input type="checkbox"/> PZBK1	2070- <input type="checkbox"/> PZ	2.52 (64)	8
E200/Z200-2/50	2100- <input type="checkbox"/> PZB	2100- <input type="checkbox"/> PZBK1	2100- <input type="checkbox"/> PZ	3.54 (90)	10

34 or 12

For pivoting brackets choose 34

For locking brackets choose 12

Example: 2050- 34 PZB

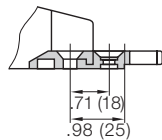
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



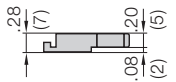
Strain relief for polymer mounting brackets (pivoting or locking)

The strain relief tiwrap plates can be snapped directly onto the mounting bracket. After bolting the mounting brackets to the machine, the strain relief tiwrap plates are firmly connected to the base. There is no need to bolt them on separately. Cable tiwraps secured to the cable and the tiwrap plate (teeth) provide proper strain relief and save time.

Tiewrap Plates



Shown assembled



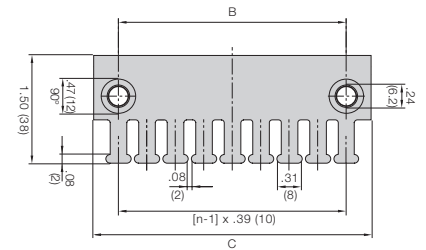
Single tiwrap plate



**Option 1:
Tiewrap plates as an individual part**

Available as an individual component, can be fixed onto a mounting bracket.

Tiewrap Plates	n Number of Teeth	Dimension C	Dimension B
2050-ZB	6	2.36 (60)	1.57 (40)
2070-ZB	8	3.15 (80)	2.36 (60)
2100-ZB	10	3.94 (100)	3.15 (80)



For more information please refer to strain relief section of Chapter 10

Strain relief for steel mounting brackets

Clip-on connection is not possible with steel mounting brackets. In this case, the tiwrap plates must be bolted directly into separate bore holes in front of the mounting bracket. Alternatively the tiwrap plates 20XX-ZB can be also used here. **Details chapter 10**



Cable tiwraps as individual parts

Cable tiwraps 100 pieces/bag	Width x Length		Maximum Ø		Tensile Strength	
	in.	(mm)	in.	(mm)	lbs	(N)
CFB-001	.19	5.91 (4.8 x 150)	1.42	(36)	50	(222)



**Option 2:
Clip-on Tiewrap plates for opening crossbars**

Clip-on tiwrap plates are also available as an attachment to opening crossbars. They can be positioned at any point along the Energy Chain®.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
2050-Z	6	2.44 (62)

For more information please refer to strain relief section of Chapter 10

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index



Series E16/Z16

Special Features / Options

IPA Qualification Certificate
Air Cleanliness Class ISO Class 2
(at v = 3.28 ft/s) upon request

Flammability Class
VDE 0304 IIC UL94 V2

Special equipment: Electrically
conductive ESD/ATEX version
upon request

Assembly Tips



Just push the cables into the Energy Chain
using your thumb

Usage Guidelines



- If filling is required without opening and closing
- If price is an issue
- If quiet operation is required



- If a long unsupported length is required
➤ Series 26/27/27i E2 Medium
- If an Energy Chain with a high locking crossbar is needed
➤ Series 26/27/27i E2 Medium

Features & Benefits

- 1 Cable-friendly interior
- 2 Limited torsion tolerance
- 3 Small pitch for low-noise and smooth operation
- 4 Very easy to fill - cables only have to be pushed in
- 5 Mounting bracket with integrated strain relief
- 6 Patented push button principle holds the links together
- 7 "E" Series features split crossbar along the outer radius
- 8 "Z" Series features split crossbar along the inner radius



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator

3.28 ft (1 m) E16-3-060-0

Energy Chain®

1 Set 117-3-12PZ

Mounting Bracket

Energy Chain System® E-Z Chain Series E16/Z16 Installation Dimensions

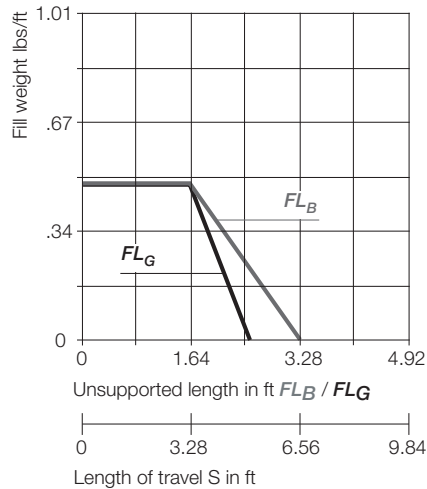
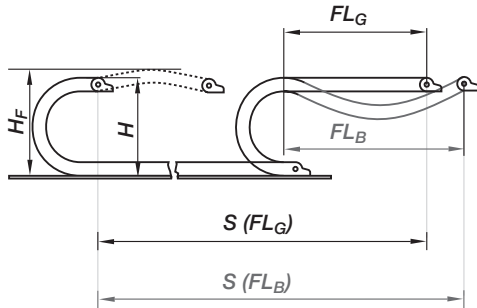
energy chain® configurator



E16
Z16

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1



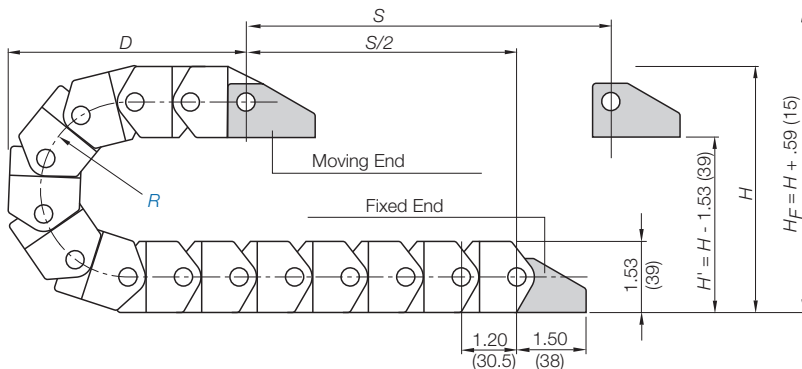
Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height



Pitch per link = 1.20" (30.5 mm)
Links per ft (m) = 10.06 (33)
For center mount applications:
Chain length = $\frac{S}{2} + K$

The required clearance height: $H_F = H + .59$ in. (15 mm) (with .20 lbs/ft (0.3 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	1.57 (040)	2.36 (060)	2.95 (075)	3.94 (100)
H	4.69 (119)	6.26 (159)	7.44 (189)	9.41 (239)
D	4.13 (105)	4.92 (125)	5.51 (140)	6.50 (165)
K	7.48 (190)	9.84 (250)	11.81 (300)	14.96 (380)

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 9.84 ft/s (3 m/s) / max. 32.8 ft/s ² (10 m/s ²)
Material (Energy Chain®) - permitted temperature	igumid NB / -40°F (-40°C) up to +176°F (+80° C)
Material (mounting brackets)* - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120° C)
Flammability Class (Energy Chain®), igumid NB	VDE 0304 IIC UL94 V2
Flammability Class (mounting brackets), igumid G*	VDE 0304 IIC UL94 HB

*Available in igumid NB upon request, please consult igus® for delivery time

Technical Data



Details of material properties

Chapter 1

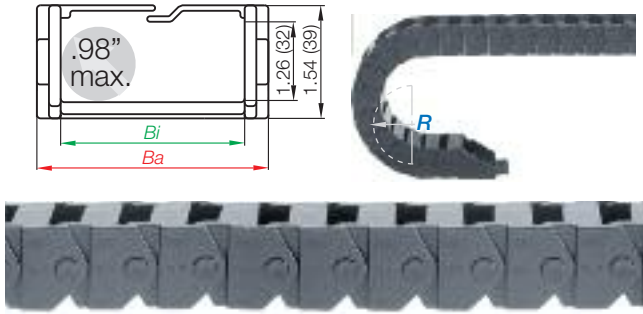


PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

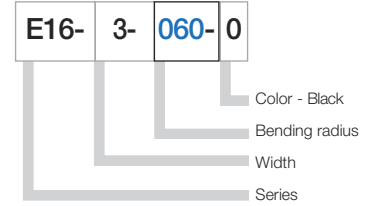


STANDARD

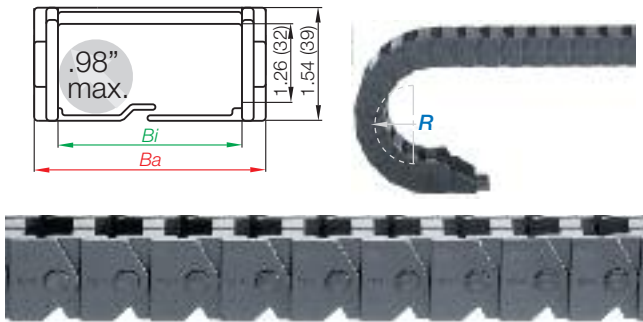
Series E16 - Split crossbar along the outer radius



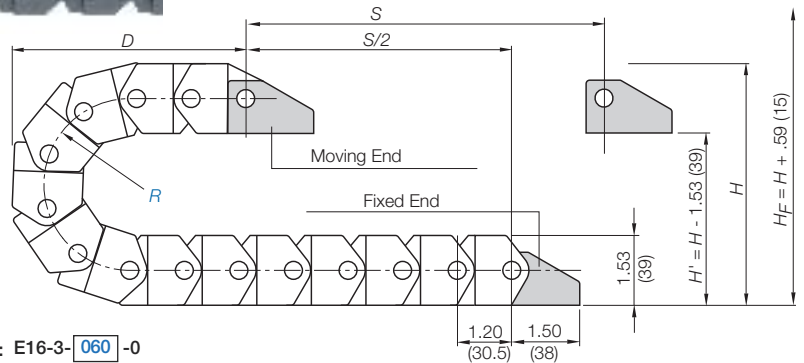
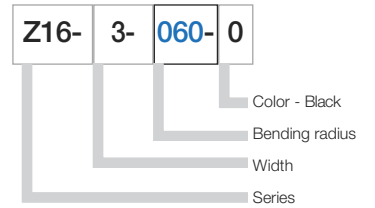
Part Number Structure



Series Z16 - Split crossbar along the inner radius



Part Number Structure



Supplement part number with required radius. Example: E16-3-060-0
Pitch: 1.20 in. (30.5 mm) per link links/ft (m) = 10.06 (33)

Part Number			<i>Bi</i>	<i>Ba</i>	Weight
Split Crossbar	Split Crossbar		in. (mm)	in. (mm)	lbs/ft (kg/m)
Outer radius	Inner radius				
E16-2-	Z16-2-	<input type="checkbox"/> -0	.91 (23)	1.48 (37.5)	≈ 0.34 (0.51)
E16-3-	Z16-3-	<input type="checkbox"/> -0	1.42 (36)	1.99 (50.5)	≈ 0.38 (0.57)
E16-4-	Z16-4-	<input type="checkbox"/> -0	1.89 (48)	2.46 (62.5)	≈ 0.42 (0.62)
E16-5-	Z16-5-	<input type="checkbox"/> -0	2.48 (63)	3.09 (78.5)	≈ 0.50 (0.75)
E16-6-	Z16-6-	<input type="checkbox"/> -0	3.15 (80)	3.76 (95.5)	≈ 0.56 (0.83)
E16-7-	Z16-7-	<input type="checkbox"/> -0	3.94 (100)	4.54 (115.3)	≈ 0.61 (0.91)

Choose from the radii below for all of the above sizes

Radius (mm) Example: E16-3-060-0

	040	060	075	100
R	1.57 (040)	2.36 (060)	2.95 (075)	3.94 (100)
H	4.69 (119)	6.26 (159)	7.44 (189)	9.41 (239)
D	4.13 (105)	4.92 (125)	5.51 (140)	6.50 (165)
K	7.48 (190)	9.84 (250)	11.81 (300)	14.96 (380)

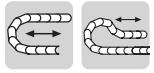
0=Standard color black. For other colors see Chapter 1

Energy Chain System® E-Z Chain Series E16/Z16 Mounting Brackets

energy chain® configurator ▶



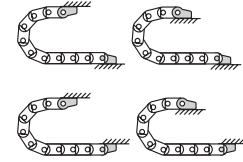
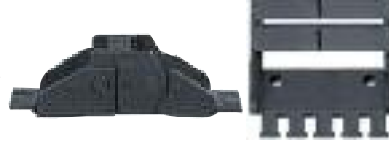
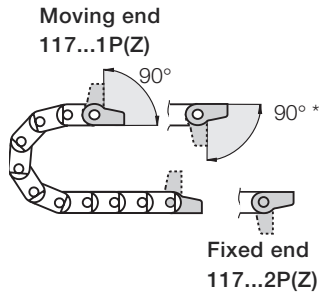
E16
Z16



Standard

Option 1: pivoting

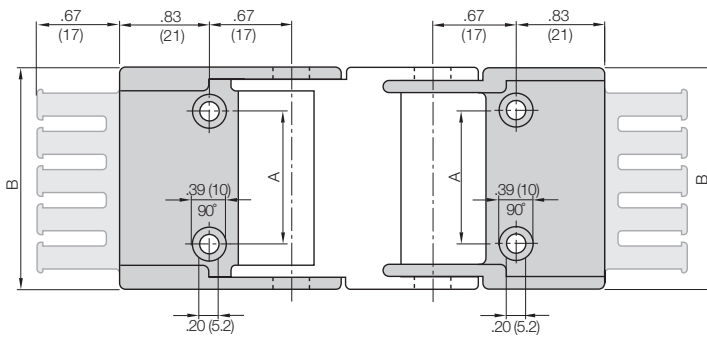
- One-piece mounting bracket
- Corrosion resistant
- Available pre-assembled
- Inner and outer attachment possible
- With our without strain relief tiwrap plates



Possible installation configurations -

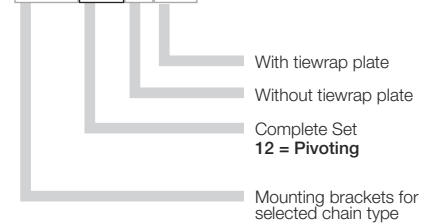
Dimensions and order configurations

Strain relief is possible on the moving end and/or the fixed end.



Part Number Structure

117-2- 12 P PZ



Full set, for both ends:

117-2-12-PZ Full set, each part with pin/bore + tiwrap plate

Single-part order:

117-2-1-PZ Mounting bracket with bore + tiwrap plate

117-2-2-PZ Mounting bracket with pin + tiwrap plate

For Chain Type	Part No. Full set with Tiwrap Plate	Part No. Full Set without Tiwrap Plate	Number of Teeth	Dimension A in. (mm)	Dimensions B in. (mm)
E16/Z16-2	117-2-12PZ	117-2-12P	3	.47 (12)	1.40 (35.5)
E16/Z16-3	117-3-12PZ	117-3-12P	4	.98 (25)	1.91 (48.5)
E16/Z16-4	117-4-12PZ	117-4-12P	5	1.46 (37)	2.38 (60.5)
E16/Z16-5	117-5-12PZ	117-5-12P	6	1.89 (48)	2.99 (76.0)
E16/Z16-6	117-6-12PZ	117-6-12P	8	2.56 (65)	3.66 (93.0)
E16/Z16-7	117-7-12PZ	117-7-12P	10	3.35 (85)	4.45 (113.0)

Additional Accessories



Quicksnap - the complete, detachable mounting unit, upon request



Quickfix - mounting bracket with dowel, upon request

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



E26
Z26



Energy Chain System® E-Z Chain Series E26/Z26



Price Index



Series E26/Z26

Special Features / Options

IPA Qualification Certificate
Air Cleanliness Class ISO Class 2
(at v = 3.28 ft/s) upon request

Flammability Class
VDE 0304 IIC UL94 V2

Special equipment: Electrically
conductive ESD/ATEX version
upon request

Assembly Tips



Just push the cables into the Energy Chain using your thumb

Other Installation Methods

- Vertical, hanging ≤ 32.8 ft (10 m)
- Vertical, standing ≤ 4.92 ft (1.5 m)
- Side-mounted, un_supp. ≤ 1.64 ft (0.5 m)
- Rotary requires further calculation

Usage Guidelines



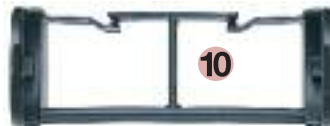
- If filling is required without opening and closing
- If price is an issue
- If quiet operation is required



- If a long unsupported length is required
➤ Series 26/27/27i E2 Medium
- If an Energy Chain with a high locking crossbar is needed
➤ Series 26/27/27i E2 Medium

Features & Benefits

- 1 Integrated strain relief option
- 2 Very easy to fill - cables only have to be pushed in
- 3 Cable-friendly interior
- 4 Limited torsion tolerance
- 5 Large pins for long service life
- 6 "E" Series features split crossbar along the outer radius
- 7 Dirt-repellent exterior
- 8 Patented push button principle holds the links together
- 9 "Z" Series features split crossbar along the inner radius
- 10 1-, 2- or 3-chamber system available



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

[energy chain® configurator](#) ▶

3.28 ft (1 m) E26-07-150-0

Energy Chain®

1 Set 2607-34PZB

Mounting Bracket

Energy Chain System® E-Z Chain Series E26/Z26 Installation Dimensions

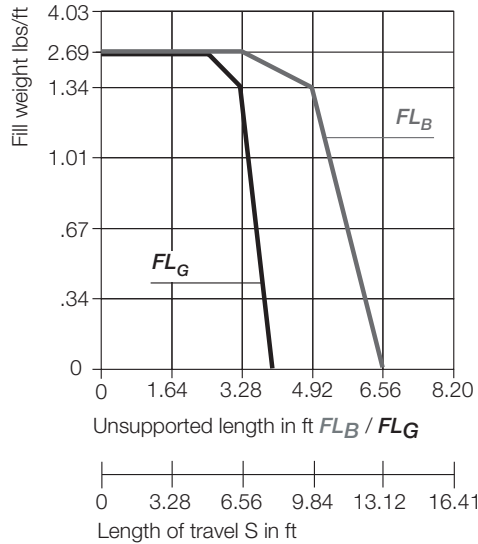
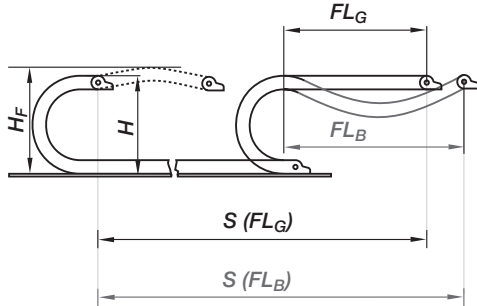
energy chain® configurator



E26
Z26

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1



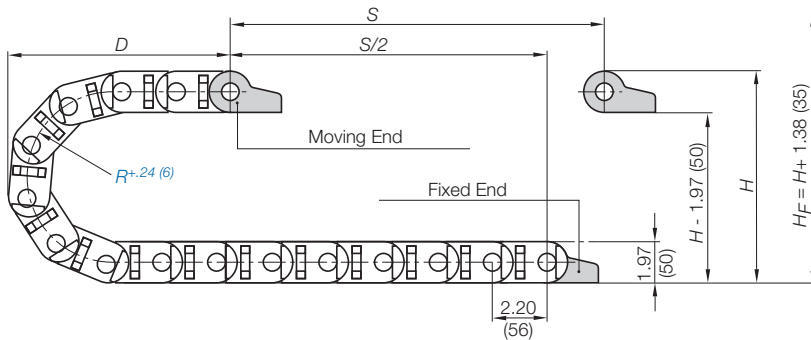
Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height



Pitch per link = 2.20" (56 mm)
Links per ft (m) = 5.49 (18)
For center mount applications:
Chain length = $S/2 + K$

The required clearance height: $H_F = H + 1.38$ in. (35 mm) (with 1.34 lbs/ft (2.0 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	2.48 (063)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)
H^{+5}	6.93 (176)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	21.65 (550)
D	6.77 (172)	7.24 (184)	8.23 (209)	9.21 (234)	10.20 (259)	11.18 (284)	12.17 (309)	14.13 (359)
K	12.20 (310)	13.78 (350)	16.93 (430)	19.90 (505)	23.03 (585)	26.18 (665)	29.33 (745)	35.43 (900)

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 9.84 ft/s (3 m/s) / max. 32.8 ft/s ² (10 m/s ²)
Material (Energy Chain®) - permitted temperature	igumid NB / -40°F (-40°C) up to +176°F (+80° C)
Material (mounting brackets)* - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120° C)
Flammability Class (Energy Chain®), igumid NB	VDE 0304 IIC UL94 V2
Flammability Class (mounting brackets), igumid G*	VDE 0304 IIC UL94 HB

*Available in igumid NB upon request, please consult igus® for delivery time

Technical Data



Details of material properties

Chapter 1

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Series E26
Split crossbar along the outer radius

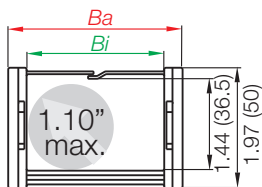


Part Number Structure

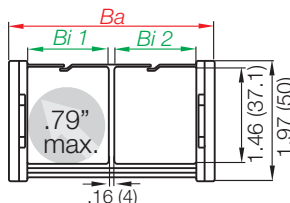


Color - Black
Bending radius
Width
Series

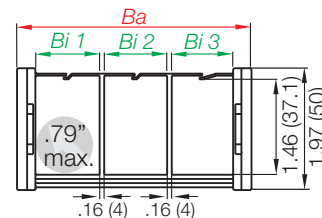
1 Chamber System



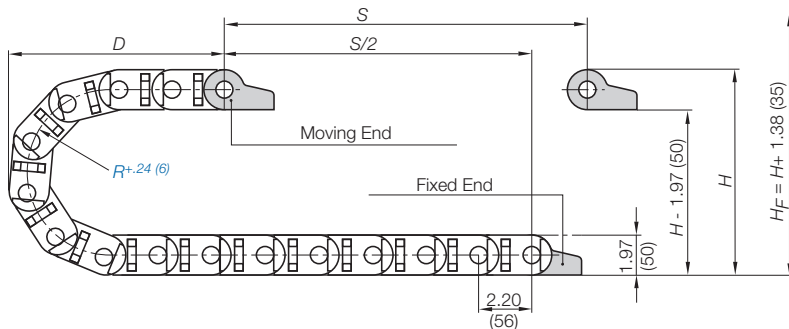
2 Chamber System



3 Chamber System



Supplement part number with required radius. Example: E26-07-150-0
Pitch: 2.20 in. (56 mm) per link links/ft (m) = 5.49 (18)



Part Number	Bi	Ba	Weight
	in. (mm)	in. (mm)	lbs/ft (kg/m)
1 Chamber System			
E26-07- <input type="text"/> -0	2.95 (75)	3.62 (92)	≈ 0.65 (0.96)

Part Number	Bi	Ba	Weight
	in. (mm)	in. (mm)	lbs/ft (kg/m)
2 Chamber System			
E26-2/45- <input type="text"/> -0	1.89/1.89 (48/48)	4.61 (117)	≈ 0.77 (1.14)

Part Number	Bi	Ba	Weight
	in. (mm)	in. (mm)	lbs/ft (kg/m)
3 Chamber System			
E26-3/45- <input type="text"/> -0	1.85/1.89/1.85 (47/48/47)	6.57 (167)	≈ 0.87 (1.30)

Choose from the radii below for all of the above sizes

Radius (mm) Example: E26-07-100-0

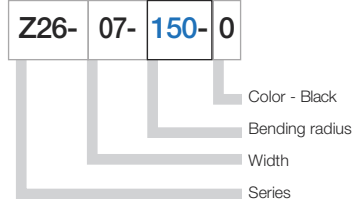
	063	075	100	125	150	175	200	250
R	2.48 (063)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)
H +5	6.93 (176)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	21.65 (550)
D	6.77 (172)	7.24 (184)	8.23 (209)	9.21 (234)	10.20 (259)	11.18 (284)	12.17 (309)	14.13 (359)
K	12.20 (310)	13.78 (350)	16.93 (430)	19.88 (505)	23.03 (585)	26.18 (665)	29.33 (745)	35.43 (900)

Series Z26

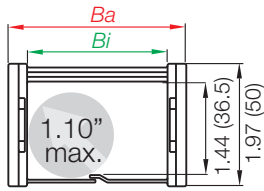
Split crossbar along the inner radius



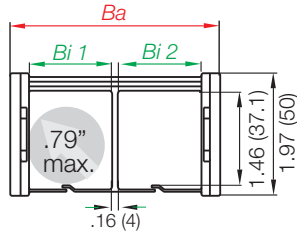
Part Number Structure



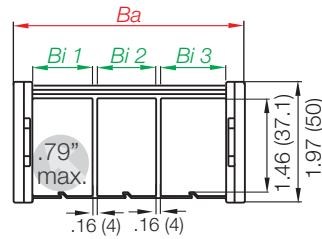
1 Chamber System



2 Chamber System

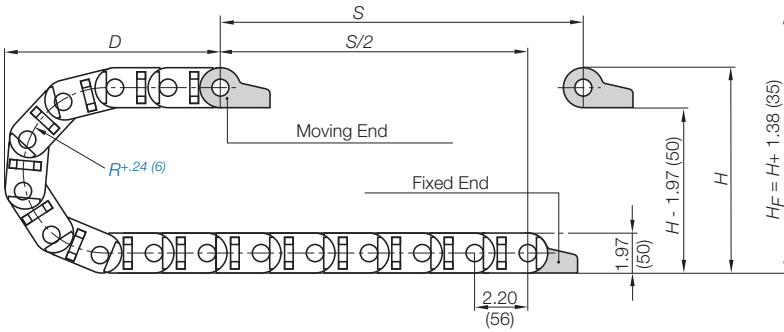


3 Chamber System



Supplement part number with required radius. Example: Z26-07-150-0

Pitch: 2.20 in. (56 mm) per link links/ft (m) = 5.49 (18)



Part Number	Bi	Ba	Weight
1 Chamber System	in. (mm)	in. (mm)	lbs/ft (kg/m)
Z26-07- <input type="text"/> -0	2.95 (75)	3.62 (92)	≈ 0.65 (0.96)

Part Number	Bi	Ba	Weight
2 Chamber System	in. (mm)	in. (mm)	lbs/ft (kg/m)
Z26-2/45- <input type="text"/> -0	1.89/1.89 (48/48)	4.61 (117)	≈ 0.77 (1.14)

Part Number	Bi	Ba	Weight
3 Chamber System	in. (mm)	in. (mm)	lbs/ft (kg/m)
Z26-3/45- <input type="text"/> -0	1.85/1.89/1.85 (47/48/47)	6.57 (167)	≈ 0.87 (1.30)

Choose from the radii below for all of the above sizes

Radius (mm) Example: Z26-07-100-0

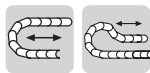
	063	075	100	125	150	175	200	250
R	2.48 (063)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)
H ⁺⁵	6.93 (176)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	21.65 (550)
D	6.77 (172)	7.24 (184)	8.23 (209)	9.21 (234)	10.20 (259)	11.18 (284)	12.17 (309)	14.13 (359)
K	12.20 (310)	13.78 (350)	16.93 (430)	19.88 (505)	23.03 (585)	26.18 (665)	29.33 (745)	35.43 (900)



igus® Energy Chain System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

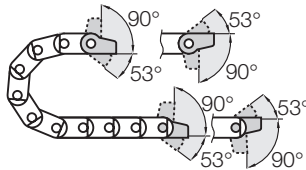


Standard

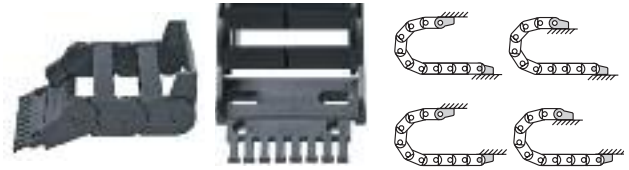
Option 1: pivoting

- Recommended for unsupported and gliding applications
- Space-restricted conditions
- Available with or without strain relief tiwrap plates
- Corrosion resistant

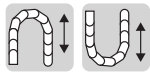
Moving end
26...3PZB



Fixed end
26...4PZB



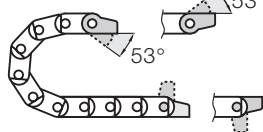
Possible installation configurations -



Option 2: locking

- Recommended for unsupported and gliding applications
- For high speed and/or accelerations
- Corrosion resistant

Moving end
26...1PZB



Fixed end
26...2PZB



Possible installation configurations -

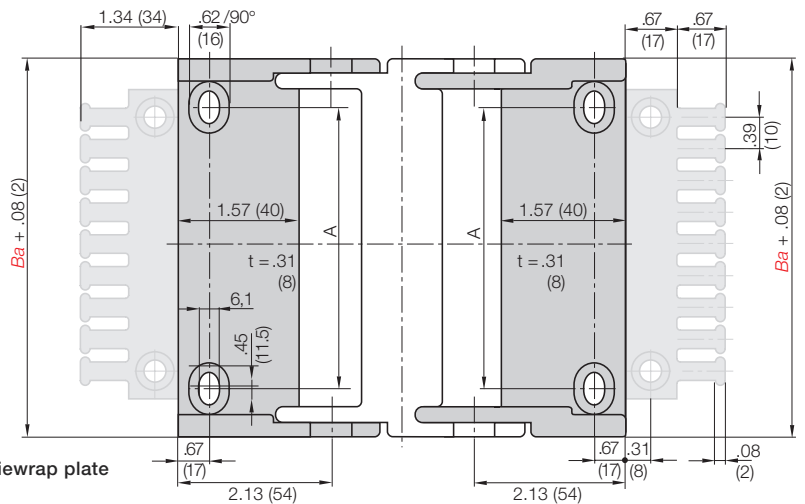
Dimensions and order configurations

Strain relief is possible on the moving end and/or the fixed end.

Part Number Structure

2607- 34 PZB K1

- With 10 cable tiwrap plates
- With tiwrap plates
- Complete Set
34 = Pivoting
12 = Locking
- Mounting brackets for selected chain type



Full set, for both ends:

2607- [34 | PZB] Full set, each part with pin/bore + tiwrap plate

Single-part order:

2607- [3 | PZB] Mounting bracket with bore + tiwrap plate

2607- [4 | PZB] Mounting bracket with pin + tiwrap plate

Part No. Full Set (pivoting)

With Tiwrap Plates

Series E26/Z26:

2607-34PZB

Part No. Full Set (pivoting)

With Tiwrap Plates + 10 cable ties

Series E26/Z26:

2607-34PZBK1

Part No. Full Set (pivoting)

Without Tiwrap Plates

Series E26/Z26:

2607-34PZ

For Chain Type	Part No. Full Set with Tiwrap Plate	Part No. Full Set with Tiwrap Plate + 10 cable ties	Part No. Full Set without Tiwrap Plate	Dimension A in. (mm)	Number of Teeth
E26/Z26-07	2607- <input type="checkbox"/> PZB	2607- <input type="checkbox"/> PZBK1	2607- <input type="checkbox"/> PZ	2.17 (55)	7
E26/Z26-2/45	2610- <input type="checkbox"/> PZB	2610- <input type="checkbox"/> PZBK1	2610- <input type="checkbox"/> PZ	3.15 (80)	10
E26/Z26-3/45	2615- <input type="checkbox"/> PZB	2615- <input type="checkbox"/> PZBK1	2615- <input type="checkbox"/> PZ	5.12 (130)	15

34 or 12

For pivoting brackets choose 34

For locking brackets choose 12

Example: 2607- 34 | PZB

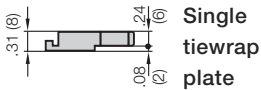
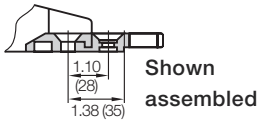
Strain relief for polymer mounting brackets (pivoting or locking)

The strain relief tiwrap plates can be snapped directly onto the mounting bracket. After bolting the mounting brackets to the machine, the strain relief tiwrap plates are firmly connected to the base. There is no need to bolt them on separately. Cable tiwraps secured to the cable and the tiwrap plate (teeth) provide proper strain relief and save time.

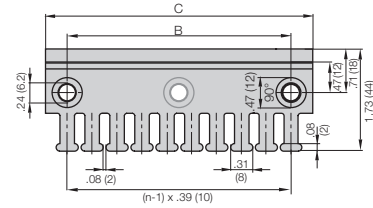
Tiewrap Plates

**Option 1:
Tiewrap plates as an individual part**

Available as an individual component, can be fixed onto a mounting bracket.



Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



For more information please refer to strain relief section of Chapter 10



Cable tiwraps as individual parts

Cable tiwraps 100 pieces/bag	Width x Length		Maximum Ø		Tensile Strength	
	in.	(mm)	in.	(mm)	lbs	(N)
CFB-001	.19 x 5.91	(4.8 x 150)	1.42	(36)	50	(222)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS





Price Index



Series E300/Z300

Special Features / Options

IPA Qualification Certificate
Air Cleanliness Class ISO Class 2
(at v = 3.28 ft/s) upon request

Flammability Class
VDE 0304 IIC UL94 V2

Special equipment: Electrically
conductive ESD/ATEX version
upon request

Assembly Tips



Just push the cables into the Energy Chain using your thumb

Other Installation Methods

Vertical, hanging ≤ 32.8 ft (10 m)

Vertical, standing ≤ 4.92 ft (1.5 m)

Side-mounted, un supp. ≤ 1.64 ft (0.5 m)

Rotary requires further calculation

Usage Guidelines



- If filling is required without opening and closing
- If price is an issue
- If quiet operation is required



- If high loads and long unsupported lengths are present
➤ Series 340/350 E2 Medium

Features & Benefits

- 1 Limited torsion tolerance
- 2 Cable-friendly interior
- 3 Large pins for long service life
- 4 Very easy to fill - cables only have to be pushed in
- 5 Dirt-repellent exterior
- 6 "E" Series features split crossbar along the outer radius
- 7 Integrated strain relief option
- 8 Patented push button principle holds the links together
- 9 "Z" Series features split crossbar along the inner radius
- 10 Interior separation possible
- 11 1-, 2- or 3-chamber system available



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator

3.28 ft (1 m) E300-075-100-0

Energy Chain®

1 Set 3075-34PZB

Mounting Bracket

Energy Chain System® E-Z Chain Series E300/Z300 Installation Dimensions

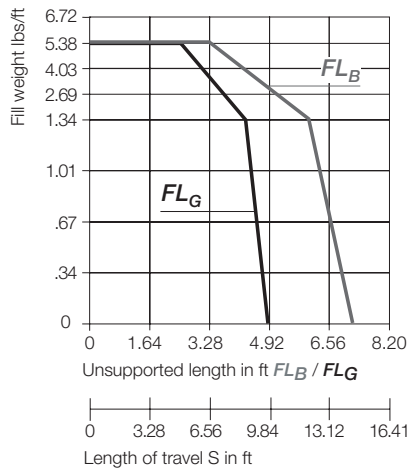
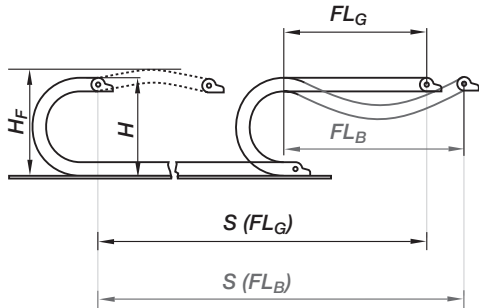
energy chain® configurator 



E300
Z300

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information  Design, Chapter 1



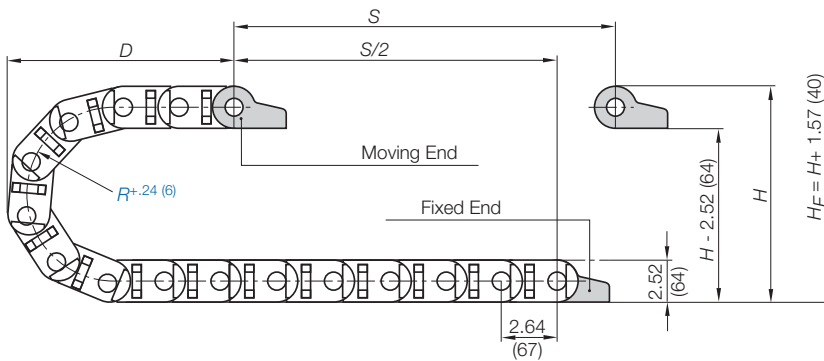
Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height



Pitch per link = 2.64" (67 mm)
Links per ft (m) = 4.57 (15)
For center mount applications:
Chain length = $S/2 + K$

The required clearance height: $H_F = H + 1.57$ in. (40 mm) (with 1.68 lbs/ft (2.5 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)
H^{+4}	8.43 (214)	10.39 (264)	12.36 (314)	14.33 (364)	18.27 (464)	22.20 (564)	26.14 (664)
D	8.19 (208)	9.17 (233)	10.16 (258)	11.14 (283)	13.11 (333)	15.08 (383)	17.05 (433)
K	14.57 (370)	17.72 (450)	20.87 (530)	24.02 (610)	30.12 (765)	36.22 (920)	42.52 (1080)

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 9.84 ft/s (3 m/s) / max. 32.8 ft/s ² (10 m/s ²)
Material (Energy Chain®) - permitted temperature	igumid NB / -40°F (-40°C) up to +176°F (+80°C)
Material (mounting brackets)* - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class (Energy Chain®), igumid NB	VDE 0304 IIC UL94 V2
Flammability Class (mounting brackets), igumid G*	VDE 0304 IIC UL94 HB

*Available in igumid NB upon request, please consult igus® for delivery time

Technical Data



Details of material properties

 Chapter 1



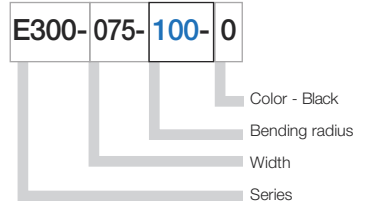
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



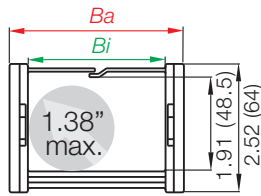
Series E300
Split crossbar along the outer radius



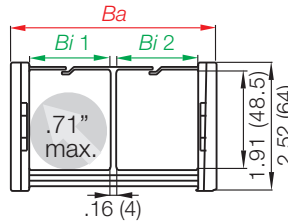
Part Number Structure



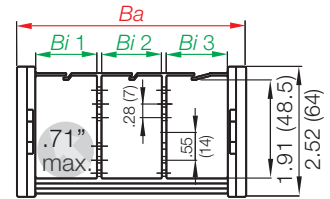
Single Chamber System



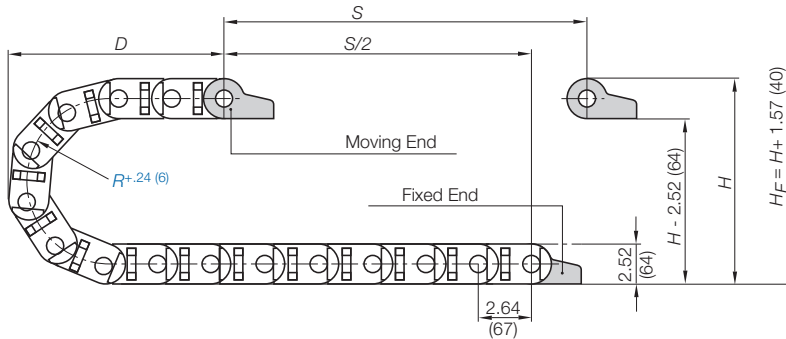
2 Chamber System



3 Chamber System
with optional shelving

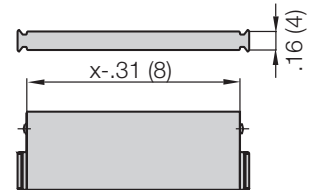


Supplement part number with required radius. Example: E300-075--0
Pitch: 2.64 in. (67 mm) per link links/ft (m) = 4.57 (15)



Shelving

Unassembled
Part number 386-54
Assembled
Part number 387-54



Part Number	Bi	Ba	Weight
	in. (mm)	in. (mm)	lbs/ft (kg/m)
1 Chamber System			
E300-075- <input type="text"/> -0	2.95 (75)	3.74 (95)	≈ 1.08 (1.60)

Part Number	Bi	Ba	Weight
	in. (mm)	in. (mm)	lbs/ft (kg/m)
2 Chamber System			
E300-2/45- <input type="text"/> -0	1.89/1.89 (48/48)	4.72 (120)	≈ 1.20 (1.78)

Part Number	Bi	Ba	Weight
	in. (mm)	in. (mm)	lbs/ft (kg/m)
3 Chamber System			
E300-3/45- <input type="text"/> -0	1.85/1.81/1.85 (47/46/47)	6.69 (170)	≈ 1.29 (1.92)

Choose from the radii below for all of the above sizes

Radius (mm) Example: E300-075--0

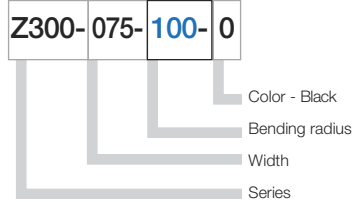
	075	100	125	150	200	250	300
R	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)
H +5	8.43 (214)	10.39 (264)	12.36 (314)	14.33 (364)	18.27 (464)	22.20 (564)	26.14 (664)
D	8.19 (208)	9.17 (233)	10.16 (258)	11.14 (283)	13.11 (333)	15.08 (383)	17.05 (433)
K	14.57 (370)	17.72 (450)	20.87 (530)	24.02 (610)	30.12 (765)	36.22 (920)	42.52 (1080)

Series Z300

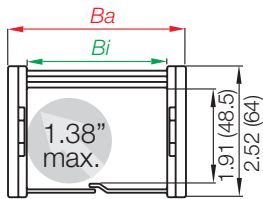
Split crossbar along the inner radius



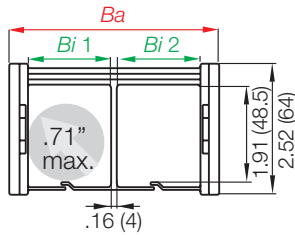
Part Number Structure



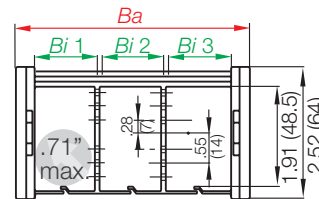
Single Chamber System



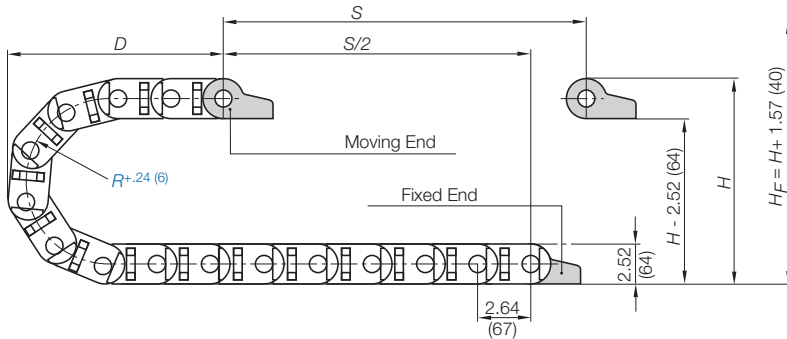
2 Chamber System



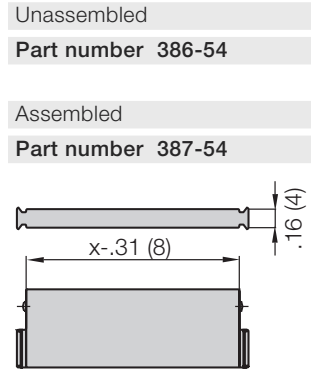
3 Chamber System



Supplement part number with required radius. Example: Z300-075--0
Pitch: 2.64 in. (67 mm) per link links/ft (m) = 4.57 (15)



Shelving



Part Number	Bi	Ba	Weight
	in. (mm)	in. (mm)	lbs/ft (kg/m)
1 Chamber System			
Z300-075- <input type="text" value=""/> -0	2.95 (75)	3.74 (95)	≈ 1.08 (1.60)

Part Number	Bi	Ba	Weight
	in. (mm)	in. (mm)	lbs/ft (kg/m)
2 Chamber System			
Z300-2/45- <input type="text" value=""/> -0	1.89/1.89 (48/48)	4.72 (120)	≈ 1.20 (1.78)

Part Number	Bi	Ba	Weight
	in. (mm)	in. (mm)	lbs/ft (kg/m)
3 Chamber System			
Z300-3/45- <input type="text" value=""/> -0	1.85/1.81/1.85 (47/46/47)	6.69 (170)	≈ 1.29 (1.92)

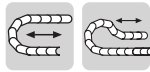
Choose from the radii below for all of the above sizes

Radius (mm) Example: Z300-075--0

	075	100	125	150	200	250	300
R	2.95 (75)	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)
H +5	8.43 (214)	10.39 (264)	12.36 (314)	14.33 (364)	18.27 (464)	22.20 (564)	26.14 (664)
D	8.19 (208)	9.17 (233)	10.16 (258)	11.14 (283)	13.11 (333)	15.08 (383)	17.05 (433)
K	14.57 (370)	17.72 (450)	20.87 (530)	24.02 (610)	30.12 (765)	36.22 (920)	42.52 (1080)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

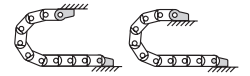
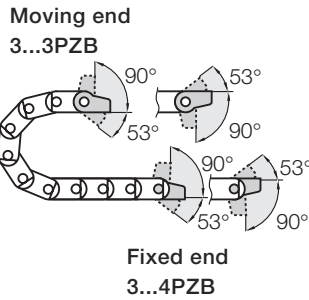




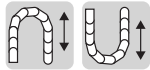
Standard

Option 1: pivoting

- Recommended for unsupported and gliding applications
- Space-restricted conditions
- Available with or without strain relief tiwrap plates
- Corrosion resistant

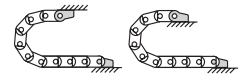
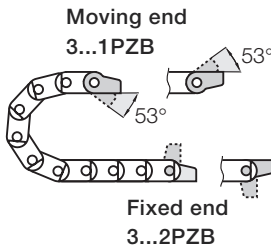


Possible installation configurations -



Option 2: locking

- Recommended for unsupported and gliding applications
- For high speed and/or accelerations
- Corrosion resistant



Possible installation configurations -

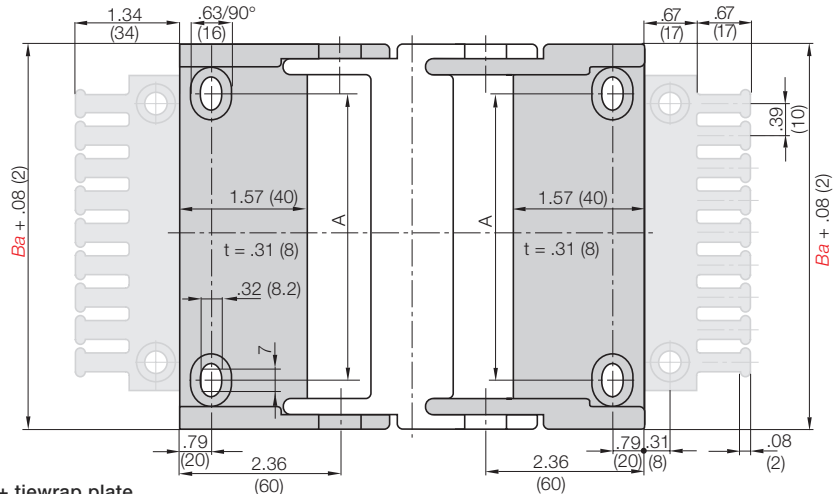
Dimensions and order configurations

Strain relief is possible on the moving end and/or the fixed end.

Part Number Structure



- 3075-34-PZB-K1: With 10 cable tiwraps
- 3075-34-PZB: With tiwrap plates
- 3075-34-PZB: Complete Set
- 34 = Pivoting
- 12 = Locking
- 3075-34-PZB-K1: Mounting brackets for selected chain type



Full set, for both ends:

3075-34-PZB Full set, each part with pin/bore + tiwrap plate

Single-part order:

3075-3-PZB Mounting bracket with bore + tiwrap plate

3075-4-PZB Mounting bracket with pin + tiwrap plate

Part No. Full Set (pivoting)

With Tiwrap Plates

Series E300, Z300:

3075-34PZB

Part No. Full Set (pivoting)

With Tiwrap Plates + 10 cable ties

Series E300, Z300:

3075-34PZBK1

Part No. Full Set (pivoting)

Without Tiwrap Plates

Series E300, Z300:

3075-34PZ

For Chain Type	Part No. Full Set with Tiwrap Plate	Part No. Full Set with Tiwrap Plate + 10 cable ties	Part No. Full Set without Tiwrap Plate	Dimension A in. (mm)	Number of Teeth
E300/Z300-075	3075- <input type="checkbox"/> PZB	3075- <input type="checkbox"/> PZBK1	3075- <input type="checkbox"/> PZ	2.09 (53)	7
E300/Z300-2/45	3100- <input type="checkbox"/> PZB	3100- <input type="checkbox"/> PZBK1	3100- <input type="checkbox"/> PZ	3.07 (78)	10
E300/Z300-3/45	3150- <input type="checkbox"/> PZB	3150- <input type="checkbox"/> PZBK1	3150- <input type="checkbox"/> PZ	5.04 (128)	15

For pivoting brackets choose 34

For locking brackets choose 12

Example: 3075- 34 PZB

34 or 12

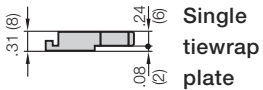
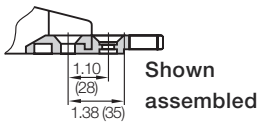
Strain relief for polymer mounting brackets (pivoting or locking)

The strain relief tiwrap plates can be snapped directly onto the mounting bracket. After bolting the mounting brackets to the machine, the strain relief tiwrap plates are firmly connected to the base. There is no need to bolt them on separately. Cable tiwraps secured to the cable and the tiwrap plate (teeth) provide proper strain relief and save time.

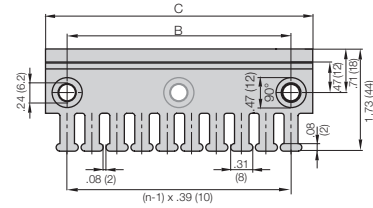
Tiewrap Plates

**Option 1:
Tiewrap plates as an individual part**

Available as an individual component, can be fixed onto a mounting bracket.



Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



For more information please refer to strain relief section of Chapter 10

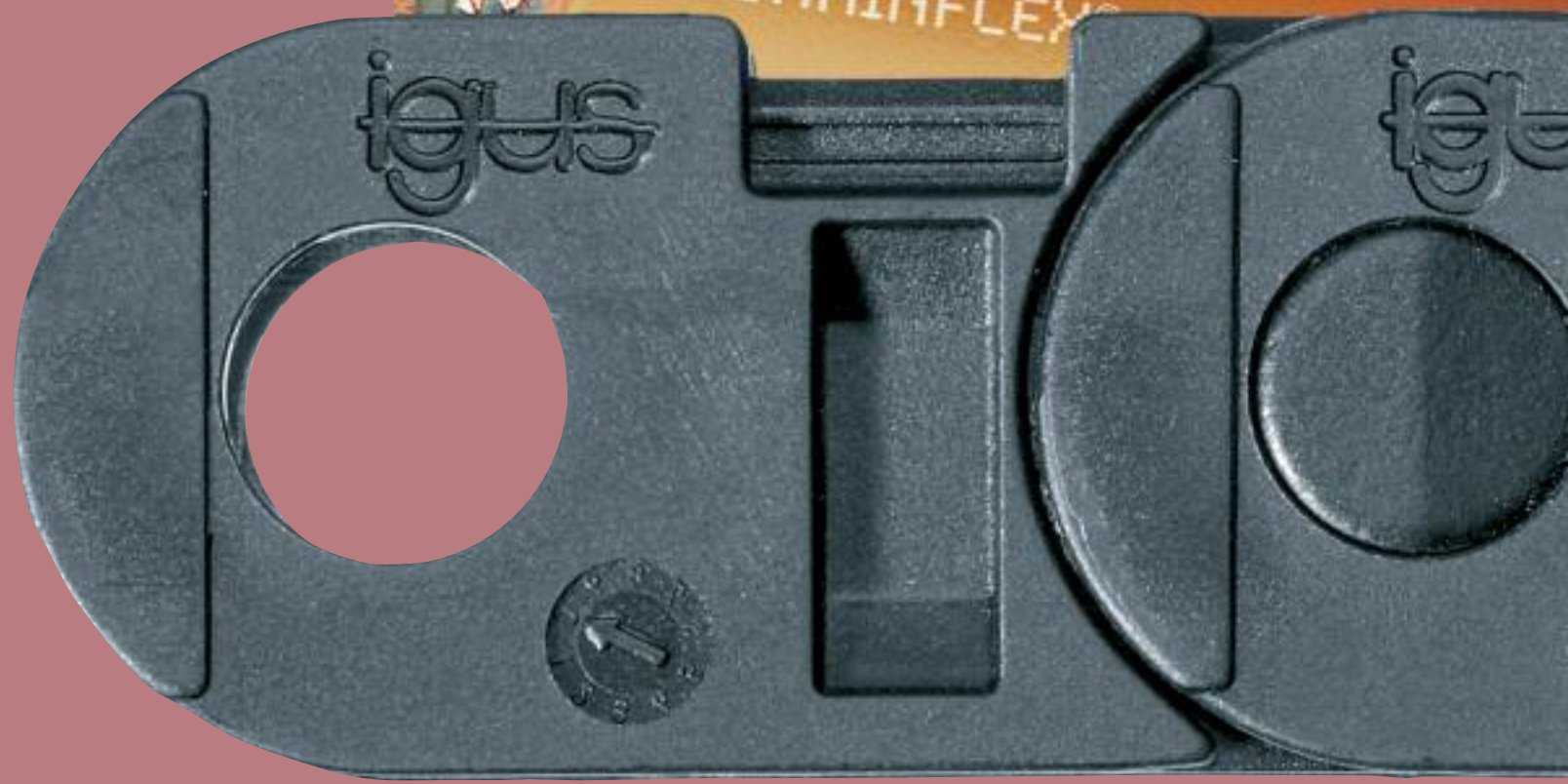
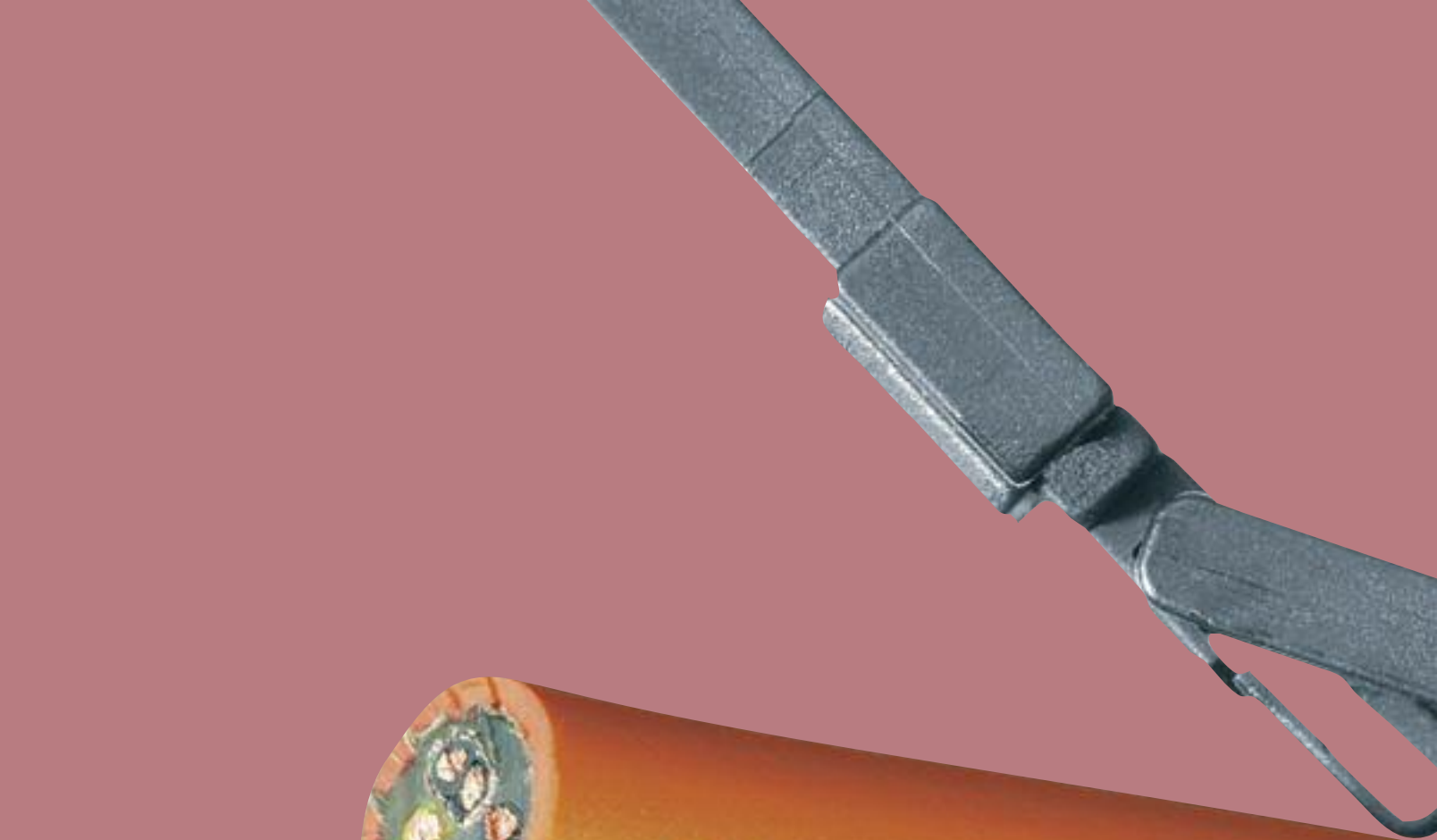


Cable tiwraps as individual parts

Cable tiwraps 100 pieces/bag	Width x Length		Maximum Ø		Tensile Strength	
	in.	(mm)	in.	(mm)	lbs	(N)
CFB-001	.19 x 5.91	(4.8 x 150)	1.42	(36)	50	(222)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS





Zipper



Zipper - Fast and easy access to cables and hoses

iF-Design Award

'Zipper' Energy Chains® enable lightning-fast opening and closing of lids. Different from the typical Energy Chain® design, which features side links and crossbars, Zipper chains are built with interconnected lids. These lids pull back like a zipper, removing the top section of the Energy Chain® in one uniform piece at any point along the length of the carrier. Cable installation and removal—especially for cables equipped with preassembled connectors—is both fast and simple because the unique design eliminates the need to snake cables through the carrier.

Typical industries and applications

- Pick & place robots
- Semi-conductor machines
- Linear motors, actuators
- Measuring equipment
- Machine tools (Zipper Energy Tube)



Cleanroom Class 1 (ISO class 3) for Zipper Series 15, tested by the Dryden Engineering Company, CA



Flammability Class
VDE 0304 IIC UL94 HB



iF-Design
Award Winner



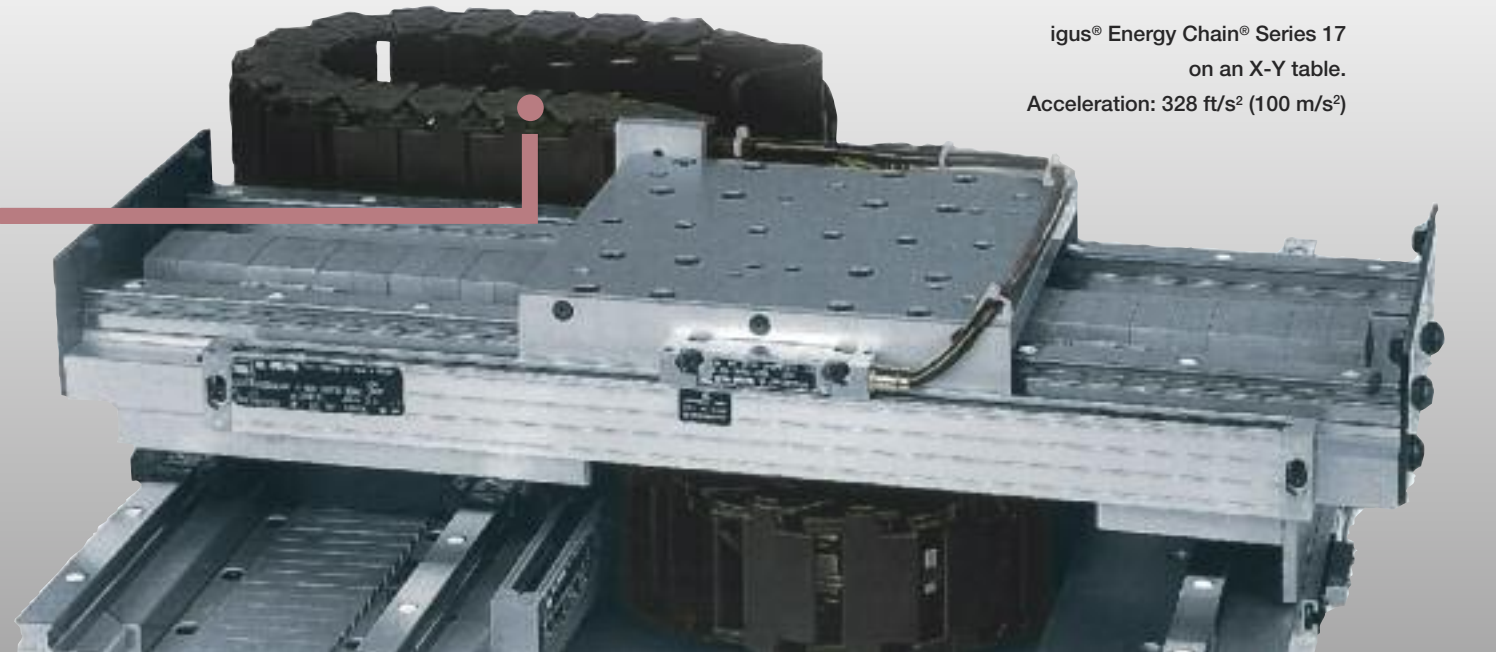
Low-noise



Fast Opening and Closing
with "Zipper"



igus® Energy Chain® Series 17
on an X-Y table.
Acceleration: 328 ft/s² (100 m/s²)

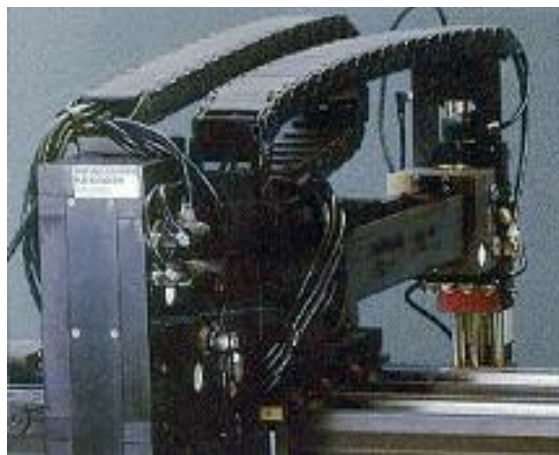


Lightning fast opening and closing with "Zipper"

- Reduced assembly-time
- Zipper-like design for quick opening and closing of lids
- Zipper lids can be separated and joined at each chain link
- Small pitch for low noise and smooth operation
- High accelerations: 328 ft/s² (100 m/s²) and more are possible
- Interior separation possible for larger versions (Series 15 and 17)



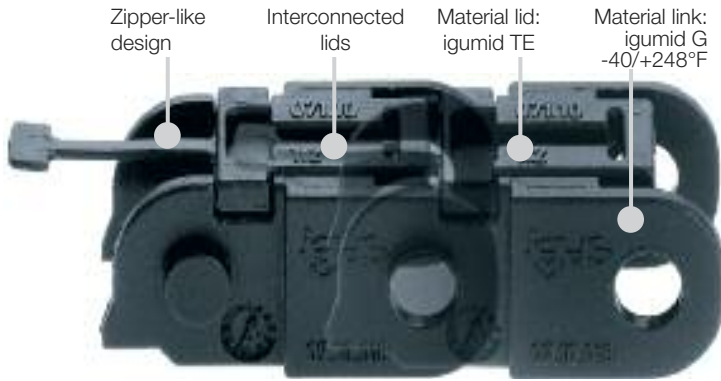
igus® Energy Chain® Series 15 Zipper in automatic equipment - reduce assembly time



Series 15 with acceleration of 328 ft/s² (100 m/s²) on pick-and-place robots, low noise

Energy Chain System® Zipper Selection Guide

energy chain® configurator 



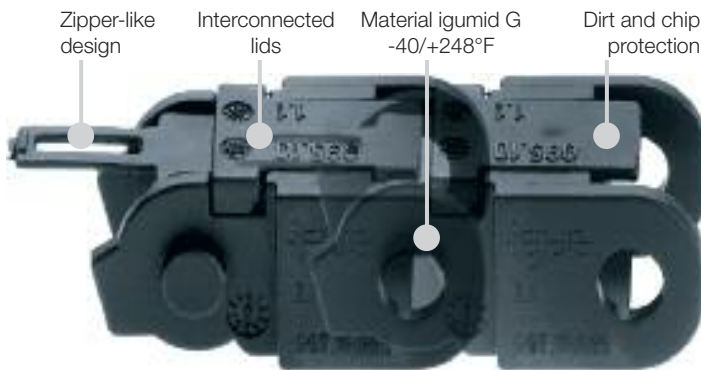
Zipper Energy Chains®

- Reduced assembly-time:
Zipper-like design for quick opening and closing of lids
- Zipper lids can be separated and joined at each chain link
- Small pitch for low noise, smooth operation
- High acceleration: 328 ft/s² (100 m/s²) and more
- Interior separation possible for larger versions
- You can find more technical data about the material, chemical resistance, temperatures ► **Design, Chapter 1**

Series	Inner height <i>hi</i>		Inner width <i>Bi</i>		Outer width <i>Ba</i>		Outer height <i>ha</i>		Bending radius <i>R</i>	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
047	.35	(9.0)	.39- .63	(10 - 16)	.63- .87	(16.0 - 22.0)	.49	(12.5)	.71- 1.50	(18 - 38)
07	.41	(10.3)	.24- 2.52	(6 - 64)	.49- 2.80	(12.5 - 71.0)	.59	(15.0)	.71- 1.50	(18 - 38)
09	.59	(15.0)	.39- 1.97	(10 - 50)	.72- 2.29	(18.2 - 58.2)	.76	(19.3)	1.10- 1.89	(28 - 48)
15	.67	(17.0)	.59- 3.94	(15 - 100)	1.02- 4.45	(26.0 - 113.0)	.94	(24.0)	1.50- 7.09	(38 - 180)
17	1.26	(32.0)	.59- 3.94	(15 - 100)	1.02- 4.45	(26.0 - 113.0)	1.54	(39.0)	2.48- 4.92	(63 - 125)

For protection against dirt and debris

For information about this zipper series please refer to the Tubes section of the catalog ► **Tubes, Chapter 5**



Zipper Energy Tubes against chips and dirt

- Fully enclosed Energy Tube with zipper opening mechanism
- Protection against dirt and chips
- Superfast opening of interconnected lids
- Modular design - tool-free lengthening and shortening
- Small pitch for low noise, smooth operation, high acceleration
- You can find more technical data about the material, chemical resistance, temperatures ► **Design, Chapter 1**

Energy Chain System® Zipper Assembly Instructions

Assembling | Zipper



1 Push and click



2 Snap lids together



3 Position and...



4 ...push and snap

Separating | Zipper



1 Zipp - upward . All lids fit like a "Zipper"



2 Separate lids



3 Release side-link



4 Twist and pull apart

Price Index



Series 047

Special Features / Options



Upon request: Cleanroom Class 1 (ISO class 3) tested by the Dryden Engineering Company, CA



Flammability Class
VDE 0304 IIC UL94 HB



Low-noise

Assembly Tips



"Zipper-fast" opening and closing

Usage Guidelines



- If fast, zipper-like accessibility to cables is required
- If quiet operation is required
- If aesthetic design is required
- If excellent service life is required
- If cost is a factor



- If easy filling without opening and closing is required
➤ Series E04 E-Z Chain

Features & Benefits

- 1 For high acceleration
- 2 Zipper lids can be separated and joined at each link
- 3 Small pitch for low-noise and smooth operation
- 4 'Zipper-fast' opening and closing
- 5 Mounting brackets available
- 6 Lightweight



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator

3.28 ft (1 m) 047-10-038-0



Energy Chain®

1 Set 0450-10-12



Mounting Bracket

Energy Chain System® Zipper Series 047

Installation Dimensions

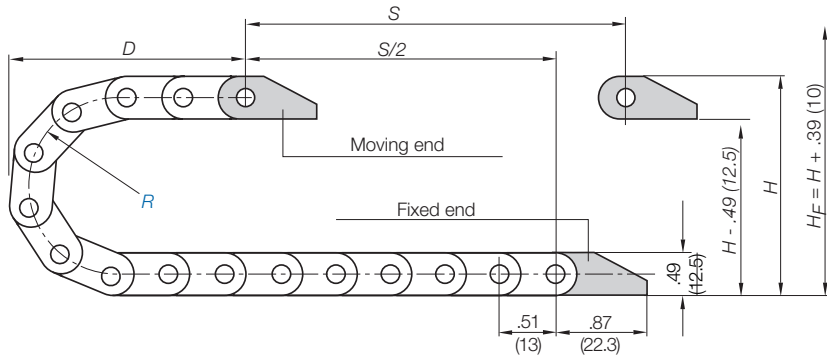
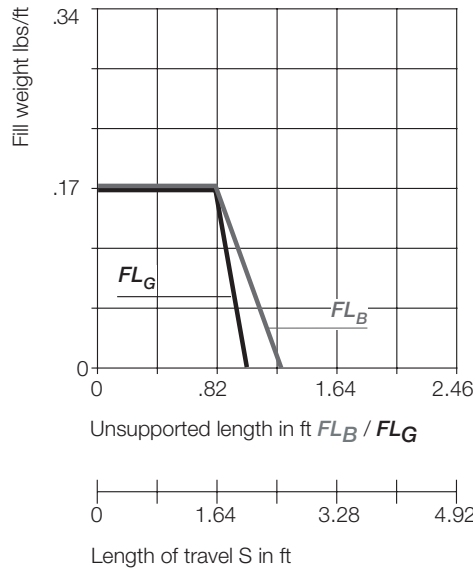
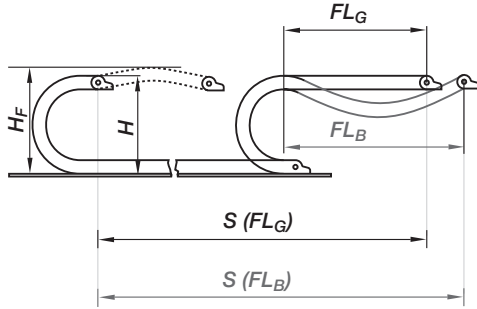
energy chain® configurator ▶



047

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



The required clearance height: $H_F = H + .39$ in. (10 mm) (with .13 lbs/ft (0.2 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	.71 (018)	1.10 (028)	1.50 (038)
H*	1.91 (48.5)	2.70 (68.5)	3.48 (88.5)
D	1.73 (44)	2.13 (54)	2.52 (64)
K	3.35 (85)	4.53 (115)	5.91 (150)

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height

Pitch per link = .51" (13 mm)
 Links per ft (m) = 23.46 (77)
 For center mount applications:
 Chain length = $S/2 + K$



PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

Technical Data



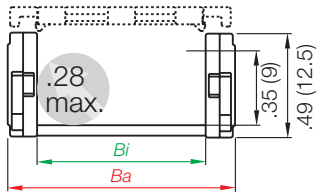
Details of material properties

▶ Chapter 1

igus® Energy Chain System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

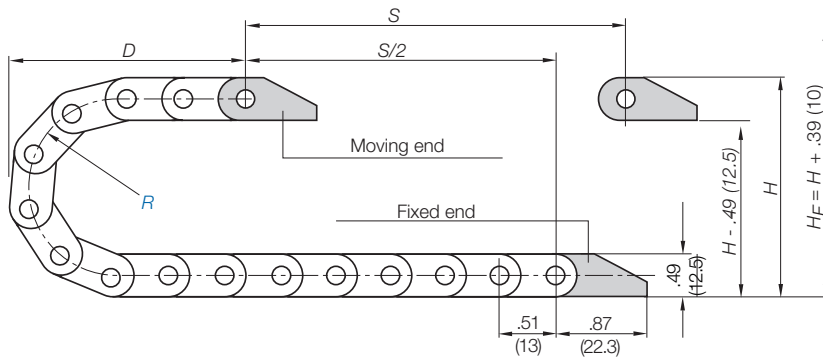
Series 047 - zip open along the outer radius



Part Number Structure



- Color - Black
- Bending radius
- Width
- Series



Supplement part number with required radius. Example: 047-10--0
Pitch: .51 in. (13 mm) per link links/ft (m) = 23.46 (77)

Part Number	<i>Bi</i> in. (mm)	<i>Ba</i> in. (mm)	Weight lbs/ft (kg/m)
047-10- <input type="text" value="038"/> -0	.39 (10)	.63 (16)	≈ 0.07 (0.10)
047-16- <input type="text" value="038"/> -0	.63 (16)	.87 (22)	≈ 0.07 (0.11)

Choose from the radii below for all of the above sizes
Radius (mm) Example: 047-10--0

	<input type="text" value="018"/>	<input type="text" value="028"/>	<input type="text" value="028"/>
<i>R</i>	.71 (018)	1.10 (028)	1.50 (038)
<i>H*</i>	1.91 (48.5)	2.70 (68.5)	3.48 (88.5)
<i>D</i>	1.73 (44)	2.13 (54)	2.52 (64)
<i>K</i>	3.35 (85)	4.53 (115)	5.91 (150)

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

Energy Chain System® Zipper Series 047 Mounting Brackets

energy chain® configurator ▶



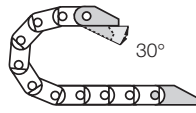
047



Plastic, one-piece

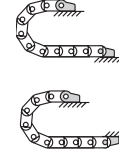
- One-piece mounting bracket
- Corrosion resistant
- Available preassembled

Moving end
0450...1 (PZ)



30°

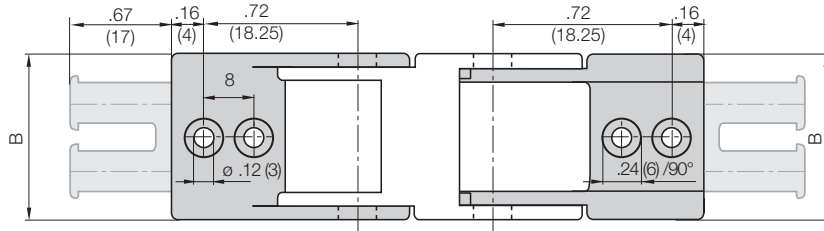
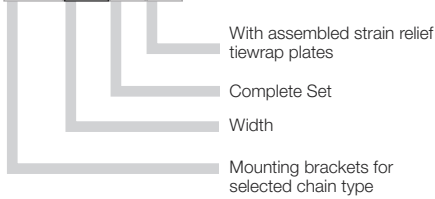
Fixed end
0450-2 (PZ)



Possible installation configurations -

Part Number Structure

0450- 10- 12 PZ



Full set, for both ends:

0450-10-12 Full set, each part with pin/bore

Single-part order:

0450-10-1 Mounting bracket with bore

0450-10-2 Mounting bracket with pin

Chain Type	Part No. Full set with Tiewrap Plate	Part No. Full Set without Tiewrap Plate	Dimensions B		Number of Teeth
			in.	(mm)	
08-					
047-10	0450-10-12PZ	0450-10-12	.63	(16)	1
047-16	0450-16-12PZ	0450-16-12	.87	(22)	2

Additional Accessories



Quicksnap - the complete, detachable mounting unit, upon request



Quickfix - mounting bracket with dowel, upon request

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index



Series 07

Special Features / Options



Upon request: Cleanroom Class 1 (ISO class 3) tested by the Dryden Engineering Company, CA



Flammability Class
VDE 0304 IIC UL94 HB



Low-noise

Assembly Tips



"Zipper-fast" opening and closing

Usage Guidelines



- If fast, zipper-like accessibility to cables is required
- If quiet operation is required
- If aesthetic design is required
- If excellent service life is required



- If a more cost-effective, openable Energy Chain is required
➤ **Series B07 E2 Micro**
- If cable installation without opening lids is possible
➤ **Series E06 E-Z Chain**
- If a closed tube system is required
➤ **Series R07 E2 Zipper Tube**

Features & Benefits

- 1 Mounting bracket with integrated strain relief
- 2 Zipper lids can be separated and joined at each link
- 3 Small pitch for low-noise and smooth operation
- 4 'Zipper-fast' opening and closing
- 5 For high acceleration
- 6 Lightweight



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

3.28 ft (1 m) 07-20-038-0

1 Set 060-20-12PZ

energy chain® configurator



Energy Chain®



Mounting Bracket

Energy Chain System® Zipper Series 07

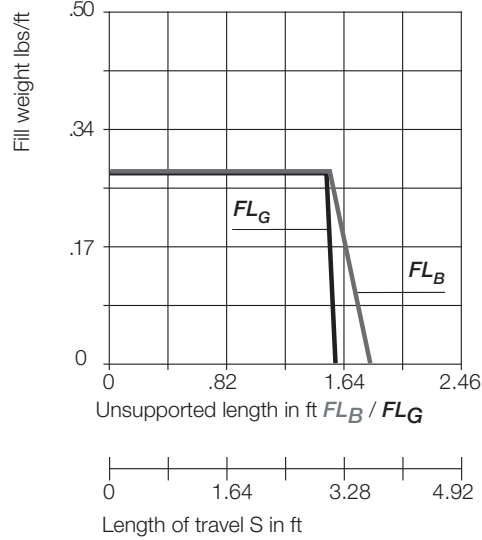
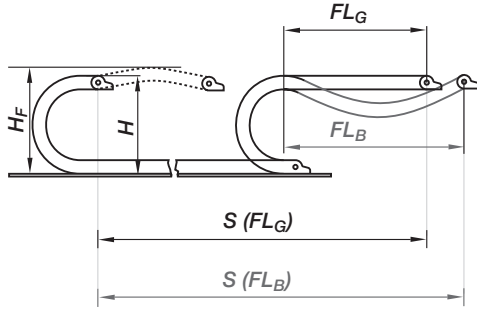
Installation Dimensions

energy chain® configurator ▶



Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



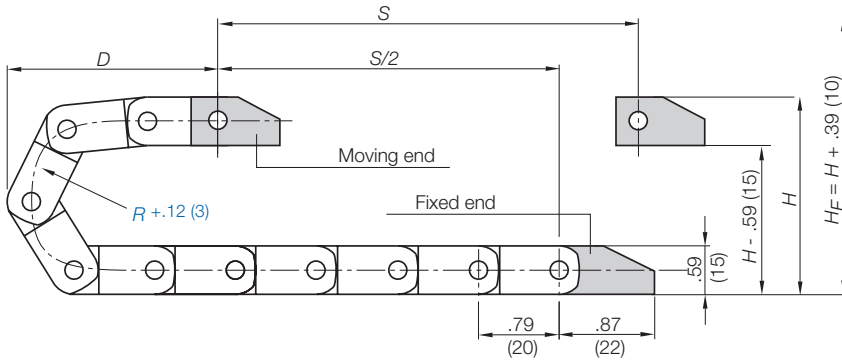
Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- $H_F = \text{Required clearance height}$



Pitch per link = .79" (20 mm)
 Links per ft (m) = 15.24 (50)
 For center mount applications:
 Chain length = $\frac{S}{2} + K$

The required clearance height: $H_F = H + .39 \text{ in. (10 mm)}$ (with .13 lbs/ft (0.2 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	.71 (018)	1.10 (028)	1.50 (038)
H^*	2.01 (51)	2.80 (71)	3.58 (91)
D	2.20 (56)	2.60 (66)	2.99 (76)
K	3.94 (100)	5.12 (130)	6.30 (160)



PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120° C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

Technical Data



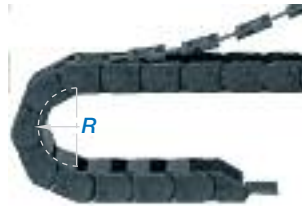
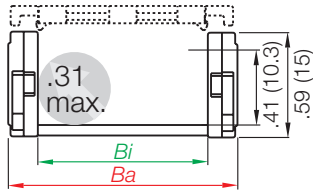
Details of material properties

▶ Chapter 1

igus® Energy Chain System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

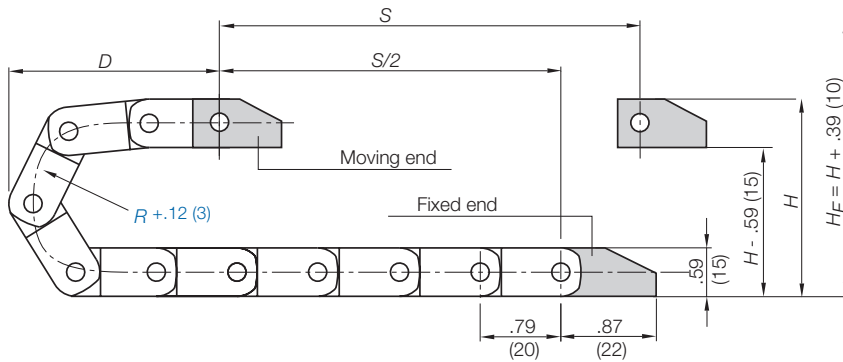
Series 07 - zip open along the outer radius



Part Number Structure



- Color - Black
- Bending radius
- Width
- Series



Supplement part number with required radius. Example: 07-20-**038**-0
Pitch: .79 in. (20 mm) per link links/ft (m) = 15.24 (50)

Part Number	<i>Bi</i> in. (mm)	<i>Ba</i> in. (mm)	Weight lbs/ft (kg/m)
07-06- <input type="checkbox"/> -0	.24 (6)	.49 (12.5)	≈ 0.09 (0.13)
07-10- <input type="checkbox"/> -0	.39 (10)	.65 (16.5)	≈ 0.09 (0.14)
07-16- <input type="checkbox"/> -0	.63 (16)	.89 (22.5)	≈ 0.11 (0.16)
07-20- <input type="checkbox"/> -0	.79 (20)	1.06 (27.0)	≈ 0.11 (0.17)
07-30- <input type="checkbox"/> -0	1.18 (30)	1.46 (37.0)	≈ 0.13 (0.20)
07-40- <input type="checkbox"/> -0	1.57 (40)	1.85 (47.0)	≈ 0.15 (0.23)
07-50- <input type="checkbox"/> -0	1.97 (50)	2.24 (57.0)	≈ 0.17 (0.26)
07-64- <input type="checkbox"/> -0	2.52 (64)	2.80 (71.0)	≈ 0.20 (0.30)

Choose from the radii below for all of the above sizes

Radius (mm) Example: 07-20-**038**-0

	018	028	038
R	.71 (018)	1.10 (028)	1.50 (038)
H*	2.01 (51)	2.80 (71)	3.58 (91)
D	2.20 (56)	2.60 (66)	2.99 (76)
K	3.94 (100)	5.12 (130)	6.30 (160)

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

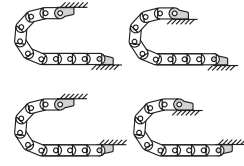
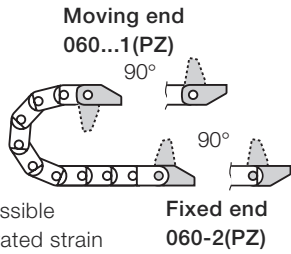
Energy Chain System® Zipper Series 07 Mounting Brackets

energy chain® configurator ▶



Plastic, one-piece

- One-piece mounting bracket
- Corrosion resistant
- Available preassembled
- Inner and outer attachment possible
- Available with or without integrated strain relief tiewrap plates

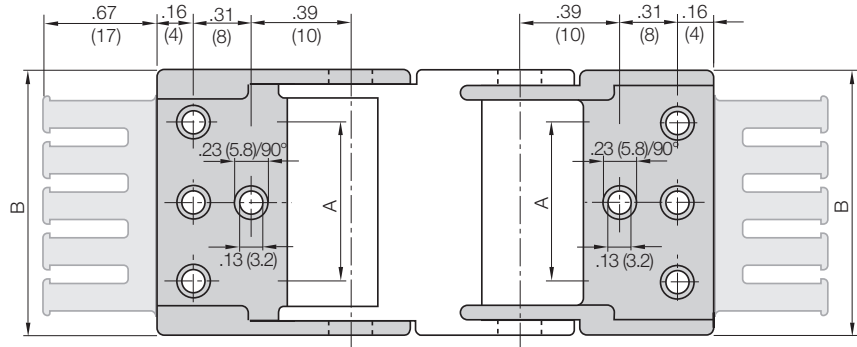


Possible installation configurations -

Part Number Structure



- 060- With assembled strain relief tiewrap plates
- 20- Complete Set
- 12 Width
- PZ Mounting brackets for selected chain type



Full set, for both ends:

060- [20- 12] Full set, each part with pin/bore

Single-part order:

060- [20- 1] Mounting bracket with bore

060- [20- 2] Mounting bracket with pin

060-06-12 - 060-20-12:

Center bores only

060-30-12 - 060-64-12:

Outer bores only

Chain Type	Part No. Full set with Tiewrap Plate	Part No. Full Set without Tiewrap Plate	Dimension A		Dimensions B		Number of Teeth
			in.	(mm)	in.	(mm)	
07-06	060-06-12PZ	060-06-12	—	—	.49	(12.5)	1
07-10	060-10-12PZ	060-10-12	—	—	.65	(16.5)	1
07-16	060-16-12PZ	060-16-12	—	—	.89	(22.5)	2
07-20	060-20-12PZ	060-20-12	—	—	1.06	(27.0)	2
07-30	060-30-12PZ	060-30-12	.87	(22)	1.46	(37.0)	3
07-40	060-40-12PZ	060-40-12	1.26	(32)	1.85	(47.0)	4
07-50	060-50-12PZ	060-50-12	1.65	(42)	2.24	(57.0)	5
07-64	060-64-12PZ	060-64-12	2.20	(56)	2.80	(71.0)	6

Additional Accessories



Quicksnap - the complete, detachable mounting unit, upon request



Quickfix - mounting bracket with dowel, upon request

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index



Series 09

Special Features / Options



Upon request: Cleanroom Class 1 (ISO class 3) tested by the Dryden Engineering Company, CA



Flammability Class VDE 0304 IIC UL94 HB



Low-noise

Assembly Tips



"Zipper-fast" opening and closing

Usage Guidelines



- If fast, zipper-like accessibility to cables is required
- If quick, easy insertion of cables with preassembled connectors is required
- If quiet operation is required
- If aesthetic design is required
- If high acceleration and travel speed is present



- If a more cost-effective, openable Energy Chain is required
 - Series B09 E2 Micro
- If cable installation without opening lids is possible
 - Series E08 E-Z Chain
- If a closed tube system is required
 - Series R09 E2 Zipper Tube

Features & Benefits

- 1 Zipper lids can be separated and joined at each link
- 2 Small pitch for low-noise and smooth operation
- 3 'Zipper-fast' opening and closing
- 4 For high acceleration
- 5 Mounting bracket with integrated strain relief
- 6 Lightweight



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

3.28 ft (1 m) 09-20-038-0

1 Set 080-20-12PZ

energy chain® configurator



Energy Chain®



Mounting Bracket

Energy Chain System® Zipper Series 09

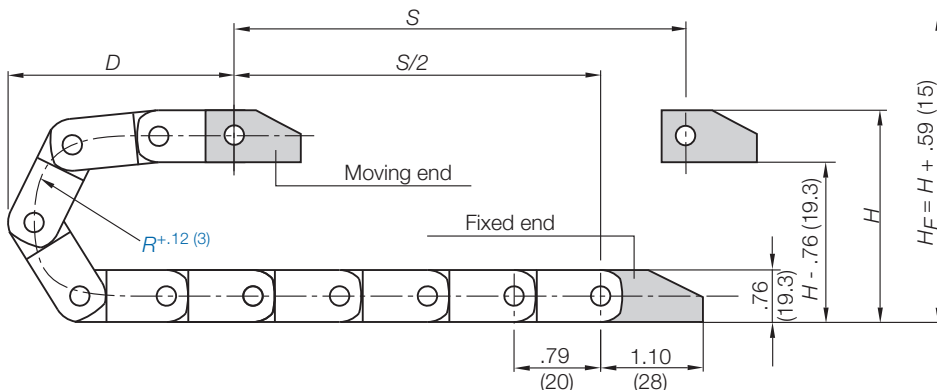
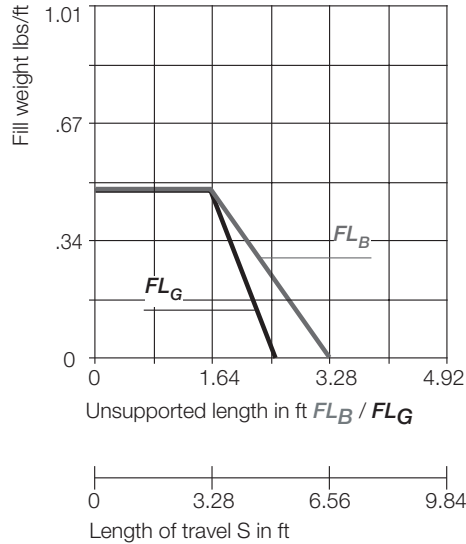
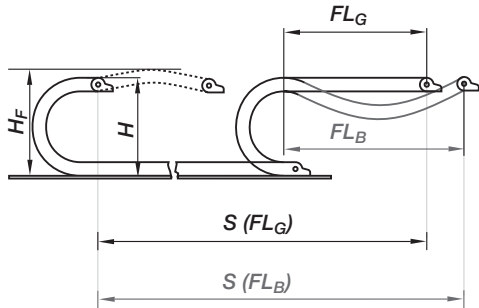
Installation Dimensions

energy chain® configurator ▶



Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



The required clearance height: $H_F = H + .59$ in. (15 mm) (with .20 lbs/ft (0.3 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	1.10 (028)	1.50 (038)	1.89 (048)
H*	2.95 (75)	3.74 (95)	4.53 (115)
D	2.68 (68)	3.07 (78)	3.46 (88)
K	5.12 (130)	6.30 (160)	7.68 (195)

Short Travels - Unsupported

Unupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

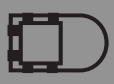
Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height

Pitch per link: = .79" (20 mm)
 Links per ft (m): = 15.24 (50)
 For center mount applications:
 Chain length = $S/2 + K$



PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120° C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

Technical Data



Details of material properties

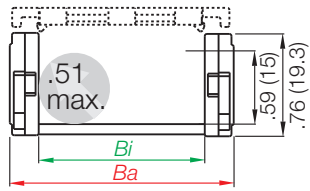
▶ Chapter 1

igus® Energy Chain System®

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Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

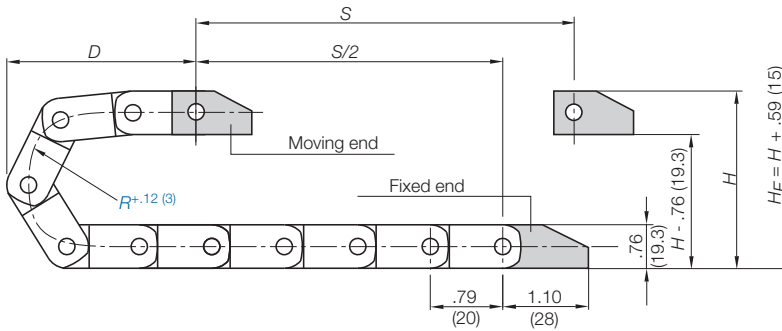
Series 09 - zip open along the outer radius



Part Number Structure



- Color - Black
- Bending radius
- Width
- Series



Supplement part number with required radius. Example: 09-20--0
Pitch: .79 in. (20 mm) per link links/ft (m) = 15.24 (50)

Part Number	<i>Bi</i> in. (mm)	<i>Ba</i> in. (mm)	Weight lbs/ft (kg/m)
09-10- <input type="text" value=""/> -0	.39 (10)	.72 (18.2)	≈ 0.14 (0.21)
09-16- <input type="text" value=""/> -0	.63 (16)	.95 (24.2)	≈ 0.16 (0.24)
09-20- <input type="text" value=""/> -0	.79 (20)	1.11 (28.2)	≈ 0.17 (0.25)
09-30- <input type="text" value=""/> -0	1.18 (30)	1.50 (38.2)	≈ 0.19 (0.28)
09-40- <input type="text" value=""/> -0	1.57 (40)	1.90 (48.2)	≈ 0.21 (0.31)
09-50- <input type="text" value=""/> -0	1.97 (50)	2.29 (58.2)	≈ 0.23 (0.34)

Choose from the radii below for all of the above sizes

Radius (mm) Example: 09-20--0

	<input type="text" value="028"/>	<input type="text" value="038"/>	<input type="text" value="048"/>
<i>R</i>	1.10 (028)	1.50 (038)	1.89 (048)
<i>H*</i>	2.95 (75)	3.74 (95)	4.53 (115)
<i>D</i>	2.68 (68)	3.07 (78)	3.46 (88)
<i>K</i>	5.12 (130)	6.30 (160)	7.68 (195)

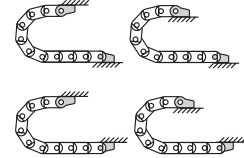
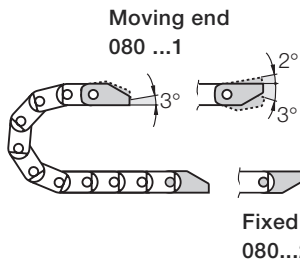
Energy Chain System® Zipper Series 09 Mounting Brackets

energy chain® configurator ▶



Plastic, pivoting

- One-piece mounting bracket
- Corrosion resistant
- Available preassembled
- Inner and outer attachment possible
- Available with or without strain relief tiewrap plates

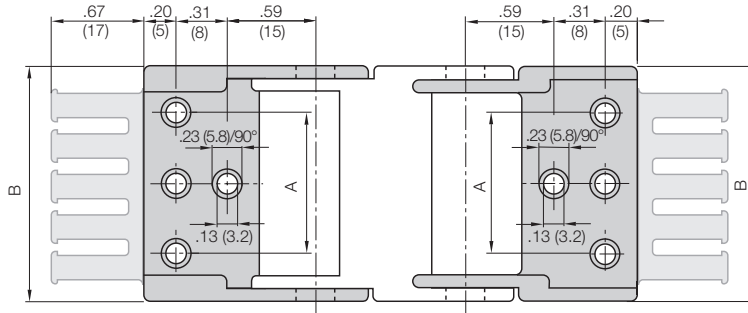


Possible installation configurations -

Part Number Structure

080-	20-	12	PZ
------	-----	----	----

- With assembled strain relief tiewrap plates
- Complete Set
- Width
- Mounting brackets for selected chain type



Full set, for both ends:

080- [20- 12] Full set, each part with pin/bore

Single-part order:

080- [20- 1] Mounting bracket with bore

080- [20- 2] Mounting bracket with pin

080-10-12 - 080-20-12:

Center bores only

080-30-12 - 080-50-12:

Outer bores only

Chain Type	Part No. Full set with Tiewrap Plate	Part No. Full Set without Tiewrap Plate	Dimension A		Dimensions B		Number of Teeth
			in.	(mm)	in.	(mm)	
08-10	080-10-12PZ	080-10-12	—	—	.72	(18.2)	1
08-16	080-16-12PZ	080-16-12	—	—	.95	(24.2)	2
08-20	080-20-12PZ	080-20-12	—	—	1.11	(28.2)	2
08-30	080-30-12PZ	080-30-12	.87	(22)	1.50	(38.2)	3
08-40	080-40-12PZ	080-40-12	1.26	(32)	1.90	(48.2)	4
08-50	080-50-12PZ	080-50-12	1.65	(42)	2.29	(58.2)	5

Additional Accessories



Quicksnap - the complete, detachable mounting unit, upon request



Quickfix - mounting bracket with dowel, upon request

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index



Series 15

Special Features / Options



Upon request: Cleanroom Class 1 (ISO class 3) tested by the Dryden Engineering Company, CA



Flammability Class VDE 0304 IIC UL94 HB



Low-noise

Assembly Tips



"Zipper-fast" opening and closing

Usage Guidelines



- If fast, zipper-like accessibility to cables is required
- If connection options are required (Quicksnap, Quickfix)
- If interior separation is required
- If high stability and long service life are required



- If opening of the link is not necessary
 - Series 10 E2 Mini
- If torsion occurs
 - Series E14 E-Z Chain
- If the chain must snap-open along the inner radius
 - Series B15i E2 Mini

3.19

Features & Benefits

- 1 Large pins and double stop dog for superior life and long unsupported length
- 2 'Zipper-fast' opening and closing
- 3 Small pitch for low-noise, smooth operation
- 4 Zipper lids can be separated and joined at each link
- 5 Mounting bracket with integrated strain relief
- 6 For high acceleration



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

[energy chain® configurator](#) ▶

3.28 ft (1 m) 15-025-038-0



Energy Chain®

With 2 separators 154 assembled every 2nd link



Interior Separation

1 Set 1025-12PZ



Mounting Bracket

Energy Chain System® Zipper Series 15

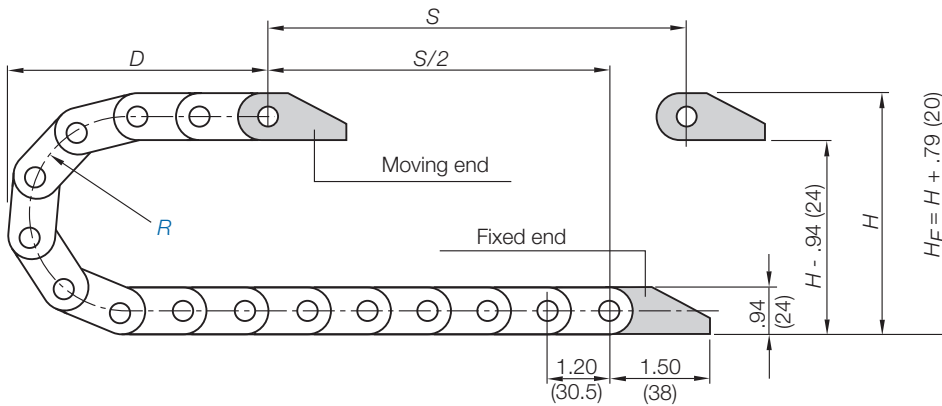
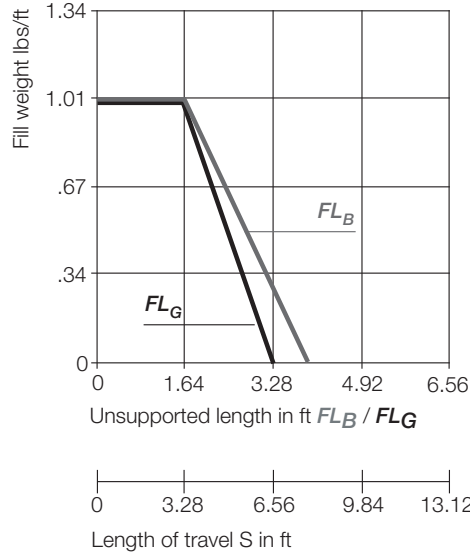
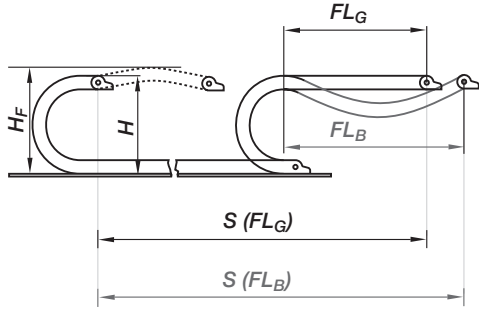
Installation Dimensions

energy chain® configurator ▶



Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



Short Travels - Unsupported

Unupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height

Pitch per link = 1.20" (30.5 mm)
 Links per ft (m) = 10.06 (33)
 For center mount applications:
 Chain length = $S/2 + K$

The required clearance height: $H_F = H + .79 \text{ in. (20 mm)}$ (with .67 lbs/ft (1.0 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	1.50 (038)	1.89 (048)	2.95 (075)	3.94 (100)	4.33 (110)	4.92 (125)	5.71 (145)	7.09 (180)
H	3.90 (99)	4.69 (119)	6.81 (173)	8.78 (223)	9.57 (243)	10.75 (273)	12.32 (313)	15.08 (383)
D	3.74 (95)	4.13 (105)	5.20 (132)	6.18 (157)	6.57 (167)	7.17 (182)	7.95 (202)	9.33 (237)
K	7.28 (185)	8.46 (215)	11.81 (300)	14.96 (380)	16.14 (410)	17.91 (455)	20.47 (520)	24.80 (630)

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120° C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

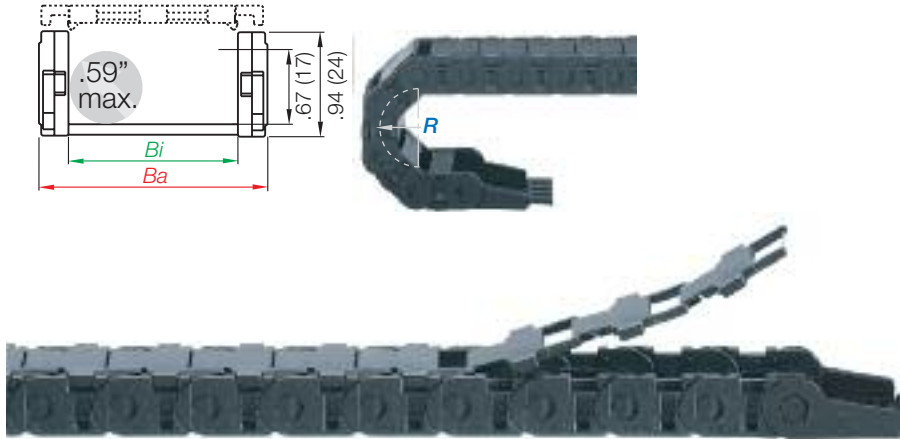
Technical Data



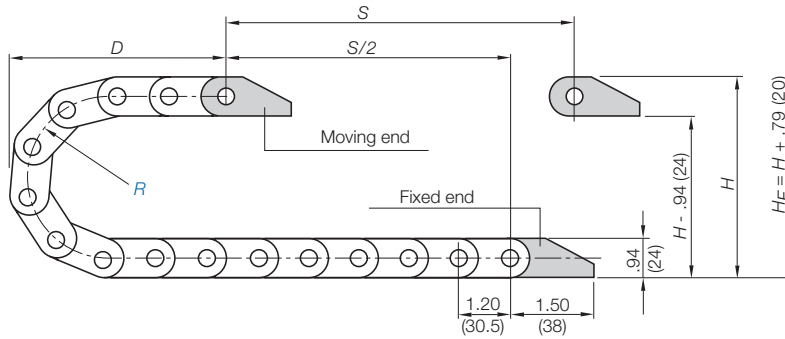
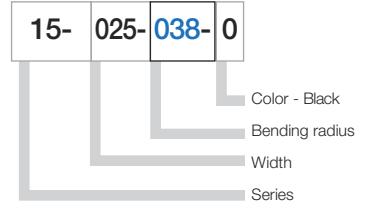
Details of material properties

▶ Chapter 1

Series 15 - Zip-open along the outer radius



Part Number Structure



Supplement part number with required radius. Example: 15-025-**038**-0
Pitch: 1.20 in. (30.5 mm) per link links/ft (m) = 10.06 (33)

Part Number	Bi	Ba	Weight
Snap-open outer radius	in. (mm)	in. (mm)	lbs/ft (kg/m)
15-015- <input type="text"/> -0	.59 (15)	1.02 (26)	≈ 0.24 (0.35)
15-025- <input type="text"/> -0	.98 (25)	1.42 (36)	≈ 0.27 (0.40)
15-038- <input type="text"/> -0	1.50 (38)	1.93 (49)	≈ 0.31 (0.46)
15-050- <input type="text"/> -0	1.97 (50)	2.40 (61)	≈ 0.35 (0.52)
15-5- <input type="text"/> -0	2.48 (63)	2.99 (76)	≈ 0.42 (0.63)
15-6- <input type="text"/> -0	3.15 (80)	3.70 (94)	≈ 0.47 (0.70)
15-7- <input type="text"/> -0	3.94 (100)	4.45 (113)	≈ 0.51 (0.76)

Choose from the radii below for all of the above sizes

Radius (mm) Example: 15-025-**038**-0

	038	048	075	100	110	125	145	180
R	1.50 (038)	1.89 (048)	2.95 (075)	3.94 (100)	4.33 (110)	4.92 (125)	5.71 (145)	7.09 (180)
H	3.90 (99)	4.69 (119)	6.81 (173)	8.78 (223)	9.57 (243)	10.75 (273)	12.32 (313)	15.08 (383)
D	3.74 (95)	4.13 (105)	5.20 (132)	6.18 (157)	6.57 (167)	7.17 (182)	7.95 (202)	9.33 (237)
K	7.28 (185)	8.46 (215)	11.81 (300)	14.96 (380)	16.14 (410)	17.91 (455)	20.47 (520)	24.80 (630)

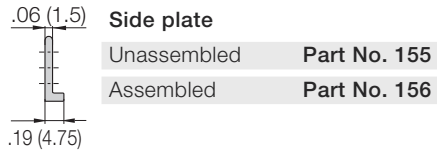
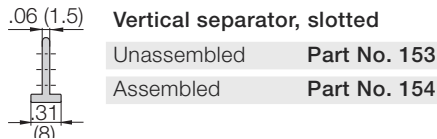
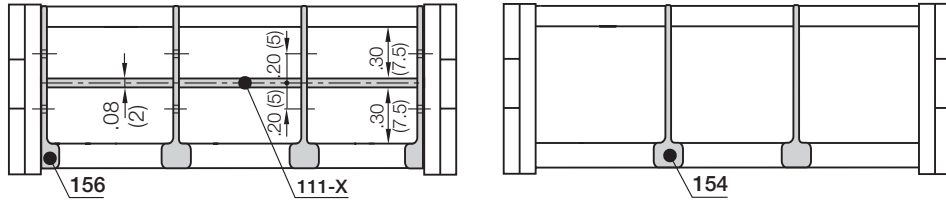
0=Standard color black. For other colors see Chapter 1

Interior Separation



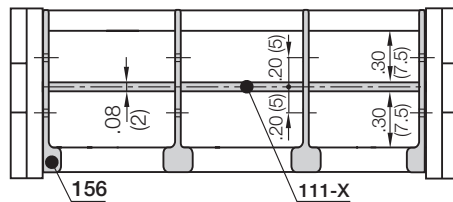
Option 1: Vertical separators

Vertical separators are used if only a vertical subdivision of the Energy Chain® interior is required. A slotted separator is used for this subdivision. This separator can also be used with full-width shelves for a continuous horizontal subdivision. By standard, vertical separators are assembled every other Energy Chain® link.

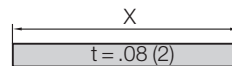


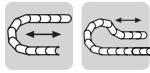
Option 2: Full-width shelf

Interior separation with continuous horizontal subdivision is practical is using a large number of thin cables with similar or identical diameters.



Width X in. (mm)	Part No. Unassembled	Part No. Assembled
.59 (015)	110-15	111-15
.98 (025)	110-25	111-25
1.50 (038)	110-38	111-38
1.97 (050)	110-50	111-50
2.48 (063)	110-63	111-63
3.15 (080)	110-80	111-80
3.94 (100)	110-100	111-100

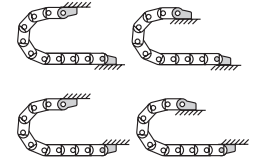
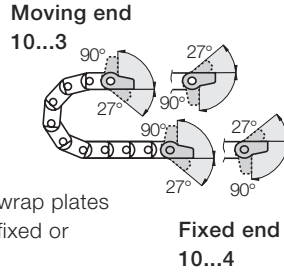




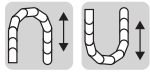
Standard

Option 1: pivoting

- Well suited for space-restricted conditions
- Strain relief with detachable tiwrap plates
- Can be mounted on either the fixed or moving end of the chain
- Variable traverse angle for flexible assembly

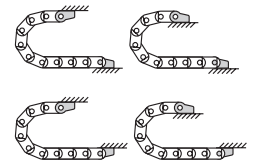
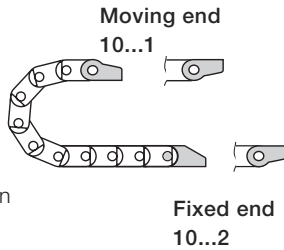


Possible installation configurations -



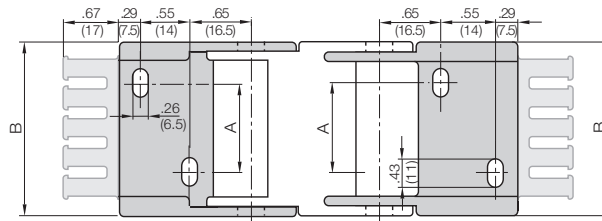
Option 2: locking

- Extreme accelerations
- If space is limited for height
- Can be mounted on either the fixed or moving end of the chain

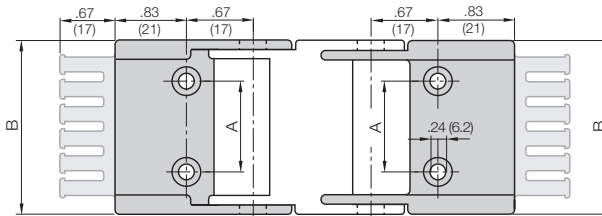


Possible installation configurations -

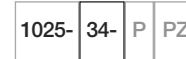
For Energy Chain 15-015 to 15-050



For Energy Chain 15-5 to 15-7



Part Number Structure



- With tiwrap plate
- Without tiwrap plate
- Complete Set
12 = Pivoting
34 = Locking
- Mounting brackets for selected chain type

Part number examples are shown for pivoting brackets. For locking brackets fill in the blank with **12**

Part No. Full Set (pivoting) with Tiwrap Plate
Series 15 with 25mm inner width
1025-34PZ

Part No. Full Set (pivoting) without Tiwrap Plate
Series 15 with 25 mm inner width
1025-34P

Full set, for both ends:
1025-34-PZ Full set, each part with pin/bore + tiwrap plate
Single-part order:
1025-3-PZ Mounting bracket with bore + tiwrap plate
1025-4-PZ Mounting bracket with pin + tiwrap plate

For Chain Type	Part No. Full set with Tiwrap Plate	Part No. Full Set without Tiwrap Plate	Dimension A in. (mm)	Dimensions B in. (mm)	Number of Teeth
15-015	1015- <input type="checkbox"/> PZ	1015- <input type="checkbox"/> P	—	1.00 (25.5)	2
15-025	1025- <input type="checkbox"/> PZ	1025- <input type="checkbox"/> P	.39 (10)	1.40 (35.5)	3
15-038	1038- <input type="checkbox"/> PZ	1038- <input type="checkbox"/> P	.91 (23)	1.91 (48.5)	4
15-050	1050- <input type="checkbox"/> PZ	1050- <input type="checkbox"/> P	1.38 (35)	2.38 (60.5)	5
15-5	105- <input type="checkbox"/> PZ	105- <input type="checkbox"/> P	1.89 (48)	2.95 (75.0)	6
15-6	106- <input type="checkbox"/> PZ	106- <input type="checkbox"/> P	2.56 (65)	3.62 (92.0)	8
15-7	107- <input type="checkbox"/> PZ	107- <input type="checkbox"/> P	3.35 (85)	4.41 (112.0)	10

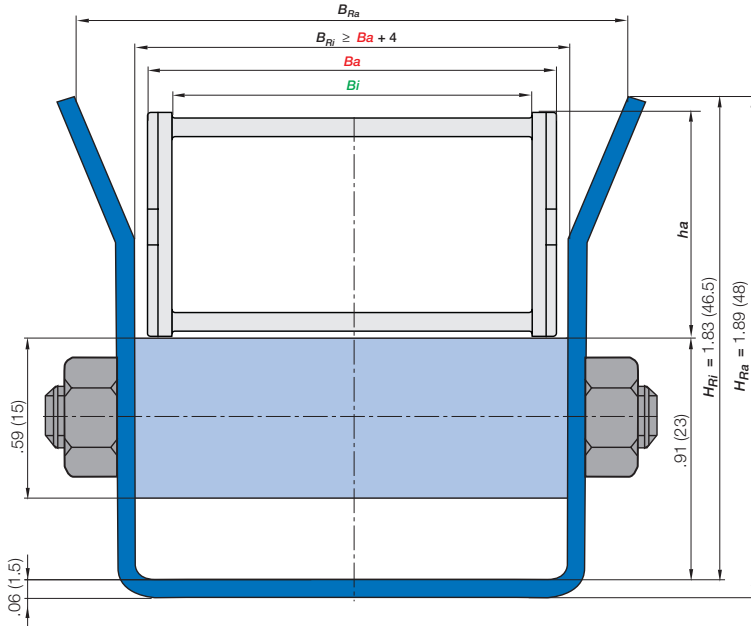
For pivoting brackets choose **34**
For locking brackets choose **12**
Example: 1025- PZ

Energy Chain System® Zipper Series 15 Guide Trough

energy chain® configurator ▶



One-piece guide troughs made of steel are available for the Series 15 Zipper Energy Chains®. These guide troughs are available from stock for outer chain widths up to 2.36 in. (60 mm). For wider Energy Chains® and Tubes, special solutions are possible with short lead times. No installation sets are required for these trough sizes since the guide troughs consist of a one-piece U-profile. The joint connection with this type of guide trough is specified individually for every application.



Dimensions Guide troughs 91-10 — 91-71

For Series	Part No.	B_{Ra} in. (mm)	B_{Ri} in. (mm)	Weight lbs/ft (kg/m)
15-015				
Trough without glide bar 6.56 ft. (2m section)	91-10	1.59 (40.5)	1.18 (30)	1.01 (1.50)
Glide bar 6.56 ft. (2m section)	91-11	1.59 (40.5)	1.18 (30)	.30 (.45)
15-025				
Trough without glide bar 6.56 ft. (2m section)	91-20	1.99 (50.5)	1.57 (40)	1.11 (1.65)
Glide bar 6.56 ft. (2m section)	91-21	1.99 (50.5)	1.57 (40)	.38 (.57)
15-038				
Trough without glide bar 6.56 ft. (2m section)	91-30	2.46 (62.5)	2.05 (52)	1.21 (1.80)
Glide bar 6.56 ft. (2m section)	91-31	2.46 (62.5)	2.05 (52)	.46 (.68)
15-050				
Trough without glide bar 6.56 ft. (2m section)	91-40	2.85 (72.5)	2.44 (62)	1.28 (1.90)
Glide bar 6.56 ft. (2m section)	91-41	2.85 (72.5)	2.44 (62)	.61 (.91)
15-5				
Trough without glide bar 6.56 ft. (2m section)	91-50	3.60 (91.5)	3.19 (81)	1.52 (2.26)
Glide bar 6.56 ft. (2m section)	91-51	3.60 (91.5)	3.19 (81)	.84 (1.25)
15-6				
Trough without glide bar 6.56 ft. (2m section)	91-60	4.27 (108.5)	3.86 (98)	1.83 (2.72)
Glide bar 6.56 ft. (2m section)	91-61	4.27 (108.5)	3.86 (98)	.91 (1.35)
15-7				
Trough without glide bar 6.56 ft. (2m section)	91-70	5.06 (128.5)	4.65 (118)	2.13 (3.17)
Glide bar 6.56 ft. (2m section)	91-71	5.06 (128.5)	4.65 (118)	1.14 (1.70)

Trough material in general: St 1203 galvanized

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index



Series 17

Special Features / Options



Upon request: Cleanroom Class 1 (ISO class 3) tested by the Dryden Engineering Company, CA



Flammability Class VDE 0304 IIC UL94 HB



Low-noise

Assembly Tips



"Zipper-fast" opening and closing

Usage Guidelines



- If fast, zipper-like accessibility to cables is required
- If connection options are required (Quicksnap, Quickfix)
- If interior separation is required
- If quiet operation is required



- If individual links must open as opposed to 'zipping' open
➤ **Series B17 E2 Mini**
- If torsion occurs
➤ **Series E16 E-Z Chain**

Features & Benefits

- 1 Interior separation possible
- 2 Small pitch for low-noise, smooth operation
- 3 'Zipper-fast' opening and closing
- 4 For high acceleration
- 5 Zipper lids can be separated and joined at each link
- 6 Mounting bracket with integrated strain relief



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

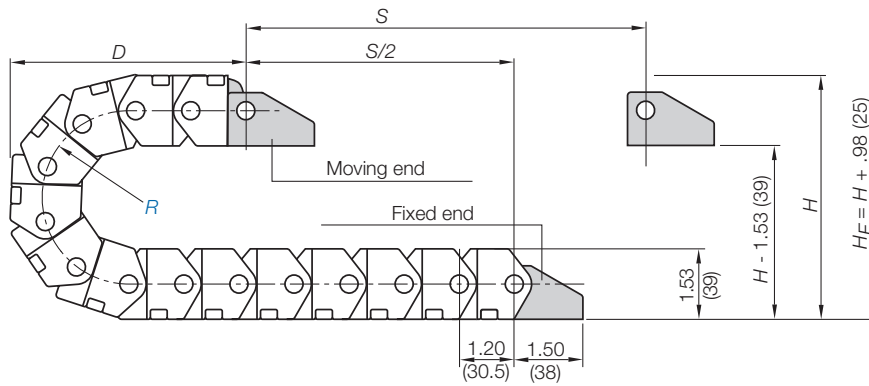
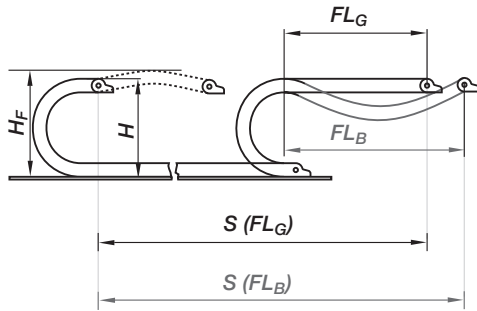
[energy chain® configurator](#) ▶
3.28 ft (1 m) **17-2-063-0****Energy Chain®**With 2 separators **172** assembled every 2nd link**Interior Separation**1 Set **117-2-12PZ****Mounting Bracket**

Energy Chain System® Zipper Series 17

Installation Dimensions

Short travel, unsupported length

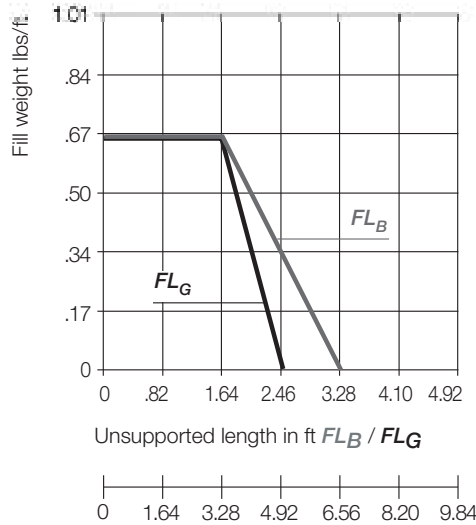
- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ► Design, Chapter 1



The required clearance height: $H_F = H + .98$ in. (25 mm) (with 1.01 lbs/ft (1.5 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	2.48 (063)	2.95 (075)	3.94 (100)	4.92 (125)
H	6.50 (165)	7.44 (189)	9.41 (239)	11.38 (289)
D	5.04 (128)	5.51 (140)	6.50 (165)	7.48 (190)
K	10.24 (260)	11.81 (300)	14.96 (380)	17.91 (455)

energy chain® configurator ►



igus®

17

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height

Pitch per link = 1.20" (30.5 mm)
 Links per ft (m) = 10.06 (33)
 For center mount applications:
 Chain length = $S/2 + K$



PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 6.56 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

Technical Data



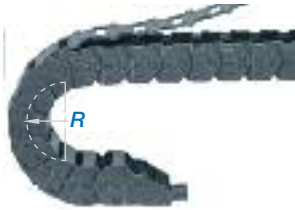
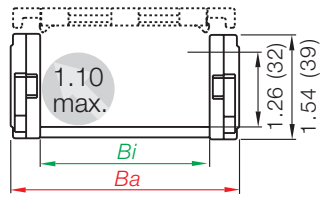
Details of material properties

► Chapter 1

3.26

STANDARD

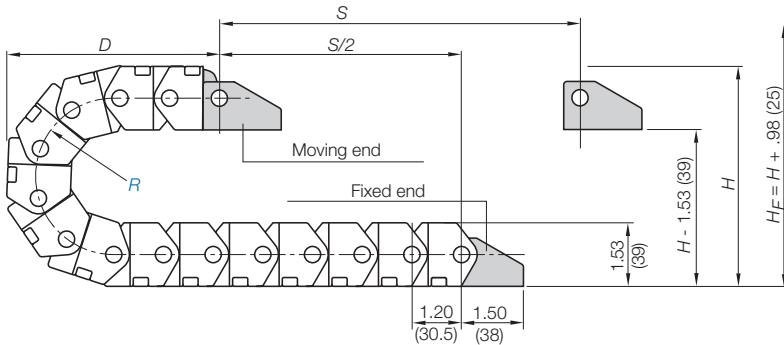
Series 17 - Zip-open along the outer radius - Standard



Part Number Structure



Color - Black
Bending radius
Width
Series



Supplement part number with required radius. Example: 17-1-**063**-0
Pitch: 1.20 in. (30.5 mm) per link links/ft (m) = 10.06 (33)

Part Number	<i>Bi</i> in. (mm)	<i>Ba</i> in. (mm)	Weight lbs/ft (kg/m)
17-1- <input type="text"/> -0	.59 (15)	1.02 (26)	≈ 0.35 (0.52)
17-2- <input type="text"/> -0	.98 (25)	1.42 (36)	≈ 0.40 (0.59)
17-3- <input type="text"/> -0	1.50 (38)	1.93 (49)	≈ 0.44 (0.65)
17-4- <input type="text"/> -0	1.97 (50)	2.40 (61)	≈ 0.47 (0.70)
17-5- <input type="text"/> -0	2.48 (63)	2.99 (76)	≈ 0.56 (0.83)
17-6- <input type="text"/> -0	3.15 (80)	3.66 (93)	≈ 0.62 (0.92)
17-7- <input type="text"/> -0	3.94 (100)	4.45 (113)	≈ 0.71 (1.06)

Choose from the radii below for all of the above sizes

Radius (mm) Example: 17-1-**063**-0

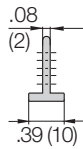
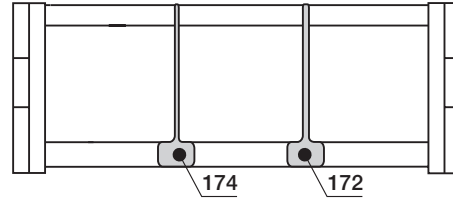
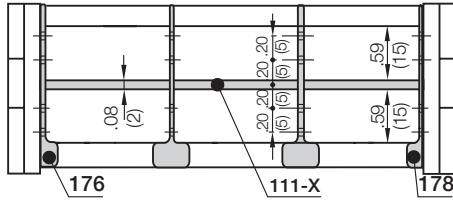
	063	075	100	125
R	2.48 (63)	2.95 (75)	3.94 (100)	4.92 (125)
H	6.50 (165)	7.44 (189)	9.41 (239)	11.38 (289)
D	5.04 (128)	5.51 (140)	6.50 (165)	7.48 (190)
K	10.24 (260)	11.81 (300)	14.96 (380)	17.91 (455)

0=Standard color black. For other colors see Chapter 1



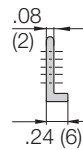
Option 1: Vertical separators

Vertical separators are used if only a vertical subdivision of the Energy Chain® interior is required. A slotted separator is used for this subdivision. This separator can also be used with full-width shelves for a continuous horizontal subdivision. By standard, vertical separators are assembled every other Energy Chain® link.



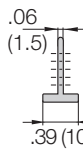
Vertical Separator for 17-1 to 17-4

Unassembled **Part No. 171**
Assembled **Part No. 172**



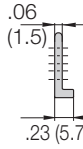
Side Plate for 17-1 to 17-4

Unassembled **Part No. 175**
Assembled **Part No. 176**



Vertical Separator for 17-5 to 17-7

Unassembled **Part No. 173**
Assembled **Part No. 174**



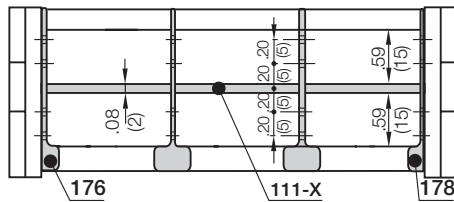
Side plate for 17-5 to 17-7

Unassembled **Part No. 177**
Assembled **Part No. 178**

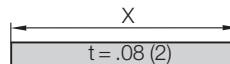


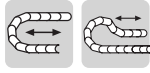
Option 2: Full-width shelf

Interior separation with continuous horizontal subdivision is practical is using a large number of thin cables with similar or identical diameters.



Width X in. (mm)	Part No.	
	Unassembled	Assembled
.59 (015)	110-15	111-15
.98 (025)	110-25	111-25
1.50 (038)	110-38	111-38
1.97 (050)	110-50	111-50
2.48 (063)	110-63	111-63
3.15 (080)	110-80	111-80
3.94 (100)	110-100	111-100



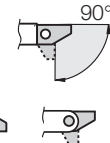
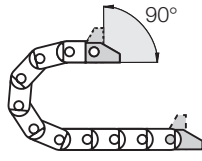


Standard

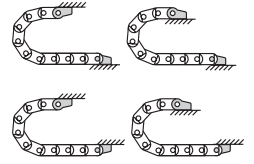
Option 1: pivoting

- One-piece mounting bracket
- Corrosion resistant
- Available pre-assembled
- Inner and outer attachment possible
- With our without strain relief tiewrap plates

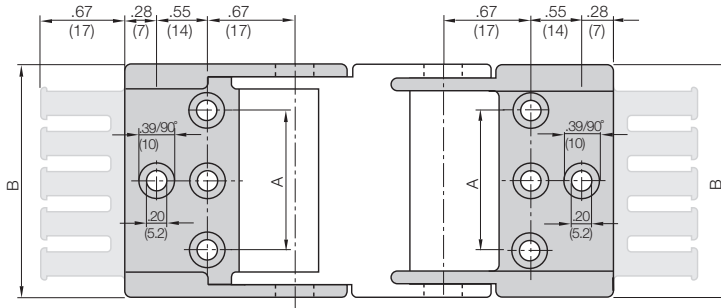
Moving end
117...1P(Z)



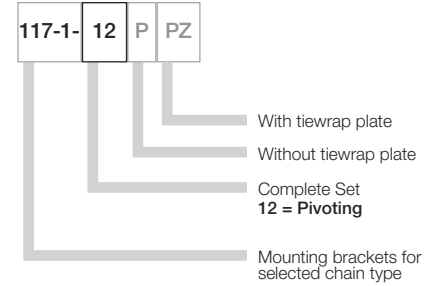
Fixed end
117...2P(Z)



Possible installation configurations -



Part Number Structure



Full set, for both ends:

117-1-12-PZ Full set, each part with pin/bore + tie-wrap plate

Single-part order:

117-1-1-PZ Mounting bracket with bore + tie-wrap plate

117-1-2-PZ Mounting bracket with pin + tie-wrap plate

For Chain Type	Part No.		Number of Teeth	Dimension A		Dimensions B	
	Full set with Tie-wrap Plate	Full Set without Tie-wrap Plate		in.	(mm)	in.	(mm)
17-1	117-1-12PZ	117-1-12P	2	—	—	1.00	(25.5)
17-2	117-2-12PZ	117-2-12P	3	.47	(12)	1.40	(35.5)
17-3	117-3-12PZ	117-3-12P	4	.98	(25)	1.91	(48.5)
17-4	117-4-12PZ	117-4-12P	5	1.46	(37)	2.38	(60.5)
17-5	117-5-12PZ	117-5-12P	6	1.89	(48)	2.99	(76.0)
17-6	117-6-12PZ	117-6-12P	8	2.56	(65)	3.66	(93.0)
17-7	117-7-12PZ	117-7-12P	10	3.35	(85)	4.45	(113.0)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS





E2 Micro



E2 micro igus[®] smallest Energy Chain[®] cable carrier

System E2 micro—considered one of the world's smallest cable carriers—can fit into almost any application, including those with tight space restrictions and small bending radii. System E2 micro is cost-effective and available in many styles and sizes with various accessory options.

Typical industries and applications

- Models (micro Energy Chains[®])
- Automatic doors
- Vehicles
- Measuring machines
- Electric equipment
- Pick and place robots
- General machinery



iF-Design Award -
for E2 micro - Series 05



Special equipment: Electrically conductive
ESD/ATEX version upon request



IPA Qualification Certificate:
Cleanroom test upon request



UL94 - V2 class for Series 03 and
UL94 - HB class for all other Micro Series



Smallest inner heights 5 mm:
Series 03 E2 micro





igus® E2 micro Energy Chains® are robust for standing applications



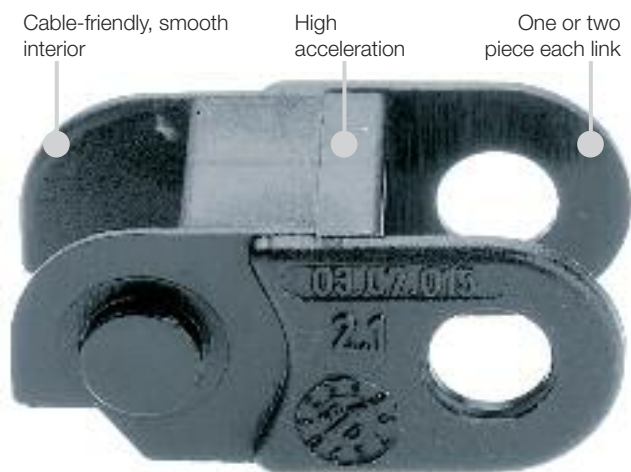
Sliding door in train - UL 94-V2 version



Sliding door in subway with igus® Chainflex® CF9 cable for smallest spaces

Energy Chain System® E2 Micro Selection Guide

energy chain® configurator 



Cable-friendly, smooth interior

High acceleration

One or two piece each link

- One-piece Energy Chains®, from inner height of .20 (5 mm)
- High torsional rigidity
- Smallest inner heights and bending radii
- Mounting brackets with optional strain relief
- Small pitch for smooth running
- Cable-friendly, smooth interior
- Low weight
- Large pins for longer life
- Space-saving ratio of inner-to-outer dimensions
- To find more technical data about the material, chemical resistance and temperatures ► **Design, Chapter 1**

Series	Inner height		Inner width		Outer width		Outer height		Bending radius	
	<i>hi</i>		<i>Bi</i>		<i>Ba</i>		<i>ha</i>		<i>R</i>	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
03	.20	(5)	.20-.39	(5-10)	.34-.54	(8.7-13.7)	.31	(8)	.39-1.10	(10-28)
04	.28	(7)	.28-1.18	(7-30)	.47-1.38	(12-35)	.39	(10)	.59-1.89	(15-48)
045	.41	(10.3)	.24-2.52	(6-64)	.47-2.76	(12-70)	.49	(12.5)	.71-1.50	(18-38)
05	.39	(10)	.24-2.52	(6-64)	.39-2.68	(10-68)	.47	(12)	.71-1.50	(18-38)
06	.41	(10.5)	.24-2.52	(6-64)	.49-2.80	(12.5-71)	.59	(15)	.71-1.50	(18-38)
08	.59	(15)	.39-1.97	(10-50)	.72-2.29	(18.2-58.2)	.76	(19.3)	1.10-1.89	(28-48)

Energy Chain System® E2 Micro Assembly Instructions

Assembling | E2 micro



Twist and click

Separating | E2 micro



Twist and separate

Speciality | E2 micro



igus® micro Energy Chains® - for smallest bending radii with Chainflex® CF98 and CF99 - 4 x d!

Price Index


Series 03

Special Features / Options

 IPA Qualification Certificate:
Cleanroom test upon request

 ESD Classification:
Electrically conductive
ESD/ATEX version upon request

 Smallest inner height
.20" (5 mm)

 Flammability Class
VDE 0304 IIC UL94 V2

Assembly Tips


Easy to assemble and disassemble

Usage Guidelines


- If quieter operation is required
- If cost is a factor
- If snap-open links are not necessary



- If snap-open links are required
➤ **Series 047 "Zipper"**
- If quick insertion of cables with preassembled connector is required
➤ **Series E03 E-Z Chain**

Features & Benefits

- 1 Mounting bracket with integrated strain relief
- 2 One-piece, non snap-open Energy Chain®
- 3 Very lightweight - low price
- 4 igus® smallest Energy Chain® - interior dimensions .20" x .20" (5 x 5 mm)
- 5 Dirt-repellant exterior
- 6 Available as E-Z style Energy Chain, See Chapter 2
- 7 Patented "push-button principle" for better stability


[energy chain® configurator](#) ▶

Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

3.28 ft (1 m) 03-05-028-0

Energy Chain®

1 Set 03-05-12Z

Mounting Bracket

Energy Chain System® E2 Micro Series 03

Installation Dimensions

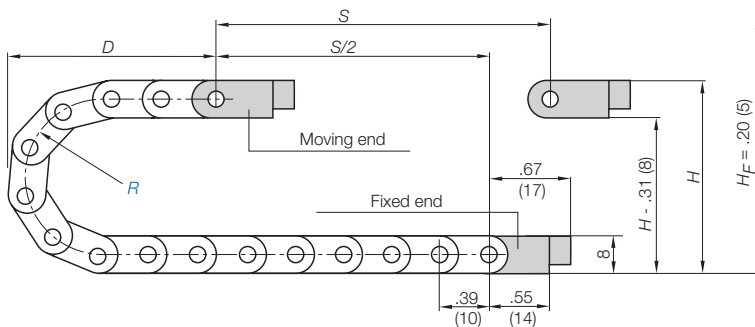
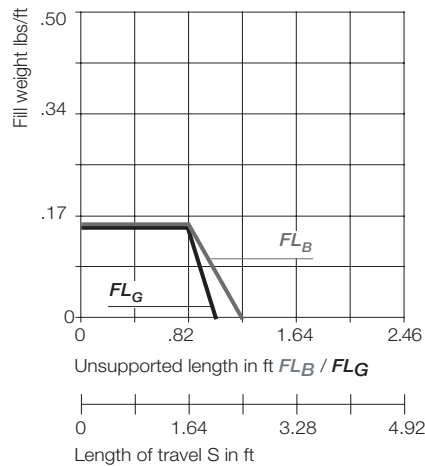
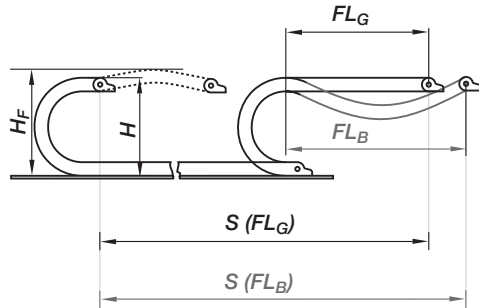
energy chain® configurator



03

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1



Pitch per link = .39" (10 mm)
 Links per ft (m) = 30.47 (100)
 For center mount applications:
 Chain length = $S/2 + K$

The required clearance height: $H_F = H + .20$ in. (5 mm) (with .067 lbs/ft (0.1 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	.39 (010)	.47 (012)	.59 (015)	.71 (018)	1.10 (028)
H	1.10 (28)	1.26 (32)	1.50 (38)	1.73 (44)	2.52 (64)
D	1.14 (29)	1.22 (31)	1.34 (34)	1.46 (37)	1.85 (47)
K	2.17 (55)	2.36 (60)	2.76 (70)	3.15 (80)	4.33 (110)

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height

*If the mounting bracket location is set lower



PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 9.84 ft/s (3 m/s) / max. 32.8 ft/s ² (10 m/s ²)
Material - permitted temperature	igumid NB / -40°F (-40°C) up to +176°F (+80°C)
Flammability Class, igumid NB	VDE 0304 IIC UL94 V2

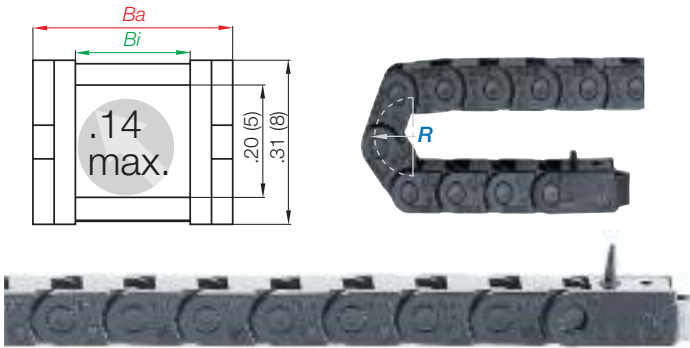
Technical Data



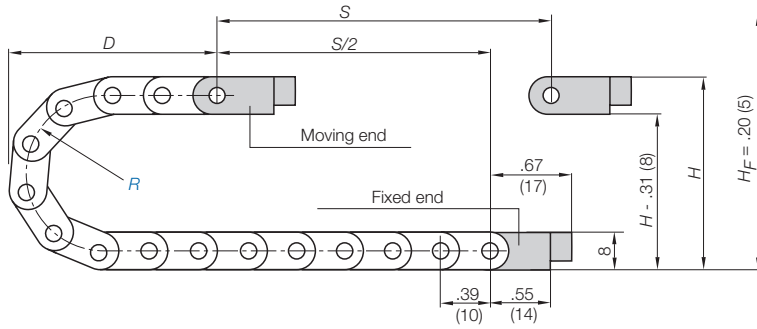
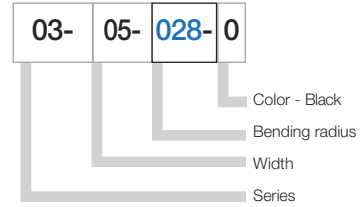
Details of material properties

Chapter 1

Series 03 - Energy Chain® non snap-open



Part Number Structure



Supplement part number with required radius. Example: 03-05-**028**-0
Pitch: .39 in. (10 mm) per link links/ft (m) = 30.47 (100)

Part Number	Bi in. (mm)	Ba in. (mm)	Weight lbs/ft (kg/m)
03-05- <input type="text"/> -0	.20 (5)	.34 (8.7)	≈ 0.027 (0.04)
03-07- <input type="text"/> -0	.28 (7)	.42 (10.7)	≈ 0.034 (0.05)
03-10- <input type="text"/> -0	.39 (10)	.54 (13.7)	≈ 0.040 (0.06)

Choose from the radii below for all of the above sizes

Radius (mm)	Example: 03-05- 028 -0
010	028
R .39 (010)	.71 (018)
H 1.10 (28)	1.73 (44)
D 1.14 (29)	1.46 (37)
K 2.17 (55)	3.15 (80)

0=Standard color black. For other colors see Chapter 1

Energy Chain System® E2 Micro Series 03 Mounting Brackets

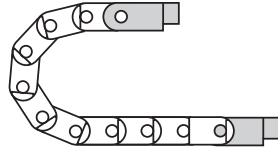
energy chain® configurator ▶



Polymer, one-piece

- One-piece mounting bracket
- Corrosion resistant
- Available preassembled
- Rapid installation through adaptor plate

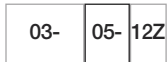
Moving end
03 ...1Z



Fixed end
03...2Z



Part Number Structure



Complete Set
Width
Mounting bracket for selected chain type

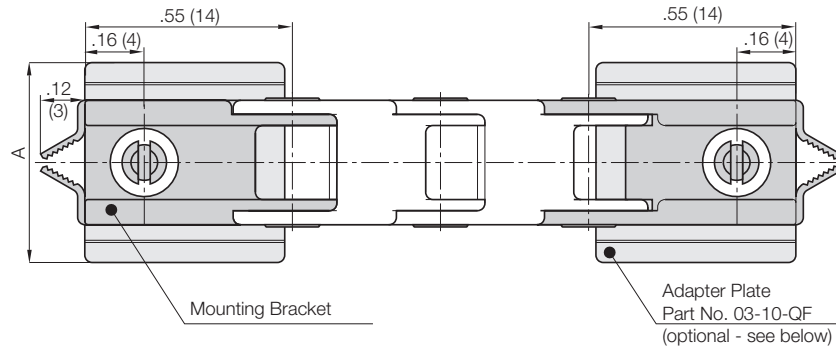
Full set, for both ends:

03- 05- 12Z Full set, each part with pin/bore

Single-part order:

03- 05- 1Z Mounting bracket with bore

03- 05- 2Z Mounting bracket with pin



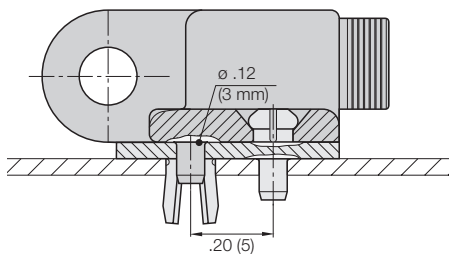
Chain Width	Part No. Full Set	Dimension A
		in. (mm)
-05	03-05-12Z	.34 (8.7)
-07	03-07-12Z	.42 (10.7)
-10	03-10-12Z	.54 (13.7)

Additional Accessories



03-10-QF = Adapter plate for all sizes

The adapter has broken edges, so that it can be adapted to the respective chain width. It is not absolutely necessary for attaching the mounting brackets. The mounting brackets can also be screwed on without the adapter plate.



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index


Series 04

Special Features / Options

IPA Qualification Certificate:
Cleanroom test upon request

ESD Classification:
Electrically conductive
ESD/ATEX version upon request

Flammability Class
VDE 0304 IIC UL94 HB

Assembly Tips


Easy to assemble and disassemble

Usage Guidelines


- If quieter operation is required
- If cost is a factor
- If snap-open links are not necessary



- If snap-open links are required
➤ **Series 047 "Zipper"**
- If quick insertion of cables with preassembled connector is required
➤ **Series E04 E-Z Chain**

Features & Benefits

- 1 Very lightweight - low price
- 2 One-piece, non snap-open Energy Chain®
- 3 Small Energy Chain® -
interior dimensions .28" x .28" (7 x 7 mm)
- 4 Dirt-repellant exterior


[energy chain® configurator](#) ▶

Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

3.28 ft (1 m) 04-07-038-0



Energy Chain®

1 Set 040-07-12



Mounting Bracket

Energy Chain System® E2 Micro Series 04

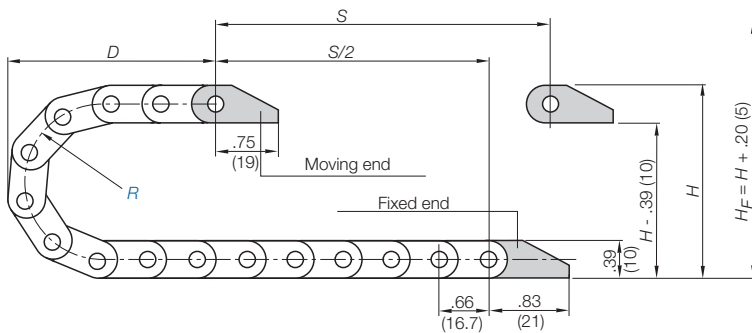
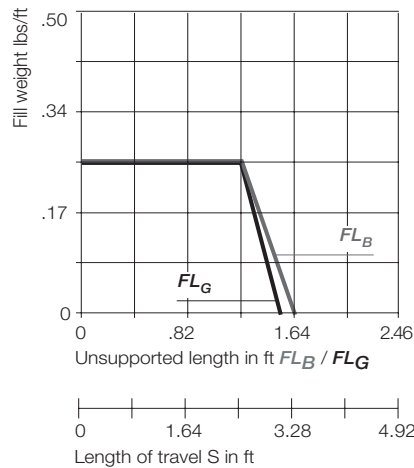
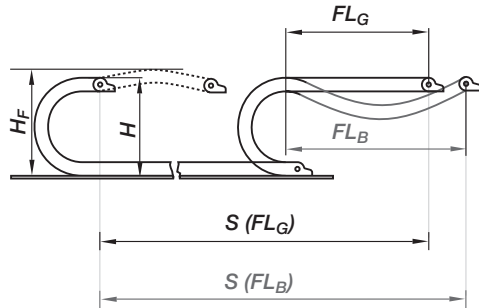
Installation Dimensions

energy chain® configurator ▶



Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



Pitch per link = .66" (16.7 mm)
 Links per ft (m) = 18.28 (60)
 For center mount applications:
 Chain length = $S/2 + K$

The required clearance height: $H_F = H + .20$ in. (5 mm) (with .067 lbs/ft (0.1 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	.59 (015)	.71 (018)	1.10 (028)	1.50 (038)	1.89 (048)
H	1.57 (40)	1.81 (46)	2.60 (66)	3.39 (86)	4.17 (106)
D	1.77 (45)	1.89 (48)	2.28 (58)	2.68 (68)	3.07 (78)
K	3.35 (85)	3.54 (90)	4.92 (125)	6.10 (155)	7.28 (185)

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height



PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 9.84 ft/s (3 m/s) / max. 32.8 ft/s ² (10 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120° C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

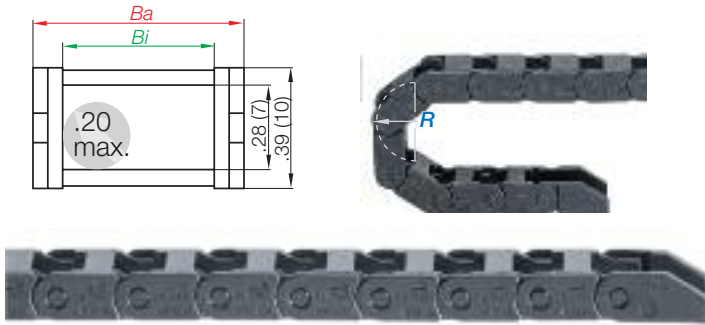
Technical Data



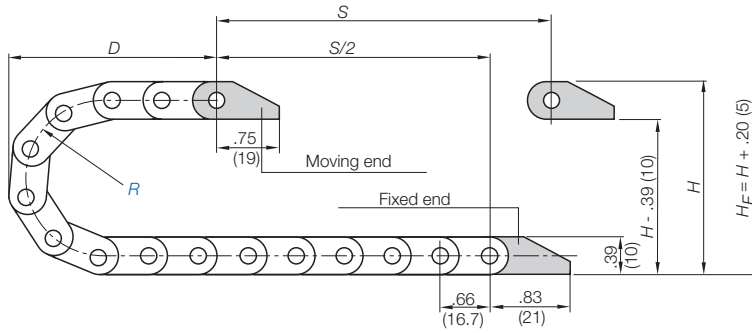
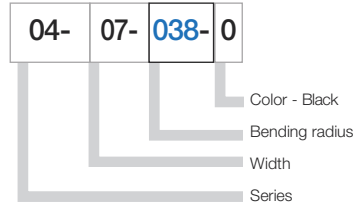
Details of material properties

▶ Chapter 1

Series 04 - Energy Chain® non snap-open



Part Number Structure



Supplement part number with required radius. Example: 04-07-**038**-0
Pitch: .66 in. (16.7 mm) per link links/ft (m) = 18.28 (60)

Part Number	<i>Bi</i> in. (mm)	<i>Ba</i> in. (mm)	Weight lbs/ft (kg/m)
04-07- <input type="text"/> -0	.28 (7)	.47 (12)	≈ 0.047 (0.07)
04-10- <input type="text"/> -0	.39 (10)	.59 (15)	≈ 0.053 (0.08)
04-16- <input type="text"/> -0	.63 (16)	.83 (21)	≈ 0.060 (0.09)
04-20- <input type="text"/> -0	.79 (20)	.98 (25)	≈ 0.067 (0.10)
04-30- <input type="text"/> -0	1.18 (30)	1.38 (35)	≈ 0.073 (0.11)

Choose from the radii below for all of the above sizes

Radius (mm) Example: 04-07-**038**-0

	015	018	028	038	048
R	.59 (015)	.71 (018)	1.10 (028)	1.50 (038)	1.89 (048)
H	1.57 (40)	1.81 (46)	2.60 (66)	3.39 (86)	4.17 (106)
D	1.77 (45)	1.89 (48)	2.28 (58)	2.68 (68)	3.07 (78)
K	3.35 (85)	3.54 (90)	4.92 (125)	6.10 (155)	7.28 (185)

0=Standard color black. For other colors see Chapter 1

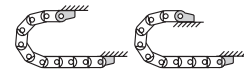
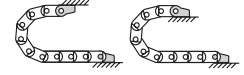
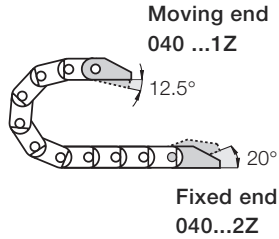
Energy Chain System® E2 Micro Series 04 Mounting Brackets

energy chain® configurator ▶



Polymer, one-piece

- One-piece mounting bracket
- Corrosion resistant
- Available preassembled
- Inner and outer attachment possible



Possible installation configurations -

Part Number Structure



With tiwrap plate

Complete Set

Width

Mounting brackets for selected chain type

Full set, for both ends:

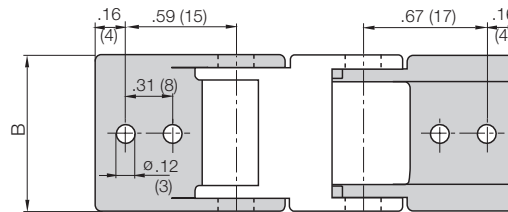
040-07-12-PZ Full set, each part with pin/bore

Single-part order:

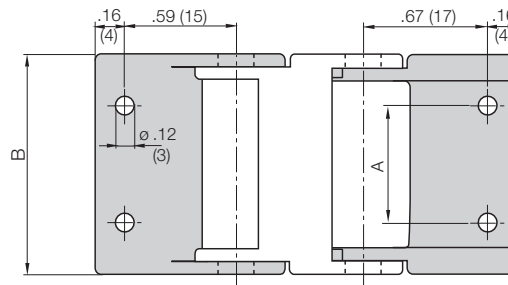
040-07-1-PZ Mounting bracket with bore

040-07-2-PZ Mounting bracket with pin

For sizes 040-07 - 040-20 only



For size 040-30 only



Chain Type	Part No.	Dimension A		Dimensions B		Number of Teeth
		in.	(mm)	in.	(mm)	
04-07	040-07-12	—	—	.47	(12)	1
04-10	040-10-12	—	—	.59	(15)	1
04-16	040-16-12	—	—	.83	(21)	2
04-20	040-20-12	—	—	.98	(25)	2
04-30	040-30-12	.87	(22)	1.38	(35)	3

Additional accessories



Quicksnap - the complete, detachable mounting unit, upon request
Only available for the 040-07 Energy Chain - **Part No. 040-07-QS**

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFG: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index


Series 045

Special Features / Options

 IPA Qualification Certificate:
Cleanroom test upon request

 ESD Classification:
Electrically conductive
ESD/ATEX version upon request

 Flammability Class
VDE 0304 IIC UL94 HB

Assembly Tips


Easy to assemble and disassemble

Features & Benefits

- 1 Small pitch for very quiet operation
- 2 Very lightweight - ideal for low inertia applications
- 3 Dirt-repellant exterior
- 4 One-piece, non snap-open Energy Chain®


 Series 046 with full-width shelving
available for the following:

046-16-018

046-16-028

046-16-038

Width Bi: .63" (16 mm)

Radii R: (018), (028), (038)


Usage Guidelines


- If very quiet operation is required
- Aesthetic design
- If excellent service life is required
- If cost is a factor
- If small bending radii are required



- If snap-open links are required
 - Series 047 "Zipper"
- If quick insertion of cables with preassembled connector is required
 - Series E06 E-Z Chain
- If extra rigidity is required
 - Series 06 E2 Micro

[energy chain® configurator](#) ▶

Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

3.28 ft (1 m) 045-20-038-0



Energy Chain®

1 Set 0450-20-12



Mounting Bracket

Energy Chain System® E2 Micro Series 045

Installation Dimensions

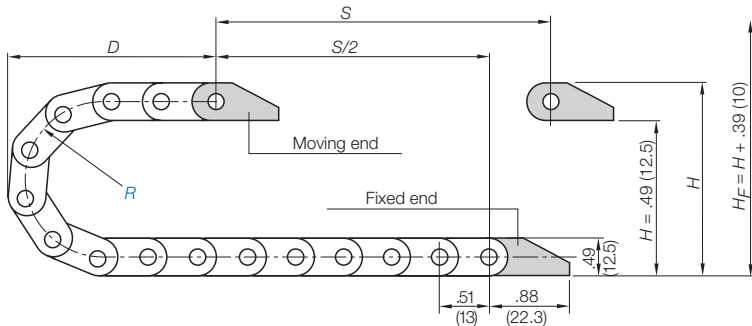
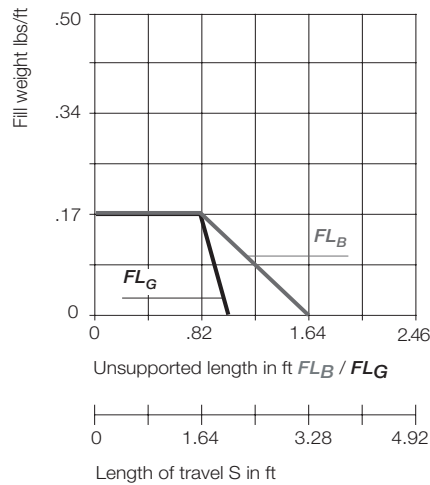
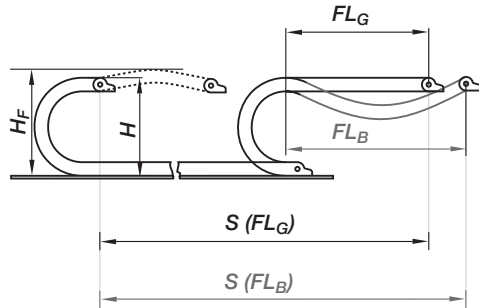
energy chain® configurator



045

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1



Pitch per link = .51" (13 mm)
 Links per ft (m) = 23.47 (77)
 For center mount applications:
 Chain length = $S/2 + K$

The required clearance height: $H_F = H + .39$ in. (10 mm) (with .13 lbs/ft (0.2 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	.71 (018)	1.10 (028)	1.50 (038)
H	1.91 (48.5)	2.70 (68.5)	3.48 (88.5)
D	1.73 (44)	2.13 (54)	2.52 (64)
K	3.35 (85)	4.53 (115)	5.91 (150)

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height

*If the mounting bracket location is set lower



PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 9.84 ft/s (3 m/s) / max. 32.8 ft/s ² (10 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120° C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

Technical Data



Details of material properties

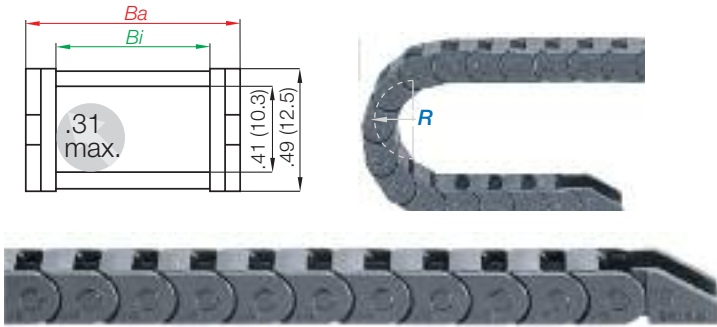
Chapter 1

igus® Energy Chain System®

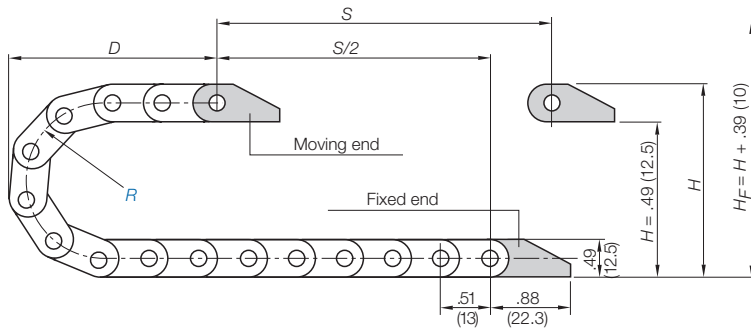
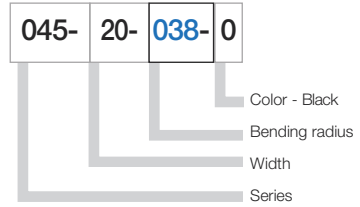
Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

Series 045 - Energy Chain® non snap-open



Part Number Structure



Supplement part number with required radius. Example: 045-20-**038**-0
Pitch: .51 in. (13 mm) per link links/ft (m) = 23.47 (77)

Part Number		<i>Bi</i> in. (mm)	<i>Ba</i> in. (mm)	Weight lbs/ft (kg/m)
045-06-	<input type="text"/> -0	.24 (6)	.47 (12)	≈ 0.060 (0.09)
045-10-	<input type="text"/> -0	.39 (10)	.63 (16)	≈ 0.067 (0.10)
045-16-	<input type="text"/> -0	.63 (16)	.87 (22)	≈ 0.074 (0.11)
045-20-	<input type="text"/> -0	.79 (20)	1.02 (26)	≈ 0.087 (0.13)
045-30-	<input type="text"/> -0	1.18 (30)	1.42 (36)	≈ 0.108 (0.16)
045-64-	<input type="text"/> -0	2.52 (64)	2.76 (70)	≈ 0.128 (0.19)

Choose from the radii below for all of the above sizes

Radius (mm) Example: 045-20-**038**-0

	018	028	038
<i>R</i>	.71 (018)	1.10 (028)	1.50 (038)
<i>H</i>	1.91 (48.5)	2.70 (68.5)	3.48 (88.5)
<i>D</i>	1.73 (44)	2.13 (54)	2.52 (64)
<i>K</i>	3.35 (85)	4.53 (115)	5.91 (150)

0=Standard color black. For other colors see Chapter 1

Energy Chain System® E2 Micro Series 045 Mounting Brackets

energy chain® configurator ▶

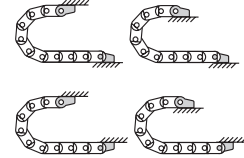
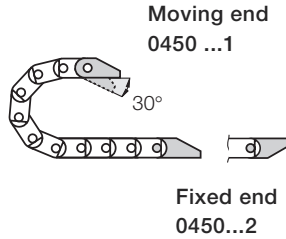


045



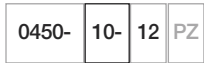
Polymer, one-piece

- One-piece mounting bracket
- Corrosion resistant
- Available preassembled
- Inner and outer attachment possible



Possible installation configurations -

Part Number Structure



- With tiewrap plates
- Complete Set
- Width
- Mounting brackets for selected chain type

Full set, for both ends:

0450-10-12-PZ

Full set, each part with pin/bore + tiewrap plate

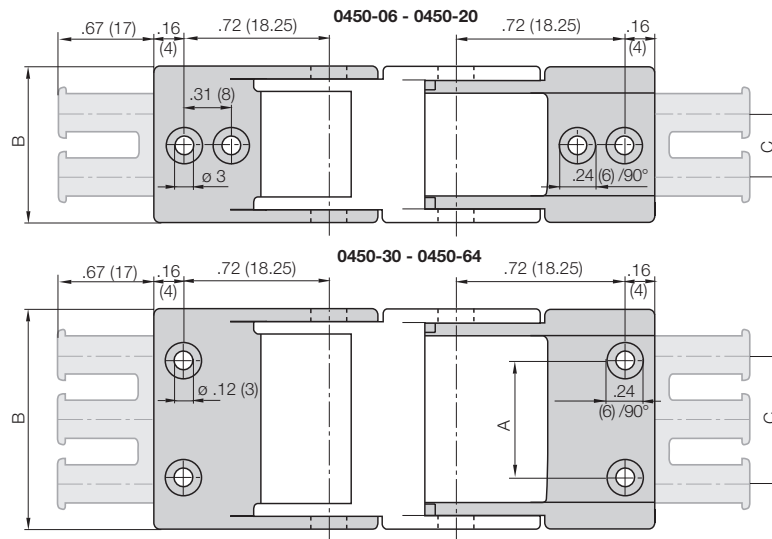
Single-part order:

0450-10-1-PZ

Mounting bracket with bore + tiewrap plate

0450-10-2-PZ

Mounting bracket with pin + tiewrap plate



Chain Type	Part No.		Dimension A in. (mm)	Dimensions B in. (mm)		Dimensions C in. (mm)		Number of Teeth
	Full set without Tiewrap Plate	Full Set with Tiewrap Plate						
045-06	0450-06-12	0450-06-12PZ	—	—	.47 (12)	—	—	1
045-10	0450-10-12	0450-10-12PZ	—	—	.63 (16)	—	—	1
045-16	0450-16-12	0450-16-12PZ	—	—	.87 (22)	.39 (10)	—	2
045-20	0450-20-12	0450-20-12PZ	—	—	1.02 (26)	.39 (10)	—	2
045-30	0450-30-12	0450-30-12PZ	.87 (22)	1.42 (36)	.79 (20)	.79 (20)	—	3
045-64	0450-64-12	0450-64-12PZ	2.20 (56)	2.76 (70)	1.97 (50)	1.97 (50)	—	6

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFG: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index


Series 05

Special Features / Options

 IPA Qualification Certificate:
Cleanroom test upon request

 ESD Classification:
Electrically conductive
ESD/ATEX version upon request

 Flammability Class
VDE 0304 IIC UL94 V2

 iF-Design Award - for E2 micro -
Series 05

Assembly Tips


Easy to assemble and disassemble

Usage Guidelines


- If lightweight construction is required
- If minimal height and width dimensions are required
- If cost is a factor



- If snap-open links are necessary
 - Series 07 "Zipper"
- If quick insertion of cables with preassembled connectors is required
 - Series E06 E-Z Chain
- If extra rigidity is required
 - Series 06 E2 Micro

Features & Benefits

- 1 Very lightweight - ideal for low inertia applications
- 2 iF-Design Award
- 3 One-piece, non snap-open Energy Chain®


[energy chain® configurator](#) ▶

Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

3.28 ft (1 m) 05-20-038-0



Energy Chain®

1 Set 050-20-12



Mounting Bracket

Energy Chain System® E2 Micro Series 05

Installation Dimensions

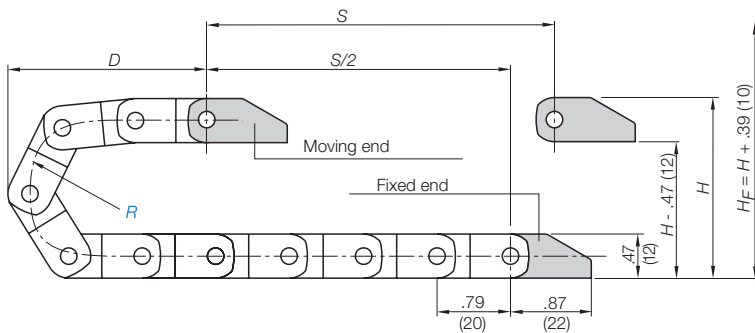
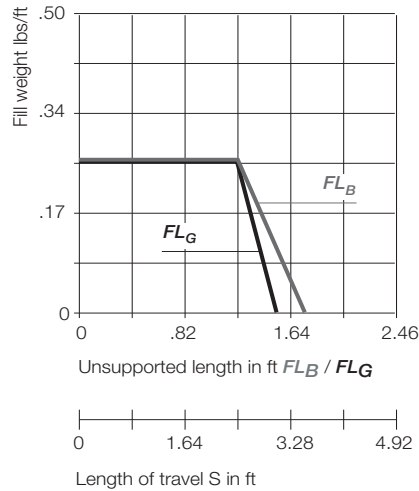
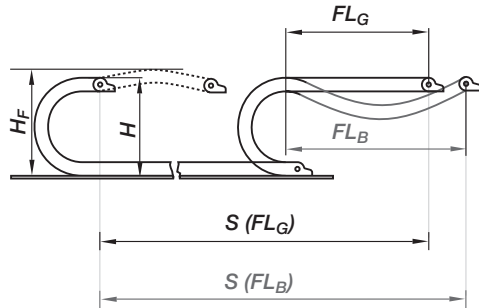
energy chain® configurator ▶



05

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



Pitch per link: = .79" (20 mm)
 Links per ft (m): = 15.24 (50)
 For center mount applications:
 Chain length = $S/2 + K$

The required clearance height: $H_F = H + .39$ in. (10 mm) (with .13 lbs/ft (0.2 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	.71 (018)	1.10 (028)	1.50 (038)
H	1.89 (48)	2.68 (68)	3.46 (88)
D	2.13 (54)	2.52 (64)	2.91 (74)
K	3.94 (100)	5.12 (130)	6.30 (160)

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height

*If the mounting bracket location is set lower



PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 9.84 ft/s (3 m/s) / max. 32.8 ft/s ² (10 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120° C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

Technical Data



Details of material properties

▶ Chapter 1

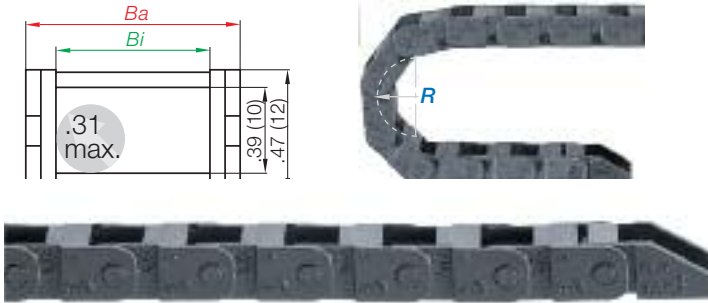
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igus® Energy Chain System®

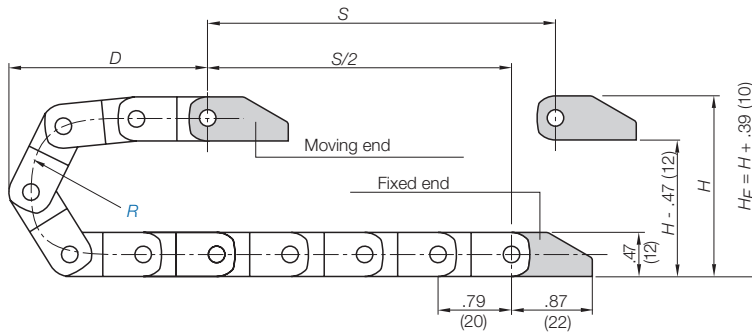
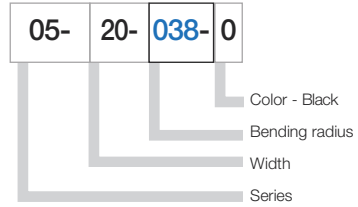
Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

Series 05 - Energy Chain® non snap-open



Part Number Structure



Supplement part number with required radius. Example: 05-20-038-0
Pitch: .79 in. (20 mm) per link links/ft (m) = 15.24 (50)

Part Number	<i>Bi</i> in. (mm)	<i>Ba</i> in. (mm)	Weight lbs/ft (kg/m)
05-06- (05-1) <input type="checkbox"/> -0	.28 (6)	.39 (10)	≈ 0.040 (0.06)
05-10- (05-2) <input type="checkbox"/> -0	.39 (10)	.55 (14)	≈ 0.047 (0.07)
05-16- (05-3) <input type="checkbox"/> -0	.63 (16)	.79 (20)	≈ 0.047 (0.07)
05-20- (05-4) <input type="checkbox"/> -0	.79 (20)	.94 (24)	≈ 0.054 (0.08)
05-30- (05-5) <input type="checkbox"/> -0	1.18 (30)	1.34 (34)	≈ 0.060 (0.09)
05-64- <input type="checkbox"/> -0	2.52 (64)	2.68 (68)	≈ 0.128 (0.19)

Choose from the radii below for all of the above sizes

Radius (mm) Example: 05-20-038-0

	018	028	038
<i>R</i>	.71 (018)	1.10 (028)	1.50 (038)
<i>H</i>	1.89 (48)	2.68 (68)	3.46 (88)
<i>D</i>	2.13 (54)	2.52 (64)	2.91 (74)
<i>K</i>	3.94 (100)	5.12 (130)	6.30 (160)

0=Standard color black. For other colors see Chapter 1

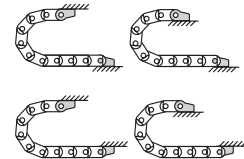
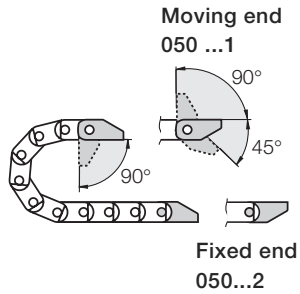
Energy Chain System® E2 Micro Series 05 Mounting Brackets

energy chain® configurator 



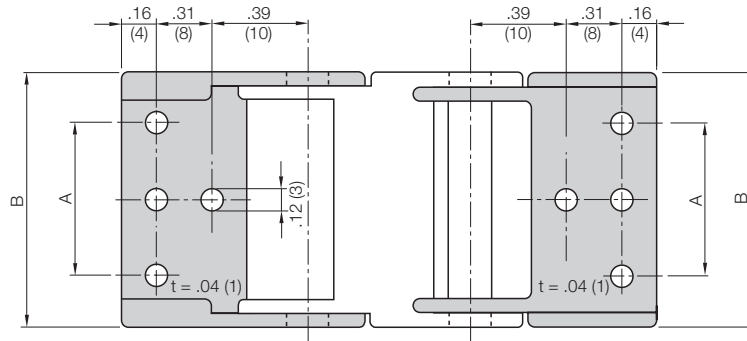
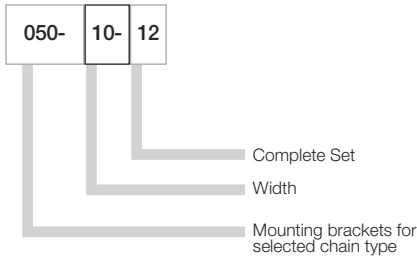
Polymer, one-piece

- One-piece mounting bracket
- Corrosion resistant
- Available preassembled
- Inner and outer attachment possible



Possible installation configurations -

Part Number Structure



Full set, for both ends:

050- [10-] [12] Full set, each part with pin/bore

Single-part order:

050- [10-] [1] Mounting bracket with bore

050- [10-] [2] Mounting bracket with pin

Chain Type	Part No.	Dimension A		Dimensions B	
		in.	(mm)	in.	(mm)
05-06 (05-1)	050-06-12	—	—	.42	(10.7)
05-10 (05-2)	050-10-12	—	—	.58	(14.7)
05-16 (05-3)	050-16-12	—	—	.81	(20.7)
05-20 (05-4)	050-20-12	—	—	.97	(24.7)
05-30 (05-5)	050-30-12	.87	(22)	1.57	(34.7)
05-64	050-64-12	2.20	(56)	2.70	(68.7)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFG: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index


Series 06

Special Features / Options

 IPA Qualification Certificate:
 Cleanroom test upon request

 ESD Classification:
 Electrically conductive
 ESD/ATEX version upon request

 Flammability Class
 VDE 0304 IIC UL94 HB

Assembly Tips


Easy to assemble and disassemble

Features & Benefits

- 1 High torsional rigidity
- 2 Very lightweight - low price
- 3 Dirt repellent exterior
- 4 Mounting bracket with integrated strain relief
- 5 Molded in separator available


Usage Guidelines


- If high torsional rigidity is required
- If cost is a factor
- If connection options are required - (Quicksnap & Quickfix)



- If snap-open links are required
 - Series 07 "Zipper"
- If quick insertion of cables with preassembled connectors is required
 - Series E06/Z06 E-Z Chain
- If very quiet operation is required
 - Series 045 E2 Micro

4.23

[energy chain® configurator](#)
Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

3.28 ft (1 m) 06-20-038-0



Energy Chain®

1 Set 060-20-12PZ



Mounting Bracket

Energy Chain System® E2 Micro Series 06

Installation Dimensions

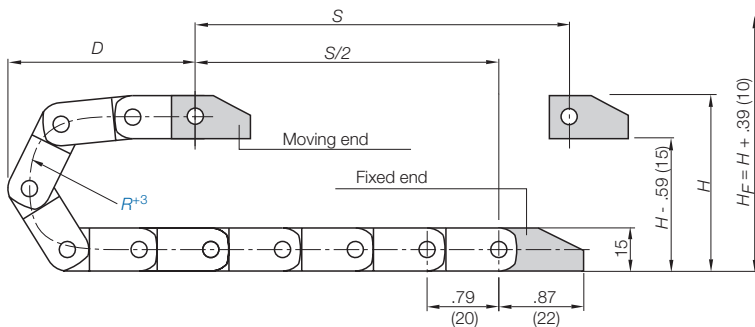
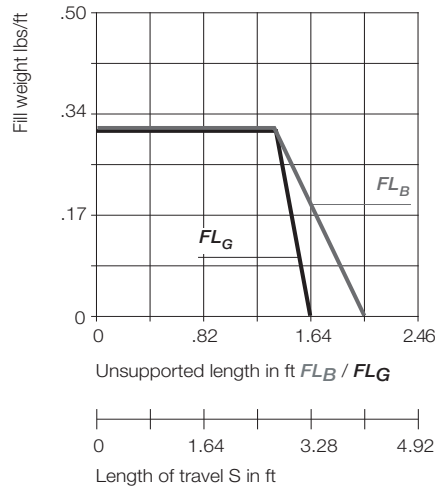
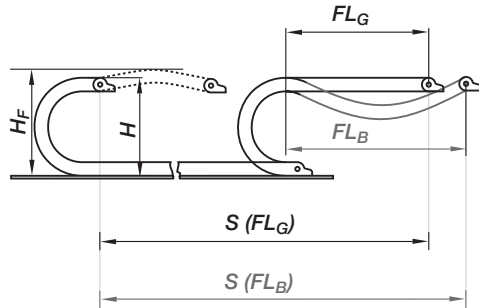
energy chain® configurator



06

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1



Pitch per link = .79" (20 mm)
 Links per ft (m) = 15.24 (50)
 For center mount applications:
 Chain length = $\frac{s}{2} + K$

The required clearance height: $H_F = H + .39$ in. (10 mm) (with .13 lbs/ft (0.2 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	.71 (018)	1.10 (028)	1.50 (038)
H*	2.01 (51)	2.80 (71)	3.58 (91)
D	2.20 (56)	2.60 (66)	2.99 (76)
K	3.94 (100)	5.12 (130)	6.30 (160)

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height

*If the mounting bracket location is set lower



PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

Technical Data



Details of material properties

Chapter 1

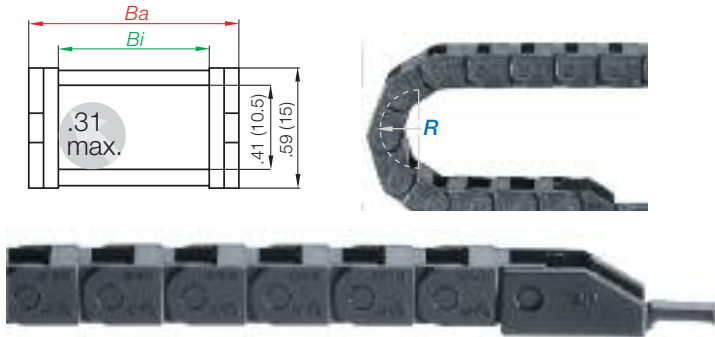
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igus® Energy Chain System®

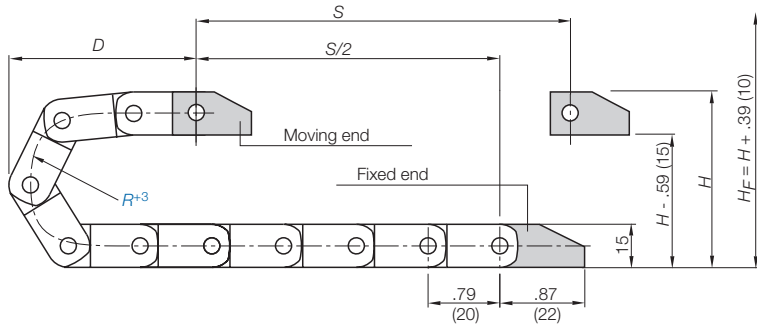
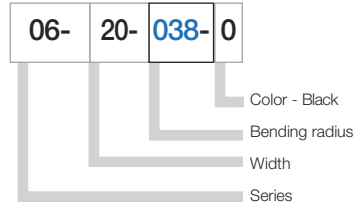
Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

Series 06 - Energy Chain® non snap-open



Part Number Structure



Supplement part number with required radius. Example: 06-20-**038**-0
Pitch: .79 in. (20 mm) per link links/ft (m) = 15.24 (50)

Part Number	<i>Bi</i> in. (mm)	<i>Ba</i> in. (mm)	Weight lbs/ft (kg/m)
06-06- <input type="text"/> -0	.28 (6)	.49 (12.5)	≈ 0.087 (0.13)
06-10- <input type="text"/> -0	.39 (10)	.65 (16.5)	≈ 0.094 (0.14)
06-16- <input type="text"/> -0	.63 (16)	.89 (22.5)	≈ 0.107 (0.16)
06-20- <input type="text"/> -0	.79 (20)	1.06 (27.0)	≈ 0.114 (0.17)
06-30- <input type="text"/> -0	1.18 (30)	1.46 (37.0)	≈ 0.134 (0.20)
06-40- <input type="text"/> -0	1.57 (40)	1.85 (47.0)	≈ 0.155 (0.23)
06-50- <input type="text"/> -0	1.97 (50)	2.24 (57.0)	≈ 0.175 (0.26)
06-64- <input type="text"/> -0	2.52 (64)	2.80 (71.0)	≈ 0.202 (0.30)

Choose from the radii below for all of the above sizes

Radius (mm) Example: 06-20-**038**-0

	018	028	038
<i>R</i>	.71 (018)	1.10 (028)	1.50 (038)
<i>H*</i>	2.01 (51)	2.80 (71)	3.58 (91)
<i>D</i>	2.20 (56)	2.60 (66)	2.99 (76)
<i>K</i>	3.94 (100)	5.12 (130)	6.30 (160)

0=Standard color black. For other colors see Chapter 1

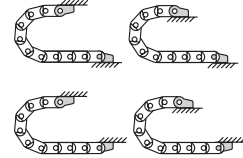
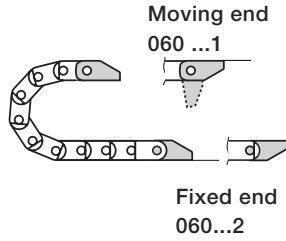
Energy Chain System® E2 Micro Series 06 Mounting Brackets

energy chain® configurator ▶



Polymer, one-piece

- One-piece mounting bracket
- Corrosion resistant
- Available preassembled
- Inner and outer attachment possible
- Available with or without strain relief tiewrap plates

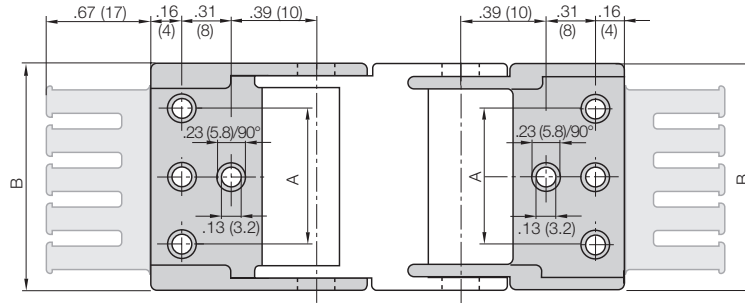


Possible installation configurations -

Part Number Structure

060-	20-	12	PZ
------	-----	----	----

- With assembled strain relief tiewrap plates
- Complete Set
- Width
- Mounting brackets for selected chain type



Full set, for both ends:

060- [20-] [12] Full set, each part with pin/bore

Single-part order:

060- [20-] [1] Mounting bracket with bore

060- [20-] [2] Mounting bracket with pin

060-06-12 - 060-20-12:

Center bores only

060-30-12 - 060-64-12:

Outer bores only

Chain Type	Part No. Full set with Tiewrap Plate	Part No. Full Set without Tiewrap Plate	Dimension A		Dimensions B		Number of Teeth
			in.	(mm)	in.	(mm)	
06-06	060-06-12PZ	060-06-12	—	—	.42	(12.5)	1
06-10	060-10-12PZ	060-10-12	—	—	.65	(16.5)	1
06-16	060-16-12PZ	060-16-12	—	—	.89	(22.5)	2
06-20	060-20-12PZ	060-20-12	—	—	1.06	(27.0)	2
06-30	060-30-12PZ	060-30-12	.87	(22)	1.46	(37.0)	3
06-40	060-40-12PZ	060-40-12	1.26	(32)	1.85	(47.0)	4
06-50	060-50-12PZ	060-50-12	1.65	(42)	2.24	(57.0)	5
06-64	060-64-12PZ	060-64-12	2.20	(56)	2.70	(71.0)	6

Additional Accessories



Quicksnap - the complete, detachable mounting unit, upon request

Part No.

060-06-QS

060-10-QS

060-16-QS

060-20-QS

060-40-QS



Quickfix - mounting bracket with dowel, upon request

Part No. 060-20-4-QZ

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index


Series 08

Special Features / Options

 IPA Qualification Certificate:
Cleanroom test upon request

 ESD Classification:
Electrically conductive
ESD/ATEX version upon request

 Flammability Class
VDE 0304 IIC UL94 HB

Assembly Tips


Easy to assemble and disassemble

Usage Guidelines


- If quiet operation is required
- If cost is a factor
- If connection options are required (Quicksnap, Quickfix, etc.)
- If high torsional rigidity is required



- If snap-open links are required
 - Series 09 "Zipper"
- If quick insertion of cables with preassembled connectors is required
 - Series E08/Z08 E-Z Chain

Features & Benefits

- 1 Small pitch for very quiet operation
- 2 High torsional rigidity
- 3 Mounting brackets with strain relief options
- 4 One-piece, non snap-open Energy Chain®
- 5 Very lightweight - low price
- 6 Dirt repellant exterior


[energy chain® configurator](#)
Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

3.28 ft (1 m) 08-30-038-0



Energy Chain®

1 Set 080-30-12PZ



Mounting Bracket

Energy Chain System® E2 Micro Series 08

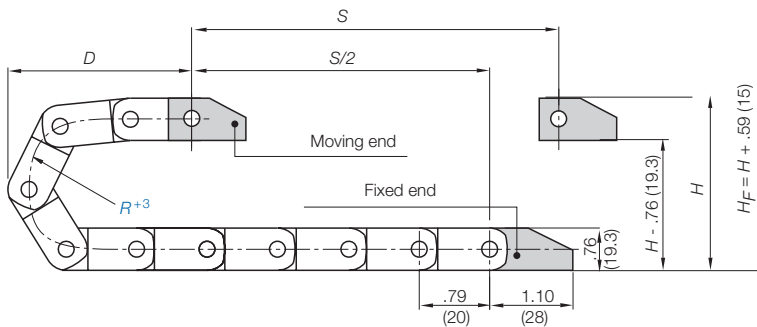
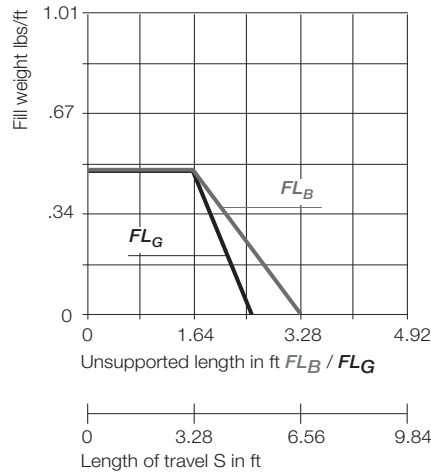
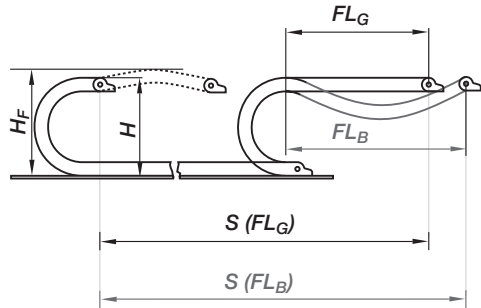
Installation Dimensions

energy chain® configurator ▶



Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



Pitch per link: = .79" (20 mm)
 Links per ft (m): = 15.24 (50)
 For center mount applications:
 Chain length = $\frac{S}{2} + K$

The required clearance height: $H_F = H + .59$ in. (15 mm) (with .20 lbs/ft (0.3 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	.98 (025*)	1.10 (028)	1.50 (038)	1.89 (048)
H	2.72 (69)	2.95 (75)	3.74 (95)	4.53 (115)
D	2.56 (65)	2.68 (68)	3.07 (78)	3.46 (88)
K	4.72 (120)	5.12 (130)	6.30 (160)	7.48 (190)

*Only for 08-10 Energy Chain®

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height

*If the mounting bracket location is set lower



PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120° C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

Technical Data



Details of material properties

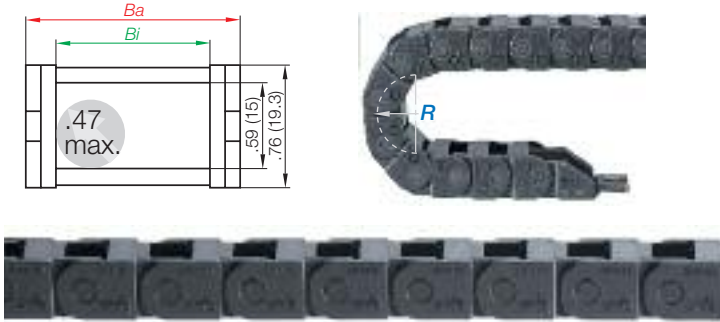
▶ Chapter 1

igus® Energy Chain System®

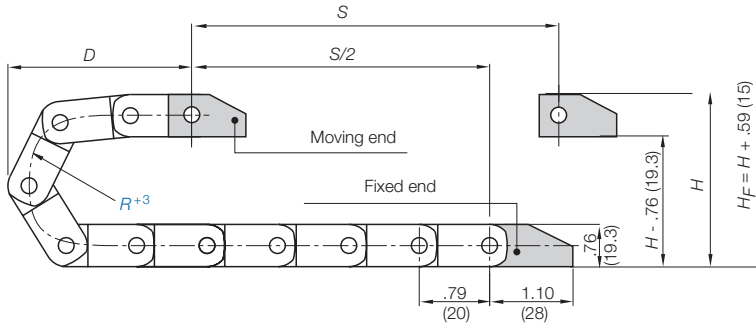
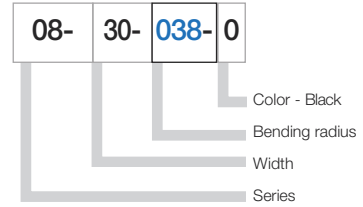
Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

Series 08 - Energy Chain® non snap-open



Part Number Structure



Supplement part number with required radius. Example: 08-20-038-0
Pitch: .79 in. (20 mm) per link links/ft (m) = 15.24 (50)

Part Number	Bi in. (mm)	Ba in. (mm)	Weight lbs/ft (kg/m)
08-10- <input type="checkbox"/> -0	.39 (10)	.72 (18.2)	≈ 0.14 (0.21)
08-16- <input type="checkbox"/> -0	.63 (16)	.95 (24.2)	≈ 0.16 (0.24)
08-20- <input type="checkbox"/> -0	.79 (20)	1.11 (28.2)	≈ 0.17 (0.25)
08-30- <input type="checkbox"/> -0	1.18 (30)	1.50 (38.2)	≈ 0.19 (0.28)
08-40- <input type="checkbox"/> -0	1.57 (40)	1.90 (48.2)	≈ 0.21 (0.31)
08-50- <input type="checkbox"/> -0	1.97 (50)	2.29 (58.2)	≈ 0.25 (0.37)

Choose from the radii below for all of the above sizes

	025*	028	038	048
Radius (mm)	.98 (025*)	1.10 (028)	1.50 (038)	1.89 (048)
R	.98 (025*)	1.10 (028)	1.50 (038)	1.89 (048)
H	2.72 (69)	2.95 (75)	3.74 (95)	4.53 (115)
D	2.56 (65)	2.68 (68)	3.07 (78)	3.46 (88)
K	4.72 (120)	5.12 (130)	6.30 (160)	7.48 (190)

*Only for 08-10 Energy Chain®
0=Standard color black. For other colors see Chapter 1

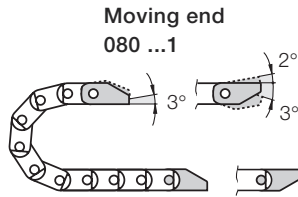
Energy Chain System® E2 Micro Series 08 Mounting Brackets - Plastic

energy chain® configurator ▶



Plastic, one-piece

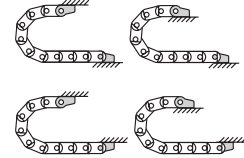
- One-piece mounting bracket
- Corrosion resistant
- Available preassembled
- Inner and outer attachment possible
- Available with or without strain relief tiewrap plates



Moving end
080 ...1



Fixed end
080...2

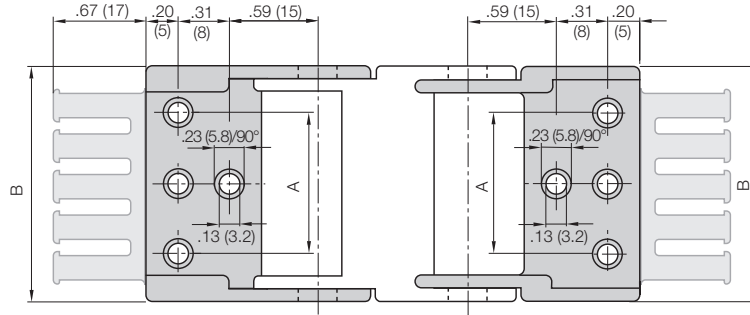


Possible installation configurations -

Part Number Structure

080- 20- 12 PZ

- With assembled strain relief tiewrap plates
- Complete Set
- Width
- Mounting brackets for selected chain type



Full set, for both ends:

080- [20- 12] Full set, each part with pin/bore

Single-part order:

080- [20- 1] Mounting bracket with bore

080- [20- 2] Mounting bracket with pin

080-10-12 - 080-20-12:

Center bores only

080-30-12 - 080-50-12:

Outer bores only

Chain Type	Part No. Full set with Tiewrap Plate	Part No. Full Set without Tiewrap Plate	Dimension A		Dimensions B		Number of Teeth
			in.	(mm)	in.	(mm)	
08-10	080-10-12PZ	080-10-12	—	—	.72	(18.2)	1
08-16	080-16-12PZ	080-16-12	—	—	.95	(24.2)	2
08-20	080-20-12PZ	080-20-12	—	—	1.11	(28.2)	2
08-30	080-30-12PZ	080-30-12	.87	(22)	1.50	(38.2)	3
08-40	080-40-12PZ	080-40-12	1.26	(32)	1.90	(48.2)	4
08-50	080-50-12PZ	080-50-12	1.65	(42)	2.29	(58.2)	5

Additional Accessories



Quicksnap - the complete, detachable mounting unit, upon request

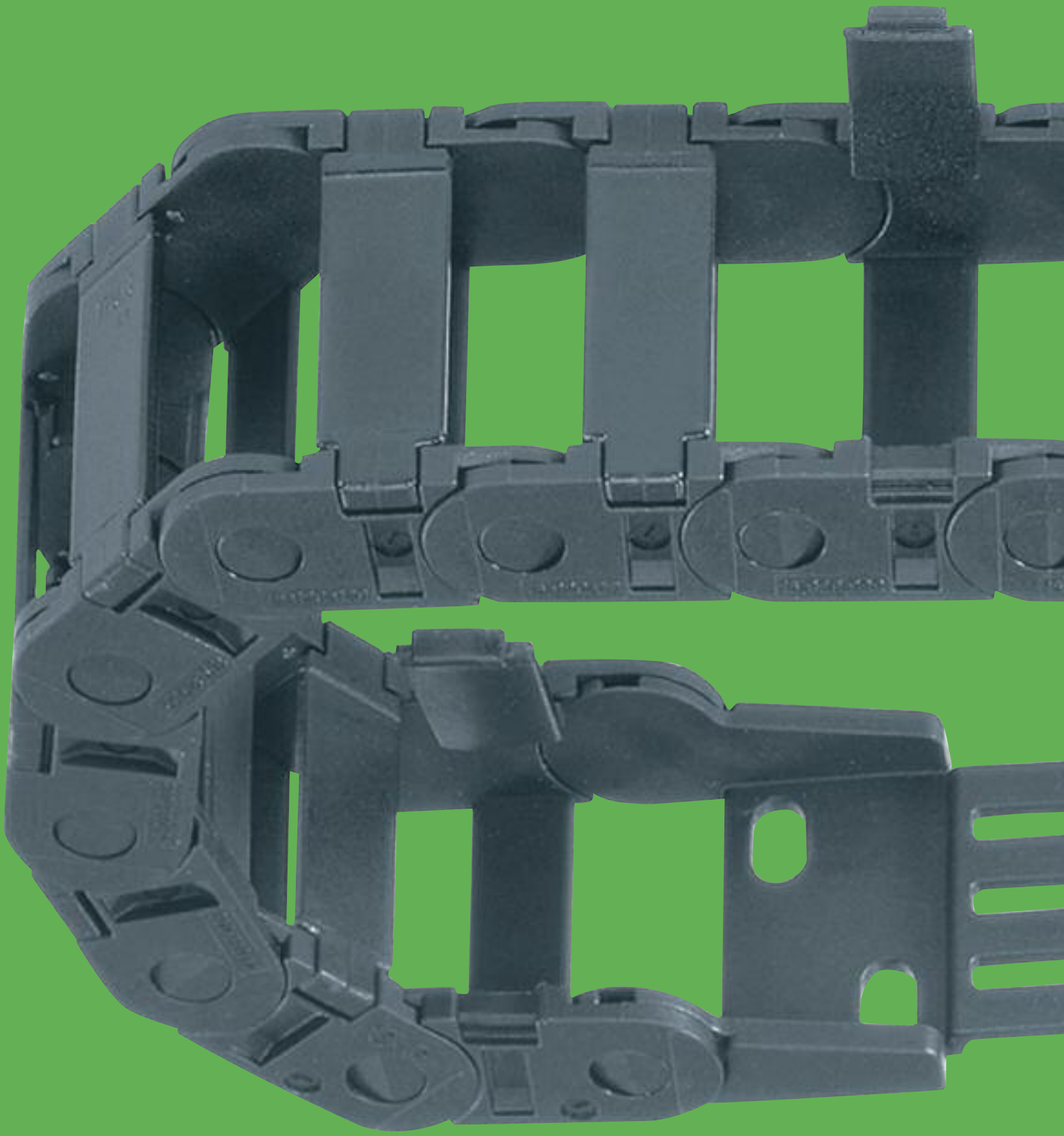
Part No.

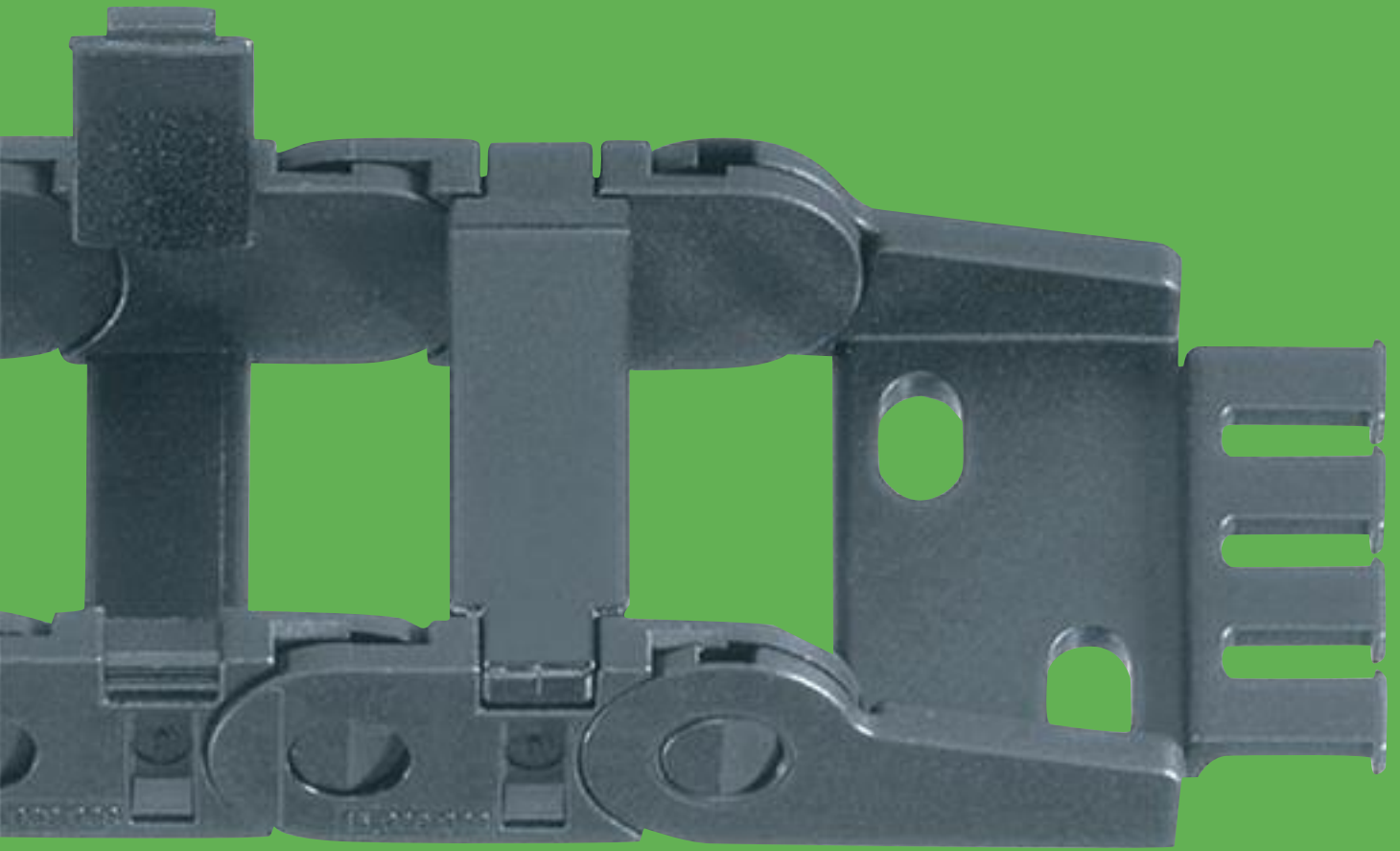
080-20-QS

080-30-QS

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS







E2 Mini

E2 mini - Small sized Energy Chains

System E2 mini is low-cost and can come equipped with interior separation to prevent cables from chaffing, twisting and corkscrewing. These Energy Chains can be used in applications with long, unsupported lengths and offer a variety of different connection options

Typical industries and applications

- Construction machinery
- Furniture
- Packaging machines
- Textile machines
- Vehicle construction
- Woodworking machines
- Glass machines
- Automation
- General machinery



Special equipment: Electrically conductive
ESD/ATEX version upon request



Cleanroom Class 1 (ISO class 3) for Series 10, tested
by the Dryden Engineering Company, California



Flammability Class
VDE 0304 IIC UL94 HB





E2 mini Energy Chain®, RBR-version with reverse bending radius



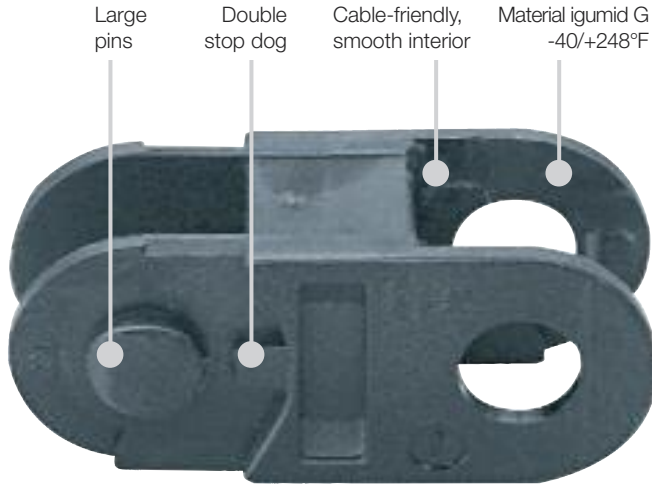
E2 mini Energy Chain® in a tooling machine, coolant resistant



Long-travel applications up to 131 ft. (40 m) are possible - here: Series 10 in textile machine

Energy Chain System® E2 Mini Selection Guide

energy chain® configurator 

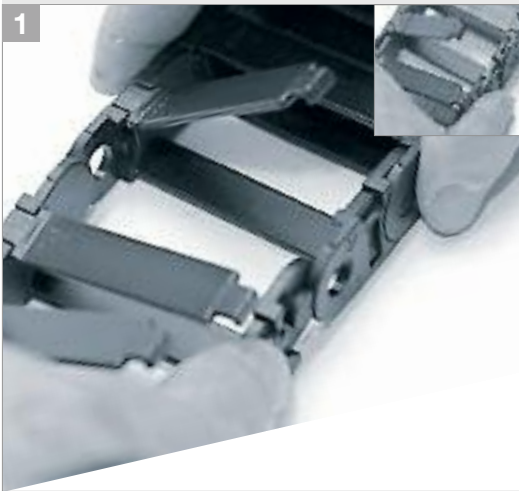


- Small pitch for smooth running
- High torsional rigidity
- Double stop dog and large pins for long service life
- Optimized relationship: weight - stability
- Large pins for long unsupported lengths
- Easy to assemble
- Various interior separation options
- You can find more technical data about the material, chemical resistance, temperatures **Design, Chapter 1**

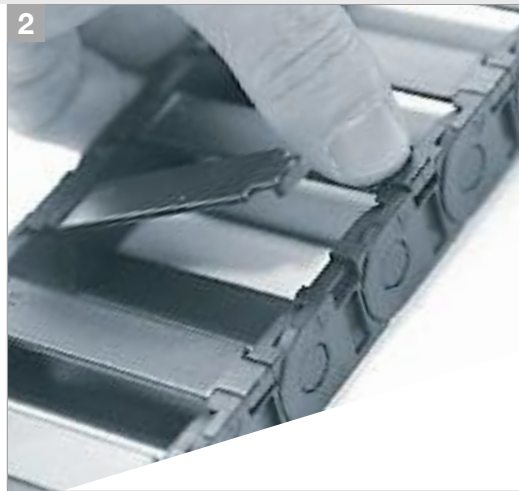
Series	Inner height <i>hi</i>		Inner width <i>Bi</i>		Outer width <i>Ba</i>		Outer height <i>ha</i>		Bending radius <i>R</i>	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
10	.71	(18)	.59-3.94	(15-100)	1.02-4.45	(26-113)	.91	(23)	1.10-7.09	(28-180)
B15/B15i	.67	(17)	.59-3.94	(15-100)	1.02-4.45	(26-113)	.91	(23)	1.50-7.09	(38-180)
B17	1.26	(32)	.59-3.94	(15-100)	1.00-4.45	(25.5-113)	1.54	(39)	1.89-4.92	(48-125)

Energy Chain System® E2 Mini Assembly Instructions

Assembling | E2 mini



Push, click and snap in pin



Push and snap crossbars

Separating | E2 micro



Lever crossbars open



Swivel crossbars



Release side link



Twist and pull apart

Price Index


Series 10

Special Features / Options


Cleanroom Class 1 (ISO class 3)


ESD Classification:
Electrically conductive
ESD/ATEX version upon request

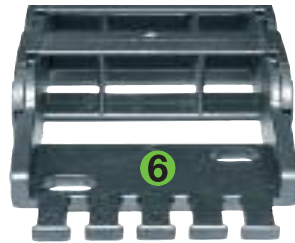
Features & Benefits

- 1 Large pins and double stop dog for superior life and long unsupported length
- 2 Dirt repellent exterior
- 3 Mounting bracket with integrated strain relief
- 4 One piece each link
- 5 Interior separation available
- 6 Molded-in separator available

Series 10-050-075-S

Assembly Tips


Easy to assemble and disassemble


Usage Guidelines


- If snap-open links are not necessary
- If a small but very stable chain is required



- If snap-open links are necessary
 - Series 15 "Zipper"
- If quick insertion of cables with preassembled connector is required
 - Series E14 E-Z Chain

Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

[energy chain® configurator](#) ▶

3.28 ft (1 m) 10-025-038-0



Energy Chain®

With 2 separators 111 assembled every 2nd link



Interior Separation

1 Set 1025-12PZ



Mounting Bracket

Energy Chain System® E2 Mini Series 10

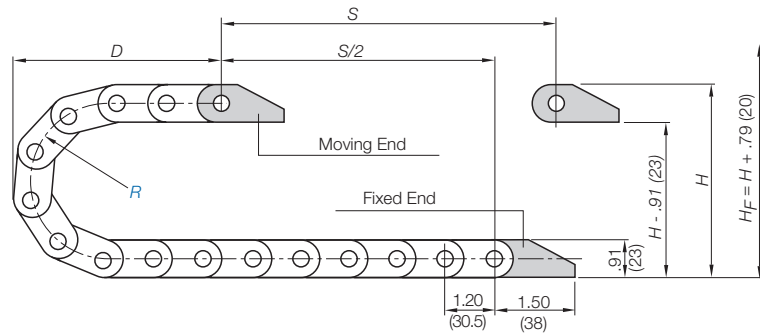
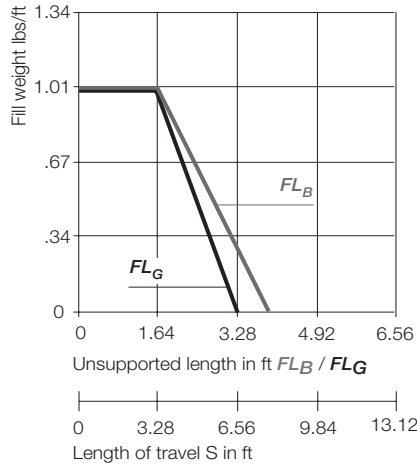
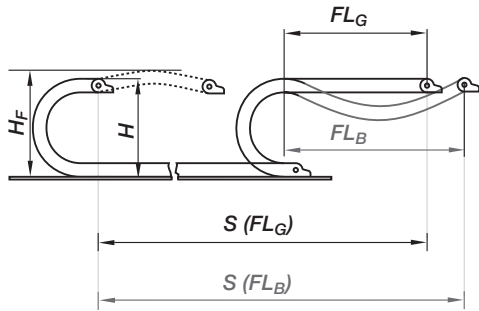
Installation Dimensions

energy chain® configurator ▶



Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



Pitch per link = 1.20" (30.5 mm)
 Links per ft (m) = 10.06 (33)
 For center mount applications:
 Chain length = $S/2 + K$

Short Travels - Unsupported

Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height

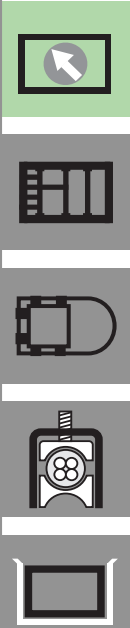
*If the mounting bracket location is set lower

The required clearance height: $H_F = H + .79$ in. (20 mm) (with 1.01 lbs/ft (1.5 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	1.10 (028)	1.50 (038)	1.89 (048)	2.95 (075)	3.94 (100)	4.33 (110)	4.92 (125)	5.71 (145)	7.09 (180)
H	3.11 (79)	3.90 (99)	4.69 (119)	6.81 (173)	8.78 (223)	9.57 (243)	10.75 (273)	12.32 (313)	15.08 (383)
D	3.35 (85)	3.74 (95)	4.3 (105)	5.20 (132)	6.18 (157)	6.57 (167)	7.16 (182)	7.95 (202)	9.33 (237)
K	5.91 (150)	7.28 (185)	8.46 (215)	11.81 (300)	14.96 (380)	16.14 (410)	17.91 (455)	20.47 (520)	24.80 (630)



PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 9.84 ft/s (3 m/s) / max. 32.8 ft/s ² (10 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120° C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

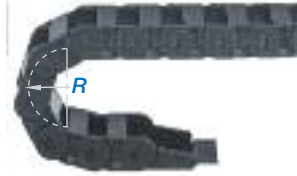
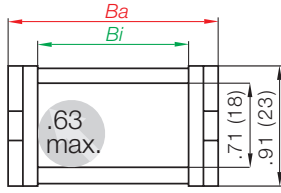
Technical Data



Details of material properties

▶ Chapter 1

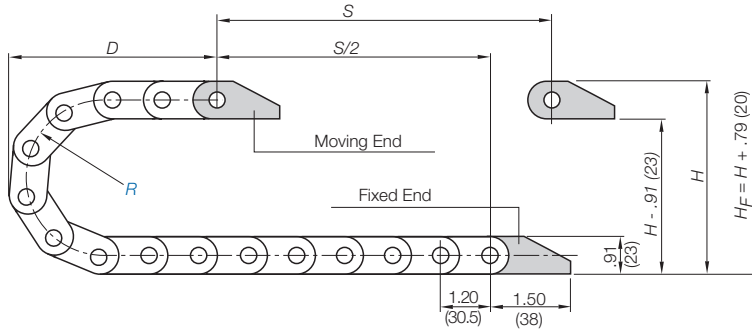
Series 10 - Energy Chain® non snap-open



Part Number Structure



- Color - Black
- Bending radius
- Width
- Series



Supplement part number with required radius. Example: 10-025-038-0
Pitch: 1.20 in. (30.5 mm) per link links/ft (m) = 10.06 (33)

Part Number	Bi in. (mm)	Ba in. (mm)	Weight lbs/ft (kg/m)
10-015- <input type="checkbox"/> -0	.59 (15)	1.02 (26)	≈ 0.24 (0.35)
10-025- <input type="checkbox"/> -0	.98 (25)	1.42 (36)	≈ 0.27 (0.40)
10-038- <input type="checkbox"/> -0	1.50 (38)	1.93 (49)	≈ 0.31 (0.46)
10-050- <input type="checkbox"/> -0	1.97 (50)	2.40 (61)	≈ 0.35 (0.52)
10-5- <input type="checkbox"/> -0	2.48 (63)	2.99 (76)	≈ 0.42 (0.63)
10-6 <input type="checkbox"/> -0	3.15 (80)	3.70 (94)	≈ 0.47 (0.70)
10-7 <input type="checkbox"/> -0	3.94 (100)	4.45 (113)	≈ 0.51 (0.76)

Choose from the radii below for all of the above sizes

Radius (mm) Example: 10-025-038-0

	028	038	048	075	100	110	125	145	180
R	1.10 (028)	1.50 (038)	1.89 (048)	2.95 (075)	3.94 (100)	4.33 (110)	4.92 (125)	5.71 (145)	7.09 (180)
H	3.11 (79)	3.90 (99)	4.69 (119)	6.81 (173)	8.78 (223)	9.57 (243)	10.75 (273)	12.32 (313)	15.08 (383)
D	3.35 (85)	3.74 (95)	4.3 (105)	5.20 (132)	6.18 (157)	6.57 (167)	7.16 (182)	7.95 (202)	9.33 (237)
K	5.91 (150)	7.28 (185)	8.46 (215)	11.81 (300)	14.96 (380)	16.14 (410)	17.91 (455)	20.47 (520)	24.80 (630)

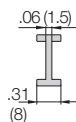
0=Standard color black. For other colors see Chapter 1

Interior Separation



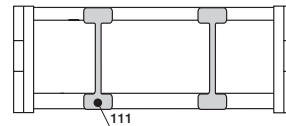
Option 1: Vertical separators

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.



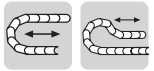
Separator

- Unassembled Part No. 101
- Assembled Part No. 111



Energy Chain System® E2 Mini Series 10 Mounting Brackets - Plastic

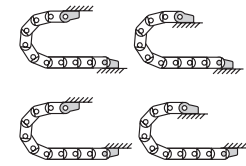
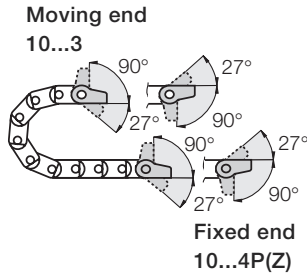
energy chain® configurator ▶



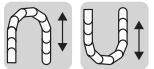
Standard

Option 1: pivoting

- Short and long travel
- Space-restricted conditions
- Corrosion resistant

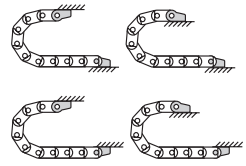
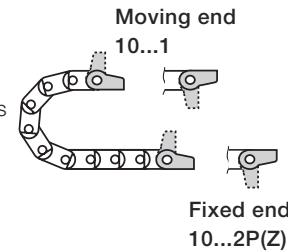


Possible installation configurations -



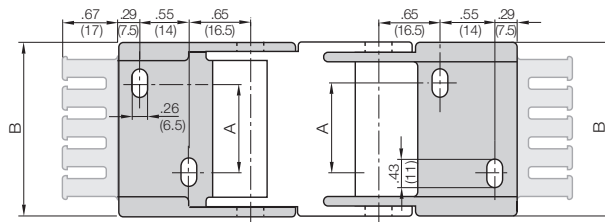
Option 2: locking

- Vertical hanging/standing travels
- Extreme accelerations
- Corrosion resistant

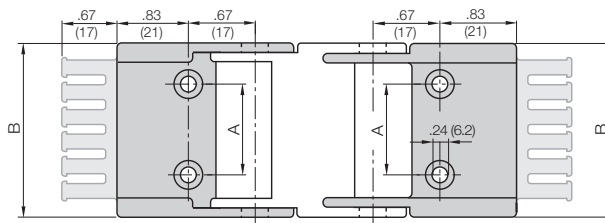


Possible installation configurations -

For Energy Chain
10-015 to 10-050

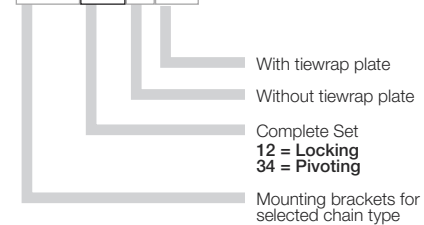


For Energy Chain
10-5 to 10-7



Part Number Structure

1025- 34- P PZ



Part number examples are shown for pivoting brackets. For locking brackets fill in the blank with **12**

Part No. Full Set (pivoting)
with Tiewrap Plate
Series 10 with 25mm inner width
1025-34PZ

Part No. Full Set (pivoting)
without Tiewrap Plate
Series 10 with 25 mm inner width
1025-34P

Full set, for both ends:
1025- 34- PZ Full set, each part
with pin/bore + tiewrap plate

Single-part order:
1025- 3- PZ Mounting bracket with bore
+ tiewrap plate
1025- 4- PZ Mounting bracket with pin
+ tiewrap plate

For Chain Type	Part No. Full set with Tiewrap Plate	Part No. Full Set without Tiewrap Plate	Dimension A in. (mm)	Dimensions B in. (mm)
10-015	1015- <input type="text"/> PZ	1015- <input type="text"/> P	— —	1.00 (25.5)
10-025	1025- <input type="text"/> PZ	1025- <input type="text"/> P	.39 (10)	1.40 (35.5)
10-038	1038- <input type="text"/> PZ	1038- <input type="text"/> P	.91 (23)	1.91 (48.5)
10-050	1050- <input type="text"/> PZ	1050- <input type="text"/> P	1.38 (35)	2.38 (60.5)
10-5	105- <input type="text"/> PZ	105- <input type="text"/> P	1.89 (48)	2.95 (75.0)
10-6	106- <input type="text"/> PZ	106- <input type="text"/> P	2.56 (65)	3.62 (92.0)
10-7	107- <input type="text"/> PZ	107- <input type="text"/> P	3.35 (85)	4.41 (112.0)

34 or **12**

For pivoting brackets choose **34**

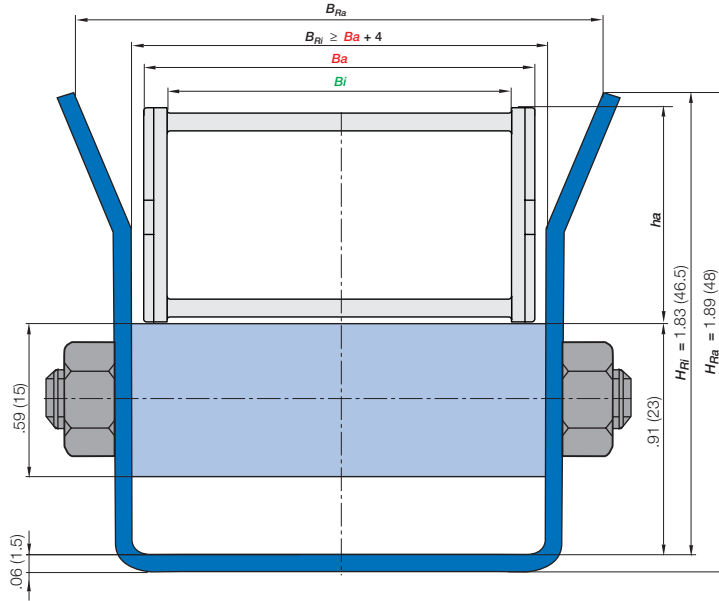
For locking brackets choose **12**

Example: 1025- **34** PZ

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



One-piece guide troughs made of steel are available for the Series 10 Energy Chains®. These guide troughs are available from stock for outer chain widths up to 2.36 in. (60 mm). For wider Energy Chains® and Tubes, special solutions are possible with short lead times. No installation sets are required for these trough sizes since the guide troughs consist of a one-piece U-profile. The joint connection with this type of guide trough is specified individually for every application.


Dimensions Guide troughs 91-10 — 91-71

For Series	Part No.	B _{Ra} in. (mm)	B _{Ri} in. (mm)	Weight lbs/ft (kg/m)
10-015				
Trough without glide bar 6.56 ft. (2m section)	91-10	1.59 (40.5)	1.18 (30)	1.01 (1.50)
Glide bar 6.56 ft. (2m section)	91-11	1.59 (40.5)	1.18 (30)	.30 (.45)
10-025				
Trough without glide bar 6.56 ft. (2m section)	91-20	1.99 (50.5)	1.57 (40)	1.11 (1.65)
Glide bar 6.56 ft. (2m section)	91-21	1.99 (50.5)	1.57 (40)	.38 (.57)
10-038				
Trough without glide bar 6.56 ft. (2m section)	91-30	2.46 (62.5)	2.05 (52)	1.21 (1.80)
Glide bar 6.56 ft. (2m section)	91-31	2.46 (62.5)	2.05 (52)	.46 (.68)
10-050				
Trough without glide bar 6.56 ft. (2m section)	91-40	2.85 (72.5)	2.44 (62)	1.28 (1.90)
Glide bar 6.56 ft. (2m section)	91-41	2.85 (72.5)	2.44 (62)	.61 (.91)
10-5				
Trough without glide bar 6.56 ft. (2m section)	91-50	3.60 (91.5)	3.19 (81)	1.52 (2.26)
Glide bar 6.56 ft. (2m section)	91-51	3.60 (91.5)	3.19 (81)	.84 (1.25)
10-6				
Trough without glide bar 6.56 ft. (2m section)	91-60	4.27 (108.5)	3.86 (98)	1.83 (2.72)
Glide bar 6.56 ft. (2m section)	91-61	4.27 (108.5)	3.86 (98)	.91 (1.35)
10-7				
Trough without glide bar 6.56 ft. (2m section)	91-70	5.06 (128.5)	4.65 (118)	2.13 (3.17)
Glide bar 6.56 ft. (2m section)	91-71	5.06 (128.5)	4.65 (118)	1.14 (1.70)

Trough material in general: St 1203 galvanized

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



B15
B15i



Energy Chain System® E2 Mini Series B15 / B15i



Price Index



Series B15 / B15i

Special Features / Options



ESD Classification:
Electrically conductive
ESD/ATEX version upon request



Flammability Class
VDE 0304 IIC UL94 HB

Assembly Tips



Easy to assemble and disassemble

Usage Guidelines



- If snap-open accessibility is required
- If a small but very stable chain is required



- If snap-open accessibility is not required
➤ **Series 10 E2 Mini**
- If torsion occurs
➤ **Series E14 E-Z Chain**

Features & Benefits

- ➊ Large pins and double stop dog for superior life and long unsupported length
- ➋ Mounting bracket with integrated strain relief
- ➌ Can be opened along the outer radius (Series B15) or along the inner radius (Series B15i), these Series can be combined
- ➍ Interior separation available
- ➎ Dirt repellent exterior



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

[energy chain® configurator](#) ▶

3.28 ft (1 m) **B15-025-038-0**

Energy Chain®

With 2 separators **154** assembled every 2nd link

Interior Separation

1 Set **1025-12PZ**

Mounting Bracket

Energy Chain System® E2 Mini Series B15 / B15i Installation Dimensions

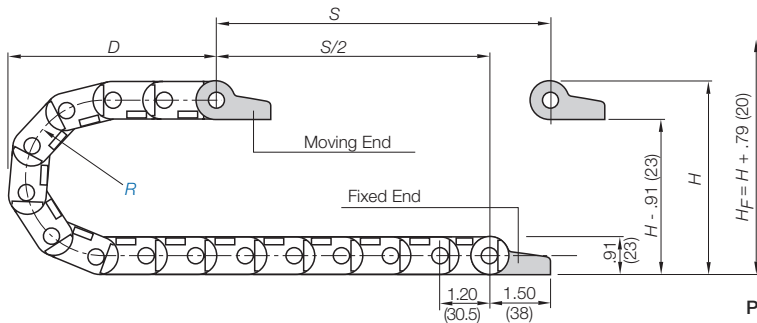
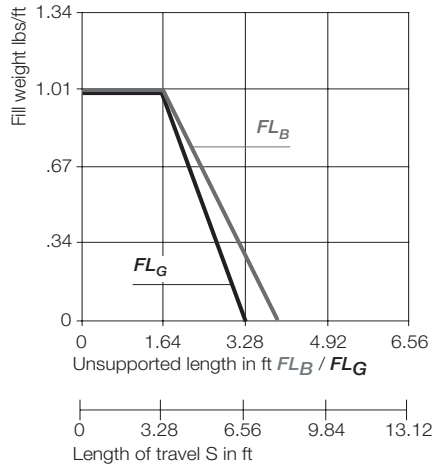
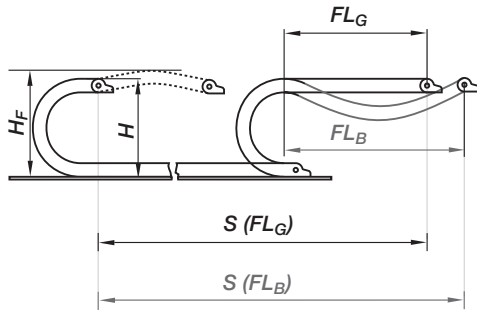
energy chain® configurator



B15
B15i

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ► Design, Chapter 1



Pitch per link: = 1.20" (30.5 mm)
Links per (m): = 10.06 (33)
For center mount applications:
Chain length = $S/2 + K$

The required clearance height: $H_F = H + .79$ in. (20 mm) (with 1.01 lbs/ft (0.5 kg/m) fill weight).
Please consult igus® if space is particularly restricted.

R	1.50 (038)	1.89 (048)	2.95 (075)	3.94 (100)	4.33 (110)	4.92 (125)	5.71 (145)	7.09 (180)
H	3.90 (99)	4.69 (119)	6.81 (173)	8.78 (223)	9.57 (243)	10.75 (273)	12.32 (313)	15.08 (383)
D	3.74 (95)	4.13 (105)	5.20 (132)	6.18 (157)	6.57 (167)	7.17 (182)	7.95 (202)	9.33 (237)
K	7.28 (185)	8.46 (215)	11.81 (300)	14.96 (380)	16.14 (410)	17.91 (455)	20.47 (520)	24.80 (630)

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height

*If the mounting bracket location is set lower



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 9.84 ft/s (3 m/s) / max. 32.8 ft/s ² (10 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120° C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

Technical Data

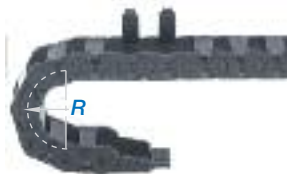
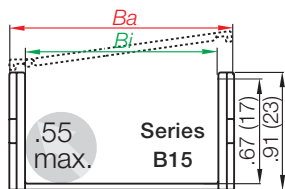


Details of material properties

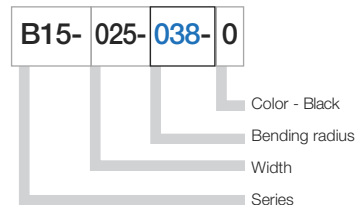
► Chapter 1

STANDARD

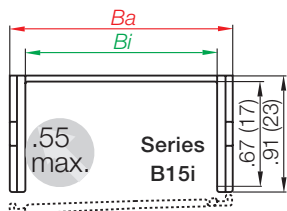
Series B15 - Snap-open along the outer radius - Standard



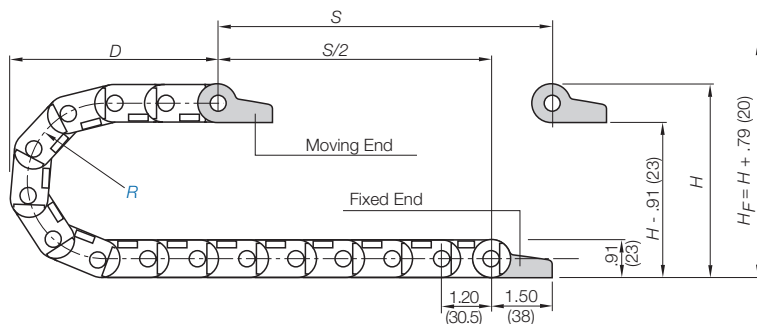
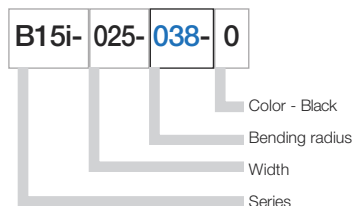
Part Number Structure



Series B15i - Snap-open along the inner radius



Part Number Structure



Supplement part number with required radius. Example: B15-025-**038**-0
Pitch: 1.20 in. (30.5 mm) per link links/ft (m) = 10.06 (33)

Part Number			<i>Bi</i>	<i>Ba</i>	Weight
Snap-open outer radius	Snap-open inner radius		in. (mm)	in. (mm)	lbs/ft (kg/m)
B15-015-	B15i-015-	<input type="text"/> -0	.59 (15)	1.02 (26)	≈ 0.24 (0.35)
B15-025-	B15i-025-	<input type="text"/> -0	.98 (25)	1.42 (36)	≈ 0.27 (0.40)
B15-038-	B15i-038-	<input type="text"/> -0	1.50 (38)	1.93 (49)	≈ 0.31 (0.46)
B15-050-	B15i-050-	<input type="text"/> -0	1.97 (50)	2.40 (61)	≈ 0.35 (0.52)
B15-5-	B15i-5-	<input type="text"/> -0	2.48 (63)	2.99 (76)	≈ 0.42 (0.63)
B15-6-	B15i-6-	<input type="text"/> -0	3.15 (80)	3.70 (94)	≈ 0.47 (0.70)
B15-7-	B15i-7-	<input type="text"/> -0	3.94 (100)	4.45 (113)	≈ 0.51 (0.76)

Choose from the radii below for all of the above sizes

Radius (mm) Example: B15-025-**038**-0

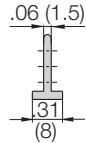
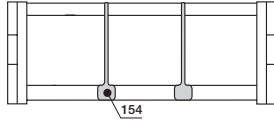
	038	048	075	100	110	125	145	180
R	1.50 (38)	1.89 (48)	2.95 (75)	3.94 (100)	4.33 (110)	4.92 (125)	5.71 (145)	7.09 (180)
H	3.90 (99)	4.69 (119)	6.81 (173)	8.78 (223)	9.57 (243)	10.75 (273)	12.32 (313)	15.08 (383)
D	3.74 (95)	4.13 (105)	5.20 (132)	6.18 (157)	6.57 (167)	7.17 (182)	7.95 (202)	9.33 (237)
K	7.28 (185)	8.46 (215)	11.81 (300)	14.96 (380)	16.14 (410)	17.91 (455)	20.47 (520)	24.80 (630)

0=Standard color black. For other colors see Chapter 1



Option 1: Vertical separators

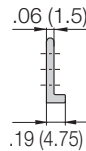
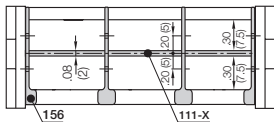
Vertical separators are used if only a vertical subdivision of the Energy Chain® interior is required. A slotted separator is used for this subdivision. This separator can also be used with full-width shelves for a continuous horizontal subdivision. By standard, vertical separators are assembled every other Energy Chain® link.



Vertical separator, slotted

Unassembled **Part No. 153**

Assembled **Part No. 154**



Side plate

Unassembled **Part No. 155**

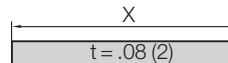
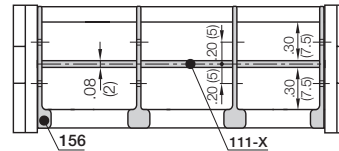
Assembled **Part No. 156**

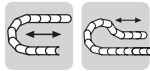


Option 2: Full-width shelf

Interior separation with continuous horizontal subdivision is practical using a large number of thin cables with similar or identical diameters.

Width X in. (mm)	Part No.	Part No.
	Unassembled	Assembled
.59 (015)	110-15	111-15
.98 (025)	110-25	111-25
1.50 (038)	110-38	111-38
1.97 (050)	110-50	111-50
2.48 (063)	110-63	111-63
3.15 (080)	110-80	111-80
3.94 (100)	110-100	111-100

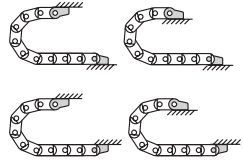
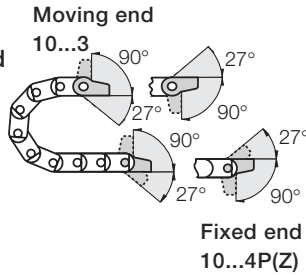




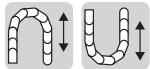
Standard

Option 1: pivoting

- Short and long travel
- Space-restricted conditions
- Corrosion resistant

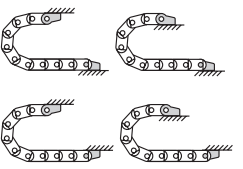
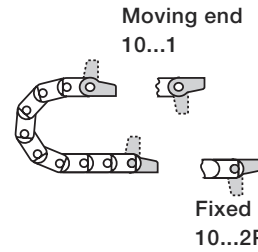


Possible installation configurations -



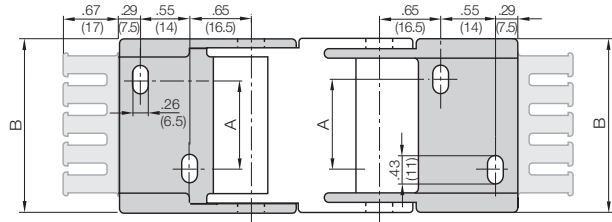
Option 2: locking

- Vertical hanging/standing travels
- Extreme accelerations
- Corrosion resistant

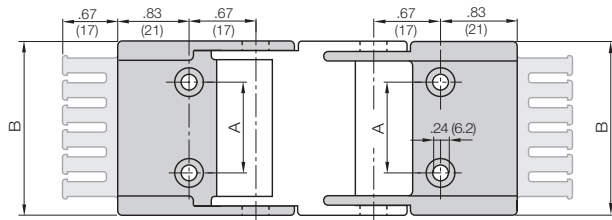


Possible installation configurations -

For Energy Chain
B15/B15i-015 to
B15/B15i-050



For Energy Chain
B15/B15i-5 to
B15/B15i-7



Part Number Structure



- With tiewrap plate
- Without tiewrap plate
- Complete Set
12 = Locking
34 = Pivoting
- Mounting brackets for selected chain type

Part number examples are shown for pivoting brackets. For locking brackets fill in the blank with **12**

Part No. Full Set (pivoting)
with Tiewrap Plate
Series B15/B15i with 25mm inner width
1025-34PZ

Part No. Full Set (pivoting)
without Tiewrap Plate
Series B15/B15i with 25 mm inner width
1025-34P

Full set, for both ends:
1025-34-PZ Full set, each part
with pin/bore + tiewrap plate

Single-part order:
1025-3-PZ Mounting bracket with bore
+ tiewrap plate
1025-4-PZ Mounting bracket with pin
+ tiewrap plate

For Chain Type	Part No. Full set with Tiewrap Plate	Part No. Full Set without Tiewrap Plate	Dimension A		Dimensions B	
			in.	(mm)	in.	(mm)
B15/B15i-015	1015- <input type="checkbox"/> PZ	1015- <input type="checkbox"/> P	—	—	1.00	(25.5)
B15/B15i-025	1025- <input type="checkbox"/> PZ	1025- <input type="checkbox"/> P	.39	(10)	1.40	(35.5)
B15/B15i-038	1038- <input type="checkbox"/> PZ	1038- <input type="checkbox"/> P	.91	(23)	1.91	(48.5)
B15/B15i-050	1050- <input type="checkbox"/> PZ	1050- <input type="checkbox"/> P	1.38	(35)	2.38	(60.5)
B15/B15i-5	105- <input type="checkbox"/> PZ	105- <input type="checkbox"/> P	1.89	(48)	2.95	(75.0)
B15/B15i-6	106- <input type="checkbox"/> PZ	106- <input type="checkbox"/> P	2.56	(65)	3.62	(92.0)
B15/B15i-7	107- <input type="checkbox"/> PZ	107- <input type="checkbox"/> P	3.35	(85)	4.41	(112.0)

For pivoting brackets choose **34**
For locking brackets choose **12**
Example: 1025- PZ

Energy Chain System® E2 Mini

Series B15 / B15i

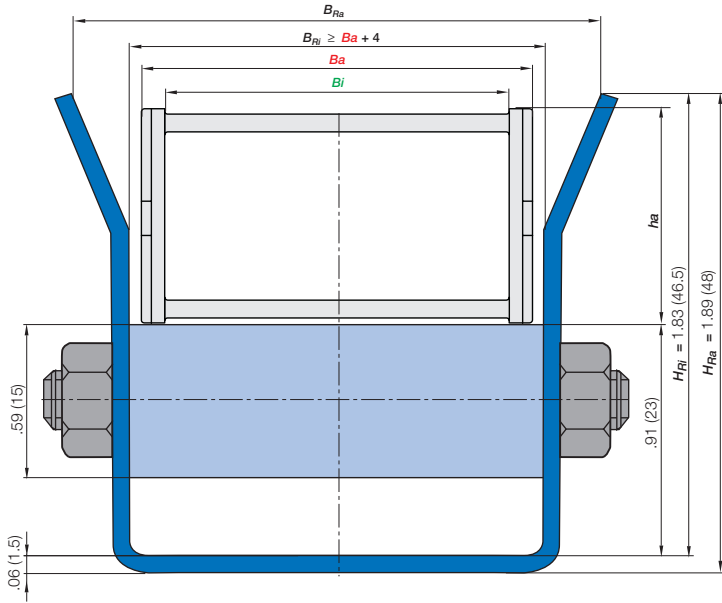
Guide Trough

energy chain® configurator 



B15
B15i

One-piece guide troughs made of steel are available for the Series B15 Energy Chains®. These guide troughs are available from stock for outer chain widths up to 2.36 in. (60 mm). For wider Energy Chains® and Tubes, special solutions are possible with short lead times. No installation sets are required for these trough sizes since the guide troughs consist of a one-piece U-profile. The joint connection with this type of guide trough is specified individually for every application.



Dimensions Guide troughs 91-10 — 91-71

For Series	Part No.	B_{Ra}		B_{Ri}		Weight	
		in.	(mm)	in.	(mm)	lbs/ft	(kg/m)
B15-015							
Trough without glide bar 6.56 ft. (2m section)	91-10	1.59	(40.5)	1.18	(30)	1.01	(1.50)
Glide bar 6.56 ft. (2m section)	91-11	1.59	(40.5)	1.18	(30)	.30	(.45)
B15-025							
Trough without glide bar 6.56 ft. (2m section)	91-20	1.99	(50.5)	1.57	(40)	1.11	(1.65)
Glide bar 6.56 ft. (2m section)	91-21	1.99	(50.5)	1.57	(40)	.38	(.57)
B15-038							
Trough without glide bar 6.56 ft. (2m section)	91-30	2.46	(62.5)	2.05	(52)	1.21	(1.80)
Glide bar 6.56 ft. (2m section)	91-31	2.46	(62.5)	2.05	(52)	.46	(.68)
B15-050							
Trough without glide bar 6.56 ft. (2m section)	91-40	2.85	(72.5)	2.44	(62)	1.28	(1.90)
Glide bar 6.56 ft. (2m section)	91-41	2.85	(72.5)	2.44	(62)	.61	(.91)
B15-5							
Trough without glide bar 6.56 ft. (2m section)	91-50	3.60	(91.5)	3.19	(81)	1.52	(2.26)
Glide bar 6.56 ft. (2m section)	91-51	3.60	(91.5)	3.19	(81)	.84	(1.25)
B15-6							
Trough without glide bar 6.56 ft. (2m section)	91-60	4.27	(108.5)	3.86	(98)	1.83	(2.72)
Glide bar 6.56 ft. (2m section)	91-61	4.27	(108.5)	3.86	(98)	.91	(1.35)
B15-7							
Trough without glide bar 6.56 ft. (2m section)	91-70	5.06	(128.5)	4.65	(118)	2.13	(3.17)
Glide bar 6.56 ft. (2m section)	91-71	5.06	(128.5)	4.65	(118)	1.14	(1.70)

Trough material in general: St 1203 galvanized

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Price Index


Series B17

Special Features / Options


Special Equipment:
Electrically conductive
ESD/ATEX version upon request



Flammability Class
VDE 0304 IIC UL94 HB

Assembly Tips


Easy to assemble and disassemble

Usage Guidelines


- If snap-open accessibility is required
- If a rather small chain with a broad inner width is required



- If quick opening of the links is required
➤ **Series 17 Zipper**
- If quick insertion of cables with preassembled connectors is required
➤ **Series E16 E-Z Chain**

Features & Benefits

- 1 Dirt-repellent exterior
- 2 Small pitch for very quiet operation
- 3 Small Energy Chain® with large inner height
- 4 Snap-open with film-hinge along the outer radius
- 5 Mounting bracket with integrated strain relief
- 6 Interior separation available


Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

[energy chain® configurator](#) ▶
3.28 ft (1 m) **B17-1-063-0**
Energy Chain®
With 2 separators **172** assembled every 2nd link
 Interior Separation
1 Set **117-1-12PZ**
Mounting Bracket

Energy Chain System® E2 Mini Series B17

Installation Dimensions

Short travel, unsupported length

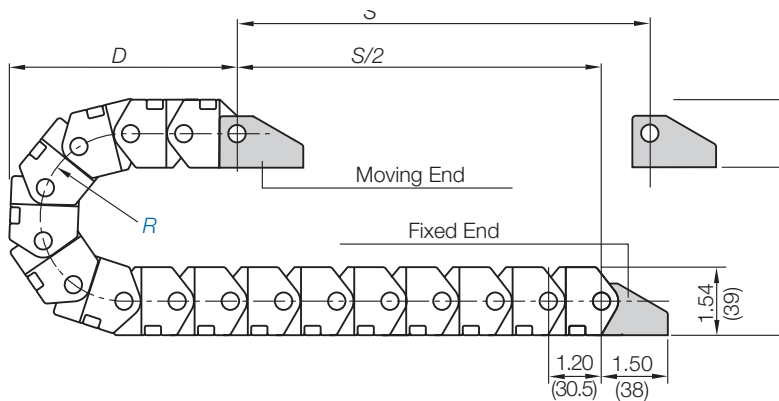
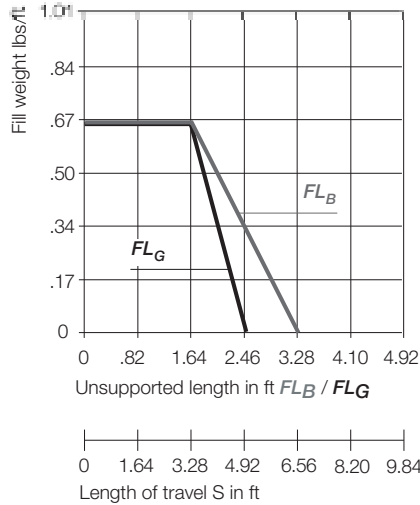
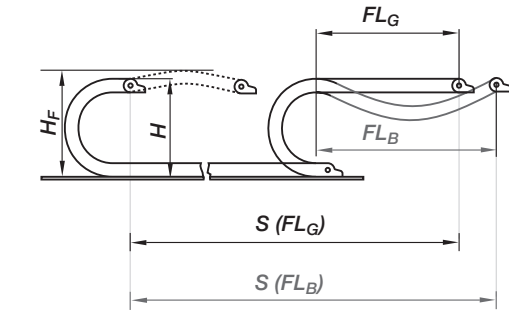
- FL_B = unsupported with permitted sag
- FL_G = unsupported with straight upper run

Further information ► Design, Chapter 1

energy chain® configurator ►



B17



Pitch per link: = 1.20" (30.5 mm)
 Links per ft (m): = 10.06 (33)
 For center mount applications:
 Chain length = $S/2 + K$

The required clearance height: $H_f = H + .98$ in. (25 mm) (with 1.01 lbs/ft (1.5 kg/m) fill weight).
 Please consult igus® if space is particularly restricted.

R	1.89 (048)	2.48 (063)	2.95 (075)	3.94 (100)	4.92 (125)
H	5.31 (135)	6.50 (165)	7.44 (189)	9.41 (239)	11.38 (289)
D	4.45 (113)	5.04 (128)	5.51 (140)	6.50 (165)	7.48 (190)
K	8.46 (215)	10.24 (260)	11.81 (300)	14.96 (380)	17.91 (455)

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_f = Required clearance height

*If the mounting bracket location is set lower



PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 9.84 ft/s (3 m/s) / max. 32.8 ft/s ² (10 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120° C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

Technical Data



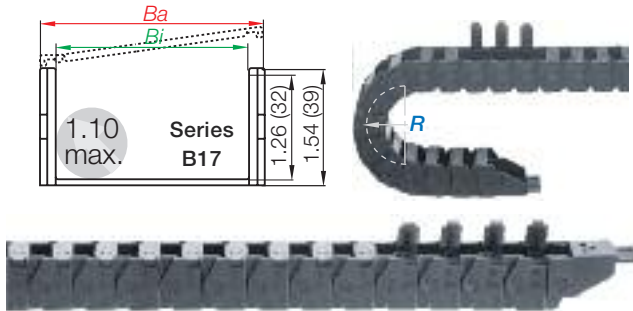
Details of material properties

► Chapter 1



STANDARD

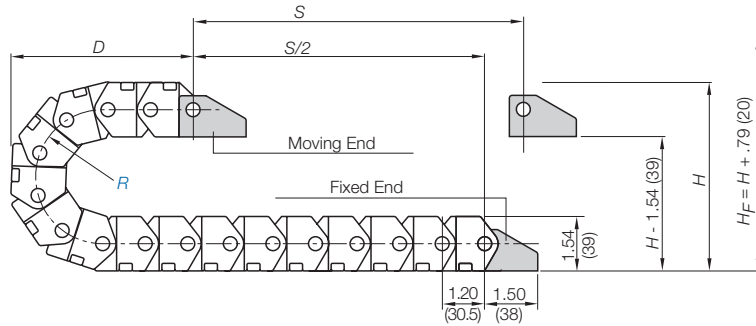
Series B17 - Snap-open along the outer radius - Standard



Part Number Structure

B17- 1- 063- 0

- Color - Black
- Bending radius
- Width
- Series



Supplement part number with required radius. Example: B17-1--0
Pitch: 1.20 in. (30.5 mm) per link links/ft (m) = 10.06 (33)

Part Number	<i>Bi</i> in. (mm)	<i>Ba</i> in. (mm)	Weight lbs/ft (kg/m)
B17-1- <input type="text" value=""/> -0	.59 (15)	1.02 (26)	≈ 0.35 (0.52)
B17-2- <input type="text" value=""/> -0	.98 (25)	1.42 (36)	≈ 0.40 (0.59)
B17-3- <input type="text" value=""/> -0	1.50 (38)	1.93 (49)	≈ 0.44 (0.65)
B17-4- <input type="text" value=""/> -0	1.97 (50)	2.40 (61)	≈ 0.47 (0.70)
B17-5- <input type="text" value=""/> -0	2.48 (63)	2.99 (76)	≈ 0.56 (0.83)
B17-6- <input type="text" value=""/> -0	3.15 (80)	3.66 (93)	≈ 0.62 (0.92)
B17-7- <input type="text" value=""/> -0	3.94 (100)	4.45 (113)	≈ 0.71 (1.06)

Choose from the radii below for all of the above sizes

Radius (mm) Example: B17-1--0

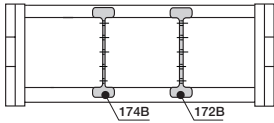
	<input type="text" value="048**"/>	<input type="text" value="063"/>	<input type="text" value="075"/>	<input type="text" value="100"/>	<input type="text" value="125"/>
R	1.89 (048)	2.48 (063)	2.95 (075)	3.94 (100)	4.92 (125)
H	5.31 (135)	6.50 (165)	7.44 (189)	9.41 (239)	11.38 (289)
D	4.45 (113)	5.04 (128)	5.51 (140)	6.50 (165)	7.48 (190)
K	8.46 (215)	10.24 (260)	11.81 (300)	14.96 (380)	17.91 (455)

** Radius 048 is not available for the B17-5 or B17-7
0=Standard color black. For other colors see Chapter 1

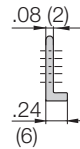


Option 1: Vertical separators

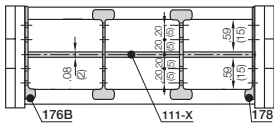
Vertical separators are used if only a vertical subdivision of the Energy Chain® interior is required. A slotted separator is used for this subdivision. This separator can also be used with full-width shelves for a continuous horizontal subdivision. By standard, vertical separators are assembled every other Energy Chain® link.



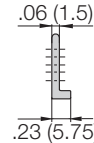
	Vertical Separator for B17-1 to B17-4
	Unassembled Part No. 171B Assembled Part No. 172B



	Side Plate for B17-1 to B17-4
	Unassembled Part No. 175B Assembled Part No. 176B



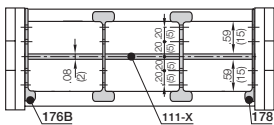
	Vertical Separator for B17-5 to B17-7
	Unassembled Part No. 173B Assembled Part No. 174B



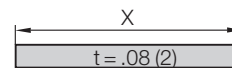
	Side plate for B17-5 to B17-7
	Unassembled Part No. 177 Assembled Part No. 178

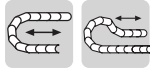
Option 2: Full-width shelf

Full-width shelves are used with applications involving numerous thin cables with similar or identical diameters. This shelf slides into place through the slotted vertical separator and spans the entire width of the chain



Width X in. (mm)	Part No. Unassembled	Part No. Assembled
.59 (015)	110-15	111-15
.98 (025)	110-25	111-25
1.50 (038)	110-38	111-38
1.97 (050)	110-50	111-50
2.48 (063)	110-63	111-63
3.15 (080)	110-80	111-80
3.94 (100)	110-100	111-100



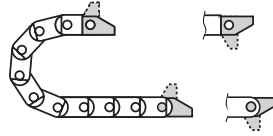


Standard

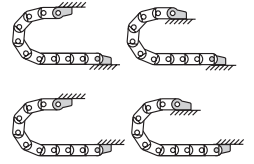
Option: locking

- One-piece mounting bracket
- Corrosion resistant
- Available pre-assembled
- Inner and outer attachment possible
- With or without strain relief tiwrap plates

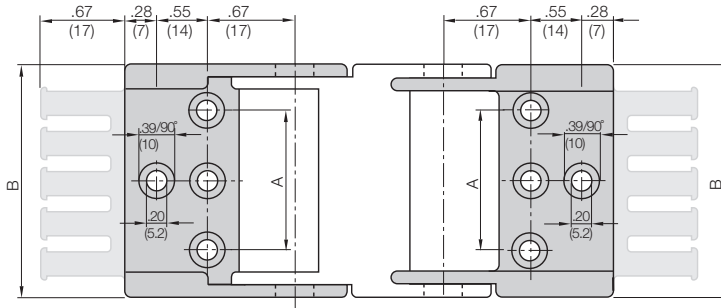
Moving end with bore
117...1P(Z)



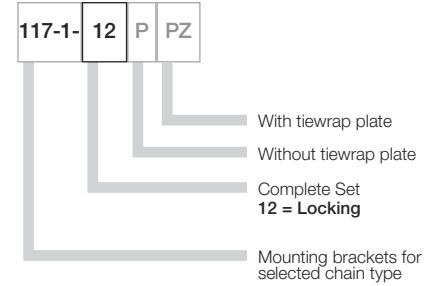
Fixed end with pin
117...2P(Z)



Possible installation configurations -



Part Number Structure



Full set, for both ends:

117-1-12-PZ Full set, each part with pin/bore + tiwrap plate

Single-part order:

117-1-1-PZ Mounting bracket with bore + tiwrap plate

117-1-2-PZ Mounting bracket with pin + tiwrap plate

For Chain Type	Part No. Full set with Tiwrap Plate	Part No. Full Set without Tiwrap Plate	Number of Teeth	Dimension A in. (mm)	Dimensions B in. (mm)
B17-1	117-1-12PZ	117-1-12P	2	— —	1.00 (25.5)
B17-2	117-2-12PZ	117-2-12P	3	.47 (12)	1.40 (35.5)
B17-3	117-3-12PZ	117-3-12P	4	.98 (25)	1.91 (48.5)
B17-4	117-4-12PZ	117-4-12P	5	1.46 (37)	2.38 (60.5)
B17-5	117-5-12PZ	117-5-12P	6	1.89 (48)	2.99 (76.0)
B17-6	117-6-12PZ	117-6-12P	8	2.56 (65)	3.66 (93.0)
B17-7	117-7-12PZ	117-7-12P	10	3.35 (85)	4.45 (113.0)

117-1-P(Z): Center bores only

117-2-12P(Z) - 117-7-P(Z): Outer bores only

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS







E2

Medium

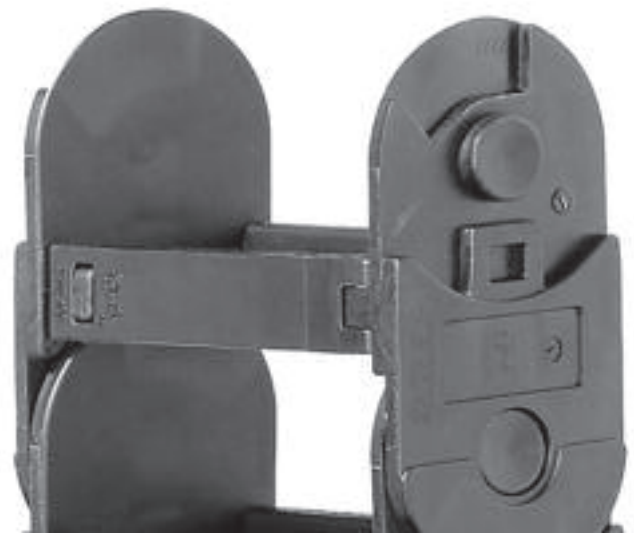
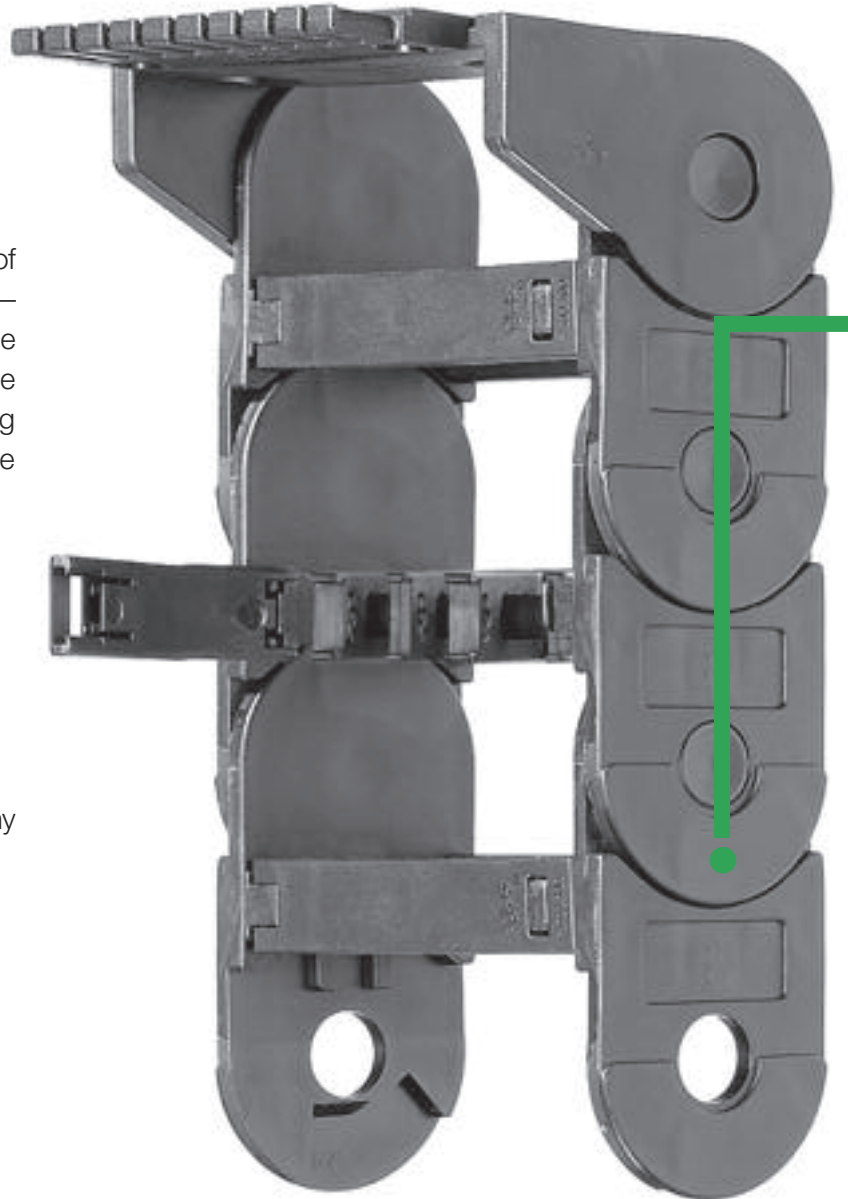
E2 Medium - Energy Chains® with 2 part link design for a wide range of applications

E2 Medium - the standard

The E2 Medium Series is the largest of the E2 family of Energy Chains® — features snap-open crossbars along the entire length of the carrier for easy cable access. It is suitable for gliding applications and delivers a long service life.

Typical industries and applications

- Material handling
- Construction machinery
- Woodworking machines
- Glass machines
- Plastic machines
- Long travel applications in many industries
- Semiconductor
- Theatrical and entertainment and amusement parks
- Vehicles
- General machinery
- And many more





Series 350 Energy Chain®, steel guide trough and Chainflex cables used in a shelf conveyor application

Selection Guide

E2/000

Series	Inner height <i>hi</i>		Inner width <i>Bi</i>		Outer width <i>Ba</i>		Outer height <i>ha</i>		Bending radius <i>R</i>	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
1400/1500	.83	(21)	.59-4.92	(15-125)	1.12-5.45	(28.5-138.5)	1.10	(28)	1.38-7.09	(35-180)
1450	.83	(21)	.59-4.92	(15-125)	1.12-5.45	(28.5-138.5)	1.10	(28)	2.95-7.09	(75-180)

E2 Medium

Series	Inner height <i>hi</i>		Inner width <i>Bi</i>		Outer width <i>Ba</i>		Outer height <i>ha</i>		Bending radius <i>R</i>	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
200	.98	(25)	.98-4.92	(25-125)	1.61-5.55	(41-141)	1.38	(35)	2.16-9.84	(55-250)
240	.98	(25)	.98-4.92	(25-125)	1.61-5.55	(41-141)	1.38	(35)	2.16-9.84	(55-250)
250	.98	(25)	.98-4.92	(25-125)	1.61-5.55	(41-141)	1.38	(35)	2.16-9.84	(55-250)
26	1.38	(35)	1.97-7.87	(50-200)	2.60-8.62	(66-219)	1.97	(50)	2.48-9.84	(63-250)
27	1.38	(35)	1.97-7.87	(50-200)	2.60-8.62	(66-219)	1.97	(50)	2.48-9.84	(63-250)
27i	1.38	(35)	1.97-7.87	(50-200)	2.60-8.62	(66-219)	1.97	(50)	2.48-9.84	(63-250)
340	1.77	(45)	1.97-9.84	(50-250)	2.76-10.63	(70-270)	2.64	(67)	2.95-11.81	(75-300)
350	1.77	(45)	1.97-9.84	(50-250)	2.76-10.63	(70-270)	2.64	(67)	2.95-11.81	(75-300)

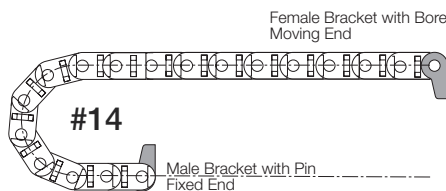
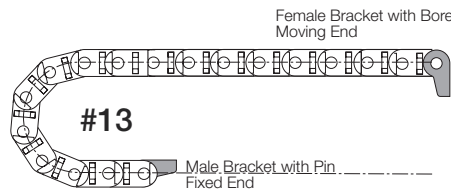
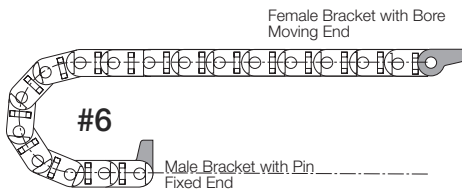
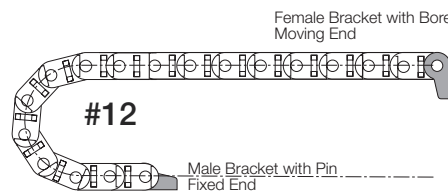
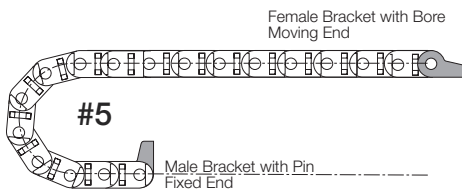
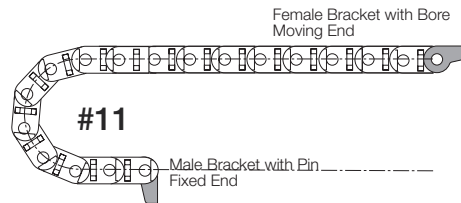
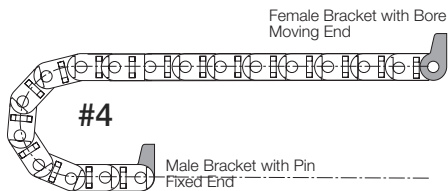
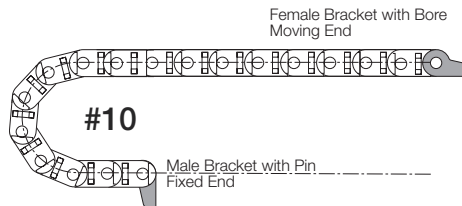
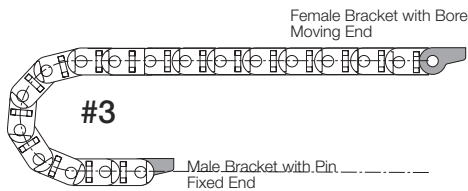
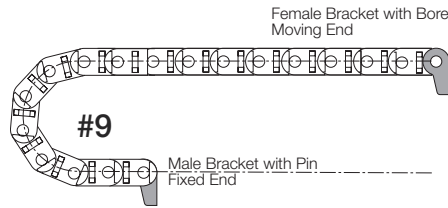
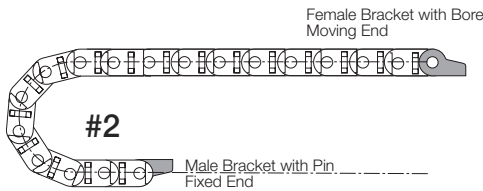
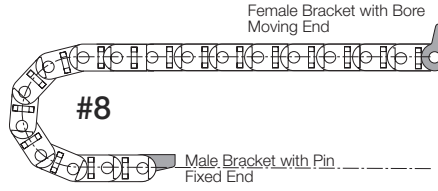
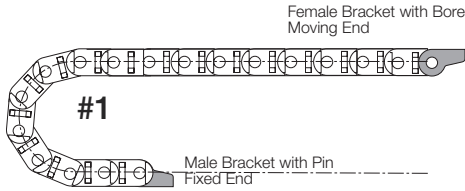
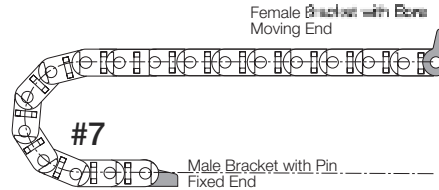
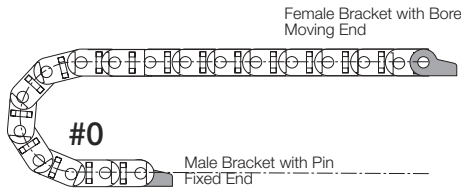
energy chain® configurator 

Energy Chain System® E2 Medium Bracket Configurations

energy chain® configurator 

- Not all configurations apply to all mounting brackets.

Please refer to bracket specifications pages of each individual series.



Energy Chain System® E2 Medium Assembly Instructions

Energy Chains® - Assembling Series 200/240/250



1
Joining chain sections: push sections together; angle one side until pin snaps into bore; repeat on other side



2
To open crossbars: press screwdriver into tab on top of link, lever screwdriver until crossbar opens



3
Repeat Step 1 on other side



4
To close crossbars: push down on crossbar with thumb until it snaps into place

Energy Chains® - Separating



1
Separating chain sections: insert screwdriver between two links. Twist until pin disengages from bore; pull sections apart

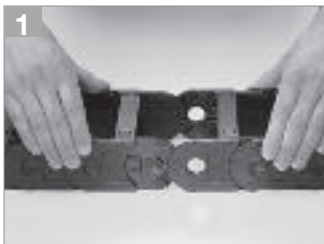


1
Attaching mounting brackets: snap bracket into link (see Step 4 - "Joining chain sections")



2
Snap tie-wrap plate into bottom groove of the mounting bracket

Energy Chains® - Assembling Series 26/27/27i and Series 340/350



1
4. Joining chain sections: push sections together; angle one side until pin snaps into bore; repeat on other side



2
2. Repeat Step 1 on other side



3
2. Repeat Step 1 on other side



4
3. To close crossbars: push down on crossbar with thumb until it snaps into place

Assembling continued



5
5. Separating chain sections: insert screwdriver between two links



6
6. Twist until pin disengages from bore; pull sections apart



7
7. Attaching mounting brackets: snap bracket into link (see Step 4 - "Joining chain sections")



8
8. Snap tie-wrap plate into bottom groove of the mounting bracket

Energy Chains® and Energy Tubes - Separating

1400
1450
1500



Energy Chain System® E2 Medium Series 1400/1450/1500



Price Index



Series 1400/1450/1500

Special Features / Options



IPA Qualification Certificate, Air Cleanliness Class ISO Class 3 (at v = 2 m/s) upon request



ESD classification: Electrically conductive ESD/ATEX version upon request



Flammability Class VDE 0304 IIC UL94 HB

Assembly Tips



Snap-open mechanism, choice of snap-open on left or right. Hinged crossbar can be swiveled by more than 180° on both sides. Lightning-fast closing by hand. Secure fit without additional locking devices.

Other Installation Methods

Vertical, hanging ≤ 65.6 ft (20 m)

Vertical, standing ≤ 6.56 ft (2 m)

Side-mounted, unsupp. ≤ 2.30 ft (0.7 m)

Rotary requires further calculation

Usage Guidelines



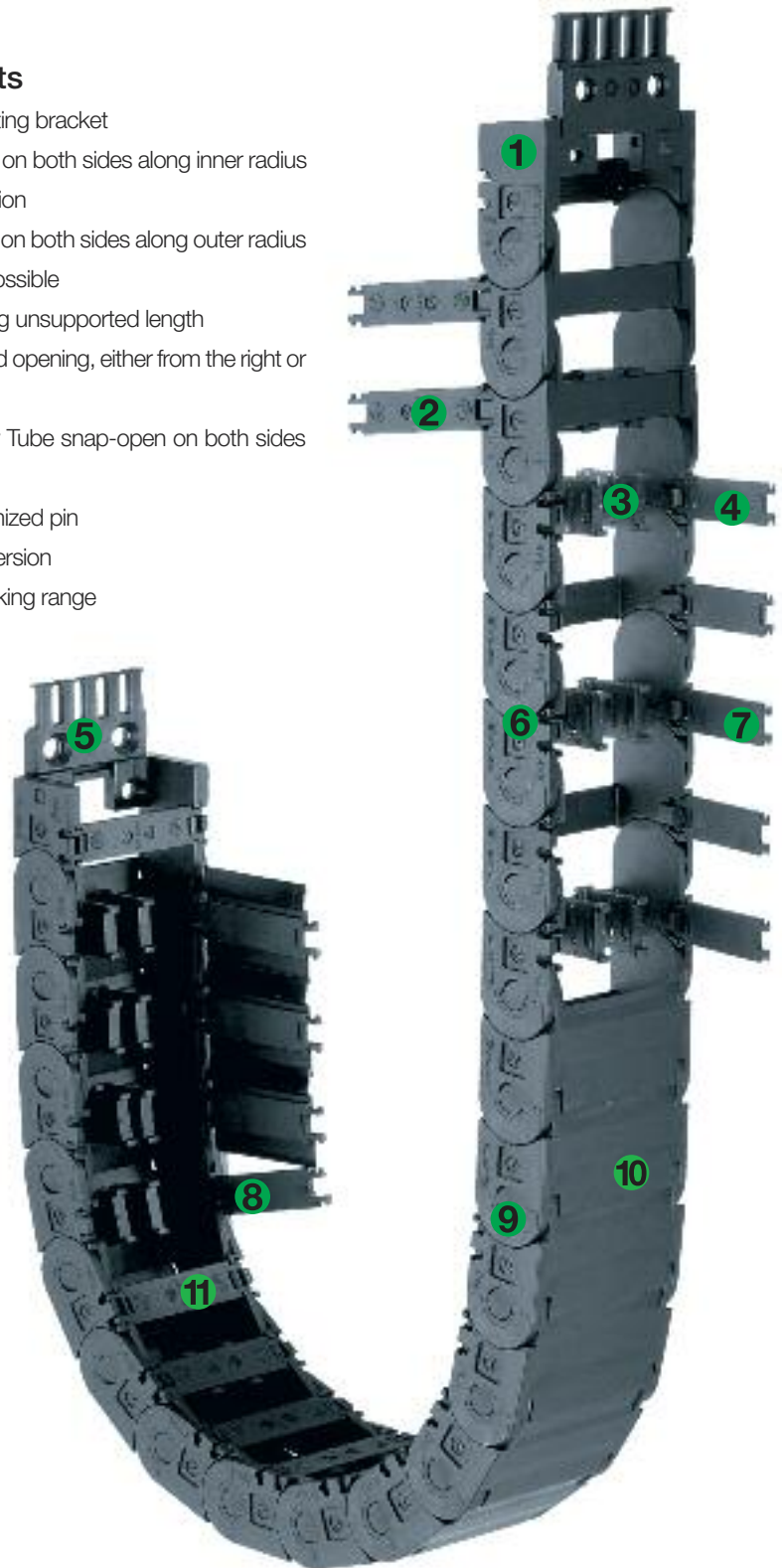
- If snap-open accessibility along the inner or outer radius is required
- If intergrated strain relief at the mounting point is required
- If half Energy Tube is required (Series 1450)
- If long service life is required
- If easy installation is required



- If the application is very simple
➤ Series E200 E-Z Chain

Features & Benefits

- 1 Tried-and-tested mounting bracket
- 2 Series 1400 snap-open on both sides along inner radius
- 3 Modular interior separation
- 4 Series 1500 snap-open on both sides along outer radius
- 5 Integrated strain relief possible
- 6 Double stop dog for long unsupported length
- 7 Opening system for rapid opening, either from the right or the left
- 8 Series 1450 half Energy Tube snap-open on both sides along inner radius
- 9 Easy assembly by optimized pin
- 10 Also available as ESD version
- 11 Crossbars with high locking range



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

[energy chain® configurator](#) ▶

9.84 ft (3 m) **1400-038-100-0**



Energy Chain®

With 2 separators **14011** assembled every 2nd link



Interior Separation

1 Set **15000-038-34PZB**



Mounting Bracket

Energy Chain System® E2 Medium Series 1400/1450/1500 Installation Dimensions

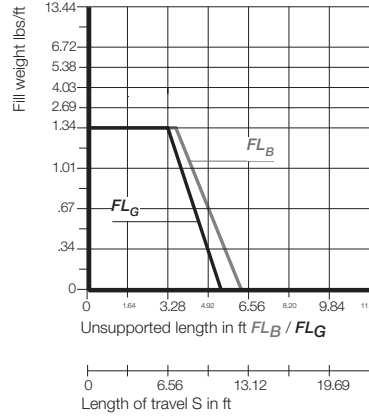
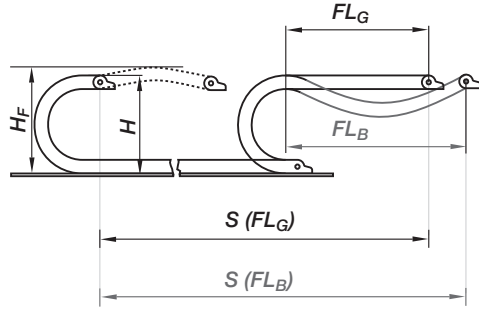
energy chain® configurator



1400
1450
1500

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1



Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height
- HRI = Trough inner height
- H_2 = *Mounting height
- D_2 = Overlength - long travels, gliding
- K_2 = *Add-on
- *If the mounting bracket location is set lower

Pitch per link = 1.31" (33.3 mm)
Links per ft (m) = 9.14 (30)
For center mount applications:
Chain length = $S/2 + K$

The required clearance height: $H_F = H + .98$ in. (25 mm) (with .34 lbs/ft (0.5 kg/m) fill weight). Please consult igus® if space is particularly restricted.

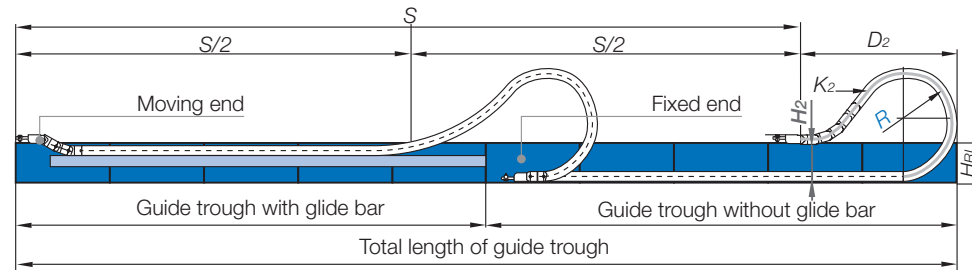
R	1.38 (035)*	1.50 (038)*	1.89 (048)*	2.95 (075)	3.94 (100)	4.92 (125)	5.71 (145)	7.09 (180)
H	3.86 (98)	4.09 (104)	4.88 (124)	7.01 (178)	8.98 (228)	10.94 (278)	12.52 (318)	15.28 (388)
D	3.90 (99)	4.02 (102)	4.41 (112)	5.47 (139)	6.46 (164)	7.44 (189)	8.23 (209)	9.61 (244)
K	7.09 (180)	7.48 (190)	8.66 (220)	12.01 (305)	15.16 (385)	18.11 (460)	20.67 (525)	25.00 (635)

*Not available for the 1450

For long travels with lowered mounting height

Long travel lengths from 32.8 ft. (10 m) to max. 246 ft. (75 m)

For center mount applications:
Chain length = $S/2 + K_2$



In case of travels between 13 ft. (4m) and 32.8 ft. (10m) we recommend a longer unsupported length.

R	1.38 (035)*	1.50 (038)*	1.89 (048)*	2.95 (075)	3.94 (100)	4.92 (125)	5.71 (145)	7.09 (180)
H_2	-	-	-	-	3.94 (100)	3.94 (100)	3.94 (100)	3.94 (100)
D_2^{*25}	-	-	-	-	13.39 (340)	19.49 (495)	21.26 (540)	27.17 (690)
K_2	-	-	-	-	23.62 (600)	31.50 (800)	37.01 (940)	46.06 (1170)

*Not available for the 1450

Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough. Design, Chapter 1

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.81 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

Technical Data



Details of material properties

Chapter 1

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Chapter 9

1400
1450
1500



Energy Chain System® E2 Medium Series 1400/1450/1500

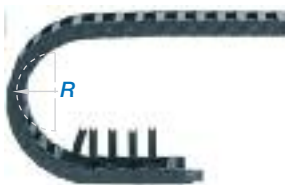
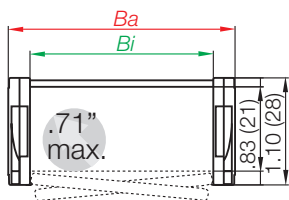
energy chain® configurator

igus® Energy Chain System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

Series 1400 - Snap-open along the inner radius

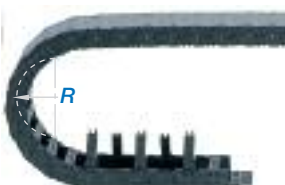
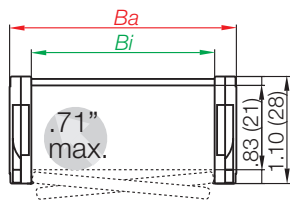


Part Number Structure

1400-038-100-0

Color - Black
Bending radius
Width
Series

Series 1450 - Half Energy Tube - Snap-open along the inner radius

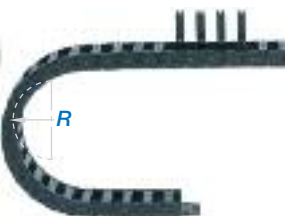
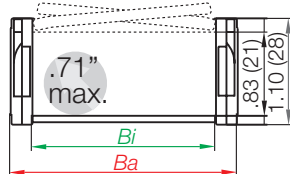


Part Number Structure

1450-038-100-0

Color - Black
Bending radius
Width
Series

Series 1500 - Snap open along the outer radius

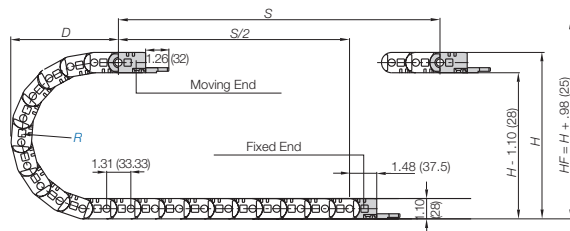


Part Number Structure

1500-038-100-0

Color - Black
Bending radius
Width
Series

Supplement part number with required radius. Example: 1400-038--0
Pitch: 1.31 in. (33.3 mm) per link links/ft (m) = 9.14 (30)



Part Number		Snap-open		Weight 1400/1500 lbs/ft (kg/m)	Weight 1450 lbs/ft (kg/m)		
Snap-open Inner Radius	Half E-Tube Snap-open Inner Radius	Snap-open Outer Radius					
				<i>Bi</i> in. (mm)	<i>Ba</i> in. (mm)		
1400-015-	1450-015-	1500-015-	<input type="text" value="0"/> -0	.59 (15)	1.12 (28.5)	≈ 0.31 (0.46)	≈ 0.32 (0.48)
1400-020-	-	1500-020-	<input type="text" value="0"/> -0	.79 (20)	1.32 (33.5)	≈ 0.32 (0.47)	-
1400-025-	1450-025-	1500-025-	<input type="text" value="0"/> -0	.98 (25)	1.52 (38.5)	≈ 0.33 (0.49)	≈ 0.38 (0.57)
1400-038-	1450-038-	1500-038-	<input type="text" value="0"/> -0	1.50 (38)	2.03 (51.5)	≈ 0.36 (0.53)	≈ 0.40 (0.59)
1400-050-	1450-050-	1500-050-	<input type="text" value="0"/> -0	1.97 (50)	2.50 (63.5)	≈ 0.38 (0.56)	≈ 0.44 (0.65)
1400-068-	1450-068-	1500-068-	<input type="text" value="0"/> -0	2.68 (68)	3.21 (81.5)	≈ 0.42 (0.63)	≈ 0.50 (0.74)
1400-080-	1450-080-	1500-080-	<input type="text" value="0"/> -0	3.15 (80)	3.68 (93.5)	≈ 0.45 (0.67)	≈ 0.54 (0.80)
1400-100-	1450-100-	1500-100-	<input type="text" value="0"/> -0	3.94 (100)	4.47 (113.5)	≈ 0.50 (0.74)	≈ 0.60 (0.90)
1400-125-	1450-125-	1500-125-	<input type="text" value="0"/> -0	4.92 (125)	5.45 (138.5)	≈ 0.56 (0.83)	≈ 0.69 (1.03)

Choose from the radii below for all of the above sizes

Radius (mm) Example: 250-10--0

	035*	038*	048*	075	100	125	145	180
R	1.38 (035)*	1.50 (038)*	1.89 (048)*	2.95 (075)	3.94 (100)	4.92 (125)	5.71 (145)	7.09 (180)
H**	3.86 (98)	4.09 (104)	4.88 (124)	7.01 (178)	8.98 (228)	10.94 (278)	12.52 (318)	15.28 (388)
D	3.90 (99)	4.02 (102)	4.41 (112)	5.47 (139)	6.46 (164)	7.44 (189)	8.23 (209)	9.61 (244)
K	7.09 (180)	7.48 (190)	8.66 (220)	12.01 (305)	15.16 (385)	18.11 (460)	20.67 (525)	25.00 (635)

*Not available for the 1450

Energy Chain System® E2 Medium

Series 1400/1450/1500

Interior Separation

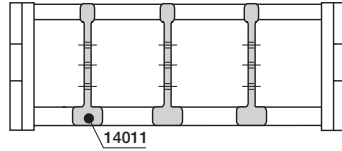
energy chain® configurator ▶



1400
1450
1500

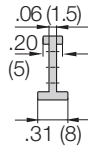
Option 1: Vertical separators for Energy Chains® 1400 and 1500

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.



! STANDARD

Slotted Vertical separator 14001



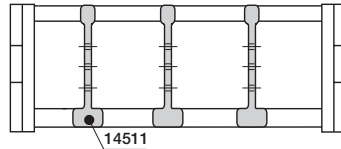
Vertical Separator, slotted

Unassembled	Part No. 14001
Assembled	Part No. 14011

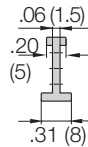
- **Standard separator 14001 for Energy Chains®**
This separator is used for general subdivision of Energy Chain®. Can be used in combination with full-width shelf 111-X.

Option 2: Vertical separators for Half Energy Tube 1450

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.



Slotted vertical separator 14501



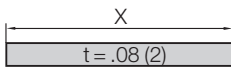
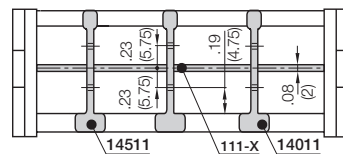
Vertical Separator, slotted

Unassembled	Part No. 14501
Assembled	Part No. 14511

- **Slotted separator 14501 for Half Energy Tube**
This component is used to form the basic pattern of a shelf system. Can be used in combination with full-width shelf 111-X.

Option 3: Full-width shelf for all styles 1400/1450/1500

It is ideal for use in applications involving many thin cables with similar or identical diameters. This shelf slides into place and spans the entire width of the chain.



Width X	Part No.	Part No.	Width X	Part No.	Part No.
in. (mm)	Unassembled	Assembled	in. (mm)	Unassembled	Assembled
.59 (015)	110-15	111-15	2.68 (068)	110-68	111-68
.79 (020)	110-20	111-20	3.15 (080)	110-80	111-80
.98 (025)	110-25	111-25	3.94 (100)	110-100	111-100
1.50 (038)	110-38	111-38	4.92 (125)	110-125	111-125
1.97 (050)	110-50	111-50			

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



1400
1450
1500



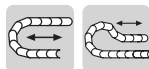
Energy Chain System® E2 Medium Series 1400/1450/1500 Mounting Brackets - One Piece

energy chain® configurator

igus® Energy Chain System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

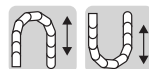
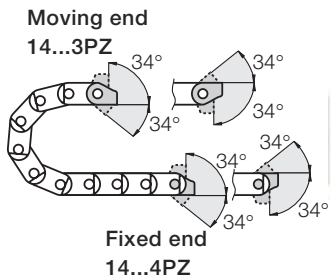
Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>



Standard

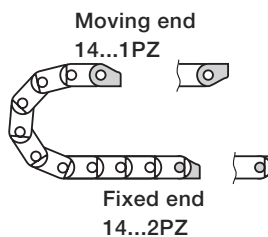
Option 1: pivoting

- Unsupported and gliding applications
- Space-restricted conditions
- Integrated strain relief
- Easy to assemble
- Various mounting positions

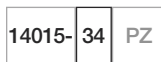


Option 2: locking

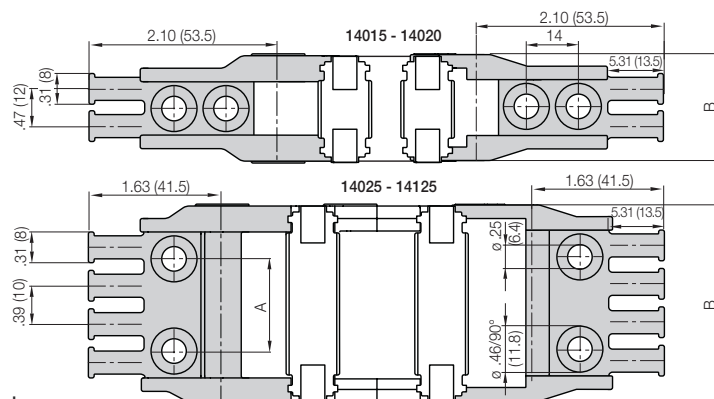
- Unsupported applications
- Extreme speed/accelerations
- If space is limited for height (H_F)
- Various mounting positions



Part Number Structure



- With tiwrap plates
- Complete Set
34 = Pivoting
12 = Locking
- Mounting brackets for selected chain type



Full set, for both ends:

14015- 34 PZ Full set, each part with pin/bore + tiwrap plate

Single-part order:

14015- 3 PZ Mounting bracket with bore + tiwrap plate

14015- 4 PZ Mounting bracket with pin + tiwrap plate

For Chain Type	Part No. Full Set with Tiewrap Plate	Dimension A in. (mm)	Dimension B in. (mm)	Number
1400/1450/1500-015	14015- <input type="checkbox"/> PZ	- -	1.12 (28.5)	2
1400/1450/1500-020	14020- <input type="checkbox"/> PZ	- -	1.32 (33.5)	2
1400/1450/1500-025	14025- <input type="checkbox"/> PZ	.51 (13)	1.52 (38.5)	2
1400/1450/1500-038	14038- <input type="checkbox"/> PZ	.94 (24)	2.03 (51.5)	4
1400/1450/1500-050	14050- <input type="checkbox"/> PZ	1.42 (36)	2.50 (63.5)	6
1400/1450/1500-068	14068- <input type="checkbox"/> PZ	2.13 (54)	3.21 (81.5)	7
1400/1450/1500-080	14080- <input type="checkbox"/> PZ	2.60 (66)	3.68 (93.5)	8
1400/1450/1500-100	14100- <input type="checkbox"/> PZ	3.39 (86)	4.47 (113.5)	10
1400/1450/1500-125	14125- <input type="checkbox"/> PZ	4.37 (111)	5.45 (138.5)	13

34 or 12

For pivoting brackets choose 34

For locking brackets choose 12

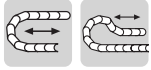
Example: 14015- 34 PZB

Energy Chain System® E2 Medium Series 1400/1450/1500 Mounting Brackets - Plastic

energy chain® configurator 



1400
1450
1500



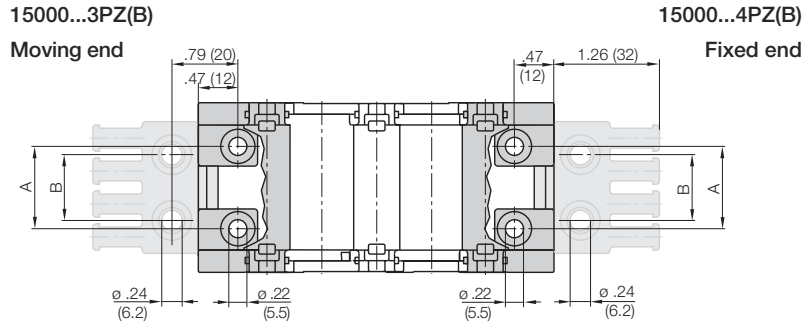
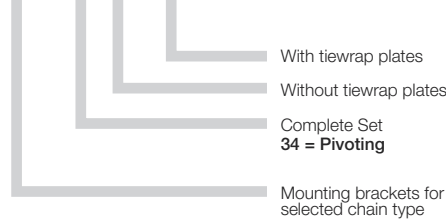
Option 3: polymer

- Unsupported applications
- Space-restricted conditions
- Strain relief with detachable tiewrap plates
- Can be attached at either the fixed end or the moving end



Part Number Structure

15000-34-PZ-B



Full set, for both ends:

15000-34-PZB Full set, each part with pin/bore + tiewrap plate

Single-part order:

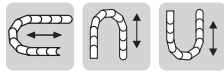
15000-3-PZB Mounting bracket with bore + tiewrap plate

15000-4-PZB Mounting bracket with pin + tiewrap plate

For Chain Type	Part No. Full Set with Tiewrap Plate	Part No. Full Set with Tiewrap Plate + 10 cable ties	Dimension A		Dimension B	
			in.	(mm)	in.	(mm)
1400/1450/1500-015	-	-	-	-	-	-
1400/1450/1500-020	-	-	-	-	-	-
1400/1450/1500-025	15000-025-34PZB	15000-025-34PZBK1	.47	(12)	.59	(15)
1400/1450/1500-038	15000-038-34PZB	15000-038-34PZBK1	.98	(25)	.79	(20)
1400/1450/1500-050	15000-050-34PZB	15000-050-34PZBK1	1.46	(37)	1.18	(30)
1400/1450/1500-068	15000-068-34PZB	15000-068-34PZBK1	2.17	(55)	1.57	(40)
1400/1450/1500-080	15000-080-34PZB	15000-080-34PZBK1	2.64	(67)	2.36	(60)
1400/1450/1500-100	15000-100-34PZB	15000-100-34PZBK1	3.43	(87)	3.15	(80)
1400/1450/1500-125	15000-125-34PZB	15000-125-34PZBK1	4.41	(112)	4.13	(105)

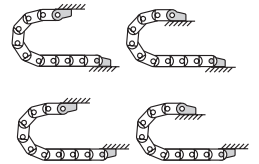
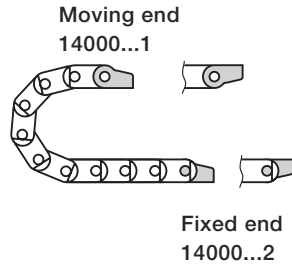
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



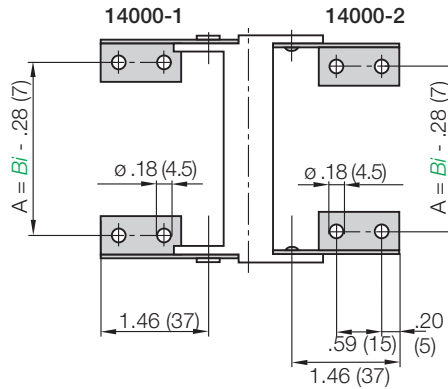
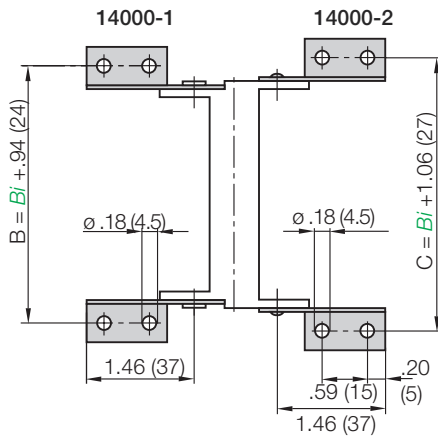


Option 4: Steel

- Locked connections
- One part (two-piece) for all chain widths
- Electrically conductive
- Bolted connection outside of chain cross-section possible



Possible installation configurations -



Chain Type	Part No.	Dimension A		Dimension B		Dimension C	
		Full Set	in. (mm)	in. (mm)	in. (mm)		
1400/1450/1500-015	14000-12	.31 (8)	1.54 (39)	1.65 (42)			
1400/1450/1500-020	14000-12	.51 (13)	1.73 (44)	1.85 (47)			
1400/1450/1500-025	14000-12	.71 (18)	1.93 (49)	2.05 (52)			
1400/1450/1500-038	14000-12	1.22 (31)	2.44 (62)	2.56 (65)			
1400/1450/1500-050	14000-12	1.69 (43)	2.91 (74)	3.03 (77)			
1400/1450/1500-068	14000-12	2.40 (61)	3.62 (92)	3.74 (95)			
1400/1450/1500-080	14000-12	2.87 (73)	4.09 (104)	4.21 (107)			
1400/1450/1500-100	14000-12	3.66 (93)	4.88 (124)	5.00 (127)			
1400/1450/1500-125	14000-12	4.65 (118)	5.87 (149)	5.98 (152)			

Part No. Mounting Brackets Full Set

4 parts, 2 with pin, 2 with bore
Series 1400/1450/1500:
14000-12

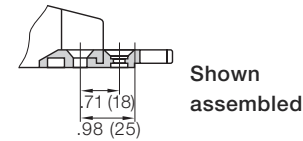
Part No. Mounting Bracket Moving End

2 parts, 1 left & 1 right
Series 1400/1450/1500:
14000-1

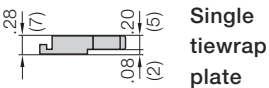
Part No. Mounting Bracket Fixed End

2 parts, 1 left & 1 right
Series 1400/1450/1500:
14000-2

Tiewrap Plates



Shown assembled



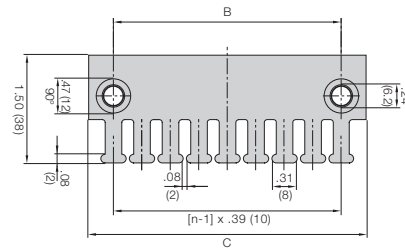
Single tie-wrap plate

Option 1:

Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plates	n Number of Teeth	Dimension C	Dimension B
2020-ZB	3	1.18 (30)	.59 (15)
2030-ZB	4	1.57 (40)	.79 (20)
2040-ZB	5	1.97 (50)	1.18 (30)
2050-ZB	6	2.36 (60)	1.57 (40)
2070-ZB	8	3.15 (80)	2.36 (60)
2090-ZB	9	3.54 (90)	2.76 (70)
2100-ZB	10	3.94 (100)	3.15 (80)
2125-ZB	12	4.72 (120)	3.94 (100)



For more information please refer to strain relief section of Chapter 10



Strain relief for steel mounting brackets

Clip-on connection is not possible with steel mounting brackets. In this case, the tie-wrap plates must be bolted directly into separate bore holes in front of the mounting bracket. Alternatively the tie-wrap plates 20XX-ZB can be also used here. **Details chapter 10**



Cable tiewraps as individual parts

Cable tiewraps 100 pieces/bag	Width x Length		Maximum Ø		Tensile Strength	
	in.	(mm)	in.	(mm)	lbs	(N)
CFB-001	.19 x 5.91	(4.8 x 150)	1.42	(36)	50	(222)



200
240
250



Energy Chain System® E2 Medium Series 200/240/250



Price Index



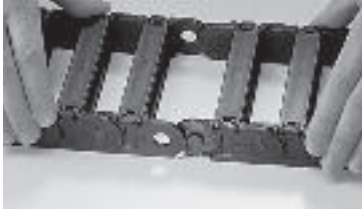
Series 200/240/250

Special Features / Options



Flammability Class
VDE 0304 IIC UL94 HB

Assembly Tips



Easy to assemble and disassemble

Other Installation Methods

Vertical, hanging ≤ 131 ft (40 m)

Vertical, standing ≤ 9.84 ft (3 m)

Side-mounted, un supp. ≤ 3.28 ft (1 m)

Rotary requires further calculation

Usage Guidelines



- If snap-open accessibility along the inner or outer radius is required (Series 200 does not open)
- If intergrated strain relief at the mounting point is required
- If modular interior separation is required
- If long service life is required
- If easy installation is required



- If each link requires snap-open accessibility on both sides simultaneously
 - Series 220 E4/100
- If chip protection is required
 - Series R48 E2 Tubes
- If the application is very simple
 - Series E200 E-Z Chain

4.69

Features & Benefits

- 1 Dirt-repellent contoured exterior
- 2 Cable-friendly, smooth interior with modular interior separation
- 3 Lateral glide surfaces for side mounted operation
- 4 Large pins for long service life
- 5 Double stop dog for long unsupported length
- 6 Tapered insertion point for easy assembly
- 7 Intergrated strain relief possible
- 8 Snap-open, hinged to left or right, accessible from the top
- 9 Series 240 snap-open along the inner radius can be combined with Series 250 snap-open along the outer radius



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator

6.56 ft (2 m) 250-10-100-0

Energy Chain®

With 2 separators 211 assembled every 2nd link

Interior Separation

1 Set 2100-34PZB

Mounting Bracket

Energy Chain System® E2 Medium Series 200/240/250 Installation Dimensions

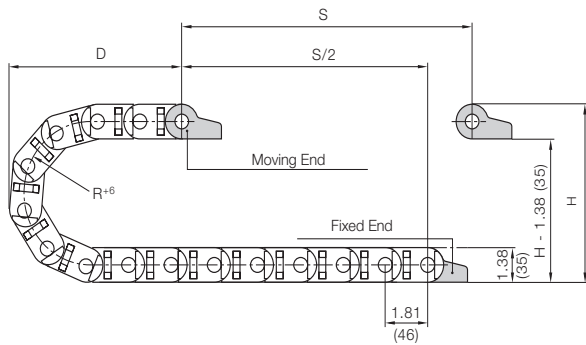
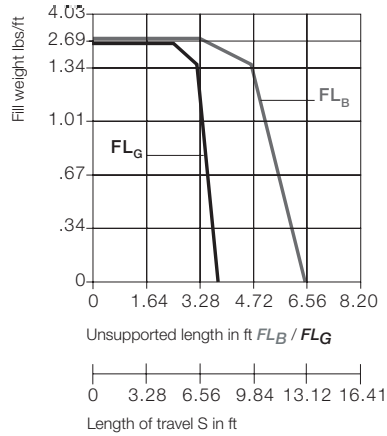
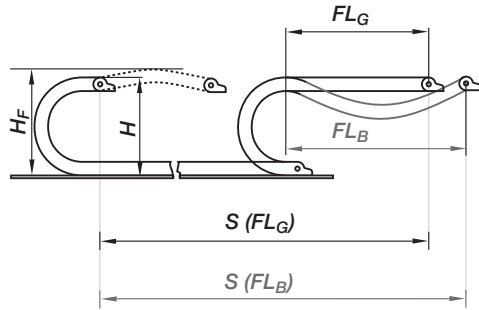
energy chain® configurator ▶



200
240
250

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



Pitch per link = 1.81" (46 mm)
Links per ft (m) = 6.63 (22)
For center mount applications:
Chain length = $S/2 + K$

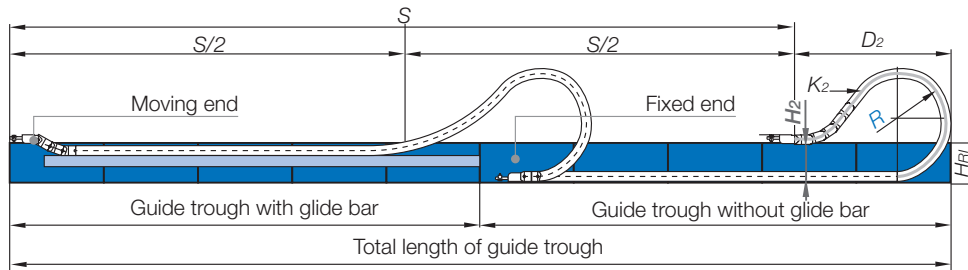
The required clearance height: $H_F = H + .98$ in. (25 mm) (with 1.01 lbs/ft (1.5 kg/m) fill weight).
Please consult igus® if space is particularly restricted.

R	2.48 (55)	2.95 (75)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.66 (225)	9.84 (250)
H^{+4}	5.71 (145)	7.28 (185)	9.25 (235)	11.22 (285)	13.19 (335)	15.16 (385)	17.13 (435)	19.09 (485)	21.06 (535)
D	4.92 (125)	5.91 (150)	6.69 (170)	7.68 (195)	8.66 (220)	9.65 (245)	10.63 (270)	11.61 (295)	12.60 (320)
K	10.87 (276)	13.62 (346)	16.30 (414)	19.53 (496)	22.76 (578)	25.98 (660)	29.21 (742)	32.05 (814)	36.22 (920)

For long travels with lowered mounting height

Long travel lengths from 32.8 ft. (10 m) to max. 328 ft. (100 m)

For center mount applications:
Chain length = $S/2 + K_2$



In case of travels between 13 ft. (4m) and 32.8 ft. (10m) we recommend a longer unsupported length.

R	2.48 (55)	2.95 (75)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.66 (225)	9.84 (250)
H_2^{+4}	-	-	3.94 (100)	3.94 (100)	3.94 (100)	3.94 (100)	3.94 (100)	3.94 (100)	3.94 (100)
D_2^{+25}	-	-	14.96 (380)	17.32 (440)	23.23 (590)	29.72 (755)	37.40 (950)	40.94 (1040)	44.49 (1130)
K_2	-	-	25.35 (644)	28.98 (736)	39.84 (1012)	48.90 (1242)	57.95 (1472)	63.39 (1610)	70.63 (1794)

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{safety buffer}$
 - H_F = Required clearance height
 - HRI = Trough inner height
 - $H_2 = *$ Mounting height
 - $D_2 = *$ Overlength - long travels, gliding
 - $K_2 = *$ Add-on
- *If the mounting bracket location is set lower

Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.
Design, Chapter 1

Technical Data



Details of material properties

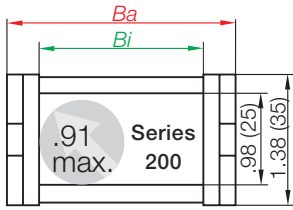
▶ Chapter 1

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.81 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

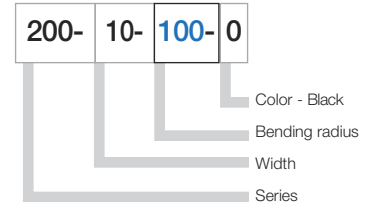
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



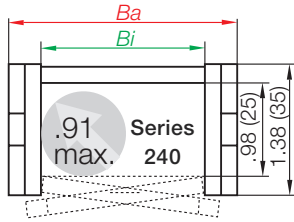
Series 200 - Non snap-open



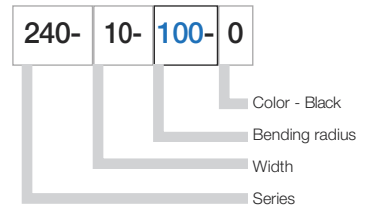
Part Number Structure



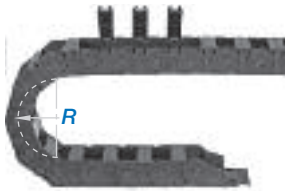
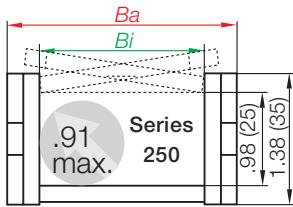
Series 240 - Snap-open along the inner radius



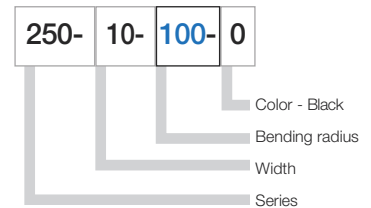
Part Number Structure



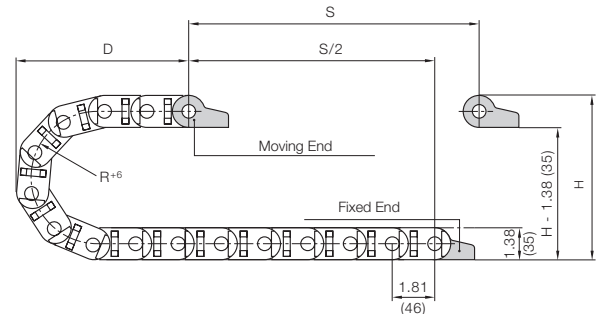
Series 250 - Snap open along the outer radius



Part Number Structure



Supplement part number with required radius. Example: 250-10-100-0
Pitch: 1.81 in. (46 mm) per link links/ft (m) = 6.71 (22)



Non Snap-open	Snap-open Inner Radius	Snap-open Outer Radius		Bi in. (mm)	Ba in. (mm)	Weight lbs/ft (kg/m)
200-02	240-02	250-02	<input type="checkbox"/> -0	.98 (25)	1.61 (41)	≈ 0.50 (0.74)
200-03-	240-03	250-03	<input type="checkbox"/> -0	1.50 (38)	2.13 (54)	≈ 0.54 (0.81)
200-05-	240-05	250-05	<input type="checkbox"/> -0	2.24 (57)	2.87 (73)	≈ 0.60 (0.90)
200-07-	240-07	250-07	<input type="checkbox"/> -0	3.03 (77)	3.66 (93)	≈ 0.68 (1.01)
200-09-	240-09	250-09	<input type="checkbox"/> -0	3.54 (90)	4.17 (106)	≈ 0.73 (1.08)
200-10	240-10	250-10	<input type="checkbox"/> -0	4.06 (103)	4.69 (119)	≈ 0.77 (1.15)
200-12	240-12	250-12	<input type="checkbox"/> -0	4.92 (125)	5.55 (141)	≈ 0.82 (1.22)

Choose from the radii below for all of the above sizes

Radius (mm) Example: 250-10-100-0

	55	075	100	125	150	175	200	225	250
R	2.17 (55)	2.95 (75)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	9.84 (250)
H+4	5.71 (145)	7.28 (185)	9.25 (235)	11.22 (285)	13.19 (335)	15.16 (385)	17.13 (435)	19.09 (485)	21.06 (535)
D	4.92 (125)	5.91 (150)	6.69 (170)	7.68 (195)	8.66 (220)	9.65 (245)	10.63 (270)	11.61 (295)	12.60 (320)
K	10.87 (276)	13.62 (346)	16.30 (414)	19.53 (496)	22.76 (578)	25.98 (660)	29.21 (742)	32.05 (814)	36.22 (920)

0=Standard color black. For other colors see Chapter 1

Energy Chain System® E2 Medium

Series 200/240/250

Interior Separation

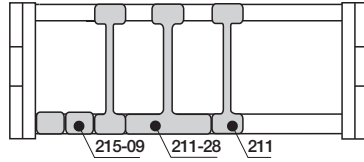
energy chain® configurator 



200
240
250

Option 1: Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link. These separators are the only option when compartmentalizing the interior of the non snap-open Energy Chain® such as the Series 200. Both are predominantly used for side-mounted applications.



 STANDARD

Vertical separator
201

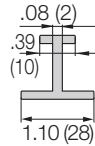


Vertical Separator

Unassembled	Part No. 201
Assembled	Part No. 211

- **Standard separator 201 for Energy Chains®**
This separator is used for general subdivision of Energy Chain®.

Vertical separator
201-28



Vertical Separator

Unassembled	Part No. 201-28
Assembled	Part No. 211-28

- **Standard separator 201-28 for Energy Chains®**
This separator features a wide base for use when a large distance between separators is required.

Spacers
205-09



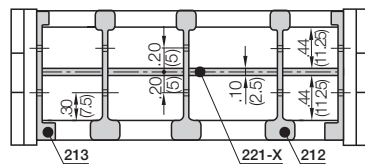
Spacer

Unassembled	Part No. 205-09
Assembled	Part No. 215-09

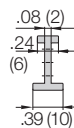
- **NOTE ON SPACERS**
Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications. The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

Option 2: Full-width shelf

This option is available for the snap-open Series 240/250 chains. It is ideal for use in applications involving many thin cables with similar or identical diameters. This shelf slides into place and spans the entire width of the chain.



Slotted vertical separator
202

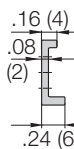


Vertical Separator

Unassembled	Part No. 202
Assembled	Part No. 212

- **Slotted separator 202 for Energy Chains®**
This component is used to form the basic pattern of a shelf system.

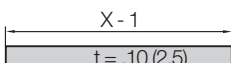
Side Plate
203



Side plate

Unassembled	Part No. 203
Assembled	Part No. 213

- **Side plate 203 for Energy Chains®**
This component is used to form the basic pattern of a shelf system.



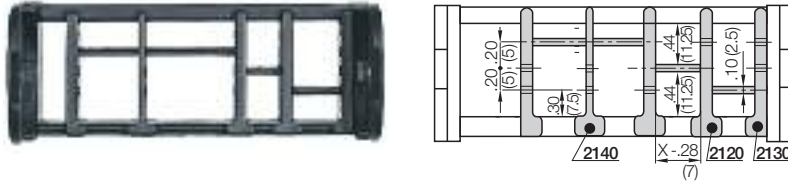
Width X	Part No.	Part No.	Width X	Part No.	Part No.
in. (mm)	Unassembled	Assembled	in. (mm)	Unassembled	Assembled
.98 (25)	220-25	221-25	3.54 (90)	220-90	221-90
1.50 (38)	220-38	221-38	4.06 (103)	220-103	221-103
2.24 (57)	220-57	221-57	4.92 (125)	220-125	221-125
3.03 (77)	220-77	221-77			

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Option 3: Shelves

This option is available for the Series 240/250 snap-open chains. It is ideal for use in applications involving many cables with different diameters. This option allows for variable compartment heights and widths across the chain width, but can also be used for level separation across the entire width.



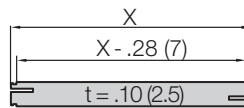
Side plate 2030		Vertical Separator	Unassembled Part No. 2030
			Assembled Part No. 2130
Vertical separator 2040		Vertical Separator	Unassembled Part No. 2040
			Assembled Part No. 2140
Vertical separator 2020		Vertical Separator	Unassembled Part No. 2020
			Assembled Part No. 2120

- **Side plate 2030 for Energy Chains®**
This component is used to form the basic pattern of a shelf system.
- **Vertical slotted separator 2040 for Energy Chains®**
This component is used to form the basic pattern of a shelf system.
- **Vertical slotted separator 2020 for Energy Chains®**
This component is used to form the basic pattern of a shelf system.

Width X in. (mm)	Part No.	
	Unassembled	Assembled
.71 (18)	2200-18	2210-18
.91 (23)	2200-23	2210-23
1.10 (28)	2200-28	2210-28
1.30 (33)	2200-33	2210-33
1.50 (38)	2200-38	2210-38
1.69 (43)	2200-43	2210-43
1.89 (48)	2200-48	2210-48
2.28 (58)	2200-58	2210-58
2.68 (68)	2200-68	2210-68
2.87 (73)	2200-73	2210-73
3.46 (88)	2200-88	2210-88
3.90 (99)	2200-99	2210-99
4.88 (124)	2200-124	2210-124

Shelves 2200-XX

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 3 different heights in .20" (5mm) increments

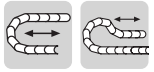


Energy Chain System® E2 Medium Series 200/240/250 Mounting Brackets - Plastic

energy chain® configurator ▶



200
240
250

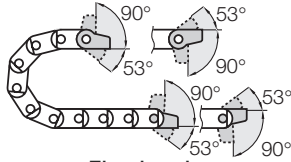


Standard

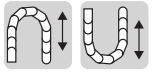
Option 1: pivoting

- Short and long travels
- Space-restricted conditions
- Corrosion resistant

Moving end
2...3PZB



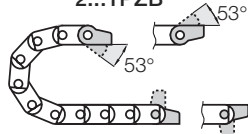
Fixed end
2...4PZB



Option 2: locking

- Vertical hanging/standing travels
- Extreme accelerations
- Corrosion resistant

Moving end
2...1PZB



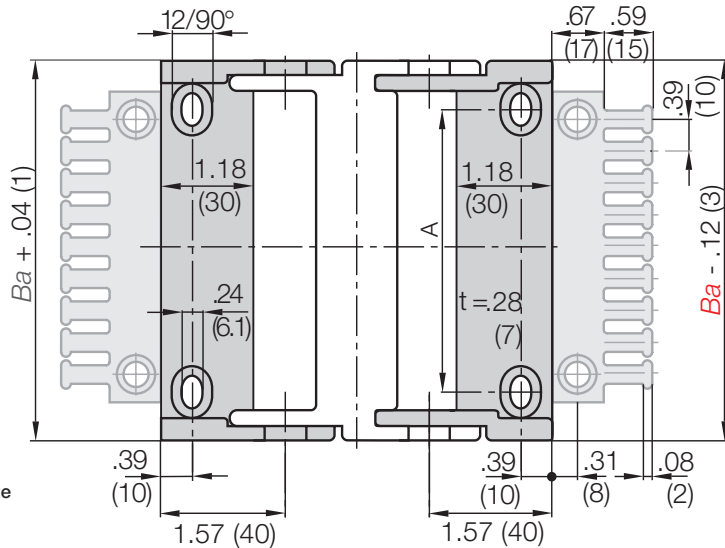
Fixed end
2...2PZB



Part Number Structure

2020- 34 PZ B K1

- With 10 cable tiwraps
- With tiwrwrap plates
- Without tiwrwrap plates
- Complete Set
34 = Pivoting
12 = Locking
- Mounting brackets for selected chain type



Full set, for both ends:

2020- [34] [PZB] Full set, each part with pin/bore + tiwrwrap plate

Single-part order:

2020- [3] [PZB] Mounting bracket with bore + tiwrwrap plate

2020- [4] [PZB] Mounting bracket with pin + tiwrwrap plate

Part No. Full Set (pivoting)
With Tiwrwrap Plates
Series 200, 240 or 250:
2020-34PZB

Part No. Full Set (pivoting)
With Tiwrwrap Plates
+ 10 cable ties
Series 200, 240 or 250:
2020-34PZBK1

Part No. Full Set (pivoting)
Without Tiwrwrap Plates
Series 200, 240 or 250:
2020-34PZ

For Chain Type	Part No. Full Set with Tiwrwrap Plate	Part No. Full Set with Tiwrwrap Plate + 10 cable ties	Part No. Full Set without Tiwrwrap Plate	Dimension A in. (mm)
200/240/250-02	2020- [] PZB	2020- [] PZBK1	2020- [] PZ	.47 (12)
200/240/250-03	2030- [] PZB	2030- [] PZBK1	2030- [] PZ	.98 (25)
200/240/250-05	2050- [] PZB	2050- [] PZBK1	2050- [] PZ	1.73 (44)
200/240/250-07	2070- [] PZB	2070- [] PZBK1	2070- [] PZ	2.52 (64)
200/240/250-09	2090- [] PZB	2090- [] PZBK1	2090- [] PZ	3.03 (77)
200/240/250-10	2100- [] PZB	2100- [] PZBK1	2100- [] PZ	3.54 (90)
200/240/250-12	2125- [] PZB	2125- [] PZBK1	2125- [] PZ	4.41 (112)

[34] or [12]

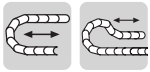
For pivoting brackets choose [34]

For locking brackets choose [12]

Example: 2020- [34] PZB

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



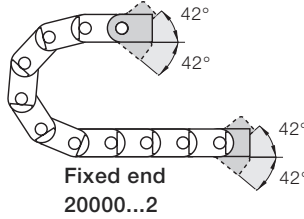


Standard

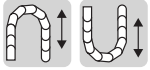
Option 1: pivoting

- Short travels
- Space-restricted conditions
- Corrosion resistant
- Bolted connection outside of chain cross section

Moving end
20000...1



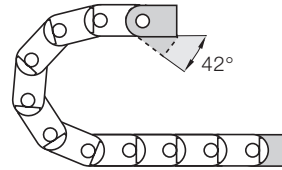
Stackable



Option 2: locking

- Vertical hanging/standing travels
- Extreme accelerations
- Corrosion resistant
- Bolted connection outside of chain cross section

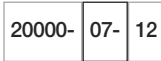
Moving end
21000...1



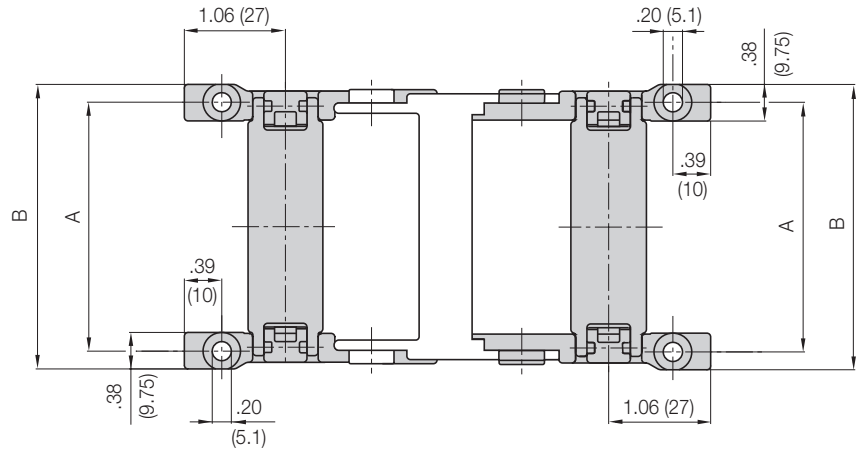
Stackable



Part Number Structure



Complete Set
Width
20000 = Pivoting
21000 = Locking



Full set, for both ends:

20000- 07- 12 Full set, each part with pin/bore

Single-part order:

20000- 07- 1 Mounting bracket with bore

20000- 07- 2 Mounting bracket with pin

Width	Part No. Full Set		Dimension A		Dimension B	
	Pivoting	Locking	in.	(mm)	in.	(mm)
-02	20000	21000	-02-12	1.36 (34.5)	1.73 (44)	
-03	20000	21000	-03-12	1.87 (47.5)	2.24 (57)	
-05	20000	21000	-05-12	2.62 (66.5)	2.99 (76)	
-07	20000	21000	-07-12	3.41 (86.5)	3.78 (96)	
-09	20000	21000	-09-12	3.92 (99.5)	4.29 (109)	
-10	20000	21000	-10-12	4.43 (112.5)	4.80 (122)	
-12	20000	21000	-12-12	5.30 (134.5)	5.67 (144)	

Energy Chain System® E2 Medium Series 200/240/250 Mounting Brackets - Steel

energy chain® configurator ▶

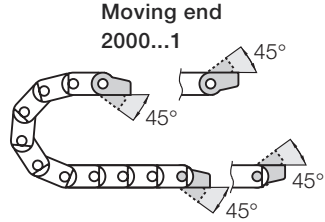
igus®

200
240
250

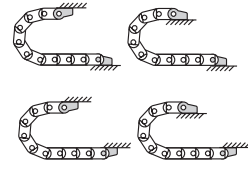


Option 1: Steel

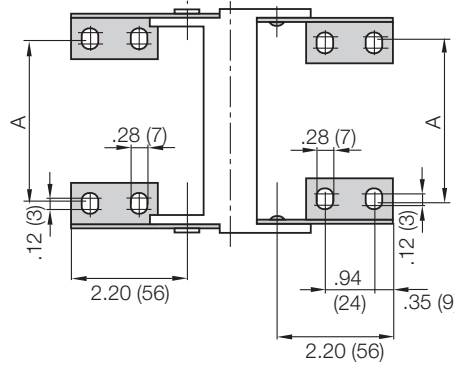
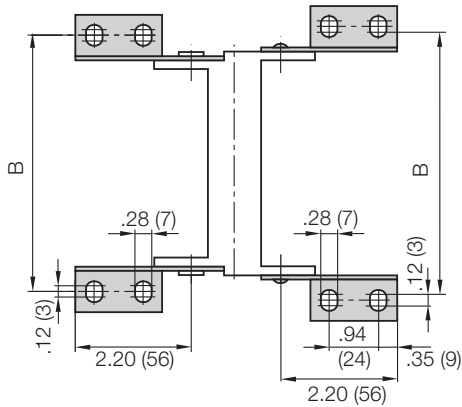
- Pivoting connections
- One part (two-piece) for all chain widths
- Electrically conductive
- Bolted connection outside of chain cross-section possible



Fixed end
2000...2



Possible installation configurations -



Chain Type	Part No. Full Set	Dimension A		Dimension B	
		in.	(mm)	in.	(mm)
200/240/250-02	2000-12	-	-	2.36	(60)
200/240/250-03	2000-12	.98	(25)	2.87	(73)
200/240/250-05	2000-12	1.73	(44)	3.62	(92)
200/240/250-07	2000-12	2.52	(64)	4.41	(112)
200/240/250-09	2000-12	3.03	(77)	4.92	(125)
200/240/250-10	2000-12	3.54	(90)	5.43	(138)
200/240/250-12	2000-12	4.41	(112)	6.30	(160)

Part No. Mounting Brackets Full Set
4 parts, 2 with pin, 2 with bore
Series 200/240/250:
2000-12

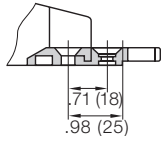
Part No. Mounting Bracket Moving End
2 parts, 1 left & 1 right
Series 200/240/250:
2000-1

Part No. Mounting Bracket Fixed End
2 parts, 1 left & 1 right
Series 200/240/250:
2000-2

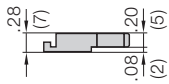
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Tiewrap Plates



Shown assembled



Single tie-wrap plate

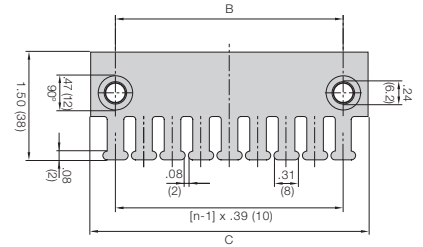


Option 1:

Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plates	n Number of Teeth	Dimension C	Dimension B
2020-ZB	3	1.18 (30)	.59 (15)
2030-ZB	4	1.57 (40)	.79 (20)
2040-ZB	5	1.97 (50)	1.18 (30)
2050-ZB	6	2.36 (60)	1.57 (40)
2070-ZB	8	3.15 (80)	2.36 (60)
2090-ZB	9	3.54 (90)	2.76 (70)
2100-ZB	10	3.94 (100)	3.15 (80)
2125-ZB	12	4.72 (120)	3.94 (100)



For more information please refer to strain relief section of Chapter 10

Strain relief for steel mounting brackets

Clip-on connection is not possible with steel mounting brackets. In this case, the tie-wrap plates must be bolted directly into separate bore holes in front of the mounting bracket. Alternatively the tie-wrap plates 20XX-ZB can be also used here. **Details chapter 10**

Cable tiewraps as individual parts

Cable tiewraps 100 pieces/bag	Width x Length		Maximum Ø		Tensile Strength	
	in.	(mm)	in.	(mm)	lbs	(N)
CFB-001	.19 x 5.91	(4.8 x 150)	1.42	(36)	50	(222)

Energy Chain System® E2 Medium Series 200/240/250 Guide Trough

energy chain® configurator ▶

igus®

200
240
250

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part Number 92-30
- 1/2 travel length of glide bars
Part Number 92-01
- Installation sets as end connectors
Part Number 92-50-XX

-XX indicates the length of the profile rail on which the guide trough is mounted. The values and part numbers are specified in the table on the left. The standard length of the trough components and glide bars is 6.56 ft (2 m.) The required overall length of the guide trough directly correlates to the length of travel.

Example:

Length of travel 164 ft (50 m)
Center mounted

Required guide troughs:

164 ft (50 m) guide trough
82 ft (25 m) glide bar
= 25 sections of 6.56 ft
(2 m) guide trough

Part No. 92-30

= 13 sections of 6.56 ft (2 m) glide bar

Part No. 92-01

Required number of installation sets:

= Number of guide trough components + 1
= 25 + 1 = 26

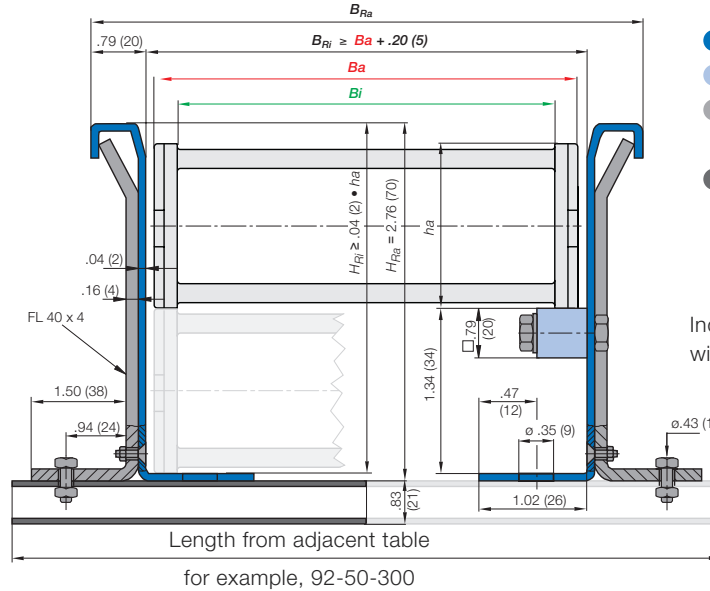
Part number of the installation sets

Example: 92-50-400 for 15.75" (400 mm) long profile rail.



Width of Crossbar
250-05-200-0

	B_{Ri}	Installation Part No.
-02*	1.81 (46)	92-50-150
-03	2.32 (59)	92-50-175
-05	3.07 (78)	92-50-175
-07	3.86 (98)	92-50-200
-09	4.37 (111)	92-50-250
-10	4.88 (124)	92-50-250
-12	5.75 (146)	92-50-300



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

* Specialized guide trough available upon request

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS





Price Index



Series 26/27/27i

Special Features / Options



Flammability Class
VDE 0304 IIC UL94 HB

Assembly Tips



Easy to assemble and disassemble

Other Installation Methods

Vertical, hanging ≤ 164 ft (50 m)

Vertical, standing ≤ 9.84 ft (3 m)

Side-mounted, un_supp. ≤ 3.28 ft (1 m)

Rotary requires further calculation

Usage Guidelines



- If snap-open accessibility along the inner or outer radius is required (Series 200 does not open)
- If stable chain of moderate size is required
- If loads are moderate
- If integrated strain relief at the connection point is required
- If easy installation is required

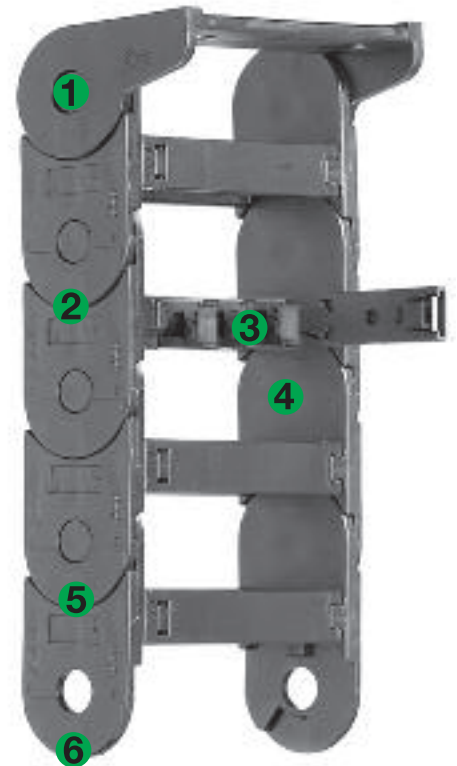


- If maximum stability is required
➤ **Series 280, E4/100**
- If chip protection is required
➤ **Series R58, E2 Tubes**
- If the application is very simple
➤ **Series E26, E-Z Chain**

4.79

Features & Benefits

- 1 Large pins for long service life
- 2 Double stop dog for long unsupported length
- 3 Modular interior separation
- 4 Space-saving ratio of inner-to-outer dimensions
- 5 Lateral glide surfaces for side-mounted operation
- 6 Side wear pads
- 7 Intergrated strain relief possible
- 8 Cable-friendly smooth interior
- 9 Series 27i snap-open along inner radius can be combined with Series 27 snap-open along the outer radius



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

[energy chain® configurator](#) ▶

9.84 ft (3 m) **27-10-100-0**

Energy Chain®

With 2 separators **261** assembled every 2nd link

Interior Separation

1 Set **2610-34PZB**

Mounting Bracket

Energy Chain System® E2 Medium Series 26/27/27i Installation Dimensions

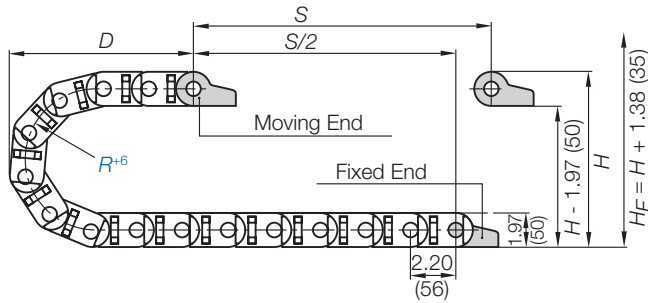
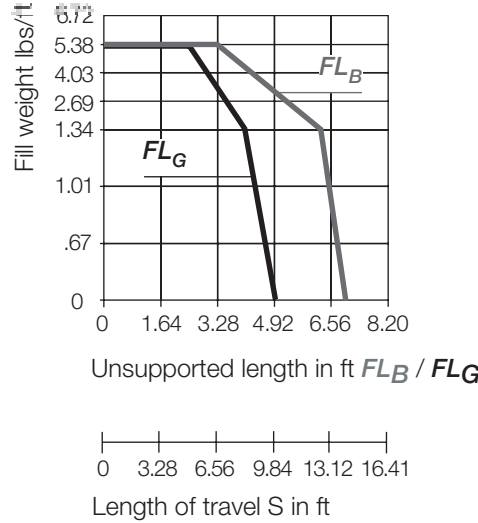
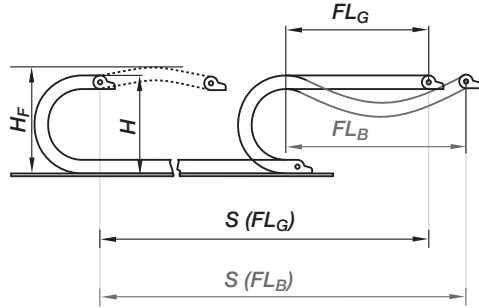
energy chain® configurator ▶



26
27
27i

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



Pitch per link = 2.20" (56 mm)
Links per ft (m) = 5.45 (18)
For center mount applications:
Chain length = $S/2 + K$

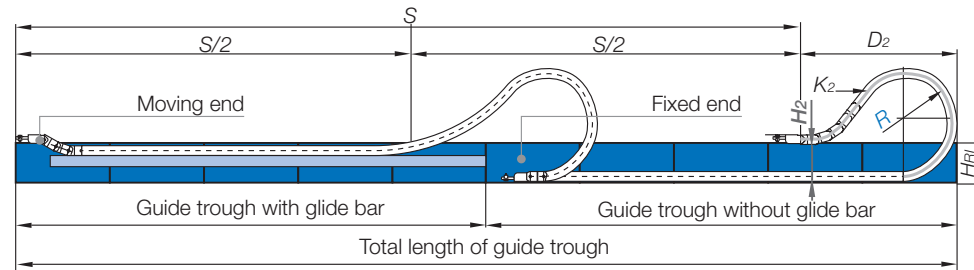
The required clearance height: $H_f = H + 1.38$ in. (35 mm) (with 1.34 lbs/ft (2 kg/m) fill weight).
Please consult igus® if space is particularly restricted.

R	2.48 (063)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)
H^{+4}	7.09 (180)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	21.65 (550)
D	5.51 (140)	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	9.84 (250)	10.83 (275)	12.80 (325)
K	13.19 (335)	14.76 (375)	18.70 (475)	21.65 (550)	25.59 (650)	29.53 (750)	32.48 (825)	36.42 (925)

For long travels with lowered mounting height

Long travel lengths from 32.8 ft. (10 m) to max. 394 ft. (120 m)

For center mount applications:
Chain length = $S/2 + K_2$



In case of travels between 13 ft. (4m) and 32.8 ft. (10m) we recommend a longer unsupported length.

R	2.48 (063)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)
H_2^{+4}	-	-	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)
D_2	-	-	13.78 (350)	18.70 (475)	19.69 (500)	25.79 (655)	30.31 (770)	37.40 (950)
K_2	-	-	24.25 (616)	30.87 (784)	35.28 (896)	44.09 (1120)	50.71 (1288)	63.94 (1624)

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_f = Required clearance height
- HRI = Trough inner height
- H_2 = *Mounting height
- D_2 = Over length - long travels, gliding
- K_2 = *Add-on
- *If the mounting bracket location is set lower



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.
Design, Chapter 1

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.81 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

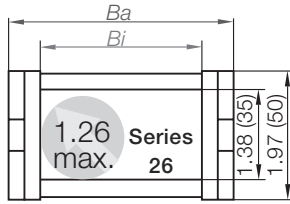
Technical Data



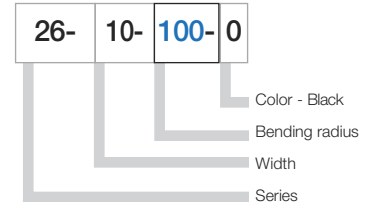
Details of material properties

▶ Chapter 1

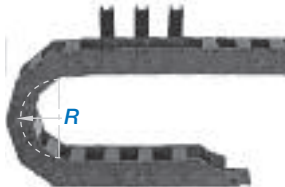
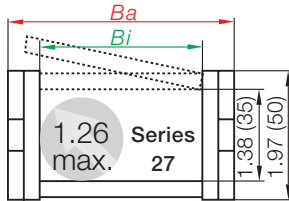
Series 26 - Non snap-open



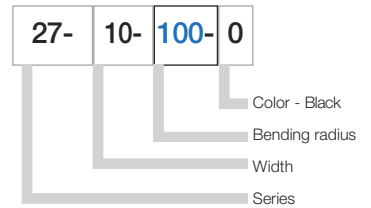
Part Number Structure



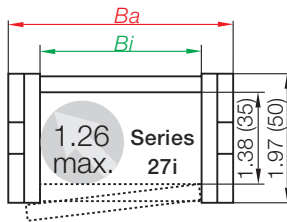
Series 27 - Snap-open along the outer radius



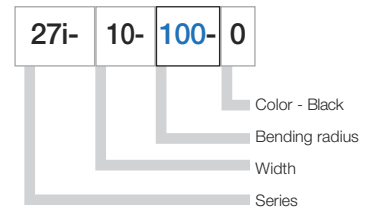
Part Number Structure



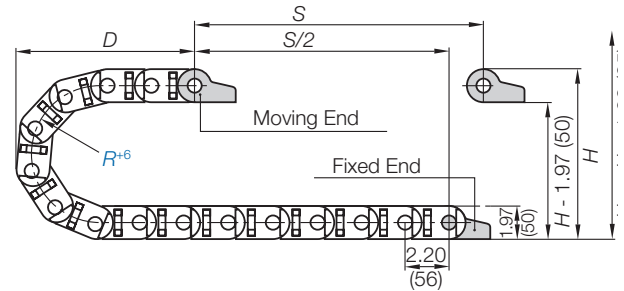
Series 27i - Snap open along the inner radius



Part Number Structure



Supplement part number with required radius. Example: 26-10-100-0
Pitch: 2.20 in. (56 mm) per link links/ft (m) = 5.49 (18)



Non Snap-open	Part Number	Snap-open Outer Radius	Snap-open Inner Radius		Bi in. (mm)	Ba in. (mm)	Weight lbs/ft (kg/m)
26-05-	27-05-	27i-05-	<input type="checkbox"/>	-0	1.97 (50)	2.60 (66)	≈ 0.79 (1.17)
26-07-	27-07-	27i-07-	<input type="checkbox"/>	-0	2.95 (75)	3.58 (91)	≈ 0.87 (1.30)
26-10-	27-10-	27i-10-	<input type="checkbox"/>	-0	3.94 (100)	4.57 (116)	≈ 0.93 (1.39)
26-12-	27-12-	27i-12-	<input type="checkbox"/>	-0	4.92 (125)	5.55 (141)	≈ 0.99 (1.48)
26-15-	27-15-	27i-15-	<input type="checkbox"/>	-0	5.91 (150)	6.54 (166)	≈ 1.09 (1.62)
26-17-	27-17-	27i-17-	<input type="checkbox"/>	-0	6.89 (175)	7.64 (194)	≈ 1.24 (1.85)
26-20-	27-20-	27i-20-	<input type="checkbox"/>	-0	7.87 (200)	8.62 (219)	≈ 1.32 (1.96)

Choose from the radii below for all of the above sizes

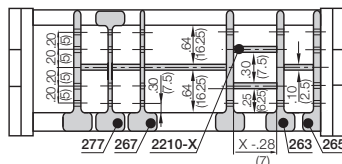
Radius (mm) Example: 26-10-100-0

	063	075	100	125	150	175	200	250
R	2.48 (063)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)
H+4	7.09 (180)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	21.65 (550)
D	5.51 (140)	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	9.84 (250)	10.83 (275)	12.80 (325)
K	13.19 (335)	14.76 (375)	18.70 (475)	21.65 (550)	25.59 (650)	29.53 (750)	32.48 (825)	36.42 (925)

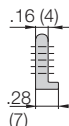
0=Standard color black. For other colors see Chapter 1

Option 3: Shelves

This option is available for the Series 27/27i snap-open chains. It is ideal for use in applications involving many cables with different diameters. This option allows for variable compartment heights and widths across the chain width, but can also be used for level separation across the entire width.



Side plate
264

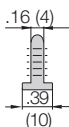


Side plate

Unassembled	Part No. 264
Assembled	Part No. 265

- **Side plate 264 for Energy Chains®**
This component is used to form the basic pattern of a shelf system.

Vertical separator
262

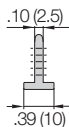


Vertical Separator

Unassembled	Part No. 262
Assembled	Part No. 263

- **Slotted separator 262 for Energy Chains®**
This component is used to form the basic pattern of a shelf system.

Closed slotted separator
266

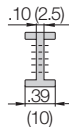


Vertical Separator

Unassembled	Part No. 266
Assembled	Part No. 267

- **Closed slotted separator 266 for Energy Chains®**
These are used for complex subdivisions. However, they cannot be retrofitted into an existing interior separation system without removing the shelves first.

Open slotted separator
276



Vertical Separator

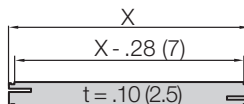
Unassembled	Part No. 276
Assembled	Part No. 277

- **Open slotted separator 276 for Energy Chains®**
This separator can be retrofitted into an existing interior separation system without removing the shelves, as long as these shelves fit into the 5 middle slots only.

Width X in. (mm)	Part No.	
	Unassembled	Assembled
.71 (18)	2200-18	2210-18
.91 (23)	2200-23	2210-23
1.10 (28)	2200-28	2210-28
1.30 (33)	2200-33	2210-33
1.50 (38)	2200-38	2210-38
1.69 (43)	2200-43	2210-43
1.89 (48)	2200-48	2210-48
2.28 (58)	2200-58	2210-58
2.68 (68)	2200-68	2210-68
2.87 (73)	2200-73	2210-73
3.46 (88)	2200-88	2210-88
3.90 (99)	2200-99	2210-99
4.88 (124)	2200-124	2210-124

Shelves 2200-XX

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 5 different heights in .20" (5mm) increments

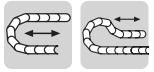


Energy Chain System® E2 Medium Series 26/27/27i Mounting Brackets - Plastic

energy chain® configurator



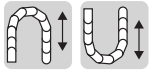
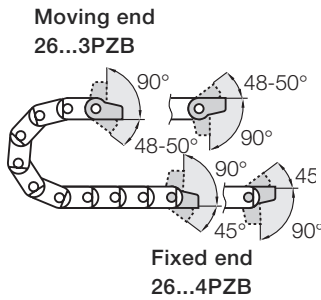
26
27
27i



Standard

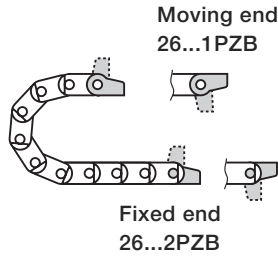
Option 1: pivoting

- Short and long travels
- Space-restricted conditions
- Corrosion resistant



Option 2: locking

- Vertical hanging/standing travels
- Extreme accelerations
- Corrosion resistant



Part Number Structure



- With 10 cable tiewraps
- With tiewrap plates
- Complete Set
34 = Pivoting
12 = Locking
- Mounting brackets for selected chain type

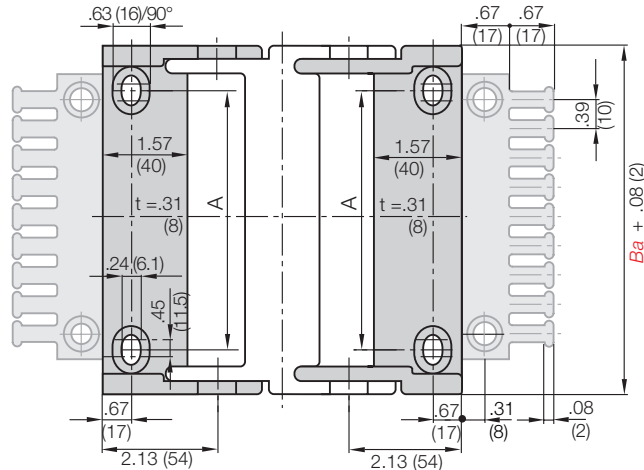
Full set, for both ends:

2605- 34 PZB Full set, each part with pin/bore + tiewrap plate

Single-part order:

2605- 3 PZB Mounting bracket with bore + tiewrap plate

2605- 4 PZB Mounting bracket with pin + tiewrap plate



Part No. Full Set (pivoting)

With Tiewrap Plates

Series 26, 27 or 27i:

2605-34PZB

Part No. Full Set (pivoting)

With Tiewrap Plates + 10 cable ties

Series 26, 27 or 27i:

2605-34PZB1

Part No. Full Set (pivoting)

Without Tiewrap Plates

Series 26, 27 or 27i:

2605-34PZ

For Chain Type	Part No. Full Set with Tiewrap Plate	Part No. Full Set with Tiewrap Plate + 10 cable ties	Part No. Full Set without Tiewrap Plate	Dimension A in. (mm)
26/27/27i-05	2605- <input type="checkbox"/> PZB	2605- <input type="checkbox"/> PZB1	2605- <input type="checkbox"/> PZ	1.18 (30)
26/27/27i-07	2607- <input type="checkbox"/> PZB	2607- <input type="checkbox"/> PZB1	2607- <input type="checkbox"/> PZ	2.17 (55)
26/27/27i-10	2610- <input type="checkbox"/> PZB	2610- <input type="checkbox"/> PZB1	2610- <input type="checkbox"/> PZ	3.15 (80)
26/27/27i-12	2612- <input type="checkbox"/> PZB	2612- <input type="checkbox"/> PZB1	2612- <input type="checkbox"/> PZ	4.13 (105)
26/27/27i-15	2615- <input type="checkbox"/> PZB	2615- <input type="checkbox"/> PZB1	2615- <input type="checkbox"/> PZ	5.12 (130)
26/27/27i-17	2617- <input type="checkbox"/> PZB	2617- <input type="checkbox"/> PZB1	2617- <input type="checkbox"/> PZ	6.10 (155)
26/27/27i-20	2620- <input type="checkbox"/> PZB	2620- <input type="checkbox"/> PZB1	2620- <input type="checkbox"/> PZ	7.09 (180)

34 or 12

For pivoting brackets choose 34

For locking brackets choose 12

Example: 2605- 34 PZB



Cable tiewraps as individual parts

Cable tiewraps	Width x Length	Maximum Ø	Tensile Strength
100 pieces/bag	in. (mm)	in. (mm)	lbs (N)
CFB-001	.19 x 5.91 (4.8 x 150)	1.42 (36)	50 (222)

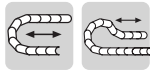
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Specs/CAD/RFQ: www.igus.com/e-chains
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igus® Energy Chain System®

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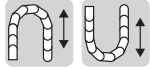
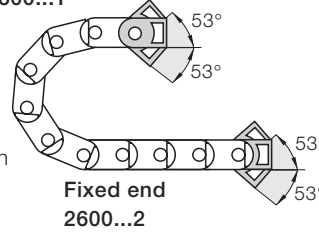


Standard

Option 1: pivoting

- Short and long travels
- Optional integrated profile rail for strain relief
- Bolted connection outside of chain cross section
- Space-restricted conditions
- Corrosion resistant
- Universal use

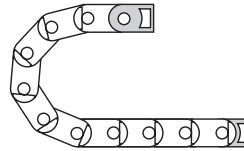
Moving end
2600...1



Option 2: locking

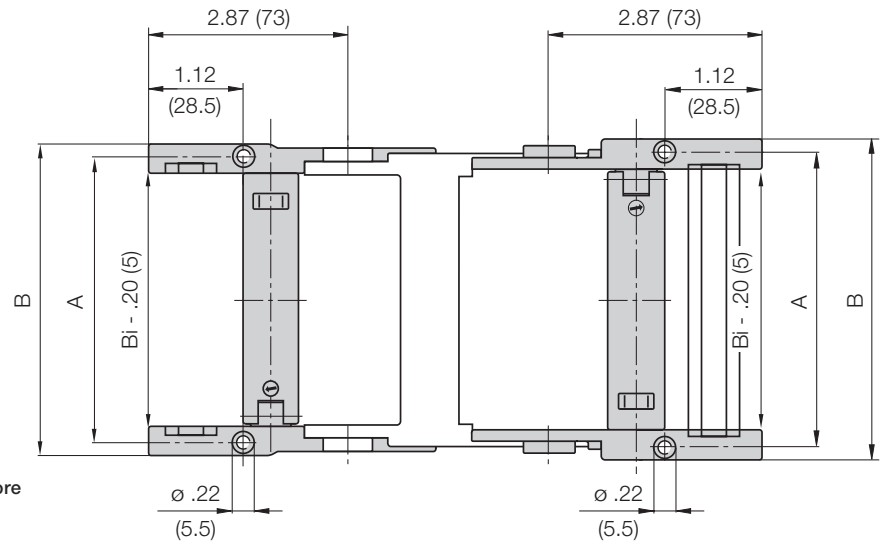
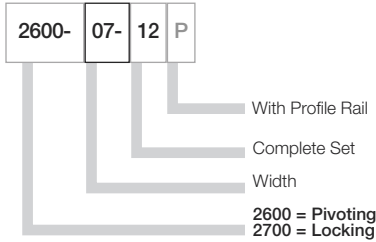
- Vertical hanging/standing travels
- Optional integrated profile rail for strain relief
- Bolted connection outside of chain cross section
- Extreme accelerations
- Corrosion resistant
- Universal use

Moving end
2700...1



Fixed end
2700...2

Part Number Structure



Full set, for both ends:

2600- 07- 12 Full set, each part with pin/bore

Single-part order:

2600- 07- 1 Mounting bracket with bore

2600- 07- 2 Mounting bracket with pin

Part number examples are shown for pivoting brackets. For locking brackets change part number to 2700

Part No. Full Set (pivoting)

Series 26/27/27i:

2600-Width-12

Part No. Full Set (pivoting)

with profile rail

Series 26/27/27i:

2600-Width-12P

Width	Part No. Full Set		With Profile Rail	Dimension A		Dimension B		
	Pivoting	Locking		in.	(mm)	in.	(mm)	
-05	2600	2700	-05-12	P	2.28	(58)	2.72	(69)
-07	2600	2700	-07-12	P	3.27	(83)	3.70	(94)
-10	2600	2700	-10-12	P	4.25	(108)	4.69	(119)
-12	2600	2700	-12-12	P	5.24	(133)	5.67	(144)
-15	2600	2700	-15-12	P	6.22	(158)	6.65	(169)
-17	2600	2700	-17-12	P	7.20	(183)	7.64	(194)
-20	2600	2700	-20-12	P	8.19	(208)	8.62	(219)

Energy Chain System® E2 Medium Series 26/27/27i Mounting Brackets - Steel

energy chain® configurator ▶

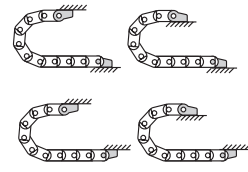
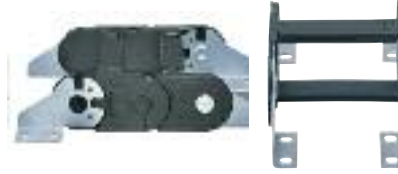
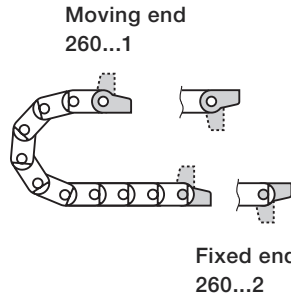
igus®

26
27
27i

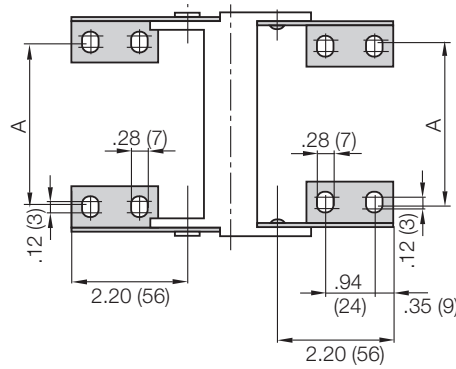
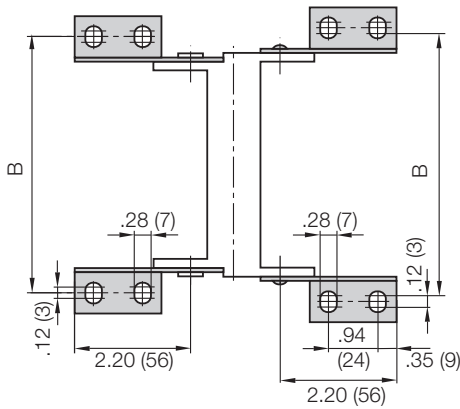


Option 1: Steel

- Pivoting connections
- One part (two-piece) for all chain widths
- Electrically conductive
- Bolted connection outside of chain cross-section possible



Possible installation configurations -



Chain Type	Part No. Full Set	Dimension A		Dimension B	
		in.	(mm)	in.	(mm)
26/27/27i-05	260-12	1.44	(36.5)	3.31	(84)
26/27/27i-07	260-12	2.44	(62)	4.25	(108)
26/27/27i-10	260-12	3.43	(87)	5.24	(133)
26/27/27i-12	260-12	4.41	(112)	6.22	(158)
26/27/27i-15	260-12	5.39	(137)	7.20	(183)
26/27/27i-17	260-12	6.42	(163)	8.23	(209)
26/27/27i-20	260-12	7.40	(188)	9.21	(234)

Part No. Mounting Brackets Full Set
4 parts, 2 with pin, 2 with bore
Series 26/27/27i:
260-12

Part No. Mounting Bracket Moving End
2 parts, 1 left & 1 right
Series 26/27/27i:
260-1

Part No. Mounting Bracket Fixed End
2 parts, 1 left & 1 right
Series 26/27/27i:
260-2

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Chainfix clamps for the profile rail



igus® Chainfix strain relief elements are available in either steel or stainless steel. They can be adjusted with a hexagon socket and are available in single, double and triple configurations.

Part No. Single Clamp		Part No. Double Clamp		Part No. Triple Clamp		Cable ø	
Steel	Stainless	Steel	Stainless	Steel	Stainless	in.	(mm)
CFX12-1	CFX12-1E	CFX12-2	CFX12-2E	CFX12-3	-	.24 - .47	(06 - 12)
CFX14-1	CFX14-1E	CFX14-2	CFX14-2E	CFX14-3	-	.47 - .55	(12 - 14)
CFX16-1	CFX16-1E	CFX16-2	CFX16-2E	CFX16-3	-	.55 - .63	(14 - 16)
CFX18-1	CFX18-1E	CFX18-2	CFX18-2E	CFX18-3	-	.63 - .71	(16 - 18)
CFX20-1	CFX20-1E	CFX20-2	CFX20-2E	CFX20-3	-	.71 - .79	(18 - 20)
CFX22-1	CFX22-1E	CFX22-2	CFX22-2E	CFX22-3	-	.79 - .87	(20 - 22)
CFX26-1	CFX26-1E	CFX26-2	CFX26-2E	-	-	.87 - 1.02	(22 - 26)
CFX30-1	CFX30-1E	CFX30-2	CFX30-2E	-	-	1.02 - 1.18	(26 - 30)
CFX34-1	CFX34-1E	CFX34-2	CFX34-2E	-	-	1.18 - 1.34	(30 - 34)
CFX38-1	CFX38-1E	-	-	-	-	1.34 - 1.50	(34 - 38)
CFX42-1	CFX42-1E	-	-	-	-	1.50 - 1.65	(38 - 42)

For more information please refer to strain relief section of Chapter 10

Chainfix Clip

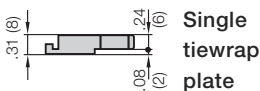
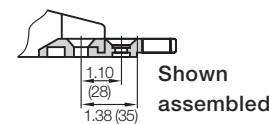


Modular snap-on strain relief device

Chainfix clip is available for cable diameters ranging from .16" (4mm) to .94" (24 mm). It is suitable for assembly on KMA mounting brackets, clip-on strain relief for crossbars as well as profile rails. Quick assembly without the use of tools. **For more information please refer to strain relief section of Chapter 10**

Cable ø	Part No. Clamp	Part No. Bottom
.16-.31 (04-08)	CFC-08-M	CFC-08-C
.31-.47 (08-12)	CFC-12-M	CFC-12-C
.47-.63 (12-16)	CFC-16-M	CFC-16-C
.63-.79 (16-20)	CFC-20-M	CFC-20-C
.79-.94 (20-24)	CFC-24-M	CFC-24-C

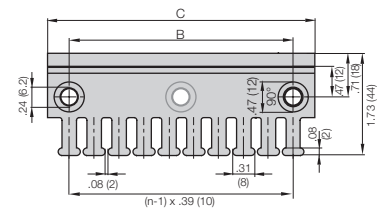
Tiewrap Plates



Option 1: Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



For more information please refer to strain relief section of Chapter 10



Option 2: Clip-on Tiewrap plates

Available as a clip-on tiewrap plate without the use of bolts They are inserted and removed with a screwdriver used as a lever. Clip-on tiewrap plates are also available as an attachment to the opening crossbars.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
3050-ZC	5	1.97 (50)
3075-ZC	7	2.95 (75)

For more information please refer to strain relief section of Chapter 10



Option 3: Clip-on Tiewrap plates for opening crossbars

Clip-on tiewrap plates are also available as an attachment to opening crossbars. They can be positioned at any point along the Energy Chain®.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
2050-Z	6	2.36 (60)

For more information please refer to strain relief section of Chapter 10

Energy Chain System® E2 Medium Series 26/27/27i Guide Trough

energy chain® configurator ▶



26
27
27i

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part Number 95-30
- 1/2 travel length of glide bars
Part number 92-01
- Installation sets as end connectors
Part Number 95-50-XX

-XX indicates the length of the profile rail on which the guide trough is mounted. The values and part numbers are specified in the table on the left. The standard length of the trough components and glide bars is 6.56 ft (2 m.). The required overall length of the guide trough directly correlates to the length of travel.

Example:

Length of travel 164 ft (50 m)
Center mounted

Required guide troughs:
164 ft (50 m) guide trough
82 ft (25 m) glide bar

= 25 sections of 6.56 ft (2 m) guide trough

Part No. 95-30

= 13 sections of 6.56 ft (2 m) glide bar

Part No. 92-01

Required number of installation sets:

= Number of guide trough components + 1
= 25 + 1 = 26

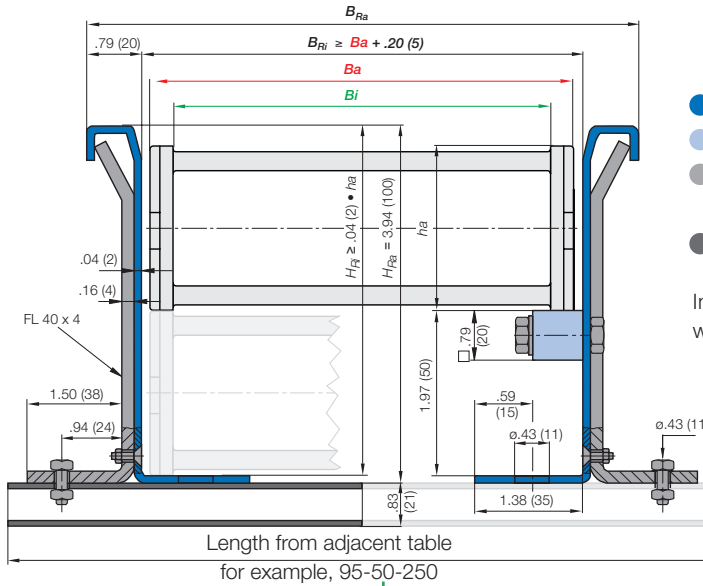
Part number of the installation sets

Example: 95-50-400 for 15.75" (400 mm) long profile rail.



Width of Crossbar
27-05-200-0

	B_{Ri}	Installation Part No.
-05	2.80 (71)	95-50-200
-07	3.78 (96)	95-50-200
-10	4.76 (121)	95-50-250
-12	5.75 (146)	95-50-250
-15	6.73 (171)	95-50-300
-17	7.83 (199)	95-50-300
-20	8.82 (224)	95-50-350



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

Standard length profile rail

* Specialized guide trough available upon request

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



340
350



Energy Chain System® E2 Medium Series 340/350



Price Index



Series 340/350

Special Features / Options



Flammability Class
VDE 0304 IIC UL94 HB

Assembly Tips



Easy to assemble and disassemble

Other Installation Methods

Vertical, hanging ≤ 262 ft (80 m)

Vertical, standing ≤ 9.84 ft (3 m)

Side-mounted, un_supp. ≤ 3.28 ft (1 m)

Rotary requires further calculation

Usage Guidelines



- If snap-open accessibility along the inner or outer radius is required
- If Intergrated strain relief at the connection point is required
- If modular interior separation is required
- For travels up to 492 ft (150 m)
- For long service life



- If maximum stability is required
➤ **Series 380, E4/100**
- If chip protection is required
➤ **Series R68 or R167/R168, E2 Tubes**
- If the application is very simple
➤ **Series E/Z 300, E-Z Chain**

Features & Benefits

- 1 Lateral glide surfaces for side mounted operation
- 2 operation
- 3 Double stop dog for long unsupported length
- 4 Integrated strain relief possible
- 5 Dirt-repellent, contoured exterior
Series 340 snap-open along the inner radius can be combined with Series 350 snap-open along the outer radius
- 6 Cable-friendly smooth interior
- 7 Large pins for long service life
- 8 Available with extender crossbars for large hoses



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

[energy chain® configurator](#) ▶

16.4 ft (5 m) **350-150-100-0**

Energy Chain®

With 2 separators **311** assembled every 2nd link

Interior Separation

1 Set **3150-34PZB**

Mounting Bracket

4.89

Energy Chain System® E2 Medium Series 340/350

energy chain® configurator ▶



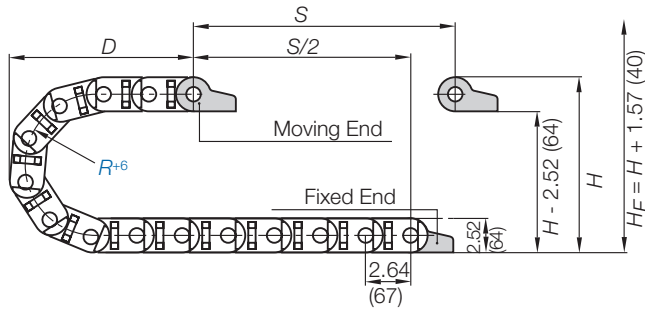
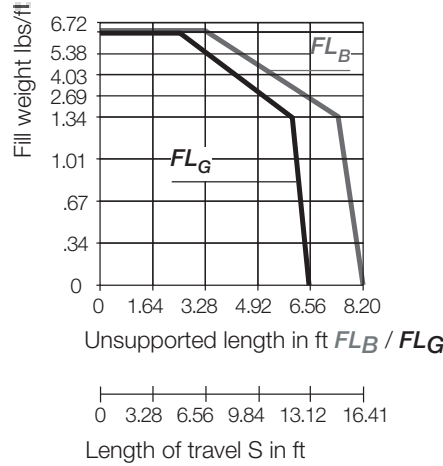
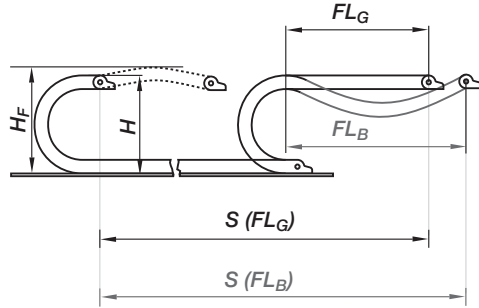
340
350

Installation Dimensions

Short travel, unsupported length

- FL_B = unsupported with permitted sag
- FL_G = unsupported with straight upper run

Further information ▶ Design, Chapter 1



Pitch per link = 2.64" (67 mm)
Links per ft (m) = 4.55 (15)
For center mount applications:
Chain length = $S/2 + K$

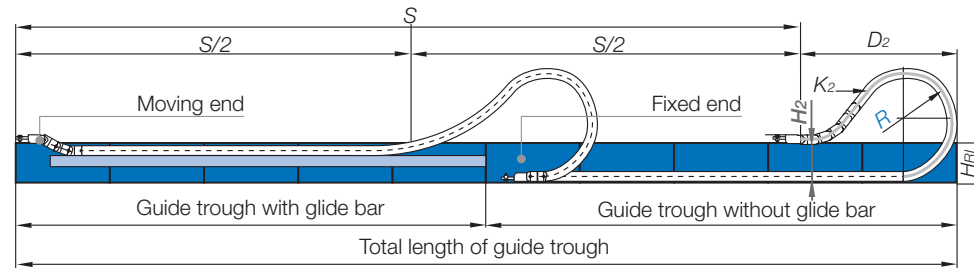
The required clearance height: $H_f = H + 1.57$ in. (40 mm) (with 1.68 lbs/ft (2.5 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)
H^{+5}	8.46 (215)	10.43 (265)	12.40 (315)	14.37 (365)	18.31 (465)	22.24 (565)	26.18 (665)
D	5.91 (150)	7.87 (200)	8.86 (225)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)
K	15.75 (400)	19.69 (500)	25.59 (650)	28.54 (725)	34.45 (875)	41.34 (1050)	48.23 (1225)

For long travels with lowered mounting height

Long travel lengths from 32.8 ft. (10 m) to max. 492 ft. (150 m)

For center mount applications:
Chain length = $S/2 + K_2$



In case of travels between 13 ft. (4m) and 32.8 ft. (10m) we recommend a longer unsupported length.

R	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)
H_2^{+5}	-	-	7.32 (186)	7.32 (186)	7.32 (186)	7.32 (186)	7.32 (186)
D_2	-	-	18.70 (475)	22.44 (570)	30.71 (780)	39.76 (1010)	45.28 (1150)
K_2	-	-	31.65 (804)	39.57 (1005)	52.76 (1340)	65.94 (1675)	76.50 (1943)

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_f = Required clearance height
- HRI = Trough inner height
- $H_2 = *$ Mounting height
- $D_2 =$ Over length - long travels, gliding
- $K_2 = *$ Add-on
- *If the mounting bracket location is set lower



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.

Design, Chapter 1

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.81 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

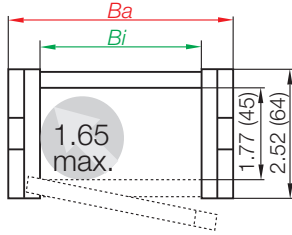
Technical Data



Details of material properties

▶ Chapter 1

Series 340 - Snap-open along the inner radius

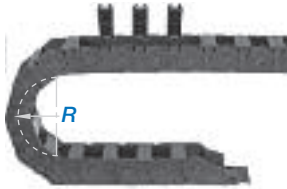
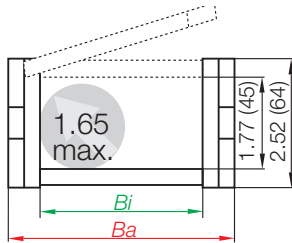


Part Number Structure



Color - Black
Bending radius
Width
Series

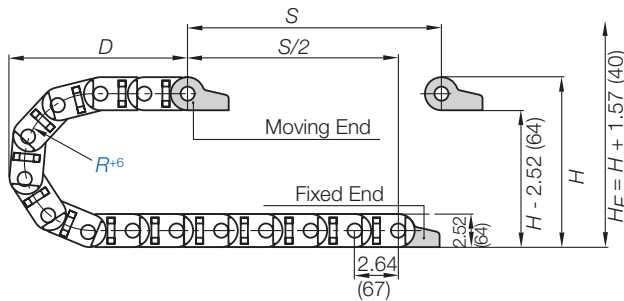
Series 350 - Snap open along the outer radius



Part Number Structure



Color - Black
Bending radius
Width
Series



Supplement part number with required radius. Example: 350-150-**100**-0
Pitch: 2.64 in. (67 mm) per link links/ft (m) = 4.57 (15)

Part Number			<i>Bi</i>	<i>Ba</i>	Weight
Snap-open Inner Radius	Snap-open Outer Radius		in. (mm)	in. (mm)	lbs/ft (kg/m)
340-050-	350-050-	<input type="checkbox"/> -0	1.97 (50)	2.76 (70)	≈ 1.08 (1.603)
340-075-	350-075-	<input type="checkbox"/> -0	2.95 (75)	3.74 (95)	≈ 1.19 (1.778)
340-100-	350-100-	<input type="checkbox"/> -0	3.94 (100)	4.72 (120)	≈ 1.29 (1.925)
340-115-	350-115-	<input type="checkbox"/> -0	4.53 (115)	5.31 (135)	≈ 1.33 (1.985)
340-125-	350-125-	<input type="checkbox"/> -0	4.92 (125)	5.71 (145)	≈ 1.36 (2.025)
340-150-	350-150-	<input type="checkbox"/> -0	5.91 (150)	6.69 (170)	≈ 1.45 (2.165)
340-175-	350-175-	<input type="checkbox"/> -0	6.89 (175)	7.68 (195)	≈ 1.53 (2.278)
340-200-	350-200-	<input type="checkbox"/> -0	7.87 (200)	8.66 (220)	≈ 1.65 (2.448)
340-225-	350-225-	<input type="checkbox"/> -0	8.86 (225)	9.65 (245)	≈ 1.74 (2.587)
340-250-	350-250-	<input type="checkbox"/> -0	9.84 (250)	10.63 (270)	≈ 1.83 (2.725)

Choose from the radii below for all of the above sizes

Radius (mm) Example: 350-150-**100**-0

	075	100	125	150	200	250	300
R	2.95 (75)	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)
H+5	8.46 (215)	10.43 (265)	12.40 (315)	14.37 (365)	18.31 (465)	22.24 (565)	26.18 (665)
D	5.91 (150)	7.87 (200)	8.86 (225)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)
K	15.75 (400)	19.69 (500)	25.59 (650)	28.54 (725)	34.45 (875)	41.34 (1050)	48.23 (1225)

Energy Chain System® E2 Medium Series 340/350 Extender Crossbars

energy chain® configurator 



340
350

The extender crossbars were developed specifically for applications in which a large diameter hose must be guided carefully. It is intended for hoses with a maximum outer diameter of 4.53 (115 mm). The extender crossbar can be placed along either the outer (Series 350) or inner (Series 340) radius. In most applications, the inner radius is preferred. However, the chain cannot glide on itself in this case. If gliding operation is required, the crossbars are assembled along the outer radius and a special guide trough is required. The extender crossbar can either be attached to the side links directly or can be used in combination with two standard snap-open crossbars.

If the extender crossbars are attached along the outer radius, the side of the chain must be supported so that the crossbars do not come in contact with the running surface. We are happy to assist with the design and assembly of this type of system. This design is also suitable for gliding applications. We are also happy to assist with guide trough requirements.

Extender crossbar: Series 340

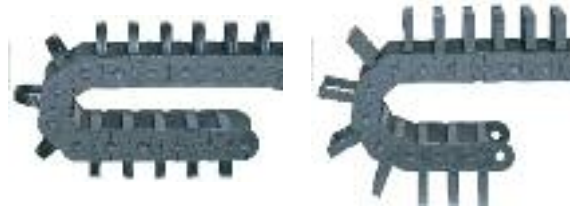


340-150...

340-175...

Series	max. Hose Ø in. (mm)	Bending Radii in. (mm)
340-150	3.54 (90)	5.91 (150), 7.87 (200), 9.84 (250)
340-175	4.53 (115)	7.87 (200), 9.84 (250)

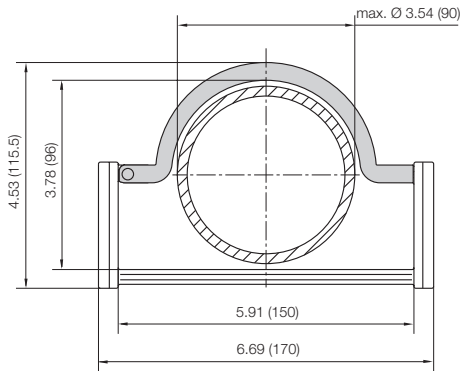
Extender crossbar: Series 350



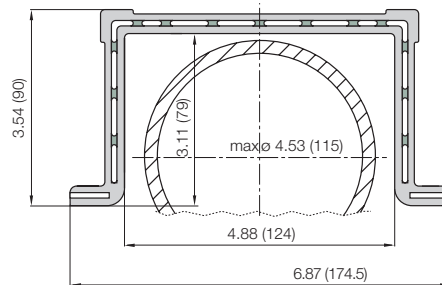
350-150...

350-175...

Series	max. Hose Ø in. (mm)	Bending Radii in. (mm)
350-150	3.54 (90)	2.95 (75), 3.94 (100), 4.92 (125), 5.91 (150), 7.87 (200), 9.84 (250)
350-175	4.53 (115)	2.95 (75), 3.94 (100), 4.92 (125), 5.91 (150), 7.87 (200), 9.84 (250)



Part No. (round extender crossbar)
3500-150-D090



Part No. (square extender crossbar)
3500-175-D115*

*This product also available in round design -
order **Part No. 3500-175-RD115**

Part Number Structure for Energy Chain® with Extender Crossbars

350- 150- D090- 175- 0



Assembly

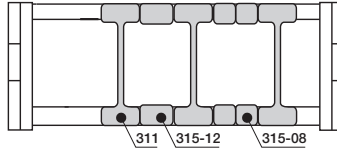
As with all Series 340/350 crossbars, the extender crossbars are opened using a screwdriver.

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Option 1: Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.



Vertical separator 301



Vertical Separator

Unassembled	Part No. 301
Assembled	Part No. 311

- **Standard separator 301 for Energy Chains®**
This separator is used for general subdivision of Energy Chain®.

Spacers 305-XX



Spacer

Unassembled	Part No. 305-XX
Assembled	Part No. 315-XX

XX = width of the spacer

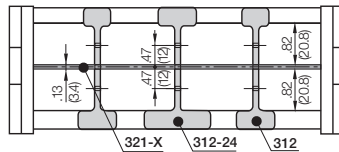
- **NOTE ON SPACERS**
Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications. The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

Spacers available in the following sizes:

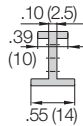
Part No. Unassembled	Part No. Assembled	in.	(mm)
305-08	315-08	.31"	(8)
305-12	315-12	..47"	(12)

Option 2: Full-width shelf

This option is available for the snap-open Series 340/350 chains. It is ideal for use in applications involving many thin cables with similar or identical diameters. This shelf slides into place and spans the entire width of the chain.



Slotted vertical separator 302

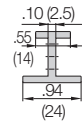


Slotted Separator

Unassembled	Part No. 302
Assembled	Part No. 312

- **Slotted separator 302 for Energy Chains®**
This component is used to form the basic pattern of a shelf system.

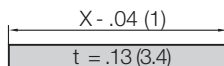
Slotted vertical separator 302-24



Slotted Separator

Unassembled	Part No. 302-24
Assembled	Part No. 312-24

- **Slotted separator 302-24 for Energy Chains®**
This separator features a wide base. It can be used in side mounted applications.



Width X in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Part No. Unassembled	Part No. Assembled
1.97 (50)	320-050	321-050	5.91 (150)	320-150	321-150
2.95 (75)	320-075	321-075	6.89 (175)	320-175	321-175
3.94 (100)	320-100	321-100	7.87 (200)	320-200	321-200
4.53 (115)	320-115	321-115	8.86 (225)	320-225	321-225
4.92 (125)	320-125	321-125	9.84 (250)	320-250	321-250

Energy Chain System® E2 Medium Series 340/350 Interior Separation

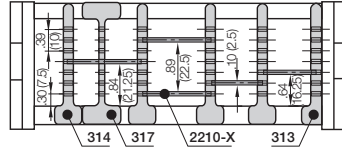
energy chain® configurator ▶



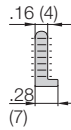
340
350

Option 3: Shelves

This option is available for the Series 340/350 snap-open chains. It is ideal for use in applications involving many cables with different diameters. This option allows for variable compartment heights and widths across the chain width, but can also be used for level separation across the entire width.



Side plate
303



Side plate

Unassembled **Part No. 303**

Assembled **Part No. 313**

- **Slotted separator 303 for Energy Chains®**

This component is used to form the basic pattern of a shelf system.

Vertical separator
304



Slotted Separator

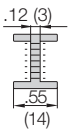
Unassembled **Part No. 304**

Assembled **Part No. 314**

- **Slotted separator 304 for Energy Chains®**

This component is used to form the basic pattern of a shelf system.

Open slotted separator
307



Slotted separator, open

Unassembled **Part No. 307**

Assembled **Part No. 317**

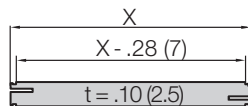
- **Open slotted separator 307 for Energy Chains®**

This separator can be retrofitted into an existing interior separation system without removing the shelves, as long as these shelves fit into the 5 middle slots only.

Shelves 2200-XX

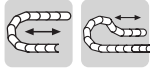
These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 5 different heights in .20" (5mm) increments

Width X in. (mm)	Part No.	
	Unassembled	Assembled
.71 (18)	2200-18	2210-18
.91 (23)	2200-23	2210-23
1.10 (28)	2200-28	2210-28
1.30 (33)	2200-33	2210-33
1.50 (38)	2200-38	2210-38
1.69 (43)	2200-43	2210-43
1.89 (48)	2200-48	2210-48
2.28 (58)	2200-58	2210-58
2.68 (68)	2200-68	2210-68
2.87 (73)	2200-73	2210-73
3.46 (88)	2200-88	2210-88
3.90 (99)	2200-99	2210-99
4.88 (124)	2200-124	2210-124



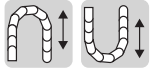
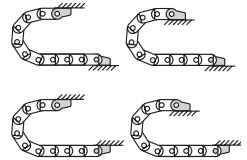
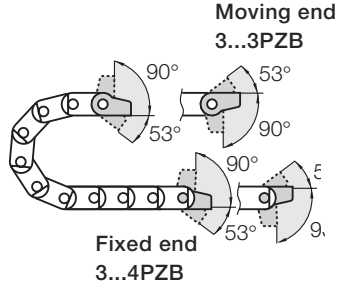
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS





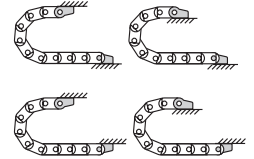
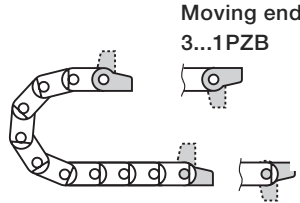
Option 1: pivoting

- Short and long travels
- Space-restricted conditions
- Corrosion resistant



Option 2: locking

- Vertical hanging/standing travels
- Extreme accelerations
- Corrosion resistant

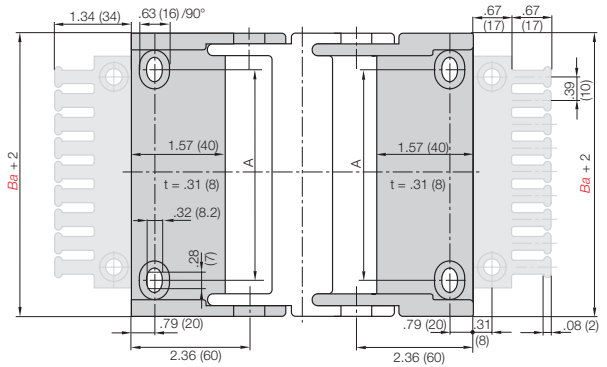


Part Number Structure

3075- 34 PZ B K1

- With 10 cable tieswraps
- With tiwrap plates
- Mounting brackets only
- Complete Set
34 = Pivoting
12 = Locking
- Mounting brackets for selected chain type

Fixed end
3...2PZB



Full set, for both ends:

3075- 34 PZB Full set, each part with pin/bore + tiwrap plate

Single-part order:

3075- 3 PZB Mounting bracket with bore + tiwrap plate

3075- 4 PZB Mounting bracket with pin + tiwrap plate

Part No. Full Set (pivoting)
Series 340, 350:
3075-34PZ

Part No. Full Set (pivoting)
With Tiwrap Plates
Series 340, 350:
3075-34PZB

Part No. Full Set (pivoting)
With Tiwrap Plates + 10 cable ties
Series 340, 350:
3075-34PZBK1

For Chain Type	Part No. Mounting Bracket Full Set	Part No. Full Set with Tiwrap Plate	Part No. Full Set with Tiwrap Plate + 10 Cable Ties	Dimension A in. (mm)
340/350-050	3050- <input type="checkbox"/> PZ	3050- <input type="checkbox"/> PZB	3050- <input type="checkbox"/> PZBK1	1.10 (28)
340/350-075	3075- <input type="checkbox"/> PZ	3075- <input type="checkbox"/> PZB	3075- <input type="checkbox"/> PZBK1	2.09 (53)
340/350-100	3100- <input type="checkbox"/> PZ	3100- <input type="checkbox"/> PZB	3100- <input type="checkbox"/> PZBK1	3.07 (78)
340/350-115	3115- <input type="checkbox"/> PZ	3115- <input type="checkbox"/> PZB	3115- <input type="checkbox"/> PZBK1	3.66 (93)
340/350-125	3125- <input type="checkbox"/> PZ	3125- <input type="checkbox"/> PZB	3125- <input type="checkbox"/> PZBK1	4.06 (103)
340/350-150	3150- <input type="checkbox"/> PZ	3150- <input type="checkbox"/> PZB	3150- <input type="checkbox"/> PZBK1	5.04 (128)
340/350-175	3175- <input type="checkbox"/> PZ	3175- <input type="checkbox"/> PZB	3175- <input type="checkbox"/> PZBK1	6.02 (153)
340/350-200	3200- <input type="checkbox"/> PZ	3200- <input type="checkbox"/> PZB	3200- <input type="checkbox"/> PZBK1	7.01 (178)
340/350-225	3225- <input type="checkbox"/> PZ	3225- <input type="checkbox"/> PZB	3225- <input type="checkbox"/> PZBK1	7.99 (203)
340/350-250	3250- <input type="checkbox"/> PZ	3250- <input type="checkbox"/> PZB	3250- <input type="checkbox"/> PZBK1	8.98 (228)

34 or 12

34 For pivoting brackets choose
12 For locking brackets choose
Example: 3075- 34 PZB



Cable tiwraps as individual parts

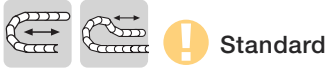
Cable tiwraps	Width x Length in. (mm)	Maximum Ø in. (mm)	Tensile Strength lbs (N)
100 pieces/bag			
CFB-001	.19 x 5.91 (4.8 x 150)	1.42 (36)	50 (222)

Energy Chain System® E2 Medium Series 340/350 Mounting Brackets - KMA

energy chain® configurator ▶

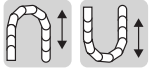
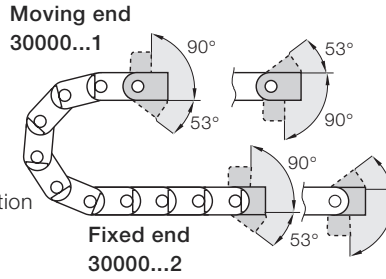


340
350



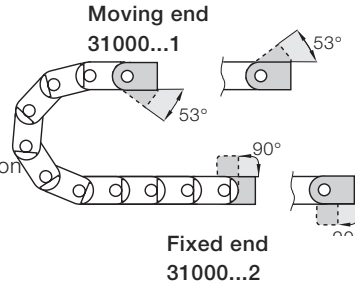
Option 1: pivoting

- Short and long travels
- Optional integrated profile rail for strain relief
- Bolted connection outside of chain cross section
- Space-restricted conditions
- Corrosion resistant
- Universal use

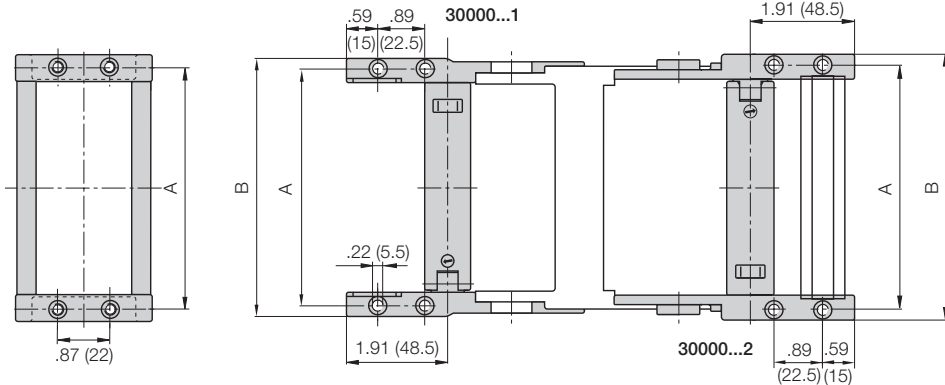
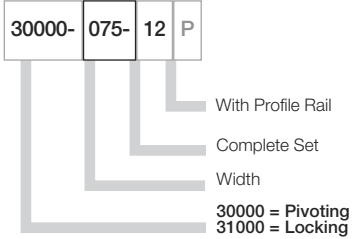


Option 2: locking

- Short and long travels
- Optional integrated profile rail for strain relief
- Bolted connection outside of chain cross section
- Extreme accelerations
- Corrosion resistant
- Universal use



Part Number Structure



Full set, for both ends:

30000-075-12 Full set, each part with pin/bore

Single-part order:

30000-075-1 Mounting bracket with bore

30000-075-2 Mounting bracket with pin

Part number examples are shown for pivoting brackets. For locking brackets change part number to 31000

Part No. Full Set (pivoting)

Series 340/350:

30000-Width-12

Part No. Full Set (pivoting)

with profile rail

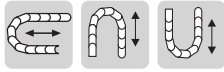
Series 340/350:

30000-Width-12P

Width	Part No. Full Set		With Profile Rail	Dimension A		Dimension B		
	Pivoting	Locking		in.	(mm)	in.	(mm)	
-050	30000	31000	-050-12	P	2.48	(63)	2.91	(74)
-075	30000	31000	-075-12	P	3.46	(88)	3.90	(99)
-100	30000	31000	-100-12	P	4.45	(113)	4.88	(124)
-115	30000	31000	-115-12	P	5.04	(128)	5.47	(139)
-125	30000	31000	-125-12	P	5.43	(138)	5.87	(149)
-150	30000	31000	-150-12	P	6.42	(163)	6.85	(174)
-175	30000	31000	-175-12	P	7.40	(188)	7.83	(199)
-200	30000	31000	-200-12	P	8.39	(213)	8.82	(224)
-225	30000	31000	-225-12	P	9.37	(238)	9.80	(249)
-250	30000	31000	-250-12	P	10.35	(263)	10.79	(274)

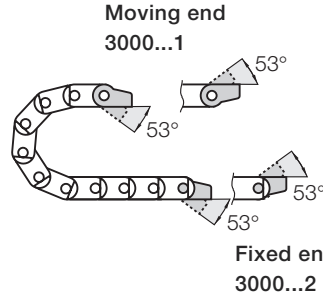
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



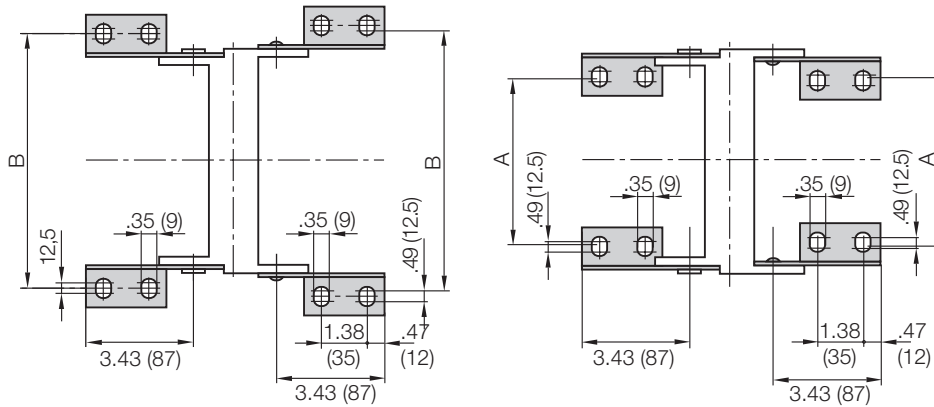


Option 1: Steel

- Pivoting connections
- One part (two-piece) for all chain widths
- Electrically conductive
- Bolted connection outside of chain cross-section possible



Possible installation configurations -



Chain Type	Part No. Full Set	Dimension A		Dimension B		Dimension C	
		in.	(mm)	in.	(mm)	in.	(mm)
340/350-050	3000-12	-	-	3.39	(86)	3.82	(97)
340/350-075	3000-12	2.09	(53)	4.37	(111)	4.80	(122)
340/350-100	3000-12	3.07	(78)	5.35	(136)	5.79	(147)
340/350-115	3000-12	3.66	(93)	5.94	(151)	6.38	(162)
340/350-125	3000-12	4.06	(103)	6.34	(161)	6.77	(172)
340/350-150	3000-12	5.04	(128)	7.32	(186)	7.76	(197)
340/350-175	3000-12	6.02	(153)	8.35	(212)	8.82	(224)
340/350-200	3000-12	7.01	(178)	9.29	(236)	9.72	(247)
340/350-225	3000-12	7.99	(203)	10.28	(261)	10.71	(272)
340/350-250	3000-12	8.98	(228)	11.26	(286)	11.69	(297)

Part No. Mounting Brackets Full Set
4 parts, 2 with pin, 2 with bore
Series 340/350:
3000-12

Part No. Mounting Bracket Moving End
2 parts, 1 left & 1 right
Series 340/350:
3000-1

Part No. Mounting Bracket Fixed End
2 parts, 1 left & 1 right
Series 340/350:
3000-2

Energy Chain System® E2 Medium

Series 340/350

Strain Relief

energy chain® configurator 



340
350

Chainfix clamps for the profile rail



igus® Chainfix strain relief elements are available in either steel or stainless steel. They can be adjusted with a hexagon socket and are available in single, double and triple configurations.

Part No. Single Clamp		Part No. Double Clamp		Part No. Triple Clamp		Cable ø	
Steel	Stainless	Steel	Stainless	Steel	Stainless	in.	(mm)
CFX12-1	CFX12-1E	CFX12-2	CFX12-2E	CFX12-3	–	.24 - .47	(06 - 12)
CFX14-1	CFX14-1E	CFX14-2	CFX14-2E	CFX14-3	–	.47 - .55	(12 - 14)
CFX16-1	CFX16-1E	CFX16-2	CFX16-2E	CFX16-3	–	.55 - .63	(14 - 16)
CFX18-1	CFX18-1E	CFX18-2	CFX18-2E	CFX18-3	–	.63 - .71	(16 - 18)
CFX20-1	CFX20-1E	CFX20-2	CFX20-2E	CFX20-3	–	.71 - .79	(18 - 20)
CFX22-1	CFX22-1E	CFX22-2	CFX22-2E	CFX22-3	–	.79 - .87	(20 - 22)
CFX26-1	CFX26-1E	CFX26-2	CFX26-2E	–	–	.87 - 1.02	(22 - 26)
CFX30-1	CFX30-1E	CFX30-2	CFX30-2E	–	–	1.02 - 1.18	(26 - 30)
CFX34-1	CFX34-1E	CFX34-2	CFX34-2E	–	–	1.18 - 1.34	(30 - 34)
CFX38-1	CFX38-1E	–	–	–	–	1.34 - 1.50	(34 - 38)
CFX42-1	CFX42-1E	–	–	–	–	1.50 - 1.65	(38 - 42)

For more information please refer to strain relief section of Chapter 10

Chainfix Clip

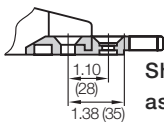


Modular snap-on strain relief device

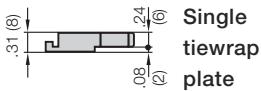
Chainfix clip is available for cable diameters ranging from .16" (4mm) to .94" (24 mm). It is suitable for assembly on KMA mounting brackets, clip-on strain relief for crossbars as well as profile rails. Quick assembly without the use of tools. **For more information please refer to strain relief section of Chapter 10**

Cable ø	Part No. Clamp	Part No. Bottom
.16-.31 (04-08)	CFC-08-M	CFC-08-C
.31-.47 (08-12)	CFC-12-M	CFC-12-C
.47-.63 (12-16)	CFC-16-M	CFC-16-C
.63-.79 (16-20)	CFC-20-M	CFC-20-C
.79-.94 (20-24)	CFC-24-M	CFC-24-C

Tiewrap Plates



Shown assembled



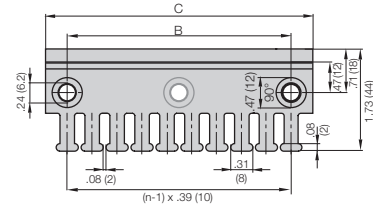
Single tiewrap plate

Option 1:

Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



For more information please refer to strain relief section of Chapter 10

Option 2:

Clip-on Tiewrap plates

Available as a clip-on tiewrap plate without the use of bolts They are inserted and removed with a screwdriver used as a lever. Clip-on tiewrap plates are also available as an attachment to the opening crossbars.

Part No.	Number of Teeth	Width of Strain Relief
3050-ZC	5	1.97 (50)
3075-ZC	7	2.95 (75)

For more information please refer to strain relief section of Chapter 10

Option 3:

Clip-on Tiewrap plates for opening crossbars

Clip-on tiewrap plates are also available as an attachment to opening crossbars. They can be positioned at any point along the Energy Chain®.

For more information please refer to strain relief section of Chapter 10

Part No.	No of Teeth	Width of Strain Relief
For Fixed Crossbar		
3050-Z	5	1.97 (50)
3075-Z	7	2.91 (74)
For Opening Crossbar		
3035-ZS	3	1.38 (35)
3050-ZS	5	1.97 (50)
3075-ZS	7	2.95 (75)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part Number 93-30
- 1/2 travel length of glide bars
Part number 93-01
- Installation sets as end connectors
Part Number 93-50 -XX

-XX indicates the length of the profile rail on which the guide trough is mounted. The values and part numbers are specified in the table on the left. The standard length of the trough components and glide bars is 6.56 ft (2 m.) The required overall length of the guide trough directly correlates to the length of travel.

Example:

Length of travel 164 ft (50 m)
Center mounted

Required guide troughs:

164 ft (50 m) guide trough
82 ft (25 m) glide bar
= 25 sections of 6.56 ft (2 m) guide trough

Part No. 93-30

= 13 sections of 6.56 ft (2 m) glide bar

Part No. 93-01

Required number of installation sets:

= Number of guide trough components + 1

= 25 + 1 = 26

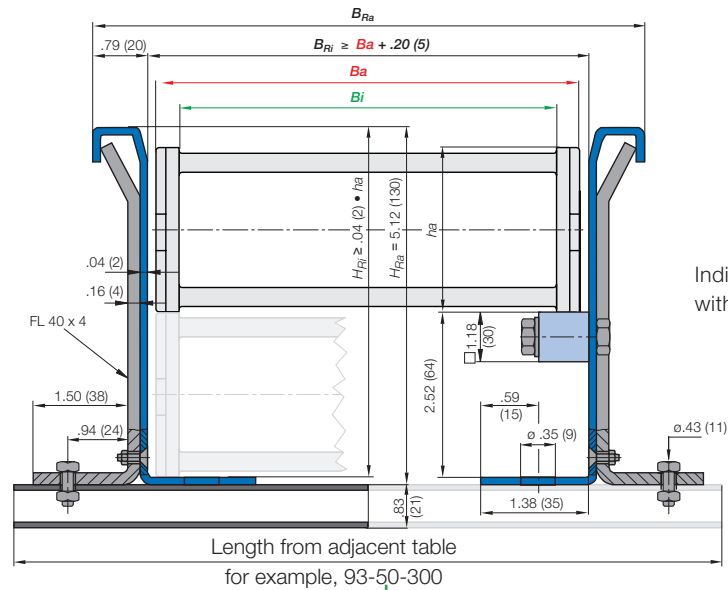
Part number of the installation sets

Example: 93-50-300 for 15.75" (400 mm) long profile rail.



Width of Crossbar
350-075-200-0

	B_{Ri}	Installation Part No.
-050	2.95 (75)	93-50-150
-075	3.94 (100)	93-50-200
-100	4.92 (125)	93-50-250
-115	5.51 (140)	93-50-250
-125	5.91 (150)	93-50-300
-150	6.89 (175)	93-50-300
-175	7.87 (200)	93-50-300
-200	8.86 (225)	93-50-350
-225	9.84 (250)	93-50-350
-250	10.83 (275)	93-50-400



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

* Specialized guide trough available upon request

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS





158

158.100.100

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158.100

E2 Tubes



E2 Tubes - protection against hot chips and debris

E2 Energy Tube

Series Zipper, R, R100 and R1000

Laboratory tests and numerous field applications over the past 20 years prove that igus® Energy Chains® and fully enclosed Energy Tubes protect cables used in welding robots and machine tools. For extreme-temperature applications, igus® offers Energy Tubes made from its igumid HT material, which repels hot chips and flying debris reaching 1,562°F (850°C). All standard E2 and E4 Energy Tubes are available made from igumid HT, upon request.

Typical industries and applications

- Tooling machines
- Woodworking machines
- All kind of industries and machines with chip, dirt and dust



iF-Design Awards -
Series R117/118 and Series R68



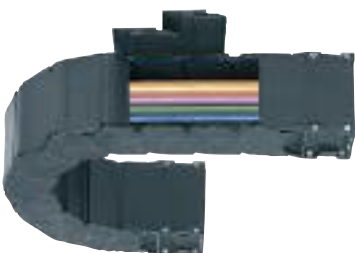
ESD Classification: Electrically conductive
ESD/ATEX version upon request



Flammability Class
VDE 0304 IIC UL94 HB



Series R - For higher speeds and smooth running



Series R100 - Cost effective alternative, for applications with low and medium speeds





E2 Energy Tubes in chip-area of a tooling machine. Resistant against hot metal chips up to 1,562°F (850°C)



U-shaped supported Energy Tube
for high lateral acceleration



Standing application - R68 Tube -
Note: the first links are supported

RX40 - New Energy Tube with chip repellent design

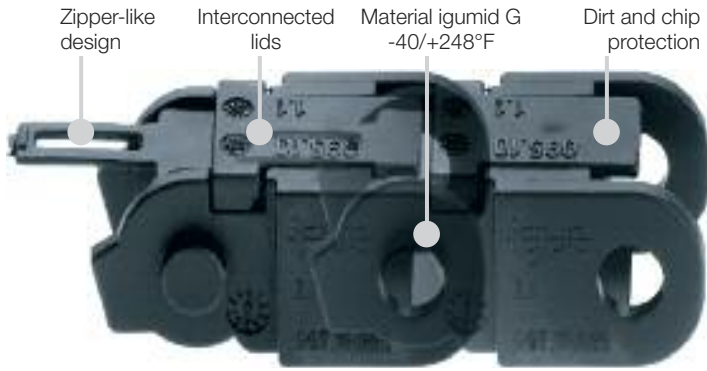
A world premiere from igus®- a totally redesigned Energy Tube - repels chips, is extremely tight, and can still be opened!

Series RX40 ▶ Page 5.95



Energy Chain System® E2 Tubes Selection Guide

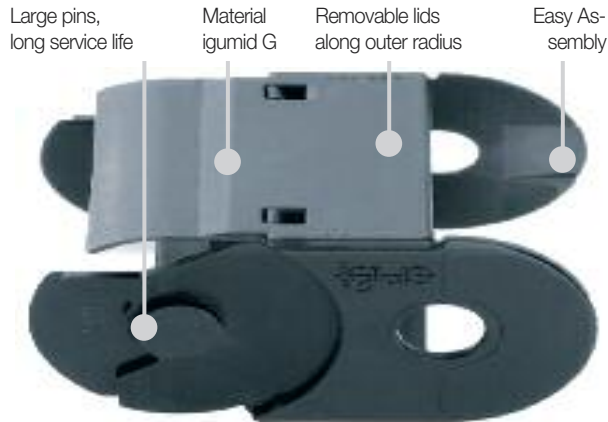
energy chain® configurator 



Zipper Energy Tubes against chips and dirt

- Fully enclosed Energy Tube with zipper opening mechanism
- Protection against dirt and chips
- Superfast opening of interconnected lids
- Modular design - tool-free lengthening and shortening
- Small pitch for low noise, smooth operation, high acceleration
- You can find more technical data about the material, chemical resistance, temperatures ► **Design, Chapter 1**

Series	Inner height <i>hi</i>		Inner width <i>Bi</i>		Outer width <i>Ba</i>		Outer height <i>ha</i>		Bending radius <i>R</i>	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
R07	.41	(10.3)	.39-1.97	(10 - 50)	.65-2.24	(16.5 - 57.0)	.59	(15.0)	1.50-1.89	(38 - 48)
R09	.59	(15.0)	.39-1.97	(10 - 50)	.72-2.29	(18.2 - 58.2)	.76	(19.3)	1.89-3.94	(48 - 100)



E2 Series R - small pitch for smooth motion

- Protection for cables and hoses against chips (also hot chips)
- Small pitch for low noise, smooth operation
- Smooth, chip repellent exterior
- Lids removable for assembly time reduction
- Double stop dog for strong unsupported lengths
- KMA mounting brackets with attachment capability on all sides
- Very small radii possible due to small pitch
- You can find more technical data about the material, chemical resistance, temperatures ► **Design, Chapter 1**

Series	Inner height <i>hi</i>		Inner width <i>Bi</i>		Outer width <i>Ba</i>		Outer height <i>ha</i>		Bending radius <i>R</i>	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
R48	.98	(25)	.98-5.12	(25-130)	1.42-5.55	(36-141)	1.42	(36)	2.36-9.84	(60 - 250)
R58	1.38	(35)	1.97-7.87	(50-200)	2.60-8.50	(66-216)	1.97	(50)	2.95-9.84	(75 - 250)
R68	1.77	(45)	1.97-9.84	(50-250)	2.68-10.55	(68-268)	2.52	(64)	3.94-11.81	(100 - 300)

Energy Chain System® E2 Tubes Assembly Instructions

Energy Chains® - Assembling E2 Zipper Energy Tubes



1 Push and click



2 Snap lids together



3 Position and...



4 ...push and snap

Energy Chains® - Separating E2 Zipper Energy Tubes



1 Pull - upward . All lids fit like a "Zipper"



2 Separate lids



1 Release side link

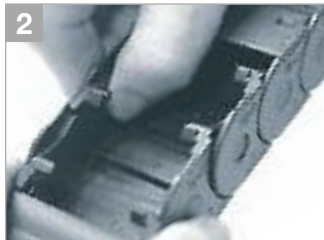


2 Twist and pull apart

Energy Chains® - Assembling E2 Series R48, R58, R68 Energy Tubes



1 Push and click



2 Snap in pin



3 Slide lid



4 Push and snap

Energy Chains® - Separating E2 Series R48, R58, R68 Energy Tubes



1 Lever open lid



2 Remove lid



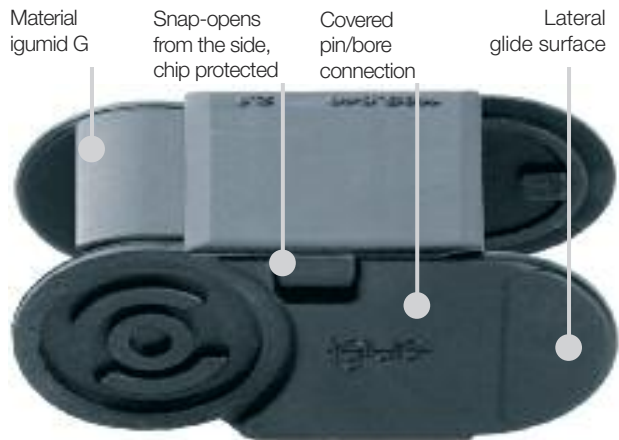
3 Release side-link



4 Twist and pull apart

Energy Chain System® E2 Tubes Selection Guide

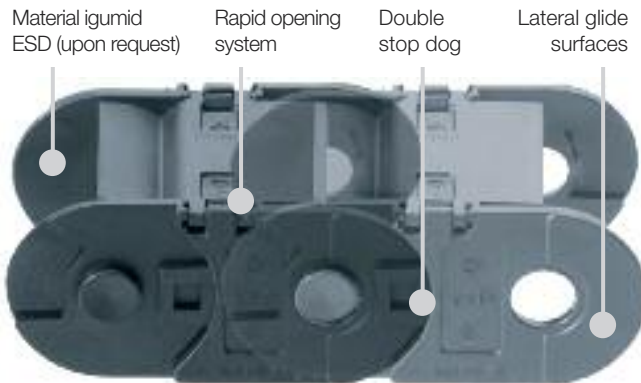
energy chain® configurator 



E2 Series R100 - robust and tight

- Very good protection against chips (also hot chips)
- Hinged, snap-open, removable lids along inner or outer radius reduce assembly time
- Space-efficient with optimized ratio of inner dimension to outer dimension
- Double stop dog for long service life and strong unsupported lengths
- Universal KMA mounting brackets with attachment capability on all sides
- You can find more technical data about the material, chemical resistance, temperatures ► **Design, Chapter 1**

Series	Inner height <i>hi</i>		Inner width <i>Bi</i>		Outer width <i>Ba</i>		Outer height <i>ha</i>		Bending radius <i>R</i>	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
R117/118	.83	(21)	.79-3.94	(20-100)	1.26-4.41	(32-112)	1.10	(28)	2.48-7.09	(63 - 180)
R157/158	1.57	(40)	1.57-7.87	(40-200)	2.20-8.50	(56-216)	1.97	(50)	3.94-9.84	(100 - 250)
R167/168	1.97	(50)	1.97-9.84	(50-250)	2.68-10.55	(68-268)	2.52	(64)	3.94-11.81	(100 - 300)



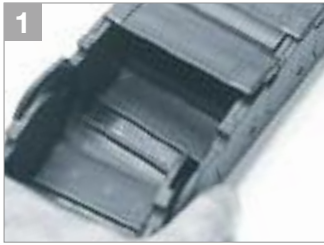
E2 Series R1000

- Enclosed Energy Tube can be used in chip areas (also hot chips)
- Snap-open mechanism, snap-open on left or right
- Opening mechanism accessible from above - rapid opening of the Energy Tube with a screwdriver or by hand
- Lightning-fast closing by hand - Secure fit without additional locking devices
- Secure fit of interior separation even when Energy Tube is open
- You can find more technical data about the material, chemical resistance, temperatures ► **Design, Chapter 1**

Series	Inner height <i>hi</i>		Inner width <i>Bi</i>		Outer width <i>Ba</i>		Outer height <i>ha</i>		Bending radius <i>R</i>	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
1480	.83	(21)	.59-4.92	(15 - 125)	1.12-5.45	(28.5 - 138.5)	1.10	(28)	2.95-7.09	(75 - 180)
2480	.98	(25)	1.50-4.06	(38 - 103)	2.13-4.69	(54.0 - 119.0)	1.38	(35)	3.94-9.84	(100 - 250)
2680	1.38	(35)	1.97-4.92	(50 - 125)	2.60-5.55	(66.0 - 141.0)	1.97	(50)	3.94-9.84	(100 - 250)
3480	1.77	(45)	2.95-6.89	(75 - 175)	3.74-7.68	(95.0 - 195.0)	2.52	(64)	4.92-11.81	(125 - 300)

Energy Chain System® E2 Tubes Assembly Instructions

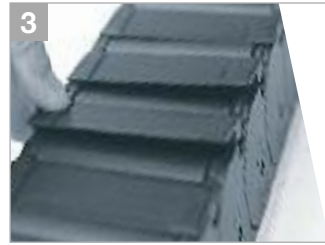
Energy Chains® - Assembling E2 Series R100 Energy Tubes



1 Push, click - and snap in pin



2 Swivel lids - push and snap



3 Slide last lid



4 Push and snap

Energy Chains® - Separating E2 Series R100 Energy Tubes



1 Lever open lid



2 Bend Energy Tube to remove lid



1 Release side-link



2 Twist and pull apart

Energy Chains® - Opening and Closing E2 Series R1000 Energy Tubes



1 Open: sivel lids



2 Close: push and snap



3 Insert screwdriver into the slot, using a lever action apply pressure to the screwdriver to release



4 Remove lid

Energy Chains® - Separating E2 Series R1000 Energy Tubes



1 Release side link



2 Twist and pull apart

Price Index



Series R07

Special Features / Options



Upon request: Cleanroom Class 1 (ISO class 3) tested by the Dryden Engineering Company, CA



ESD classification:
Electrically conductive
ESD/ATEX version upon request



Flammability Class
VDE 0304 IIC UL94 HB



Low-noise

Assembly Tips



"Zipper" fast opening and closing

Usage Guidelines



- If fast installation using zipper lids is required
- If protection against dust and dirt is required
- If quick insertion of cables with preassembled connectors is required



- If opening of the link is not necessary
 - Series 06 E2 Micro
- If cable installation without opening lids is possible
 - Series E06 E-Z Chain

Features & Benefits

- 1 "Zipper" fast opening and closing
- 2 Small pitch for low-noise, smooth operation
- 3 Zipper lids can be separated and joined at each link
- 4 For high acceleration
- 5 Mounting bracket with integrated strain relief
- 6 Lightweight
- 7 Smallest zip-open Energy Tube
- 8 Protection against dirt and chips



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator

3.28 ft (1 m) R07-20-038-0



Energy Chain®

1 Set 060-20-12PZ



Mounting Bracket

Energy Chain System® E2 Tubes Series R07 Installation Dimensions

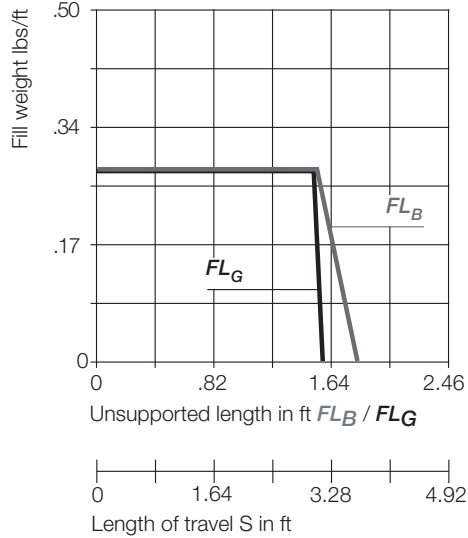
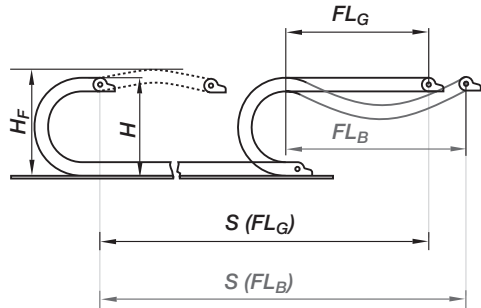
energy chain® configurator



R07

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1



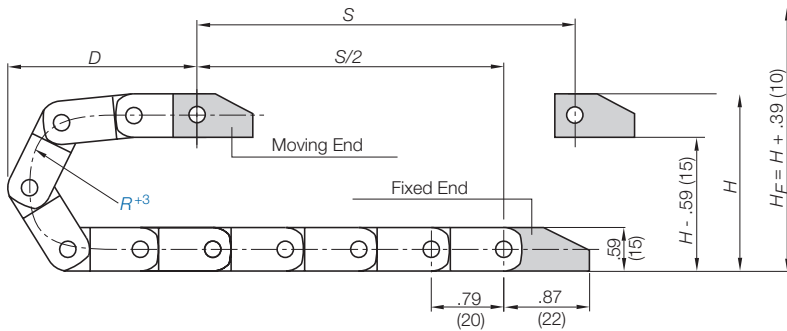
Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{Safety buffer}$
- $H_F = \text{Required clearance height}$



Pitch per link = .79" (20 mm)
Links per ft (m) = 15.24 (50)
For center mount applications:
Chain length = $S/2 + K$

The required clearance height: $H_F = H + .39 \text{ in. (10 mm)}$ (with .13 lbs/ft (0.2 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	1.50 (038)	1.89 (048)
H	3.58 (91)	4.37 (111)
D	2.99 (76)	3.39 (86)
K	6.30 (160)	7.68 (195)



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 9.84 ft/s (3 m/s) / max. 32.8 ft/s ² (10 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120° C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

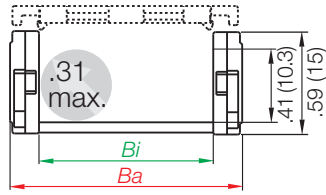
Technical Data



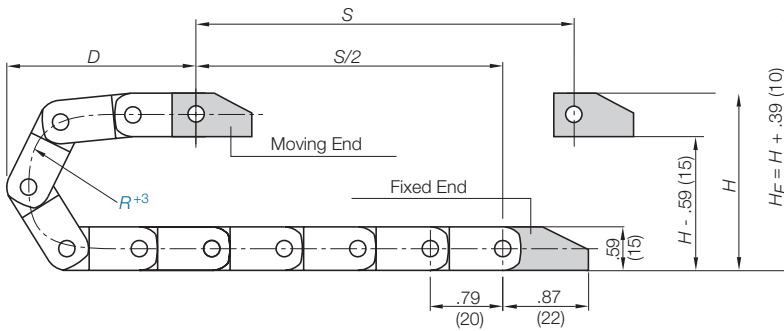
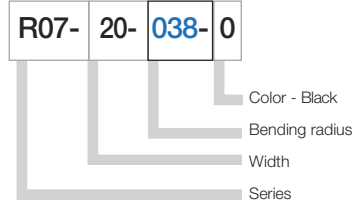
Details of material properties

Chapter 1

Series R07 - Energy Tube zip open along the outer radius



Part Number Structure



Supplement part number with required radius. Example: R07-20--0
Pitch: .79 in. (20 mm) per link links/ft (m) = 15.24 (50)

Part Number	<i>Bi</i> in. (mm)	<i>Ba</i> in. (mm)	Weight lbs/ft (kg/m)
R07-10- <input type="text" value="038"/> -0	.39 (10)	.65 (16.5)	≈ 0.09 (0.14)
R07-16- <input type="text" value="038"/> -0	.63 (16)	.89 (22.5)	≈ 0.11 (0.16)
R07-20- <input type="text" value="038"/> -0	.79 (20)	1.06 (27.0)	≈ 0.11 (0.17)
R07-30- <input type="text" value="038"/> -0	1.18 (30)	1.46 (37.0)	≈ 0.13 (0.20)
R07-40- <input type="text" value="038"/> -0	1.57 (40)	1.85 (47.0)	≈ 0.15 (0.23)
R07-50- <input type="text" value="038"/> -0	1.97 (50)	2.24 (57.0)	≈ 0.17 (0.26)

Choose from the radii below for all of the above sizes

Radius (mm) Example: R07-20--0

	<input type="text" value="038"/>	<input type="text" value="048"/>
R	1.50 (038)	1.89 (048)
H	3.58 (91)	4.37 (111)
D	2.99 (76)	3.39 (86)
K	6.30 (160)	7.68 (195)

Energy Chain System® E2 Tubes Series R07 Mounting Brackets - Plastic

energy chain® configurator ▶

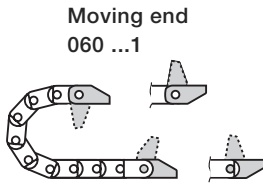


R07



Plastic, one-piece

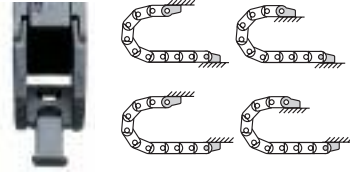
- One-piece mounting bracket
- Corrosion resistant
- Available preassembled
- Inner and outer attachment possible
- Available with or without strain relief tiewrap plates



Moving end
060 ...1



Fixed end
060...2

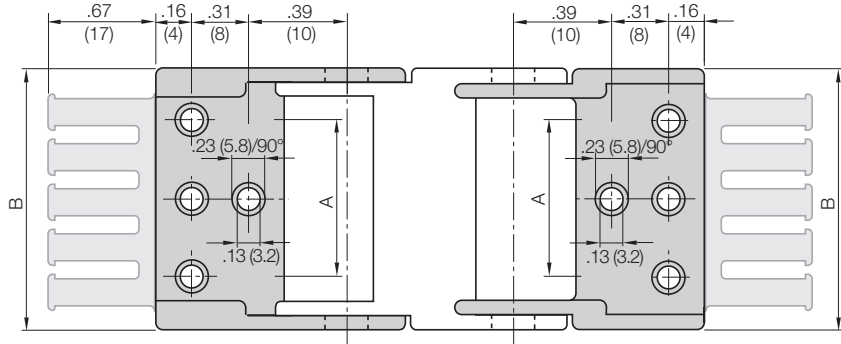


Possible installation configurations -

Part Number Structure

060-	10-	12	PZ
------	-----	----	----

- With assembled strain relief tiewrap plates
- Complete Set
- Width
- Mounting brackets for selected chain type



Full set, for both ends:

060- [10- 12] Full set, each part with pin/bore

Single-part order:

060- [10- 1] Mounting bracket with bore

060- [10- 2] Mounting bracket with pin

060-10-12 - 060-20-12:

Center bores only

060-30-12 - 060-50-12:

Outer bores only

Chain Type	Part No. Full set with Tiewrap Plate	Part No. Full Set without Tiewrap Plate	Dimension A		Dimensions B		Number of Teeth
			in.	(mm)	in.	(mm)	
R07-10	060-10-12PZ	060-10-12	—	—	.65	(16.5)	1
R07-16	060-16-12PZ	060-16-12	—	—	.89	(22.5)	2
R07-20	060-20-12PZ	060-20-12	—	—	1.06	(27.0)	2
R07-30	060-30-12PZ	060-30-12	.87	(22)	1.46	(37.0)	3
R07-40	060-40-12PZ	060-40-12	1.26	(32)	1.85	(47.0)	4
R07-50	060-50-12PZ	060-50-12	1.65	(42)	2.24	(57.0)	5

Additional Accessories



Quicksnap - the complete, detachable mounting unit, upon request



Quickfix - mounting bracket with dowel, upon request

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index


Series R09

Special Features / Options


Upon request: Cleanroom Class 1
(ISO class 3) tested by the Dryden
Engineering Company, CA



iF-Design Award Winner



Flammability Class
VDE 0304 IIC UL94 HB



Low-noise

Assembly Tips


"Zipper" fast opening and closing

Usage Guidelines

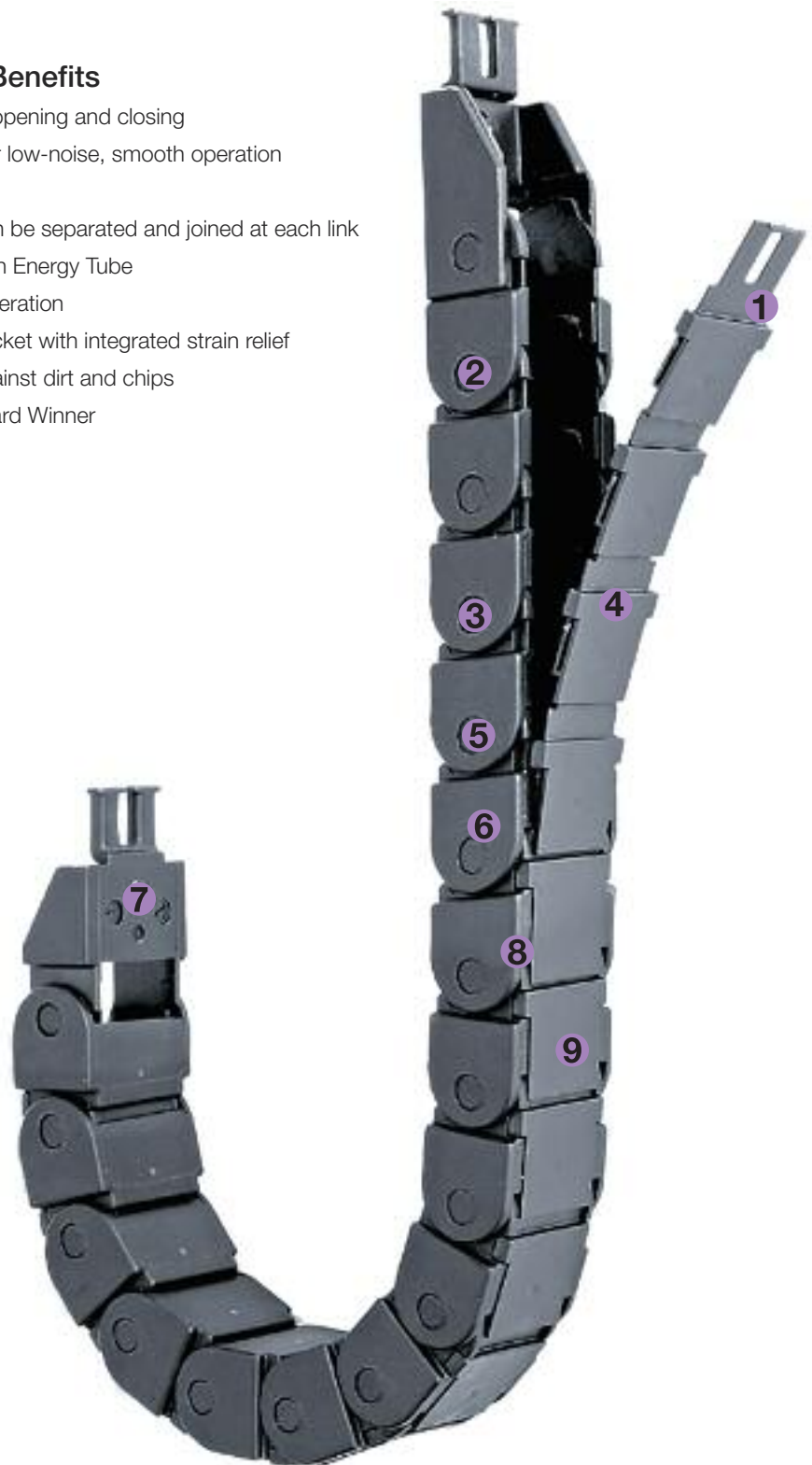

- If fast installation using zipper lids is required
- If protection against dust and dirt is required
- If quick insertion of cables with preassembled connectors is required



- If opening of the link is not necessary
 - **Series 08 E2 Micro**
- If cable installation without opening lids is necessary
 - **Series E08 E-Z Chain**

Features & Benefits

- 1 "Zipper" fast opening and closing
- 2 Small pitch for low-noise, smooth operation
- 3 Lightweight
- 4 Zipper lids can be separated and joined at each link
- 5 Small zip-open Energy Tube
- 6 For high acceleration
- 7 Mounting bracket with integrated strain relief
- 8 Protection against dirt and chips
- 9 iF-Design Award Winner


[energy chain® configurator](#)
Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

3.28 ft (1 m) **R09-20-048-0****Energy Chain®**1 Set **080-20-12PZ****Mounting Bracket**

Energy Chain System® E2 Tubes Series R09 Installation Dimensions

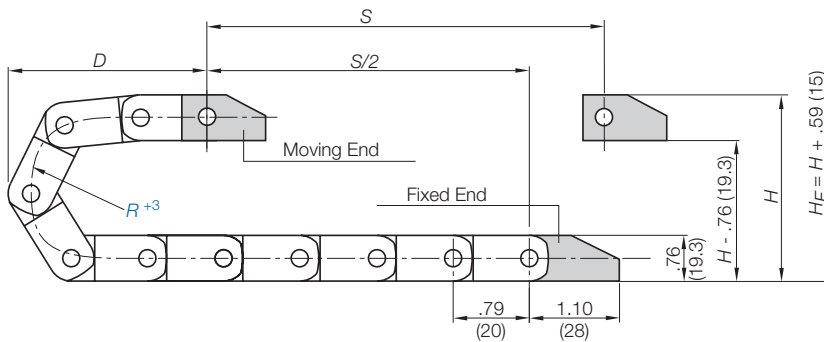
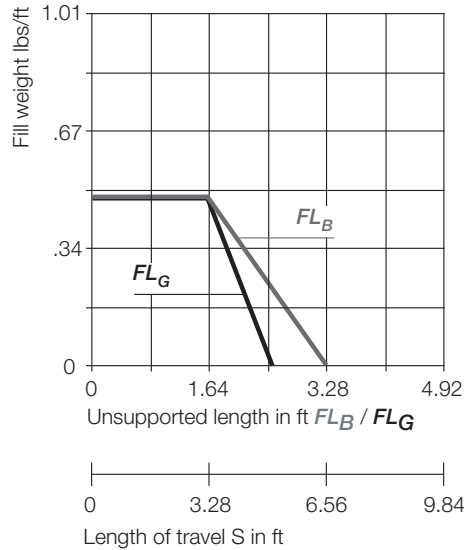
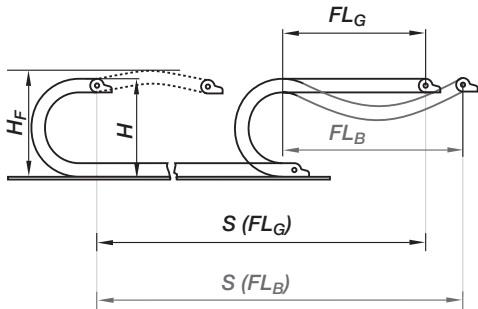
energy chain® configurator ▶



R09

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



Pitch per link = .79" (20 mm)
Links per ft (m) = 15.24 (50)
For center mount applications:
Chain length = $\frac{S}{2} + K$

The required clearance height: $H_F = H + .59$ in. (15 mm) (with .20 lbs/ft (0.3 kg/m) fill weight).
Please consult igus® if space is particularly restricted.

R	1.89 (048)	2.95 (075)	3.94 (100)
H	4.53 (115)	6.65 (169)	8.62 (219)
D	3.46 (88)	4.53 (115)	5.51 (140)
K	7.68 (195)	11.02 (280)	13.98 (355)

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{Safety buffer}$
- H_F = Required clearance height



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

Technical Data



Details of material properties

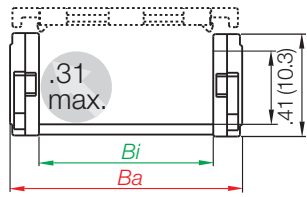
▶ Chapter 1

igus® Energy Chain System®

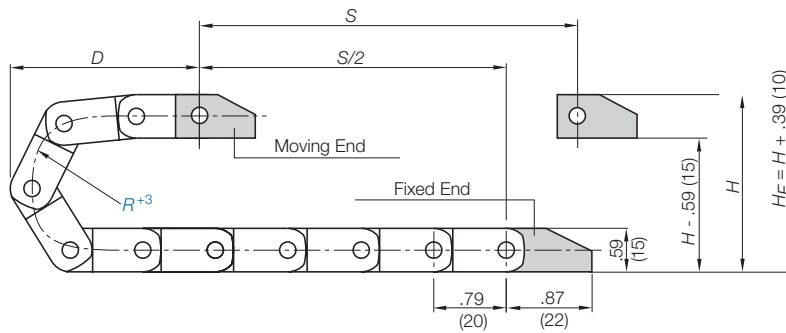
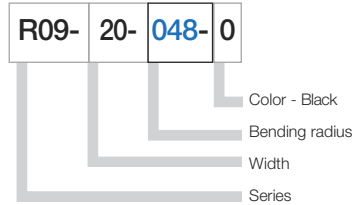
Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

Series R09 - Energy Tube zip open along the outer radius



Part Number Structure



Supplement part number with required radius. Example: R09-20-**048**-0

Pitch: .79 in. (20 mm) per link links/ft (m) = 15.24 (50)

Part Number	<i>Bi</i> in. (mm)	<i>Ba</i> in. (mm)	Weight lbs/ft (kg/m)
R09-10- <input type="text"/> -0	.39 (10)	.72 (18.2)	≈0.15 (0.23)
R09-16- <input type="text"/> -0	.63 (16)	.95 (24.2)	≈0.17 (0.26)
R09-20- <input type="text"/> -0	.79 (20)	1.11 (28.2)	≈0.18 (0.27)
R09-30- <input type="text"/> -0	1.18 (30)	1.50 (38.2)	≈0.20 (0.30)
R09-40- <input type="text"/> -0	1.57 (40)	1.90 (48.2)	≈0.22 (0.33)
R09-50- <input type="text"/> -0	1.97 (50)	2.29 (58.2)	≈0.24 (0.36)

Choose from the radii below for all of the above sizes
Radius (mm) Example: R09-20-**038**-0

	048	075	100
<i>R</i>	1.89 (048)	2.95 (075)	3.94 (100)
<i>H</i>	4.53 (115)	6.65 (169)	8.62 (219)
<i>D</i>	3.46 (88)	4.53 (115)	5.51 (140)
<i>K</i>	7.68 (195)	11.02 (280)	13.98 (355)

Energy Chain System® E2 Tubes Series R09 Mounting Brackets - Plastic

energy chain® configurator ▶

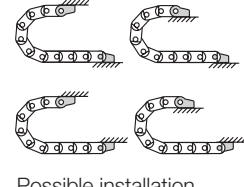
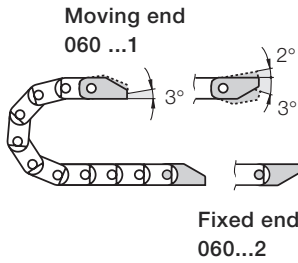


R09



Plastic, one-piece

- One-piece mounting bracket
- Corrosion resistant
- Available preassembled
- Inner and outer attachment possible
- Available with or without strain relief tiewrap plates

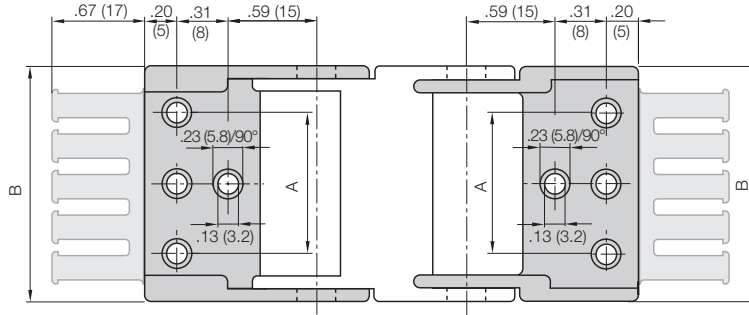


Possible installation configurations -

Part Number Structure

080-	20-	12	PZ
------	-----	----	----

- With assembled strain relief tiewrap plates
- Complete Set
- Width
- Mounting brackets for selected chain type



Full set, for both ends:

080- [20- 12] Full set, each part with pin/bore

Single-part order:

080- [20- 1] Mounting bracket with bore

080- [20- 2] Mounting bracket with pin

080-10-12 - 080-20-12:

Center bores only

080-30-12 - 080-50-12:

Outer bores only

Chain Type	Part No. Full set with Tiewrap Plate	Part No. Full Set without Tiewrap Plate	Dimension A		Dimensions B		Number of Teeth
			in.	(mm)	in.	(mm)	
08-10	080-10-12PZ	080-10-12	—	—	.72	(18.2)	1
08-16	080-16-12PZ	080-16-12	—	—	.95	(24.2)	2
08-20	080-20-12PZ	080-20-12	—	—	1.11	(28.2)	2
08-30	080-30-12PZ	080-30-12	.87	(22)	1.50	(38.2)	3
08-40	080-40-12PZ	080-40-12	1.26	(32)	1.90	(48.2)	4
08-50	080-50-12PZ	080-50-12	1.65	(42)	2.29	(58.2)	5

Additional Accessories



Quicksnap - the complete, detachable mounting unit, upon request



Quickfix - mounting bracket with dowel, upon request

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index


Series R48

Special Features / Options


ESD classification:
Electrically conductive
ESD/ATEX version upon request



Flammability Class
VDE 0304 IIC UL94 HB

Assembly Tips


To open the Energy Tube Series R, lift up the lid (with a screwdriver) and remove the lid

Other Installation Methods

Vertical, hanging ≤ 164 ft (50 m)

Vertical, standing ≤ 13.12 ft (4 m)

Side-mounted, un_supp. ≤ 4.92 ft (1.5 m)

Rotary requires further calculation

Usage Guidelines


- If particularly quiet operation is required
- If very high speeds are required
- If chip repellent features are required



- If a particularly low-cost solution is the main factor
➤ **Series R117/R118 E2 Tubes**
- If no chip protection is required
➤ **Series 250 E2 Medium**

Features & Benefits

- 1 Large pins for high stability
- 2 Protection for cables and hoses against hot chips
- 3 Removable lids along the outer radius
- 4 Small pitch for low-noise, smooth operation
- 5 KMA mounting brackets with attachment capabilities on all sides
- 6 Smooth, chip-repellent exterior
- 7 Fully enclosed
- 8 Strain relief separator option: Separator with integrated strain relief for use in the first or last chain link ➤ **Strain Relief, Chapter 10**


Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator

3.28 ft (1 m) **48-075-060-0**

Energy Chain®

With 2 separators **482** assembled every 2nd link

Interior Separation

1 Set **480-075-12**

Mounting Bracket

Energy Chain System® E2 Tubes Series R48 Installation Dimensions

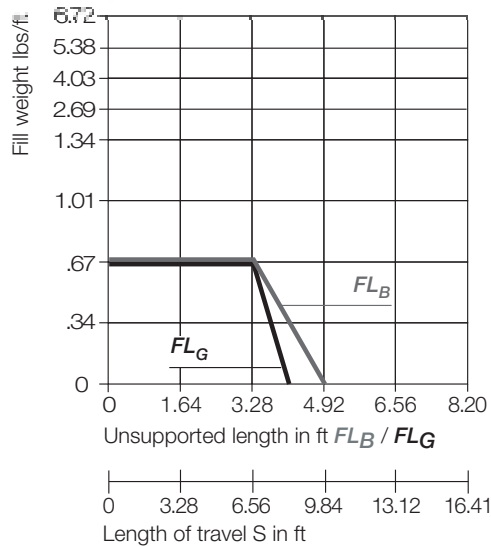
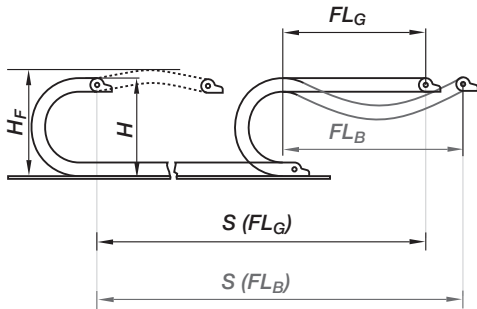
energy chain® configurator



R48

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1



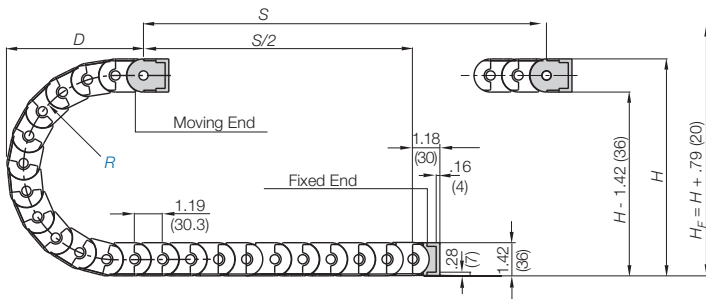
Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{safety buffer}$
 - H_F = Required clearance height
 - H_{R1} = Trough inner height
 - H_2 = *Mounting height
 - D_2 = Over length - long travels, gliding
 - K_2 = *Add-on
- *If the mounting bracket location is set lower



Pitch per link = 1.19" (30.3 mm)
Links per ft (m) = 10.06 (33)
For center mount applications:
Chain length = $S/2 + K$

The required clearance height: $H_F = H + .79 \text{ in. (20 mm)}$ (with .34 lbs/ft (0.5 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	2.36 (060)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)
H	6.14 (156)	7.32 (186)	9.29 (236)	11.26 (286)	13.23 (336)	15.20 (386)	17.17 (436)	21.10 (536)
D	4.84 (123)	5.43 (138)	6.42 (163)	7.40 (188)	8.39 (213)	9.37 (238)	10.35 (263)	12.32 (313)
K	9.84 (250)	11.81 (300)	14.76 (375)	17.91 (455)	21.06 (535)	24.21 (615)	27.17 (690)	33.46 (850)



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 32.8 ft/s (10 m/s) / max. 328 ft/s ² (100 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 9.84 ft/s (3 m/s) / max. 32.8 ft/s ² (10 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

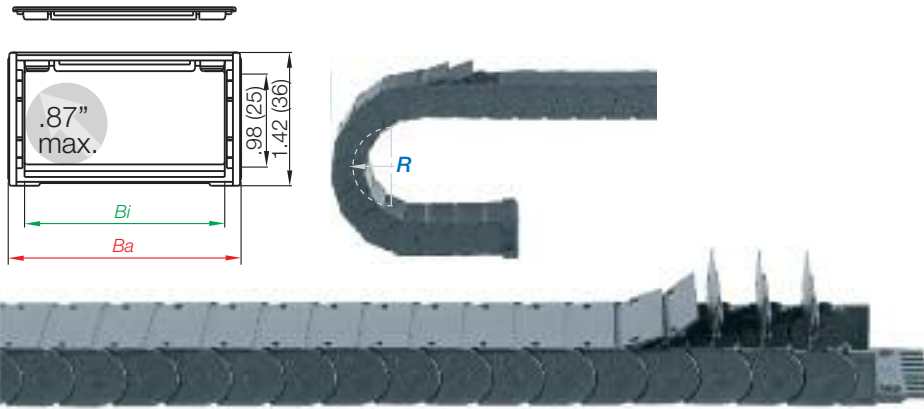
Technical Data



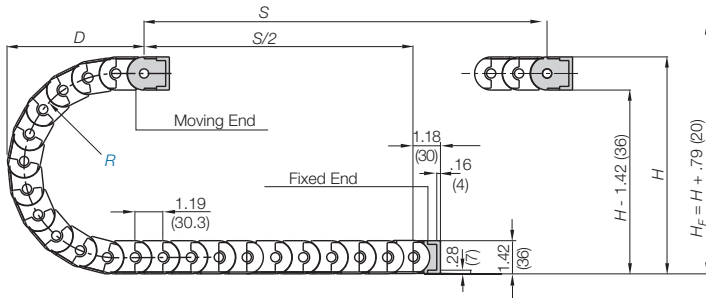
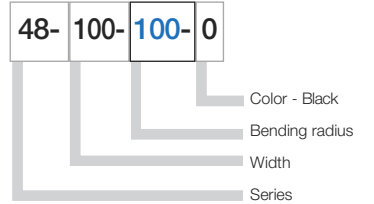
Details of material properties

Chapter 1

Series R48 - Energy Tube snap-open along the outer radius



Part Number Structure



Supplement part number with required radius. Example: R48-100-**100**-0
Pitch: 1.19 in. (30.3 mm) per link links/ft (m) = 10.06 (33)

Part Number	<i>Bi</i> in. (mm)	<i>Ba</i> in. (mm)	Weight lbs/ft (kg/m)
48-025- <input type="checkbox"/> -0	.98 (25)	1.42 (36)	≈ 0.43 (0.64)
48-050- <input type="checkbox"/> -0	1.97 (50)	2.40 (61)	≈ 0.56 (0.84)
48-075- <input type="checkbox"/> -0	2.95 (75)	3.39 (86)	≈ 0.69 (1.03)
48-100- <input type="checkbox"/> -0	3.94 (100)	4.37 (111)	≈ 0.83 (1.23)
48-130- <input type="checkbox"/> -0	5.12 (130)	5.55 (141)	≈ 0.98 (1.46)

Choose from the radii below for all of the above sizes

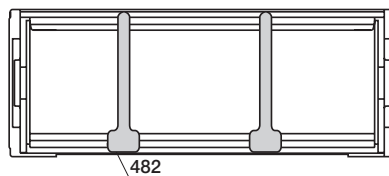
Radius (mm) Example: R48-100-**100**-0

	060	075	100	125	150	175	200	250
R	2.36 (060)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)
H	6.14 (156)	7.32 (186)	9.29 (236)	11.26 (286)	13.23 (336)	15.20 (386)	17.17 (436)	21.10 (536)
D	4.84 (123)	5.43 (138)	6.42 (163)	7.40 (188)	8.39 (213)	9.37 (238)	10.35 (263)	12.32 (313)
K	9.84 (250)	11.81 (300)	14.76 (375)	17.91 (455)	21.06 (535)	24.21 (615)	27.17 (690)	33.46 (850)

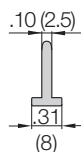
Interior Separation

Option 1: Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link. .



Vertical separator 481



Vertical Separator

Unassembled	Part No. 481
Assembled	Part No. 482

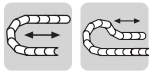
- Standard separator 481 for Energy Chains®
This separator is used for general subdivision of Energy Chain®.

Energy Chain System® E2 Tubes Series R48 Mounting Brackets - KMA

energy chain® configurator ▶



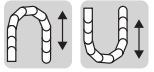
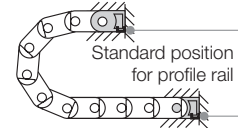
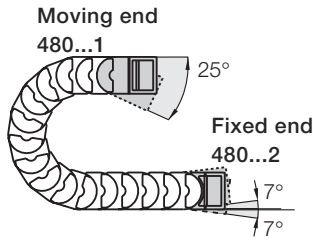
R48



Standard

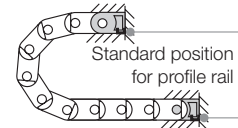
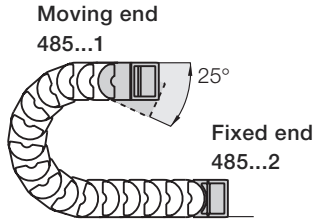
Option 1: KMA pivoting

- Attachment points on all sides
- Corrosion resistant

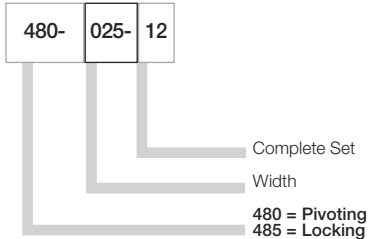


Option 2: KMA locking

- Vertical hanging, standing travel
- Attachment points on all sides
- Corrosion resistant



Part Number Structure



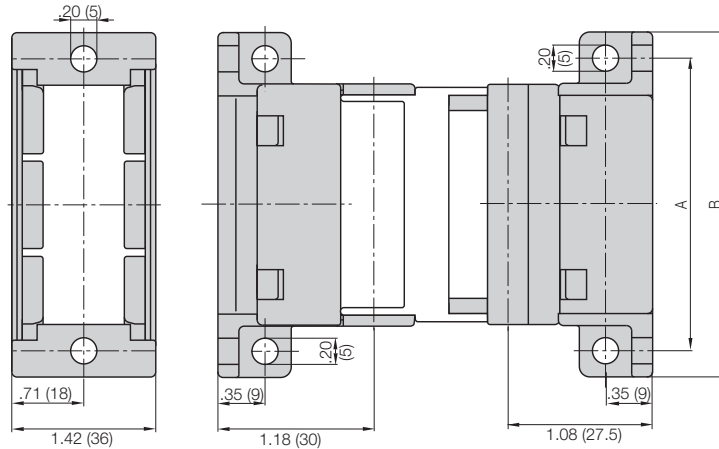
Full set, for both ends:

480-025-12 Full set, each part with pin/bore

Single-part order:

480-025-1 Mounting bracket with bore

480-025-2 Mounting bracket with pin



Width	Part No. Full Set			Dimension A		Dimension B	
	Pivoting	Locking		in.	(mm)	in.	(mm)
-025	480	485	-025-12	1.77	(45)	2.17	(55)
-050	480	485	-050-12	2.76	(70)	3.15	(80)
-075	480	485	-075-12	3.74	(95)	4.13	(105)
-100	480	485	-100-12	4.72	(120)	5.12	(130)
-130	480	485	-130-12	5.91	(150)	6.30	(160)

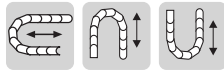
The following parts are required for attachment of the mounting brackets:

- Socket head cap bolt M5* DIN 912-8.8
4 pieces/set
- Washer 5.3 DIN 125-ST
8 pieces/set
- Hexagon nut M5 DIN 934-8
4 pieces/set

* The length of the socket head cap bolt is dependent on the thickness of the attachment base.

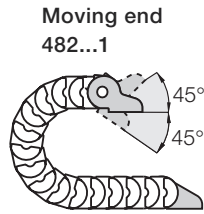
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



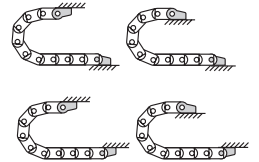


Option 1: Steel

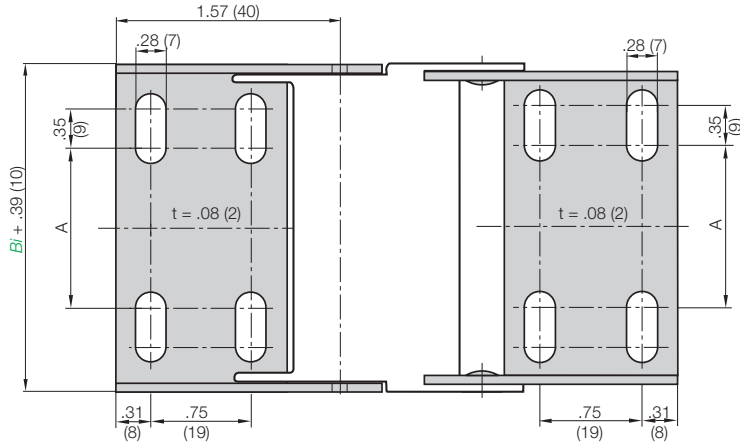
- Locked connection to Energy Tube
- Electrically conductive
- Minimized external width



Fixed end
482...2



Possible installation configurations -



Full set, for both ends:

482- 025- 12 Full set, each part with pin/bore

Single-part order:

482- 025- 1 Mounting bracket with bore

482- 025- 2 Mounting bracket with pin

For Series	Part No. Full Set	Dimension A in. (mm)
48-025	482-025-12	-
48-050	482-050-12	.87 (22)
48-075	482-075-12	1.85 (47)
48-100	482-100-12	2.83 (72)
48-130	482-130-12	4.02 (102)

The following parts are required for attachment of the mounting brackets:

- Socket head cap bolt M5* DIN 912-8.8
4 pieces/set
- Washer 5.3 DIN 125-ST
8 pieces/set
- Hexagon nut M5 DIN 934-8
4 pieces/set

* The length of the socket head cap bolt is dependent on the thickness of the attachment base.

Part No. Mounting Brackets Full Set

4 parts, 2 with pin, 2 with bore

Series R48:

482-Width-12

Part No. Mounting bracket with bore

2 parts, 1 left & 1 right

Series R48:

482-Width -1

Part No. Mounting bracket with pin

2 parts, 1 left & 1 right

Series R48:

482-Width-2

Energy Chain System® E2 Tubes Series R48 Mounting Bracket - Plastic

energy chain® configurator 

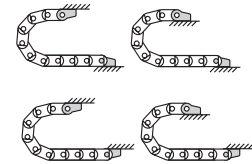
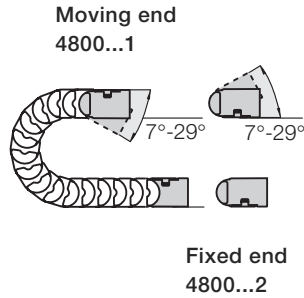


R48

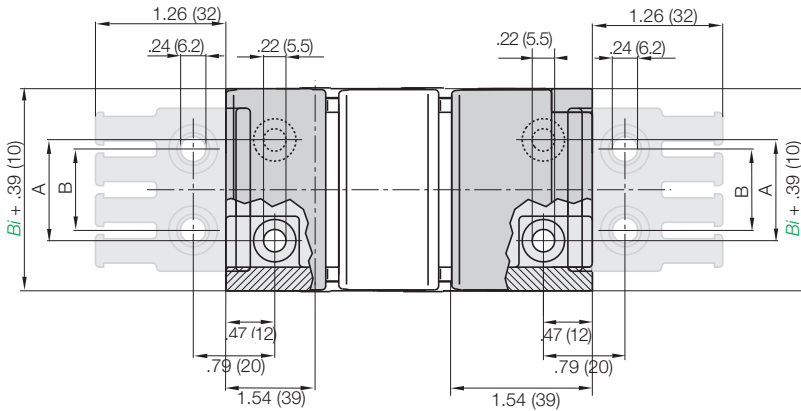


Option 1: Plastic

- Attachment option for strain relief tie-wrap plate
- Locked connection to Energy Tube
- Minimized external width



Possible installation configurations -



Part Number Structure

4800- 025- 12- PZB

- 4800- With tie-wrap plate
- 025- Complete Set
- 12- Width
- PZB Mounting brackets for selected chain type

Full set, for both ends:

4800-025-12 Full set, each part with pin/bore

Single-part order:

- 4800-025-1 Mounting bracket with bore
- 4800-025-2 Mounting bracket with pin

Part No. Mounting Brackets Full Set

4 parts, 2 with pin, 2 with bore
Series R48:
4800-Width-12

Part No. Mounting bracket with bore

2 parts, 1 left & 1 right
Series R48:
4800-Width -1

Part No. Mounting bracket with pin

2 parts, 1 left & 1 right
Series R48:
4800-Width-2

For Series	Part No. Full Set	Part No. Full Set with Tiewrap Plate	Dimension A		Dimension B	
			in.	(mm)	in.	(mm)
48-025	4800-025-12	4800-025-12PZB	.47	(12)	.59	(15)
48-050	4800-050-12	4800-050-12PZB	1.46	(37)	1.18	(30)
48-075	4800-075-12	4800-075-12PZB	2.44	(62)	1.57	(40)
48-100	4800-100-12	4800-100-12PZB	3.43	(87)	3.15	(80)
48-130	4800-130-12	4800-130-12PZB	4.61	(117)	-	-

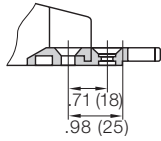
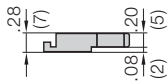
The following parts are required for attachment of the mounting brackets:

- Socket head cap bolt M5* DIN 912-8.8
4 pieces/set
- Washer 5.3 DIN 125-ST
8 pieces/set
- Hexagon nut M5 DIN 934-8
4 pieces/set

* The length of the socket head cap bolt is dependent on the thickness of the attachment base.

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

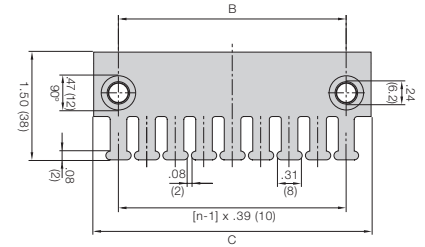


Tiewrap Plates

 Shown
assembled

 Single
tiewrap
plate

**Option 1:
Tiewrap plates as an individual part**

Available as an individual component that can be fixed external to the mounting bracket.

Tiewrap Plates	n Number of Teeth	Dimension C	Dimension B
2020-ZB	3	1.18 (30)	.59 (15)
2030-ZB	4	1.57 (40)	.79 (20)
2040-ZB	5	1.97 (50)	1.18 (30)
2050-ZB	6	2.36 (60)	1.57 (40)
2070-ZB	8	3.15 (80)	2.36 (60)
2090-ZB	9	3.54 (90)	2.76 (70)
2100-ZB	10	3.94 (100)	3.15 (80)
2120-ZB	12	4.72 (120)	3.94 (100)


 For more information please refer to
strain relief section of Chapter 10

Cable tiewraps as individual parts

Cable tiewraps 100 pieces/bag	Width x Length		Maximum Ø		Tensile Strength	
	in.	(mm)	in.	(mm)	lbs	(N)
CFB-001	.19 x 5.91	(4.8 x 150)	1.42	(36)	50	(222)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index


Series R58

Special Features / Options


ESD classification:
Electrically conductive
ESD/ATEX version upon request



Flammability Class
VDE 0304 IIC UL94 HB

Assembly Tips


To open the Energy Tube Series R, lift up the lid (with a screwdriver) and remove the lid

Other Installation Methods

Vertical, hanging ≤ 164 ft (50 m)

Vertical, standing ≤ 13.12 ft (4 m)

Side-mounted, un_supp. ≤ 6.56 ft (2 m)

Rotary requires further calculation

Usage Guidelines


- If particularly quiet operation is required
- If very high speeds are required
- If chip protection is subject to stringent requirements



- If a particularly low-cost solution is the main factor
 - **Series R157/R158 E2 Tubes**
- If no chip protection is required
 - **Series 250 E2 Medium**

Features & Benefits

- 1 Protection for cables and hoses against hot chips
- 2 Large pins for high stability
- 3 Removable lids along the outer radius
- 4 Small pitch for low-noise, smooth operation
- 5 KMA mounting brackets with attachment capabilities on all sides
- 6 Smooth, chip-repellent exterior
- 7 Fully enclosed
- 8 Small pitch enable very small radii
- 9 Integrated strain relief available especially for Energy Tubes


Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator

3.28 ft (1 m) **58-100-100-0**

Energy Chain®

With 2 separators **582** assembled every 2nd link

Interior Separation

1 Set **580-100-12**

Mounting Bracket

Energy Chain System® E2 Tubes Series R58 Installation Dimensions

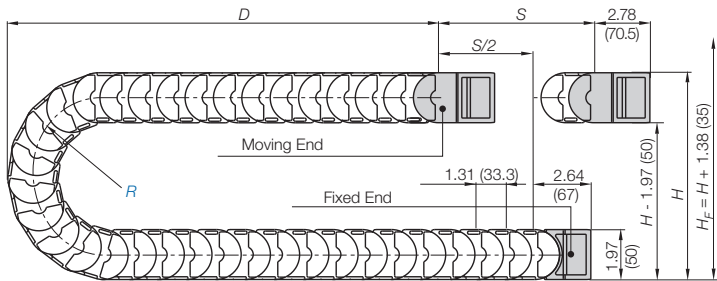
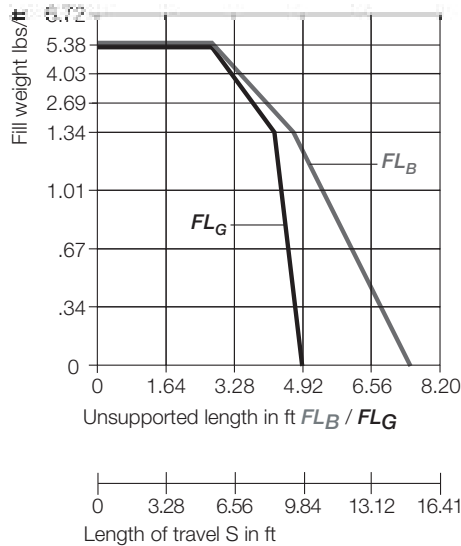
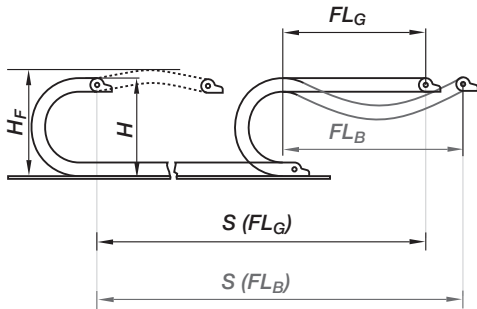
energy chain® configurator ▶



R58

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



Pitch per link: = 1.31" (33.3 mm)
Links per foot (m): = 9.14 (30)
For center mount applications:
Chain length = $S/2 + K$

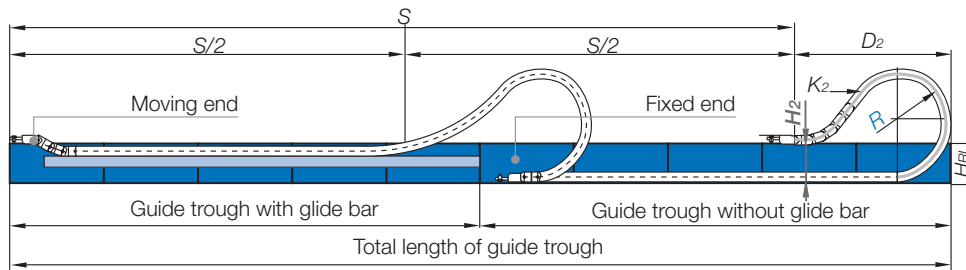
The required clearance height: $H_F = H + 1.38$ in. (35 mm) (with .34 lbs/ft (0.5 kg/m) fill weight. Please consult igus® if space is particularly restricted.

R	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)
H	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	17.72 (450)	21.65 (550)
D	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	10.83 (275)	12.80 (325)
K	12.96 (305)	15.16 (385)	18.11 (460)	21.26 (540)	27.36 (695)	33.66 (855)

For long travels with lowered mounting height

Long travel lengths from 32.8 ft. (10 m) to max. 246 ft. (75 m)

For center mount applications:
Chain length: = $S/2 + K_2$



R	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)
H_2	7.87 (200)	8.50 (216)	8.50 (216)	8.50 (216)	8.50 (216)	8.50 (216)
D_2	5.91 (150)	12.20 (310)	14.96 (380)	18.90 (480)	31.50 (800)	41.34 (1050)
K_2	14.76 (375)	19.69 (500)	27.52 (699)	34.09 (866)	49.80 (1265)	65.55 (1665)

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{safety buffer}$
 - H_F = Required clearance height
 - H_{R1} = Trough inner height
 - H_2 = *Mounting height
 - D_2 = Overlength - long travels, gliding
 - K_2 = *Add-on
- *If the mounting bracket location is set lower

Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.

Design, Chapter 1

Technical Data



Details of material properties

▶ Chapter 1

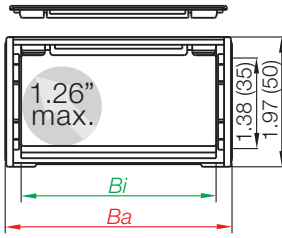
Speed / acceleration FL_G	max. 32.8 ft/s (10 m/s) / max. 328 ft/s ² (100 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 9.84 ft/s (3 m/s) / max. 32.8 ft/s ² (10 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120° C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB



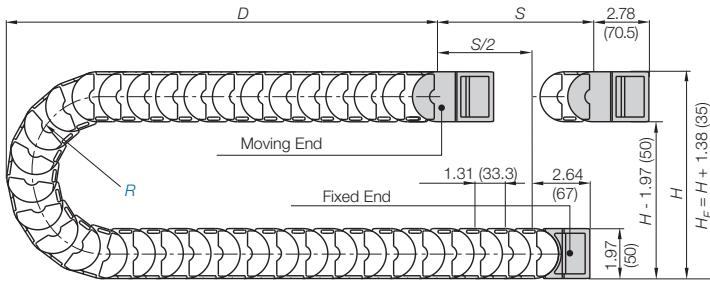
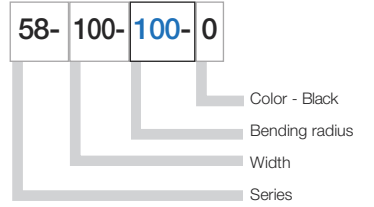
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Series R58 - Energy Tube snap-open along the outer radius



Part Number Structure



Supplement part number with required radius. Example: R58-100--0
Pitch: 1.31 in. (33.3 mm) per link links/ft (m) = 9.14 (30)

Part Number	<i>Bi</i> in. (mm)	<i>Ba</i> in. (mm)	Weight lbs/ft (kg/m)
58-050- <input type="text" value=""/> -0	1.97 (50)	2.60 (66)	≈ 1.01 (1.50)
58-075- <input type="text" value=""/> -0	2.95 (75)	3.58 (91)	≈ 1.19 (1.77)
58-100- <input type="text" value=""/> -0	3.94 (100)	4.57 (116)	≈ 1.37 (2.04)
58-125- <input type="text" value=""/> -0	4.92 (125)	5.55 (141)	≈ 1.55 (2.31)
58-150- <input type="text" value=""/> -0	5.91 (150)	6.54 (166)	≈ 1.75 (2.61)
58-175- <input type="text" value=""/> -0	6.89 (175)	7.52 (191)	≈ 1.94 (2.88)
58-200- <input type="text" value=""/> -0	7.87 (200)	8.50 (216)	≈ 2.12 (3.15)

Choose from the radii below for all of the above sizes
Radius (mm) Example: R58-100--0

	<input type="text" value="075"/>	<input type="text" value="100"/>	<input type="text" value="125"/>	<input type="text" value="150"/>	<input type="text" value="200"/>	<input type="text" value="250"/>
R	2.95 (75)	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)
H	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	17.72 (450)	21.65 (550)
D	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	10.83 (275)	12.80 (325)
K	12.96 (305)	15.16 (385)	18.11 (460)	21.26 (540)	27.36 (695)	33.66 (855)

Energy Chain System® E2 Tubes

Series R58

Interior Separation

energy chain® configurator 

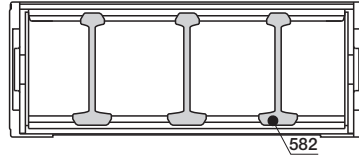


R58

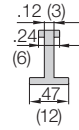
Option 1: Vertical separators

Vertical separators are used if a vertical subdivision of the Energy Tube interior is required. By standard, vertical separators are assembled every other Energy Tube link.

 STANDARD



- **Standard separator 581 for Energy Tubes**
This separator is used for general subdivision of Energy Tubes.

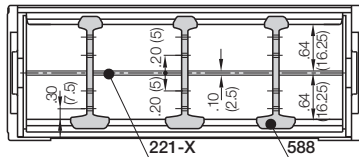


Vertical Separator

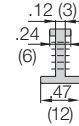
Unassembled	Part No. 581
Assembled	Part No. 582

Option 2: Full-width shelf

It is ideal for use in applications involving many thin cables with similar or identical diameters. This shelf slides into place and spans the entire width of the chain.



- **Slotted separator 587 for Energy Tubes**
This component is used to form the basic pattern of a shelf system.



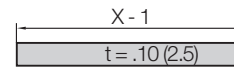
Slotted Separator

Unassembled	Part No. 587
Assembled	Part No. 588

Shelves 220-XX

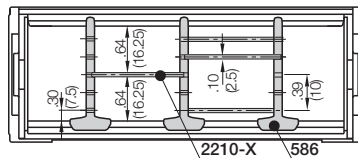
Shelves can be inserted at 3 different heights in .20" (5mm) increments

Width X in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Part No. Unassembled	Part No. Assembled
1.97 (50)	220-50	221-50	5.91 (150)	220-150	221-150
2.95 (75)	220-75	221-75	6.89 (175)	220-175	221-175
3.94 (100)	220-100	221-100	7.87 (200)	220-200	221-200
4.92 (125)	220-125	221-125			

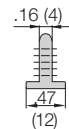


Option 3: Shelves

It is ideal for use in applications involving many cables with similar or identical diameters. Partial separation into individual compartments can be achieved and can be used across the entire width.



- **Slotted separator 585 for Energy Tubes**
This component is used to form the basic pattern of a shelf system.



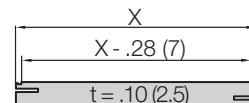
Slotted Separator

Unassembled	Part No. 585
Assembled	Part No. 586

Shelves 2200-XX

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 3 different heights in .20" (5mm) increments

Width X in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Part No. Unassembled	Part No. Assembled
.71 (18)	2200-18	2210-18	2.28 (58)	2200-58	2210-58
.91 (23)	2200-23	2210-23	2.68 (68)	2200-68	2210-68
1.10 (28)	2200-28	2210-28	2.87 (73)	2200-73	2210-73
1.30 (33)	2200-33	2210-33	3.46 (88)	2200-88	2210-88
1.50 (38)	2200-38	2210-38	3.90 (99)	2200-99	2210-99
1.69 (43)	2200-43	2210-43	4.88 (124)	2200-124	2210-124
1.89 (48)	2200-48	2210-48	5.87 (149)	2200-149	2210-149



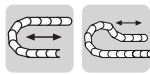
PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



igus® Energy Chain System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

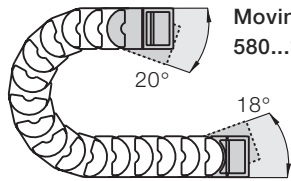
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QuickSpec: <http://www.igus.com/quickspec>



Standard

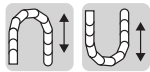
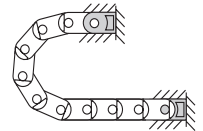
Option 1: pivoting

- Unsupported and gliding applications
- Space-restricted conditions
- Mounting points on all sides
- KMA with Quickflange option available for short and long travels



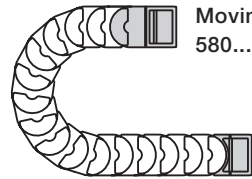
Moving end
580...1

Fixed end
580...2



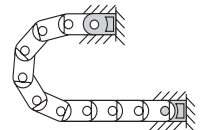
Option 2: locking

- Vertical hanging/standing travels
- Extreme speeds and accelerations
- Mounting points on all sides
- Flush mounting at both ends of the Energy Tube
- KMA with Quickflange option



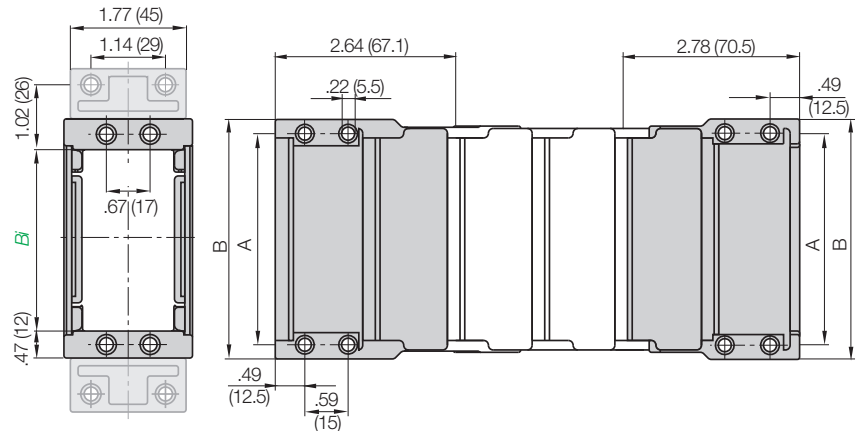
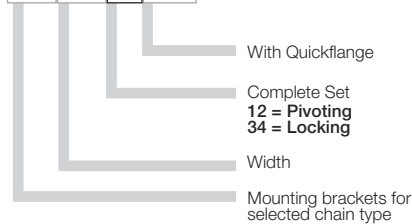
Moving end
580...3

Fixed end
580...4



Part Number Structure

580-050-12-QF



Full set, for both ends:

580-050-12-QF Full set, each part with pin/bore + tiewrap plate

Single-part order:

580-050-1-QF Mounting bracket with bore + tiewrap plate

580-050-2-QF Mounting bracket with pin + tiewrap plate



Quickflange upon request

- Unassembled

Part number 16800-QF

For Tube Type	Part No. Full set with Tiewrap Plate	Part No. Full Set with Quickflange	Dimension A in. (mm)	Dimension B in. (mm)
58-050	580-050- <input type="checkbox"/>	580-050- <input type="checkbox"/> QF	2.44 (62)	2.91 (74)
58-075	580-075- <input type="checkbox"/>	580-075- <input type="checkbox"/> QF	3.43 (87)	3.90 (99)
58-100	580-100- <input type="checkbox"/>	580-100- <input type="checkbox"/> QF	4.41 (112)	4.88 (124)
58-125	580-125- <input type="checkbox"/>	580-125- <input type="checkbox"/> QF	5.39 (137)	5.87 (149)
58-150	580-150- <input type="checkbox"/>	580-150- <input type="checkbox"/> QF	6.38 (162)	6.85 (174)
58-175	580-175- <input type="checkbox"/>	580-175- <input type="checkbox"/> QF	7.36 (187)	7.83 (199)
58-200	580-200- <input type="checkbox"/>	580-200- <input type="checkbox"/> QF	8.35 (212)	8.82 (224)

For pivoting brackets choose 12

For locking brackets choose 34

Example: 580-050- 34 QF

The following parts are required for attachment of the mounting brackets:

- **Socket head cap bolt**
M5* DIN 912-8.8
8 pieces/set
- **Washer**
5.3 DIN 125-ST
8 pieces/set
- **Hexagon nut**
M5 DIN 934-8
8 pieces/set

* The length of the socket head cap bolt is dependent on the thickness of the attachment base.



Integrated strain relief for E2 Energy Tubes - Series R

- Strain relief disappears completely within the Energy Tube
- Easy to assemble, no screws required

Part. No.	Width (mm)	Number of teeth
5850-Z	1.81 (46)	4

Number of tiewrap plates 5850-Z for selected inner width B_i

B_i (mm)	Width tiewrap plate (mm)	Number of tiewrap plate n	Total number of teeth
50	-	-	-
75	1.81 (46)	1	4
100	1.81 (46)	1	4
125	1.81 (46)	2	8
150	1.81 (46)	2	8
175	1.81 (46)	3	12
200	1.81 (46)	3	12

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



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Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus steel guide troughs, the following components are required:

- Full travel length of guide trough
Part number 95-30
- 1/2 travel length glide bars
Part number 92-01
- Installation sets as end connectors
Part number 95-50-XX

-XX indicates the length of the profile rails on which the guide trough is mounted. The values and part numbers are specified in the table on the right. The standard length of the trough components and glide bars is 6.56 ft (2 m). The required overall length of the guide trough directly correlates to the length of travel.

Example:

Length of travel 164 ft (50 m)
Center mounted

Required guide troughs:
164 ft (50 m) guide trough without glide bar
82 ft (25 m) glide bar
= 25 sections of 6.56 ft (2 m) guide trough

Part No. 95-30
= 13 sections of 6.56 ft (2 m) glide bar

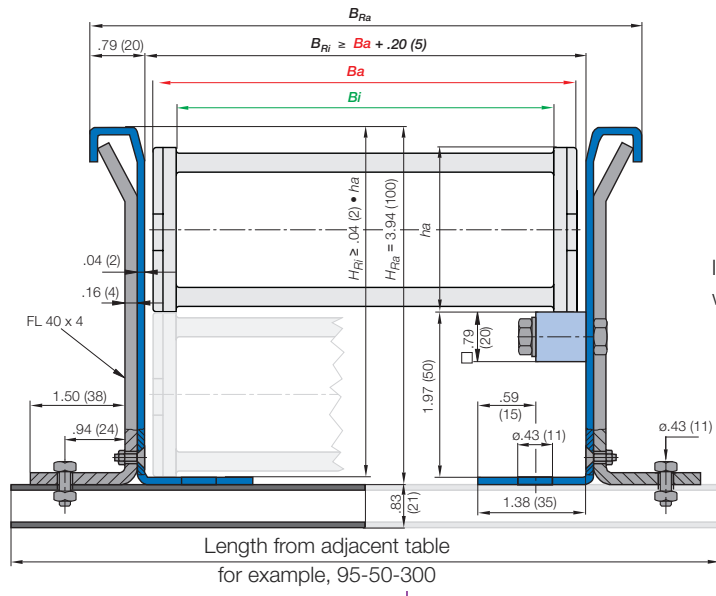
Part No. 92-01
Required number of installation sets:
= Number of guide trough components + 1
= 25 + 1 = 26
Part number of the installation sets

95-50-XXX
Example:
95-50-250 for 9.84" (250 mm) long profile rail.



Width of Crossbar
58-075-200-0

	B_{Ri}	Part No. Installation Set
-050	2.80 (71)	95-50-200
-075	3.78 (96)	95-50-225
-100	4.76 (121)	95-50-250
-125	5.75 (146)	95-50-275
-150	6.73 (171)	95-50-300
-175	7.72 (196)	95-50-325
-200	8.70 (221)	95-50-350



- Guide trough
- Glide bars
- Installation set "Basic"
- C-profile rail

Individual attachment without profile rail

Standard length profile rail

* Specialized guide trough available upon request

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index


Series R68

Special Features / Options


ESD classification:
Electrically conductive
ESD/ATEX version upon request



Flammability Class
VDE 0304 IIC UL94 HB



iF-Design Award Winner

Assembly Tips


To open the Energy Tube Series R, lift up the lid (with a screwdriver) and remove the lid

Other Installation Methods

Vertical, hanging ≤ 197 ft (60 m)

Vertical, standing ≤ 13.12 ft (4 m)

Side-mounted, un supp. ≤ 6.56 ft (2 m)

Rotary requires further calculation

Usage Guidelines


- If particularly quiet operation is required
- If very high speeds are required
- If chip protection is subject to stringent requirements



- If a particularly low-cost solution is the main factor
 - Series R167/R168 E2 Tubes
- If no chip protection is required
 - Series 340/350 E2 Medium

Features & Benefits

- 1 Large pins for high stability
- 2 Protection for cables and hoses against hot chips
- 3 Small pitch for low-noise, smooth operation
- 4 Removable lids along the outer radius
- 5 Smooth, chip-repellent exterior
- 6 KMA mounting brackets with attachment capabilities on all sides
- 7 Fully enclosed
- 8 Integrated strain relief available especially for Energy Tubes


Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

[energy chain® configurator](#)

3.28 ft (1 m) **68-100-100-0****Energy Chain®**With 2 separators **311** assembled every 2nd link**Interior Separation**1 Set **680-100-12****Mounting Bracket**

Energy Chain System® E2 Tubes Series R68 Installation Dimensions

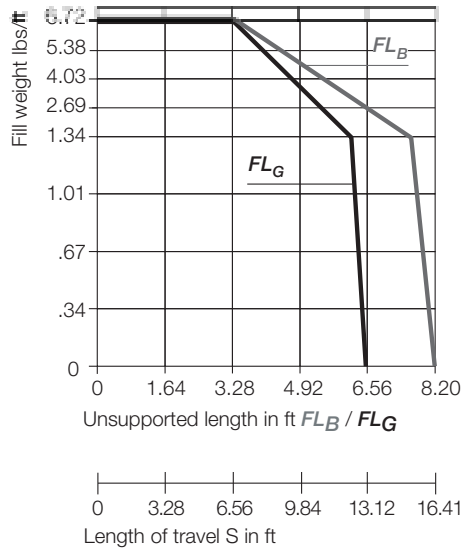
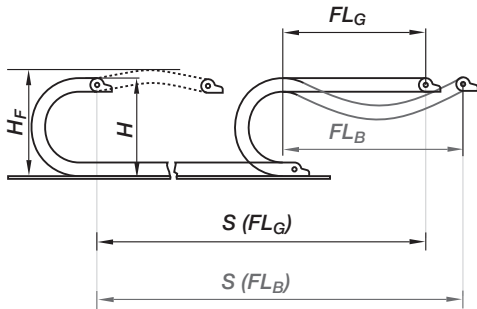
energy chain® configurator



R68

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1



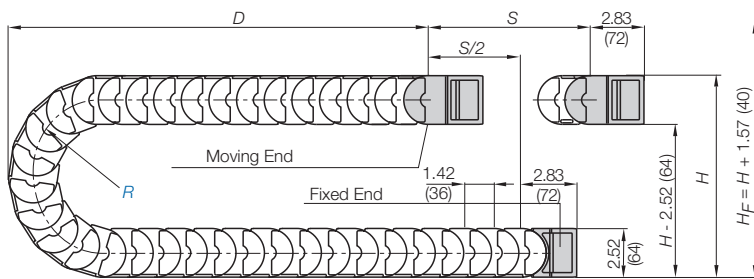
Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- $H_f = \text{Required clearance height}$
- $H_{R1} = \text{Trough inner height}$
- $H_2 = \text{*Mounting height}$
- $D_2 = \text{Overlength - long travels, gliding}$
- $K_2 = \text{*Add-on}$
- *If the mounting bracket location is set lower



Pitch per link = 1.42" (36 mm)
Links per foot (m) = 8.53 (28)
For center mount applications:
Chain length = $S/2 + K$

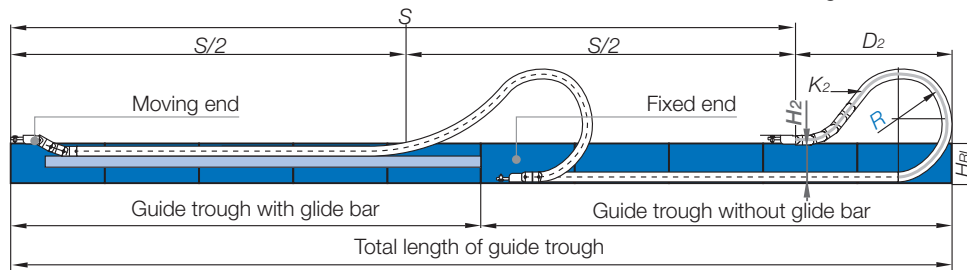
The required clearance height: $H_f = H + 1.57 \text{ in. (40 mm)}$ (with 1.68 lbs/ft (2.5 kg/m) fill weight. Please consult igus® if space is particularly restricted.

R	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	9.84 (250)	11.81 (300)
H	10.39 (264)	12.36 (314)	14.33 (364)	16.30 (414)	18.27 (464)	20.24 (514)	22.20 (564)	26.14 (664)
D	7.32 (186)	8.31 (211)	9.29 (236)	10.28 (261)	11.26 (286)	12.24 (311)	13.23 (336)	15.20 (386)
K	15.35 (390)	18.31 (465)	21.46 (545)	24.60 (625)	27.76 (705)	30.71 (780)	33.86 (860)	39.96 (1015)

For long travels with lowered mounting height

Long travel lengths from 32.8 ft. (10 m) to max. 328 ft. (100 m)

For center mount applications:
Chain length = $S/2 + K_2$



Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.

Design, Chapter 1

R	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	9.84 (250)	11.81 (300)
H_2	10.43 (265)	11.18 (284)	11.18 (284)	11.18 (284)	11.18 (284)	11.18 (284)	11.18 (284)	11.18 (284)
D_2	7.87 (200)	14.57 (370)	17.32 (440)	21.26 (540)	25.59 (650)	27.56 (700)	33.46 (850)	41.34 (1050)
K_2	19.69 (500)	25.51 (648)	31.18 (792)	35.43 (900)	43.94 (1116)	49.96 (1269)	58.11 (1476)	70.87 (1800)

Speed / acceleration FL_G	max. 32.8 ft/s (10 m/s) / max. 328 ft/s ² (100 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 9.84 ft/s (3 m/s) / max. 32.8 ft/s ² (10 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

Technical Data



Details of material properties

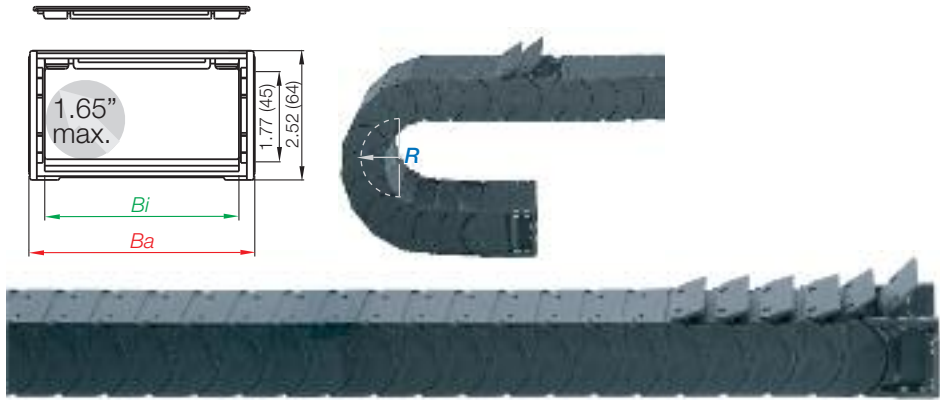
Chapter 1

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

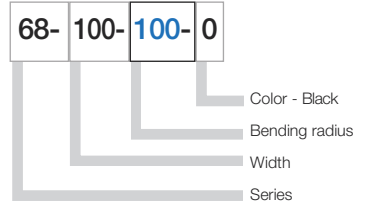


igus® Energy Chain System®

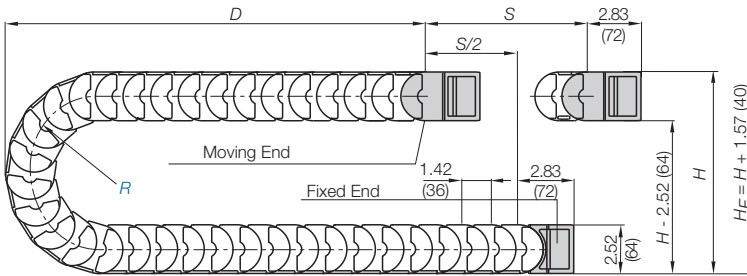
Series R68 - Energy Tube snap-open along the outer radius



Part Number Structure



Telephone 1-800-521-2747
Fax 1-401-438-7270



Supplement part number with required radius. Example: R68-100--0
Pitch: 1.42 in. (36 mm) per link links/ft (m) = 8.53 (28)

Part Number	<i>Bi</i> in. (mm)	<i>Ba</i> in. (mm)	Weight lbs/ft (kg/m)
68-050- <input type="text" value=""/> -0	1.97 (50)	2.68 (68)	≈ 1.28 (1.90)
68-075- <input type="text" value=""/> -0	2.95 (75)	3.66 (93)	≈ 1.46 (2.18)
68-100- <input type="text" value=""/> -0	3.94 (100)	4.65 (118)	≈ 1.65 (2.46)
68-115- <input type="text" value=""/> -0	4.53 (115)	5.24 (133)	≈ 1.77 (2.63)
68-125- <input type="text" value=""/> -0	4.92 (125)	5.63 (143)	≈ 1.86 (2.77)
68-150- <input type="text" value=""/> -0	5.91 (150)	6.61 (168)	≈ 2.05 (3.05)
68-175- <input type="text" value=""/> -0	6.89 (175)	7.60 (193)	≈ 2.26 (3.36)
68-200- <input type="text" value=""/> -0	7.87 (200)	8.58 (218)	≈ 2.45 (3.64)
68-225- <input type="text" value=""/> -0	8.86 (225)	9.57 (243)	≈ 2.63 (3.92)
68-250- <input type="text" value=""/> -0	9.84 (250)	10.55 (268)	≈ 2.84 (4.23)

Choose from the radii below for all of the above sizes

Radius (mm) Example: R68-100--0

	100	125	150	175	200	225	250	300
R	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	9.84 (250)	11.81 (300)
H	10.39 (264)	12.36 (314)	14.33 (364)	16.30 (414)	18.27 (464)	20.24 (514)	22.20 (564)	26.14 (664)
D	7.32 (186)	8.31 (211)	9.29 (236)	10.28 (261)	11.26 (286)	12.24 (311)	13.23 (336)	15.20 (386)
K	15.35 (390)	18.31 (465)	21.46 (545)	24.60 (625)	27.76 (705)	30.71 (780)	33.86 (860)	39.96 (1015)

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Energy Chain System® E2 Tubes

Series R68

Interior Separation

energy chain® configurator 

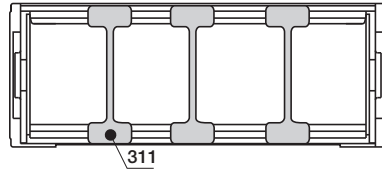


R68

Option 1: Vertical separators

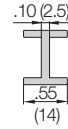
Vertical separators are used if a vertical subdivision of the Energy Tube interior is required. By standard, vertical separators are assembled every other Energy Tube link.

 STANDARD



- **Standard separator 301 for Energy Tubes**

This separator is used for general subdivision of Energy Tubes.

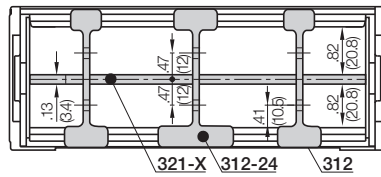


Vertical Separator

Unassembled	Part No. 301
Assembled	Part No. 311

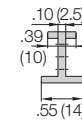
Option 2: Full-width shelf

It is ideal for use in applications involving many thin cables with similar or identical diameters. This shelf slides into place and spans the entire width of the chain.



- **Slotted separator 302 for Energy Tubes**

This component is used to form the basic pattern of a shelf system.



Slotted Separator

Unassembled	Part No. 302
Assembled	Part No. 312

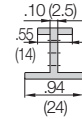
Shelves 320-XX

Shelves can be inserted at 3 different heights in .47" (12mm) increments

Width X in. (mm)	Part No. Unassembled	Part No. Assembled
1.97 (050)	320-050	321-050
2.95 (075)	320-075	321-075
3.94 (100)	320-100	321-100
4.53 (115)	320-115	321-115
4.92 (125)	320-125	321-125
5.91 (150)	320-150	321-150
6.89 (175)	320-175	321-175
7.87 (200)	320-200	321-200

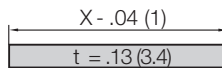
- **Slotted separator 302-24 for Energy Tubes**

This component is used to form the basic pattern of a shelf system.



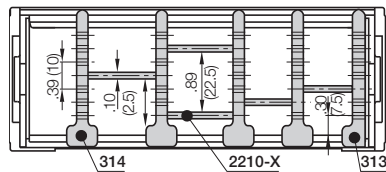
Slotted Separator

Unassembled	Part No. 302-24
Assembled	Part No. 312-24



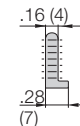
Option 3: Shelves

It is ideal for use in applications involving many cables with similar or identical diameters. Partial separation into individual compartments can be achieved and can be used across the entire width.



- **Side plate 303 for Energy Tubes**

This component is used to form the basic pattern of a shelf system.



Side Plate

Unassembled	Part No. 303
Assembled	Part No. 313

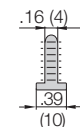
Shelves 2200-XX

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 7 different heights in .20" (5mm) increments

Width X in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Part No. Unassembled	Part No. Assembled
.71 (18)	2200-18	2210-18	2.28 (58)	2200-58	2210-58
.91 (23)	2200-23	2210-23	2.68 (68)	2200-68	2210-68
1.10 (28)	2200-28	2210-28	2.87 (73)	2200-73	2210-73
1.30 (33)	2200-33	2210-33	3.46 (88)	2200-88	2210-88
1.50 (38)	2200-38	2210-38	3.90 (99)	2200-99	2210-99
1.69 (43)	2200-43	2210-43	4.88 (124)	2200-124	2210-124
1.89 (48)	2200-48	2210-48	5.87 (149)	2200-149	2210-149

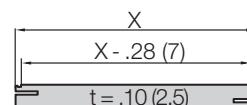
- **Vertical separator 304 for Energy Tubes**

This component is used to form the basic pattern of a shelf system.



Vertical Separator

Unassembled	Part No. 304
Assembled	Part No. 314



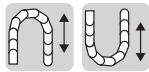
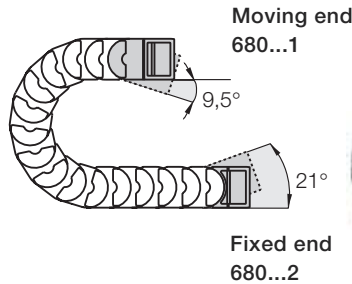
PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS





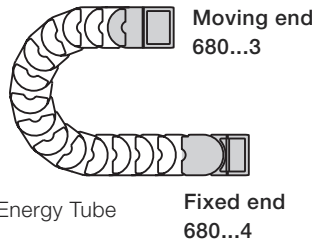
Option 1: pivoting

- Unsupported and gliding applications
- Space-restricted conditions
- Mounting points on all sides
- KMA with Quickflange option available for short and long travels



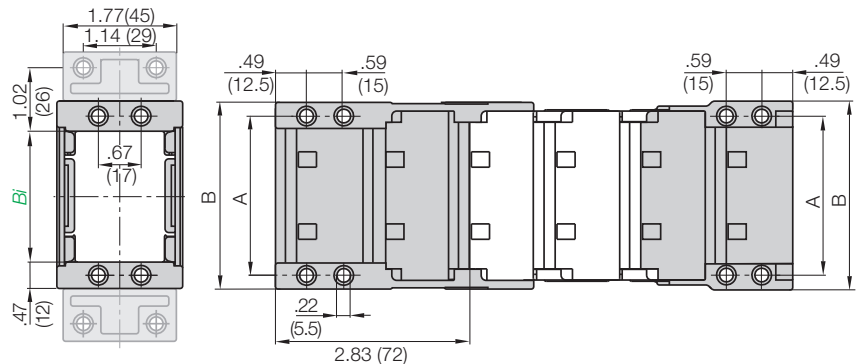
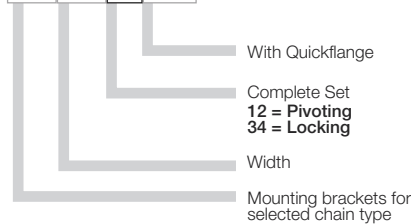
Option 2: locking

- Vertical hanging/standing travels
- Extreme speeds and accelerations
- Mounting points on all sides
- Flush mounting at both ends of the Energy Tube
- KMA with Quickflange option



Part Number Structure

680-050-12-QF



Full set, for both ends:

680-050-12-QF Full set, each part with pin/bore + tiewrap plate

Single-part order:

- 680-050-1-QF Mounting bracket with bore + tiewrap plate
- 680-050-2-QF Mounting bracket with pin + tiewrap plate



Quickflange unassembled
Part number 16800-QF

For Tube Type	Part No. Full set with Tiewrap Plate	Part No. Full Set with Quickflange	Dimension A		Dimension B	
			in.	(mm)	in.	(mm)
68-050	680-050- <input type="checkbox"/>	680-050- <input type="checkbox"/> QF	2.44	(62)	2.91	(74)
68-075	680-075- <input type="checkbox"/>	680-075- <input type="checkbox"/> QF	3.43	(87)	3.90	(99)
68-100	680-100- <input type="checkbox"/>	680-100- <input type="checkbox"/> QF	4.41	(112)	4.88	(124)
68-115	680-115- <input type="checkbox"/>	680-115- <input type="checkbox"/> QF	5.00	(127)	5.47	(139)
68-125	680-125- <input type="checkbox"/>	680-125- <input type="checkbox"/> QF	5.39	(137)	5.87	(149)
68-150	680-150- <input type="checkbox"/>	680-150- <input type="checkbox"/> QF	6.38	(162)	6.85	(174)
68-175	680-175- <input type="checkbox"/>	680-175- <input type="checkbox"/> QF	7.36	(187)	7.83	(199)
68-200	680-200- <input type="checkbox"/>	680-200- <input type="checkbox"/> QF	8.35	(212)	8.82	(224)
68-225	680-225- <input type="checkbox"/>	680-225- <input type="checkbox"/> QF	9.33	(237)	9.80	(249)
68-250	680-250- <input type="checkbox"/>	680-250- <input type="checkbox"/> QF	10.31	(262)	10.79	(274)

The following parts are required for attachment of the mounting brackets:

- **Socket head cap bolt**
M5* DIN 912-8.8
8 pieces/set
- **Washer**
5.3 DIN 125-ST
8 pieces/set
- **Hexagon nut**
M5 DIN 934-8
8 pieces/set

* The length of the socket head cap bolt is dependent on the thickness of the attachment base.

For pivoting brackets choose 12
For locking brackets choose 34
Example: 680-050- 34 QF



Integrated strain relief for E2 Energy Tubes - Series R

- Strain relief disappears completely within the Energy Tube
- Easy to assemble, no screws required

Part. No.	Width (mm)	Number of teeth
3050-Z	1.97 (50)	5
3075-Z	2.95 (75)	7

Number of tiewrap plates 3050-Z for selected inner width B_i

B_i in. (mm)	Width tiewrap plate in. (mm)	Number of tiewrap plates n	Total number of teeth
1.97 (50)	–	–	–
2.95 (75)	–	–	–
3.94 (100)	1.97 (50)	1	5
4.52 (115)	1.97 (50)	1	5
4.92 (125)	1.97 (50)	1	5
5.91 (150)	1.97 (50)	2	10
6.89 (175)	1.97 (50)	2	10
7.87 (200)	1.97 (50)	3	15
8.86 (225)	1.97 (50)	3	15
9.89 (250)	1.97 (50)	4	20

Number of tiewrap plates 3075-Z for selected inner width B_i

B_i in. (mm)	Width tiewrap plate in. (mm)	Number of tiewrap plates n	Total number of teeth
1.97 (50)	–	–	–
2.95 (75)	–	–	–
3.94 (100)	–	–	–
4.52 (115)	2.95 (75)	1	7
4.92 (125)	2.95 (75)	1	7
5.91 (150)	2.95 (75)	1	7
6.89 (175)	2.95 (75)	2	14
7.87 (200)	2.95 (75)	2	14
8.86 (225)	2.95 (75)	3	21
9.89 (250)	2.95 (75)	3	21

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Guide troughs are used with applications where the upper run of the Energy Tube glides on the lower run. If using igus steel guide troughs, the following components are required:

- Full travel length of guide trough
Part number 93-30
- 1/2 travel length glide bars
Part number 93-01
- Installation sets as end connectors
Part number 93-50-XX

-XX indicates the length of the profile rail on which the guide trough is mounted. The values and part numbers are specified in the table on the right. The standard length of the trough components and glide bars is 6.56 ft (2 m). The required overall length of the guide trough directly correlates to the length of travel.

Example:

Length of travel 164 ft (50 m)
Center mounted

Required guide troughs:

164 ft (50 m) guide trough, 82 ft (25 m) glide bar
= 25 sections of 6.56 ft (2 m) guide trough
Part No. 93-30
= 13 sections of 6.56 ft (2 m) glide bar

Part No. 93-01

Required number of installation sets:

= Number of guide trough components + 1
= 25 + 1 = 26

Part number of the installation sets

93-50-XXX

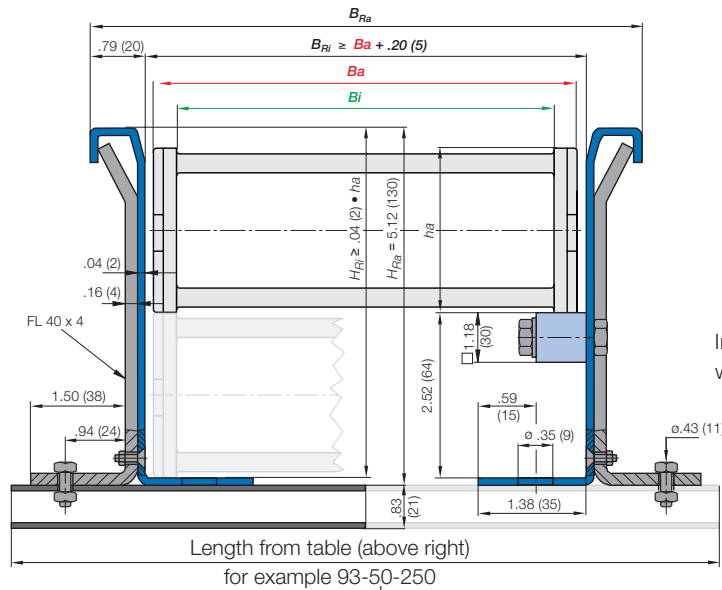
Example:

93-50-250 for 9.84" (250 mm) long profile rail.



Width of Crossbar
68-075-200-0

	B_{Ri}	Installation Part No.
-050	2.87 (73)	93-50-200
-075	3.86 (98)	93-50-225
-100	4.84 (123)	93-50-250
-115	5.43 (138)	93-50-250
-125	5.83 (148)	93-50-275
-150	6.81 (173)	93-50-300
-175	7.80 (198)	93-50-325
-200	8.78 (223)	93-50-350
-225	9.76 (248)	93-50-375
-250	10.75 (273)	93-50-400



- Guide trough
- Glide bars
- Installation set "Basic"
- C-profile rail

Individual attachment without profile rail

* Specialized guide trough available upon request

Standard length profile rail

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



R117
R118



Energy Chain System® E2 Medium Series R117/R118



Price Index



Series R117/R118

Special Features / Options



ESD classification:
Electrically conductive
ESD/ATEX version upon request

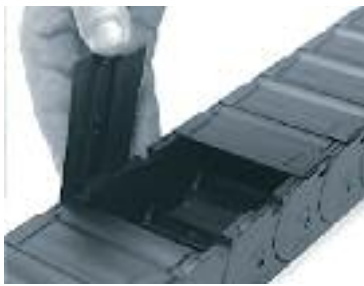


Flammability Class
VDE 0304 IIC UL94 HB



iF-Design Award Winner

Assembly Tips



Lids of the Energy Tube Series R100 are hinged for easy access

Usage Guidelines



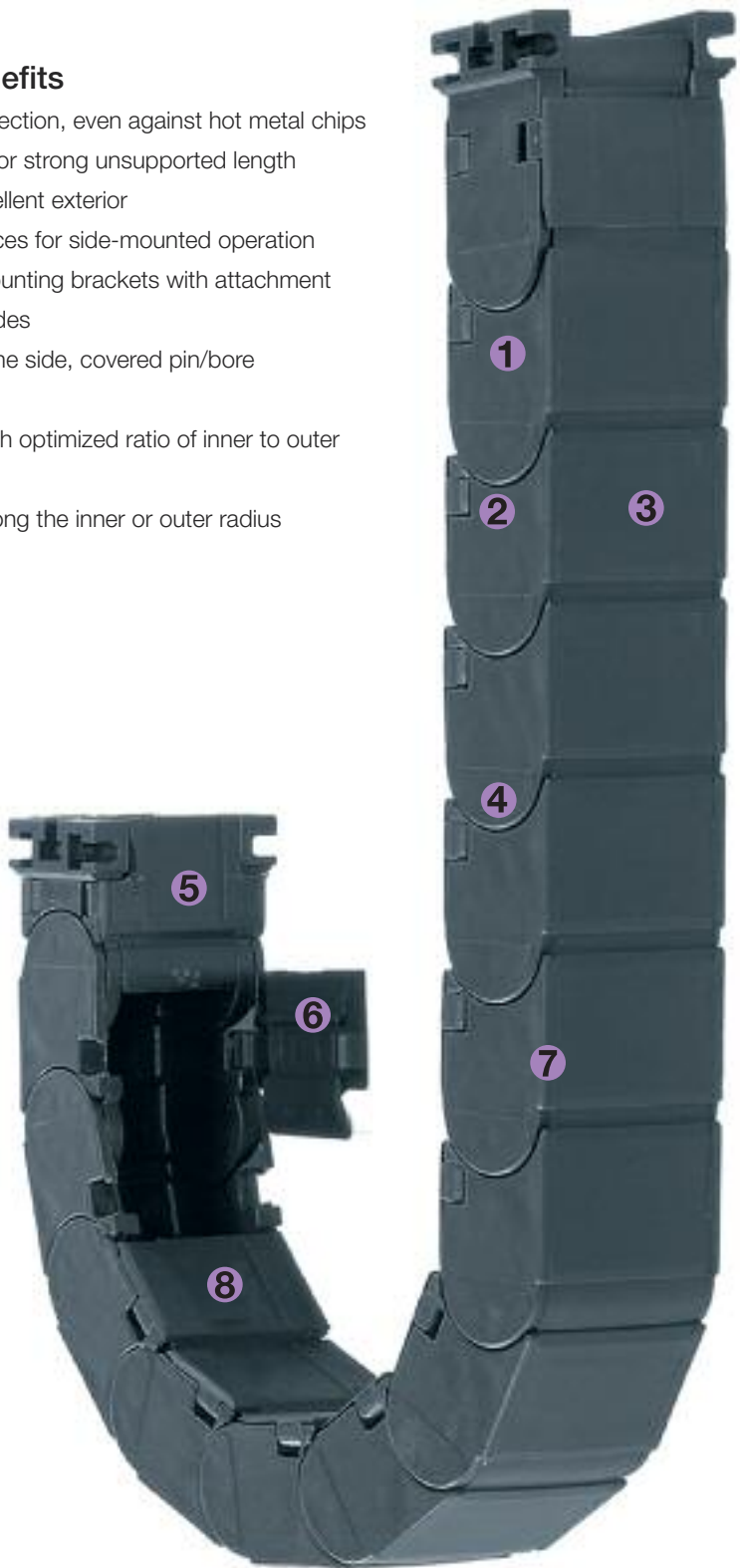
- If snap-open accessibility along inner or outer radius is required
- If price is an issue
- If flush attachment is required



- For smoother running and smaller pitch
 - Series R48 E2 Tubes
- If accessibility along the sides of the radius is required
 - Series R760 E4/100

Features & Benefits

- 1 Effective chip protection, even against hot metal chips
- 2 Double stop dog for strong unsupported length
- 3 Smooth, chip-repellent exterior
- 4 Lateral glide surfaces for side-mounted operation
- 5 Universal KMA mounting brackets with attachment capability on all sides
- 6 Snap-open from the side, covered pin/bore connection
- 7 Space-efficient with optimized ratio of inner to outer dimension
- 8 Snap-open lids along the inner or outer radius



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

[energy chain® configurator](#) ▶

3.28 ft (1 m) **117-100-100-0**



Energy Chain®

With 2 separators **1186-01** assembled every 2nd link



Interior Separation

1 Set **11800-100-14**



Mounting Bracket

Energy Chain System® E2 Medium Series R117/R118 Installation Dimensions

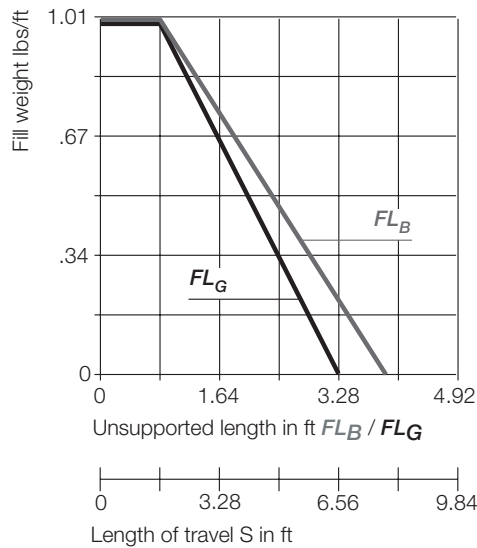
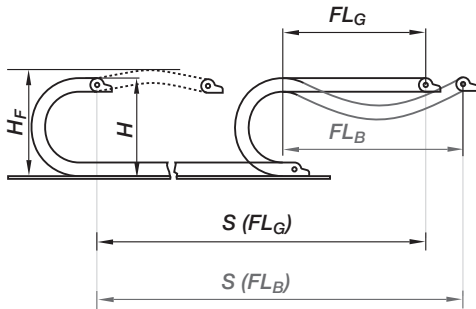
energy chain® configurator



R117
R118

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1



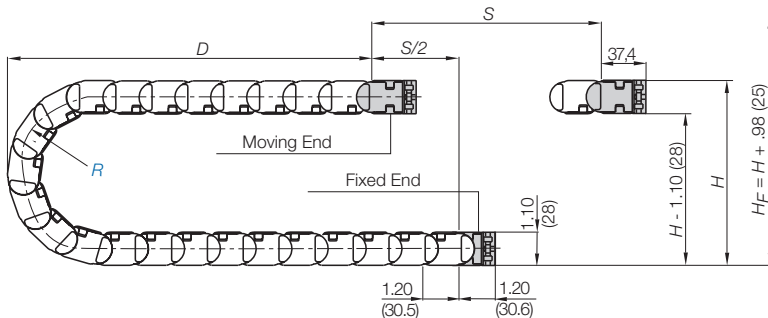
Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height



Pitch per link: = 1.20" (30.5 mm)
Links per ft (m): = 10.06 (33)
For center mount applications:
Chain length = $S/2 + K$

The required clearance height: $H_F = H + .98$ in. (25 mm) (with .67 lbs/ft (1.0 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	2.48 (063)	2.95 (075)	3.94 (100)	4.33 (110)	4.92 (125)	5.71 (145)	7.09 (180)
H	6.06 (154)	7.01 (178)	8.98 (228)	9.76 (248)	10.94 (278)	12.52 (318)	15.28 (388)
D	4.84 (123)	5.31 (135)	6.30 (160)	6.69 (170)	7.28 (185)	8.07 (205)	9.45 (240)
K	10.24 (260)	11.81 (300)	14.96 (380)	16.14 (410)	17.91 (455)	20.47 (520)	24.80 (630)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 32.8 ft/s (10 m/s) / max. 328 ft/s ² (100 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 1.64 ft/s (0.5 m/s) / max. 16.4 ft/s ² (5 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

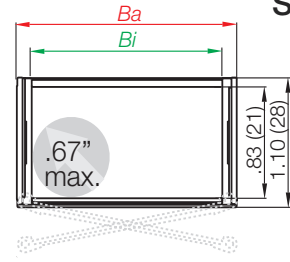
Technical Data



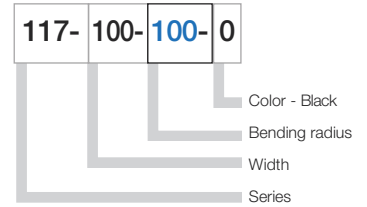
Details of material properties

Chapter 1

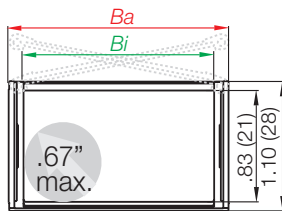
Series R117 - hinged, snap-open on both sides of the inner radius



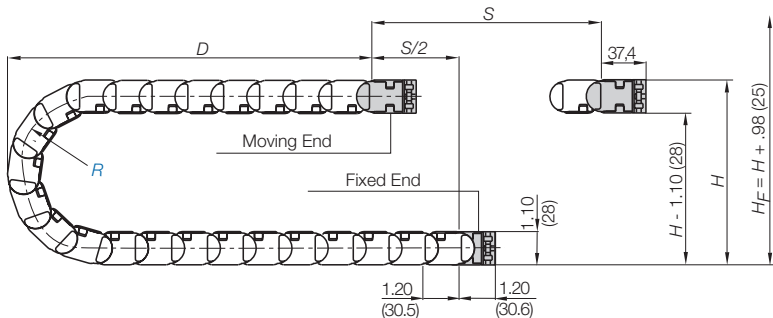
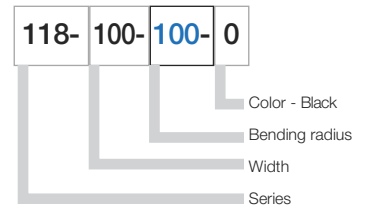
Part Number Structure



Series R118 - hinged, snap-open on both sides of the outer radius



Part Number Structure



Supplement part number with required radius. Example: 117-100-100-0
Pitch: 1.20 in. (30.5 mm) per link links/ft(m) = 10.06 (33)

Part Number.			<i>Bi</i>	<i>Ba</i>	Weight
Snap-open inner radius	Snap-open outer radius		in. (mm)	in. (mm)	lbs/ft (kg/m)
117-020-		<input type="checkbox"/> -0	.79 (20)	1.26 (32)	≈ 0.29 (0.43)
117-025-	118-025-	<input type="checkbox"/> -0	.98 (25)	1.46 (37)	≈ 0.31 (0.46)
117-038-		<input type="checkbox"/> -0	1.50 (38)	1.97 (50)	≈ 0.38 (0.56)
117-048-	118-048-	<input type="checkbox"/> -0	1.89 (48)	2.40 (60)	≈ 0.44 (0.66)
117-063-		<input type="checkbox"/> -0	2.48 (63)	2.95 (75)	≈ 0.51 (0.76)
117-080-	118-080-	<input type="checkbox"/> -0	3.15 (80)	3.62 (92)	≈ 0.60 (0.89)
117-100-		<input type="checkbox"/> -0	3.94 (100)	4.41 (112)	≈ 0.71 (1.06)

Choose from the radii below for all of the above sizes
Radius (mm) Example: 117-100-100-0

	063	075	100	110	125	145	180
R	2.48 (063)	2.95 (075)	3.94 (100)	4.33 (110)	4.92 (125)	5.71 (145)	7.09 (180)
H	6.06 (154)	7.01 (178)	8.98 (228)	9.76 (248)	10.94 (278)	12.52 (318)	15.28 (388)
D	4.84 (123)	5.31 (135)	6.30 (160)	6.69 (170)	7.28 (185)	8.07 (205)	9.45 (240)
K	10.24 (260)	11.81 (300)	14.96 (380)	16.14 (410)	17.91 (455)	20.47 (520)	24.80 (630)

Energy Chain System® E2 Tubes Series R117/R118 Interior Separation Mounting Brackets - KMA

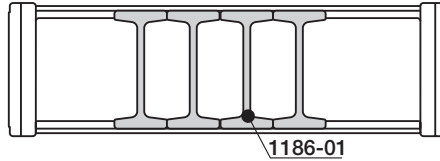
energy chain® configurator 



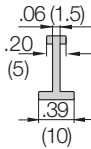
R117
R118

Option 1: Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link. .



Vertical separator
1185-01



Vertical Separator

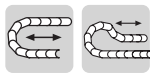
Unassembled Part No. 1185-01

Assembled Part No. 1186-01

- Standard separator 1185-01 for Energy Chains®

This separator is used for general subdivision of Energy Chain®.

Mounting Brackets - KMA

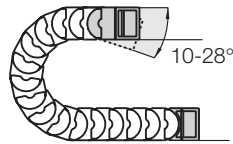


 Standard

Option: KMA pivoting

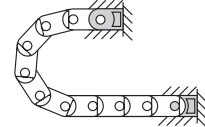
- Short and long travels
- Space restricted
- Corrosion-resistant

Moving end
11800...1



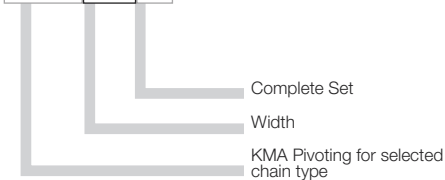
10-28°

Fixed end
11800...4



Part Number Structure

11800- 020- 14



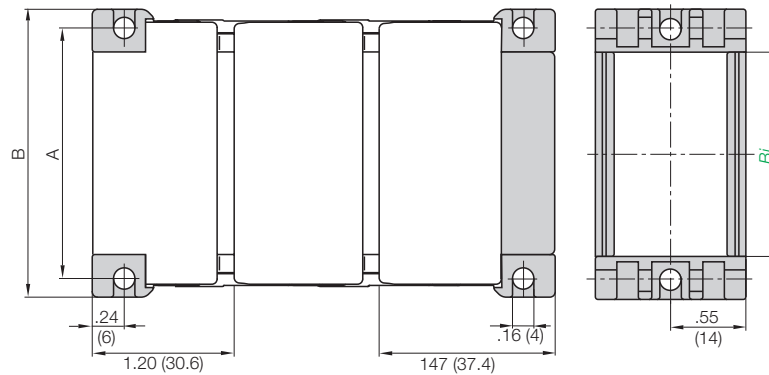
Full set, for both ends:

11800-020-14 Full set, each part with pin/bore

Single-part order:

11800-020-1 Mounting bracket with bore

11800-020-4 Mounting bracket with pin

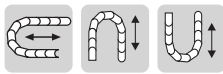


Series	Part No. Full Set	Dimension A		Dimension B	
		in.	(mm)	in.	(mm)
117-020	11800-020-14	1.14	(29)	1.42	(36)
117/118-025	11800-025-14	1.34	(34)	1.61	(41)
117-038	11800-038-14	1.85	(47)	2.13	(54)
117/118-048	11800-048-14	2.24	(57)	2.52	(64)
117-063	11800-063-14	2.83	(72)	3.11	(79)
117/118-080	11800-080-14	3.50	(89)	3.78	(96)
117-100	11800-100-14	4.29	(109)	4.57	(116)

- The mounting brackets are supplied with hexagon nuts and can be attached with M4 bolts, or the mounting brackets may also be attached with M4 socket head cap bolts

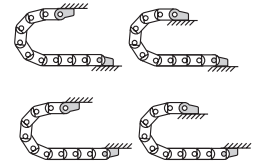
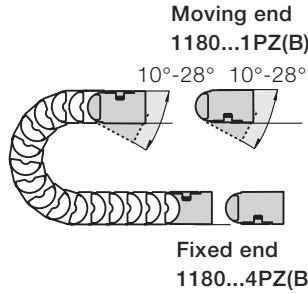
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



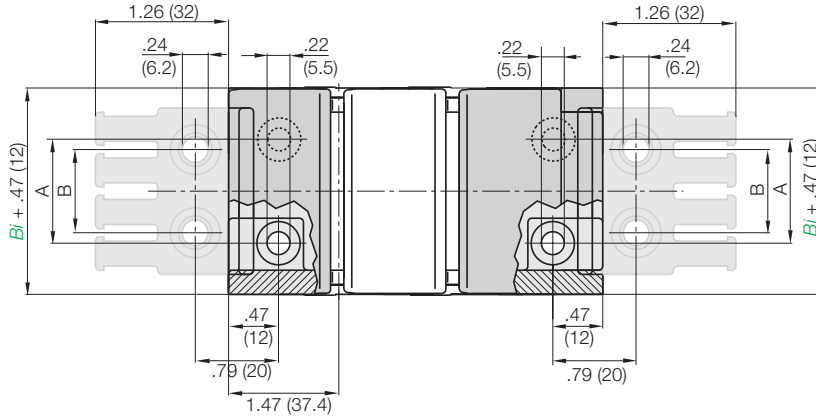


Option: plastic bracket

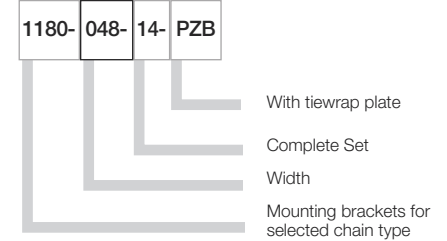
- For long travels
- Attachment option for strain relief tie-wrap plate
- Locked connection to Energy Tube
- Minimized external width



Possible installation configurations -



Part Number Structure



Full set, for both ends:

1180-048-14 Full set, each part with pin/bore

Single-part order:

1180-048-1 Mounting bracket with bore

1180-048-4 Mounting bracket with pin

Part No. Mounting Brackets Full Set
4 parts, 2 with pin, 2 with bore
Series R117/R118:
1180-Width-14

Part No. Mounting bracket with bore
2 parts, 1 left & 1 right
Series R117/R118:
1180-Width-1

Part No. Mounting bracket with pin
2 parts, 1 left & 1 right
Series R117/R118:
1180-Width-4

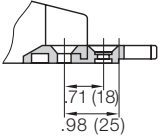
For Series	Part No. Full Set without Tiewrap Plate	Part No. Full Set with Tiewrap Plate	Dimension A		Dimension B	
			in.	(mm)	in.	(mm)
R117/R118-025	1180-025-14	1180-025-14PZB	.47	(12)	.59	(15)
R117-038	1180-038-14	1180-038-14PZB	.98	(25)	.79	(20)
R117/R118-048	1180-048-14	1180-048-14PZB	1.38	(35)	1.18	(30)
R117-063	1180-063-14	1180-063-14PZB	1.97	(50)	1.57	(40)
R117/R118-080	1180-080-14	1180-080-14PZB	2.64	(67)	2.36	(60)
R117-100	1180-100-14	1180-100-14PZB	3.43	(87)	3.15	(80)

The following parts are required for attachment of the mounting brackets:

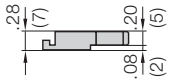
- Countersunk bolt M5* DIN 912-8.8
 - Hexagon nut M5 DIN 934-8
- 4 pieces/set

* The length of the socket head cap bolt is dependent on the thickness of the attachment base.

Tiewrap Plates



Shown assembled



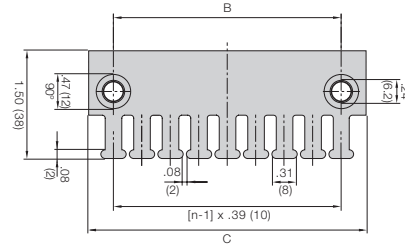
Single tie-wrap plate



Option 1:
Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plates	n Number of Teeth	Dimension C	Dimension B
2020-ZB	3	1.18 (30)	.59 (15)
2030-ZB	4	1.57 (40)	.79 (20)
2040-ZB	5	1.97 (50)	1.18 (30)
2050-ZB	6	2.36 (60)	1.57 (40)
2070-ZB	8	3.15 (80)	2.36 (60)
2090-ZB	9	3.54 (90)	2.76 (70)
2100-ZB	10	3.94 (100)	3.15 (80)
2125-ZB	12	4.72 (120)	3.94 (100)



For more information please refer to strain relief section of Chapter 10

Cable tiewraps as individual parts

Cable tiewraps 100 pieces/bag	Width x Length		Maximum Ø		Tensile Strength	
	in.	(mm)	in.	(mm)	lbs	(N)
CFB-001	.19 x 5.91	(4.8 x 150)	1.42	(36)	50	(222)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index



Series R157/R158

Special Features / Options

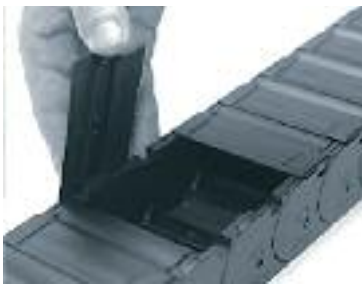


ESD classification:
Electrically conductive
ESD/ATEX version upon request



Flammability Class
VDE 0304 IIC UL94 HB

Assembly Tips



Lids of the Energy Tube Series R100 are hinged for easy access

Usage Guidelines



- If hinged, snap-open accessibility along inner **or** outer radius is required
- If a low-cost, lightweight Energy Tube for many types of applications is required
- If flush attachment is required
- If chip-repellent features are required



- If particularly quiet operation is required
➤ **Series R58 E2 Tubes**
- If snap-open accessibility along both radii simultaneously is required
➤ **Series R770 E4/100**

Features & Benefits

- 1 Effective chip protection even against hot chips
- 2 Space-efficient with optimized ratio of inner dimension to outer dimension
- 3 Snap-open lids along the inner and outer radius
- 4 Snap-open from the side, covered pin/bore connection
- 5 Double stop dog for strong unsupported length
- 6 Universal KMA mounting brackets with attachment capability on all sides
- 7 Lateral glide surfaces for side mounted operation



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator ▶

3.28 ft (1 m) **157-088-100-0**



Energy Chain®

With 2 separators **1586-01** assembled every 2nd link



Interior Separation

1 Set **15800-088-12**



Mounting Bracket

Energy Chain System® E2 Tubes Series R157/R158 Installation Dimensions

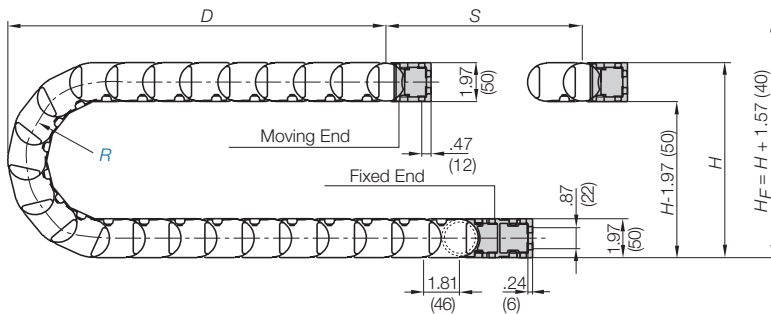
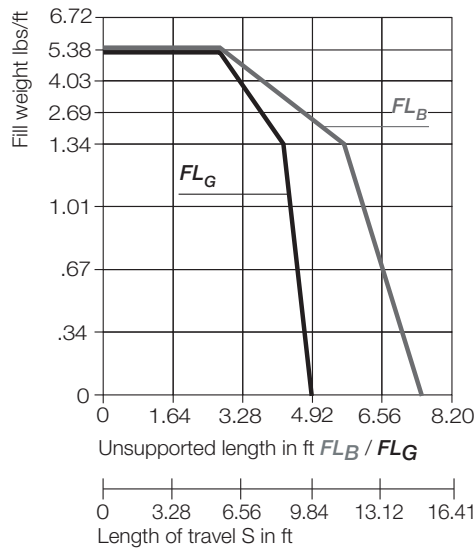
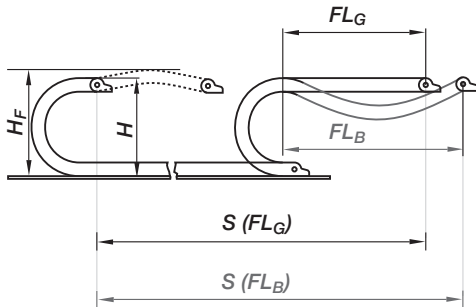
energy chain® configurator ▶



R157
R158

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



Pitch per link: = 1.81" (46 mm)
Links per ft (m): = 6.71 (22)
For center mount applications:
Chain length = $\frac{S}{2} + K$

The required clearance height: $H_f = H + 1.57$ in. (40 mm) (with .67 lbs/ft (1.0 kg/m) fill weight. Please consult igus® if space is particularly restricted.

R	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)
H	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	21.65 (550)
D	7.64 (194)	8.62 (219)	9.61 (244)	10.59 (269)	11.57 (294)	13.54 (344)
K	16.14 (410)	19.09 (485)	22.24 (565)	25.39 (645)	28.54 (725)	34.65 (880)

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_f = Required clearance height



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 32.8 ft/s (10 m/s) / max. 328 ft/s ² (100 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 1.64 ft/s (0.5 m/s) / max. 16.4 ft/s ² (5 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

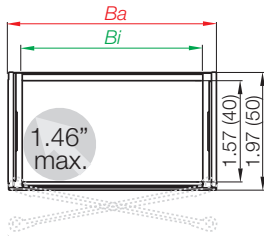
Technical Data



Details of material properties

▶ Chapter 1

Series R157 - hinged, snap-open on both sides of the inner radius

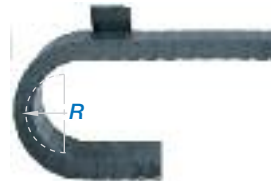
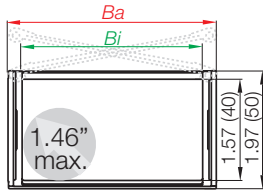


Part Number Structure



- Color - Black
- Bending radius
- Width
- Series

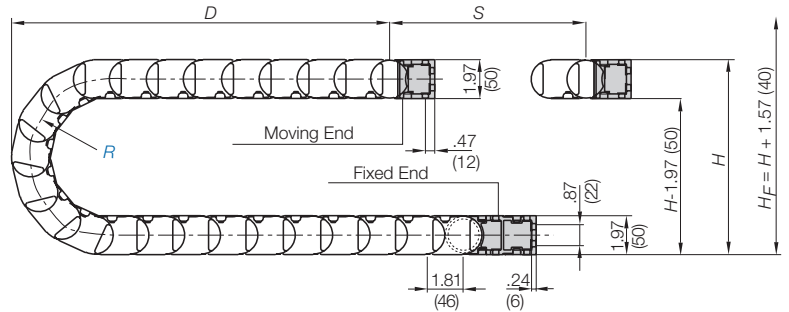
Series R158 - hinged, snap-open on both sides of the outer radius



Part Number Structure



- Color - Black
- Bending radius
- Width
- Series



Supplement part number with required radius.
Example: 157-100--0
Pitch: 1.81 in. (46 mm) per link links/ft (m) = 6.71 (22)

Part Number.			<i>Bi</i>	<i>Ba</i>	Weight
Snap-open inner radius	Snap-open outer radius		in. (mm)	in. (mm)	lbs/ft (kg/m)
157-040-*	158-040-*	<input type="text" value="0"/> -0	1.57 (40)	2.20 (56)	≈ 0.81 (1.21)
157-050-	158-050-	<input type="text" value="0"/> -0	1.97 (50)	2.60 (66)	≈ 0.87 (1.30)
157-075-	158-075-	<input type="text" value="0"/> -0	2.95 (75)	3.58 (91)	≈ 1.01 (1.50)
157-088-	158-088-	<input type="text" value="0"/> -0	3.46 (88)	4.09 (104)	≈ 1.06 (1.57)
157-090-**	158-090-**	<input type="text" value="0"/> -0	3.46 (88)	4.09 (104)	≈ 1.10 (1.63)
157-100-	158-100-	<input type="text" value="0"/> -0	3.94 (100)	4.57 (116)	≈ 1.15 (1.71)
157-125-	158-125-	<input type="text" value="0"/> -0	4.92 (125)	5.55 (141)	≈ 1.29 (1.92)
157-135-	158-135-	<input type="text" value="0"/> -0	5.31 (135)	5.91 (150)	≈ 1.41 (2.10)
157-150-	158-150-	<input type="text" value="0"/> -0	5.91 (150)	6.54 (166)	≈ 1.43 (2.13)
157-175-	158-175-	<input type="text" value="0"/> -0	6.89 (175)	7.52 (191)	≈ 1.57 (2.34)
157-200-	158-200-	<input type="text" value="0"/> -0	7.87 (200)	8.50 (216)	≈ 1.71 (2.55)

Choose from the radii below for all of the above sizes

Radius (mm) Example: 157-100--0

	100	125	150	175	200	250
R	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)
H	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	21.65 (550)
D	7.64 (194)	8.62 (219)	9.61 (244)	10.59 (269)	11.57 (294)	13.54 (344)
K	16.14 (410)	19.09 (485)	22.24 (565)	25.39 (645)	28.54 (725)	34.65 (880)

*Removable lid only, not hinged

**Same dimensions as 157/158-088 - removable lids only

Energy Chain System® E2 Tubes

Series R157/R158

Interior Separation

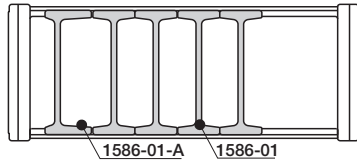
energy chain® configurator 



R157
R158

Option 1: Vertical separators

Vertical separators are used if a vertical subdivision of the Energy Tube interior is required. By standard, vertical separators are assembled every other Energy Tube link.



 STANDARD

- **Standard separator 1585-0 for Energy Tubes**

This separator is used for general subdivision of Energy Tubes.

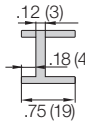


Vertical Separator

Unassembled **Part No. 1585-01**
Assembled **Part No. 1586-01**

- **Assymetrical separator 1585-01-A for Energy Tubes**

This separator is used for subdivision of Energy Tubes in side-mounted applications.

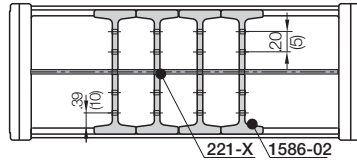


Asymmetrical Separator

Unassembled **Part No. 1585-01-A**
Assembled **Part No. 1586-01-A**

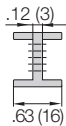
Option 2: Full-width shelf

It is ideal for use in applications involving many thin cables with similar or identical diameters. This shelf slides into place and spans the entire width of the chain.



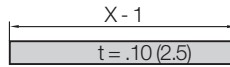
- **Slotted separator 1585-02 for Energy Tubes**

This component is used to form the basic pattern of a shelf system.



Vertical Separator, slotted

Unassembled **Part No. 1585-02**
Assembled **Part No. 1586-02**



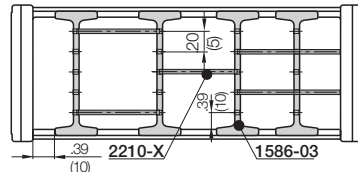
Shelves 220-XX

Shelves can be inserted at 3 different heights in .20" (5mm) increments

Width X in. (mm)	Part No. Unassembled	Part No. Assembled
1.57 (40)	220-40	221-40
1.97 (50)	220-50	221-50
2.95 (75)	220-75	221-75
3.46 (88)	220-88	221-88
3.94 (100)	220-100	221-100
4.92 (125)	220-125	221-125
5.31 (135)	220-135	221-135
5.91 (150)	220-150	221-150
6.89 (175)	220-175	221-175
7.87 (200)	220-200	221-200

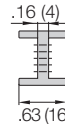
Option 3: Shelves

It is ideal for use in applications involving many cables with similar or identical diameters. Partial separation into individual compartments can be achieved and can be used across the entire width.



- **Slotted separator 1585-03 for Energy Tubes**

This component is used to form the basic pattern of a shelf system.



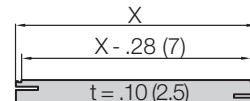
Vertical Separator, slotted

Unassembled **Part No. 1585-03**
Assembled **Part No. 1586-03**

Shelves 2200-XX

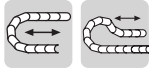
These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 5 different heights in .20" (5mm) increments

Width X in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Part No. Unassembled	Part No. Assembled
.71 (18)	2200-18	2210-18	2.28 (58)	2200-58	2210-58
.91 (23)	2200-23	2210-23	2.68 (68)	2200-68	2210-68
1.10 (28)	2200-28	2210-28	2.87 (73)	2200-73	2210-73
1.30 (33)	2200-33	2210-33	3.46 (88)	2200-88	2210-88
1.50 (38)	2200-38	2210-38	3.90 (99)	2200-99	2210-99
1.69 (43)	2200-43	2210-43	4.88 (124)	2200-124	2210-124
1.89 (48)	2200-48	2210-48	5.87 (149)	2200-149	2210-149



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



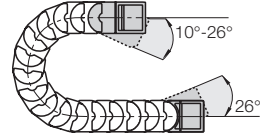


Standard

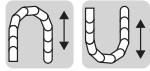
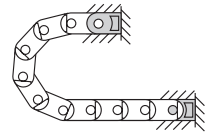
Option 1: KMA pivoting

- Extended, pivoting
- Easy to install
- Universal use
- Corrosion-resistant
- Long travels with lowered mounting height possible

Moving end
15800/15801...1

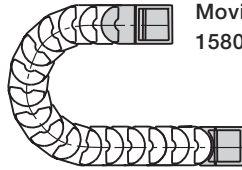


Fixed end
15800/15801...2



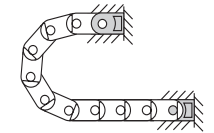
Option 2: KMA locking

- Extended, locking
- Easy to install
- Flush mounting at both ends of the Energy Tube
- Mounting points on all sides
- Corrosion resistant

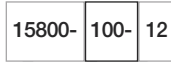


Moving end
15800/15801...3

Fixed end
15800/15801...4



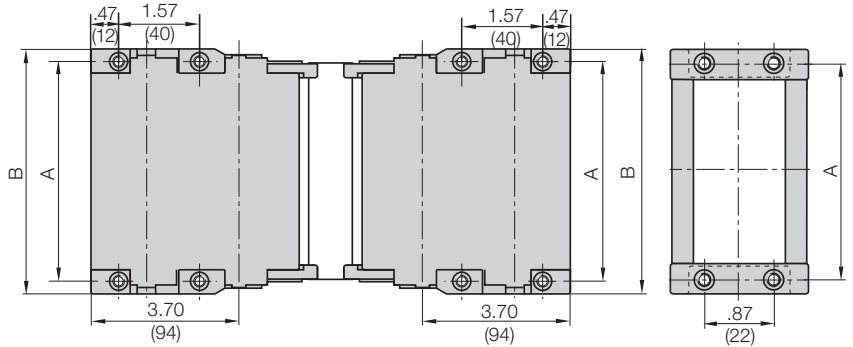
Part Number Structure



Complete Set
12 = Pivoting
34 = Locking

Width

KMA Pivoting for selected chain type



Full set, for both ends:

15800-100-12 Full set, each part with pin/bore

Single-part order:

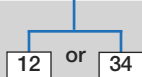
15800-100-1 Mounting bracket with bore

15800-100-2 Mounting bracket with pin



Quickflange upon request
• Unassembled
Part number 16800-QF

Series	Part No.	Dimension A		Dimension B	
		in.	(mm)	in.	(mm)
157/158-040	15801-040- <input type="checkbox"/>	1.97	(50)	2.40	(61)
157/158-050	15800-050- <input type="checkbox"/>	2.40	(60)	2.80	(71)
157/158-075	15800-075- <input type="checkbox"/>	3.35	(85)	3.78	(96)
157/158-088	15800-088- <input type="checkbox"/>	3.86	(98)	4.29	(109)
157/158-090	15801-090- <input type="checkbox"/>	3.86	(98)	4.29	(109)
157/158-100	15800-100- <input type="checkbox"/>	4.33	(110)	4.76	(121)
157/158-125	15800-125- <input type="checkbox"/>	5.31	(135)	5.75	(146)
157/158-135	15800-135- <input type="checkbox"/>	5.71	(145)	6.14	(156)
157/158-150	15800-150- <input type="checkbox"/>	6.30	(160)	6.73	(171)
157/158-175	15800-175- <input type="checkbox"/>	7.28	(185)	7.72	(196)
157/158-200	15800-200- <input type="checkbox"/>	8.27	(210)	8.70	(221)



For pivoting brackets choose 12

For locking brackets choose 34

Example: 15800-100- 34

The following parts are required for attachment of the mounting brackets:

- **Socket head cap bolt**
M5* DIN 912-8.8
8 pieces/set
- **Washer**
5.3 DIN 125-ST
8 pieces/set
- **Hexagon nut**
M5 DIN 934-8
8 pieces/set

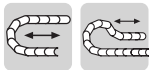
* The length of the socket head cap bolt is dependent on the thickness of the attachment base.

Energy Chain System® E2 Tubes Series R157/R158 Mounting Brackets - KMA Abbreviated

energy chain® configurator



R157
R158

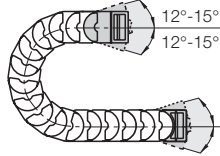


Standard

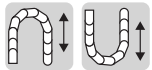
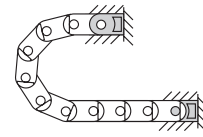
Option 1: KMA pivoting

- Extended, pivoting
- Easy to install
- Universal use
- Corrosion-resistant
- Long travels with lowered mounting height possible

Moving end
1580...1



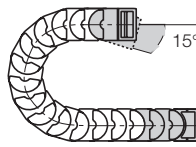
Fixed end
1580...2



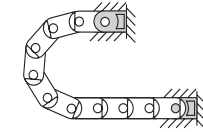
Option 2: KMA locking

- Extended, locking
- Easy to install
- Flush mounting at both ends of the Energy Tube
- Mounting points on all sides
- Corrosion resistant

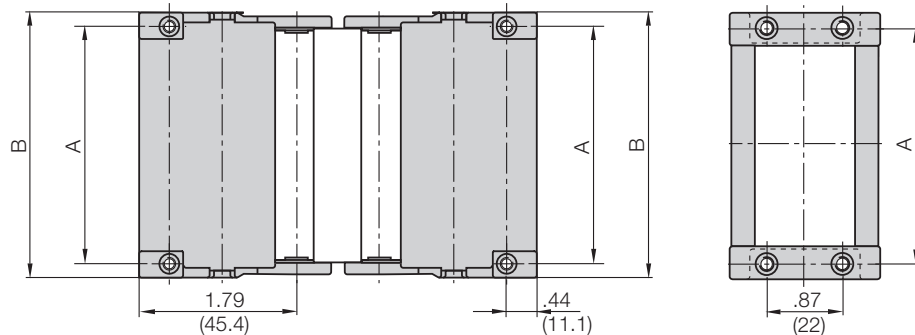
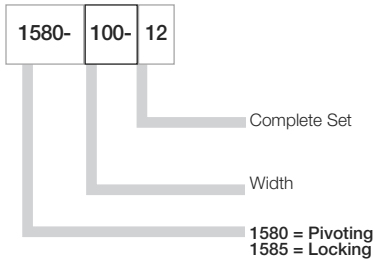
Moving end
1585...1



Fixed end
1585...2



Part Number Structure



Part number examples are shown for pivoting brackets.
For locking brackets change part number to 1585

Full set, for both ends:

1580-100-12 Full set, each part with pin/bore

Single-part order:

1580-100-1 Mounting bracket with bore

1580-100-2 Mounting bracket with pin



Quickflange upon request

- Unassembled

Part number 16800-QF

Series	Part No. Full Set		Dimension A		Dimension B	
	Pivoting	Locking	in.	(mm)	in.	(mm)
157/158-040	1580-040-12	1585-040-12	1.97	(50)	2.40	(61)
157/158-050	1580-050-12	1585-050-12	2.40	(60)	2.80	(71)
157/158-075	1580-075-12	1585-075-12	3.35	(85)	3.78	(96)
157/158-088	1580-088-12	1585-088-12	3.86	(98)	4.29	(109)
157/158-090	1580-090-12	1585-090-12	3.86	(98)	4.29	(109)
157/158-100	1580-100-12	1585-100-12	4.33	(110)	4.76	(121)
157/158-125	1580-125-12	1585-125-12	5.31	(135)	5.75	(146)
157/158-135	1580-135-12	1585-135-12	5.71	(145)	6.14	(156)
157/158-150	1580-150-12	1585-150-12	6.30	(160)	6.73	(171)
157/158-175	1580-175-12	1585-175-12	7.28	(185)	7.72	(196)
157/158-200	1580-200-12	1585-200-12	8.27	(210)	8.70	(221)

The following parts are required for attachment of the mounting brackets:

- **Socket head cap bolt**
M5* DIN 912-8.8
8 pieces/set
- **Washer**
5.3 DIN 125-ST
8 pieces/set
- **Hexagon nut**
M5 DIN 934-8
8 pieces/set

* The length of the socket head cap bolt is dependent on the thickness of the attachment base.

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index



Series R167/R168

Special Features / Options

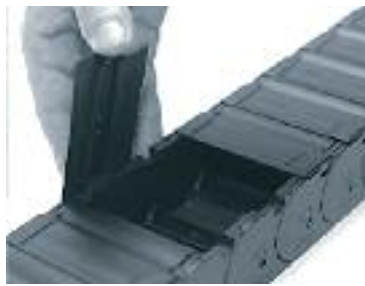


ESD classification:
Electrically conductive
ESD/ATEX version upon request



Flammability Class
VDE 0304 IIC UL94 HB

Assembly Tips



Lids of the Energy Tube Series R100 are hinged for easy access

Usage Guidelines



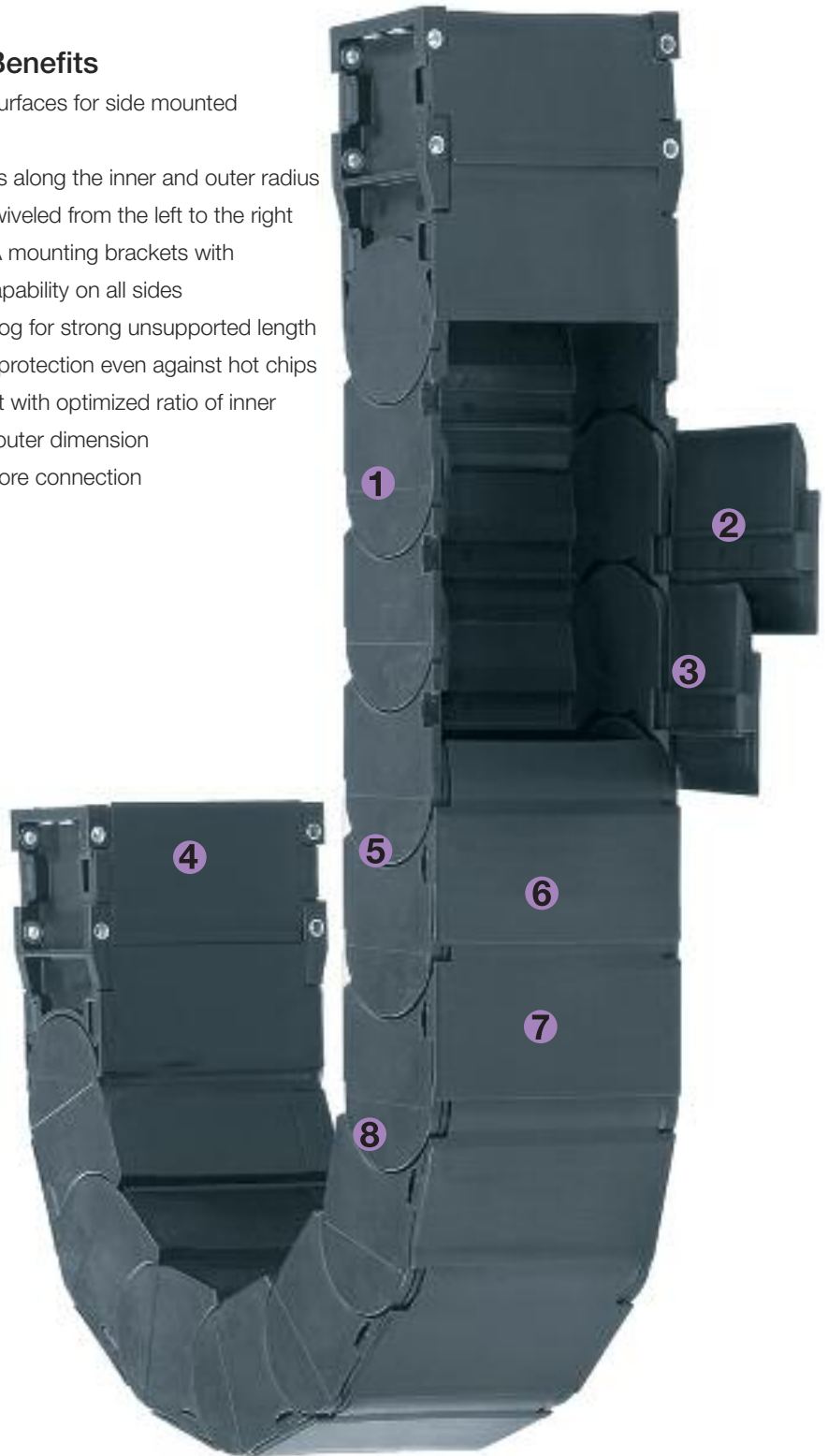
- If snap-open accessibility along inner **or** outer radius is required
- If a low-cost, lightweight Energy Tube for many types of applications is required
- If flush attachment is required
- If chip-repellent features are required



- If very smooth travel due to small pitch is required
➤ **Series R68 E2 Tubes**
- If snap-open accessibility along both radii simultaneously is required
➤ **Series R780 E4/100**

Features & Benefits

- 1 Lateral glide surfaces for side mounted operation
- 2 Snap-open lids along the inner and outer radius
- 3 Lids can be swiveled from the left to the right
- 4 Universal KMA mounting brackets with attachment capability on all sides
- 5 Double stop dog for strong unsupported length
- 6 Effective chip protection even against hot chips
- 7 Space-efficient with optimized ratio of inner dimension to outer dimension
- 8 Covered pin/bore connection



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator ▶

3.28 ft (1 m) **167-100-100-0**



Energy Chain®

With 2 separators **1686-01** assembled every 2nd link



Interior Separation

1 Set **1680-100-12**



Mounting Bracket

Energy Chain System® E2 Tubes Series R167/R168 Installation Dimensions

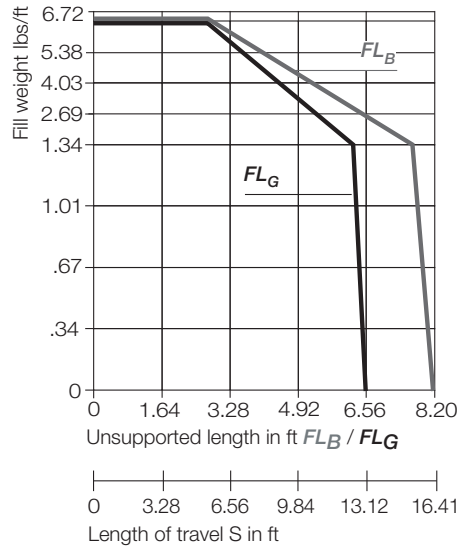
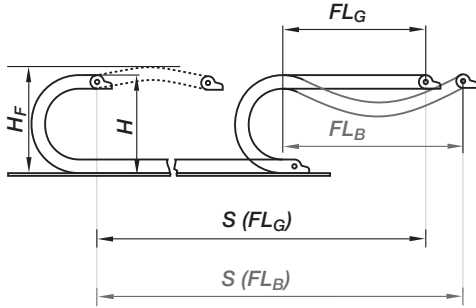
energy chain® configurator ▶



R167
R168

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



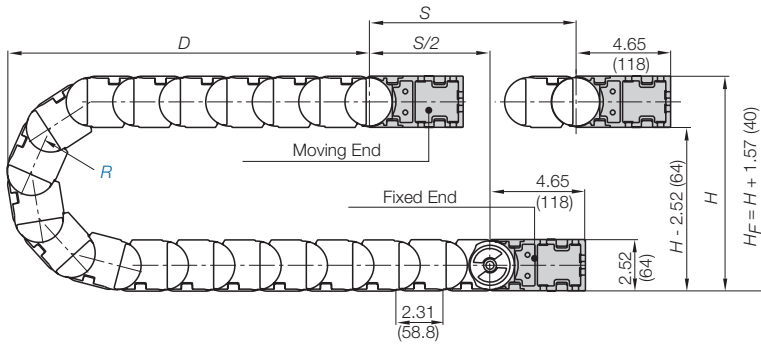
Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_f = Required clearance height



Pitch per link = 2.31" (58.8 mm)
Links per ft (m) = 5.18 (17)
For center mount applications:
Chain length = $\frac{S}{2} + K$

The required clearance height: $H_f = H + 1.57$ in. (40 mm) (with 1.34 lbs/ft (2.0 kg/m) fill weight. Please consult igus® if space is particularly restricted.

R	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	9.84 (250)	11.81 (300)
H	10.39 (264)	12.36 (314)	14.33 (364)	16.30 (414)	18.27 (464)	20.24 (514)	22.20 (564)	26.14 (664)
D	8.66 (220)	9.65 (245)	10.63 (270)	11.61 (295)	12.60 (320)	13.58 (345)	14.57 (370)	16.54 (420)
K	17.12 (435)	20.28 (515)	23.23 (590)	26.38 (670)	29.53 (750)	32.48 (825)	35.63 (905)	41.93 (1065)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 32.8 ft/s (10 m/s) / max. 328 ft/s ² (100 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 1.64 ft/s (0.5 m/s) / max. 16.4 ft/s ² (5 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

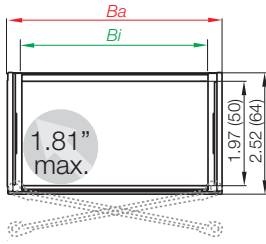
Technical Data



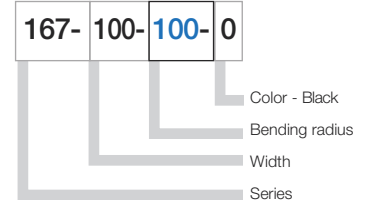
Details of material properties

▶ Chapter 1

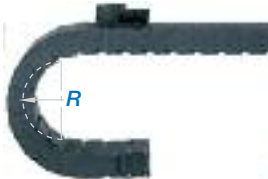
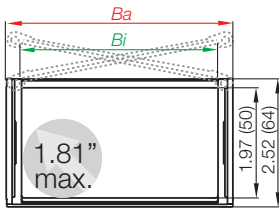
Series R167 - hinged, snap-open on both sides of the inner radius



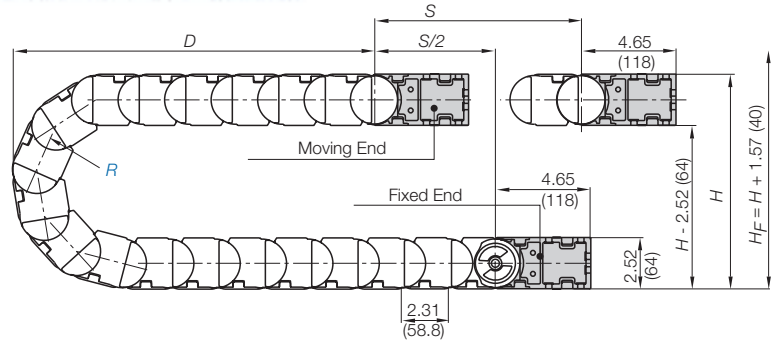
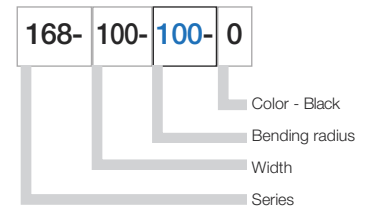
Part Number Structure



Series R168 - hinged, snap-open on both sides of the outer radius



Part Number Structure



Supplement part number with required radius.
Example: 167-100-**100**-0
Pitch: 2.31 in. (58.8 mm) per link links/ft (m) = 5.18 (17)

Part Number.			<i>Bi</i>	<i>Ba</i>	Weight
Snap-open inner radius	Snap-open outer radius		in. (mm)	in. (mm)	lbs/ft (kg/m)
167-050-	168-050-	<input type="checkbox"/> -0	1.97 (50)	2.68 (68)	≈ 1.06 (1.58)
167-075-	168-075-	<input type="checkbox"/> -0	2.95 (75)	3.66 (93)	≈ 1.24 (1.84)
167-100-	168-100-	<input type="checkbox"/> -0	3.94 (100)	4.65 (118)	≈ 1.40 (2.09)
167-115-	168-115-	<input type="checkbox"/> -0	4.53 (115)	5.24 (133)	≈ 1.51 (2.24)
167-125-	168-125-	<input type="checkbox"/> -0	4.92 (125)	5.63 (143)	≈ 1.58 (2.35)
167-150-	168-150-	<input type="checkbox"/> -0	5.91 (150)	6.61 (168)	≈ 1.75 (2.60)
167-175-	168-175-	<input type="checkbox"/> -0	6.89 (175)	7.60 (193)	≈ 1.92 (2.86)
167-200-	168-200-	<input type="checkbox"/> -0	7.87 (200)	8.58 (218)	≈ 2.09 (3.11)
167-225-	168-225-	<input type="checkbox"/> -0	8.86 (225)	9.57 (243)	≈ 2.26 (3.37)
167-250-	168-250-	<input type="checkbox"/> -0	9.84 (250)	10.55 (268)	≈ 2.43 (3.62)

Choose from the radii below for all of the above sizes

Radius (mm) Example: 167-100-**100**-0

	100	125	150	175	200	225	250	300
R	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	9.84 (250)	11.81 (300)
H	10.39 (264)	12.36 (314)	14.33 (364)	16.30 (414)	18.27 (464)	20.24 (514)	22.20 (564)	26.14 (664)
D	8.66 (220)	9.65 (245)	10.63 (270)	11.61 (295)	12.60 (320)	13.58 (345)	14.57 (370)	16.54 (420)
K	17.12 (435)	20.28 (515)	23.23 (590)	26.38 (670)	29.53 (750)	32.48 (825)	35.63 (905)	41.93 (1065)

Energy Chain System® E2 Tubes

Series R167/R168

Interior Separation

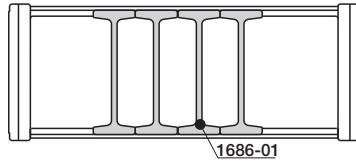
energy chain® configurator 



R167
R168

Option 1: Vertical separators

Vertical separators are used if a vertical subdivision of the Energy Tube interior is required. By standard, vertical separators are assembled every other Energy Tube link.



 STANDARD

- **Standard separator 1685-01 for Energy Tubes**

This separator is used for general subdivision of Energy Tubes.

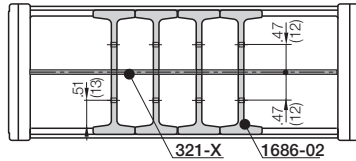


Vertical Separator

Unassembled	Part No. 1685-01
Assembled	Part No. 1686-01

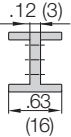
Option 2: Full-width shelf

It is ideal for use in applications involving many thin cables with similar or identical diameters. This shelf slides into place and spans the entire width of the chain.



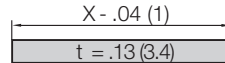
- **Slotted separator 1685-02 for Energy Tubes**

This component is used to form the basic pattern of a shelf system.



Vertical Separator, slotted

Unassembled	Part No. 1685-02
Assembled	Part No. 1686-02



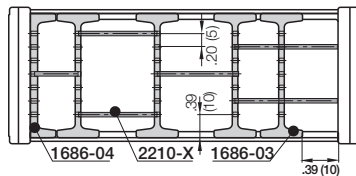
Shelves 220-XX

Shelves can be inserted at 3 different heights in .20" (5mm) increments

Width X		Part No.	Part No.
in. (mm)		Unassembled	Assembled
.98 (25)		320-050	321-050
1.50 (38)		320-075	321-075
2.24 (57)		320-100	321-100
3.03 (77)		320-115	321-115
3.54 (90)		320-125	321-125
4.06 (103)		320-150	321-150
4.92 (125)		320-175	321-175
4.92 (125)		320-200	321-200
4.92 (125)		320-225	321-225
4.92 (125)		320-250	321-250

Option 3: Shelves

It is ideal for use in applications involving many cables with similar or identical diameters. Partial separation into individual compartments can be achieved and can be used across the entire width.



- **Slotted separator 1685-03 for Energy Tubes**

This component is used to form the basic pattern of a shelf system.

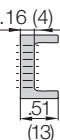


Vertical Separator, slotted

Unassembled	Part No. 1685-03
Assembled	Part No. 1686-03

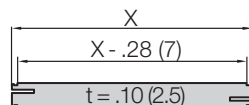
- **Side plate 1685-04 for Energy Tubes**

This component is used to form the basic pattern of a shelf system.



Side Plate

Unassembled	Part No. 1685-04
Assembled	Part No. 1686-04



Shelves 2200-XX

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 7 different heights in .20" (5mm) increments

Width X		Part No.	Part No.
in. (mm)		Unassembled	Assembled
.71 (18)		2200-18	2210-18
.91 (23)		2200-23	2210-23
1.10 (28)		2200-28	2210-28
1.30 (33)		2200-33	2210-33
1.50 (38)		2200-38	2210-38
1.69 (43)		2200-43	2210-43
1.89 (48)		2200-48	2210-48
2.28 (58)		2200-58	2210-58
2.68 (68)		2200-68	2210-68
2.87 (73)		2200-73	2210-73
3.46 (88)		2200-88	2210-88
3.90 (99)		2200-99	2210-99
4.88 (124)		2200-124	2210-124
5.87 (149)		2200-149	2210-149

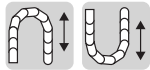
PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS





Option 1: pivoting

- Unsupported and gliding applications
- Mounting points on all sides
- Quickflange Option, bolted outside of Energy Tube cross section
- Long travels with lowered mounting height possible
- Corrosion-resistant

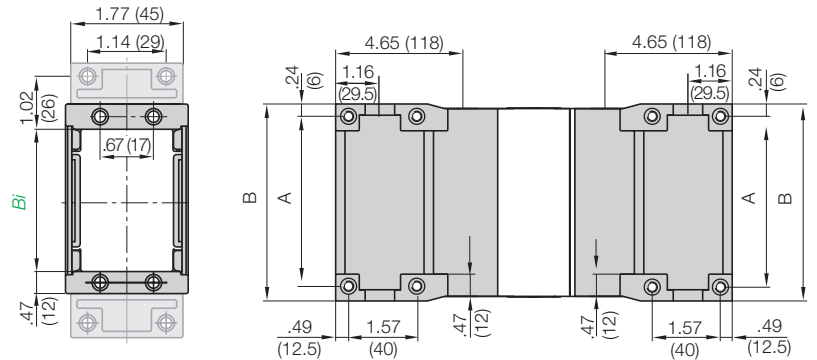
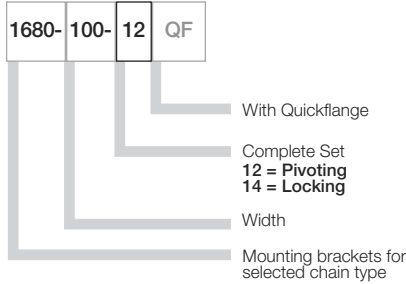


Option 2: locking

- Vertical hanging/standing applications
- Quickflange Option, bolted outside of Energy Tube cross section
- Extreme speeds and accelerations
- Mounting points on all sides
- Flush mounting at both ends of the Energy Tube



Part Number Structure



Full set, for both ends:

1680-100-12-QF Full set, each part with pin/bore + tiewrap plate

Single-part order:

1680-100-1-QF Mounting bracket with bore + tiewrap plate

1680-100-2-QF Mounting bracket with pin + tiewrap plate



Quickflange Unassembled
Part number 16800-QF

For Tube Type	Part No. Full set with Tiewrap Plate	Part No. Full Set with Quickflange	Dimension A in. (mm)	Dimension B in. (mm)
167/168-050	1680-050- <input type="checkbox"/>	1680-050- <input type="checkbox"/> QF	2.44 (62)	2.91 (74)
167/168-075	1680-075- <input type="checkbox"/>	1680-075- <input type="checkbox"/> QF	3.43 (87)	3.90 (99)
167/168-100	1680-100- <input type="checkbox"/>	1680-100- <input type="checkbox"/> QF	4.41 (112)	4.88 (124)
167/168-115	1680-115- <input type="checkbox"/>	1680-115- <input type="checkbox"/> QF	5.00 (127)	5.47 (139)
167/168-125	1680-125- <input type="checkbox"/>	1680-125- <input type="checkbox"/> QF	5.39 (137)	5.87 (149)
167/168-150	1680-150- <input type="checkbox"/>	1680-150- <input type="checkbox"/> QF	6.38 (162)	6.85 (174)
167/168-175	1680-175- <input type="checkbox"/>	1680-175- <input type="checkbox"/> QF	7.36 (187)	7.83 (199)
167/168-200	1680-200- <input type="checkbox"/>	1680-200- <input type="checkbox"/> QF	8.35 (212)	8.82 (224)
167/168-225	1680-225- <input type="checkbox"/>	1680-225- <input type="checkbox"/> QF	9.33 (237)	9.80 (249)
167/168-250	1680-250- <input type="checkbox"/>	1680-250- <input type="checkbox"/> QF	10.31 (262)	10.79 (274)

For pivoting brackets choose 12
For locking brackets choose 14
Example: 1680-100- 14 QF

The following parts are required for attachment of the mounting brackets:

- **Socket head cap bolt**
M5* DIN 912-8.8
8 pieces/set
- **Washer**
5.3 DIN 125-ST
8 pieces/set
- **Hexagon nut**
M5 DIN 934-8
8 pieces/set

* The length of the socket head cap bolt is dependent on the thickness of the attachment base.

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index


Series 1480

Special Features / Options


IPA Qualification Certificate
Air Cleanliness Class ISO Class 3
(at v = 6.56 ft/s) upon request



ESD classification:
Electrically conductive
ESD/ATEX version upon request



Flammability Class
VDE 0304 IIC UL94 HB

Assembly Tips


Insert screwdriver into the slot, using a lever action apply pressure to the screwdriver to release

Other Installation Methods

Vertical, hanging ≤ 65.6 ft (20 m)

Vertical, standing ≤ 6.56 ft (2 m)

Side-mounted, un_supp. ≤ 2.3 ft (0.7 m)

Rotary requires further calculation

Usage Guidelines

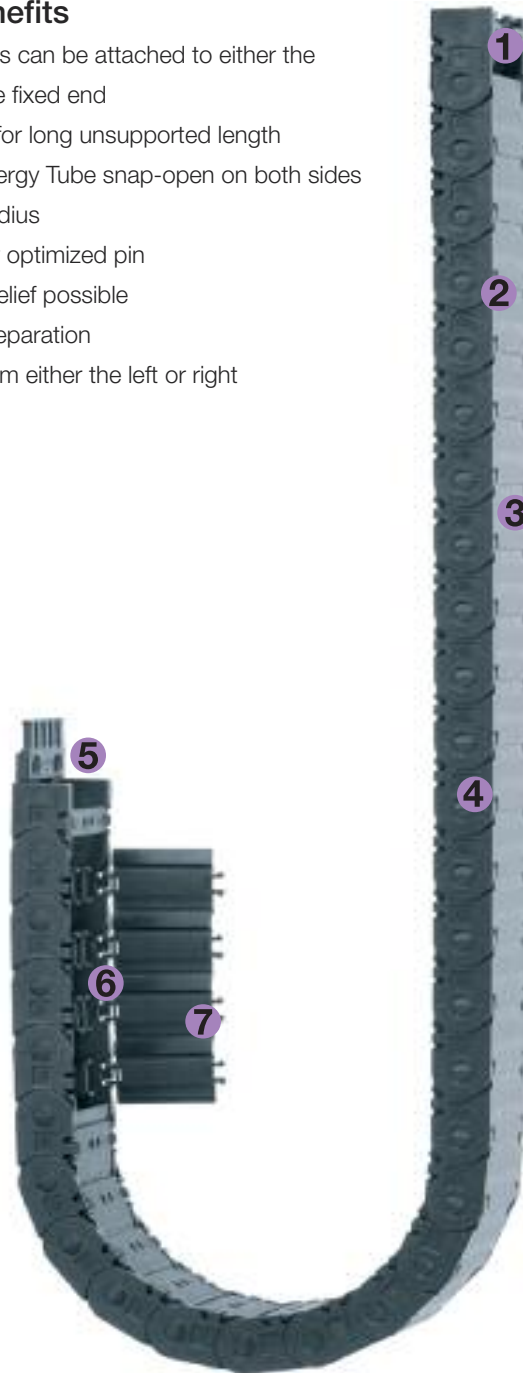

- If hinged, snap-open accessibility along the inner radius is required
- If integrated strain relief is required at the connection point
- If long service life is required
- If chip protection is required
- If easy installation is required



- If the application is very simple
➤ **Series R117 E2 Tubes**

Features & Benefits

- 1 Mounting brackets can be attached to either the moving end or the fixed end
- 2 Double stop dog for long unsupported length
- 3 Fully enclosed Energy Tube snap-open on both sides along the inner radius
- 4 Easy assembly by optimized pin
- 5 Integrated strain relief possible
- 6 Modular interior separation
- 7 Rapid opening from either the left or right


Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator

3.28 ft (1 m) **1480-038-075-0**



Energy Chain®

With 2 separators **14501** assembled every 2nd link



Interior Separation

1 Set **15000-038-34PZB**



Mounting Bracket

Energy Chain System® E2 Tubes Series R1480 Installation Dimensions

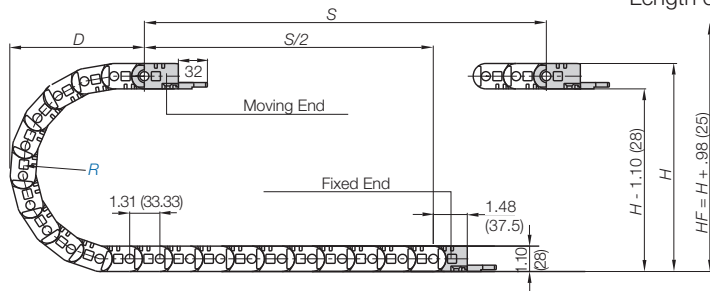
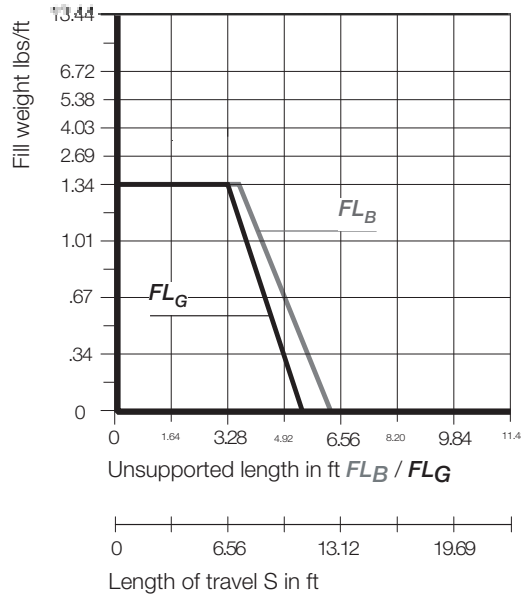
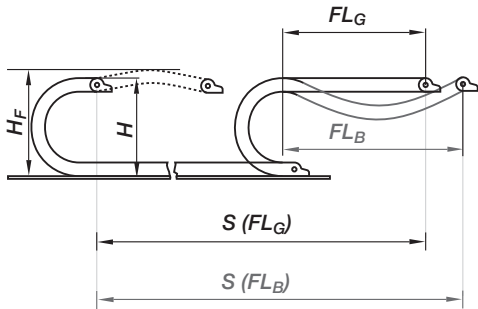
energy chain® configurator



R1480

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1



Pitch per link = 1.31" (33 mm)
Links per ft (m) = 9.41 (30)
For center mount applications:
Chain length = $\frac{S}{2} + K$

The required clearance height: $H_f = H + .98$ in. (25 mm) (with .34 lbs/ft (0.5 kg/m) fill weight).
Please consult igus® if space is particularly restricted.

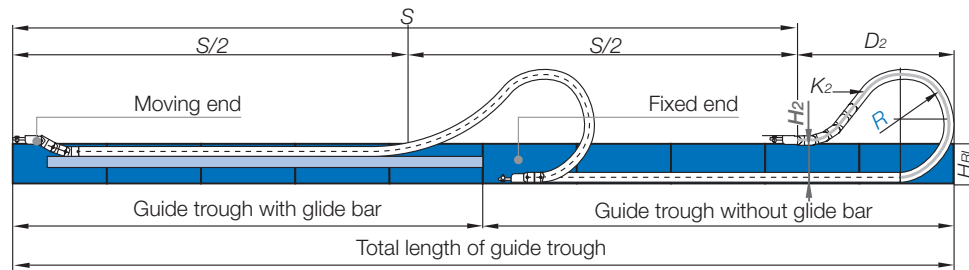
R	2.95 (075)	3.94 (100)	4.92 (125)	5.71 (145)	7.09 (180)
H	7.01 (178)	8.98 (228)	10.94 (278)	12.52 (318)	15.28 (388)
D	5.47 (139)	6.46 (164)	7.44 (189)	8.23 (209)	9.61 (244)
K	12.01 (305)	15.16 (385)	18.11 (460)	20.67 (525)	25.00 (635)

For long travels with lowered mounting height

Long travel lengths from 32.8 ft. (10 m) to max. 246 ft. (75 m)

For center mount applications:

Chain length = $\frac{S}{2} + K_2$



R	6.89 (075)	7.87 (100)	8.86 (125)	9.84 (145)	11.81 (180)
H_2	-	3.94 (100)	3.94 (100)	3.94 (100)	3.94 (100)
D_2^{125}	-	13.39 (340)	19.49 (495)	21.26 (540)	27.17 (690)
K_2	-	23.62 (600)	31.50 (800)	37.01 (940)	46.06 (1170)

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{safety buffer}$
 - H_f = Required clearance height
 - H_{R1} = Trough inner height
 - H_2 = *Mounting height
 - D_2 = Overlength - long travels, gliding
 - K_2 = *Add-on
- *If the mounting bracket location is set lower

Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.

Design, Chapter 1

Technical Data



Details of material properties

Chapter 1

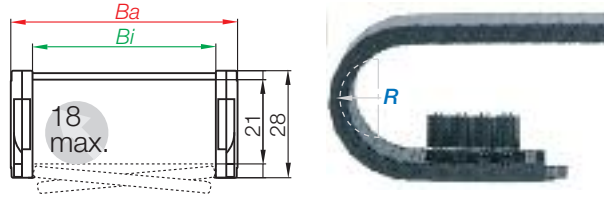
Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



igus® Energy Chain System®

Series R1480 - hinged, snap-open along the inner radius

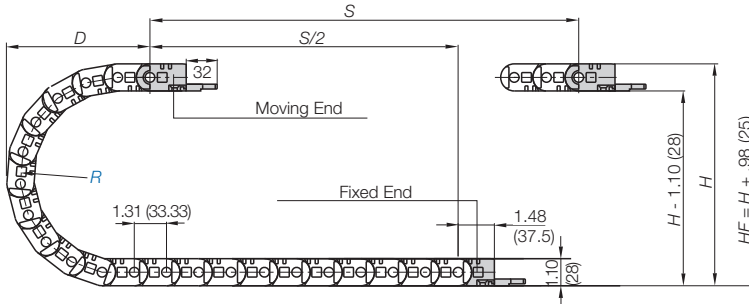


Part Number Structure

1480-038-075-0

- Color - Black
- Bending radius
- Width
- Series

Telephone 1-800-521-2747
Fax 1-401-438-7270



Supplement part number with required radius. Example: 1480-038--0
Pitch: 1.31 in. (33 mm) per link links/ft(m) = 9.41 (30)

Part Number.

Snap-open inner radius	Bi in. (mm)	Ba in. (mm)	Weight lbs/ft (kg/m)
1480-015- <input type="text" value="0"/> -0	.79 (15)	1.12 (28.5)	≈ 0.32 (0.48)
1480-025- <input type="text" value="0"/> -0	.98 (25)	1.52 (38.5)	≈ 0.36 (0.54)
1480-038- <input type="text" value="0"/> -0	1.50 (38)	2.03 (51.5)	≈ 0.41 (0.61)
1480-050- <input type="text" value="0"/> -0	1.97 (50)	2.50 (63.5)	≈ 0.45 (0.67)
1480-068- <input type="text" value="0"/> -0	2.68 (68)	3.21 (81.5)	≈ 0.52 (0.77)
1480-080- <input type="text" value="0"/> -0	3.15 (80)	3.68 (93.5)	≈ 0.56 (0.84)
1480-100- <input type="text" value="0"/> -0	3.94 (100)	4.47 (113.5)	≈ 0.64 (0.95)
1480-125- <input type="text" value="0"/> -0	3.94 (125)	5.45 (138.5)	≈ 0.73 (1.08)

Choose from the radii below for all of the above sizes

Radius (mm) Example: 1480-038--0

	075	100	125	145	180
R	2.95 (075)	3.94 (100)	4.92 (125)	5.71 (145)	7.09 (180)
H	7.01 (178)	8.98 (228)	10.94 (278)	12.52 (318)	15.28 (388)
D	5.47 (139)	6.46 (164)	7.44 (189)	8.23 (209)	9.61 (244)
K	12.01 (305)	15.16 (385)	18.11 (460)	20.67 (525)	25.00 (635)

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

Energy Chain System® E2 Tubes

Series R1480

Interior Separation

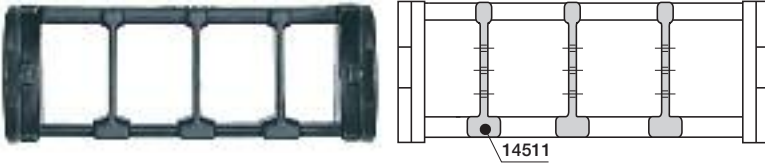
energy chain® configurator 



R1480

Option 1: Vertical separators

Vertical separators are used if a vertical subdivision of the Energy Tube interior is required. By standard, vertical separators are assembled every other Energy Tube link.



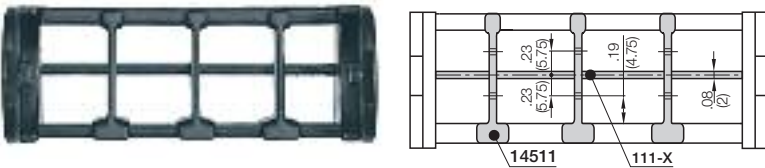
- **Standard separator 14501 for Energy Tubes**

This separator is used for general subdivision of Energy Tubes.



Option 2: Full-width shelf

It is ideal for use in applications involving many thin cables with similar or identical diameters. This shelf slides into place and spans the entire width of the chain.



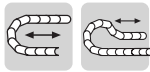
Shelves 110-XX

Shelves can be inserted at 3 different heights in .20" (5mm) increments

Width X in. (mm)	Part No. Unassembled	Part No. Assembled
1.57 (15)	110-15	111-15
1.97 (20)	110-20	111-20
2.95 (25)	110-25	111-25
3.46 (38)	110-38	111-38
3.94 (50)	110-50	111-50
4.92 (68)	110-68	111-68
5.31 (80)	110-80	111-80
5.91 (100)	110-100	111-100
6.89 (125)	110-125	111-125

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFG: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS

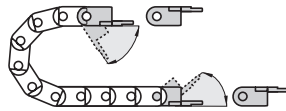




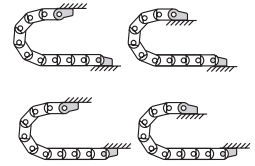
Option 1: pivoting

- For unsupported applications
- Well suited for tight installation conditions
- Detachable strain relief tiwrap plates
- Can be mounted on the fixed and/or moving end

Moving end
15000...3PZ(B)

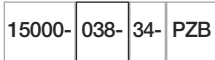


Fixed end
15000...4PZ(B)

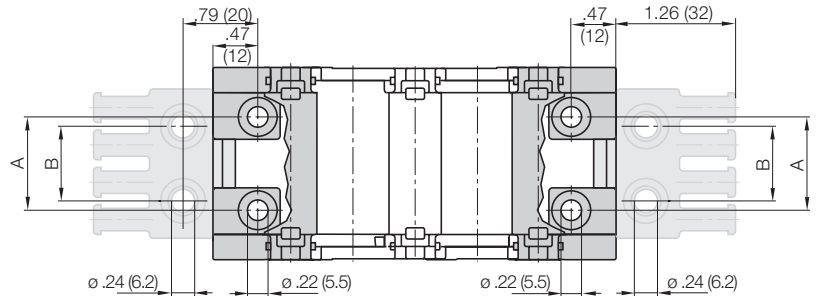


Possible installation configurations -

Part Number Structure



- 15000- With tiwrap plate
- 038- Complete Set
34 = Pivoting
- 34- Width
- PZB- Mounting brackets for selected chain type



Full set, for both ends:

15000-038-34 Full set, each part with pin/bore

Single-part order:

15000-038-3 Mounting bracket with bore

15000-038-4 Mounting bracket with pin

Part No. Mounting Brackets Full Set

4 parts, 2 with pin, 2 with bore
Series 1480:

15000-Width-34

Part No. Mounting bracket with bore

2 parts, 1 left & 1 right
Series 1480:

15000-Width-1

Part No. Mounting bracket with pin

2 parts, 1 left & 1 right
Series 1480:

15000-Width-4

For Series	Part No.		Dimension A		Dimension B	
	Full Set without Tiewrap Plate	Full Set with Tiewrap Plate	in.	(mm)	in.	(mm)
1480-015	-	-	-	-	-	-
1480-020	-	-	-	-	-	-
1480-025	15000-025-34PZ	15000-025-34PZB	.47	(12)	.59	(15)
1480-038	15000-038-34PZ	15000-038-34PZB	.98	(25)	.79	(20)
1480-050	15000-050-34PZ	15000-050-34PZB	1.46	(37)	1.18	(30)
1480-068	15000-068-34PZ	15000-068-34PZB	2.17	(55)	1.57	(40)
1480-080	15000-080-34PZ	15000-080-34PZB	2.64	(67)	2.36	(60)
1480-100	15000-100-34PZ	15000-100-34PZB	3.43	(87)	3.15	(80)
1480-125	15000-125-34PZ	15000-125-34PZB	4.41	(112)	4.13	(105)

Energy Chain System® E2 Tubes Series R1480 Mounting Bracket - Steel

energy chain® configurator 

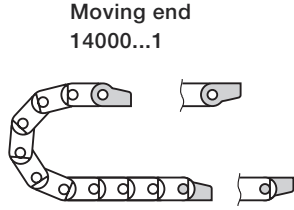


R1480



Option 2: Steel

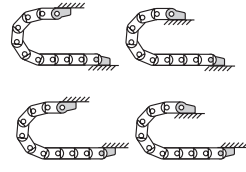
- Locked connections
- One part (two-piece) for all chain widths
- Electrically conductive
- Bolted connection outside of chain cross-section possible



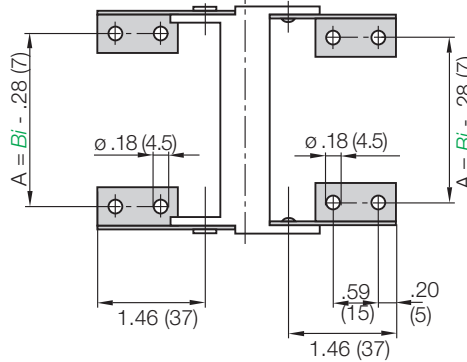
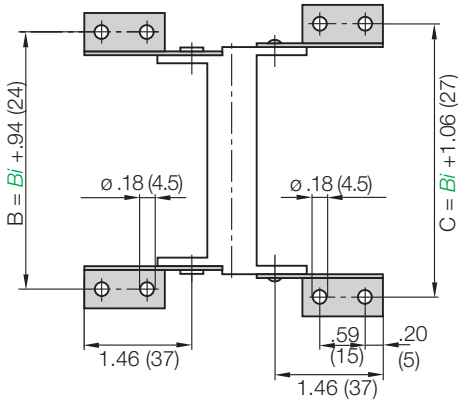
Moving end
14000...1



Fixed end
14000...2



Possible installation configurations -



Chain Type	Part No. Full Set	Dimension A		Dimension B		Dimension C	
		in.	(mm)	in.	(mm)	in.	(mm)
1480-015	14000-12	.31	(8)	1.54	(39)	1.65	(42)
1480-020	14000-12	.51	(13)	1.73	(44)	1.85	(47)
1480-025	14000-12	.71	(18)	1.93	(49)	2.05	(52)
1480-038	14000-12	1.22	(31)	2.44	(62)	2.56	(65)
1480-050	14000-12	1.69	(43)	2.91	(74)	3.03	(77)
1480-068	14000-12	2.40	(61)	3.62	(92)	3.74	(95)
1480-080	14000-12	2.87	(73)	4.09	(104)	4.21	(107)
1480-100	14000-12	3.66	(93)	4.88	(124)	5.00	(127)
1480-125	14000-12	4.65	(118)	5.87	(149)	5.98	(152)

Part No. Mounting Brackets Full Set

4 parts, 2 with pin, 2 with bore
Series 1480:
14000-12

Part No. Mounting Bracket Moving End

2 parts, 1 left & 1 right
Series 1480:
14000-1

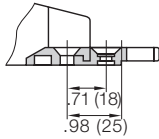
Part No. Mounting Bracket Fixed End

2 parts, 1 left & 1 right
Series 1480:
14000-2

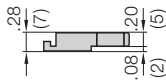
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Tiewrap Plates



Shown assembled



Single tiewrap plate

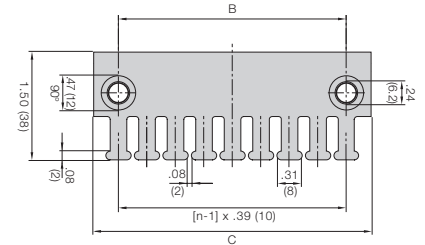


Option 1:

Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plates	n Number of Teeth	Dimension C	Dimension B
2020-ZB	3	1.18 (30)	.59 (15)
2030-ZB	4	1.57 (40)	.79 (20)
2040-ZB	5	1.97 (50)	1.18 (30)
2050-ZB	6	2.36 (60)	1.57 (40)
2070-ZB	8	3.15 (80)	2.36 (60)
2090-ZB	9	3.54 (90)	2.76 (70)
2100-ZB	10	3.94 (100)	3.15 (80)
2125-ZB	12	4.72 (120)	3.94 (100)



For more information please refer to strain relief section of Chapter 10

Cable tiewraps as individual parts

Cable tiewraps 100 pieces/bag	Width x Length		Maximum Ø		Tensile Strength	
	in.	(mm)	in.	(mm)	lbs	(N)
CFB-001	.19 x 5.91	(4.8 x 150)	1.42	(36)	50	(222)

Strain relief for steel mounting brackets

Clip-on connection is not possible with steel mounting brackets. In this case, the tiewrap plates must be bolted directly into separate bore holes in front of the mounting bracket. Alternatively the tiewrap plates **20XX-ZB** can be also used here. **Details chapter 10**

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index


Series 2480

Special Features / Options


IPA Qualification Certificate
Air Cleanliness Class ISO Class 3
(at v = 6.56 ft/s) upon request



ESD classification:
Electrically conductive
ESD/ATEX version upon request



Flammability Class
VDE 0304 IIC UL94 HB

Assembly Tips


Insert screwdriver into the slot, using a lever action apply pressure to the screwdriver to release

Other Installation Methods

Vertical, hanging ≤ 131 ft (40 m)

Vertical, standing ≤ 9.84 ft (3 m)

Side-mounted, un_supp. ≤ 3.28 ft (1 m)

Rotary requires further calculation

Usage Guidelines


- If hinged, snap-open accessibility along the inner radius is required
- If integrated strain relief is required at the connection point
- If long service life is required
- If chip protection is required
- If easy installation is required



- If particularly quiet operation is required
➤ **Series R58 E2 Tubes**
- If snap-open accessibility along both radii is required
➤ **Series R770 E4/100**

Features & Benefits

- 1 Double stop dog for long unsupported length
- 2 Lateral glide surfaces for side-mounted operation
- 3 Integrated strain relief possible
- 4 Fully enclosed Energy Tube snap-open on both sides along the inner radius
- 5 Modular interior separation
- 6 Easy assembly by optimized pin
- 7 Rapid opening from either the left or right


Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator

9.84 ft (3 m) **2480-10-100-0**



Energy Chain®

With 2 separators **24501** assembled every 2nd link



Interior Separation

1 Set **2100-34PZB+**



Mounting Bracket

Energy Chain System® E2 Tubes Series R2480 Installation Dimensions

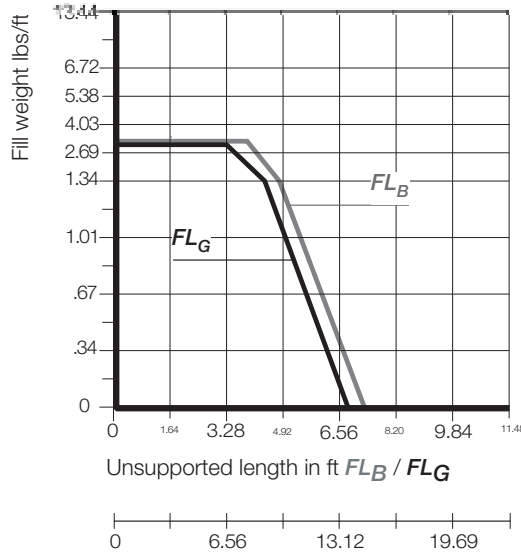
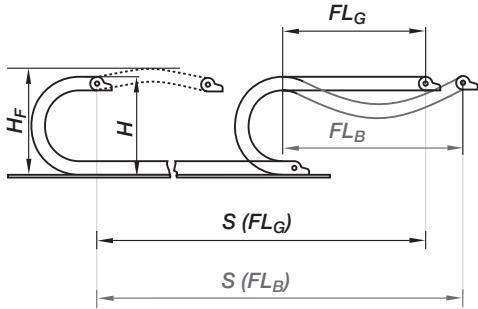
energy chain® configurator



R2480

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1



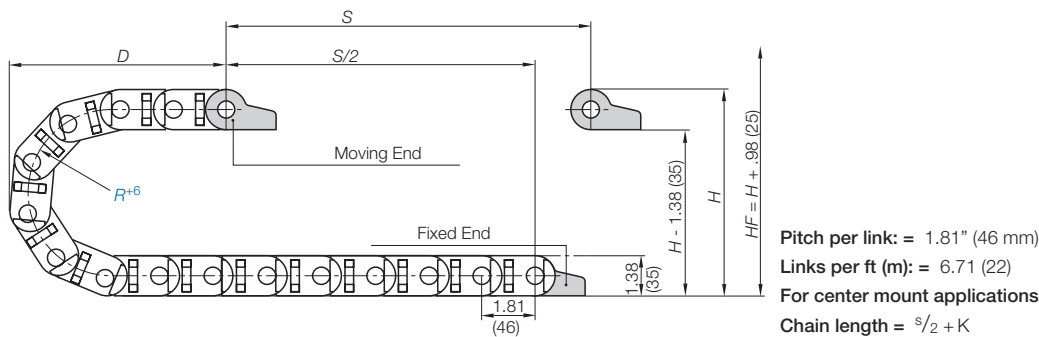
Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height
- H_{R1} = Trough inner height
- H_2 = *Mounting height
- D_2 = Overlength - long travels, gliding
- K_2 = *Add-on
- *If the mounting bracket location is set lower



The required clearance height: $H_F = H + .98$ in. (25 mm) (with 1.01 lbs/ft (1.5 kg/m) fill weight). Please consult igus® if space is particularly restricted.

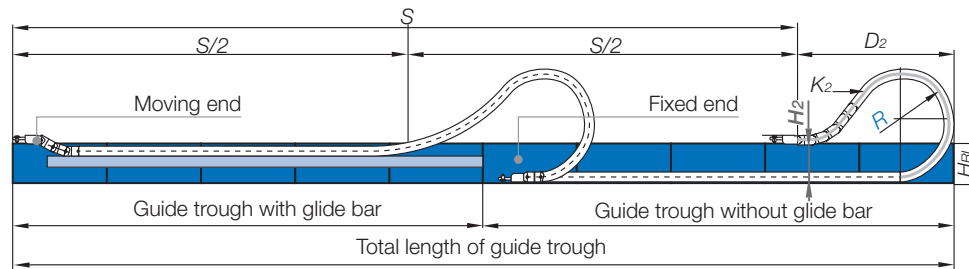
R	1.38 (055*)	1.50 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	9.84 (250)
H	5.71 (145)	7.28 (185)	9.25 (235)	11.22 (285)	13.19 (335)	15.16 (385)	17.13 (435)	19.09 (485)	21.06 (535)
D	5.59 (142)	6.38 (162)	7.36 (187)	8.35 (212)	9.33 (237)	10.31 (262)	11.30 (287)	12.28 (312)	13.27 (337)
K	10.43 (265)	12.99 (330)	16.14 (410)	19.09 (485)	22.24 (565)	25.39 (645)	28.54 (725)	31.50 (800)	34.65 (880)

*upon request

For long travels with lowered mounting height

Long travel lengths from 32.8 ft. (10 m) to max. 328 ft. (100 m)

For center mount applications:
Chain length = $S/2 + K_2$



R	1.38 (055*)	1.50 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	9.84 (250)
H_2	4.33 (110)	5.91 (150)	3.94 (100)	3.94 (100)	3.94 (100)	3.94 (100)	3.94 (100)	3.94 (100)	3.94 (100)
D_2^{*25}	5.59 (142)	6.38 (162)	14.96 (380)	17.32 (440)	23.23 (590)	29.72 (755)	37.40 (950)	40.94 (1040)	44.49 (1130)
K_2	10.43 (265)	12.99 (330)	25.35 (644)	28.98 (736)	39.84 (1012)	48.90 (1242)	57.95 (1472)	63.39 (1610)	70.63 (1794)

*upon request

Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.

Design, Chapter 1

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120° C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

Technical Data



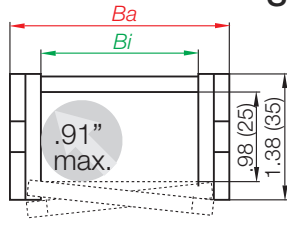
Details of material properties

Chapter 1

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



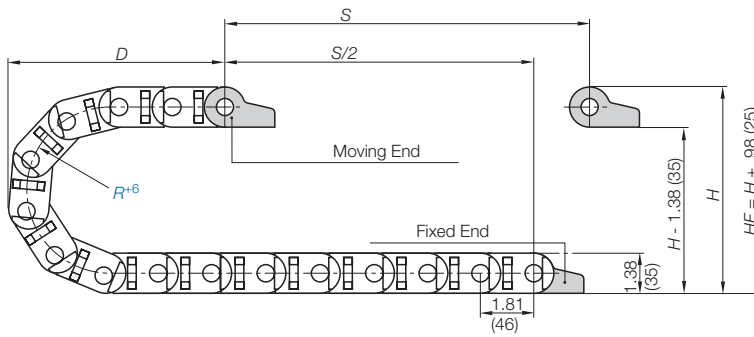
Series R2480 - hinged, snap-open along the inner radius



Part Number Structure



- Color - Black
- Bending radius
- Width
- Series



Supplement part number with required radius. Example: 2480-10--0
Pitch: 1.81 in. (46 mm) per link links/ft(m) = 6.71 (22)

Part Number.

Snap-open inner radius	Bi in. (mm)	Ba in. (mm)	Weight lbs/ft (kg/m)
2480-02- <input type="text" value=""/> -0	.98 (25)	1.61 (41)	≈ 0.55 (0.82)
2480-03- <input type="text" value=""/> -0	1.50 (38)	2.13 (54)	≈ 0.62 (0.92)
2480-05- <input type="text" value=""/> -0	2.24 (57)	2.87 (73)	≈ 0.69 (1.03)
2480-07- <input type="text" value=""/> -0	3.03 (77)	3.66 (93)	≈ 0.79 (1.17)
2480-09- <input type="text" value=""/> -0	3.50 (89)	4.13 (105)	≈ 0.85 (1.26)
2480-10- <input type="text" value=""/> -0	4.06 (103)	4.69 (119)	≈ 0.90 (1.34)
2480-12- <input type="text" value=""/> -0	4.92 (125)	5.55 (141)	≈ 0.96 (1.43)

Choose from the radii below for all of the above sizes

Radius (mm) Example: 2480-10--0

	055*	075	100	125	150	175	200	225	250
R	1.38 (055*)	1.50 (075*)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	9.84 (250)
H	5.71 (145)	7.28 (185)	9.25 (235)	11.22 (285)	13.19 (335)	15.16 (385)	17.13 (435)	19.09 (485)	21.06 (535)
D	5.59 (142)	6.38 (162)	7.36 (187)	8.35 (212)	9.33 (237)	10.31 (262)	11.30 (287)	12.28 (312)	13.27 (337)
K	10.43 (265)	12.99 (330)	16.14 (410)	19.09 (485)	22.24 (565)	25.39 (645)	28.54 (725)	31.50 (800)	34.65 (880)

Energy Chain System® E2 Tubes

Series R2480

Interior Separation

energy chain® configurator ▶



R2480

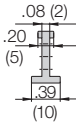
Option 1: Vertical separators

Vertical separators are used if a vertical subdivision of the Energy Tube interior is required. By standard, vertical separators are assembled every other Energy Tube link.



- **Standard separator 24501 for Energy Tubes**

This separator is used for general subdivision of Energy Tubes.

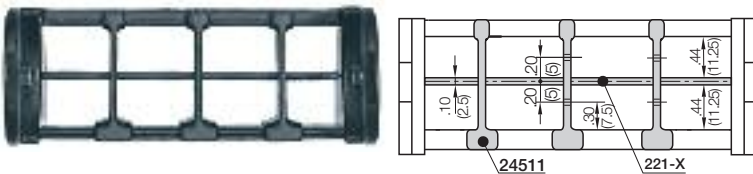


Vertical Separator

Unassembled	Part No. 24501
Assembled	Part No. 24511

Option 2: Full-width shelf

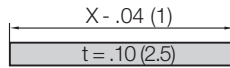
It is ideal for use in applications involving many thin cables with similar or identical diameters. This shelf slides into place and spans the entire width of the chain.



Shelves 220-XX

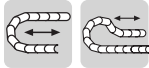
Shelves can be inserted at 3 different heights in .20" (5mm) increments

Width X in. (mm)	Part No. Unassembled	Part No. Assembled
.98 (25)	220-25	221-25
1.50 (38)	220-38	221-38
2.24 (57)	220-57	221-57
3.03 (77)	220-77	221-77
3.54 (90)	220-90	221-90
4.06 (103)	220-103	221-103
4.92 (125)	220-125	221-125



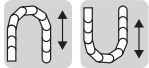
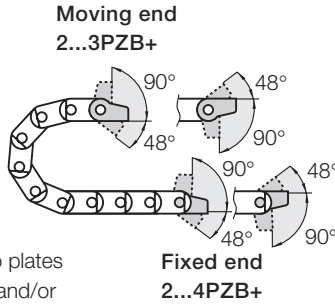
PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFG: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS





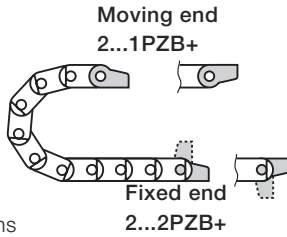
Option 1: pivoting

- For unsupported and gliding applications
- Well suited for tight installation conditions
- Detachable strain relief tiwrap plates
- Can be mounted on the fixed and/or moving end

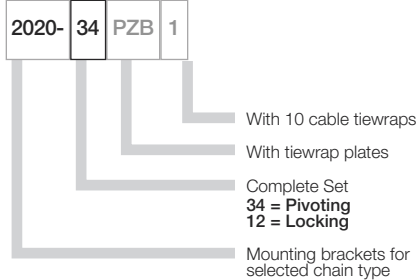


Option 2: locking

- For unsupported and gliding applications
- Extreme speed an/or accelerations
- For height restricted applications
- Can be mounted on the fixed and/or moving end



Part Number Structure



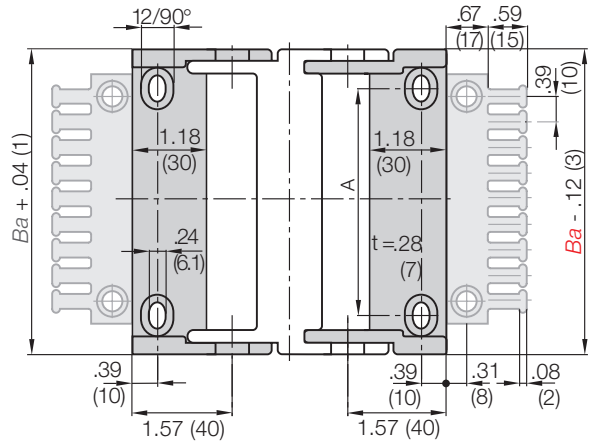
Full set, for both ends:

2020- 34 PZB Full set, each part with pin/bore + tiwrap plate

Single-part order:

2020- 3 PZB Mounting bracket with bore + tiwrap plate

2020- 4 PZB Mounting bracket with pin + tiwrap plate



Part No. Full Set (pivoting)

With Tiwrap Plates

Series 2480:

2020-34PZB

Part No. Full Set (pivoting)

With Tiwrap Plates

+ 10 cable ties

Series 2480:

2020-34PZB1

For Chain Type	Part No. Full set with Tiwrap Plate	Part No. Full Set with Tiwrap Plate + 10 cable ties	Dimension A	
			in.	(mm)
2480-02	2020- <input type="checkbox"/> PZB+	2020- <input type="checkbox"/> PZB1+	.47	(12)
2480-03	2030- <input type="checkbox"/> PZB+	2030- <input type="checkbox"/> PZB1+	.98	(25)
2480-05	2050- <input type="checkbox"/> PZB+	2050- <input type="checkbox"/> PZB1+	1.73	(44)
2480-07	2070- <input type="checkbox"/> PZB+	2070- <input type="checkbox"/> PZB1+	2.52	(64)
2480-09	2090- <input type="checkbox"/> PZB+	2090- <input type="checkbox"/> PZB1+	3.03	(77)
2480-10	2100- <input type="checkbox"/> PZB+	2100- <input type="checkbox"/> PZB1+	3.54	(90)
2480-12	2125- <input type="checkbox"/> PZB+	2125- <input type="checkbox"/> PZB1+	4.41	(112)

34 or 12

For pivoting brackets choose 34

For locking brackets choose 12

Example: 2020- 34 PZB

Energy Chain System® E2 Tubes Series R2480 Mounting Bracket - Steel

energy chain® configurator ▶

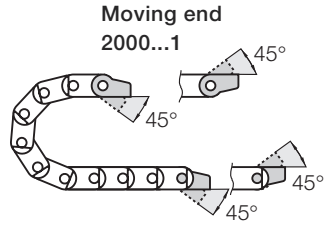


R2480

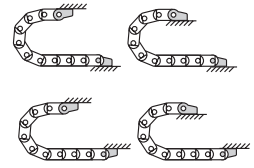


Option 1: Steel

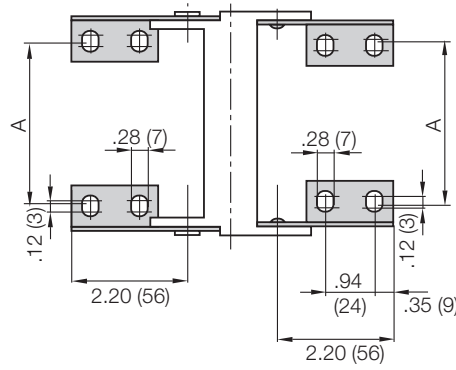
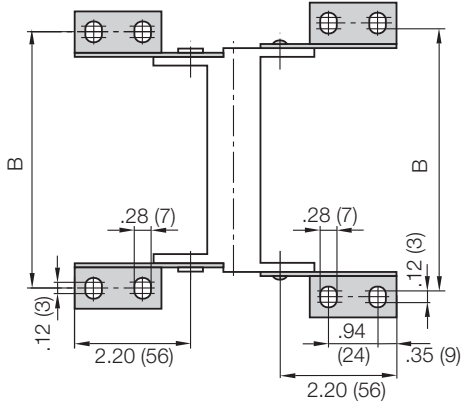
- Pivoting connections
- One part (two-piece) for all chain widths
- Electrically conductive
- Bolted connection outside of chain cross-section possible



Fixed end
2000...2



Possible installation configurations -



Chain Type	Part No. Full Set	Dimension A		Dimension B	
		in.	(mm)	in.	(mm)
2480-02	2000-12				
2480-03	2000-12	.98	(25)	2.87	(73)
2480-05	2000-12	1.73	(44)	3.62	(92)
2480-07	2000-12	2.52	(64)	4.41	(112)
2480-09	2000-12	2.99	(76)	4.88	(124)
2480-10	2000-12	3.54	(90)	5.43	(138)
2480-12	2000-12	4.41	(112)	6.30	(160)

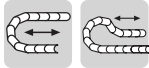
Part No. Mounting Brackets Full Set
4 parts, 2 with pin, 2 with bore
Series 2480:
2000-12

Part No. Mounting Bracket Moving End
2 parts, 1 left & 1 right
Series 2480:
2000-1

Part No. Mounting Bracket Fixed End
2 parts, 1 left & 1 right
Series 2480:
2000-2

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

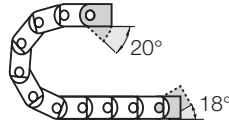




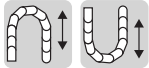
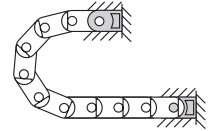
Option 1: pivoting

- For unsupported applications
- Bolted connection outside of chain cross section
- Confined installation conditions
- Attachment points on all sides
- Stackable

Moving end
24801...1



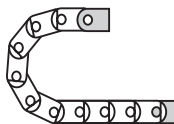
Fixed end
24801...2



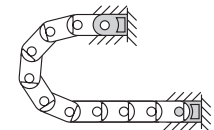
Option 2: locking

- For vertical hanging/standing applications
- Bolted connection outside of chain cross section
- For very high speeds and accelerations
- Attachment points on all sides
- Stackable

Moving end
24811...1



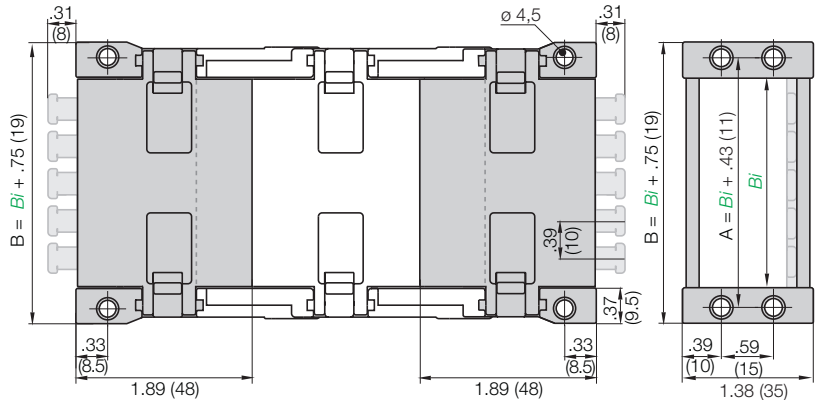
Fixed end
24811...2



Part Number Structure

24801- 02 12 12

- With tiwrap plates
- Complete Set
- Width
- Mounting brackets for selected chain type
24801 = Pivoting
24811 = Locking



Full set, for both ends:

24801- 12 ZB Full set, each part with pin/bore + tiwrap plate

Single-part order:

24801- 1 ZB Mounting bracket with bore + tiwrap plate

24801- 2 ZB Mounting bracket with pin + tiwrap plate

Part No. Full Set (pivoting)

With Tiwrap Plates

Series 2480:

24801-Width-12ZB

Part No. Full Set (pivoting)

Without Tiwrap Plates

Series 2480:

24801-Width-12

For Chain Type	Part No. Full set with Tiwrap Plate	Part No. Full Set without Tiwrap Plate	Dimension A in. (mm)
2480-02	24801-02-12-ZB	24801-02-12	1.42 (36)
2480-03	24801-03-12-ZB	24801-03-12	1.93 (49)
2480-05	24801-05-12-ZB	24801-05-12	2.68 (68)
2480-07	24801-07-12-ZB	24801-07-12	3.46 (88)
2480-09	24801-09-12-ZB	24801-09-12	3.94 (100)
2480-10	24801-10-12-ZB	24801-10-12	4.49 (114)
2480-12	24801-12-12-ZB	24801-12-12	5.35 (136)

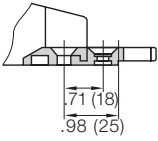
24801 or 24811

For pivoting brackets choose 24801

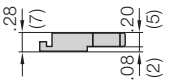
For locking brackets choose 24811

Example: 24801-02-12-ZB

Tiewrap Plates



Shown assembled

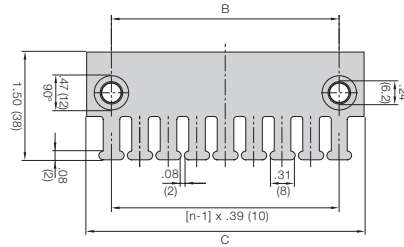


Single tiewrap plate

Option 1:
Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plates	n Number of Teeth	Dimension C	Dimension B
2020-ZB	3	1.18 (30)	.59 (15)
2030-ZB	4	1.57 (40)	.79 (20)
2040-ZB	5	1.97 (50)	1.18 (30)
2050-ZB	6	2.36 (60)	1.57 (40)
2070-ZB	8	3.15 (80)	2.36 (60)
2090-ZB	9	3.54 (90)	2.76 (70)
2100-ZB	10	3.94 (100)	3.15 (80)
2125-ZB	12	4.72 (120)	3.94 (100)



For more information please refer to strain relief section of Chapter 10



Cable tiewraps as individual parts

Cable tiewraps 100 pieces/bag	Width x Length		Maximum Ø		Tensile Strength	
	in.	(mm)	in.	(mm)	lbs	(N)
CFB-001	.19 x 5.91	(4.8 x 150)	1.42	(36)	50	(222)



Strain relief for steel mounting brackets

Clip-on connection is not possible with steel mounting brackets. In this case, the tiewrap plates must be bolted directly into separate bore holes in front of the mounting bracket. Alternatively the tiewrap plates 20XX-ZB can be also used here. **Details chapter 10**

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part Number 92-30
- 1/2 travel length of glide bars
Part Number 92-01
- Installation sets as end connectors
Part Number 92-50-XX

-XX indicates the length of the profile rail on which the guide trough is mounted. The values and part numbers are specified in the table on the left. The standard length of the trough components and glide bars is 6.56 ft (2 m.) The required overall length of the guide trough directly correlates to the length of travel.

Example:
Length of travel 164 ft (50 m)
Center mounted

Required guide troughs:
164 ft (50 m) guide trough
82 ft (25 m) glide bar
= 25 sections of 6.56 ft
(2 m) guide trough
Part No. 92-30
= 13 sections of 6.56 ft (2 m) glide bar
Part No. 92-01

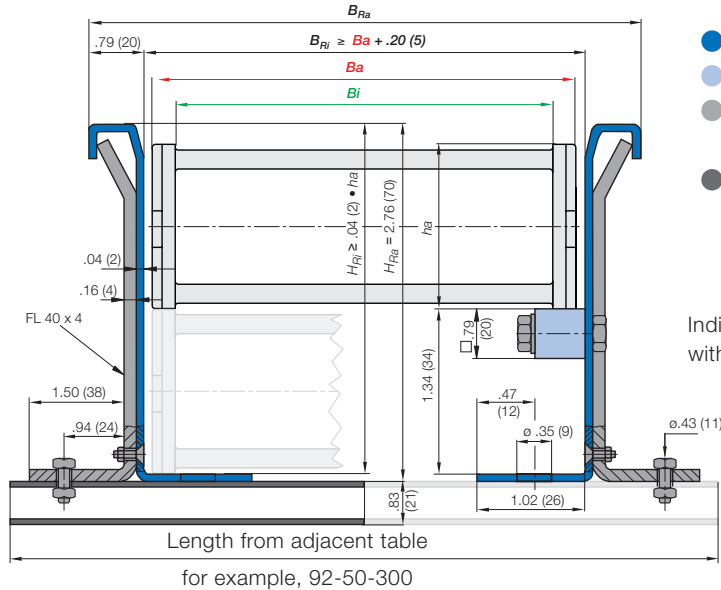
Required number of installation sets:
= Number of guide trough components + 1
= 25 + 1 = 26
Part number of the installation sets

Example: 92-50-400 for 15.75" (400 mm) long profile rail.



Width of Crossbar
2480-05-200-0

	B_{Ri}	Installation Part No.
-02	1.81 (46)	92-50-150
-03	2.32 (59)	92-50-175
-05	3.07 (78)	92-50-175
-07	3.86 (98)	92-50-200
-09	4.37 (111)	92-50-250
-10	4.88 (124)	92-50-250
-12	5.75 (146)	92-50-300



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

* Specialized guide trough available upon request

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RfQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index


Series 2680

Special Features / Options


IPA Qualification Certificate
Air Cleanliness Class ISO Class 3
(at v = 6.56 ft/s) upon request



ESD classification:
Electrically conductive
ESD/ATEX version upon request



Flammability Class
VDE 0304 IIC UL94 HB

Assembly Tips


Insert screwdriver into the slot, using a lever action apply pressure to the screwdriver to release

Other Installation Methods

Vertical, hanging ≤ 164 ft (50 m)

Vertical, standing ≤ 9.84 ft (3 m)

Side-mounted, un_supp. ≤ 3.28 ft (1 m)

Rotary requires further calculation

Usage Guidelines

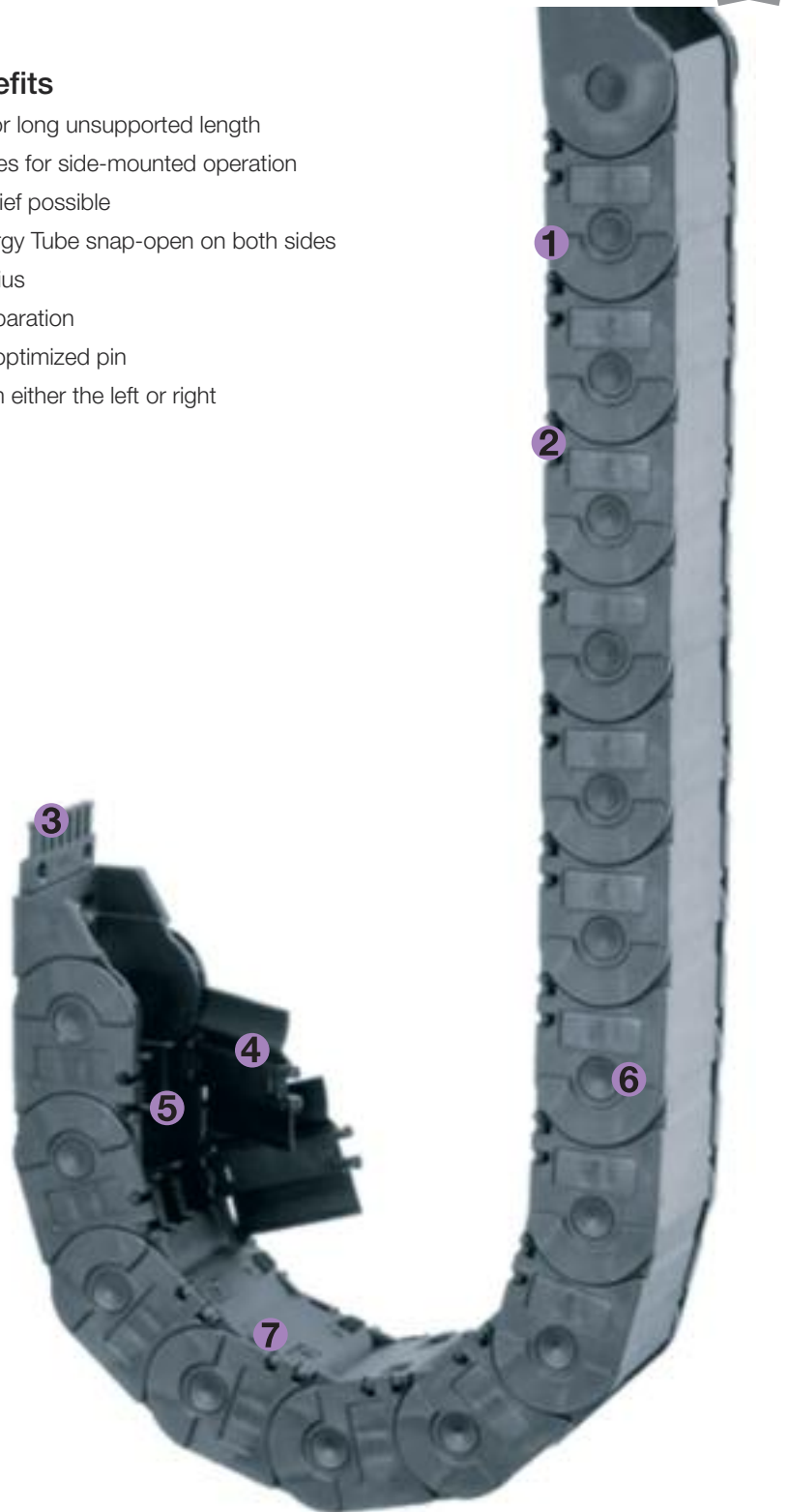

- If hinged, snap-open accessibility along the inner radius is required
- If stable chain of moderate size is required
- If integrated strain relief is required at the connection point
- If loads are moderate
- If chip protection is required
- If easy installation is required



- If the application is very simple
➤ **Series R58 E2 Tubes**
- If maximum stability is required
➤ **Series R770 E4/100**
- If cables over 1.26" (32 mm) are involved
➤ **Series R780 E4/100**

Features & Benefits

- 1 Double stop dog for long unsupported length
- 2 Lateral glide surfaces for side-mounted operation
- 3 Integrated strain relief possible
- 4 Fully enclosed Energy Tube snap-open on both sides along the inner radius
- 5 Modular interior separation
- 6 Easy assembly by optimized pin
- 7 Rapid opening from either the left or right


Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator

9.84 ft (3 m) **2680-10-100-0**



Energy Chain®

With 2 separators **26501** assembled every 2nd link



Interior Separation

1 Set **2610-34 PZB**



Mounting Bracket

Energy Chain System® E2 Tubes Series R2680 Installation Dimensions

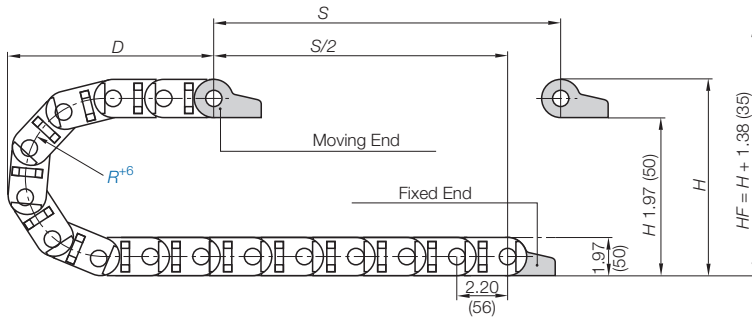
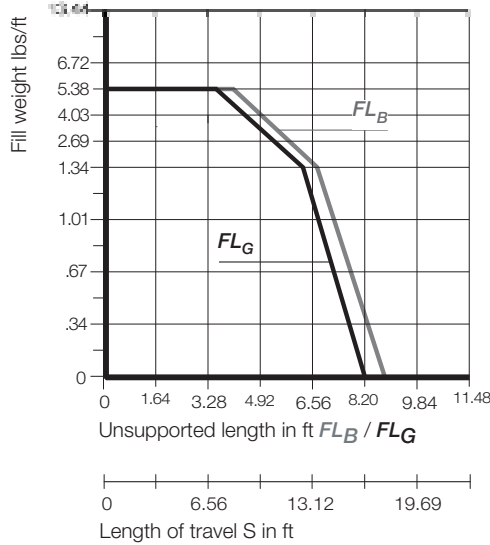
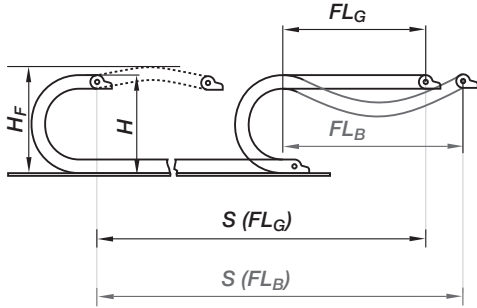
energy chain® configurator ▶

igus®

R2680

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



Pitch per link: = 2.20" (56 mm)
Links per foot (m): = 5.49 (18)
For center mount applications:
Chain length = $\frac{S}{2} + K$

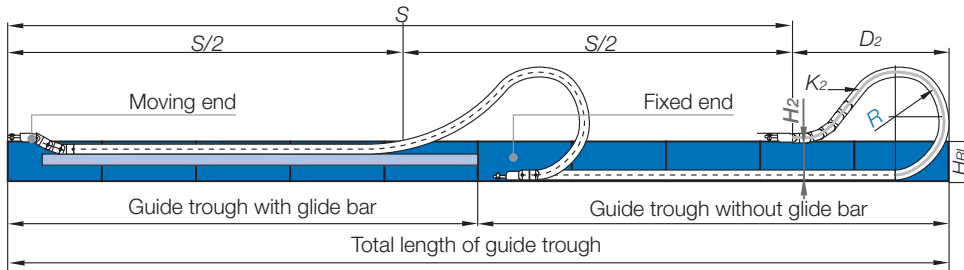
The required clearance height: $H_f = H + 1.38$ in. (35 mm) (with 1.34 lbs/ft (2.0 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)
H	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	21.65 (550)
D	8.23 (209)	9.21 (234)	10.20 (259)	11.18 (284)	12.17 (309)	14.13 (359)
K	16.93 (430)	19.88 (505)	23.03 (585)	26.18 (665)	29.33 (745)	35.43 (900)

For long travels with lowered mounting height

Long travel lengths from 32.8 ft. (10 m) to max. 394 ft. (120 m)

For center mount applications:
Chain length: = $\frac{S}{2} + K_2$



R	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)
H_2	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)
D_2	13.78 (350)	18.70 (475)	19.69 (500)	25.79 (655)	30.31 (770)	37.40 (950)
K_2	24.25 (616)	30.87 (784)	35.28 (896)	44.09 (1120)	50.71 (1288)	63.94 (1624)

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{safety buffer}$
 - H_f = Required clearance height
 - H_{R1} = Trough inner height
 - H_2 = *Mounting height
 - D_2 = Overlength - long travels, gliding
 - K_2 = *Add-on
- *If the mounting bracket location is set lower

Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.

Design, Chapter 1

Technical Data



Details of material properties

▶ Chapter 1



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



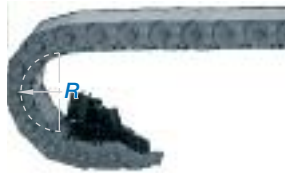
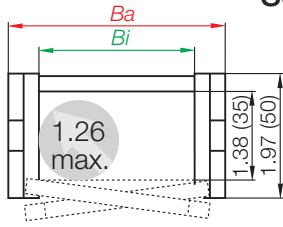
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igus® Energy Chain System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

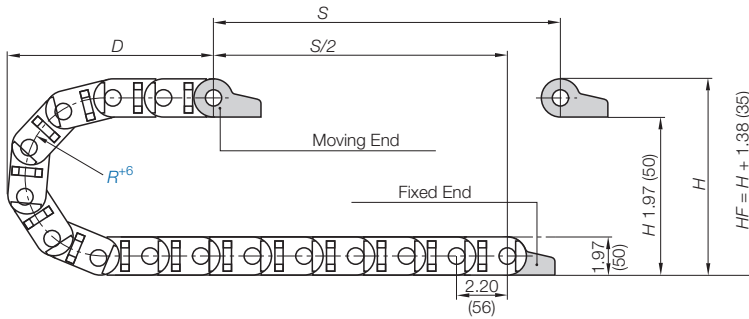
Series R2680 - hinged, snap-open along the inner radius



Part Number Structure



Color - Black
Bending radius
Width
Series



Supplement part number with required radius. Example: 2680-10--0
Pitch: 1.81 in. (46 mm) per link links/ft(m) = 6.71 (22)

Part Number.

Snap-open inner radius	<i>Bi</i> in. (mm)	<i>Ba</i> in. (mm)	Weight lbs/ft (kg/m)
2680-05- <input type="text" value=""/> -0	1.97 (50)	2.60 (66)	≈ 0.89 (1.33)
2680-07- <input type="text" value=""/> -0	2.95 (75)	3.58 (91)	≈ 1.01 (1.51)
2680-10- <input type="text" value=""/> -0	3.94 (100)	4.57 (116)	≈ 1.22 (1.81)
2680-12- <input type="text" value=""/> -0	4.92 (125)	5.55 (141)	≈ 1.34 (1.99)

Choose from the radii below for all of the above sizes

	Radius (mm)					
	100	125	150	175	200	250
R	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)
H	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	21.65 (550)
D	8.23 (209)	9.21 (234)	10.20 (259)	11.18 (284)	12.17 (309)	14.13 (359)
K	16.93 (430)	19.88 (505)	23.03 (585)	26.18 (665)	29.33 (745)	35.43 (900)

Energy Chain System® E2 Tubes

Series R2680

Interior Separation

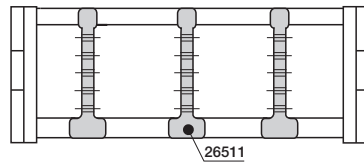
energy chain® configurator 



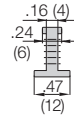
R2680

Option 1: Vertical separators

Vertical separators are used if a vertical subdivision of the Energy Tube interior is required. By standard, vertical separators are assembled every other Energy Tube link.



- **Standard separator 26501 for Energy Tubes**
This separator is used for general subdivision of Energy Tubes.

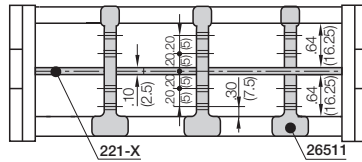


Vertical Separator

Unassembled	Part No. 26501
Assembled	Part No. 26511

Option 2: Full-width shelf

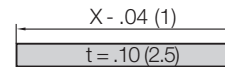
It is ideal for use in applications involving many thin cables with similar or identical diameters. This shelf slides into place and spans the entire width of the chain.



Shelves 220-XX

Shelves can be inserted at 3 different heights in .20" (5mm) increments

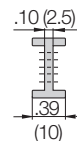
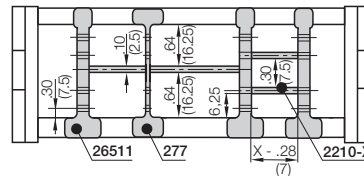
Width X in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Part No. Unassembled	Part No. Assembled
1.97 (50)	220-50	221-50	3.94 (100)	220-100	221-100
2.56 (65)	220-65	221-65	4.92 (125)	220-125	221-125
2.95 (75)	220-75	221-75	5.91 (150)	220-150	221-150
3.54 (90)	220-90	221-90	6.89 (175)	220-175	221-175



Option 3: shelves

For applications involving many cables with different diameters. This shelf slides into place and spans the entire width of the chain. Use shelf 2200-XX in combination with slotted vertical separator 26510.

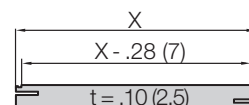
- **Open slotted separator 276 for Energy Tubes**
This separator can be retrofitted into an existing interior separation system without removing the shelves, as long as these shelves fit into the 5 middle slots only.



Slotted Separator, Open

Unassembled	Part No. 276
Assembled	Part No. 277

Width X in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Part No. Unassembled	Part No. Assembled
.71 (18)	2200-18	2210-18	2.28 (58)	2200-58	2210-58
.91 (23)	2200-23	2210-23	2.68 (68)	2200-68	2210-68
1.10 (28)	2200-28	2210-28	2.87 (73)	2200-73	2210-73
1.30 (33)	2200-33	2210-33	3.46 (88)	2200-88	2210-88
1.50 (38)	2200-38	2210-38	3.90 (99)	2200-99	2210-99
1.69 (43)	2200-43	2210-43	4.88 (124)	2200-124	2210-124
1.89 (48)	2200-48	2210-48			



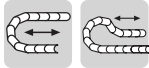
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 RoHS info: www.igus.com/RoHS



igus® Energy Chain System®

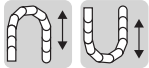
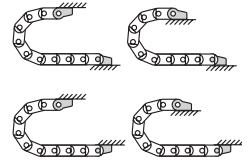
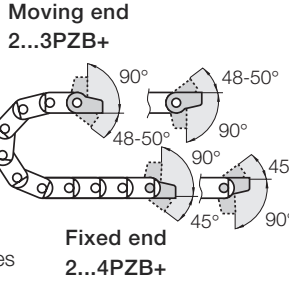
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email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>



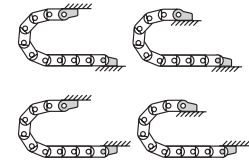
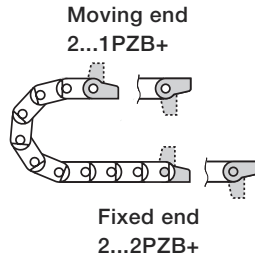
Option 1: pivoting

- For unsupported and gliding applications
- Well suited for tight installation conditions
- Detachable strain relief tiwrap plates
- Can be mounted on the fixed and/or moving end



Option 2: locking

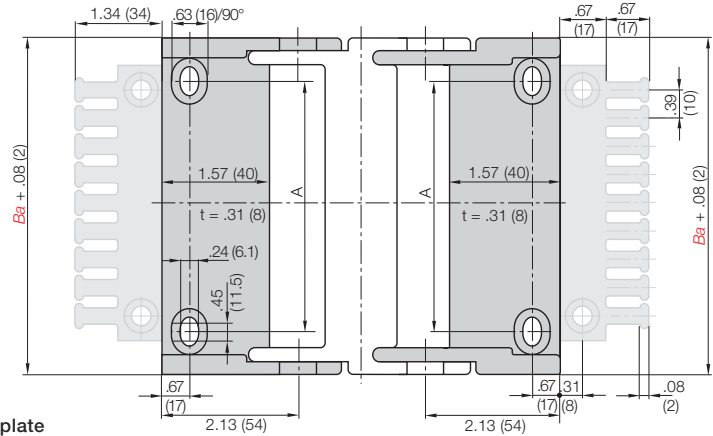
- For unsupported and gliding applications
- Extreme speed and/or accelerations
- For height restricted applications
- Can be mounted on the fixed and/or moving end



Part Number Structure

2605- 34 PZB K1

- With 10 cable tiwraps
- With tiwrap plates
- Complete Set
34 = Pivoting
12 = Locking
- Mounting brackets for selected chain type



Full set, for both ends:

2605- 34 PZB Full set, each part with pin/bore + tiwrap plate

Single-part order:

2605- 3 PZB Mounting bracket with bore + tiwrap plate

2605- 4 PZB Mounting bracket with pin + tiwrap plate

Part No. Full Set (pivoting)

With Tiwrap Plates

Series 2680:

2605-34PZB

Part No. Full Set (pivoting)

With Tiwrap Plates + 10 cable ties

Series 2680:

2605-34PZBK1

For Chain Type	Part No. Full Set without Tiwrap Plate	Part No. Full Set with Tiwrap Plate	Part No. Full Set with Tiwrap Plate + 10 cable ties	Dimension A in. (mm)
2680-05	2605- <input type="checkbox"/> PZ	2605- <input type="checkbox"/> PZB	2605- <input type="checkbox"/> PZBK1	1.18 (30)
2680-07	2607- <input type="checkbox"/> PZ	2607- <input type="checkbox"/> PZB	2607- <input type="checkbox"/> PZBK1	2.17 (55)
2680-10	2610- <input type="checkbox"/> PZ	2610- <input type="checkbox"/> PZB	2610- <input type="checkbox"/> PZBK1	3.15 (80)
2680-12	2612- <input type="checkbox"/> PZ	2612- <input type="checkbox"/> PZB	2612- <input type="checkbox"/> PZBK1	4.13 (105)

For pivoting brackets choose 34
For locking brackets choose 12
Example: 2605- 34 PZB

Energy Chain System® E2 Tubes Series R2680 Mounting Bracket - Steel

energy chain® configurator ▶

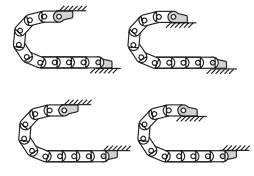
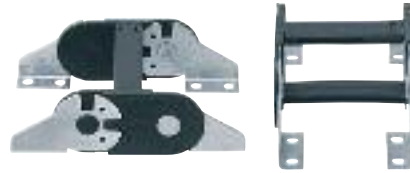
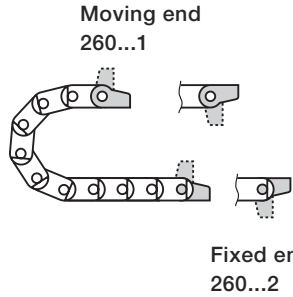


R2680

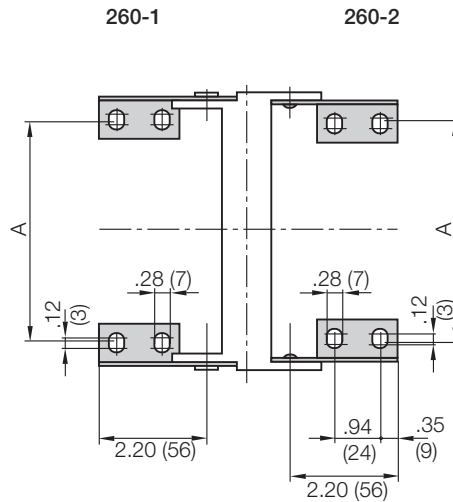
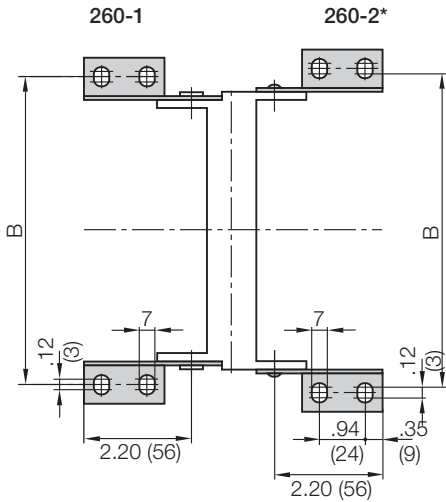


Option 1: Steel

- One part (two-piece) for all chain widths
- Electrically conductive
- Bolted connection outside of chain cross-section possible



Possible installation configurations -



*pivoting with no stop, (360°)

Chain Type	Part No. Full Set	Dimension A		Dimension B	
		in.	(mm)	in.	(mm)
2680-05	260-12	1.46	(37)	3.27	(83)
2680-07	260-12	2.44	(62)	4.25	(108)
2680-10	260-12	3.43	(87)	5.24	(133)
2680-12	260-12	4.41	(112)	6.22	(158)

Part No. Mounting Brackets Full Set
4 parts, 2 with pin, 2 with bore
Series 2680:
260-12

Part No. Mounting Bracket Moving End
2 parts, 1 left & 1 right
Series 2680:
260-1

Part No. Mounting Bracket Fixed End
2 parts, 1 left & 1 right
Series 2680:
260-2

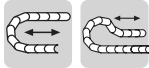
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



igus® Energy Chain System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

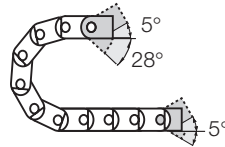
Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>



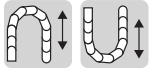
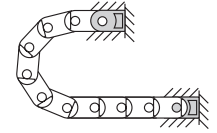
Option 1: pivoting

- For unsupported applications
- Bolted connection outside of chain cross section
- Confined installation conditions
- Attachment points on all sides
- Stackable

Moving end
26800...1



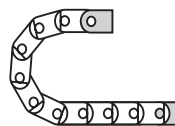
Fixed end
26800...2



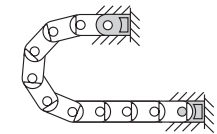
Option 2: locking

- For vertical hanging/standing applications
- Bolted connection outside of chain cross section
- For very high speeds and accelerations
- Attachment points on all sides
- Stackable

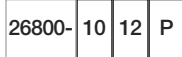
Moving end
26810...1



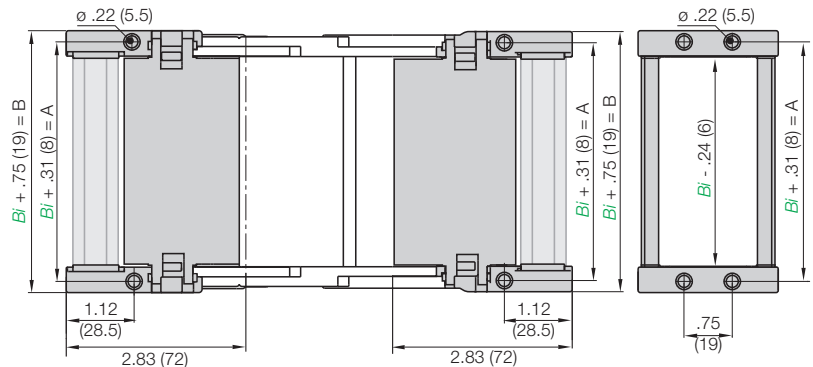
Fixed end
26810...2



Part Number Structure



- With profile rail
- Complete Set
- Width
- Mounting brackets for selected chain type
26800 = Pivoting
26810 = Locking



Full set, for both ends:

26800-12-P Full set, each part with pin/bore + proile rail

Single-part order:

26800-1-P Mounting bracket with bore + proile rail

26800-2-P Mounting bracket with pin + proile rail

Part No. Full Set (pivoting)

With Profile Rail

Series 2680:

26800-Width-12P

Part No. Full Set (pivoting)

Without Profile Rail

Series 2680:

26800-Width-12

For Chain Type	Part No. Full set with Profile Rail	Part No. Full Set without Profile Rail	Dimension A in. (mm)	Dimension B in. (mm)
2680-05	<input type="text"/> -05-12P	<input type="text"/> -05-12	2.28 (58)	2.72 (69)
2680-07	<input type="text"/> -07-12P	<input type="text"/> -07-12	3.27 (83)	3.70 (94)
2680-10	<input type="text"/> -10-12P	<input type="text"/> -10-12	4.25 (108)	4.69 (119)
2680-12	<input type="text"/> -12-12P	<input type="text"/> -12-12	5.24 (133)	5.67 (144)

For pivoting brackets choose or

For pivoting brackets choose

For locking brackets choose

Example: -10-12P

Energy Chain System® E2 Tubes

Series R2680

Strain Relief

energy chain® configurator 



R2680

Chainfix clamps for the profile rail



igus® Chainfix strain relief elements are available in either steel or stainless steel. They can be adjusted with a hexagon socket and are available in single, double and triple configurations.

Part No. Single Clamp		Part No. Double Clamp		Part No. Triple Clamp		Cable ø	
Steel	Stainless	Steel	Stainless	Steel	Stainless	in.	(mm)
CFX12-1	CFX12-1E	CFX12-2	CFX12-2E	CFX12-3	-	.24 - .47	(06 - 12)
CFX14-1	CFX14-1E	CFX14-2	CFX14-2E	CFX14-3	-	.47 - .55	(12 - 14)
CFX16-1	CFX16-1E	CFX16-2	CFX16-2E	CFX16-3	-	.55 - .63	(14 - 16)
CFX18-1	CFX18-1E	CFX18-2	CFX18-2E	CFX18-3	-	.63 - .71	(16 - 18)
CFX20-1	CFX20-1E	CFX20-2	CFX20-2E	CFX20-3	-	.71 - .79	(18 - 20)
CFX22-1	CFX22-1E	CFX22-2	CFX22-2E	CFX22-3	-	.79 - .87	(20 - 22)
CFX26-1	CFX26-1E	CFX26-2	CFX26-2E	-	-	.87 - 1.02	(22 - 26)
CFX30-1	CFX30-1E	CFX30-2	CFX30-2E	-	-	1.02 - 1.18	(26 - 30)
CFX34-1	CFX34-1E	CFX34-2	CFX34-2E	-	-	1.18 - 1.34	(30 - 34)
CFX38-1	CFX38-1E	-	-	-	-	1.34 - 1.50	(34 - 38)
CFX42-1	CFX42-1E	-	-	-	-	1.50 - 1.65	(38 - 42)

For more information please refer to strain relief section of Chapter 10

Chainfix Clip

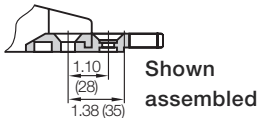


Modular snap-on strain relief device

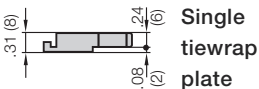
Chainfix clip is available for cable diameters ranging from .16" (4mm) to .94" (24 mm). It is suitable for assembly on KMA mounting brackets, clip-on strain relief for crossbars as well as profile rails. Quick assembly without the use of tools. **For more information please refer to strain relief section of Chapter 10**

Cable ø	Part No. Clamp	Part No. Bottom
in. (mm)		
.16-.31 (04-08)	CFC-08-M	CFC-08-C
.31-.47 (08-12)	CFC-12-M	CFC-12-C
.47-.63 (12-16)	CFC-16-M	CFC-16-C
.63-.79 (16-20)	CFC-20-M	CFC-20-C
.79-.94 (20-24)	CFC-24-M	CFC-24-C

Tiewrap Plates



Shown assembled



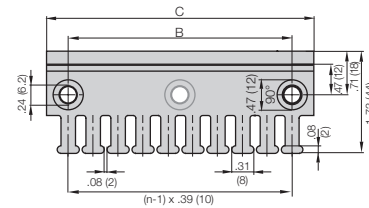
Single tiewrap plate

Option 1:

Tiewrap plates as an individual part

Available as an individual component, it can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



For more information please refer to strain relief section of Chapter 10

Option 2:

Clip-on Tiewrap plates

Available as a clip-on tiewrap plate without the use of bolts They are inserted and removed with a screwdriver used as a lever. Clip-on tiewrap plates are also available as an attachment to the opening crossbars.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
3050-ZC	5	1.97 (50)
3075-ZC	7	2.95 (75)

For more information please refer to strain relief section of Chapter 10

Strain relief for steel mounting brackets

Clip-on connection is not possible with steel mounting brackets. In this case, the tiewrap plates must be bolted directly into separate bore holes in front of the mounting bracket. Alternatively the tiewrap plates 30XX-Z and ZS can be also used here. **Details chapter 10**

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part Number 95-30
- 1/2 travel length of glide bars
Part number 92-01
- Installation sets as end connectors
Part Number 95-50-XX

-XX indicates the length of the profile rail on which the guide trough is mounted. The values and part numbers are specified in the table on the left. The standard length of the trough components and glide bars is 6.56 ft (2 m.) The required overall length of the guide trough directly correlates to the length of travel.

Example:

Length of travel 164 ft (50 m)
Center mounted

Required guide troughs:

164 ft (50 m) guide trough
82 ft (25 m) glide bar
= 25 sections of 6.56 ft (2 m) guide trough

Part No. 95-30

= 13 sections of 6.56 ft (2 m) glide bar

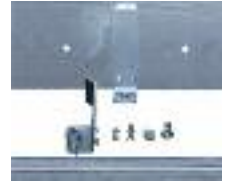
Part No. 92-01

Required number of installation sets:

= Number of guide trough components + 1
= 25 + 1 = 26

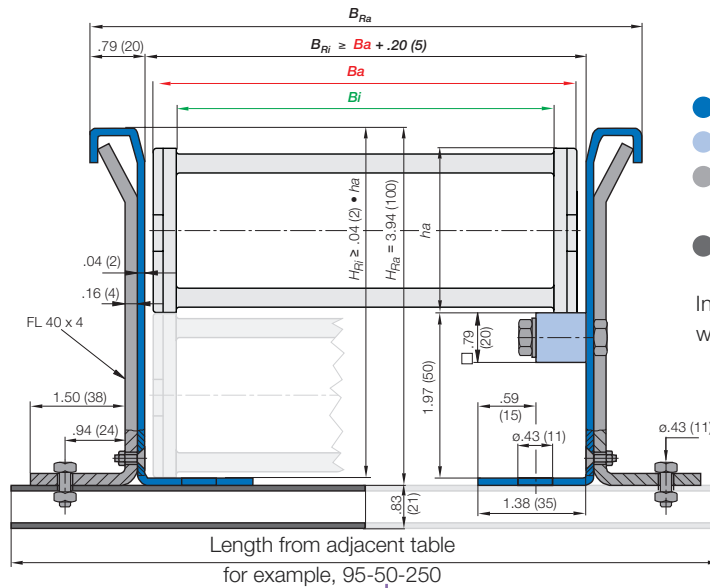
Part number of the installation sets

Example: 95-50-400 for 15.75" (400 mm) long profile rail.



Width of Crossbar
2680-05-200-0

	B_{Ri}	Installation Part No.
-05	2.80 (71)	95-50-200
-07	3.78 (96)	95-50-225
-10	4.76 (121)	95-50-250
-12	5.75 (146)	95-50-250



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

Length from adjacent table
for example, 95-50-250

Standard length profile rail

* Specialized guide trough available upon request

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index


Series 3480

Special Features / Options


IPA Qualification Certificate
 Air Cleanliness Class ISO Class 3
 (at $v = 6.56$ ft/s) upon request



ESD classification:
 Electrically conductive
 ESD/ATEX version upon request



Flammability Class
 VDE 0304 IIC UL94 HB

Assembly Tips


Insert screwdriver into the slot, using a lever action apply pressure to the screwdriver to release

Other Installation Methods

Vertical, hanging ≤ 262 ft (80 m)

Vertical, standing ≤ 9.84 ft (3 m)

Side-mounted, un supp. ≤ 3.28 ft (1 m)

Rotary requires further calculation

Usage Guidelines


- If hinged, snap-open accessibility along the inner radius is required
- If integrated strain relief is required at the connection point
- If modular interior separation is required
- If chip protection is required
- If easy installation is required
- If long service life is required

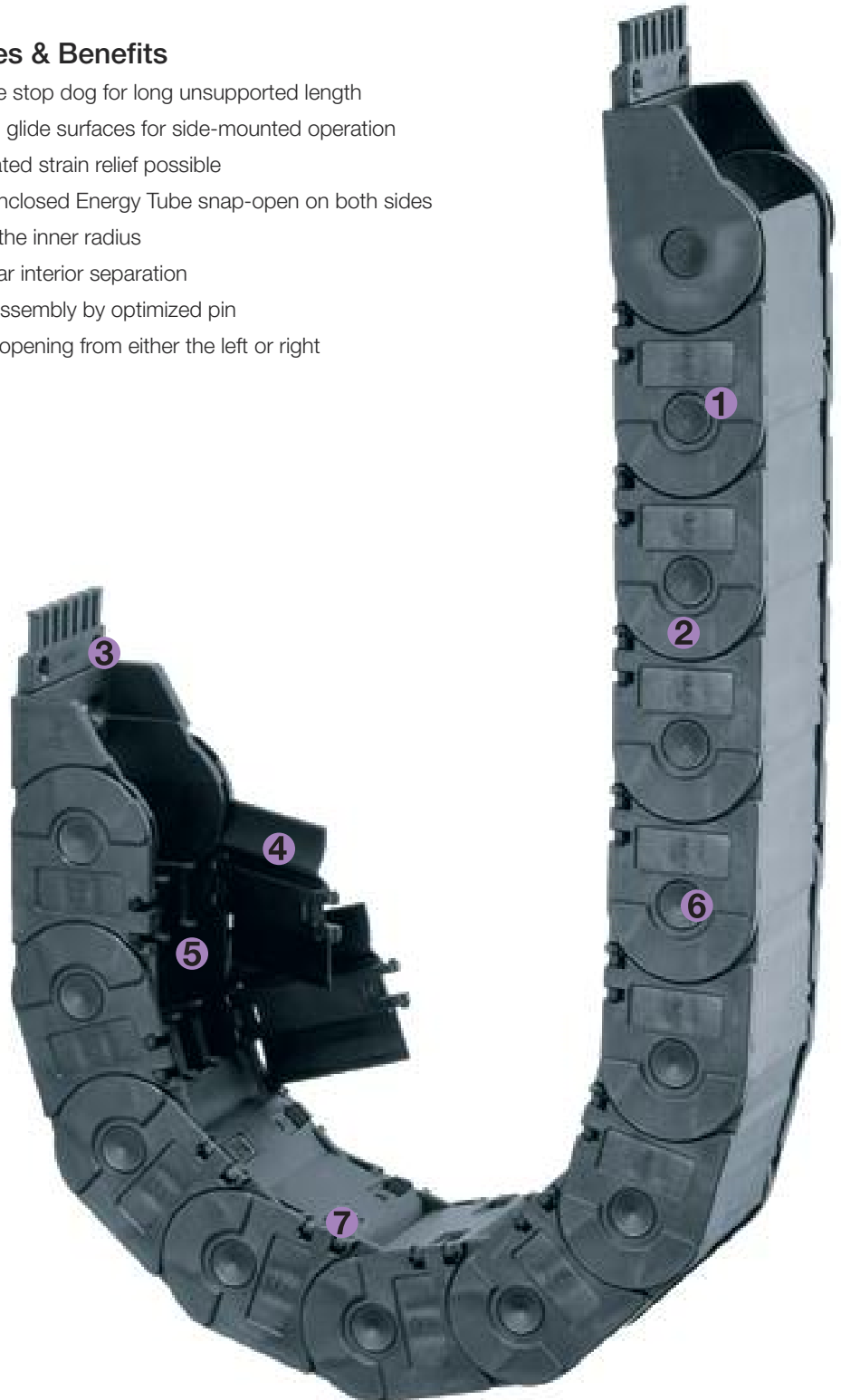


- If the application is very simple
 ➤ **Series R68 E2 Tubes**
- If maximum stability is required
 ➤ **Series R780 E4/100**
- If each link requires snap-open accessibility on both sides simultaneously
 ➤ **Series R780 E4/100**

5.87

Features & Benefits

- 1 Double stop dog for long unsupported length
- 2 Lateral glide surfaces for side-mounted operation
- 3 Integrated strain relief possible
- 4 Fully enclosed Energy Tube snap-open on both sides along the inner radius
- 5 Modular interior separation
- 6 Easy assembly by optimized pin
- 7 Rapid opening from either the left or right


Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

9.84 ft (3 m) **3480-150-100-0**

With 2 separators **34501** assembled every 2nd link

1 Set **3150-34PZB**

energy chain® configurator



Energy Chain®



Interior Separation



Mounting Bracket

Energy Chain System® E2 Tubes Series R3480 Installation Dimensions

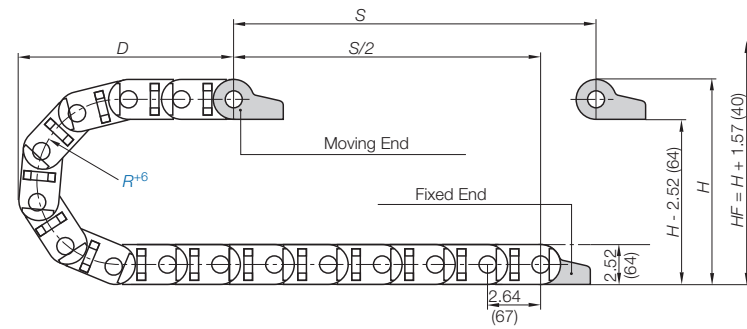
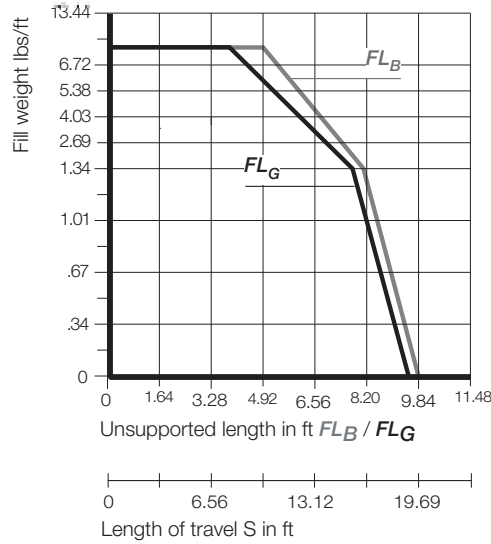
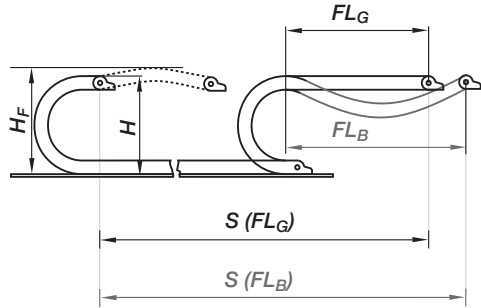
energy chain® configurator ▶



R3480

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



Pitch per link: = 2.64" (67 mm)
Links per ft (m): = 4.57 (15)
For center mount applications:
Chain length = $\frac{S}{2} + K$

The required clearance height: $HF = H + 1.57$ in. (40 mm) (with 1.68 lbs/ft (2.5 kg/m) fill weight.
Please consult igus® if space is particularly restricted.

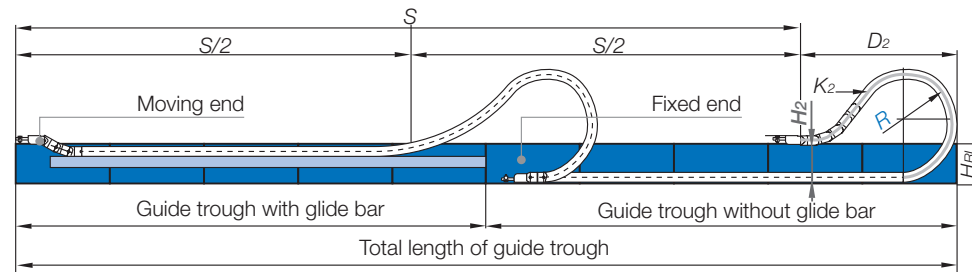
R	1.50 (075*)	3.94 (100*)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)
H	8.43 (214)	10.39 (264)	12.36 (314)	14.33 (364)	18.27 (464)	22.20 (564)	26.14 (664)
D	8.19 (208)	9.17 (233)	10.16 (258)	11.14 (283)	13.11 (333)	15.08 (383)	17.05 (433)
K	14.57 (370)	17.72 (450)	20.87 (530)	24.02 (610)	30.11 (765)	36.22 (920)	42.52 (1080)

*upon request

For long travels with lowered mounting height

Long travel lengths from 32.8 ft. (10 m) to max. 328 ft. (100 m)

Chain length: = $\frac{S}{2} + K_2$



R	1.50 (075*)	3.94 (100*)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)
H	-	-	7.32 (186)	7.32 (186)	7.32 (186)	7.32 (186)	7.32 (186)
D	-	-	18.70 (475)	22.44 (570)	30.71 (780)	39.76 (1010)	45.28 (1150)
K	-	-	31.65 (804)	39.57 (1005)	52.76 (1340)	65.94 (1675)	76.50 (1943)

*upon request

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_f = Required clearance height
- H_{R1} = Trough inner height
- H_2 = *Mounting height
- D_2 = Overlength - long travels, gliding
- K_2 = *Add-on
- *If the mounting bracket location is set lower

Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.

Design, Chapter 1

Technical Data



Details of material properties

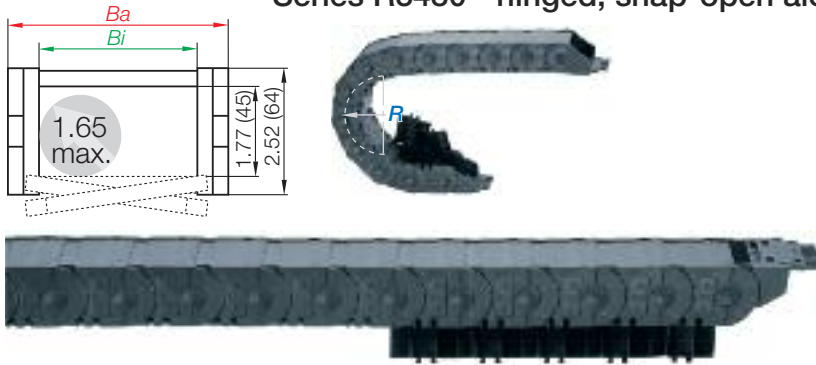
▶ Chapter 1

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

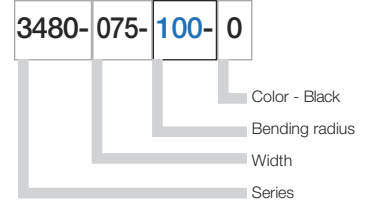
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



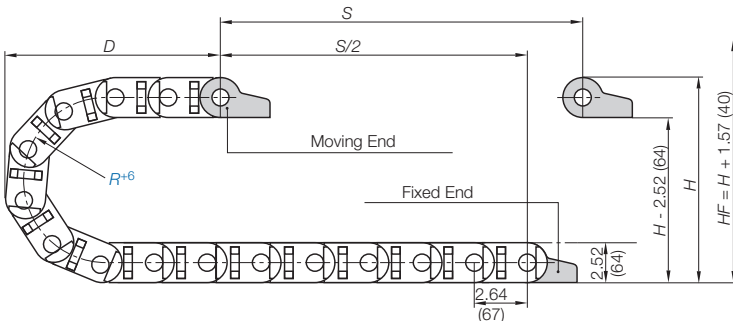
Series R3480 - hinged, snap-open along the inner radius



Part Number Structure



Please note: For using this series for long travels (gliding), please consult with igus® first. For long travels, igus® specifies Energy Chains® that snap open on the outer radius.



Supplement part number with required radius. Example: 3480-075--0
Pitch: 2.64 in. (67 mm) per link links/ft(m) = 4.57 (15)

Part Number.	Bi	Ba	Weight
Snap-open inner radius	in. (mm)	in. (mm)	lbs/ft (kg/m)
3480-075- <input type="text"/> -0	2.95 (75)	3.74 (95)	≈ 1.39 (2.07)
3480-100- <input type="text"/> -0	3.94 (100)	4.72 (120)	≈ 1.55 (2.30)
3480-115- <input type="text"/> -0	4.53 (115)	5.31 (135)	≈ 1.65 (2.46)
3480-150- <input type="text"/> -0	5.91 (150)	6.69 (170)	≈ 1.76 (2.62)
3480-175- <input type="text"/> -0	6.89 (175)	7.68 (195)	≈ 1.88 (2.80)

Choose from the radii below for all of the above sizes

	Radius (mm)						
	075*	100	125	150	175	200	250
R	1.50 (075*)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)
H	8.43 (214)	10.39 (264)	12.36 (314)	14.33 (364)	18.27 (464)	22.20 (564)	26.14 (664)
D	8.19 (208)	9.17 (233)	10.16 (258)	11.14 (283)	13.11 (333)	15.08 (383)	17.05 (433)
K	14.57 (370)	17.72 (450)	20.87 (530)	24.02 (610)	30.11 (765)	36.22 (920)	42.52 (1080)

Energy Chain System® E2 Tubes

Series R3480

Interior Separation

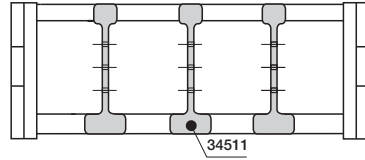
energy chain® configurator 



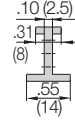
R3480

Option 1: Vertical separators

Vertical separators are used if a vertical subdivision of the Energy Tube interior is required. By standard, vertical separators are assembled every other Energy Tube link.



- **Standard separator 26501 for Energy Tubes**
This separator is used for general subdivision of Energy Tubes.

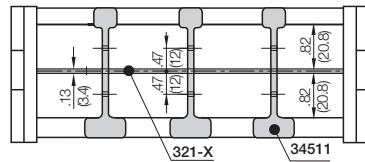


Vertical Separator

Unassembled	Part No. 34501
Assembled	Part No. 34511

Option 2: Full-width shelf

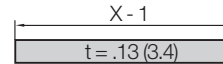
It is ideal for use in applications involving many thin cables with similar or identical diameters. This shelf slides into place and spans the entire width of the chain.



Shelves 220-XX

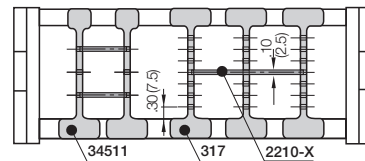
Shelves can be inserted at 3 different heights in .20" (5mm) increments

Width X	Part No.	Part No.	Width X	Part No.	Part No.
in. (mm)	Unassembled	Assembled	in. (mm)	Unassembled	Assembled
1.97 (50)	320-50	321-50	5.91 (150)	320-150	321-150
2.95 (75)	320-75	321-75	6.89 (175)	320-175	321-175
3.94 (100)	320-100	321-100	7.87 (200)	320-200	321-200
4.53 (115)	320-115	321-115	8.86 (225)	320-225	321-225
4.92 (125)	320-125	321-125	9.84 (250)	320-250	321-250

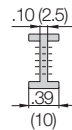


Option 3: shelves

For applications involving many cables with different diameters. This shelf slides into place and spans the entire width of the chain. Use shelf 2200-XX in combination with slotted vertical separator 26510.



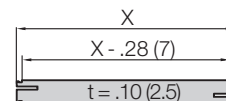
- **Open slotted separator 307 for Energy Tubes**
This separator can be retrofitted into an existing interior separation system without removing the shelves, as long as these shelves fit into the 5 middle slots only.



Slotted Separator, Open

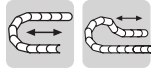
Unassembled	Part No. 307
Assembled	Part No. 317

Width X	Part No.	Part No.	Width X	Part No.	Part No.
in. (mm)	Unassembled	Assembled	in. (mm)	Unassembled	Assembled
.71 (18)	2200-18	2210-18	2.28 (58)	2200-58	2210-58
.91 (23)	2200-23	2210-23	2.68 (68)	2200-68	2210-68
1.10 (28)	2200-28	2210-28	2.87 (73)	2200-73	2210-73
1.30 (33)	2200-33	2210-33	3.46 (88)	2200-88	2210-88
1.50 (38)	2200-38	2210-38	3.90 (99)	2200-99	2210-99
1.69 (43)	2200-43	2210-43	4.88 (124)	2200-124	2210-124
1.89 (48)	2200-48	2210-48	5.87 (149)	2200-149	2210-149



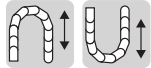
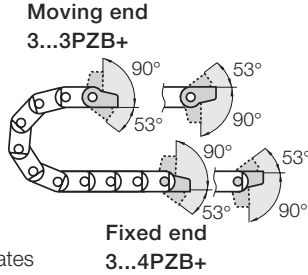
PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFG: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS





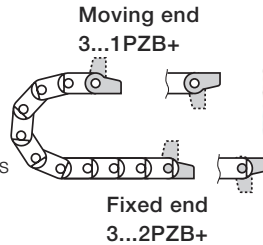
Option 1: pivoting

- For unsupported and gliding applications
- Well suited for tight installation conditions
- Detachable strain relief tiwrap plates
- Can be mounted on the fixed and/or moving end



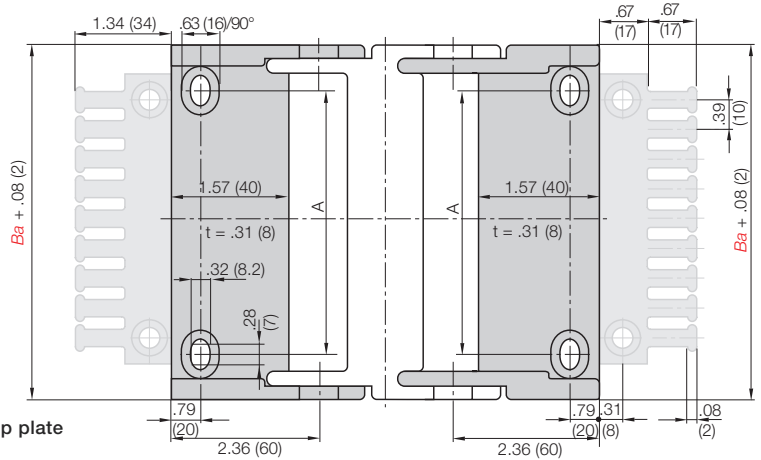
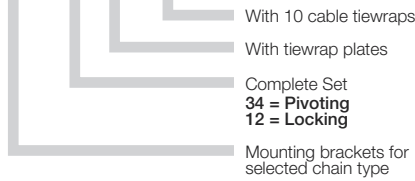
Option 2: locking

- For unsupported and gliding applications
- Extreme speed and/or accelerations
- For height restricted applications
- Can be mounted on the fixed and/or moving end



Part Number Structure

3075- 34 PZB K1



Full set, for both ends:

3075- 34 PZB Full set, each part with pin/bore + tiwrap plate

Single-part order:

3075- 3 PZB Mounting bracket with bore + tiwrap plate

3075- 4 PZB Mounting bracket with pin + tiwrap plate

Part No. Full Set (pivoting)

Without Tiwrap Plates

Series 3480:

3075-34PZ

Part No. Full Set (pivoting)

With Tiwrap Plates

Series 3480:

3075-34PZB

Part No. Full Set (pivoting)

With Tiwrap Plates + 10 cable ties

Series 3480:

3075-34PZBK1

For Chain Type	Part No. Full Set without Tiwrap Plate	Part No. Full Set with Tiwrap Plate	Part No. Full Set with Tiwrap Plate + 10 cable ties	Dimension A	
				in.	(mm)
3480-075	3075- <input type="checkbox"/> PZ	3075- <input type="checkbox"/> PZB	3075- <input type="checkbox"/> PZBK1	2.09	(53)
3480-100	3100- <input type="checkbox"/> PZ	3100- <input type="checkbox"/> PZB	3100- <input type="checkbox"/> PZBK1	3.07	(78)
3480-115	3115- <input type="checkbox"/> PZ	3115- <input type="checkbox"/> PZB	3115- <input type="checkbox"/> PZBK1	3.66	(93)
3480-150	3150- <input type="checkbox"/> PZ	3150- <input type="checkbox"/> PZB	3150- <input type="checkbox"/> PZBK1	5.04	(128)
3480-175	3175- <input type="checkbox"/> PZ	3175- <input type="checkbox"/> PZB	3175- <input type="checkbox"/> PZBK1	6.02	(153)

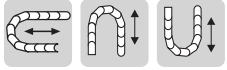
For pivoting brackets choose **34**
For locking brackets choose **12**
Example: 3075- **34** PZB

Energy Chain System® E2 Tubes Series R3480 Mounting Bracket - Steel

energy chain® configurator ▶

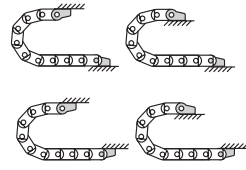
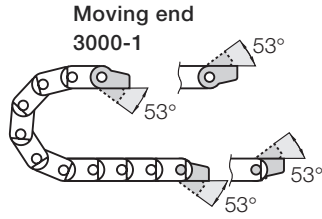


R3480



Option 1: Steel

- One part (two-piece) for all chain widths
- Electrically conductive
- Bolted connection outside of chain cross-section possible



Possible installation configurations -

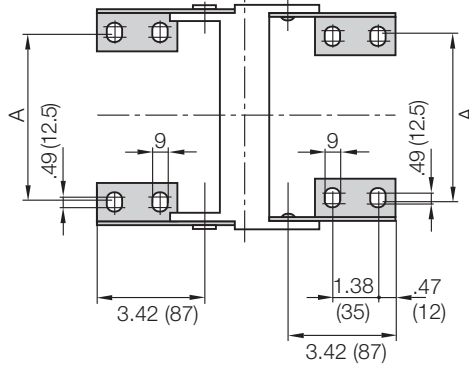
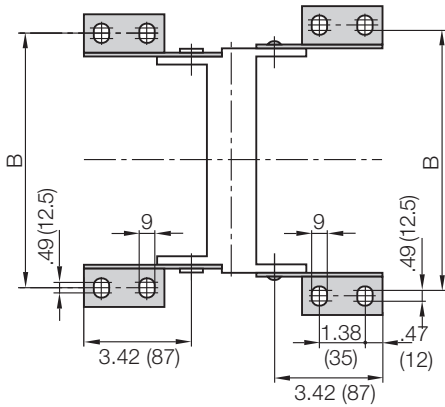
Fixed end
3000-2

3000-1

3000-2*

3000-1

3000-2



*pivoting with no stop, (360°)

Chain Type	Part No. Full Set	Dimension A		Dimension B	
		in.	(mm)	in.	(mm)
3480-075	3000-12	2.09	(53)	4.37	(111)
3480-100	3000-12	3.07	(78)	5.35	(136)
3480-115	3000-12	3.66	(93)	5.94	(151)
3480-150	3000-12	5.04	(128)	7.32	(186)
3480-175	3000-12	6.02	(153)	8.35	(212)

Part No. Mounting Brackets Full Set

4 parts, 2 with pin, 2 with bore
Series 3480:
3000-12

Part No. Mounting Bracket Moving End

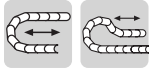
2 parts, 1 left & 1 right
Series 3480:
3000-1

Part No. Mounting Bracket Fixed End

2 parts, 1 left & 1 right
Series 3480:
3000-2

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

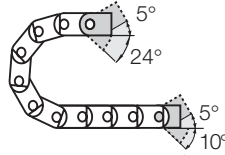




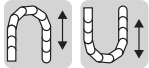
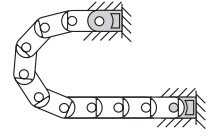
Option 1: pivoting

- For unsupported applications
- Bolted connection outside of chain cross section
- Confined installation conditions
- Attachment points on all sides
- Stackable

Moving end
34800...1



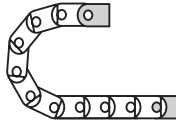
Fixed end
34800...2



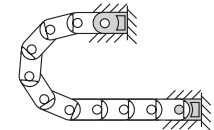
Option 2: locking

- For vertical hanging/standing applications
- Bolted connection outside of chain cross section
- For very high speeds and accelerations
- Attachment points on all sides
- Stackable

Moving end
34810...1

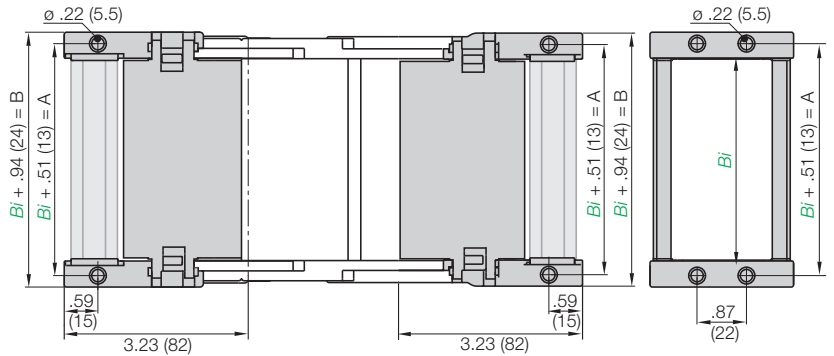
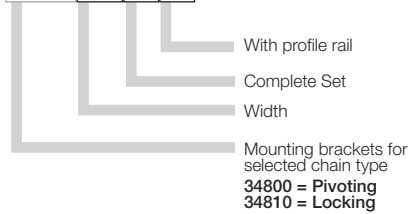


Fixed end
34810...2



Part Number Structure

34800-075-12 P



Full set, for both ends:

34800-12 P Full set, each part with pin/bore + proile rail

Single-part order:

34800-1 P Mounting bracket with bore + proile rail

34800-2 P Mounting bracket with pin + proile rail

Part No. Full Set (pivoting)

With Profile Rail

Series 3480:

34800-Width-12P

Part No. Full Set (pivoting)

Without Profile Rail

Series 3480:

34800-Width-12

For Chain Type	Part No. Full set with Profile Rail	Part No. Full Set without Profile Rail	Dimension A in. (mm)	Dimension B in. (mm)
3480-075	34800-075-12P	34800-075-12	3.46 (88)	3.90 (99)
3480-100	34800-100-12P	34800-100-12	4.45 (113)	4.88 (124)
3480-115	34800-115-12P	34800-115-12	5.04 (128)	5.47 (139)
3480-150	34800-150-12P	34800-150-12	6.42 (163)	6.85 (174)
3480-175	34800-175-12P	34800-175-12	7.40 (188)	7.83 (199)

For pivoting brackets choose **34800**

For locking brackets choose **34810**

Example: **34800**-075-12P

Energy Chain System® E2 Tubes

Series R3480

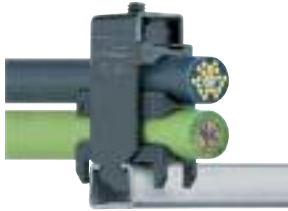
Strain Relief

energy chain® configurator 



R3480

Chainfix clamps for the profile rail



igus® Chainfix strain relief elements are available in either steel or stainless steel. They can be adjusted with a hexagon socket and are available in single, double and triple configurations.

Part No. Single Clamp		Part No. Double Clamp		Part No. Triple Clamp		Cable ø	
Steel	Stainless	Steel	Stainless	Steel	Stainless	in.	(mm)
CFX12-1	CFX12-1E	CFX12-2	CFX12-2E	CFX12-3	–	.24 - .47	(06 - 12)
CFX14-1	CFX14-1E	CFX14-2	CFX14-2E	CFX14-3	–	.47 - .55	(12 - 14)
CFX16-1	CFX16-1E	CFX16-2	CFX16-2E	CFX16-3	–	.55 - .63	(14 - 16)
CFX18-1	CFX18-1E	CFX18-2	CFX18-2E	CFX18-3	–	.63 - .71	(16 - 18)
CFX20-1	CFX20-1E	CFX20-2	CFX20-2E	CFX20-3	–	.71 - .79	(18 - 20)
CFX22-1	CFX22-1E	CFX22-2	CFX22-2E	CFX22-3	–	.79 - .87	(20 - 22)
CFX26-1	CFX26-1E	CFX26-2	CFX26-2E	–	–	.87 - 1.02	(22 - 26)
CFX30-1	CFX30-1E	CFX30-2	CFX30-2E	–	–	1.02 - 1.18	(26 - 30)
CFX34-1	CFX34-1E	CFX34-2	CFX34-2E	–	–	1.18 - 1.34	(30 - 34)
CFX38-1	CFX38-1E	–	–	–	–	1.34 - 1.50	(34 - 38)
CFX42-1	CFX42-1E	–	–	–	–	1.50 - 1.65	(38 - 42)

For more information please refer to strain relief section of Chapter 10

Chainfix Clip

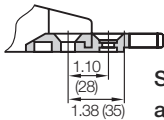


Modular snap-on strain relief device

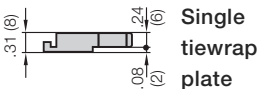
Chainfix clip is available for cable diameters ranging from .16" (4mm) to .94" (24 mm). It is suitable for assembly on KMA mounting brackets, clip-on strain relief for crossbars as well as profile rails. Quick assembly without the use of tools. **For more information please refer to strain relief section of Chapter 10**

Cable ø	Part No. Clamp	Part No. Bottom
in. (mm)		
.16-.31 (04-08)	CFC-08-M	CFC-08-C
.31-.47 (08-12)	CFC-12-M	CFC-12-C
.47-.63 (12-16)	CFC-16-M	CFC-16-C
.63-.79 (16-20)	CFC-20-M	CFC-20-C
.79-.94 (20-24)	CFC-24-M	CFC-24-C

Tiewrap Plates



Shown assembled

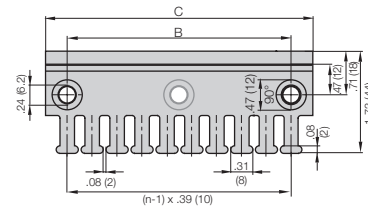


Single tiewrap plate

Option 1: Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



For more information please refer to strain relief section of Chapter 10

Option 2: Clip-on Tiewrap plates

Available as a clip-on tiewrap plate without the use of bolts They are inserted and removed with a screwdriver used as a lever. Clip-on tiewrap plates are also available as an attachment to the opening crossbars.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
3050-ZC	5	1.97 (50)
3075-ZC	7	2.95 (75)

For more information please refer to strain relief section of Chapter 10

Strain relief for steel mounting brackets

Clip-on connection is not possible with steel mounting brackets. In this case, the tiewrap plates must be bolted directly into separate bore holes in front of the mounting bracket. Alternatively the tiewrap plates 30XX-Z and ZS can be also used here. **Details chapter 10**

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS





RX Energy





Tubes

RX Tube - Totally new Energy Tube with chip repellent design

A world premiere from igus®- a totally redesigned Energy Tube repels chips, is extremely tight, and can be opened!

- Full chip protection without undercuts, projecting edges and gaps
- Round contour prevents chip accumulation
- Large interior cross section with 2.87" (73 mm) max. inner height
- Covered pin/bore connection and stop dogs
- Reverse bending radius (RBR) becomes a standard option

Typical industries and applications

- Tooling machines
- Woodworking machines
- All kind of industries and machines with chip, dirt and dust



ESD Classification: Electrically conductive
ESD/ATEX version upon request



Flammability Class
VDE 0304 IIC UL94 HB

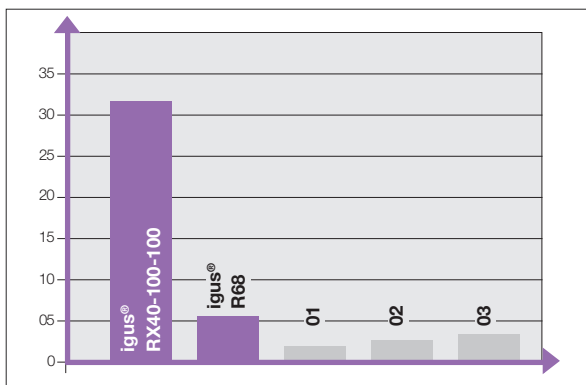


Energy Tubes with HT-material for hot chips
up to 1562°F (850°C) available upon request

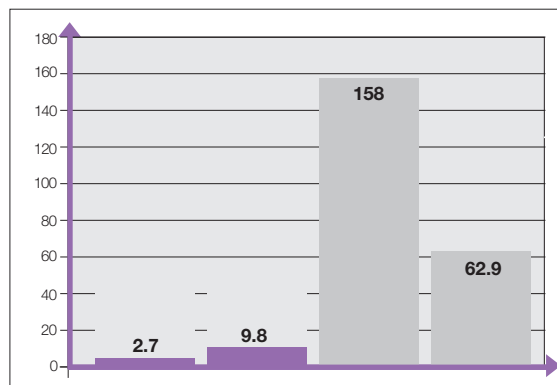




RX Energy Tubes, without undercuts, projecting edges or gaps



Test 1: Drowning - Various tube styles were submerged under water. For the RX Energy Tube, it takes more than 30 sec. to fill up with water

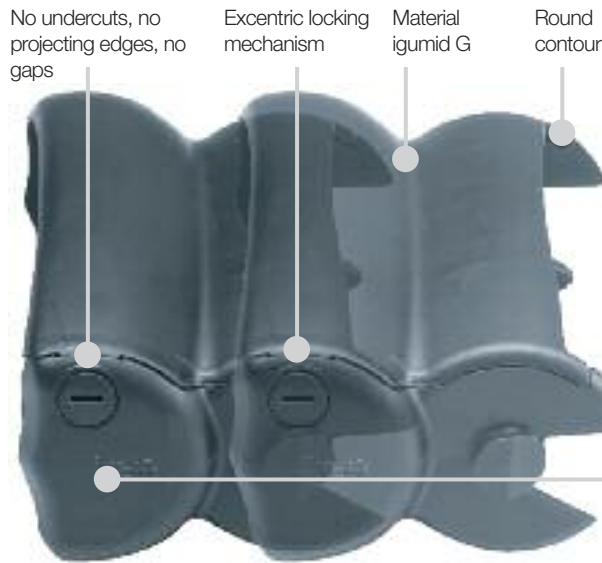


Test 2: Chip intrusion - Various tube styles were charged with a defined quantity of chips. Only 3.7 g of chips were found inside the new RX Energy Tube after 251,900 cycles



Chip-test at the igus® test-lab proven enormous tightness.

Energy Chain System® E2 Medium Series RX40



Series RX - new chip protected design, small pitch, lids open

- Full chip protection without undercuts, projecting edges or gaps
- Round contour prevents chip accumulation
- Large interior cross section with 2.05 (52 mm) maximum inner height
- Covered pin/bore connection and stop dogs
- Reverse bending radius (RBR) becomes a standard option
- Perfect fastening with flange mounting brackets
- You can find more technical data about the material, chemical resistance, temperatures ► **Design, Chapter 1**

Fully covered stop dogs and connections

Selection table

Series	Inner height <i>hi</i>		Inner width <i>Bi</i>		Outer width <i>Ba</i>		Outer height <i>ha</i>		Bending radius <i>R</i>	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
RX32	1.02-1.65	(26-42)	3.15	(80)	3.87	(98.4)	2.20	(56)	3.15-5.91	(80-150)
RX40	1.26/2.05	(32/52)	3.94	(100)	4.84	(123)	2.76	(70)	3.94-11.81	(100-300)
RX48	1.38-2.44	(35-62)	4.72	(120)	5.81	(147.6)	3.31	(84)	4.72-5.91	(120-150)
RX56	1.61-2.87	(41-73)	5.51	(140)	6.78	(172.2)	3.86	(98)	5.51	(140)



Protection from all kinds of chips

Energy Tubes - Assembling RX Energy Tube



Easy opening of lids on the outer radius with embedded excentric locking mechanism

Energy Tubes - Interior Separation of the RX Energy Tube



Interior separation with cable-friendly separators and shelves

Price Index



Series RX32

Special Features / Options



ESD classification:
Electrically conductive
ESD/ATEX version upon request



Flammability Class
VDE 0304 IIC UL94 HB

Assembly Tips



Easy opening of lids on the outer radius with embedded excentric locking mechanism

Features & Benefits

- 1 Mounting bracket available with or without strain relief
- 2 Full chip protection without undercuts, projecting edges or gaps
- 3 Large interior cross section
- 4 Round contour prevents chip accumulation
- 5 Covered pin/bore connection and stop dogs
- 6 Lids open from outer radius
- 7 Interior separation available



Usage Guidelines



- If fully protected Energy Tube is desired
- If easy access from the outside is required



- If a particularly low-cost solution is the main factor
 - Series R168 E2 Tubes
- If no chip protection is required
 - Series R4-56 E4-1

Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

3.28 ft (1 m) RX32-080-080-0



Energy Chain®

With 3 separators RX32-1-1/RX32-1-2 assemb. every 2nd link



Interior Separation

1 Set RX321-080-12



Mounting Bracket

Energy Chain System® E2 Tubes Series RX32

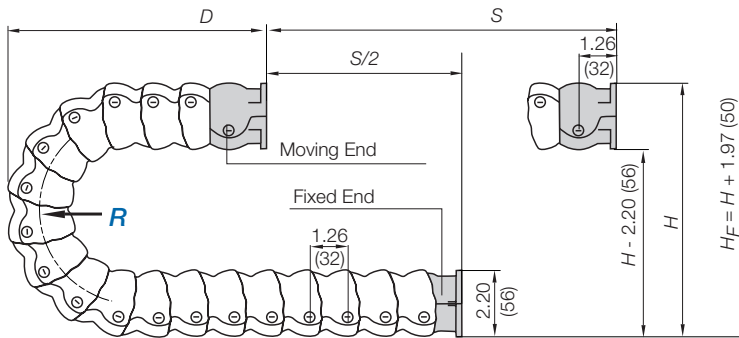
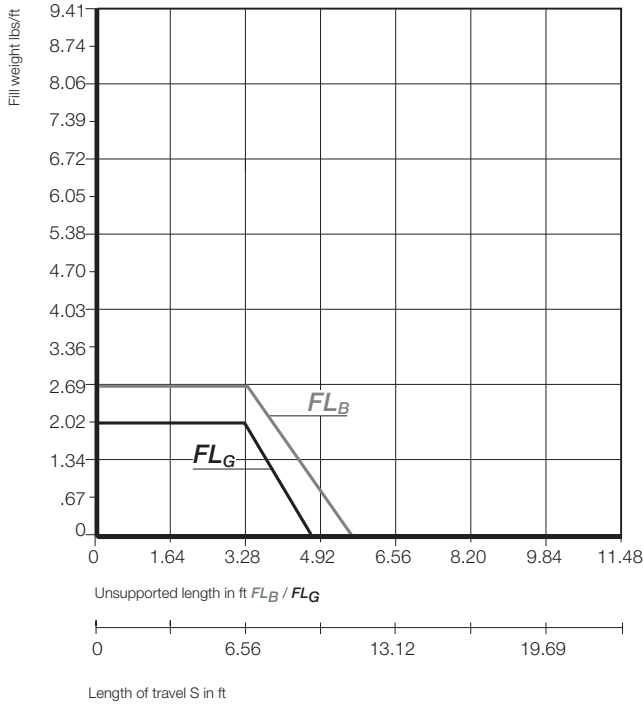
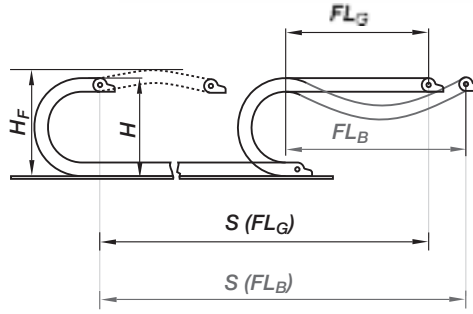
energy chain® configurator ▶



RX32

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



Pitch per link = 1.26" (32 mm)
 Links per ft (m) = 9.52 (32)
 For center mount applications:
 Chain length = $\frac{S}{2} + K$

The required clearance height: $H_F = H + 1.97$ in. (50 mm) (with .34 lbs/ft (0.5 kg/m) fill weight).
 Please consult igus® if space is particularly restricted.

R	3.15 (080)	5.91 (150)
H	8.50 (216)	14.02 (356)
D	5.51 (140)	8.27 (210)
K	12.60 (320)	21.26 (540)

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height

1.65

PDF: www.igus.com/echainpdf.asp
 Specs/CAD/RFQ: www.igus.com/echain.asp
 RoHS info: www.igus.com/RoHS.asp



Technical Data

Speed / acceleration FL_G	max. 32.8 ft/s (10 m/s) / max. 328 ft/s ² (100 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB



Details of material properties

▶ Chapter 1

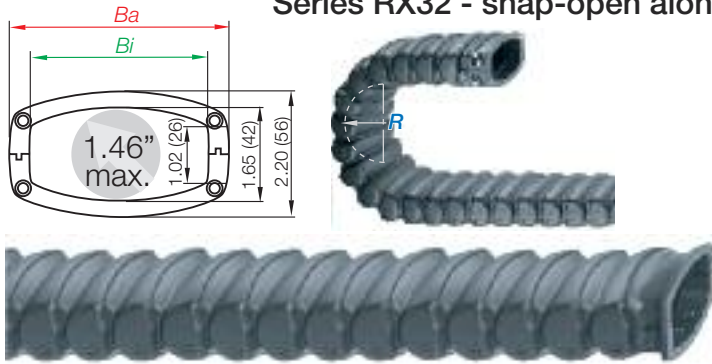
5.102

igus® Energy Chain System®

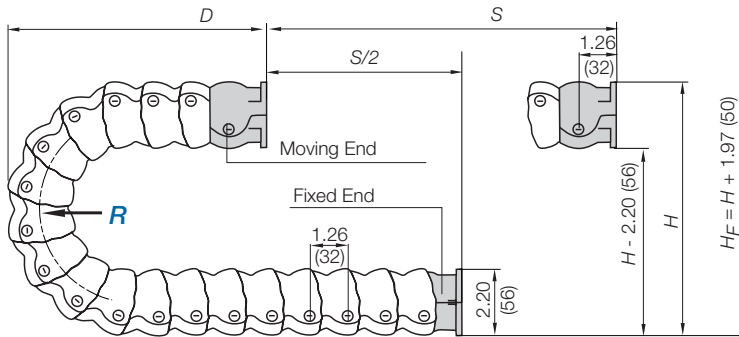
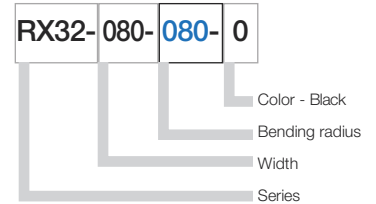
Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/qs/echain.asp>

Series RX32 - snap-open along the outer radius



Part Number Structure



Supplement part number with required radius. Example: RX32-080-080-0
Pitch: 1.26 in. (32 mm) per link links/ft(m) = 9.52 (32)

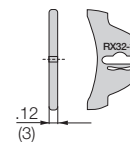
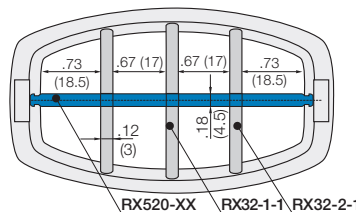
Part Number	Bi in. (mm)	Ba in. (mm)	Weight lbs/ft (kg/m)
RX32-080- <input type="text"/> -0	3.15 (80)	3.87 (98.4)	≈ 0.83 (1.23)

Choose from the radii below for all of the above sizes
Radius (mm) Example: RX32-080-080-0

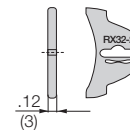
	080	150
R	3.15 (80)	5.91 (150)
H	8.50 (216)	14.02 (356)
D	5.51 (140)	8.27 (210)
K	12.60 (320)	21.26 (540)

Separators and shelves

Vertical separators are used if a vertical subdivision of the Energy Tube interior is required. By standard, vertical separators are assembled every other Energy Tube link.



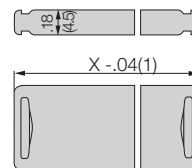
Separator, central
Unassembled Part No. RX32-1
Assembled Part No. RX32-1-1



Slotted Separator, lateral
Unassembled Part No. RX32-1
Assembled Part No. RX32-2-1

Shelves RX520-XX

Full width shelves lock into separators on both ends, fixed width possible. Separators can be moved freely over the shelf horizontally.



Width X in. (mm)	Part No. Unassembled	Part No. Assembled
1.14 (29)	RX520-29	RX521-29
2.13 (54)	RX520-54	RX521-54
3.11 (79)	RX520-79	RX521-79
4.09 (104)	RX520-104	RX521-104

Energy Chain System® E2 Tubes Series RX32 Mounting Brackets

energy chain® configurator 



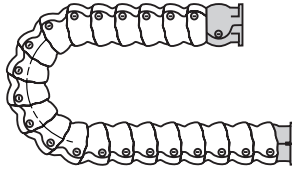
RX32



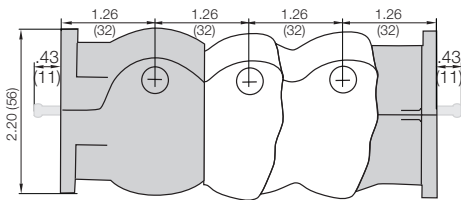
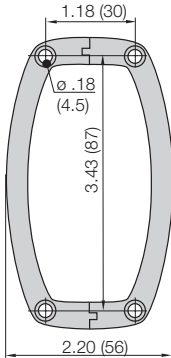
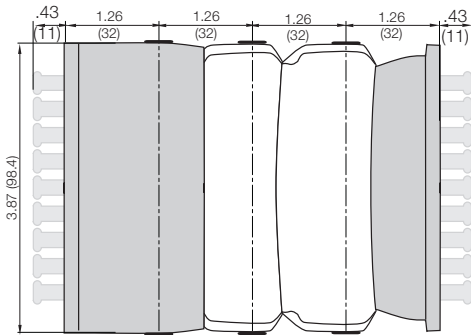
Option: Flange mounting brackets

- Universally mountable with flange attachment capability
- Optional strain relief tiwrap plates
- Easy to open
- Optional M4 insert nuts

Moving end
RX321-080-1



Fixed end
RX321-080-2



Shown with
strain relief



Chain Type	Part No.	Number of Teeth
RX32	RX321-080-12	8

Full set, for both ends:

RX321-080-12

Single-part order:

RX321-080-1 Mounting bracket moving end

RX321-080-2 Mounting bracket fixed end

PDF: www.igus.com/echainpdf.asp
Specs/CAD/RFQ: www.igus.com/echain.asp
RoHS info: www.igus.com/RoHS.asp



Price Index


Series RX40

Special Features / Options


ESD classification:
Electrically conductive
ESD/ATEX version upon request



Flammability Class
VDE 0304 IIC UL94 HB



Energy Tubes with HT-material
for hot chips up to 1562°F
(850°C) available upon request

Assembly Tips


Easy opening of lids on the outer radius with embedded excentric locking mechanism

Features & Benefits

- 1 Mounting bracket available with or without strain relief
- 2 Full chip protection without undercuts, projecting edges or gaps
- 3 Large interior cross section
- 4 Round contour prevents chip accumulation
- 5 Covered pin/bore connection and stop dogs
- 6 Lids open from outer radius
- 7 Interior separation available


Usage Guidelines


- If a fully protected Energy Tube is desired
- If easy access from the outside is required



- If a particularly low-cost solution is the main factor
 - **Series R68 E2 Tubes**
- If no chip protection is required
 - **Series 340/350 E2 Medium**

Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

3.28 ft (1 m) **RX-40-100-100-0**



Energy Chain®

With 3 separators **RX40-1-1/RX40-1-2** assemb. every 2nd link



Interior Separation

1 Set **RX401-100-12**



Mounting Bracket

Energy Chain System® E2 Tubes Series RX40 Installation Dimensions

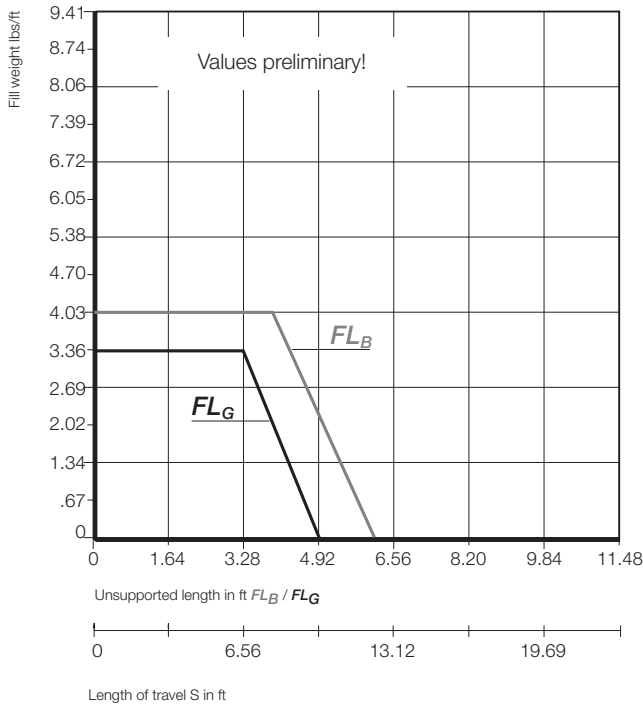
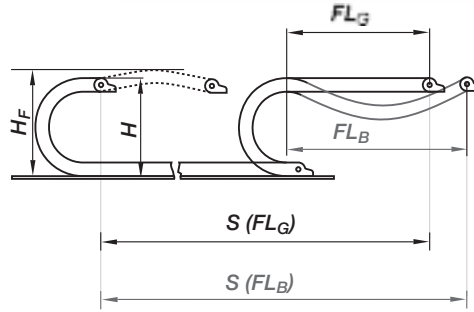
energy chain® configurator ▶



RX40

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



Short Travels - Unsupported



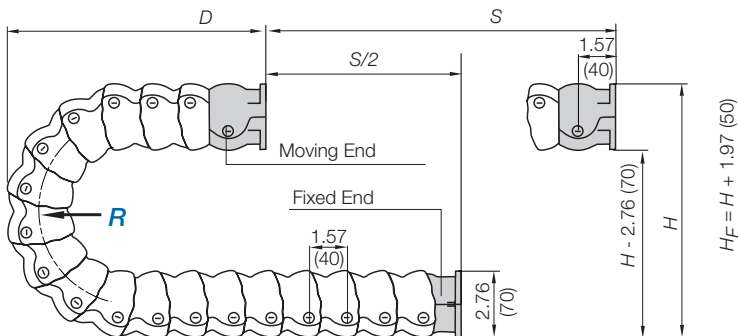
Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- $H_F = \text{Required clearance height}$

2.05

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Pitch per link = 1.57" (40 mm)
Links per ft (m) = 7.62 (25)
For center mount applications:
Chain length = $\frac{S}{2} + K$

The required clearance height: $H_F = H + 1.97$ in. (50 mm) (with 1.68 lbs/ft (2.5 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	9.84 (250)	10.83 (275)	11.81 (300)
H	10.63 (270)	12.59 (320)	14.57 (370)	16.54 (420)	18.50 (470)	20.47 (520)	22.44 (570)	24.41 (620)	26.38 (670)
D	6.89 (175)	7.87 (200)	8.86 (225)	9.84 (250)	10.83 (275)	11.81 (300)	12.80 (325)	13.78 (350)	14.76 (375)
K	15.55 (395)	18.70 (475)	21.85 (555)	24.80 (630)	27.95(710)	31.10 (790)	34.25 (870)	37.20 (945)	40.35(1025)

Technical Data

Speed / acceleration FL_G	max. 32.8 ft/s (10 m/s) / max. 328 ft/s ² (100 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120° C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

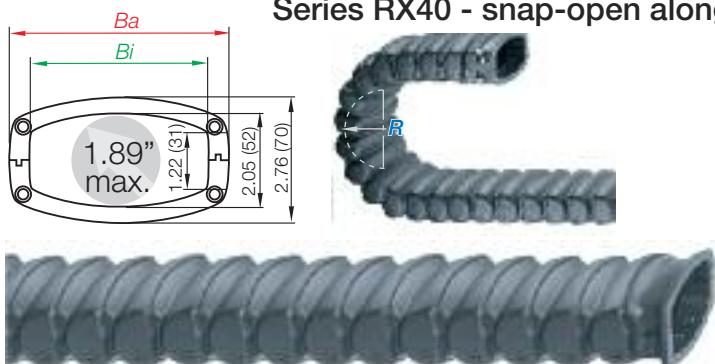


Details of material properties

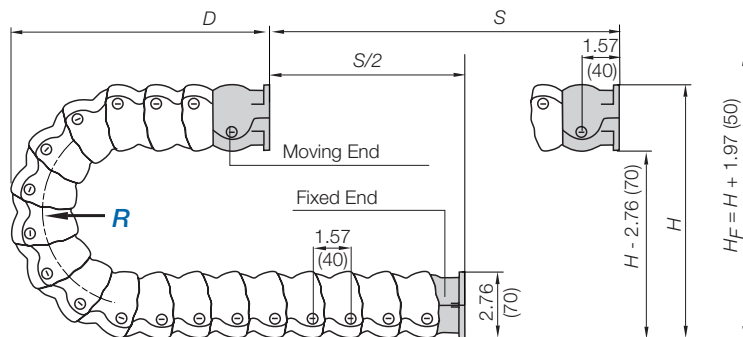
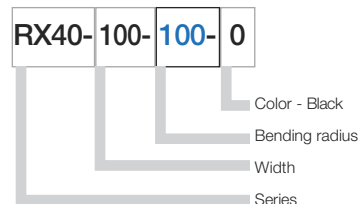
▶ Chapter 1

5.106

Series RX40 - snap-open along the outer radius



Part Number Structure



Supplement part number with required radius. Example: RX40-100-**100**-0
Pitch: 1.57 in. (40 mm) per link links/ft(m) = 7.62 (25)

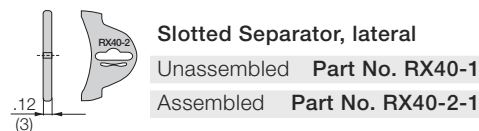
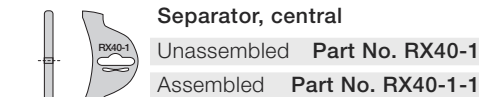
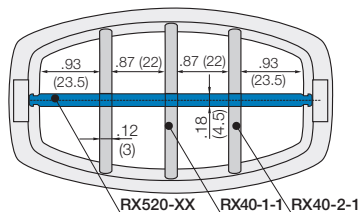
Part Number	Bi in. (mm)	Ba in. (mm)	Weight lbs/ft (kg/m)
RX40-100- <input type="text"/> -0	3.94 (100)	4.84 (123)	≈ 1.27 (1.89)

Choose from the radii below for all of the above sizes
Radius (mm) Example: RX40-100-**100**-0

	100	150
R	3.94 (100)	5.91 (150)
H	10.63 (270)	14.57 (370)
D	6.89 (175)	8.86 (225)
K	15.55 (395)	21.85 (555)

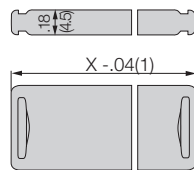
Separators and shelves

Vertical separators are used if a vertical subdivision of the Energy Tube interior is required. By standard, vertical separators are assembled every other Energy Tube link.



Shelves RX520-XX

Full width shelves lock into separators on both ends, fixed width possible. Separators can be moved freely over the shelf horizontally.



Width X in. (mm)	Part No. Unassembled	Part No. Assembled
1.14 (29)	RX520-24	RX521-24
2.13 (54)	RX520-44	RX521-44
3.11 (79)	RX520-64	RX521-64
4.09 (104)	RX520-84	RX521-84

Energy Chain System® E2 Tubes Series RX40 Mounting Brackets

energy chain® configurator 



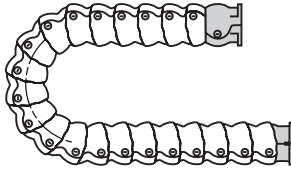
RX40



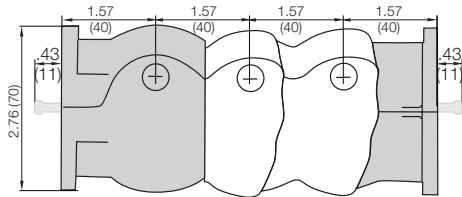
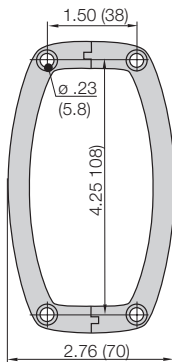
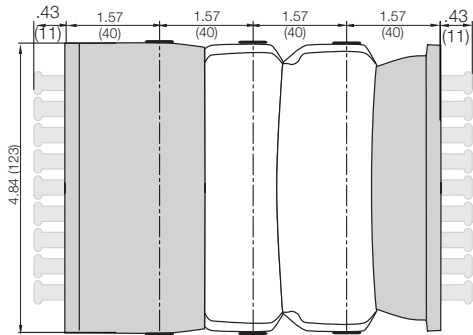
Option: Flange mounting brackets

- Universally mountable with flange attachment capability
- Optional strain relief tiwrap plates
- Easy to open
- Optional M4 insert nuts

Moving end
RX401-100-1



Fixed end
RX401-100-2



Shown with
strain relief



Chain Type	Part No.	Number of Teeth
RX40	RX401-100-12	10

Full set, for both ends:

RX401-100-12

Single-part order:

RX401-100-1 Mounting bracket moving end

RX401-100-2 Mounting bracket fixed end

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index


Series RX48

Special Features / Options


ESD classification:
Electrically conductive
ESD/ATEX version upon request



Flammability Class
VDE 0304 IIC UL94 HB

Assembly Tips


Easy opening of lids on the outer radius with embedded excentric locking mechanism

Features & Benefits

- 1 Mounting bracket available with or without strain relief
- 2 Full chip protection without undercuts, projecting edges or gaps
- 3 Large interior cross section
- 4 Round contour prevents chip accumulation
- 5 Covered pin/bore connection and stop dogs
- 6 Lids open from outer radius
- 7 Interior separation available


Usage Guidelines


- If a fully protected Energy Tube is desired
- If easy access from the outside is required



- For chip protection in gliding applications
➤ Series R18840 E4 Light

Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

9.84 ft (3 m) RX48-120-120-0



Energy Chain®

With 3 separators RX48-1-1/RX48-1-2 assemb. every 2nd link



Interior Separation

1 Set RX48-120-12



Mounting Bracket

Energy Chain System® E2 Tubes Series RX48 Installation Dimensions

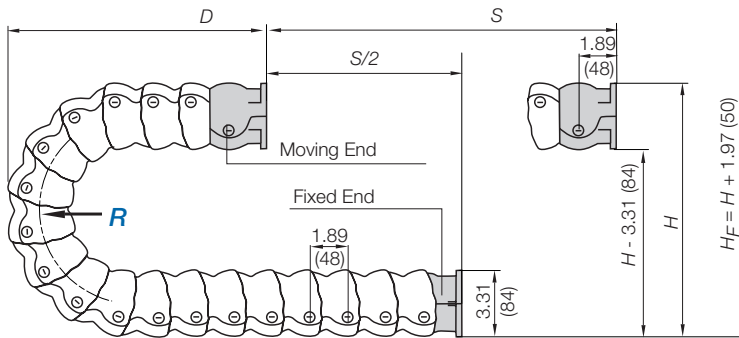
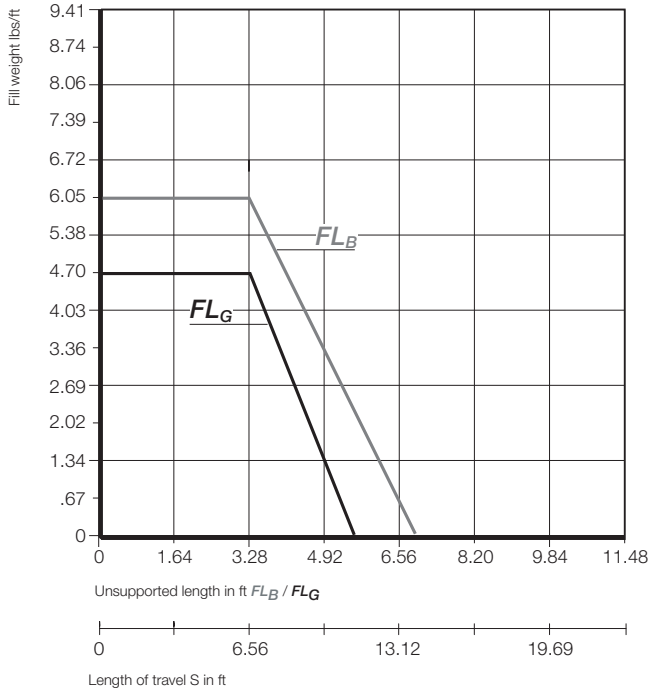
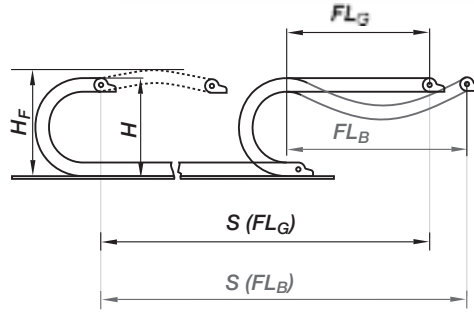
energy chain® configurator ▶

igus®

RX48

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



Pitch per link = 1.89" (48 mm)
Links per ft (m) = 6.35 (21)
For center mount applications:
Chain length = $\frac{S}{2} + K$

The required clearance height: $H_F = H + 1.97$ in. (50 mm) (with .34 lbs/ft (0.5 kg/m) fill weight).
Please consult igus® if space is particularly restricted.

R	4.72 (120)	5.91 (150)
H	12.76 (324)	15.12 (384)
D	8.27 (210)	9.45 (240)
K	18.70 (475)	22.44 (570)

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height

2.44

PDF: www.igus.com/echainpdf.asp
Specs/CAD/RFQ: www.igus.com/echain.asp
RoHS info: www.igus.com/RoHS.asp



Technical Data



Details of material properties

▶ Chapter 1

Speed / acceleration FL_G	max. 32.8 ft/s (10 m/s) / max. 328 ft/s ² (100 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

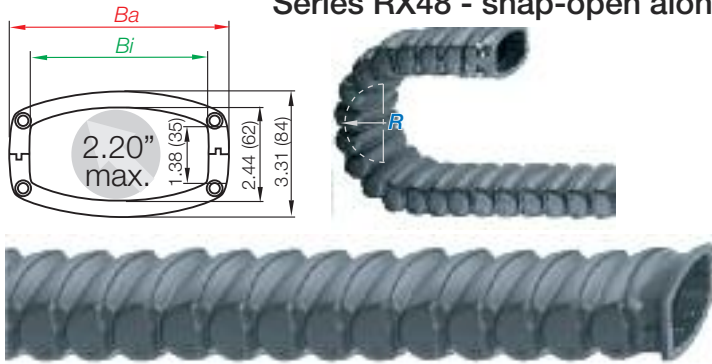
5.110

igus® Energy Chain System®

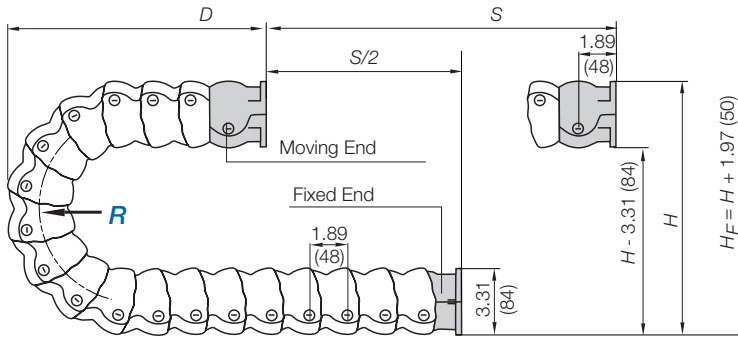
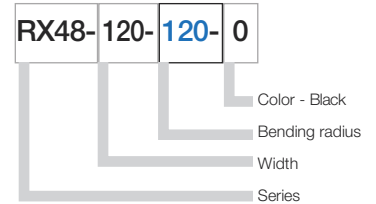
Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/qs/echain.asp>
5.111

Series RX48 - snap-open along the outer radius



Part Number Structure



Supplement part number with required radius. Example: RX48-120-**120**-0
Pitch: 1.89 in. (48 mm) per link links/ft(m) = 6.35 (21)

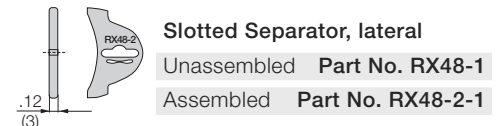
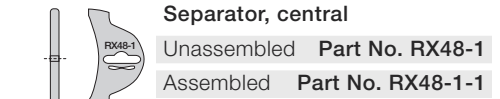
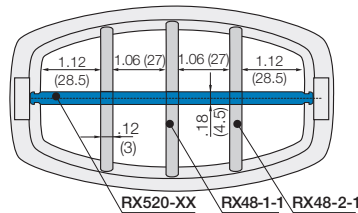
Part Number	Bi in. (mm)	Ba in. (mm)	Weight lbs/ft (kg/m)
RX48-120- <input type="text"/> -0	4.72 (120)	5.81 (147.6)	≈ 1.85 (2.76)

Choose from the radii below for all of the above sizes
Radius (mm) Example: RX48-120-**120**-0

	120	150
R	4.72 (120)	5.91 (150)
H	12.76 (324)	15.12 (384)
D	8.27 (210)	9.45 (240)
K	18.70 (475)	22.44 (570)

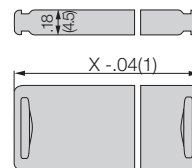
Separators and shelves

Vertical separators are used if a vertical subdivision of the Energy Tube interior is required. By standard, vertical separators are assembled every other Energy Tube link.



Shelves RX520-XX

Full width shelves lock into separators on both ends, fixed width possible. Separators can be moved freely over the shelf horizontally.



Width X in. (mm)	Part No. Unassembled	Part No. Assembled
1.34 (34)	RX520-34	RX521-24
2.52 (64)	RX520-64	RX521-44
3.70 (94)	RX520-94	RX521-64
4.88 (124)	RX520-124	RX521-84

Energy Chain System® E2 Tubes Series RX48 Mounting Brackets

energy chain® configurator 

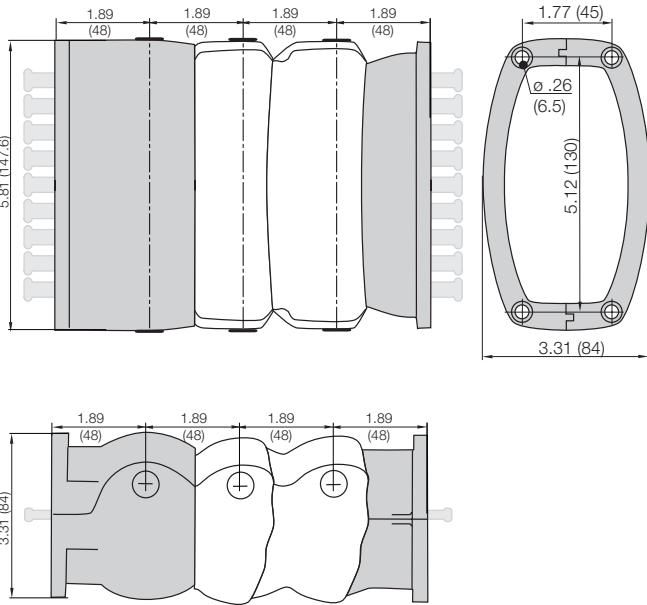
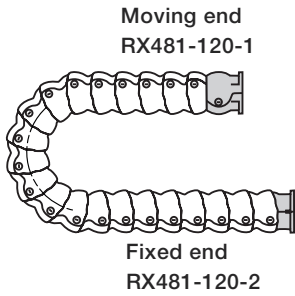


RX48



Option: Flange mounting brackets

- Universally mountable with flange attachment capability
- Optional strain relief tiwrap plates
- Easy to open
- Optional M4 insert nuts



Shown with strain relief



Chain Type	Part No.	Number of Teeth
RX48	RX481-120-12	upon request

Full set, for both ends:

RX481-120-12

Single-part order:

RX481-120-1 Mounting bracket moving end

RX481-120-2 Mounting bracket fixed end

PDF: www.igus.com/echainpdf.asp
Specs/CAD/RFG: www.igus.com/echain.asp
RoHS info: www.igus.com/RoHS.asp



Price Index



Series RX56

Special Features / Options



ESD classification:
Electrically conductive
ESD/ATEX version upon request



Flammability Class
VDE 0304 IIC UL94 HB

Assembly Tips



Easy opening of lids on the outer radius with embedded excentric locking mechanism

Features & Benefits

- 1 Mounting bracket available with or without strain relief
- 2 Full chip protection without undercuts, projecting edges or gaps
- 3 Large interior cross section
- 4 Round contour prevents chip accumulation
- 5 Covered pin/bore connection and stop dogs
- 6 Lids open from outer radius
- 7 Interior separation available



Usage Guidelines



- If a fully protected Energy Tube is desired
- If easy access from the outside is required



- For chip protection in gliding applications
➤ Series R19850 E4 Light

Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

9.84 ft (3 m) RX56-140-140-0



Energy Chain®

With 3 separators RX56-1-1/RX56-1-2 assemb. every 2nd link



Interior Separation

1 Set RX561-140-12



Mounting Bracket

Energy Chain System® E2 Tubes Series RX56 Installation Dimensions

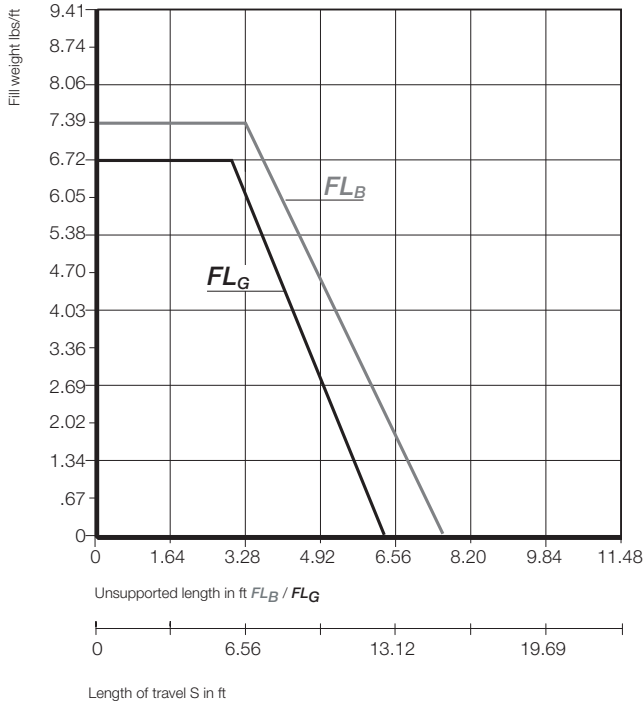
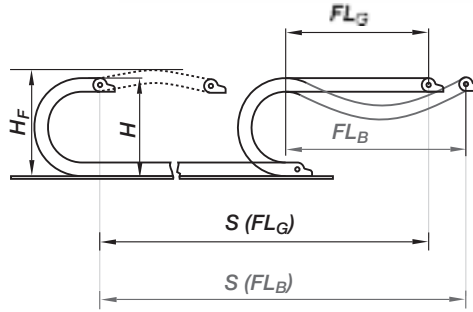
energy chain® configurator ▶

igus®

RX56

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



Short Travels - Unsupported



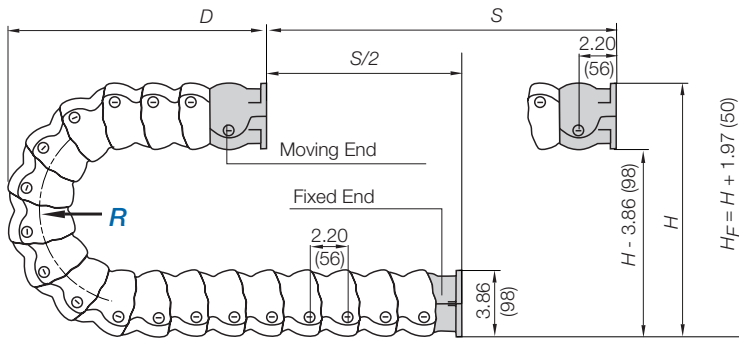
Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height

2.87

PDF: www.igus.com/echainpdf.asp
Specs/CAD/RFQ: www.igus.com/echain.asp
RoHS info: www.igus.com/RoHS.asp



Pitch per link = 2.20" (56 mm)
Links per ft (m) = 5.45 (18)
For center mount applications:
Chain length = $\frac{S}{2} + K$

The required clearance height: $H_F = H + 1.97$ in. (50 mm) (with .34 lbs/ft (0.5 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	5.51 (140)
H	14.88 (378)
D	9.65 (245)
K	21.85 (555)

Technical Data

Speed / acceleration FL_G	max. 32.8 ft/s (10 m/s) / max. 328 ft/s ² (100 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB



Details of material properties

▶ Chapter 1

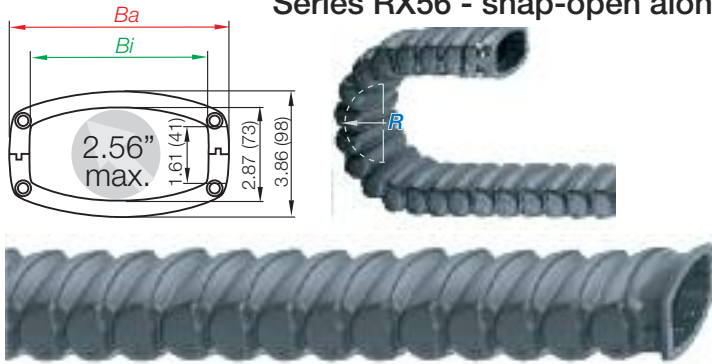
5.114

igus® Energy Chain System®

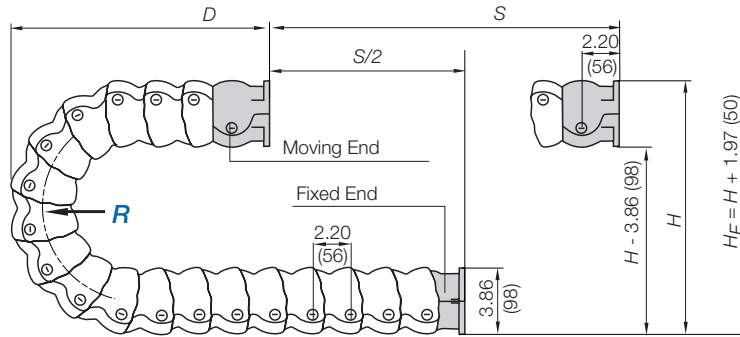
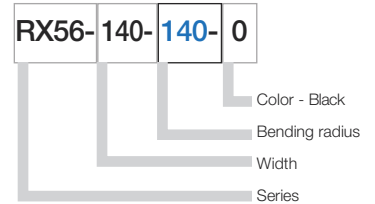
Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/qs/echain.asp>
5.115

Series RX56 - snap-open along the outer radius



Part Number Structure



Supplement part number with required radius. Example: RX56-140-**140**-0
Pitch: 2.20 in. (56 mm) per link links/ft(m) = 5.45 (18)

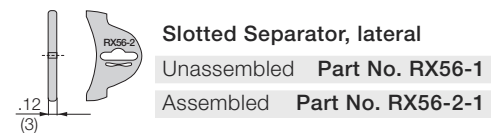
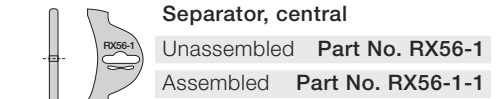
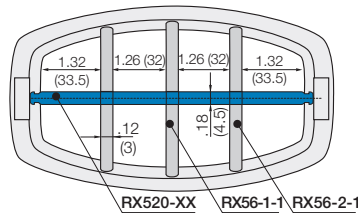
Part Number	Bi in. (mm)	Ba in. (mm)	Weight lbs/ft (kg/m)
RX40-100- <input type="text"/> -0	5.51 (140)	6.78 (172.2)	≈ 2.57 (3.83)

Choose from the radii below for all of the above sizes
Radius (mm) Example: RX56-140-**140**-0

R	140 5.51 (140)
H	14.88 (378)
D	9.65 (245)
K	21.85 (555)

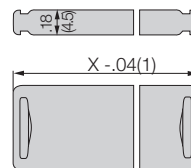
Separators and shelves

Vertical separators are used if a vertical subdivision of the Energy Tube interior is required. By standard, vertical separators are assembled every other Energy Tube link.



Shelves RX520-XX

Full width shelves lock into separators on both ends, fixed width possible. Separators can be moved freely over the shelf horizontally.



Width X in. (mm)	Part No. Unassembled	Part No. Assembled
1.54 (39)	RX520-39	RX521-39
2.91 (74)	RX520-74	RX521-74
4.29 (109)	RX520-109	RX521-109
5.67 (144)	RX520-144	RX521-144

Energy Chain System® E2 Tubes Series RX56 Mounting Brackets

energy chain® configurator ▶

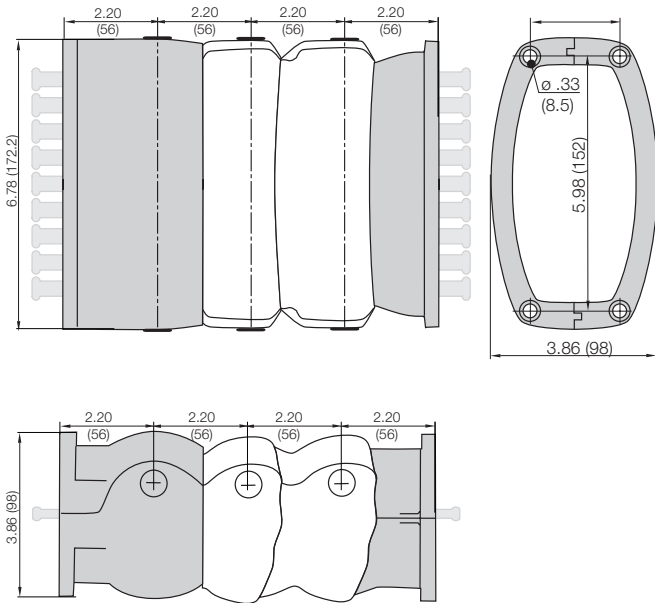
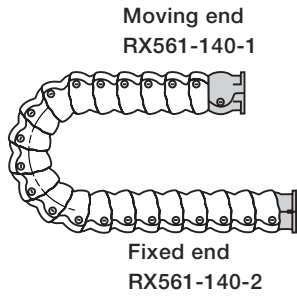


RX56



Option: Flange mounting brackets

- Universally mountable with flange attachment capability
- Optional strain relief tiwrap plates
- Easy to open
- Optional M4 insert nuts



Shown with strain relief



Chain Type	Part No.	Number of Teeth
RX56	RX561-140-12	upon request

Full set, for both ends:

RX561-140-12

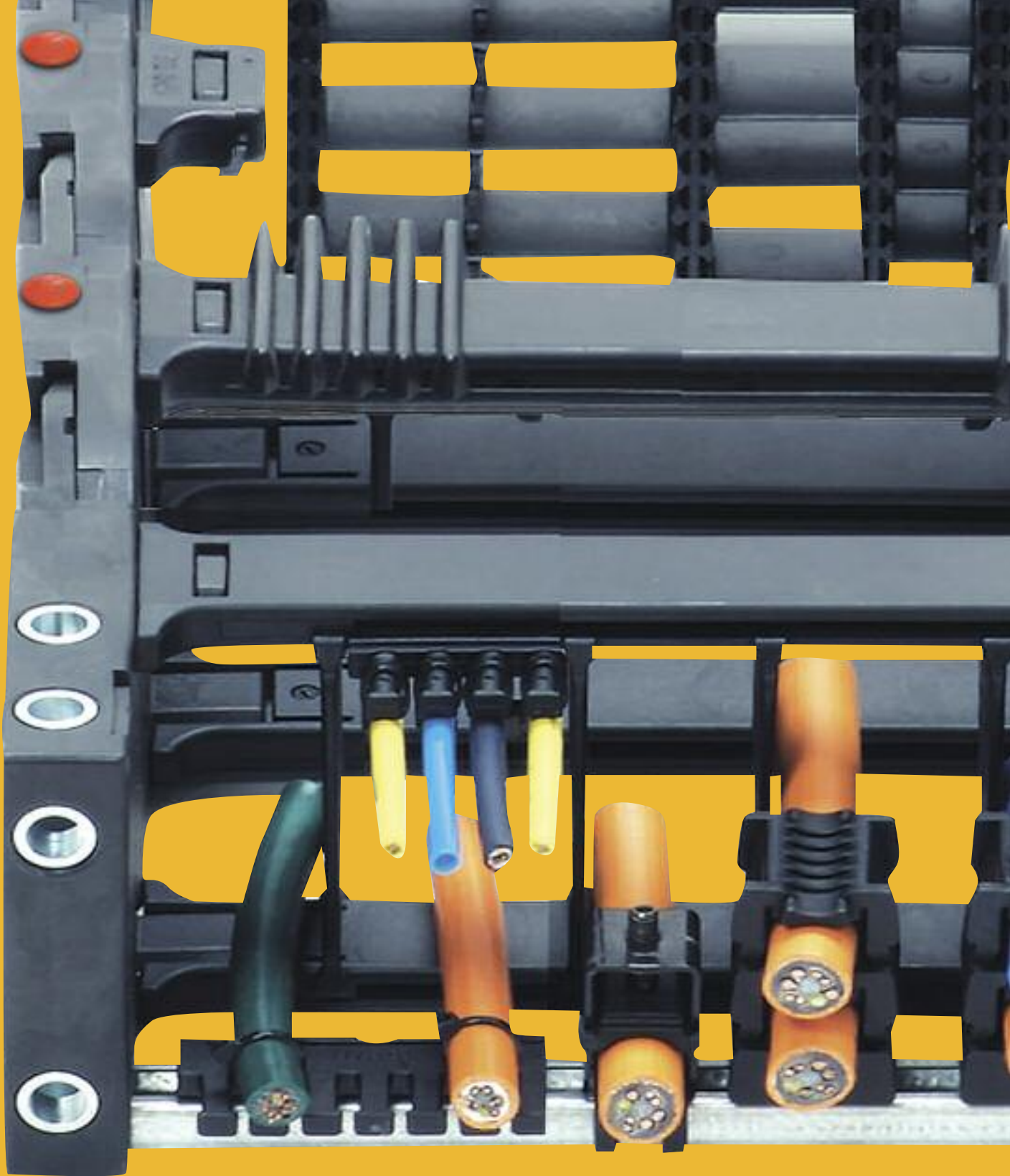
Single-part order:

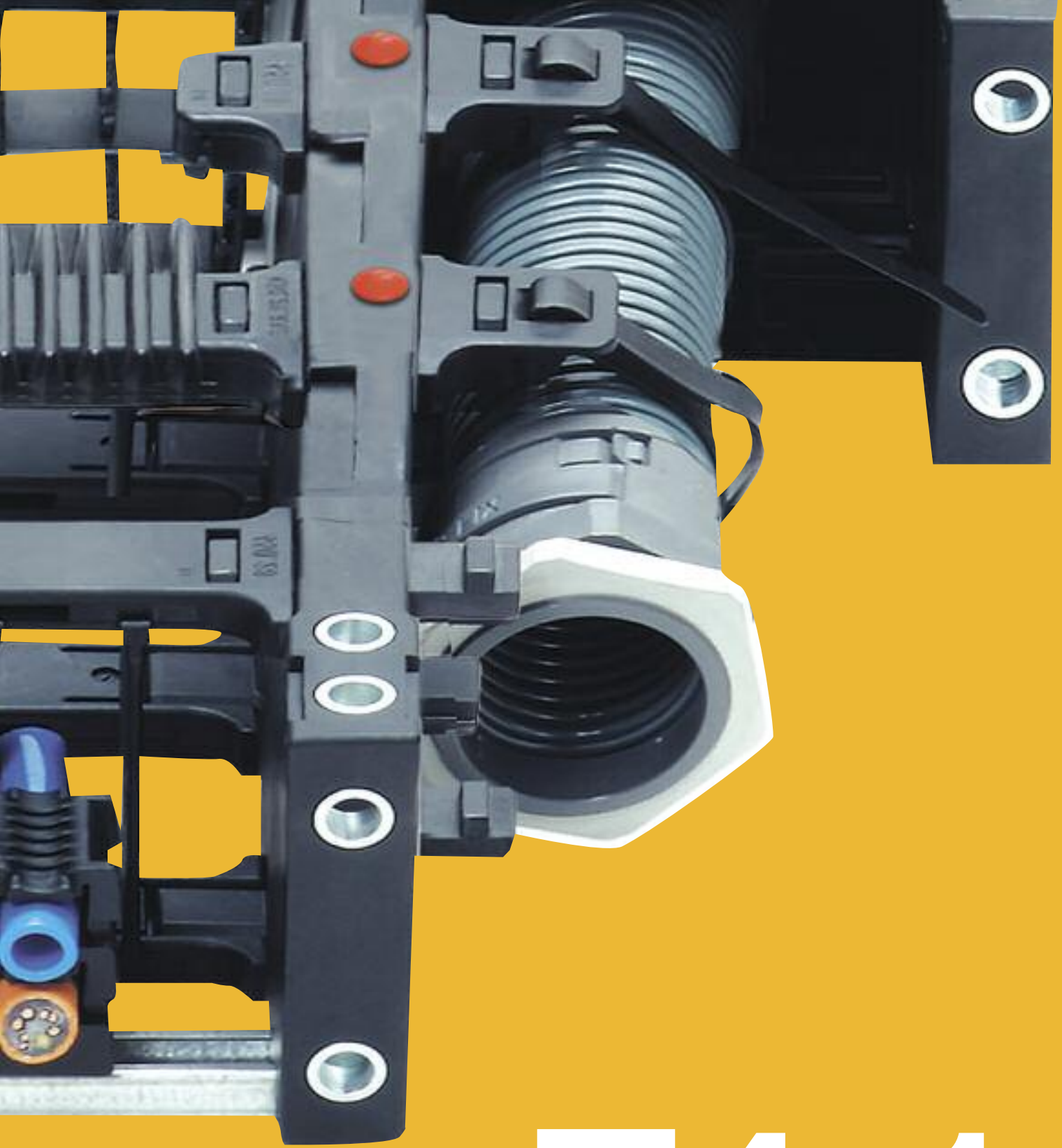
RX561-140-1 Mounting bracket moving end

RX561-140-2 Mounting bracket fixed end

PDF: www.igus.com/echainpdf.asp
Specs/CAD/RFG: www.igus.com/echain.asp
RoHS info: www.igus.com/RoHS.asp







E4-1

E4-1 Energy Chain® series for almost all applications

The E4-1 system combines all the advantages of its three predecessors:

- Tongue and groove design provides greater lateral stability, high shear force on long travels and for longer unsupported lengths
- Ideal for side-mounted applications
- Noise dampening "brakes" and rubber dampers available
- Snap-open links for quick assembly, with or without pretension
- Dirt repellant and wear-resistant
- Side wear pads

Almost all accessories and mounting dimensions are identical. With the E4-1, the service life of your application can be still increased with lower costs.

Typical industries and applications

- Crane
- Indoor crane
- Composting plants
- Sewage plants
- Machine tools
- General mechanical engineering
- Material handling technology
- Refrigeration engineering
- Construction machinery
- Wood working
- Robotics and handling systems



Cleanroom test upon request



Reduced noise due to special rubber pads and special stop dog design



ESD classification: Electrically conductive ESD/ATEX version upon request



System E4-1 field proven in long travels



Fully enclosed Energy Tubes available as special design with HT material for 1562°F hot chips





The E4-42 series in a machine tool, completely assembled with igus® Chainflex^a cables

Application	Design feature
Long unsupported length	Special stop dogs, tongue and groove link design
Low-noise operation, unsupported gliding	Integrated "brake", smooth gliding surfaces - rubber dampers optional
Hanging and standing installation	Torsional stability through tongue and groove link design, "no camber" option by flipping the outer link
Long travels	High push/pull forces through tongue and groove link design and stop dogs, large and smooth gliding surfaces
Side-mounted, unsupported	Tongue and groove link design increases unsupported length by about 30% mounted on the side
Fast assembly	"Inner link/outer link" design
Rotary motion	Through simple flipping of links or easy modification, gliding surfaces on the side
Increase service life of cable	Smooth, wide solid polymer support for cables, many quick-mounting shelving options
Increase service life of chains	Large pins, optimized material, high stability
ESD, ATEX	Tongue and groove link design for secure contact surfaces in motion (special version in conductive material)
Operation under dirt, chips, humidity	Tongue and groove link design design prevents chain breakage, dirt-resistant design

E4-1 Design Features

The E4-1 Series combines the tongue and groove link design and the inner and outer link design of previous E4 constructions — all in one Energy Chain®

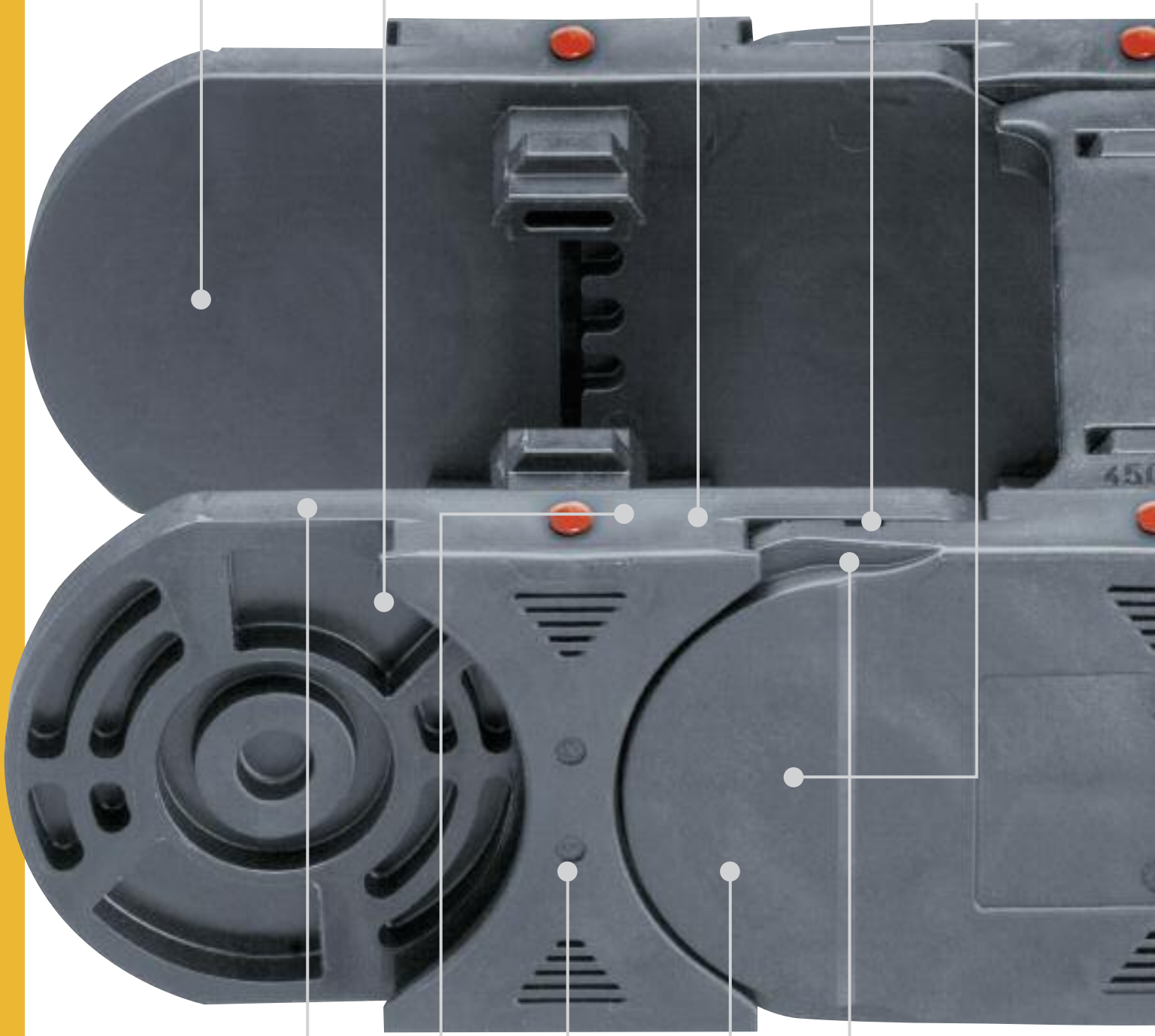
Smooth, cable-friendly inner surfaces

Low noise operation through integrated "brake" on the radial stop dogs

Smooth and wear-resistant gliding surface - with no additional gliding shoe

ESD version ideal through "tongue and groove" contact

Lateral wear pads for a long service life



Special chain link contour provide for low rolling noise

Additional noise-reducing option with rubber dampers

Inner-/outer-link design for faster assembly

Tongue and groove design provides greater lateral stability

E4-1 Design Features

Stable crossbars with double locking

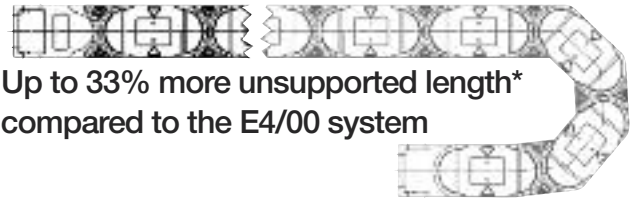
Types "with" or "without camber" by flipping outer links



Cable-friendly, rounded crossbar

Vertical stop dog system for larger unsupported lengths

Cut costs by eliminating additional components with E4-1 Energy Chains® - Proven durability and stability



Up to 33% more unsupported length* compared to the E4/00 system

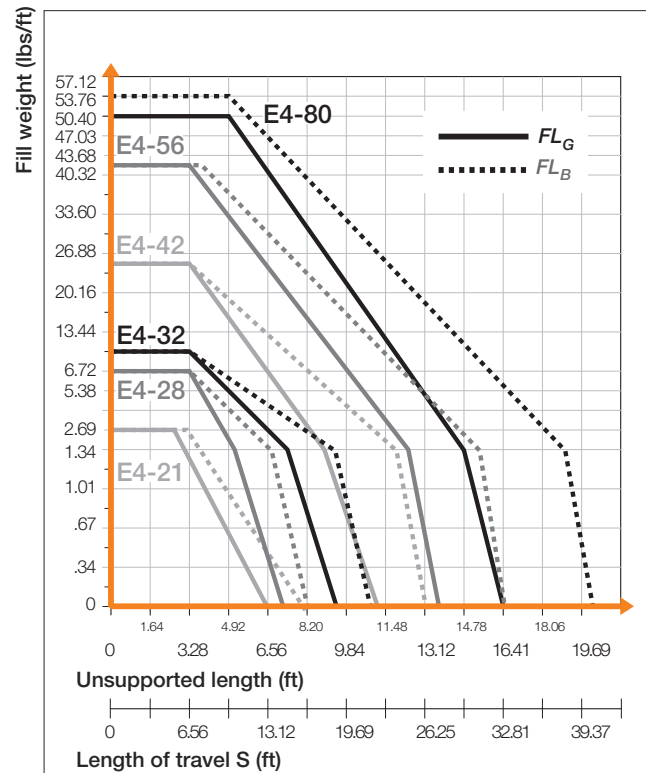
- Up to 133% higher tensile strength*
- Up to 33% more unsupported length*. Save in the purchase cost, as you can now use smaller Energy Chains®
- Due to the large unsupported lengths or loads, oversized energy supply systems can be optimized with the igus® E4-1 system

* Compared to the igus® E4/00 system series

** Test at igus® laboratory: Sag tested with defined weight and length over 96h

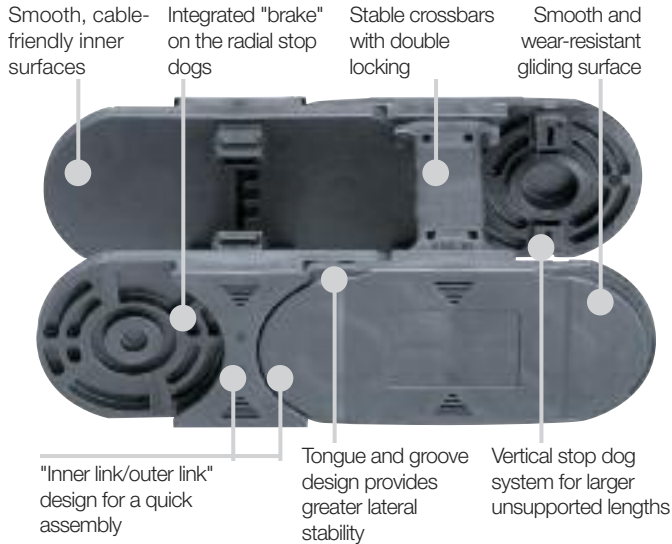
Selection table and assembly instructions

► page 8



E4-1 Design Features

energy chain® configurator 



- Available in 40 width sizes in both Energy Chain® and Energy Tube
- Interlocking side links for optimum lateral stability, for high push/pull force on long travels
- Long unsupported lengths
- "Brake" and rubber dampers as additional noise-reducing options
- Inner link/outer link design for quick assembly with various interior separation options
- Double locking stable crossbars that open from both sides
- Support Tray tool kit for the support of the lower run
- Chapter 9, main catalog
- Find more technical data about the material, chemical resistance, temperatures ➤ Chapter 1, main catalog

Crossbars every link for particularly demanding applications



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Bending radius <i>R</i> in. (mm)
E4-21	.82 (21)	1.18-4.72 (30-120)	1.73-5.28 (44-134)	1.10 (28)	1.50-7.87 (38-200)
E4-28	1.10 (28)	1.57-11.81 (40-300)	2.36-12.60 (60-320)	1.65 (42)	2.16-9.84 (55-250)
E4-32	1.26 (32)	1.97-15.75 (50-400)	2.87-16.65 (73-423)	2.13 (54)	2.48-11.81 (63-300)
E4-42	1.65 (42)	1.97-15.75 (50-400)	2.99-16.77 (76-426)	2.52 (64)	2.95-13.78 (75-350)
E4-56	2.20 (56)	1.97-23.62 (50-600)	3.31-24.96 (84-634)	3.31 (84)	5.31-19.69 (135-500)
E4-80	3.15 (80)	1.97-23.62 (50-600)	3.94-25.59 (100-650)	4.25 (108)	5.91-39.37 (150-1000)

Crossbars every 2nd link for almost all applications



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Bending radius <i>R</i> in. (mm)
H4-32	1.26 (32)	1.97-15.75 (50-400)	2.87-16.65 (73-423)	2.13 (54)	2.48-11.81 (63-300)
H4-42	1.65 (42)	1.97-15.75 (50-400)	2.99-16.77 (76-426)	2.52 (64)	2.95-13.78 (75-350)
H4-56	2.20 (56)	1.97-23.62 (50-600)	3.31-24.96 (84-634)	3.31 (84)	5.31-19.69 (135-500)
H4-80	3.15 (80)	1.97-23.62 (50-600)	3.94-25.59 (100-650)	4.25 (108)	5.91-39.37 (150-1000)

Energy Tubes fully enclosed, for complete cable protection



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Bending radius <i>R</i> in. (mm)
R4-28	1.10 (28)	1.97-11.81 (50-300)	2.76-12.60 (70-320)	1.65 (42)	2.95-9.84 (75-250)
R4-32	1.26 (32)	1.97-11.81 (50-300)	2.87-12.72 (73-323)	2.13 (54)	4.92-11.81 (125-300)
R4-42	1.65 (42)	1.97-11.81 (50-300)	2.99-12.83 (76-326)	2.52 (64)	4.92-13.78 (125-350)
R4-56	2.20 (56)	2.95-18.19 (75-462)	4.29-19.57 (109-497)	3.31 (84)	5.91-19.69 (150-500)
R4-80	3.15 (80)	7.87-15.75 (200-400)	9.84-15.75 (250-450)	4.25 (108)	7.87-39.37 (200-1000)

Energy Chain system® E4-1

Assembly instructions

Energy Chains® - Opening



1 Remove crossbars - Insert screwdriver into the slot, using a lever action, apply pressure to the screwdriver to remove the crossbar.



2 Remove clips - Insert screwdriver into the slot, using a lever action, apply pressure to the screwdriver to remove the clip

Energy Tube - Opening



1 Remove lids/bottoms - Insert screwdriver into the slot, using a lever action apply pressure to the screwdriver to release



2 Release only **one side** to open the lid

Energy Chains® and Energy Tubes - Assembling



1 Line up two inner side links side by side. Attach an outer side link between



2 Assemble crossbars - push down and snap in using a screwdriver



3 Assemble clips (for Energy Chains with crossbars every other link) - push down and snap in using a screwdriver



4 Assemble Energy Tube lids and bottoms - Attach to the connector at an angle and snap in place

Energy Chains® and Energy Tubes - Separating



1 Remove crossbars, clips, lids and bottoms at the outer links



2 Insert screwdriver into the slot between the side links. Using a lever action, release the side links



3 Remove the outer links



4 Separate the Energy Chain®

Price Index



Series E4-21

Special Options Available



Low noise version available with special rubber pads



Cleanroom test upon request



ESD classification:
Electrically conductive
ESD/ATEX version upon request

Assembly Tips



Opening Energy Chains®: Remove crossbars and clips - Insert screwdriver into the slot, push down, release by lever action

Other Installation Methods

Vertical, hanging ≤ 131 ft (40 m)

Vertical, standing ≤ 9.84 ft (3 m)

Side-mounted, un_supp. ≤ 3.28 ft (1 m)

Rotary requires further calculation

Usage Guidelines



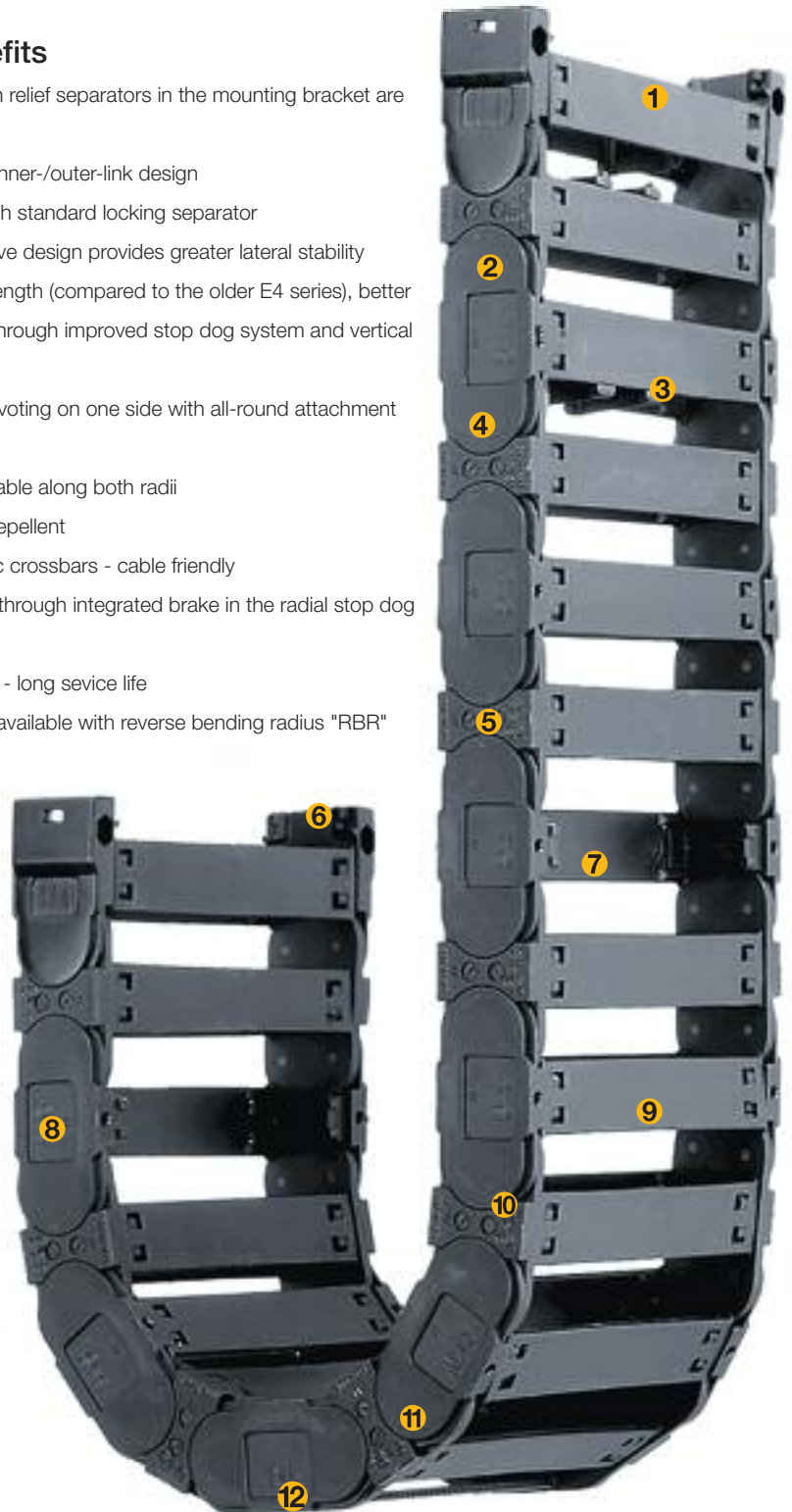
- If quiet operation is required
- If very high speeds and/or accelerations are required
- Long travels
- High fill weights



- When an economic one-sided snap-open Energy Chain/tube is required
 - Series 1400/1450/1480/1500
- When a one-sided snap-open Energy Tube is required at a low price
 - Series R117/R118

Features & Benefits

- 1 Strain relief with strain relief separators in the mounting bracket are available
- 2 Straight run through inner-/outer-link design
- 3 Interior separation with standard locking separator
- 4 The tongue and groove design provides greater lateral stability
- 5 15% more tensile strength (compared to the older E4 series), better unsupported length through improved stop dog system and vertical radial stops
- 6 Mounting brackets pivoting on one side with all-round attachment option
- 7 Crossbars are removable along both radii
- 8 Smooth outline, dirt repellent
- 9 Wide, rounded plastic crossbars - cable friendly
- 10 Low-noise operation through integrated brake in the radial stop dog system
- 11 Optimized glide pads - long service life
- 12 Energy Chains® also available with reverse bending radius "RBR"



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

6.56 ft (2 m) **E4-21-120-100-0**



Energy Chain®

With 2 separators **T2112** assembled every 2nd link



Interior Separation

1 Set **E4-210-120-12**



Mounting Bracket

Energy Chain system® E4-1

Series E4-21

Installation Dimensions

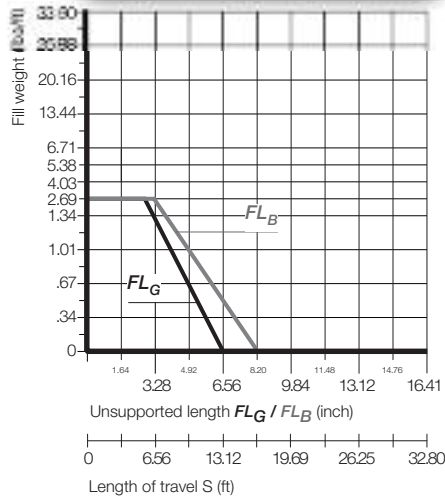
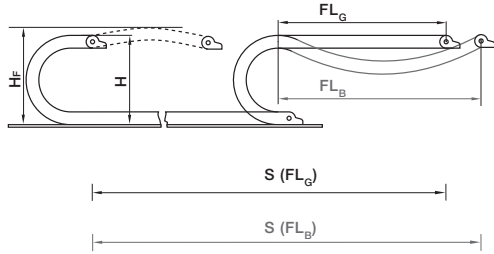
energy chain® configurator



E4-21

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1, main catalog

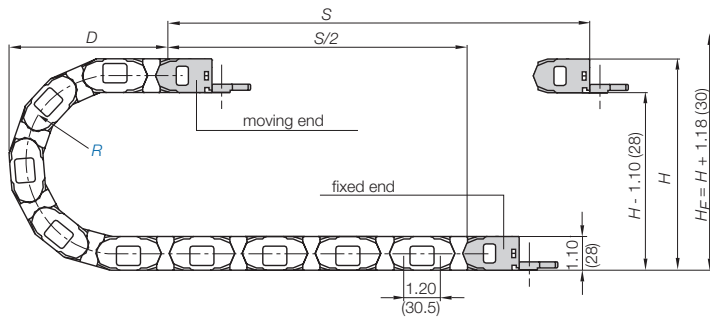


Short Travels - Unsupported

Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{safety buffer}$
 - $H_F = \text{Required clearance height}$
 - $H_{Fi} = \text{Trough inner height}$
 - $H_2 = \text{*Mounting height}$
 - $D_2 = \text{Overlength - long travels, gliding}$
 - $K_2 = \text{*Add-on}$
- *If the mounting bracket location is set lower



Pitch per link = 1.20" (30.5 mm)
 Links per ft (m) = 10.06 (33)
 For center mount applications:
 Chain length = $S/2 + K$

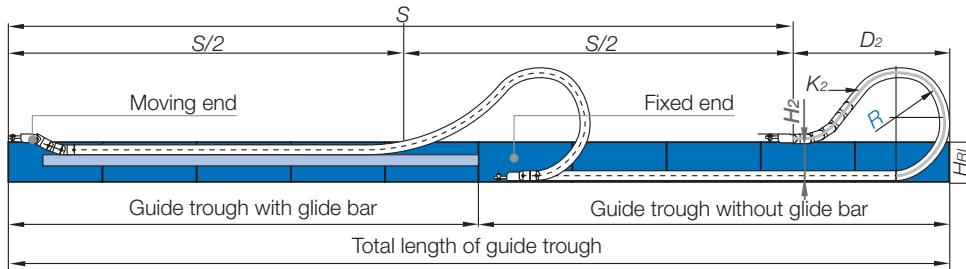
The required clearance height: $H_F = H + 1.18$ in. (30 mm) (with 1.01 lbs/ft (1.5 kg/m) fill weight. Please consult igus® if space is particularly restricted.

R	1.50 (038)	1.89 (048)	2.48 (063)	2.95 (075)	3.94 (100)	5.91 (150)	7.87 (200)
H	4.09 (104)	4.88 (124)	6.06 (154)	7.01 (178)	8.98 (228)	12.91 (328)	16.85 (428)
D	3.35 (085)	3.74 (095)	4.33 (110)	4.72 (120)	5.71 (145)	7.68 (195)	9.65 (245)
K	7.28 (185)	8.46 (215)	10.24 (260)	11.81 (300)	14.96 (380)	21.06 (535)	27.17 (690)

For long travels with lowered mounting height

Long travel lengths from 32.8 ft.(10m) to max. 394 ft. (120m)

For center mount applications:
 Chain length = $S/2 + K_2$



R	1.50 (038)	1.89 (048)	2.48 (063)	2.95 (075)	3.94 (100)	5.91 (150)	7.87 (200)
H_2	-	-	-	-	5.31 (135)	5.31 (135)	5.31 (135)
D_{2+25}	-	-	-	-	19.29 (490)	20.87 (530)	26.18 (665)
K_2	-	-	-	-	30.79 (782)	36.22 (920)	43.46 (1104)

For support of the lower run, see Chapter 9 of the main catalog for the **Support Tray tool kit**

Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough. **Design, Chapter 1 main catalog**

Technical Data

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB



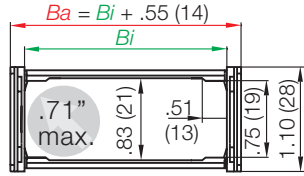
Details of material properties

Chapter 1
main catalog

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS

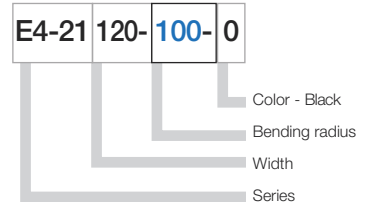


Series E4-21 - Energy Chain® with crossbars every link

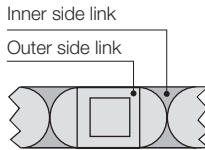
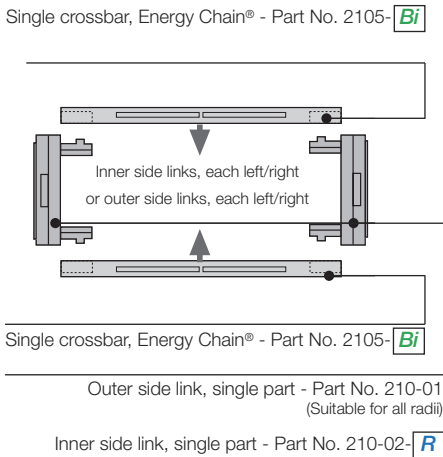


- Crossbars every link
- Removable crossbars
- Separator for locking crossbar (fixable) Standard
- Can be opened from both sides

Part Number Structure



Energy Chain® as separate parts, links and side plates



Supplement part number with required radius. Example: E4-21-120-100-0
Pitch: 1.20 in. (30.5 mm) per link links/ft(m) = 10.06 (33)

Part Number.	<i>Bi</i>	<i>Ba</i>	Weight
Snap-open inner radius	in. (mm)	in. (mm)	lbs/ft (kg/m)
E4-21-030-□-0	1.18 (30)	1.73 (44)	≈ 0.40 (0.60)
E4-21-040-□-0	1.57 (40)	2.13 (54)	≈ 0.43 (0.64)
E4-21-050-□-0	1.97 (50)	2.52 (64)	≈ 0.45 (0.67)
E4-21-060-□-0	2.36 (60)	2.91 (74)	≈ 0.48 (0.71)
E4-21-070-□-0	2.76 (70)	3.31 (84)	≈ 0.50 (0.74)
E4-21-080-□-0	3.15 (80)	3.70 (94)	≈ 0.52 (0.78)
E4-21-090-□-0	3.54 (90)	4.09 (104)	≈ 0.55 (0.82)
E4-21-100-□-0	3.94 (100)	4.49 (114)	≈ 0.57 (0.85)
E4-21-110-□-0	4.33 (110)	4.88 (124)	≈ 0.60 (0.89)
E4-21-120-□-0	4.72 (120)	5.28 (134)	≈ 0.62 (0.92)

Choose from the radii below for all of the above sizes

Radius (mm) Example: E4-21-120-100-0

	038	048	063	075	100	150	200
<i>R</i>	1.50 (038)	1.89 (048)	2.48 (063)	2.95 (075)	3.94 (100)	5.91 (150)	7.87 (200)
<i>H</i>	4.09 (104)	4.88 (124)	6.06 (154)	7.01 (178)	8.98 (228)	12.91 (328)	16.85 (428)
<i>D</i>	3.35 (085)	3.74 (095)	4.33 (110)	4.72 (120)	5.71 (145)	7.68 (195)	9.65 (245)
<i>K</i>	7.28 (185)	8.46 (215)	10.24 (260)	11.81 (300)	14.96 (380)	21.06 (535)	27.17 (690)

Energy Chain system® E4-1

Series E4-21

Interior Separation

energy chain® configurator ▶



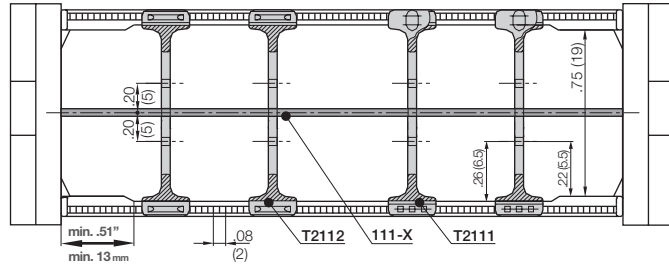
E4-21



Vertical separators and shelves

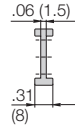
Energy Chains® can be subdivided both vertically and horizontally using the various interior separation elements.

► **Design, Chapter 1** of the main catalog for layout recommendations.



- **Vertical separator T2102**

This component is used when vertical and horizontal separation is required. Due to the slotted design it allows vertical/horizontal shelving arrangements



Slotted Vertical Separator

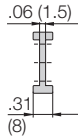
Unassembled	Part No. T2102
Assembled	Part No. T2112

Slotted Vertical separator
T2102



- **Notched vertical separator T2101**

This component can be locked in 2mm increments due to spaces in the crossbar preventing the separator from sliding sideways



Vertical Separator

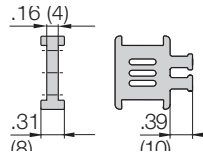
Unassembled	Part No. T2101
Assembled	Part No. T2111

Slotted notched separator
T2101



- **Strain relief separator T2103-Z**

This separator can be integrated into the mounting bracket and can be placed at any point. It combines strain relief and interior separation.



Separators w/Integrated Shelf

Unassembled	Part No. T2103-Z
Assembled	Part No. T2113-Z

Strain relief separator
T2103-Z



Width X	Usable Width	Part No.	Part No.
in. (mm)	in. (mm)	Unassembled	Assembled
1.18 (030)	.87 (22)	110-30	111-30
1.57 (040)	1.26 (32)	110-40	111-40
1.97 (050)	1.65 (42)	110-50	111-50
2.36 (060)	2.05 (52)	110-60	111-60
2.76 (070)	2.44 (62)	110-70	111-70
3.15 (080)	2.83 (72)	110-80	111-80
3.54 (090)	3.23 (82)	110-90	111-90
3.94 (100)	3.62 (92)	110-100	111-100
4.33 (110)	4.02 (102)	110-110	111-110
4.72 (120)	4.41 (112)	110-120	111-120

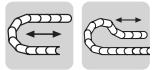
Shelves 110-XX

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 3 different heights in .20" (5mm) increments.



PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS





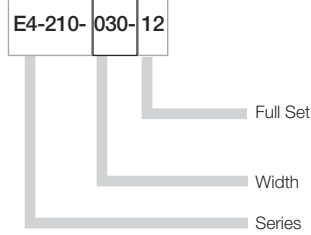
Standard

Option: pivoting

- Recommended for unsupported and gliding applications
- KMA mounting bracket with attachment points on all sides
- Well suited for tight installation conditions
- Integrated strain relief possible



Part Number Structure



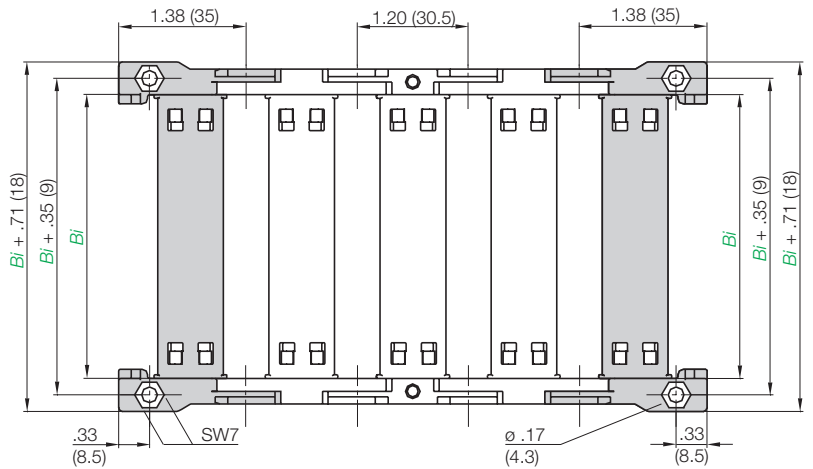
Full set, for both ends:

E4-210-030-12

Single-part order:

E4-210-030-1 Mounting bracket moving end

E4-210-030-2 Mounting bracket fixed end



Width	Part No. Full Set	Bi in. (mm)	Width	Part No. Full Set	Bi in. (mm)
-030-	E4-210-030-12	1.18 (30)	-080-	E4-210-080-12	3.15 (80)
-040-	E4-210-040-12	1.57 (40)	-090-	E4-210-090-12	3.54 (90)
-050-	E4-210-050-12	1.97 (50)	-100-	E4-210-100-12	3.94 (100)
-060-	E4-210-060-12	2.36 (60)	-110-	E4-210-110-12	4.33 (110)
-070-	E4-210-070-12	2.75 (70)	-120-	E4-210-120-12	4.72 (120)



Special feature mounting brackets KMA: Series E4-21

- Mounting brackets with attachment points on all sides
- Mounting hole is countersunk for socket head screw (M4) and hexagon nut (M4)
- **Attention:** Mounting brackets always need to end with an inner link (odd number of links)



E4-28
R4-28



Energy Chain system® E4-1 Series E4-28/R4-28

Price Index



Special Options Available

- Low noise version available with special rubber pads
- Cleanroom test upon request
- ESD classification: Electrically conductive ESD/ATEX version upon request

Assembly Tips



Opening Energy Chains®: Remove crossbars and clips - Insert screwdriver into the slot, push down, release by lever action



Remove lids/bottoms (Energy Tubes) - Insert screwdriver into the slot, release by lever action

Other Installation Methods

- Vertical, hanging ≤ 262 ft (80 m)
- Vertical, standing ≤ 16.4 ft (5 m)
- Side-mounted, un supp. ≤ 6.56 ft (2 m)
- Rotary requires further calculation

Usage Guidelines

- If quiet operation is required
 - If very high speeds and/or accelerations are required
 - Long travels
 - High fill weights
- When an extremely low vibration Energy Chain®/Energy Tube is required
 - Series E6-29
 - Series R6-29
 - When an economic one-sided snap-open Energy Chain®/Energy Tube is required
 - Series 2400/2450/2480/2500

Features & Benefits

- Wide, rounded plastic crossbars - cable friendly
- Low-noise operation through integrated brake in the radial stop dog system
- Hinged snap-open removable lids along outer radius of Energy Tube
- Straight run through inner-/outer-link design
- The tongue and groove design provides greater lateral stability
- 15% more tensile strength (compared to the older E4 series), better Optimized glide pads - long service life
- Shelving program with a wide range of options
- Crossbars are removable along both radii
- 15% more tensile strength (compared to the best E4 series), better unsupported length through improved stop dog system and vertical radial stops
- Version NCST "without camber" simply by turning outer links without unnecessary rework



Also available without camber. Add NCST to the end of the part number. Ex: E4-28-300-250NCST

Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

9.84 ft (3 m) **E4-28-300-250-0**

Energy Chain®

With 2 separators **2211** assembled every 2nd link

Interior Separation

1 Set **E4-280-300-12**

Mounting Bracket

Energy Chain system® E4-1 Series E4-28/R4-28 Installation Dimensions

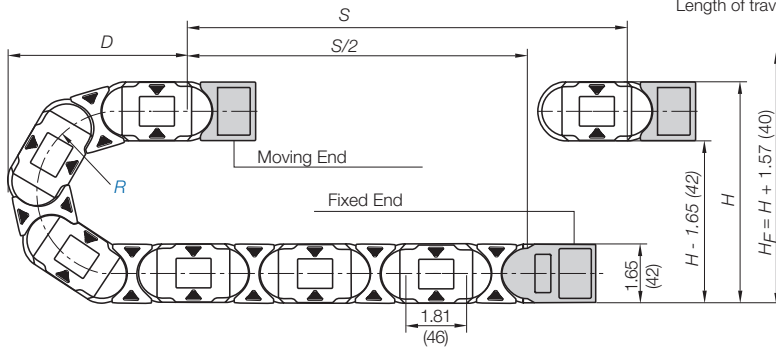
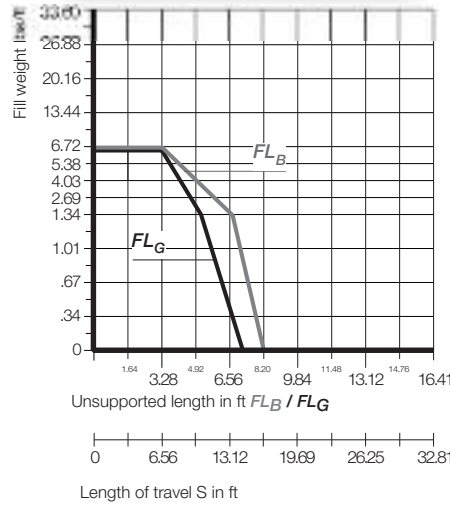
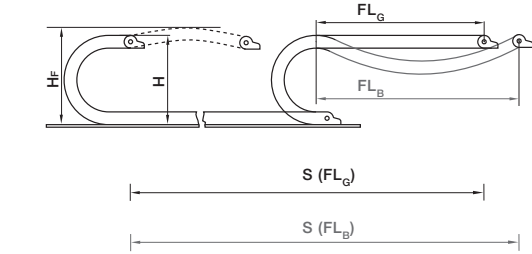
energy chain® configurator ▶



E4-28
R4-28

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1, main catalog



Pitch per link: = 1.81" (46 mm)
Links per ft (m): = 6.71 (22)
For center mount applications:
Chain length = $S/2 + K$

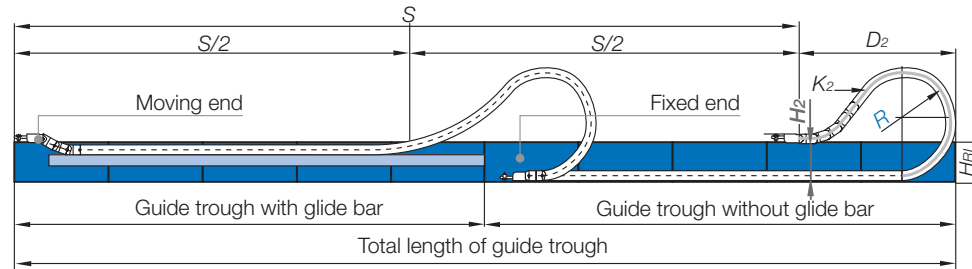
The required clearance height: $H_F = H + 1.57$ in. (40 mm) (with .67 lbs/ft (1.0 kg/m) fill weight).
Please consult igus® if space is particularly restricted.

R	2.17 (055)	2.48 (063)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)
H	5.98 (152)	6.61 (168)	7.56 (192)	9.53 (242)	11.50 (292)	13.46 (342)	15.43 (392)	17.40 (442)	21.34 (542)
D	4.80 (122)	5.12 (130)	5.59 (142)	6.57 (167)	7.56 (192)	8.54 (217)	9.53 (242)	10.51 (267)	12.48 (317)
K	10.43 (265)	11.42 (290)	12.99 (330)	16.14 (410)	19.09 (485)	22.24 (565)	25.78 (655)	28.54 (725)	34.65 (880)

For long travels with lowered mounting height

Long travel lengths from 32.8 ft.(10m) to max. 656 ft. (200m)

For center mount applications:
Chain length: = $S/2 + K_2$



R	2.17 (055)	2.48 (063)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)
H ₂	-	-	-	6.22 (158)	6.22 (158)	6.22 (158)	6.22 (158)	6.22 (158)	6.22 (158)
D ₂₊₂₅	-	-	-	13.78 (350)	19.29 (490)	20.87 (530)	26.18 (665)	28.74 (730)	36.81 (935)
K ₂	-	-	-	23.54 (598)	30.79 (782)	36.22 (920)	43.46 (1104)	48.89 (1242)	63.39 (1610)

For support of the lower run, see Chapter 9 of the main catalog for the Support Tray tool kit

Short Travels - Unsupported

Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to Installation dimensions for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{safety buffer}$
 - H_F = Required clearance height
 - H_{int} = Trough inner height
 - H₂ = *Mounting height
 - D₂ = Overlength - long travels, gliding
 - K₂ = *Add-on
- *If the mounting bracket location is set lower



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.
Design, Chapter 1, main catalog

Technical Data

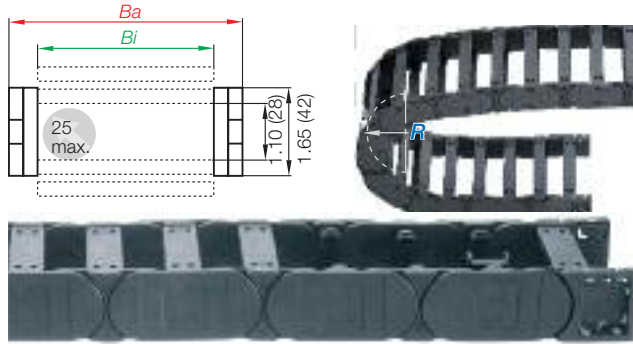
Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB



Details of material properties

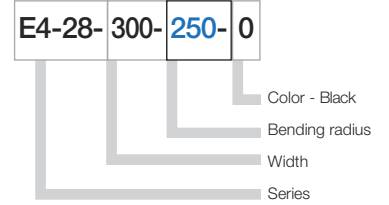
▶ Chapter 1

Series E4-28 - Energy Chain® with crossbars every link

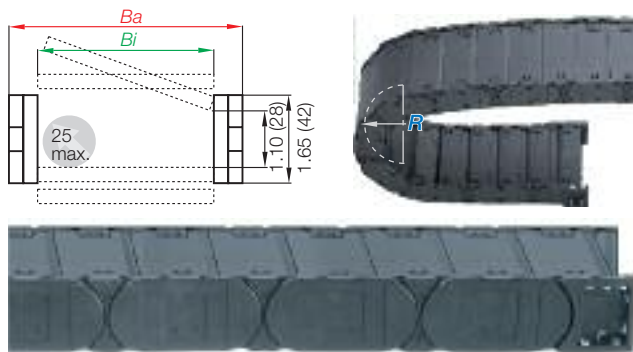


- Robust solution with crossbars every link
- Can be opened from two sides
- Removable crossbars

Part Number Structure

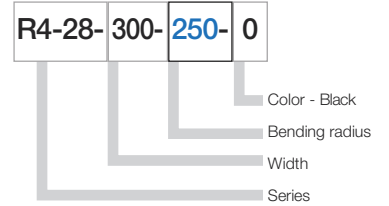


Series R4-28 - fully enclosed Energy Tube

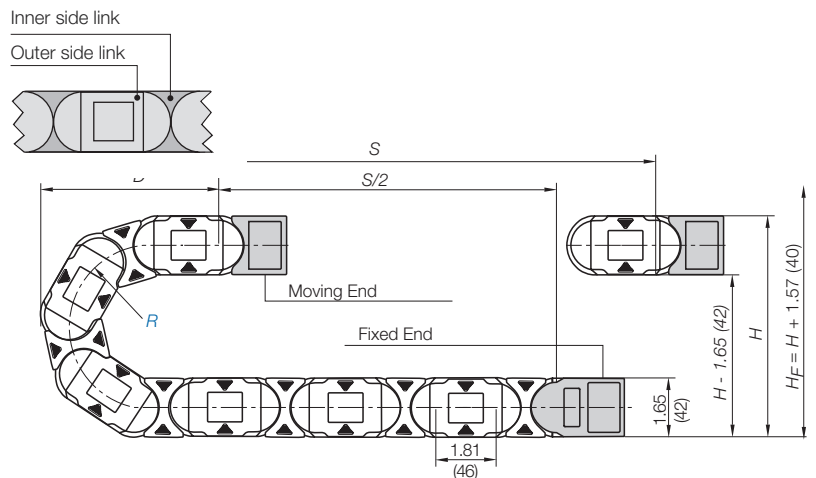
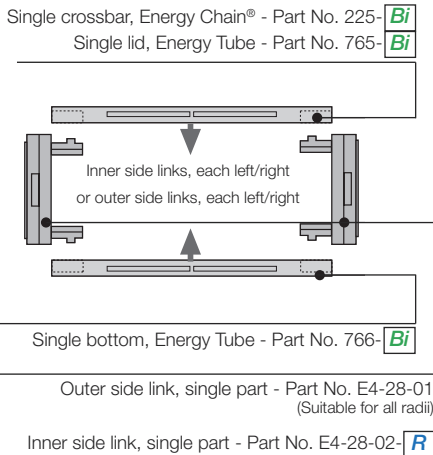


- Fully enclosed
- Excellent cable and hose protection against dirt
- Protection against hot chips
- Lids along inner radius are completely removable
- Lids along the outer radius are single-sided, snap open, hinged on one side as well as completely removable

Part Number Structure



Energy Chain® as separate parts, links and side plates



Energy Chain system® E4-1

Series E4-28/R4-28

Product Range

energy chain® configurator 



E4-28
R4-28

Supplement part number with required radius. Example: E4-28-300--0
Pitch: 1.81 in. (46mm) per link links/ft(m) = 6.71 (22)

Part Number.				<i>Bi</i>	<i>Ba</i>	E4-28	R4-28
Crossbars	Tube			in. (mm)	in. (mm)	lbs/ft (kg/m)	lbs/ft (kg/m)
Every link	Version						
E4-28-040-		<input type="text" value=""/>	-0	1.57 (40)	2.36 (60)	≈ 0.71 (1.06)	-
E4-28-050-	R4-28-050-	<input type="text" value=""/>	-0	1.97 (50)	2.76 (70)	≈ 0.75 (1.11)	≈ 1.48 (2.20)
E4-28-062-		<input type="text" value=""/>	-0	2.44 (62)	3.23 (82)	≈ 0.79 (1.17)	-
E4-28-070-		<input type="text" value=""/>	-0	2.76 (70)	3.54 (90)	≈ 0.81 (1.20)	-
E4-28-075-		<input type="text" value=""/>	-0	2.95 (75)	3.74 (95)	≈ 0.83 (1.23)	-
E4-28-087-		<input type="text" value=""/>	-0	3.43 (87)	4.21 (107)	≈ 0.86 (1.28)	-
E4-28-100-	R4-28-100-	<input type="text" value=""/>	-0	3.94 (100)	4.72 (120)	≈ 0.92 (1.37)	≈ 1.71 (2.54)
E4-28-125-	R4-28-125-	<input type="text" value=""/>	-0	4.92 (125)	5.71 (145)	≈ 1.01 (1.51)	≈ 1.87 (2.78)
E4-28-150-	R4-28-150-	<input type="text" value=""/>	-0	5.91 (150)	6.69 (170)	≈ 1.08 (1.61)	≈ 2.03 (3.02)
E4-28-175-	R4-28-175-	<input type="text" value=""/>	-0	6.89 (175)	7.68 (195)	≈ 1.15 (1.71)	≈ 2.19 (3.26)
E4-28-200-	R4-28-200-	<input type="text" value=""/>	-0	7.87 (200)	8.66 (220)	≈ 1.24 (1.84)	≈ 2.35 (3.50)
E4-28-225-	R4-28-225-	<input type="text" value=""/>	-0	8.86 (225)	9.65 (245)	≈ 1.34 (1.99)	≈ 2.57 (3.82)
E4-28-250-	R4-28-250-	<input type="text" value=""/>	-0	9.84 (250)	10.63 (270)	≈ 1.44 (2.14)	≈ 2.67 (3.98)
E4-28-275-		<input type="text" value=""/>	-0	10.83 (275)	11.61 (295)	≈ 1.53 (2.27)	-
E4-28-300-	R4-28-300-	<input type="text" value=""/>	-0	11.81 (300)	12.60 (320)	≈ 1.61 (2.39)	≈ 3.00 (4.46)

Choose from the radii below for all of the above sizes

Radius (mm) Example: E4-28-300--0

	055*	063*	075	100	125	150	175	200	250
<i>R</i>	2.17 (055*)	2.48 (063*)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)
<i>H</i>	5.98 (152)	6.61 (168)	7.56 (192)	9.53 (242)	11.50 (292)	13.46 (342)	15.43 (392)	17.40 (442)	21.34 (542)
<i>D</i>	4.80 (122)	5.12 (130)	5.59 (142)	6.57 (167)	7.56 (192)	8.54 (217)	9.53 (242)	10.51 (267)	12.48 (317)
<i>K</i>	10.43 (265)	11.42 (290)	12.99 (330)	16.14 (410)	19.09 (485)	22.24 (565)	25.78 (655)	28.54 (725)	34.65 (880)

* This radius is not available for the R4-28 Series

0 = Standard color black.

For other colors see Chapter 1, main catalog

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

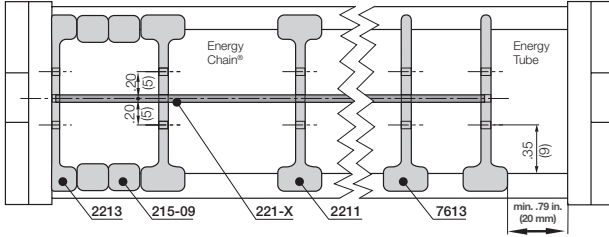




Option 1: Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.

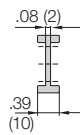
NOTE: Observe a lateral spacing of at least .79 in. (20mm) for Energy Tubes and



STANDARD



Vertical separator
2201



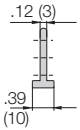
Vertical separator (Chain only)

Unassembled	Part No. 2201
Assembled	Part No. 2211

- **Vertical separator 2201 for Energy Chains®**
This separator is used for vertical subdivision. Because they are slotted, separators can also be used horizontally to form simple compartments.



Vertical separator
7603



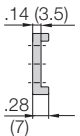
Vertical separator (tube only)

Unassembled	Part No. 7603
Assembled	Part No. 7613

- **Vertical separator 7603 for Energy Tubes**
This separator is used for vertical subdivision. Because they are slotted, separators can also be used horizontally to form simple compartments.



Side plate
2203



Side plate (chain only)

Unassembled	Part No. 2203
Assembled	Part No. 2213

- **Side plate 2203 for Energy Chains®**
Used in conjunction with full-width shelf 220-X, this option is used for applications involving many thin cables with similar diameters.



Spacers
205-09

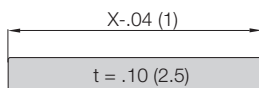


Spacer (chain only)

Unassembled	Part No. 205-09
Assembled	Part No. 215-09

- **NOTE ON SPACERS**
Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications. The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

Full-width shelf 220-XX



Width X in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Part No. Unassembled	Part No. Assembled
1.57 (040)	220-40	221-40	3.94 (100)	220-100	221-100
1.97 (050)	220-50	221-50	4.92 (125)	220-125	221-125
2.44 (062)	220-62	221-62	5.91 (150)	220-150	221-150
2.76 (070)	220-70	221-70	6.89 (175)	220-175	221-175
2.95 (075)	220-75	221-75	7.87 (200)	220-200	221-200
3.43 (087)	220-87	221-87			

Energy Chain system® E4-1

Series E4-28/R4-28

Interior Separation

energy chain® configurator ▶



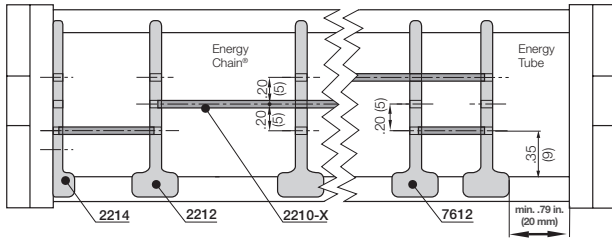
E4-28
R4-28



Option 2: Shelves

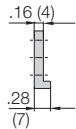
Energy Chains® and Energy Tubes can be subdivided both vertically and horizontally using the various interior separation elements.

▶ Design, Chapter 1, main catalog for layout recommendations.



- **Side plates 2204**

This component is used to form the basic pattern of a shelf system.



Side plate

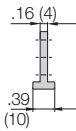
Unassembled	Part No. 2204
Assembled	Part No. 2214

Side plate
2204



- **Vertical separator 2202 for Energy Chain®**

This component is used to form the basic pattern of a shelf system.



Vertical separator (chain only)

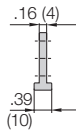
Unassembled	Part No. 2202
Assembled	Part No. 2212

Vertical separator
2202



- **Vertical separator 7602 for Energy Tube**

This separator is slotted and able to be combined with shelves



Vertical separator (tube only)

Unassembled	Part No. 7602
Assembled	Part No. 7612

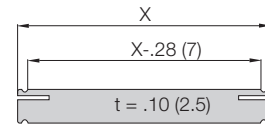
Vertical separator
7602



Shelves 420-XX

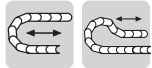
These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 7 different heights in .28" (7mm) increments

Width X in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Part No. Unassembled	Part No. Assembled
.71 (18)	2200-18	2210-18	2.28 (58)	2200-58	2210-58
.91 (23)	2200-23	2210-23	2.68 (68)	2200-68	2210-68
1.10 (28)	2200-28	2210-28	2.87 (73)	2200-73	2210-73
1.30 (33)	2200-33	2210-33	3.46 (88)	2200-88	2210-88
1.50 (38)	2200-38	2210-38	3.90 (99)	2200-99	2210-99
1.69 (43)	2200-43	2210-43	4.88 (124)	2200-124	2210-124
1.89 (48)	2200-48	2210-48	5.87 (149)	2200-149	2210-149



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

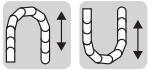
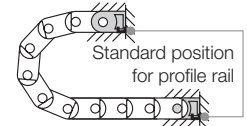
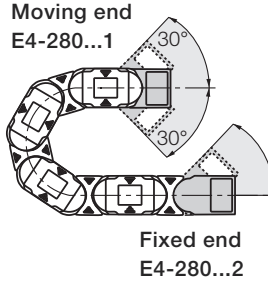




Standard

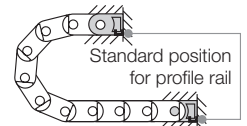
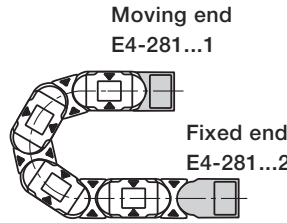
Option 1: pivoting

- Unsupported and gliding applications
- mounting capabilities on all sides
- Bolted connection outside of chain cross-section
- Space-restricted conditions
- corrosion-resistant



Option 2: locking

- Vertical hanging/standing applications
- For high accelerations
- Universally mountable
- Various mounting positions
- Corrosion-resistant



Part Number Structure

E4-281-040-2-12



Full set, for both ends:

E4-280-040-12

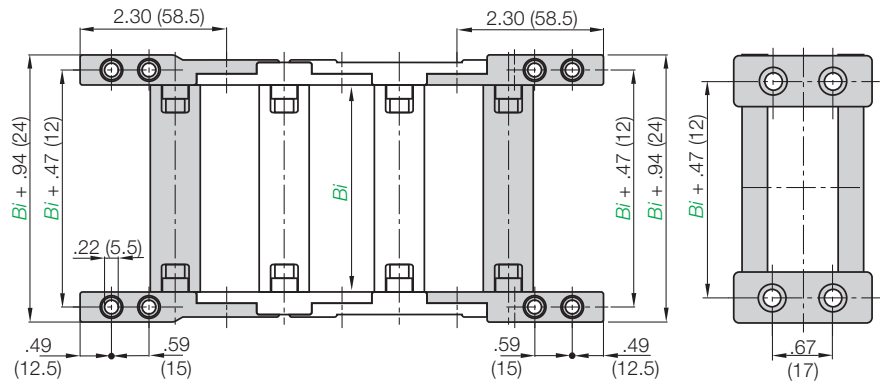
Single-part order:

E4-280-040-1

Mounting bracket moving end

E4-280-040-2

Mounting bracket fixed end



Part number example is shown for pivoting brackets.
For locking brackets change part number to E4-281

Part No. Full Set (pivoting)
Series E4-28
E4-28-Width-12

Width	Part No. Full Set		Bi in. (mm)	
	Pivoting	Locking		
-040	E4-280	E4-281	-040-12	1.57 (40)
-050	E4-280	E4-281	-050-12	1.97 (50)
-062	E4-280	E4-281	-062-12	2.44 (62)
-070	E4-280	E4-281	-070-12	2.76 (70)
-075	E4-280	E4-281	-075-12	2.95 (75)
-087	E4-280	E4-281	-087-12	3.43 (87)
-100	E4-280	E4-281	-100-12	3.94 (100)
-125	E4-280	E4-281	-125-12	4.92 (125)
-150	E4-280	E4-281	-150-12	5.91 (150)
-175	E4-280	E4-281	-175-12	6.89 (175)
-200	E4-280	E4-281	-200-12	7.87 (200)
-225	E4-280	E4-281	-225-12	8.86 (225)
-250	E4-280	E4-281	-250-12	9.84 (250)
-275	E4-280	E4-281	-275-12	10.83 (275)
-300	E4-280	E4-281	-300-12	11.81 (300)

Due to the design of the E4-28 series chains,
please note the following when ordering brackets:

Even number of links = full set, part number ending in -12
Odd number of links = 2 pieces, part number ending in -2

**Series E4-28/R4-28
Strain Relief**



Strain relief tiwrap plate Part No. 2050-Z can be fixed
on the last crossbar. **Details ▶ chapter 10 main catalog**

Part. No.	Width [mm]	Number of teeth
2050.Z	60	6

Energy Chain system® E4-1 Series E4-28/R4-28 Guide Trough

energy chain® configurator ▶



E4-28
R4-28

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part No. 96-30
- 1/2 travel length of glide bars
Part No. 92-01
- Installation sets as end connectors
Part No. 95-50-XX

-XX indicates the length of the profile rail on which the guide trough is mounted. The values and part numbers are specified in the table on the left. Standard length of the trough components and glide bars is 6.56 ft (2m). The required overall length of the guide trough directly correlates to the length of travel.

Example:
Length of travel 164 ft. (50 m)
Center mounted

Required guide troughs:
164 ft (50 m) guide trough,
82 ft (25 m) glide bar
= 25 sections of 6.56 ft (2 m) guide trough

Part No. 96-30
= 13 sections of 6.56 ft. (2 m) glide bar

Part No. 92-01
Required number of installation sets
= Number of guide trough components + 1
= 25 + 1 = 26

Part number of the installation sets
95-50-XXX

Example: 95-50-400 for
15.75 (400 mm) long profile rail



Left: Guide trough with glide bars

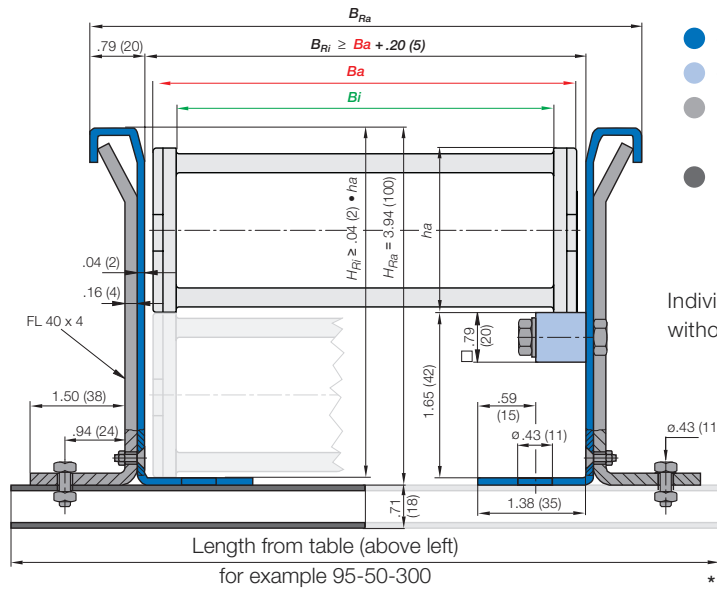
Right: Guide troughs without glide bars



Installation sets as section connectors

Width of Crossbar
E4-28-040-200-0

	B_{Ri}	Installation Part No.
-040	2.56 (65)	*
-050	2.95 (75)	95-50-200
-062	3.43 (87)	95-50-200
-070	3.74 (95)	95-50-200
-075	3.94 (100)	95-50-225
-100	4.92 (125)	95-50-250
-125	5.91 (150)	95-50-275
-150	6.89 (175)	95-50-300
-175	7.87 (200)	95-50-325
-200	8.86 (225)	95-50-350
-225	9.84 (250)	95-50-375
-250	10.83 (275)	95-50-400
-275	11.81 (300)	95-50-425
-300	12.80 (325)	95-50-450



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

* Specialized guide trough available upon request

Standard length profile rail

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



E4-32
H4-32
R4-32



Energy Chain system® E4-1 Series E4-32/H4-32/R4-32

Price Index



Series E4-32



Series H4-32



Series R4-32

Special Options Available



Low noise version available with special rubber pads



Cleanroom test upon request



ESD classification:
Electrically conductive
ESD/ATEX version upon request

Assembly Tips



Opening Energy Chains®: Remove crossbars and clips - Insert screwdriver into the slot, push down, release by lever action



Remove lids/bottoms (Energy Tubes) - Insert screwdriver into the slot, release by lever action

Other Installation Methods

Vertical, hanging ≤ 262 ft (80 m)

Vertical, standing ≤ 16.4 ft (5 m)

Side-mounted, un supp. ≤ 4.92 ft (1.5 m)

Rotary requires further calculation

Usage Guidelines



- If quiet operation is required
- If very high speeds and/or accelerations are required
- Long travels
- High additional loads



- When an extremely low vibration Energy Chain® is required
➤ Series E6-35
- When an economic one-sided snap-open Energy Chain®/Energy Tube is required
➤ Series 2600/2650/2680/2700

Features & Benefits

- 1 Wide, rounded plastic crossbars - cable friendly
- 2 Low-noise operation through integrated brake in the radial stop dog system
- 3 Hinged snap-open removable lids - Energy Tube
- 4 Straight run through inner-/outer-link design
- 5 Strain relief with strain relief separators in the mounting bracket are available
- 6 The tongue and groove design provides greater lateral stability
- 7 QuickLock Crossbar, 385-X-Q, available for faster assembly/disassembly
- 8 Optimized glide pads - long service life
- 9 New Interior separation kit available
- 10 Crossbars are removable along both radii
- 11 15% more tensile strength (compared to the older E4 series), better unsupported length through improved stop dog system and vertical radial stops
- 12 Smooth outline, dirt repellent
- 13 Version NCST "without camber" simply by turning outer links without unnecessary rework



Also available without camber. Add NCST to the end of the part number.
Ex: E4-32-30-300NCST

Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

13.12 ft (4 m) E4-32-30-300-0

Energy Chain®

With 2 separators 282 assembled every 2nd link

Interior Separation

1 Set E4-320-30-12P

Mounting Bracket

Energy Chain system® E4-1 Series E4-32/H4-32/R4-32 Installation Dimensions

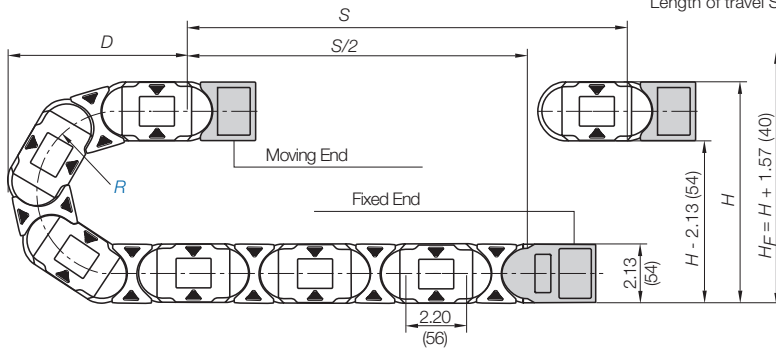
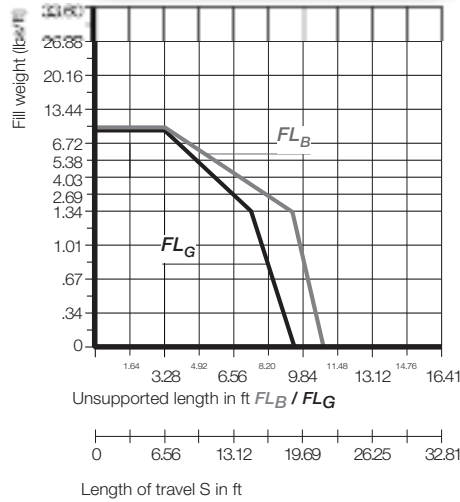
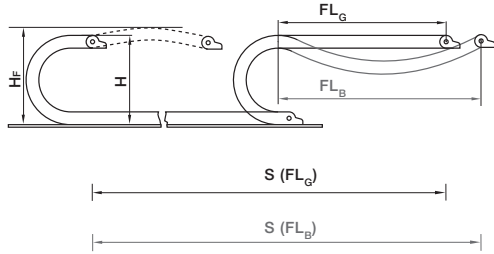
energy chain® configurator



E4-32
H4-32
R4-32

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ► Design, Chapter 1, main catalog



Pitch per link: = 2.20" (56 mm)
Links per ft (m): = 5.49 (18)
For center mount applications:
Chain length = $S/2 + K$

The required clearance height: $H_F = H + 1.57$ in. (40 mm) (with 1.34 lbs/ft (2.0 kg/m) fill weight).
Please consult igus® if space is particularly restricted.

R	2.48 (063)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.66 (220)	9.84 (250)	11.81 (300)
H	7.09 (180)	8.07 (205)	10.04 (255)	12.01 (305)	13.98 (355)	15.51 (405)	17.91 (455)	19.49 (495)	21.85 (555)	25.79 (655)
D	5.75 (146)	6.22 (158)	7.20 (183)	8.19 (208)	9.17 (233)	10.16 (258)	11.14 (283)	11.93 (303)	13.11 (333)	15.08 (383)
K	12.20 (310)	13.78 (350)	16.93 (430)	19.88 (505)	23.03 (585)	26.18 (665)	29.33 (745)	31.69 (805)	35.43 (900)	41.54 (1055)

Short Travels - Unsupported

Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{safety buffer}$
 - H_F = Required clearance height
 - H_{F1} = Trough inner height
 - H_2 = *Mounting height
 - D_2 = Overlength - long travels, gliding
 - K_2 = *Add-on
- *If the mounting bracket location is set lower

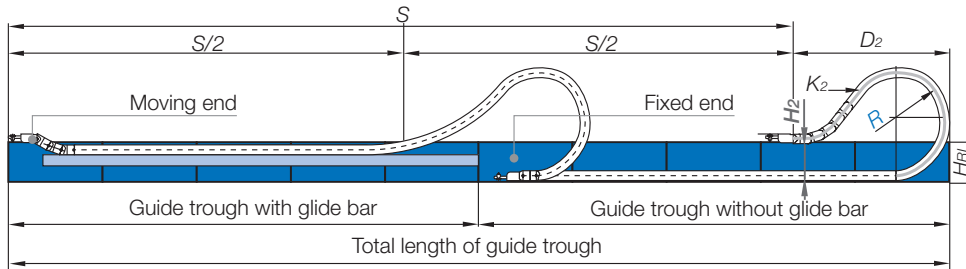


PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

For long travels with lowered mounting height

Long travel lengths from 32.8 ft.(10m) to max. 656 ft. (200m)

For center mount applications:
Chain length: = $S/2 + K_2$



Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.
Design, Chapter 1, main catalog

R	2.48 (063)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.66 (220)	9.84 (250)	11.81 (300)
H_2	-	-	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)
D_2	-	-	14.57 (370)	18.50 (470)	19.69 (500)	25.79 (655)	30.31 (770)	35.43 (900)	36.61 (930)	43.31 (1100)
K_2	-	-	24.25 (616)	30.87 (784)	35.27 (896)	44.10 (1120)	50.71 (1288)	57.32 (1456)	61.73 (1568)	75.00 (1904)



For support of the lower run, see Chapter 9 of the main catalog for the **Support Tray tool kit**

Technical Data

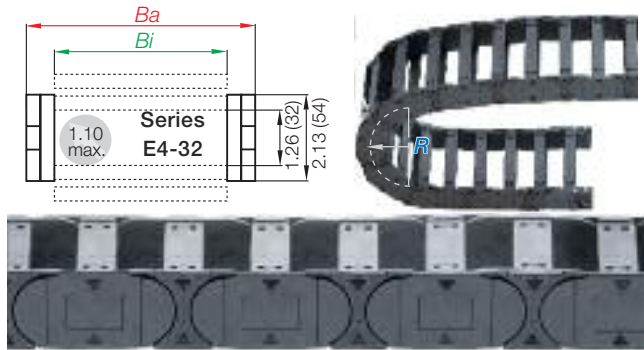
Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB



Details of material properties

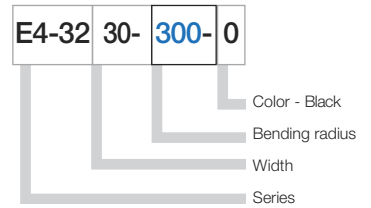
► Chapter 1

Series E4-32 - Energy Chain® with crossbars every link

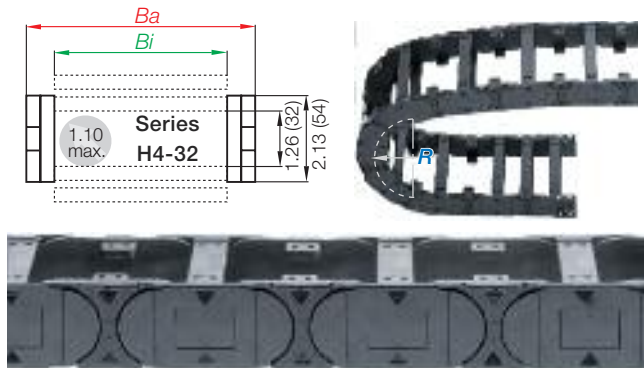


- Crossbars every link
- For use with rigid hydraulic hoses
- For particularly demanding applications
- Can be opened from both sides

Part Number Structure

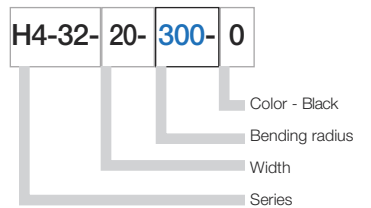


Series H4-32 - Energy Chain® with crossbars every other link

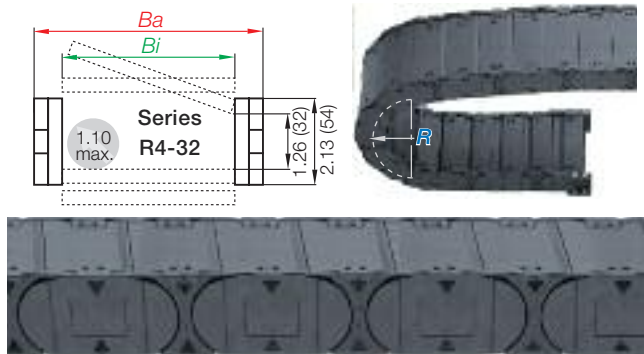


- Crossbars every other link
- Standard configuration
- For nearly every situation
- Can be opened from both sides
- Easy assembly
- Stable
- Cost-effective

Part Number Structure

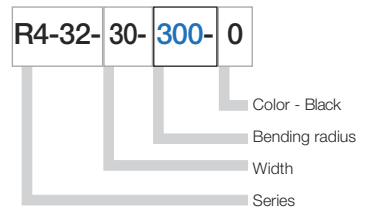


Series R4-32 - fully enclosed Energy Tube

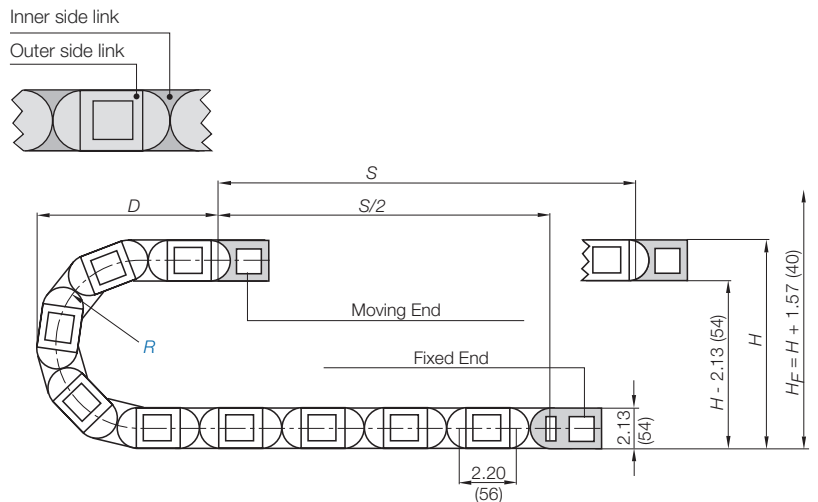
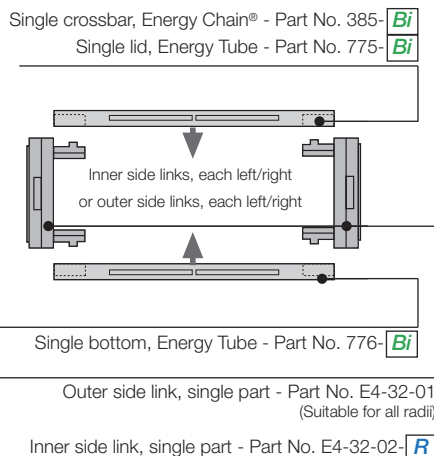


- Fully enclosed
- Excellent cable and hose protection against dirt
- Protection against hot chips up to 1652°F (900°C)
- Lids along inner radius are completely removable
- Lids along the outer radius are single-sided, snap open, hinged on one side as well as completely removable

Part Number Structure



Energy Chain® as separate parts, links and side plates



Energy Chain system® E4-1

Series E4-32/H4-32/R4-32

Product Range

energy chain® configurator ▶



E4-32
H4-32
R4-32

Supplement part number with required radius. Example: E4-32-30-300-0
Pitch: 2.20 in. (56mm) per link links/ft(m) = 5.49 (18)

Part Number			Weight					
Crossbars	Crossbars	Tube	<i>Bi</i>	<i>Ba</i>	E4-32	H4-32	R4-32	
Every link	Every other	Version	in. (mm)	in. (mm)	lbs/ft (kg/m)	lbs/ft (kg/m)	lbs/ft (kg/m)	
E4-32-05-	H4-32-05-	*R4-32-05-	<input type="checkbox"/> -0	1.97 (50)	2.87 (73)	≈ 1.05 (1.57)	≈ 0.96 (1.43)	≈ 1.65 (2.45)
E4-32-06-	H4-32-06-		<input type="checkbox"/> -0	2.68 (68)	3.58 (91)	≈ 1.14 (1.70)	≈ 1.00 (1.49)	–
E4-32-07-	H4-32-07-	R4-32-07-	<input type="checkbox"/> -0	2.95 (75)	3.86 (98)	≈ 1.16 (1.73)	≈ 1.01(1.51)	≈ (1.73 2.57)
E4-32-087-	H4-32-087-		<input type="checkbox"/> -0	3.43 (87)	4.33 (110)	≈ 1.21 (1.80)	≈ 1.03 (1.54)	–
E4-32-10-	H4-32-10-	R4-32-10-	<input type="checkbox"/> -0	3.94 (100)	4.84 (123)	≈ 1.27 (1.89)	≈ 1.06 (1.58)	≈ 1.78 (2.65)
E4-32-11-	H4-32-11-	R4-32-11-	<input type="checkbox"/> -0	4.25 (108)	5.16 (131)	≈ 1.30 (1.94)	≈ 1.08 (1.61)	≈ 1.85 (2.76)
E4-32-112-	H4-32-112-		<input type="checkbox"/> -0	4.41(112)	5.35 (136)	≈ 1.32 (1.96)	≈ 1.09 (1.62)	–
E4-32-12-	H4-32-12-	R4-32-12-	<input type="checkbox"/> -0	4.92 (125)	5.83 (148)	≈ 1.39 (2.07)	≈ 1.13 (1.68)	≈ 1.92 (2.85)
E4-32-137-	H4-32-137-		<input type="checkbox"/> -0	5.39 (137)	6.34 (161)	≈ 1.42 (2.12)	≈ 1.14 (1.70)	–
E4-32-15-	H4-32-15-	R4-32-15-	<input type="checkbox"/> -0	5.91 (150)	6.81 (173)	≈ 1.49 (2.21)	≈ 1.18 (1.75)	≈ 2.02 (3.01)
E4-32-162-	H4-32-162-		<input type="checkbox"/> -0	6.38 (162)	7.32 (186)	≈ 1.50 (2.24)	≈ 1.18 (1.76)	–
E4-32-17-	H4-32-17-	R4-32-17-	<input type="checkbox"/> -0	6.61 (168)	7.52 (191)	≈ 1.56 (2.32)	≈ 1.21 (1.80)	≈ 2.16 (3.21)
E4-32-18-	H4-32-18-		<input type="checkbox"/> -0	6.89 (175)	7.80 (198)	≈ 1.58 (2.35)	≈ 1.22 (1.81)	–
E4-32-187-	H4-32-187-		<input type="checkbox"/> -0	7.36 (187)	8.31 (211)	≈ 1.61 (2.39)	≈ 1.24 (1.84)	–
E4-32-20-	H4-32-20-	R4-32-20-	<input type="checkbox"/> -0	7.87 (200)	8.78 (223)	≈ 1.69 (2.52)	≈ 1.28 (1.90)	≈ 2.29 (3.41)
E4-32-212-	H4-32-212-		<input type="checkbox"/> -0	8.35 (212)	9.29 (236)	≈ 1.73 (2.57)	≈ 1.30 (1.93)	–
E4-32-23-	H4-32-23-		<input type="checkbox"/> -0	8.86 (225)	9.76 (248)	≈ 1.79 (2.67)	≈ 1.33 (1.98)	–
E4-32-237-	H4-32-237-		<input type="checkbox"/> -0	9.33 (237)	10.28 (261)	≈ 1.81 (2.70)	≈ 1.34 (1.99)	–
E4-32-25-	H4-32-25-	R4-32-25-	<input type="checkbox"/> -0	9.84 (250)	10.75 (273)	≈ 1.90 (2.83)	≈ 1.38 (2.06)	≈ 2.59 (3.86)
E4-32-262-	H4-32-262-		<input type="checkbox"/> -0	10.31 (262)	11.26 (286)	≈ 1.96 (2.92)	≈ 1.41 (2.10)	–
E4-32-28	H4-32-28-		<input type="checkbox"/> -0	10.83 (275)	11.73 (298)	≈ 2.01 (2.99)	≈ 1.44 (2.14)	–
E4-32-29-	H4-32-29-		<input type="checkbox"/> -0	11.30 (287)	12.24 (311)	≈ 2.02 (3.02)	≈ 1.44 (2.15)	–
E4-32-30-	H4-32-30-	R4-32-30-	<input type="checkbox"/> -0	11.81 (300)	12.72 (323)	≈ 2.12 (3.15)	≈ 1.49 (2.22)	≈ 2.85 (4.25)
E4-32-312-	H4-32-312-		<input type="checkbox"/> -0	12.28 (312)	13.23 (336)	≈ 2.14 (3.18)	≈ 1.50 (2.23)	–
E4-32-325-	H4-32-325-		<input type="checkbox"/> -0	12.79 (325)	13.70 (348)	≈ 2.20 (3.28)	≈ 1.53 (2.28)	–
E4-32-337-	H4-32-337-		<input type="checkbox"/> -0	13.27 (337)	14.21 (361)	≈ 2.24 (3.34)	≈ 1.55 (2.31)	–
E4-32-350-	H4-32-350-		<input type="checkbox"/> -0	13.78 (350)	14.69 (373)	≈ 2.40 (3.57)	≈ 1.63 (2.42)	–
E4-32-362-	H4-32-362-		<input type="checkbox"/> -0	14.25 (362)	15.20 (386)	≈ 2.46 (3.66)	≈ 1.66 (2.47)	–
E4-32-375-	H4-32-375-		<input type="checkbox"/> -0	14.76 (375)	15.67 (398)	≈ 2.51 (3.74)	≈ 1.69 (2.51)	–
E4-32-387-	H4-32-387-		<input type="checkbox"/> -0	15.24 (387)	16.18 (411)	≈ 2.55 (3.80)	≈ 1.71 (2.54)	–
E4-32-400	H4-32-400-		<input type="checkbox"/> -0	15.75 (400)	16.65 (423)	≈ 2.60 (3.87)	≈ 1.73 (2.58)	–

Choose from the radii below for all of the above sizes

Radius (mm) Example: E4-32-30-300-0

	063**	075**	100**	125	150	175	200	220	250	300
<i>R</i>	2.48 (063*)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.66 (220)	9.84 (250)	11.81 (300)
<i>H</i> $\frac{0}{20}$	7.09 (180)	8.07 (205)	10.04 (255)	12.01 (305)	13.98 (355)	15.94 (405)	17.91 (455)	19.49 (495)	21.85 (555)	25.79 (655)
<i>D</i>	5.75 (146)	6.22 (158)	7.20 (183)	8.19 (208)	9.17 (233)	10.16 (258)	11.14 (283)	11.93 (303)	13.11 (333)	15.08 (383)
<i>K</i>	12.20 (310)	13.78 (350)	16.93 (430)	19.88 (505)	23.03 (585)	26.18 (665)	29.33 (745)	31.69 (805)	35.43 (900)	41.54 (1055)

** This radius is not available for the R4-32 Series

*Removable lid only, no hinged option

0 = Standard color black.

For other colors see Chapter 1, main catalog

For wider chains see page 32.

For large diameter hoses see page 32

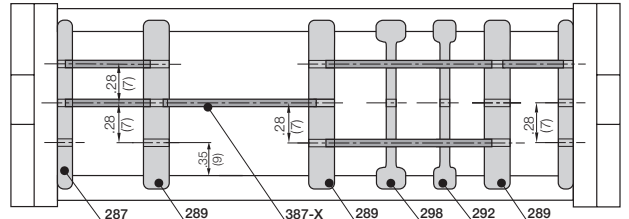
PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



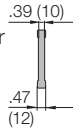


Shelves and Separators

Energy Chains® and Energy Tubes can be subdivided both vertically and horizontally using the various interior separation elements. ▶ **Design, Chapter 1, main catalog** for layout recommendations.



- Split separator T323 for Energy Chains®**
 This separator is ideal for subsequent shelving or the initial assembly of the Energy Chain. Fast assembly and disassembly using a hinge/push mechanism. Enhances flexibility

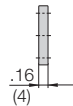


Split Separator (chain only)	
Unassembled	Part No. T323
Assembled	Part No. T323M

Split separator T323, to be split for shelf 386-X



- Side plates 286**
 This component is used to form the basic pattern of a shelf system.



Side Plate	
Unassembled	Part No. 286
Assembled	Part No. 287

Side plate 286



- Vertical separator 288**
 This component is used to form the basic pattern of a shelf system.

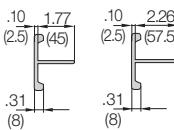


Vertical Separator	
Unassembled	Part No. 288
Assembled	Part No. 289

Vertical separator 288



- Locking vertical separator 281-S**
 This separator is slotted and able to be combined with shelves

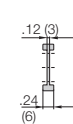


Separators w/Integrated Shelf	
Unassembled	Part No. 281-S-45
Assembled	Part No. 282-S-45
Unassembled	Part No. 281-S-57
Assembled	Part No. 282-S-57

Separator with integrated shelf 281-S



- Closed Slotted separators 291**
 These are used for complex subdivisions. However, they cannot be retrofitted into an existing interior separation system without removing the shelves first.

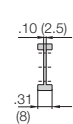


Slotted Separators	
Unassembled	Part No. 291
Assembled	Part No. 292

Closed slotted separator 291



- Open slotted separator 297**
 This separator can be retrofitted into an existing interior separation system without removing the shelves, as long as these shelves fit into the middle slot only.



Slotted Separators, Open	
Unassembled	Part No. 297
Assembled	Part No. 298

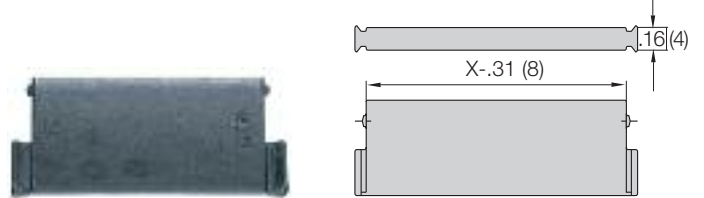
Open slotted separator 297



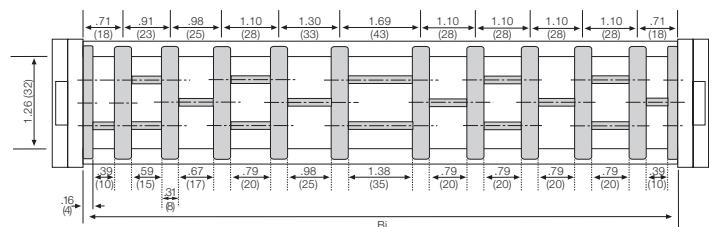
Width X	Usable Width	Part No.	Part No.
in. (mm)	in. (mm)	Unassembled	Assembled
.71 (18)	.39 (10)	386-18	387-18
.91 (23)	.59 (15)	386-23	387-23
.98 (25)	.67 (17)	386-25	387-25
1.10 (28)	.79 (20)	386-28	387-28
1.30 (33)	.98 (25)	386-33	387-33
1.69 (43)	1.38 (35)	386-43	387-43
1.97 (50)	1.65 (42)	386-50	387-50
2.13 (54)	1.81 (46)	386-54	387-54
2.44 (62)	2.13 (54)	386-62	387-62
2.95 (75)	2.64 (67)	386-75	387-75
3.43 (87)	3.12 (87)	386-87	387-87
3.94 (100)	3.62 (92)	386-100	387-100
4.25 (108)	3.94 (100)	386-108	387-108
4.92 (125)	4.61 (117)	386-125	387-125
5.91 (150)	5.59 (142)	386-150	387-150
6.89 (175)	6.57 (167)	386-175	387-175
7.87 (200)	7.56 (192)	386-200	387-200
8.19 (208)	7.87 (200)	386-208	387-208
8.86 (225)	8.54 (217)	386-225	387-225

Shelves 386-XX

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 3 different heights in .28" (7mm) increments



The diagram below is for reference purposes only. Multiple configurations are possible. To create your e-chain shelving cross section please see our online e-chain configurator. Call 1-800-521-2747 for assistance and/or go to igus.com click on the **Products** drop down menu, choose **Energy Chain Cable Carriers** and on the next drop down menu simply click on **e-chain Configurator**.



Energy Chain system® E4-1 Series E4-32/H4-32/R4-32 Interior Separation

energy chain® configurator ▶

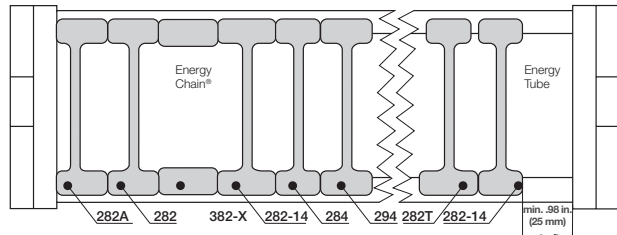


E4-32
H4-32
R4-32



Vertical separators and spacers

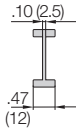
Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.



NOTE: Observe a lateral spacing of at least .98 in. (25mm) for Energy Tubes



Vertical separator
280

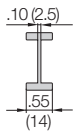


Separator (chain/tube)

Unassembled	Part No. 280
Assembled	Part No. 281



Vertical separator
280 -14

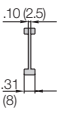


Separator (chain/tube)

Unassembled	Part No. 280-14
Assembled	Part No. 281-14



Vertical separator
283

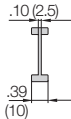


Separator (chain only)

Unassembled	Part No. 283
Assembled	Part No. 284



Locking separator
293

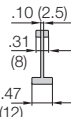


Locking Separator (chain only)

Unassembled	Part No. 293
Assembled	Part No. 294



Locking separator
281T

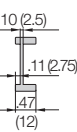


Locking Separator (tubes only)

Unassembled	Part No. 281T
Assembled	Part No. 282T



Asymmetric separator
281A



Asymmetric separator (chain only)

Unassembled	Part No. 280A
Assembled	Part No. 281A



Spacers
381-XX



Spacer (chain only)

Unassembled	Part No. 381-XX
Assembled	Part No. 382-XX

XX = width of the spacer

Spacers available in the following sizes:

Part No. Unassembled	Part No. Assembled	in.	(mm)
381 -10	382 -10	.39"	(10)
381 -15	382 -15	.59"	(15)
381 -20	382 -20	.79"	(20)

- Standard separator 280 for Energy Chains® and Energy Tubes**
 This separator offers safe stability due to its wide base design, also when used with thick cables or hoses.
- Vertical separator 280-14 for Energy Chains® and Energy Tubes**
 This separator offers safe stability due to its broad base design when used with thick cables or hoses.
- Vertical separator 283 for Energy Chains®**
 This separator features a narrow base for use in applications where a large number of small cables need to be individually separated.
- Locking separator 293 for Energy Chains®**
 This separator is used in applications with very high relative humidity. It features increased retention force which is produced by asymmetrical retention "clamps" attached to the chain's crossbar. Please ensure that they are properly aligned.
- Locking separator 281T for Energy Tubes**
 It clamps to the fixed radius and remains free along the other radius to facilitate lid removal.
- Asymmetrical separator 281A for Energy Chains®**
 This separator features an (12mm) base. It can be used in combinations between spacers of different widths and vertical separators in side mounted applications.
- NOTE ON SPACERS**
 Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications. The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm)). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



igus® Energy Chain System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>



Extension links - for extremely wide Energy Chains® up to 9.84 ft (3m)

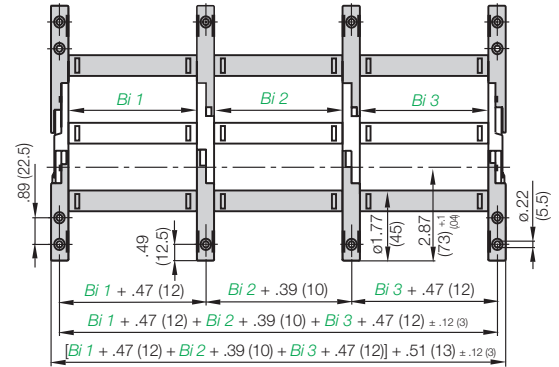
- For applications in which particularly high fill weights necessitate extremely wide Energy Chains®
- The extension link design allows virtually limitless side-by-side attachment of chains
- The unsupported length of a chain can be increased when additional loads are required
- Extension links can be used with Energy Chains®, Energy Tubes or a combination of both
- They are suitable for unsupported and gliding applications in a guide trough
- Energy Chains® with extension links are attached with KMA or steel mounting brackets.

Part number example for Energy Chain®

E4-32-10/20/10-200-0

E4-32-Bi1/Bi2/Bi3-R-0

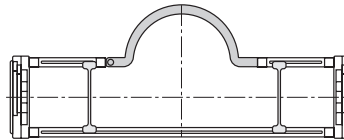
We strongly recommend on-site consultation with an igus® technician for individual advice regarding mounting brackets, guide troughs and other design details.



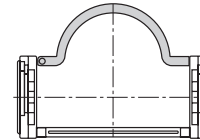
Extender crossbars - For careful guiding of large diameter cables and hoses

- Intended for cables and hoses with a maximum outer diameter of 4.13 in. (105 mm).
- Gliding operation with crossbars assembled along the outer radius in conjunction with a special guide trough
- Gliding operation not guaranteed with crossbars assembled along the inner radius
- The extender crossbar can either be attached to the side links directly or can be used in combination with two standard snap-open crossbars.

Consult igus® for your extender crossbar applications. We will be happy to assist you with your design layout.



Round extender crossbar combined with standard snap-open crossbars.

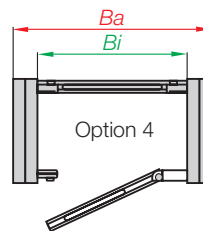
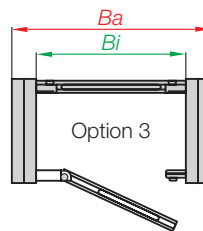
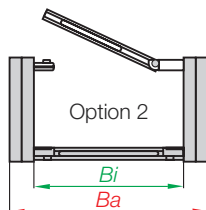
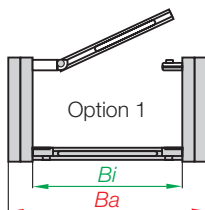


Attached directly to the side link.

Part No.	Max Ø Hose in. (mm)	Style	Installation Side Link	Combined with Snap-Open Crossbars
385-15-RHD115	4.13 (105)	Round	No	Yes
385-18-RD115	4.13 (105)	Round	Yes	No

Hinged crossbars

- Typically, Energy Chain® crossbars are completely removable. In cases where it is preferable that the opening crossbars remain on the Energy Chain®, a hinged design has been developed.
- Please consult igus® for design assistance

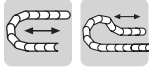


Energy Chain system® E4-31 Series E4-32/H4-32/R4-32 Mounting Brackets - KMA

energy chain® configurator



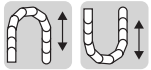
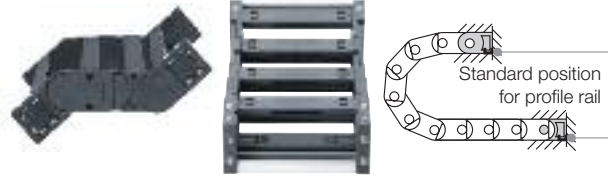
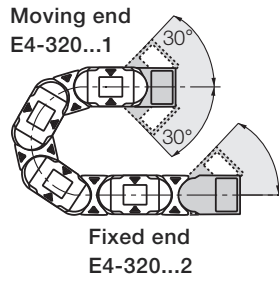
E4-32
H4-32
R4-32



Standard

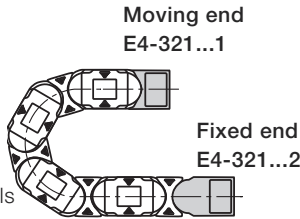
Option 1: pivoting

- Recommended for unsupported and gliding applications
- Attachment capability on all sides
- Bolted connection outside of chain cross-section
- Space restricted conditions
- Corrosion resistant



Option 2: locking

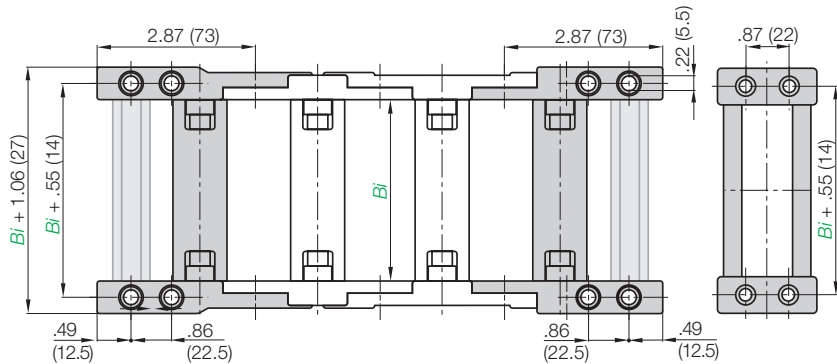
- Profile rail option
- Universal use
- Corrosion resistant
- Vertical hanging/standing travels
- Extreme accelerations



Part Number Structure

E4-320-07-12 P

- With Profile Rail
- Complete Set
- Width
- E4-320 = Pivoting for chain
R4-320 = Pivoting for tube
- E4-321 = Locking for chain
R4-321 = Locking for tube



Due to the design of the E4-32 series chains, please note the following when ordering brackets:
Even number of links = full set, part number ending in -12; Odd number of links = 2 pieces, part number ending in -2

Part number examples are shown for pivoting brackets for Energy Chain.
For locking brackets change part number to 321

Part No. Full Set (pivoting)
Series E4-32 or H4-32
E4-320-Width-12

Part No. Full Set (pivoting)
with profile rail
Series E4-32 or H4-32
E4-320-Width-12P

Part No. Full Set (pivoting)
Tube Series R4-32
R4-320-Width-12

Part No. Full Set (pivoting)
with Profile Rail
Tube Series R4-32
R4-320-Width-12P

Width	Part No. Full Set chain/tube		With Profile Rail	Bi in. (mm)	Width	Part No. Full Set chain/tube		With Profile Rail	Bi in. (mm)		
	Pivoting	Locking				Pivoting	Locking				
-05*	E4-320/R4-320	E4-321/R4-321	-05-12	P	1.97 (50)	-23	E4-320	E4-321	-23-12	P	8.86 (225)
-06	E4-320	E4-321	-06-12	P	2.68 (68)	-237	E4-320	E4-321	-237-12	P	9.33 (237)
-07	E4-320/R4-320	E4-321/R4-321	-07-12	P	2.95 (75)	-25	E4-320/R4-320	E4-321/R4-321	-25-12	P	9.84 (250)
-087	E4-320	E4-321	-087-12	P	3.43 (87)	-262	E4-320	E4-321	-262-12	P	10.31 (262)
-10	E4-320/R4-320	E4-321/R4-321	-10-12	P	3.94 (100)	-28	E4-320	E4-321	-28-12	P	10.83 (275)
-11	E4-320/R4-320	E4-321/R4-321	-11-12	P	4.25 (108)	-29	E4-320	E4-321	-29-12	P	11.30 (287)
-112	E4-320	E4-321	-112-12	P	4.41 (112)	-30	E4-320/R4-320	E4-321/R4-321	-30-12	P	11.81 (300)
-12	E4-320/R4-320	E4-321/R4-321	-12-12	P	4.92 (125)	-312	E4-320	E4-321	-312-12	P	12.28 (312)
-137	E4-320	E4-321	-137-12	P	5.39 (137)	-325	E4-320	E4-321	-325-12	P	12.79 (325)
-15	E4-320/R4-320	E4-321/R4-321	-15-12	P	5.91 (150)	-337	E4-320	E4-321	-337-12	P	13.27 (337)
-162	E4-320	E4-321	-162-12	P	6.38 (162)	-350	E4-320	E4-321	-350-12	P	13.78 (350)
-17	E4-320/R4-320	E4-321/R4-321	-17-12	P	6.61 (168)	-362	E4-320	E4-321	-362-12	P	14.25 (362)
-18	E4-320	E4-321	-18-12	P	6.89 (175)	-375	E4-320	E4-321	-375-12	P	14.76 (375)
-187	E4-320	E4-321	-187-12	P	7.36 (187)	-387	E4-320	E4-321	-387-12	P	15.24 (387)
-20	E4-320/R4-320	E4-321/R4-321	-20-12	P	7.87 (200)	-400	E4-320	E4-321	-400-12	P	15.75 (400)
-212	E4-320	E4-321	-212-12	P	8.35 (212)						

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Chainfix clamps for the profile rail



igus® Chainfix strain relief elements are available in either steel or stainless steel. They can be adjusted with a hexagon socket and are available in single, double and triple configurations.

Part No. Single Clamp		Part No. Double Clamp		Part No. Triple Clamp		Cable ø	
Steel	Stainless	Steel	Stainless	Steel	Stainless	in.	(mm)
CFX12-1M	CFX12-1E	CFX12-2	CFX12-2E	CFX12-3	-	.24 - .47	(06 - 12)
CFX14-1M	CFX14-1E	CFX14-2	CFX14-2E	CFX14-3	-	.47 - .55	(12 - 14)
CFX16-1M	CFX16-1E	CFX16-2	CFX16-2E	CFX16-3	-	.55 - .63	(14 - 16)
CFX18-1M	CFX18-1E	CFX18-2	CFX18-2E	CFX18-3	-	.63 - .71	(16 - 18)
CFX20-1M	CFX20-1E	CFX20-2	CFX20-2E	CFX20-3	-	.71 - .79	(18 - 20)
CFX22-1M	CFX22-1E	CFX22-2	CFX22-2E	CFX22-3	-	.79 - .87	(20 - 22)
CFX26-1M	CFX26-1E	CFX26-2	CFX26-2E	-	-	.87 - 1.02	(22 - 26)
CFX30-1M	CFX30-1E	CFX30-2	CFX30-2E	-	-	1.02 - 1.18	(26 - 30)
CFX34-1M	CFX34-1E	CFX34-2	CFX34-2E	-	-	1.18 - 1.34	(30 - 34)
CFX38-1M	CFX38-1E	-	-	-	-	1.34 - 1.50	(34 - 38)
CFX42-1M	CFX42-1E	-	-	-	-	1.50 - 1.65	(38 - 42)

For more information please refer to strain relief section of Chapter 10

Chainfix Clip

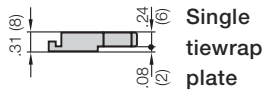
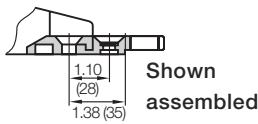


Modular snap-on strain relief device

Chainfix clips are available for cable diameters ranging from .16" (4mm) to .94" (24 mm). They are for assembly on KMA mounting brackets, clip-on strain relief for crossbars as well as profile rails. Quick assembly without the use of tools. For more information please refer to strain relief section of Chapter 10

Cable ø	Part No. Clamp	Part No. Bottom
.16-.31 (04-08)	CFC-08-M	CFC-08-C
.31-.47 (08-12)	CFC-12-M	CFC-12-C
.47-.63 (12-16)	CFC-16-M	CFC-16-C
.63-.79 (16-20)	CFC-20-M	CFC-20-C
.79-.94 (20-24)	CFC-24-M	CFC-24-C

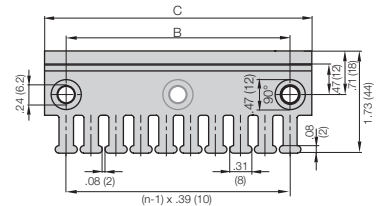
Tiewrap Plates



Option 1:
Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



If used with KMA brackets with profile rail please add "KMA" to the end of the part number.

Example: 3050-ZBKMA

For more information please refer to strain relief section of Chapter 10



Option 2:
Clip-on Tiewrap plates

Available as a clip-on tiewrap plate without the use of bolts They are inserted and removed with a screwdriver used as a lever. Clip-on tiewrap plates are also available as an attachment to the opening crossbars.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
3050-ZC	5	1.97 (50)
3075-ZC	7	2.95 (75)

For more information please refer to strain relief section of Chapter 10

Energy Chain system® E4-1 Series E4-32/H4-32/R4-32 Guide Trough

energy chain® configurator ▶



E4-32
H4-32
R4-32

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part Number 98-30
- 1/2 travel length of glide bars
Part number 92-01
- Installation sets as end connectors
Part Number 93-50-XX

-XX indicates the length of the profile rail on which the guide trough is mounted. The values and part numbers are specified in the table on the left. The standard length of the trough components and glide bars is 6.56 ft (2 m.) The required overall length of the guide trough directly correlates to the length of travel.

Example:

Length of travel 164 ft (50 m)
Center mounted

Required guide troughs:

164 ft (50 m) guide trough
82 ft (25 m) glide bar
= 25 sections of 6.56 ft (2 m) guide trough
Part No. 98-30
= 13 sections of 6.56 ft (2 m) glide bar
Part No. 92-01

Required number of installation sets:

= Number of guide trough components + 1
= 25 + 1 = 26

Part number of the installation sets

93-50-XXX

Example: 93-50-400 for 15.75" (400 mm) long profile rail.



Left: Guide trough with glide bars

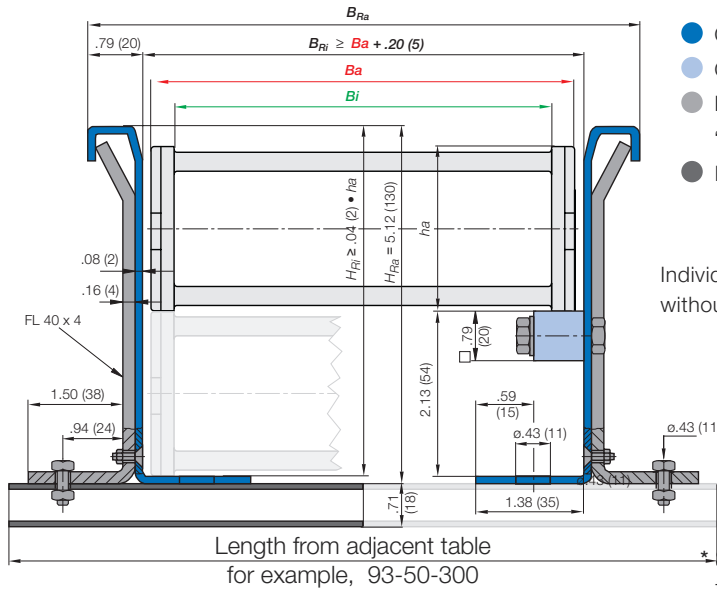
Right: Guide troughs without glide bars



Installation sets as section connectors

Width of Crossbar
E4-32-05-200-0

	B_{Ri}	Installation Part No.
-05	3.15 (78)	93-50-200
-06	3.86 (96)	93-50-225
-07	4.13 (103)	93-50-225
-087	4.61 (115)	93-50-225
-10	5.12 (128)	93-50-250
-11	5.43 (136)	93-50-250
-112	5.59 (141)	93-50-250
-12	6.10 (153)	93-50-275
-137	6.57 (166)	93-50-275
-15	7.09 (178)	93-50-300
-162	7.56 (191)	93-50-300
-17	7.80 (196)	93-50-325
-18	8.07 (203)	93-50-325
-187	8.54 (216)	93-50-325
-20	9.06 (228)	93-50-350
-212	9.53 (241)	93-50-350
-23	10.04 (253)	93-50-375
-237	10.51 (266)	93-50-375
-25	11.02 (278)	93-50-400
-262	11.50 (291)	93-50-400
-28	12.01 (303)	93-50-425
-29	12.48 (316)	93-50-425
-30	12.99 (328)	93-50-450
-312	13.46 (341)	93-50-450
-325	13.98 (353)	93-50-475
-337	14.45 (366)	93-50-475
-350	14.96 (378)	93-50-500
-362	15.43 (391)	93-50-500
-375	15.94 (403)	93-50-525
-387	16.42 (416)	93-50-525
-400	16.93 (428)	93-50-550



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

*Specialized guide trough available upon request

Standard length profile rail

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



E4-42
H4-42
R4-42



Energy Chain system® E4-1

Series E4-42/H4-42/R4-42

Price Index



Series E4-42



Series H4-42



Series R4-42

Special Options Available



Low noise version available with special rubber pads



Cleanroom test upon request



ESD classification:
Electrically conductive
ESD/ATEX version upon request

Assembly Tips



Opening Energy Chains®: Remove crossbars and clips - Insert screwdriver into the slot, push down, release by lever action



Remove lids/bottoms (Energy Tubes) - Insert screwdriver into the slot, release by lever action

Other Installation Methods

Vertical, hanging ≤ 328 ft (100 m)

Vertical, standing ≤ 19.69 ft (6 m)

Side-mounted, unsupp. ≤ 6.56 ft (2 m)

Rotary requires further calculation

Usage Guidelines



- If quiet operation is required
- If very high speeds and/or accelerations are required
- Long travels
- High additional loads



- When an extremely low vibration Energy Chain®/Energy Tube is required
 - Series E6-40/R6-40
- When an economic one-sided snap-open Energy Chain®/Energy Tube is required
 - Series 3400/3450/3480/3500

Features & Benefits

- 1 Wide, rounded plastic crossbars - cable friendly
- 2 Low-noise operation through integrated brake in the radial stop dog system
- 3 Hinged snap-open removable lids along the outer radius of the Energy Tube
- 4 Straight run through inner-/outer-link design
- 5 QuickLock Crossbar, 385-X-Q, available for faster assembly/disassembly
- 6 The tongue and groove design provides greater lateral stability
- 7 New Interior separation kit available
- 8 Crossbars are removable along both radii
- 9 15% more tensile strength (compared to the older E4 series), better unsupported length through improved stop dog system and vertical radial stops
- 10 Version NCST "without camber" simply by turning outer links without unnecessary rework



Also available without camber.
Add NCST to the end of the part number.
Ex: E4-42-20-300NCST

Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

16.4 ft (5 m) E4-42-20-300-0



Energy Chain®

With 2 separators 382 assembled every 2nd link



Interior Separation

1 Set E4-420-20-12P



Mounting Bracket

Energy Chain system® E4-1 Series E4-42/H4-42/R4-42 Installation Dimensions

energy chain® configurator

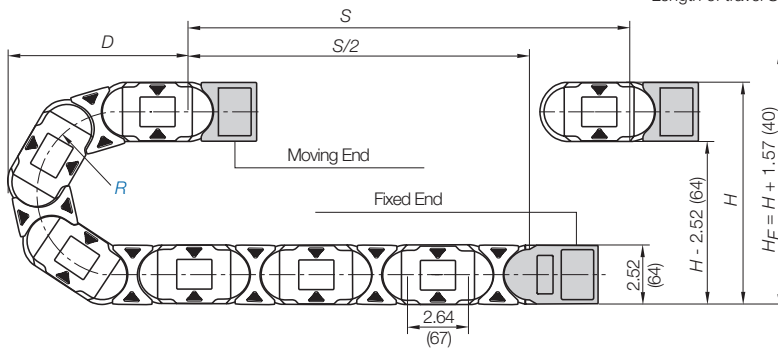
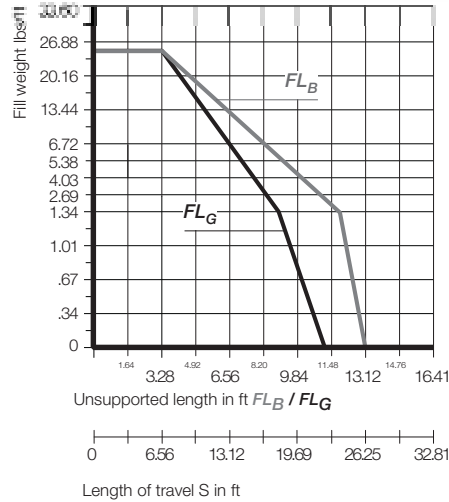
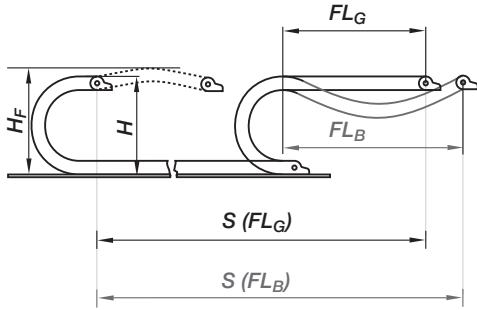


E4-42
H4-42
R4-42

Short travel, unsupported length

- FL_B = unsupported with permitted sag
- FL_G = unsupported with straight upper run

Further information Design, Chapter 1, main catalog



Pitch per link = 2.64" (67 mm)
Links per ft (m) = 4.57 (15)
For center mount applications:
Chain length = $S/2 + K$

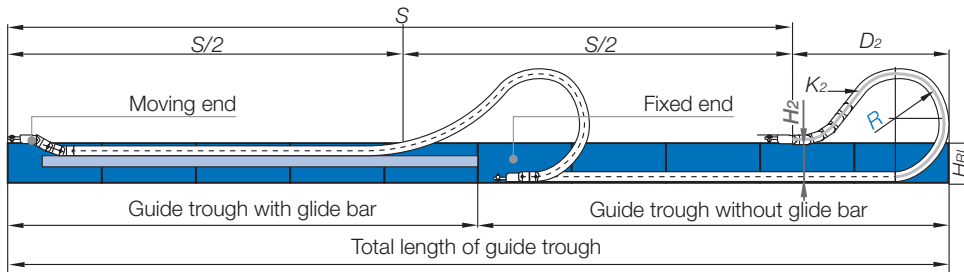
The required clearance height: $H_F = H + 1.57$ in. (40 mm) (with 2.02 lbs/ft (3 kg/m) fill weight).
Please consult igus® if space is particularly restricted.

R	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.69 (175)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)
H	8.43 (214)	10.39 (264)	12.36 (314)	14.33 (364)	16.30 (414)	18.27 (464)	22.20 (564)	26.14 (664)	30.08 (764)
D	6.85 (174)	7.83 (199)	8.82 (224)	9.80 (249)	10.78 (274)	11.77 (299)	13.74 (349)	15.71 (399)	17.68 (449)
K	14.57 (370)	17.72 (450)	20.87 (530)	24.02 (610)	26.97 (685)	30.12 (765)	36.22 (920)	42.52 (1080)	48.62 (1235)

For long travels with lowered mounting height

Long travel lengths from 32.8 ft. (10 m) to max. 984 ft. (300 m)

For center mount applications:
Chain length = $S/2 + K_2$



R	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.69 (175)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)
H_2	-	-	7.32 (186)	7.32 (186)	7.32 (186)	7.32 (186)	7.32 (186)	7.32 (186)	7.32 (186)
D_2	-	-	18.70 (475)	22.44 (570)	26.38 (670)	30.71 (780)	40.55 (1030)	45.28 (1150)	59.06 (1500)
K_2	-	-	31.65 (804)	36.93 (938)	44.84 (1139)	52.76 (1340)	65.94 (1675)	76.50 (1943)	94.96 (2412)

For support of the lower run, see Chapter 9 for the Support Tray tool kit

Short Travels - Unsupported

Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to Installation dimensions for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{safety buffer}$
 - H_F = Required clearance height
 - H_{R1} = Trough inner height
 - H_2 = *Mounting height
 - D_2 = Overlength - long travels, gliding
 - K_2 = *Add-on
- *If the mounting bracket location is set lower



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.

Design, Chapter 1, main catalog

Technical Data

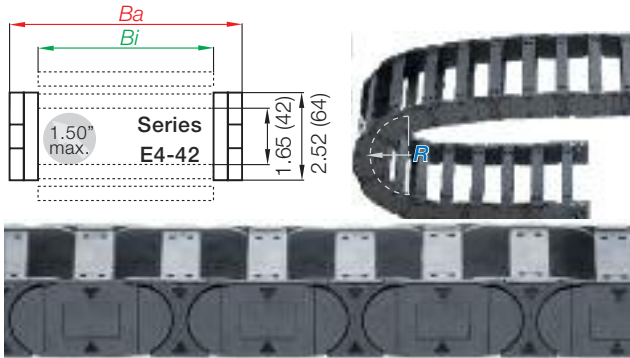


Details of material properties

Chapter 1

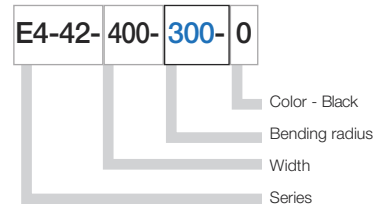
Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

Series E4-42 - Energy Chain® with crossbars every link

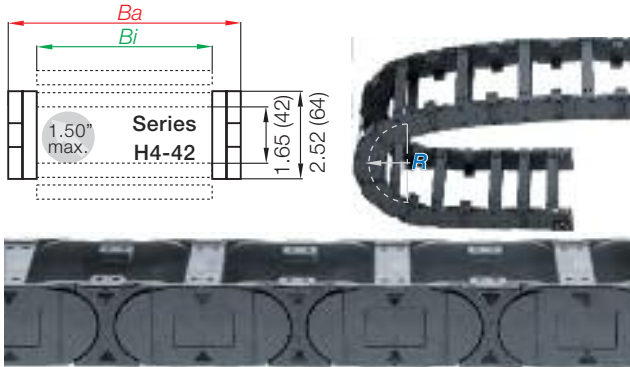


- Crossbars every link
- For use with rigid hydraulic hoses
- For particularly demanding applications
- Can be opened from both sides

Part Number Structure

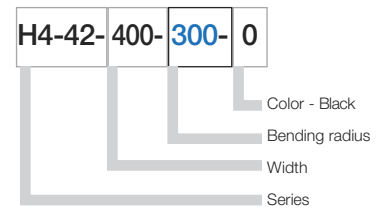


Series H4-42 - Energy Chain® with crossbars every other link

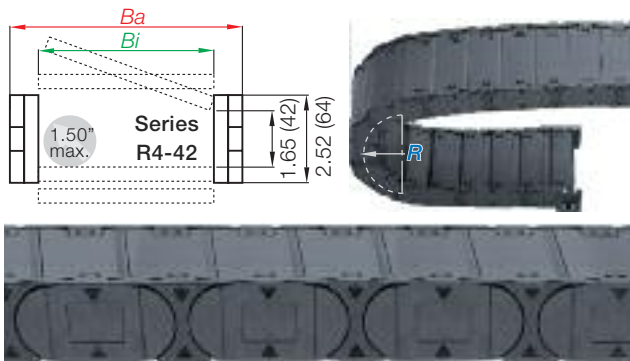


- Crossbars every other link
- Standard configuration
- For nearly every situation
- Can be opened from both sides
- Easy assembly
- Stable
- Cost-effective

Part Number Structure

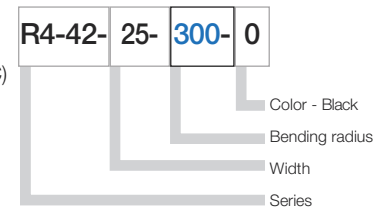


Series R4-42 - fully enclosed Energy Tube

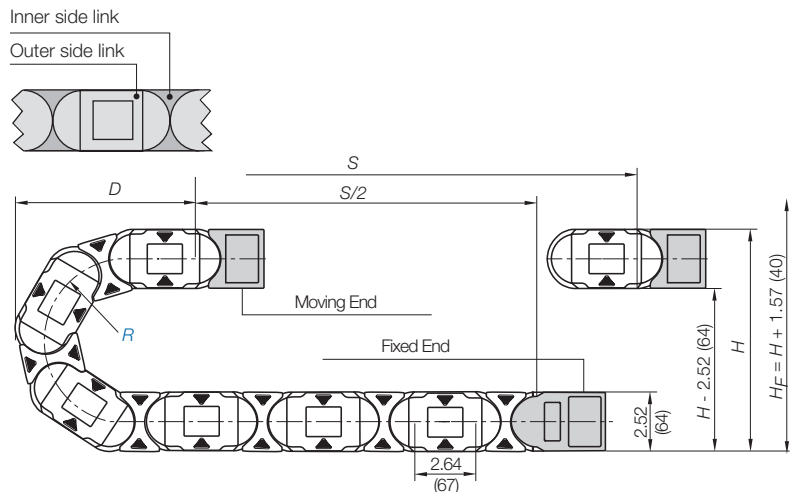
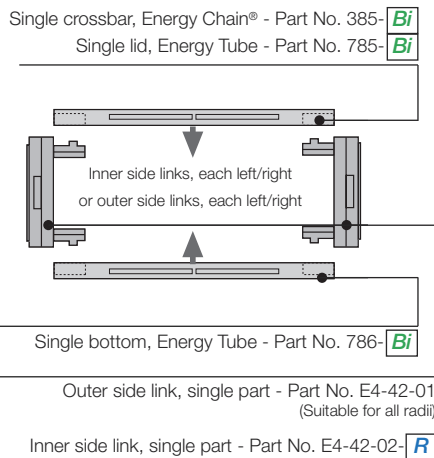


- Fully enclosed
- Excellent cable and hose protection against dirt
- Protection against hot chips up to 1652°F (900°C)
- Lids along inner radius are completely removable
- Lids along the outer radius are single-sided, snap open, hinged on one side as well as completely removable

Part Number Structure



Energy Chain® as separate parts, links and side plates



Energy Chain system® E4-1

Series E4-42/H4-42/R4-42

Product Range

energy chain® configurator 



E4-42
H4-42
R4-42

Supplement part number with required radius. Example: E4-42-400--0
Pitch: 2.64 in. (67mm) per link, links/ft(m) = 4.57 (15)

Part Number			Weight					
Crossbars Every link	Crossbars Every other	Tube Version	<i>Bi</i> in. (mm)	<i>Ba</i> in. (mm)	E4-42 lbs/ft (kg/m)	H4-42 lbs/ft (kg/m)	R4-42 lbs/ft (kg/m)	
E4-42-05-	H4-42-05	*R4-42-05- <input type="text" value="300"/> -0	1.97 (50)	2.99 (76)	≈ 1.29 (1.92)	≈ 1.21 (1.80)	≈ 1.44 (2.15)	
E4-42-06-	H4-42-06-	<input type="text" value="300"/> -0	2.68 (68)	3.70 (94)	≈ 1.36 (2.03)	≈ 1.25 (1.86)	-	
E4-42-07-	H4-42-07	R4-42-07- <input type="text" value="300"/> -0	2.95 (75)	3.98 (101)	≈ 1.38 (2.06)	≈ 1.26 (1.87)	≈ 1.53 (2.28)	
E4-42-087-	H4-42-087-	<input type="text" value="300"/> -0	3.43 (87)	4.49 (114)	≈ 1.42 (2.12)	≈ 1.28 (1.90)	≈ 1.62 (2.41)	
E4-42-10-	H4-42-10-	R4-42-10- <input type="text" value="300"/> -0	3.94 (100)	4.96 (126)	≈ 1.47 (2.19)	≈ 1.32 (1.96)	≈ 1.69 (2.52)	
E4-42-11-	H4-42-11-	R4-42-11- <input type="text" value="300"/> -0	4.25 (108)	5.28 (134)	≈ 1.50 (2.24)	≈ 1.32 (1.97)	≈ 1.73 (2.57)	
E4-42-112-	H4-42-112-	<input type="text" value="300"/> -0	4.41(112)	5.47 (139)	≈ 1.51 (2.25)	≈ 1.32 (1.97)	-	
E4-42-12-	H4-42-12-	R4-42-12- <input type="text" value="300"/> -0	4.92 (125)	5.94 (151)	≈ 1.57 (2.34)	≈ 1.35 (2.01)	≈ 1.83 (2.73)	
E4-42-137-	H4-42-137-	<input type="text" value="300"/> -0	5.39 (137)	6.46 (164)	≈ 1.61 (2.39)	≈ 1.37 (2.04)	-	
E4-42-15-	H4-42-15-	R4-42-15- <input type="text" value="300"/> -0	5.91 (150)	6.93 (176)	≈ 1.65 (2.46)	≈ 1.39 (2.07)	≈ 2.00 (2.98)	
E4-42-162-	H4-42-162-	<input type="text" value="300"/> -0	6.38 (162)	7.44 (189)	≈ 1.67 (2.48)	≈ 1.40 (2.09)	-	
E4-42-17-	H4-42-17-	R4-42-17- <input type="text" value="300"/> -0	6.61 (168)	7.64 (194)	≈ 1.71 (2.55)	≈ 1.42 (2.12)	≈ 2.12 (3.15)	
E4-42-18-	H4-42-18-	<input type="text" value="300"/> -0	6.89 (175)	7.91 (201)	≈ 1.73 (2.57)	≈ 1.43 (2.13)	-	
E4-42-187-	H4-42-187-	<input type="text" value="300"/> -0	7.36 (187)	8.43 (214)	≈ 1.75 (2.61)	≈ 1.44 (2.15)	-	
E4-42-20-	H4-42-20-	R4-42-20- <input type="text" value="300"/> -0	7.87 (200)	8.90 (226)	≈ 1.83 (2.72)	≈ 1.48 (2.20)	≈ 2.32 (3.45)	
E4-42-212-	H4-42-212-	<input type="text" value="300"/> -0	8.35 (212)	9.41 (239)	≈ 1.85 (2.76)	≈ 1.49 (2.22)	-	
E4-42-23-	H4-42-23-	<input type="text" value="300"/> -0	8.86 (225)	9.88 (251)	≈ 1.90 (2.84)	≈ 1.52 (2.26)	-	
E4-42-237-	H4-42-237-	<input type="text" value="300"/> -0	9.33 (237)	10.39 (264)	≈ 1.93 (2.87)	≈ 1.53 (2.28)	-	
E4-42-25-	H4-42-25-	R4-42-25- <input type="text" value="300"/> -0	9.84 (250)	10.87 (276)	≈ 2.00 (2.98)	≈ 1.57 (2.33)	≈ 2.86 (4.25)	
E4-42-262-	H4-42-262-	<input type="text" value="300"/> -0	10.31 (262)	11.38 (289)	≈ 2.05 (3.05)	≈ 1.59 (2.37)	-	
E4-42-28	H4-42-28-	<input type="text" value="300"/> -0	10.83 (275)	11.85 (301)	≈ 2.09 (3.11)	≈ 1.61 (2.40)	-	
E4-42-29-	H4-42-29-	<input type="text" value="300"/> -0	11.30 (287)	12.36 (314)	≈ 2.11 (3.14)	≈ 1.62 (2.41)	-	
E4-42-30-	H4-42-30-	R4-42-30- <input type="text" value="300"/> -0	11.81 (300)	12.83 (326)	≈ 2.18 (3.24)	≈ 1.65 (2.46)	≈ 3.29 (4.89)	
E4-42-312-	H4-42-312-	<input type="text" value="300"/> -0	12.28 (312)	13.35 (339)	≈ 2.19 (3.26)	≈ 1.66 (2.47)	-	
E4-42-325-	H4-42-325-	<input type="text" value="300"/> -0	12.79 (325)	13.82 (351)	≈ 2.24 (3.34)	≈ 1.69 (2.52)	-	
E4-42-337-	H4-42-337-	<input type="text" value="300"/> -0	13.27 (337)	14.33 (364)	≈ 2.28 (3.40)	≈ 1.71 (2.54)	-	
E4-42-350-	H4-42-350-	<input type="text" value="300"/> -0	13.78 (350)	14.80 (376)	≈ 2.41 (3.59)	≈ 1.77 (2.64)	-	
E4-42-362-	H4-42-362-	<input type="text" value="300"/> -0	14.25 (362)	15.31 (389)	≈ 2.47 (3.67)	≈ 1.80 (2.68)	-	
E4-42-375-	H4-42-375-	<input type="text" value="300"/> -0	14.76 (375)	15.83 (402)	≈ 2.51 (3.73)	≈ 1.82 (2.71)	-	
E4-42-387-	H4-42-387-	<input type="text" value="300"/> -0	15.24 (387)	16.30 (414)	≈ 2.55 (3.79)	≈ 1.84 (2.74)	-	
E4-42-400	H4-42-400-	<input type="text" value="300"/> -0	15.75 (400)	16.77 (426)	≈ 2.58 (3.84)	≈ 1.85 (2.76)	-	

Choose from the radii below for all of the above sizes

Radius (mm) Example: E4-42-400--0

	075**	100**	125	150	175	200	250	300	350
R	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)
H $\frac{0}{20}$	8.43 (214)	10.39 (264)	12.36 (314)	14.33 (364)	16.30 (414)	18.27 (464)	22.20 (564)	26.14 (664)	30.08 (764)
D	6.85 (174)	7.83 (199)	8.82 (224)	9.80 (249)	10.78 (274)	11.77 (299)	13.74 (349)	15.71 (399)	17.68 (449)
K	14.57 (370)	17.72 (450)	20.87 (530)	24.02 (610)	26.97 (685)	30.12 (765)	36.22 (920)	42.52 (1080)	48.62 (1235)

** This radius is not available for the R4-42 Series

*Removable lid only, no hinged option

0 = Standard color black.

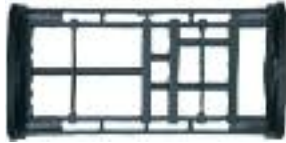
For other colors see Chapter 1, main catalog

For wider chains see page 44.

For large diameter hoses see page 44

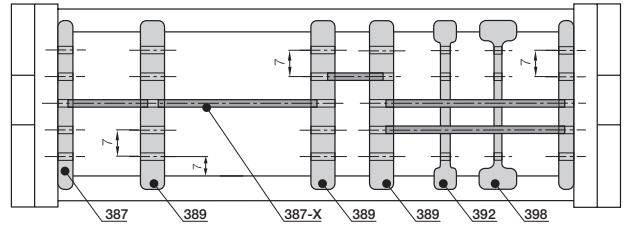
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



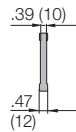


Shelves and Separators

Energy Chains® and Energy Tubes can be subdivided both vertically and horizontally using the various interior separation elements. ► **Design, Chapter 1, main catalog** for layout recommendations.

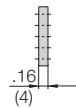


- Split separator T423 for Energy Chains®**
This separator is ideal for subsequent shelving or the initial assembly of the Energy Chain. Fast assembly and disassembly using a hinge/push mechanism. Enhances flexibility
- Side plates 386**
This component is used to form the basic pattern of a shelf system.
- Vertical separator 388**
This component is used to form the basic pattern of a shelf system.
- Closed Slotted separators 391**
These are used for complex subdivisions. However, they cannot be retrofitted into an existing interior separation system without removing the shelves first.
- Open slotted separator 397**
This separator can be retrofitted into an existing interior separation system without removing the shelves, as long as these shelves fit into the middle 3 slots only.



Split separator (chain only)
Unassembled **Part No. T423**
Assembled **Part No. T423M**

Split separator T423, to be split for shelf 386-X



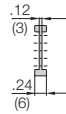
Side Plate
Unassembled **Part No. 386**
Assembled **Part No. 387**

Side plate 386



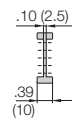
Vertical Separator
Unassembled **Part No. 388**
Assembled **Part No. 389**

Vertical separator 388



Slotted Separators
Unassembled **Part No. 391**
Assembled **Part No. 392**

Closed slotted separator 391



Slotted Separators, Open
Unassembled **Part No. 397**
Assembled **Part No. 398**

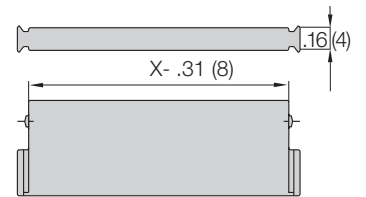
Open slotted separator 397



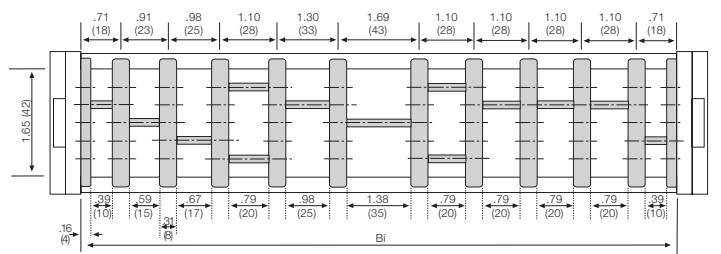
Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled
.71 (18)	.39 (10)	386-18	387-18
.91 (23)	.59 (15)	386-23	387-23
.98 (25)	.67 (17)	386-25	387-25
1.10 (28)	.79 (20)	386-28	387-28
1.30 (33)	.98 (25)	386-33	387-33
1.69 (43)	1.38 (35)	386-43	387-43
1.97 (50)	1.65 (42)	386-50	387-50
2.13 (54)	1.81 (46)	386-54	387-54
2.44 (62)	2.13 (54)	386-62	387-62
2.95 (75)	2.64 (67)	386-75	387-75
3.43 (87)	3.12 (87)	386-87	387-87
3.94 (100)	3.62 (92)	386-100	387-100
4.25 (108)	3.94 (100)	386-108	387-108
4.92 (125)	4.61 (117)	386-125	387-125
5.91 (150)	5.59 (142)	386-150	387-150
6.89 (175)	6.57 (167)	386-175	387-175
7.87 (200)	7.56 (192)	386-200	387-200
8.19 (208)	7.87 (200)	386-208	387-208

Shelves 386-XX

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 5 different heights in .28" (7mm) increments



The diagram below is for reference purposes only. Multiple configurations are possible. To create your e-chain shelving cross section please see our online e-chain configurator. Call 1-800-521-2747 for assistance and/or go to igus.com click on the **Products** drop down menu, choose **Energy Chain Cable Carriers** and on the next drop down menu simply click on **e-chain Configurator**.



Energy Chain system® E4-1

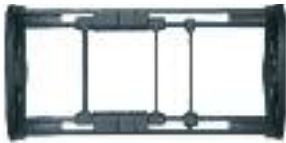
Series E4-42/H4-42/R4-42

Interior Separation

energy chain® configurator 



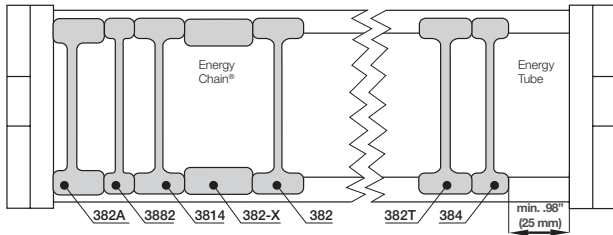
E4-42
H4-42
R4-42



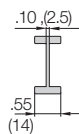
Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.

NOTE: Observe a lateral spacing of at least .98 in. (25mm) for Energy Tubes



Vertical separator
380



Separator (chain/tube)

Unassembled **Part No. 380**

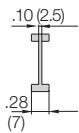
Assembled **Part No. 381**

- **Standard separator 380 for Energy Chains® and Energy Tubes**

This separator offers safe stability due to its wide base design, also when used with thick cables or hoses.



Vertical separator
3881



Separator (chain only)

Unassembled **Part No. 3881**

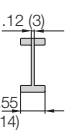
Assembled **Part No. 3882**

- **Vertical separator 3881 for Energy Chains®**

This separator features a narrow 7mm base for applications where a large number of small cables need to be individually separated.



Vertical separator
380T



Vertical Separator (tubes only)

Unassembled **Part No. 380T**

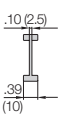
Assembled **Part No. 381T**

- **Locking separator 380T for Energy Tubes**

It clamps to the fixed radius and remains free along the other radius to facilitate lid removal. When installing please ensure they are identically aligned.



Vertical separator
383



Separator (chain only)

Unassembled **Part No. 383**

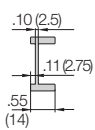
Assembled **Part No. 384**

- **Vertical separator 383 for Energy Chains®**

This separator features an increased retention force for applications exposed to very high humidity or extreme loads. It features asymmetric claws for the crossbar which results in the increased retention force.



Asymmetric separator
381A



Asymmetric separator (chain only)

Unassembled **Part No. 381A**

Assembled **Part No. 382A**

- **Asymmetrical separator 381A for Energy Chains®**

This separator features an (14mm) base. It can be used in combinations between spacers of different widths and vertical separators in side mounted applications.



Spacers
381-XX



Spacer (chain only)

Unassembled **Part No. 381-XX**

Assembled **Part No. 382-XX**

XX = width of the spacer

- **NOTE ON SPACERS**

Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications.

The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm)). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

Spacers available in the following sizes:

Part No. Unassembled	Part No. Assembled	in.	(mm)
381 -10	382 -10	.39"	(10)
381 -15	382 -15	.59"	(15)
381 -20	382 -20	.79"	(20)

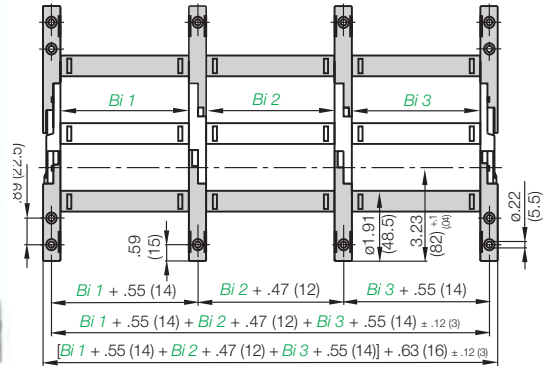
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS





Extension links - for extremely wide Energy Chains® up to 9.84 ft (3m)

- For applications in which particularly high fill weights necessitate extremely wide Energy Chains®
- The extension link design allows virtually limitless side-by-side attachment of chains
- The unsupported length of a chain can be increased when additional loads are required
- Extension links can be used with Energy Chains®, Energy Tubes or a combination of both
- They are suitable for unsupported and gliding applications in a guide trough
- Energy Chains® with extension links are attached with KMA or steel mounting brackets.



Part number example for Energy Chain®

E4-42-10/20/10--0

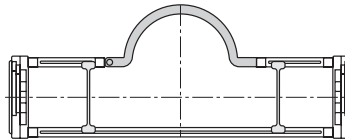
E4-42---0

We **strongly** recommend on-site consultation with an igus® technician for individual advice regarding mounting brackets, guide troughs and other design details.

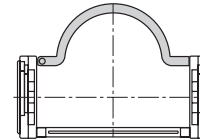


Extender crossbars - For careful guiding of large diameter cables and hoses

- Intended for cables and hoses with a maximum outer diameter of 4.53 in. (115 mm).
- Gliding operation with crossbars assembled along the outer radius in conjunction with a special guide trough
- Gliding operation not guaranteed with crossbars assembled along the inner radius
- The extender crossbar can either be attached to the side links directly or can be used in combination with two standard snap-open crossbars.



Round extender crossbar combined with standard snap-open crossbars.



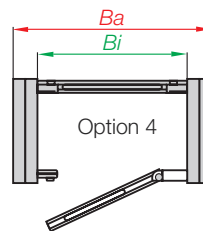
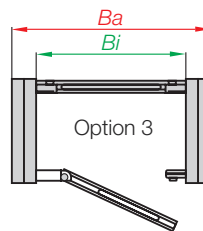
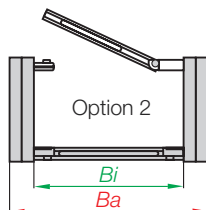
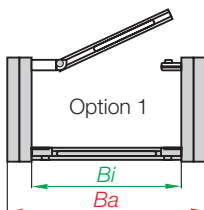
Attached directly to the side link.

Consult igus® for your extender crossbar applications. We will be happy to assist you with your design layout.

Part No.	Max Ø Hose in. (mm)	Style	Installation Side Link	Combined with Snap-Open Crossbars
385-15-RHD115	4.53 (115)	Round	No	Yes
385-18-RD115	4.53 (115)	Round	Yes	No

Hinged crossbars

- Typically, Energy Chain® crossbars are completely removable. In cases where it is preferable that the opening crossbars remain on the Energy Chain®, a hinged design has been developed.
- Please consult igus® for design assistance



Energy Chain system® E4-1

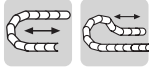
Series E4-42/H4-42/R4-42

Mounting Brackets

energy chain® configurator ▶



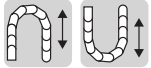
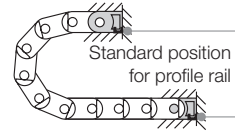
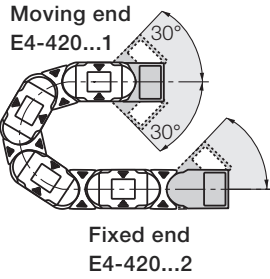
E4-42
H4-42
R4-42



Standard

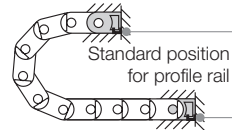
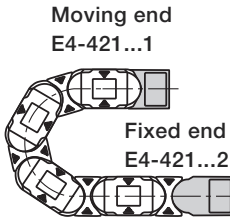
Option 1: pivoting

- Recommended for unsupported and gliding applications
- Attachment capability on all sides
- Bolted connection outside of chain cross-section
- Space restricted conditions
- Corrosion resistant



Option 2: locking

- Profile rail option
- Universal use
- Corrosion resistant
- Vertical hanging/standing travels
- Extreme accelerations



Part Number Structure

E4-420-07-12 P

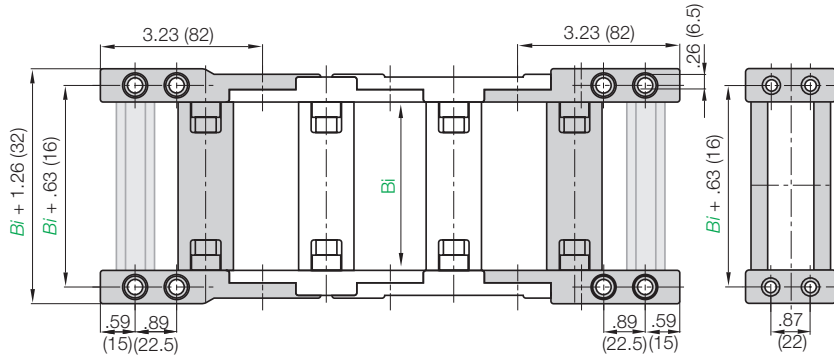
With Profile Rail

Complete Set

Width

E4-420 = Pivoting for chain
R4-420 = Pivoting for tube

E4-421 = Locking for chain
R4-421 = Locking for tube



Due to the design of the E4-42 series chains, please note the following when ordering brackets:

Even number of links = full set, part number ending in -12; Odd number of links = 2 pieces, part number ending in -2

Part number examples are shown for pivoting brackets for Energy Chain.

For locking brackets change part number to 421

Part No. Full Set (pivoting)

Series E4-42 or H4-42

E4-420-Width-12

Part No. Full Set (pivoting)

with profile rail

Series E4-42 or H4-42

E4-420-Width-12P

Part No. Full Set (pivoting)

Tube Series R4-42

R4-420-Width-12

Part No. Full Set (pivoting)

with Profile Rail

Tube Series R4-42

R4-420-Width-12P

Width	Part No. Full Set chain/tube		With Profile Rail	Bi in. (mm)	Width	Part No. Full Set chain/tube		With Profile Rail	Bi in. (mm)		
	Pivoting	Locking				Pivoting	Locking				
-05*	E4-420/R4-420	E4-421/R4-421	-05-12	P	1.97 (50)	-23	E4-420	E4-421	-23-12	P	8.86 (225)
-06	E4-420	E4-421	-06-12	P	2.68 (68)	-237	E4-420	E4-421	-237-12	P	9.33 (237)
-07	E4-420/R4-420	E4-421/R4-421	-07-12	P	2.95 (75)	-25	E4-420/R4-420	E4-421/R4-421	-25-12	P	9.84 (250)
-087	E4-420	E4-421	-087-12	P	3.43 (87)	-262	E4-420	E4-421	-262-12	P	10.31 (262)
-10	E4-420/R4-420	E4-421/R4-421	-10-12	P	3.94 (100)	-28	E4-420	E4-421	-28-12	P	10.83 (275)
-11	E4-420/R4-420	E4-421/R4-421	-11-12	P	4.25 (108)	-29	E4-420	E4-421	-29-12	P	11.30 (287)
-112	E4-420	E4-421	-112-12	P	4.41 (112)	-30	E4-420/R4-420	E4-421/R4-421	-30-12	P	11.81 (300)
-12	E4-420/R4-420	E4-421/R4-421	-12-12	P	4.92 (125)	-312	E4-420	E4-421	-312-12	P	12.28 (312)
-137	E4-420	E4-421	-137-12	P	5.39 (137)	-325	E4-420	E4-421	-325-12	P	12.79 (325)
-15	E4-420/R4-420	E4-421/R4-421	-15-12	P	5.91 (150)	-337	E4-420	E4-421	-337-12	P	13.27 (337)
-162	E4-420	E4-421	-162-12	P	6.38 (162)	-350	E4-420	E4-421	-350-12	P	13.78 (350)
-17	E4-420/R4-420	E4-421/R4-421	-17-12	P	6.61 (168)	-362	E4-420	E4-421	-362-12	P	14.25 (362)
-18	E4-420	E4-421	-18-12	P	6.89 (175)	-375	E4-420	E4-421	-375-12	P	14.76 (375)
-187	E4-420	E4-421	-187-12	P	7.36 (187)	-387	E4-420	E4-421	-387-12	P	15.24 (387)
-20	E4-420/R4-420	E4-421/R4-421	-20-12	P	7.87 (200)	-400	E4-420	E4-421	-400-12	P	15.75 (400)
-212	E4-420	E4-421	-212-12	P	8.35 (212)						

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Chainfix clamps for the profile rail



igus® Chainfix strain relief elements are available in either steel or stainless steel. They can be adjusted with a hexagon socket and are available in single, double and triple configurations.

Part No. Single Clamp		Part No. Double Clamp		Part No. Triple Clamp		Cable ø	
Steel	Stainless	Steel	Stainless	Steel	Stainless	in.	(mm)
CFX12-1M	CFX12-1E	CFX12-2	CFX12-2E	CFX12-3	-	.24 - .47	(06 - 12)
CFX14-1M	CFX14-1E	CFX14-2	CFX14-2E	CFX14-3	-	.47 - .55	(12 - 14)
CFX16-1M	CFX16-1E	CFX16-2	CFX16-2E	CFX16-3	-	.55 - .63	(14 - 16)
CFX18-1M	CFX18-1E	CFX18-2	CFX18-2E	CFX18-3	-	.63 - .71	(16 - 18)
CFX20-1M	CFX20-1E	CFX20-2	CFX20-2E	CFX20-3	-	.71 - .79	(18 - 20)
CFX22-1M	CFX22-1E	CFX22-2	CFX22-2E	CFX22-3	-	.79 - .87	(20 - 22)
CFX26-1M	CFX26-1E	CFX26-2	CFX26-2E	-	-	.87 - 1.02	(22 - 26)
CFX30-1M	CFX30-1E	CFX30-2	CFX30-2E	-	-	1.02 - 1.18	(26 - 30)
CFX34-1M	CFX34-1E	CFX34-2	CFX34-2E	-	-	1.18 - 1.34	(30 - 34)
CFX38-1M	CFX38-1E	-	-	-	-	1.34 - 1.50	(34 - 38)
CFX42-1M	CFX42-1E	-	-	-	-	1.50 - 1.65	(38 - 42)

For more information please refer to strain relief section of Chapter 10 in main catalog.

Chainfix Clip

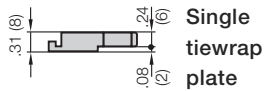
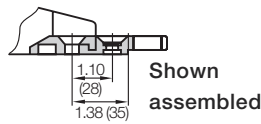


Modular snap-on strain relief device

Chainfix clips are available for cable diameters ranging from .16" (4mm) to .94" (24 mm). They are for assembly on KMA mounting brackets, clip-on strain relief for cross-bars as well as profile rails. Quick assembly without the use of tools. **For more information please refer to strain relief section of Chapter 10 in main catalog.**

Cable ø	Part No. Clamp	Part No. Bottom
.16-.31 (04-08)	CFC-08-M	CFC-08-C
.31-.47 (08-12)	CFC-12-M	CFC-12-C
.47-.63 (12-16)	CFC-16-M	CFC-16-C
.63-.79 (16-20)	CFC-20-M	CFC-20-C
.79-.94 (20-24)	CFC-24-M	CFC-24-C

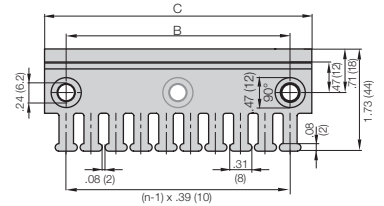
Tiewrap Plates



Option 1:
Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



If used with KMA brackets with profile rail please add "KMA" to the end of the part number.

Example: 3050-ZBKMA

For more information please refer to strain relief section of Chapter 10 in main catalog.

Option 2:
Clip-on Tiewrap plates

Available as a clip-on tiewrap plate without the use of bolts They are inserted and removed with a screwdriver used as a lever. Clip-on tiewrap plates are also available as an attachment to the opening crossbars.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
3050-ZC	5	1.97 (50)
3075-ZC	7	2.95 (75)

For more information please refer to strain relief section of Chapter 10 in main catalog.



Energy Chain system® E4-1

Series E4-42/H4-42/R4-42

Guide Trough

energy chain® configurator ▶



E4-42
H4-42
R4-42

Width of Crossbar
E4-42-05-200-0

	B_{Ri}	Installation Part No.
-05	3.19 (81)	93-50-200
-06	3.90 (99)	93-50-225
-07	4.17 (106)	93-50-225
-087	4.69 (119)	93-50-250
-10	5.16 (131)	93-50-250
-11	5.47 (139)	93-50-250
-112	5.67 (144)	93-50-275
-12	6.14 (156)	93-50-275
-137	6.65 (169)	93-50-300
-15	7.12 (181)	93-50-300
-162	7.64 (194)	93-50-325
-17	7.83 (199)	93-50-325
-18	8.11 (206)	93-50-325
-187	8.62 (219)	93-50-350
-20	9.09 (231)	93-50-350
-212	9.61 (244)	93-50-375
-23	10.08 (256)	93-50-375
-237	10.59 (269)	93-50-400
-25	11.06 (281)	93-50-400
-262	11.57 (294)	93-50-425
-28	12.05 (306)	93-50-425
-29	12.56 (319)	93-50-450
-30	13.03 (331)	93-50-450
-312	13.54 (344)	93-50-475
-325	14.01 (356)	93-50-475
-337	14.52 (369)	93-50-500
-350	15.00 (381)	93-50-500
-362	15.51 (394)	93-50-525
-375	16.02 (407)	93-50-525
-387	16.50 (419)	93-50-550
-400	16.97 (431)	93-50-550

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part No. 93-30
- 1/2 travel length of glide bars
Part No. 93-01
- Installation sets as end connectors
Part No. 93-50-XX

-XX indicates the length of the profile rail on which the guide trough is mounted. The values and part numbers are specified in the table below. The standard length of the trough components and glide bars is 6.56 ft (2 m). The required overall length of the guide trough directly correlates to the length of travel

Example:

Length of travel 164 ft (50 m)
Center mounted

Required guide troughs:

164 ft (50 m) guide trough,
82 ft (25 m) glide bar
= 25 sections of 6.56 ft (2 m) guide trough

Part No. 93-30

= 13 sections of 6.56 ft (2 m) glide bar

Part No. 93-01

Required number of installation sets:

= Number of guide trough components + 1
= 25 + 1 = 26

Part No. of the installation sets **93-50-XXX**

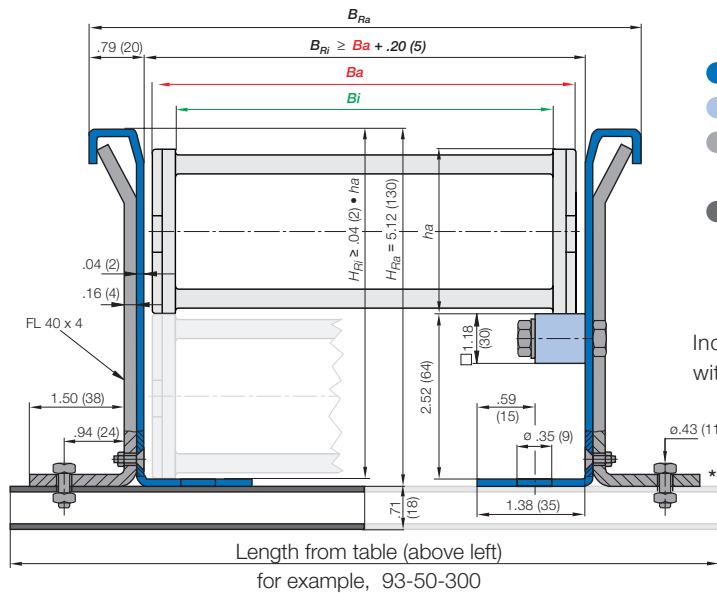
Example: 93-50-400 for 15.75 (400 mm) long profile rail



Left: Guide trough with glide bars
Right: Guide troughs without glide bars



Installation sets as section connectors



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

* Specialized guide trough available upon request

Standard length profile rail

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



E4-56
H4-56
R4-56



Energy Chain system® E4-1 Series E4-56/H4-56/R4-56

energy chain® configurator

Price Index



Series E4-56



Series H4-56



Series R4-56

Special Options Available



Low noise version available with special rubber pads



Cleanroom test upon request



ESD classification: Electrically conductive ESD/ATEX version upon request

Assembly Tips



Opening Energy Chains®: Remove crossbars and clips - Insert screwdriver into the slot, push down, release by lever action



Remove lids/bottoms (Energy Tubes) - Insert screwdriver into the slot, release by lever action

Other Installation Methods

Vertical, hanging ≤ 328 ft (100 m)

Vertical, standing ≤ 19.69 ft (6 m)

Side-mounted, unsupp. ≤ 8.20 ft (2.5 m)

Rotary requires further calculation

Usage Guidelines



- If quiet operation is required
- If very high speeds and/or accelerations are required
- Long travels
- High additional loads



- When an extremely low vibration Energy Chain®/Energy Tube is required
 - Series E6-52
- When an economic one-sided snap-open Energy Chain®/Energy Tube is required
 - Series 14040/14140/R18840

Features & Benefits

- 1 Wide, rounded plastic crossbars - cable friendly
- 2 Low-noise operation through integrated brake in the radial stop dog system
- 3 Hinged snap-open removable lids along the outer radius of the Energy Tube
- 4 Straight run through inner-/outer-link design
- 5 The tongue and groove design provides greater lateral stability
- 6 QuickLock Crossbar, 450-X-Q, available for faster assembly/disassembly
- 7 New Interior separation kit available
- 8 Crossbars are removable along both radii
- 9 15% more tensile strength (compared to the older E4 series), better unsupported length through improved stop dog system and vertical radial stops
- 10 Version NCST "without camber" simply by turning outer links without unnecessary rework



Also available without camber. Add NCST to the end of the part number.
Ex: E4-56-30-300NCST

Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

9.84 ft (3 m) E4-56-30-300-0



Energy Chain®

With 2 separators 411 assembled every 2nd link



Interior Separation

1 Set E4-560-30-12P



Mounting Bracket

Energy Chain system® E4-1 Series E4-56/H4-56/R4-56 Installation Dimensions

energy chain® configurator

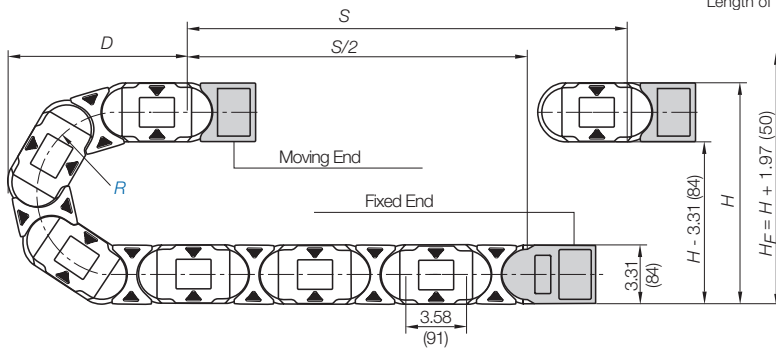
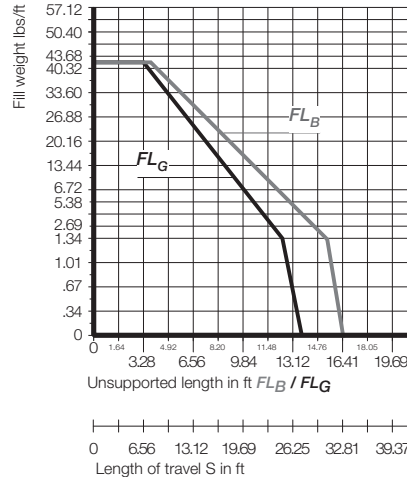
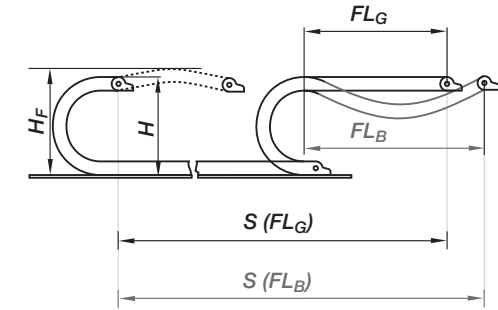


E4-56
H4-56
R4-56

Short travel, unsupported length

- FL_B = unsupported with permitted sag
- FL_G = unsupported with straight upper run

Further information ► Design, Chapter 1, main catalog



Pitch per link = 3.58" (91 mm)
Links per ft (m) = 3.35 (11)
For center mount applications:
Chain length = $S/2 + K$

The required clearance height: $H_F = H + 1.96$ in. (50 mm) (with 2.02 lbs/ft (3 kg/m) fill weight. Please consult igus® if space is particularly restricted.

R	5.31 (135)	5.91 (150)	6.89 (175)	7.87 (200)	9.45 (240)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	19.68 (500)
H_{I+25}	13.94 (354)	15.12 (384)	17.09 (434)	19.06 (484)	22.20 (564)	22.99 (584)	26.93 (684)	30.87 (784)	34.80 (884)	38.74 (984)	42.68 (1084)
D	10.55 (268)	11.14 (283)	12.13 (308)	13.11 (333)	14.69 (373)	15.08 (383)	17.05 (433)	19.02 (483)	20.98 (533)	22.95 (583)	24.92 (633)
K	24.02 (610)	25.79 (655)	28.94 (735)	32.09 (815)	37.01 (940)	38.19 (970)	44.29 (1125)	50.59 (1285)	56.69 (1440)	62.99 (1600)	69.09 (1755)

Short Travels - Unsupported

Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

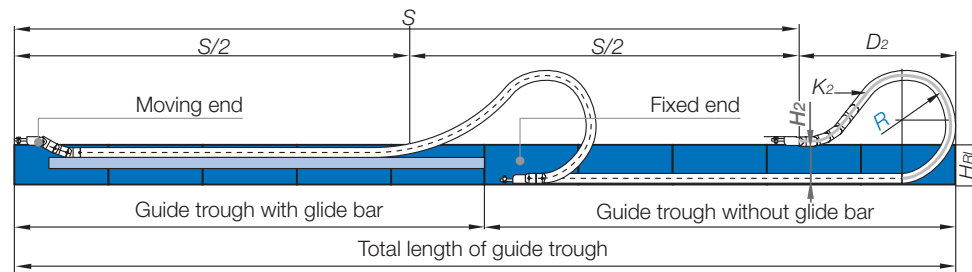
- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{safety buffer}$
 - H_F = Required clearance height
 - H_{I1} = Trough inner height
 - H_2 = *Mounting height
 - D_2 = Overlength - long travels, gliding
 - K_2 = *Add-on
- *If the mounting bracket location is set lower

For long travels with lowered mounting height

Long travel lengths from 32.8 ft.(10m) to max. 1,312.4 ft. (400m)

For center mount applications:

Chain length = $S/2 + K_2$



Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.

Design, Chapter 1, main catalog

R	5.31 (135)	5.91 (150)	6.89 (175)	7.87 (200)	9.45 (240)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	19.68 (500)
H_2	13.94 (354)	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)
D_2	10.55 (268)	17.72 (450)	22.83 (580)	27.95 (710)	35.43 (900)	38.58 (980)	46.46 (1180)	56.69 (1440)	60.24 (1530)	66.93 (1700)	72.83 (1850)
K_2	24.02 (610)	32.24 (819)	42.99 (1092)	50.16 (1274)	60.91 (1547)	64.49 (1638)	78.82 (2002)	89.57 (2275)	100.31 (2548)	114.64 (2912)	128.98 (3276)



For support of the lower run, see Chapter 9 for the Support Tray tool kit

Technical Data



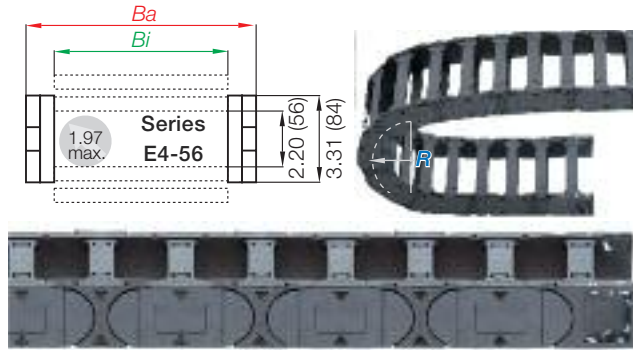
Details of material properties
► Chapter 1, main catalog

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Series E4-56 - Energy Chain® with crossbars every link



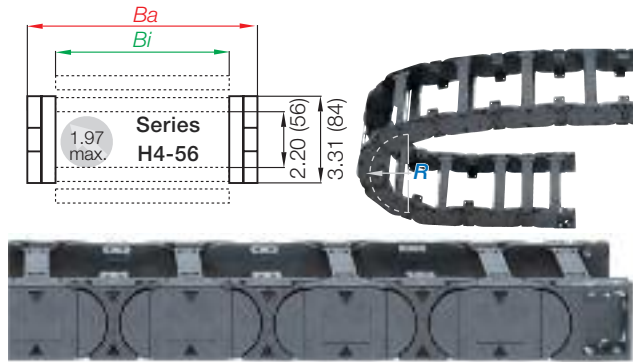
- Crossbars every link
- For use with rigid hydraulic hoses
- For particularly demanding applications
- Can be opened from both sides

Part Number Structure

E4-56-	13-	250-	0
--------	-----	------	---

Color - Black
Bending radius
Width
Series

Series H4-56 - Energy Chain® with crossbars every other link



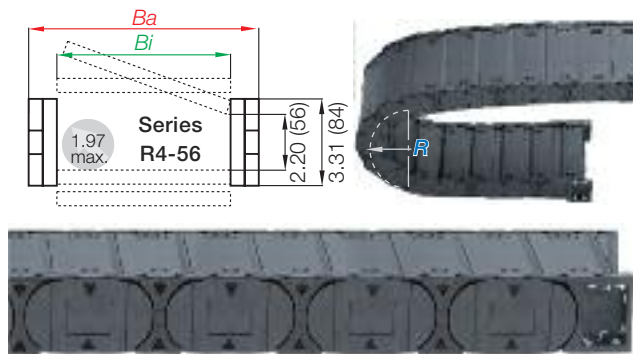
- Crossbars every other link
- Standard configuration
- For nearly every situation
- Can be opened from both sides
- Easy assembly
- Stable
- Cost-effective

Part Number Structure

H4-56-	13-	250-	0
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Color - Black
Bending radius
Width
Series

Series R4-56 - fully enclosed Energy Tube



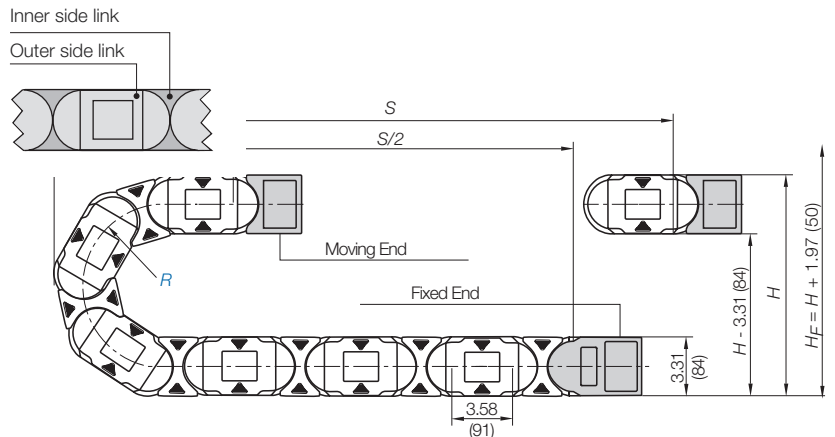
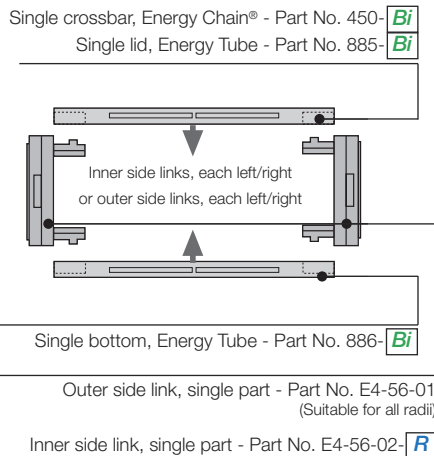
- Fully enclosed
- Excellent cable and hose protection against dirt
- Protection against hot chips up to 1,562°F (850°C)
- Lids along inner radius are completely removable
- Lids along the outer radius are single-sided, snap open, hinged on one side as well as completely removable

Part Number Structure

R4-56-	25-	250-	0
--------	-----	------	---

Color - Black
Bending radius
Width
Series

Energy Chain® as separate parts, links and side plates



Energy Chain system® E4-1

Series E4-56/H4-56/R4-56

Product Range

energy chain® configurator 



E4-56
H4-56
R4-56

Part Number			Weight				
Crossbars	Crossbars	Tube	<i>Bi</i>	<i>Ba</i>	E4-56	H4-56	R4-56
Every link	Every other	Version	in. (mm)	in. (mm)	lbs/ft (kg/m)	lbs/ft (kg/m)	lbs/ft (kg/m)
E4-56-05-	H4-56-05-	<input type="checkbox"/> -0	1.97 (50)	3.31 (84)	≈ 2.22 (3.30)	≈ 2.12 (3.16)	-
E4-56-06-	H4-56-06-	<input type="checkbox"/> -0	2.56 (65)	3.90 (99)	≈ 2.28 (3.39)	≈ 2.15 (3.20)	-
E4-56-07-	H4-56-07-	R4-56-07- <input type="checkbox"/> -0*	2.95 (75)	4.29 (109)	≈ 2.33 (3.46)	≈ 2.18 (3.24)	≈ 2.63 (3.91)
E4-56-08-	H4-56-08-	<input type="checkbox"/> -0	3.43 (87)	4.76 (121)	≈ 2.38 (3.54)	≈ 2.20 (3.28)	-
E4-56-10-	H4-56-10-	R4-56-10- <input type="checkbox"/> -0	3.94 (100)	5.28 (134)	≈ 2.44 (3.63)	≈ 2.23 (3.32)	≈ 2.82 (4.20)
E4-56-11-	H4-56-11-	- <input type="checkbox"/> -0	4.41 (112)	5.79 (147)	≈ 2.52 (3.75)	≈ 2.27 (3.38)	-
E4-56-12-	H4-56-12-	R4-56-12- <input type="checkbox"/> -0	4.92 (125)	6.26 (159)	≈ 2.57 (3.83)	≈ 2.30 (3.42)	≈ 3.06 (4.56)
E4-56-13-	H4-56-13-	<input type="checkbox"/> -0	5.39 (137)	6.77 (172)	≈ 2.66 (3.96)	≈ 2.35 (3.49)	-
E4-56-15-	H4-56-15-	R4-56-15- <input type="checkbox"/> -0	5.91 (150)	7.24 (184)	≈ 2.69 (4.00)	≈ 2.36 (3.51)	≈ 3.32 (4.94)
E4-56-16-	H4-56-16-	<input type="checkbox"/> -0	6.38 (162)	7.76 (197)	≈ 2.76 (4.11)	≈ 2.39 (3.56)	-
E4-56-17-	H4-56-17-	R4-56-17 <input type="checkbox"/> -0	6.89 (175)	8.23 (209)	≈ 2.86 (4.25)	≈ 2.44 (3.63)	≈ 3.53 (5.25)
E4-56-18-	H4-56-18-	<input type="checkbox"/> -0	7.36 (187)	8.74 (222)	≈ 2.93 (4.36)	≈ 2.48 (3.69)	-
E4-56-20-	H4-56-20-	R4-56-20- <input type="checkbox"/> -0	7.87 (200)	9.21 (234)	≈ 2.96 (4.41)	≈ 2.49 (3.71)	≈ 3.74 (5.56)
E4-56-21-	H4-56-21-	<input type="checkbox"/> -0	8.35 (212)	9.72 (247)	≈ 3.01 (4.48)	≈ 2.52 (3.75)	-
E4-56-22-	H4-56-22-	<input type="checkbox"/> -0	8.86 (225)	10.20 (259)	≈ 3.06 (4.55)	≈ 2.54 (3.78)	-
E4-56-23-	H4-56-23-	<input type="checkbox"/> -0	9.33 (237)	10.71 (272)	≈ 3.13 (4.66)	≈ 2.58 (3.84)	-
E4-56-25-	H4-56-25-	R4-56-25- <input type="checkbox"/> -0	9.84 (250)	11.18 (284)	≈ 3.21 (4.77)	≈ 2.61 (3.89)	≈ 4.23 (6.29)
E4-56-26-	H4-56-26-	<input type="checkbox"/> -0	10.31 (262)	11.69 (297)	≈ 3.27 (4.87)	≈ 2.65 (3.94)	-
E4-56-27-	H4-56-27-	R4-56-27- <input type="checkbox"/> -0	10.83 (275)	12.17 (309)	≈ 3.34 (4.97)	≈ 2.68 (3.99)	≈ 4.47 (6.65)
E4-56-28-	H4-56-28-	<input type="checkbox"/> -0	11.30 (287)	12.68 (322)	≈ 3.38 (5.03)	≈ 2.70 (4.02)	-
E4-56-30-	H4-56-30-	R4-56-30- <input type="checkbox"/> -0	11.81 (300)	13.15 (334)	≈ 3.48 (5.18)	≈ 2.76 (4.10)	≈ 4.67 (6.95)
E4-56-31-	H4-56-31-	<input type="checkbox"/> -0	12.28 (312)	13.66 (347)	≈ 3.50 (5.21)	≈ 2.76 (4.11)	-
E4-56-32-	H4-56-32-	<input type="checkbox"/> -0	12.79 (325)	14.13 (359)	≈ 3.57 (5.32)	≈ 2.80 (4.17)	-
E4-56-33-	H4-56-33-	<input type="checkbox"/> -0	13.27 (337)	14.65 (372)	≈ 3.66 (5.44)	≈ 2.84 (4.23)	-
E4-56-35-	H4-56-35-	R4-56-35- <input type="checkbox"/> -0	13.78 (350)	15.12 (384)	≈ 3.79 (5.64)	≈ 2.91 (4.33)	≈ 5.14 (7.65)
E4-56-36-	H4-56-36-	<input type="checkbox"/> -0	14.25 (362)	15.63 (397)	≈ 3.73 (5.55)	≈ 2.88 (4.28)	-
E4-56-37-	H4-56-37-	<input type="checkbox"/> -0	14.76 (375)	16.10 (409)	≈ 3.80 (5.65)	≈ 2.91 (4.33)	-
E4-56-38-	H4-56-38-	<input type="checkbox"/> -0	15.24 (387)	16.61 (422)	≈ 3.87 (5.76)	≈ 2.95 (4.39)	-
E4-56-40-	H4-56-40-	R4-56-40- <input type="checkbox"/> -0	15.75 (400)	17.09 (434)	≈ 4.05 (6.03)	≈ 3.04 (4.52)	≈ 5.81 (8.65)
E4-56-41-	H4-56-41-	<input type="checkbox"/> -0	16.22 (412)	17.60 (447)	≈ 4.00 (5.96)	≈ 3.01 (4.48)	-
E4-56-42-	H4-56-42-	<input type="checkbox"/> -0	16.73 (425)	18.07 (459)	≈ 4.19 (6.23)	≈ 3.11 (4.63)	-
E4-56-43-	H4-56-43-	<input type="checkbox"/> -0	17.20 (437)	18.58 (472)	≈ 4.09 (6.09)	≈ 3.06 (4.55)	-
E4-56-45-	H4-56-45-	<input type="checkbox"/> -0	17.72 (450)	19.06 (484)	≈ 4.31 (6.42)	≈ 3.17 (4.72)	-
E4-56-46-	H4-56-46-	R4-56-46- <input type="checkbox"/> -0	18.19 (462)	19.57 (497)	≈ 4.28 (6.37)	≈ 3.15 (4.69)	≈ 6.13 (9.12)
E4-56-47-	H4-56-47-	<input type="checkbox"/> -0	18.70 (475)	20.04 (509)	≈ 4.31 (6.41)	≈ 3.16 (4.71)	-
E4-56-48-	H4-56-48-	<input type="checkbox"/> -0	19.17 (487)	20.55 (522)	≈ 4.48 (6.66)	≈ 3.25 (4.84)	-
E4-56-50-	H4-56-50-	<input type="checkbox"/> -0	19.69 (500)	21.02 (534)	≈ 4.54 (6.76)	≈ 3.29 (4.89)	-
E4-56-51-	H4-56-51-	<input type="checkbox"/> -0	20.16 (512)	21.54 (547)	≈ 4.48 (6.67)	≈ 3.25 (4.84)	-
E4-56-52-	H4-56-52-	<input type="checkbox"/> -0	20.67 (525)	22.01 (559)	≈ 4.60 (6.84)	≈ 3.31 (4.93)	-
E4-56-53-	H4-56-53-	<input type="checkbox"/> -0	21.14 (537)	22.52 (572)	≈ 4.66 (6.93)	≈ 3.34 (4.97)	-
E4-56-55-	H4-56-55-	<input type="checkbox"/> -0	21.65 (550)	22.99 (584)	≈ 4.95 (7.36)	≈ 3.48 (5.18)	-
E4-56-60-	H4-56-60-	<input type="checkbox"/> -0	23.62 (600)	24.96 (634)	≈ 5.09 (7.58)	≈ 3.56 (5.30)	-

Choose from the radii below for all of the above sizes

Radius (mm) Example: E4-56-30- -0

	135**	150	175	200	240	250	300	350	400	450	500
R	5.31 (135)	5.91 (150)	6.89 (175)	7.87 (200)	9.45 (240)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	19.68 (500)
H ^o _{±25}	13.94 (354)	15.12 (384)	17.09 (434)	19.06 (484)	22.20 (564)	22.99 (584)	26.93 (684)	30.87 (784)	34.80 (884)	38.74 (984)	42.68 (1084)
D	10.55 (268)	11.14 (283)	12.13 (308)	13.11 (333)	14.69 (373)	15.08 (383)	17.05 (433)	19.02 (483)	20.98 (533)	22.95 (583)	24.92 (633)
K	24.02 (610)	25.79 (655)	28.94 (735)	32.09 (815)	37.01 (940)	38.19 (970)	44.29 (1125)	50.59 (1285)	56.69 (1440)	62.99 (1600)	69.09 (1755)

** This radius is not available for the R4-56 Series

*Removable lid only, no hinged option

0 = Standard color black. For other colors see Chapter 1, main catalog
For wider chains see page 56. For large diameter hoses see page 56

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS

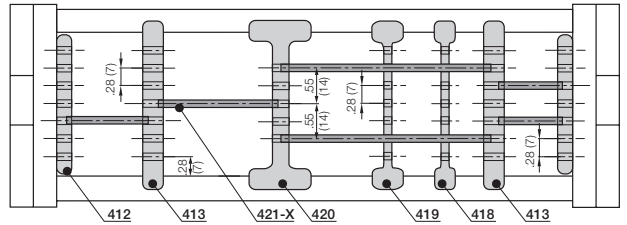




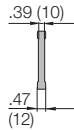
Shelves and separators

Energy Chains® and Energy Tubes can be subdivided both vertically and horizontally using the various interior separation elements.

► **Design, Chapter 1, main catalog** for layout recommendations.



- Split separator T563 for Energy Chains®**
This separator is ideal for subsequent shelving or the initial assembly of the Energy Chain. Fast assembly and disassembly using a hinge/push mechanism. Enhances flexibility

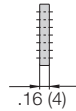


Split separator (chain only)	
Unassembled	Part No. T563
Assembled	Part No. T563M

Split separator T563, to be split for shelf 420-X



- Side plates 402**
This component is used to form the basic pattern of a shelf system.

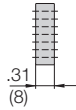


Side plate	
Unassembled	Part No. 402
Assembled	Part No. 412

Side plate 402



- Vertical separator 403**
This component is used to form the basic pattern of a shelf system.

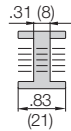


Vertical separator	
Unassembled	Part No. 403
Assembled	Part No. 413

Vertical separator 403



- Locking vertical separator 410**
This separator is slotted and able to be combined with shelves. For Energy Chains® only

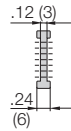


Locking vertical separator	
Unassembled	Part No. 410
Assembled	Part No. 420

Locking vertical separator 410



- Slotted separators 408**
These are used for very complex subdivisions. However, they cannot be retrofitted into an existing separation system without removing the shelves first.

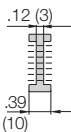


Slotted separators, closed	
Unassembled	Part No. 408
Assembled	Part No. 418

Closed slotted separator 408



- Slotted separator 409**
This separator can be retrofitted into an existing interior separation system without removing the shelves, as long as these shelves fit into any of the 3 middle slots



Slotted separators, open	
Unassembled	Part No. 409
Assembled	Part No. 419

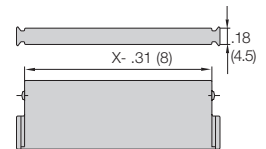
Open slotted separator 409



Shelves 420-XX

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 7 different heights in .28" (7mm) increments

Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled
.71 (18)	.39 (10)	420-18	421-18	2.95 (75)	2.64 (67)	420-75	421-75
.91 (23)	.59 (15)	420-23	421-23	3.46 (88)	3.15 (80)	420-88	421-88
.98 (25)	.67 (17)	420-25	421-25	3.94 (100)	3.62 (92)	420-100	421-100
1.10 (28)	.79 (20)	420-28	421-28	4.92 (125)	4.61(117)	420-125	421-125
1.30 (33)	.98 (25)	420-33	421-33	5.91 (150)	5.59(142)	420-150	421-150
1.69 (43)	1.38 (35)	420-43	421-43	6.89 (175)	6.57(167)	420-175	421-175
1.97 (50)	1.65 (42)	420-50	421-50	7.36 (187)	7.05(179)	420-187	421-187
2.44 (62)	2.13 (54)	420-62	421-62	7.87 (200)	7.56(192)	420-200	421-200



Energy Chain system® E4-1

Series E4-56/H4-56/R4-56

Interior Separation

energy chain® configurator ▶



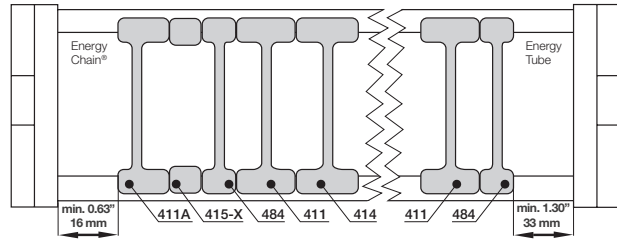
E4-56
H4-56
R4-56



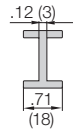
Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. In standard configuration, a separator is installed every second chain link.

NOTE: Observe a lateral spacing of at least 1.26 in. (32mm) for Energy Tubes and .63 in. (16mm) for Energy Chain®. There is no minimum spacing needed for side plates



Vertical separator
401

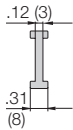


Vertical separator

Unassembled Part No. 401
Assembled Part No. 411



Vertical separator
483

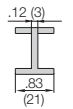


Vertical separator

Unassembled Part No. 483
Assembled Part No. 484



Locking separator
404

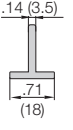


Locking separator (chain only)

Unassembled Part No. 404
Assembled Part No. 414



Locking separator
406

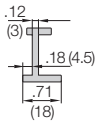


Locking separator (tube only)

Unassembled Part No. 406
Assembled Part No. 416



Asymmetrical separator
401A



Asymmetrical separator (chain only)

Unassembled Part No. 401A
Assembled Part No. 411A



Spacers
405-XX
XX = width of the spacer



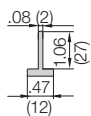
Spacer (chain only)

Unassembled Part No. 405-XX
Assembled Part No. 415-XX

Spacers available in the following sizes:

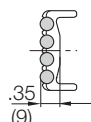
Part No. Unassembled	Part No. Assembled	in.	(mm)
405 -10	415 -10	.39"	(10)
405 -15	415 -15	.59"	(15)
405 -20	415 -20	.79"	(20)
405 -30	415 -30	1.18"	(30)
405 -40	415 -40	1.57"	(40)

Center crossbar - for applications involving a very large number of thin cables This offers the option of subdividing the Energy Chain® into upper and lower halves



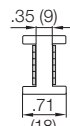
Center crossbar

Unassembled Part No. 405
Assembled Part No. 415



Rollclip

Unassembled Part No. 489-27
Assembled Part No. 490-27



Center crossbar

Unassembled Part No. 429
Assembled Part No. 430

Rollclip - minimizes abrasion of particularly sensitive hoses or cables. The integrated rollers compensate for relative movement between the chain and the hose or cable.

Roller separator - performs a similar function to the Rollclip, but doubles as a separator.

- **Standard separator 401 for Energy Chains® and Energy Tubes**
This separator offers safe stability due to its wide base design.
- **Vertical separator 483 for Energy Chains® and Energy Tubes**
This separator offers a narrow base for applications where a large number of small cables need to be individually separated.
- **Locking separator 404 for Energy Chains®**
This separator features increased retention force for applications exposed to very high humidity and extreme loads. The extra retention force is achieved by asymmetric claws for the crossbar. Take care to ensure proper alignment.
- **Locking separator 406 for Energy Tubes**
It features a single sided, secure fit, and can be placed on the lid or the bottom of the Energy Tube. The single side locking design helps to eliminate difficulties in assembling the opposite cover or crossbar
- **Asymmetrical separator 401A for Energy Chains®**
This separator features an .71" (18mm) base. It can be used in combinations between spacers of different widths and vertical separators in side mounted applications.
- **NOTE ON SPACERS**
Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications. The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



igus® Energy Chain System®

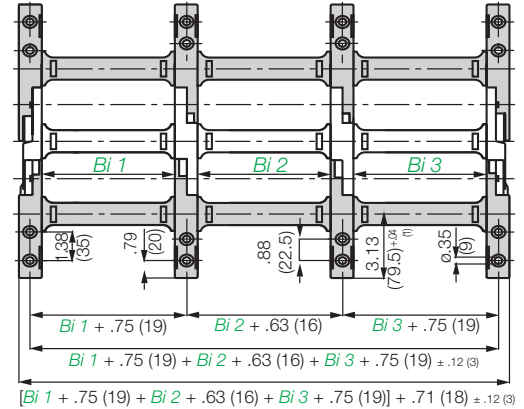


Part number example for Energy Chain®
E4-56-10/20/10- -0
E4-56-*Bi1/Bi2/Bi3*- -0

We strongly recommend on-site consultation with an igus® technician for individual advice regarding mounting brackets, guide troughs and other design details.

Extension links - for extremely wide Energy Chains® up to 9.84 ft (3m)

- For applications in which particularly high fill weights necessitate extremely wide Energy Chains®
- The extension link design allows virtually limitless side-by-side attachment of chains
- The unsupported length of a chain can be increased when additional loads are required
- Extension links can be used with Energy Chains®, Energy Tubes or a combination of both
- They are suitable for unsupported and gliding applications in a guide trough
- Energy Chains® with extension links are attached with KMA or steel mounting brackets.



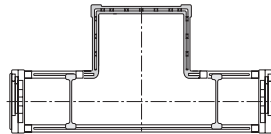
Telephone 1-800-521-2747
Fax 1-401-438-7270

Extender crossbars - For careful guiding of large diameter cables and hoses

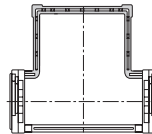
- Intended for cables and hoses with a maximum outer diameter of 9.65 in. (245 mm).
- Can be attached along either the inner or outer radius, inner radius preferred
- Gliding operation with crossbars assembled along the outer radius in conjunction with a special guide trough
- Gliding operation not guaranteed with crossbars assembled along the inner radius
- The extender crossbar can either be attached to the side links directly or can be used in combination with two standard snap-open crossbars.



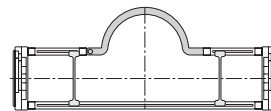
Consult igus® for your extender crossbar applications. We will be happy to assist you with your design layout.



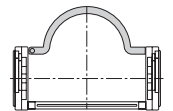
Square extender crossbar combined with standard snap-open crossbars.



Attached directly to the side link.



Round extender crossbar combined with standard snap-open crossbars.



Attached directly to the side link.

Part No.	Max Ø Hose	Style	Installation Side Link	Combined with Snap-Open Crossbars
450-15-RHD115	4.52 (115)	Round	No	Yes
450-17-RD115	4.52 (115)	Round	Yes	No
450-25-D150	5.91 (150)	Square	Yes	No
450-30-D200	7.09 (180)	Square	Yes	No
450-35-D250	7.68 (195)	Square	Yes	No
450-40-D300	9.65 (245)	Square	Yes	No
450-20-HD150	5.91 (150)	Square	No	Yes
450-25-HD200	7.09 (180)	Square	No	Yes
450-30-HD250	7.68 (195)	Square	No	Yes

E4 clip on cable binder

- For side mounted applications
- Serves as a clip-on, lateral guide for hoses and cables on Energy Chains®
- The loops can be adjusted as needed
- Compatible with many E4 Energy Chains®
- Economical
- One clip and one locking band are needed for each chain link



Part No.	Form
450-B12	Locking clip, comprised of a locking element
450-B12-200	Locking band, comprised of a locking element and band; 12 x 1.5 x 200 mm

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

Energy Chain system® E4-1

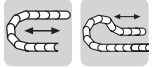
Series E4-56/H4-56/R4-56

Mounting Brackets

energy chain® configurator ▶



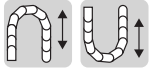
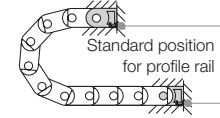
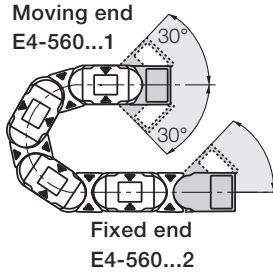
E4-56
H4-56
R4-56



Option 1: pivoting

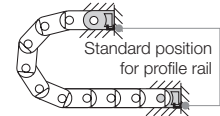
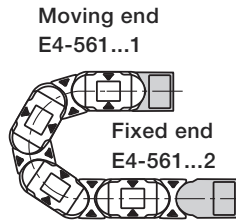


- Recommended for unsupported and gliding applications
- Attachment capability on all sides
- Bolted connection outside of chain cross-section
- Space restricted conditions
- Corrosion resistant



Option 2: locking

- Profile rail option
- Universal use
- Corrosion resistant
- Vertical hanging/standing travels
- Extreme accelerations



Part Number Structure

E4-560-07-12 P

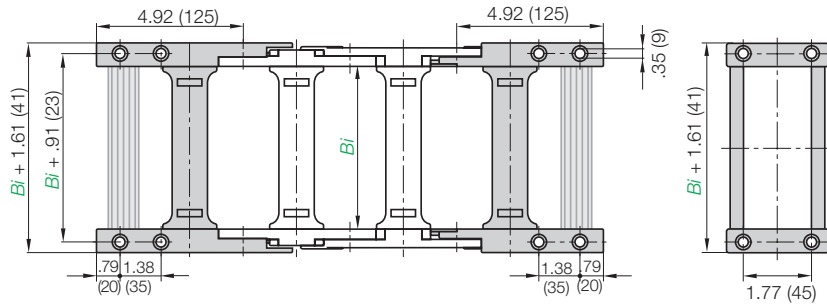
With Profile Rail

Complete Set

Width

E4-560 = Pivoting for chain
R4-560 = Pivoting for tube

E4-561 = Locking for chain
R4-561 = Locking for tube



Due to the design of the E4-56 series chains, please note the following when ordering brackets:

- Even number of links = full set, part number ending in -12
- Odd number of links = 2 pieces, part number ending in -2

Part number examples are shown for pivoting brackets for Energy Chain. For locking brackets change part number to 561

Part No. Full Set (pivoting)
Series E4-56 or H4-56
E4-560-Width-12

Part No. Full Set (pivoting)
with profile rail
Series E4-56 or H4-56
E4-560-Width-12P

Part No. Full Set (pivoting)
Tube Series R4-56
R4-560-Width-12

Part No. Full Set (pivoting)
with Profile Rail
Tube Series R4-56
R4-560-Width-12P

Width	Part No. Full Set chain/tube		With Profile Rail	Bi in. (mm)	Width	Part No. Full Set chain/tube		With Profile Rail	Bi in. (mm)		
	Pivoting	Locking				Pivoting	Locking				
-05*	E4-560/R4-560	E4-561/R4-561	-05-12	P	1.97 (50)	-31	E4-560	E4-561	-31-12	P	12.28 (312)
-06	E4-560	E4-561	-06-12	P	2.56 (65)	-32	E4-560	E4-561	-32-12	P	12.79 (325)
-07	E4-560/R4-560	E4-561/R4-561	-07-12	P	2.95 (75)	-33	E4-560	E4-561	-33-12	P	13.27 (337)
-08	E4-560	E4-561	-08-12	P	3.43 (87)	-35	E4-560/R4-560	E4-561/R4-561	-35-12	P	13.78 (350)
-10	E4-560/R4-560	E4-561/R4-561	-10-12	P	3.94 (100)	-36	E4-560	E4-561	-36-12	P	14.25 (362)
-11	E4-560	E4-561	-11-12	P	4.41 (112)	-37	E4-560	E4-561	-37-12	P	14.76 (375)
-12	E4-560/R4-560	E4-561/R4-561	-12-12	P	4.92 (125)	-38	E4-560	E4-561	-38-12	P	15.24 (387)
-13	E4-560	E4-561	-13-12	P	5.39 (137)	-40	E4-560/R4-560	E4-561/R4-561	-40-12	P	15.75 (400)
-15	E4-560/R4-560	E4-561/R4-561	-15-12	P	5.91 (150)	-41	E4-560	E4-561	-41-12	P	16.22 (412)
-16	E4-560	E4-561	-16-12	P	6.38 (162)	-42	E4-560	E4-561	-42-12	P	16.73 (425)
-17	E4-560	E4-561	-17-12	P	6.89 (175)	-43	E4-560	E4-561	-43-12	P	17.20 (437)
-18	E4-560	E4-561	-18-12	P	7.36 (187)	-45	E4-560	E4-561	-45-12	P	17.72 (450)
-20	E4-560/R4-560	E4-561/R4-561	-20-12	P	7.87 (200)	-46	E4-560/R4-560	E4-561/R4-561	-46-12	P	18.19 (462)
-21	E4-560	E4-561	-21-12	P	8.35 (212)	-47	E4-560	E4-561	-47-12	P	18.70 (475)
-22	E4-560	E4-561	-22-12	P	8.86 (225)	-48	E4-560	E4-561	-48-12	P	19.17 (487)
-23	E4-560	E4-561	-23-12	P	9.33 (237)	-50	E4-560	E4-561	-50-12	P	19.69 (500)
-25	E4-560/R4-560	E4-561/R4-561	-25-12	P	9.84 (250)	-51	E4-560	E4-561	-51-12	P	20.16 (512)
-26	E4-560	E4-561	-26-12	P	10.31 (262)	-52	E4-560	E4-561	-52-12	P	20.67 (525)
-27	E4-560	E4-561	-27-12	P	10.83 (275)	-53	E4-560	E4-561	-53-12	P	21.14 (537)
-28	E4-560	E4-561	-28-12	P	11.30 (287)	-55	E4-560	E4-561	-55-12	P	21.65 (550)
-30	E4-560/R4-560	E4-561/R4-561	-30-12	P	11.81 (300)	-60	E4-560	E4-561	-60-12	P	23.62 (600)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Chainfix clamps for the profile rail



igus® Chainfix strain relief elements are available in either steel or stainless steel. They can be adjusted with a hexagon socket and are available in single, double and triple configurations.

Part No. Single Clamp		Part No. Double Clamp		Part No. Triple Clamp		Cable ø	
Steel	Stainless	Steel	Stainless	Steel	Stainless	in.	(mm)
CFX12-1	CFX12-1E	CFX12-2	CFX12-2E	CFX12-3	-	.24 - .47	(06 - 12)
CFX14-1	CFX14-1E	CFX14-2	CFX14-2E	CFX14-3	-	.47 - .55	(12 - 14)
CFX16-1	CFX16-1E	CFX16-2	CFX16-2E	CFX16-3	-	.55 - .63	(14 - 16)
CFX18-1	CFX18-1E	CFX18-2	CFX18-2E	CFX18-3	-	.63 - .71	(16 - 18)
CFX20-1	CFX20-1E	CFX20-2	CFX20-2E	CFX20-3	-	.71 - .79	(18 - 20)
CFX22-1	CFX22-1E	CFX22-2	CFX22-2E	CFX22-3	-	.79 - .87	(20 - 22)
CFX26-1	CFX26-1E	CFX26-2	CFX26-2E	-	-	.87 - 1.02	(22 - 26)
CFX30-1	CFX30-1E	CFX30-2	CFX30-2E	-	-	1.02 - 1.18	(26 - 30)
CFX34-1	CFX34-1E	CFX34-2	CFX34-2E	-	-	1.18 - 1.34	(30 - 34)
CFX38-1	CFX38-1E	-	-	-	-	1.34 - 1.50	(34 - 38)
CFX42-1	CFX42-1E	-	-	-	-	1.50 - 1.65	(38 - 42)

For more information please refer to strain relief section of Chapter 10 in main catalog.

Chainfix Clip

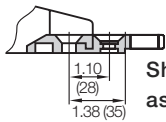


Modular snap-on strain relief device

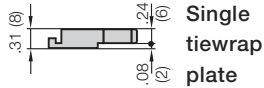
Chainfix clips are available for cable diameters ranging from .16" (4mm) to .94" (24 mm). They are for assembly on KMA mounting brackets, clip-on strain relief for crossbars as well as profile rails. Quick assembly without the use of tools. **For more information please refer to strain relief section of Chapter 10 in main catalog.**

Cable ø	Part No. Clamp	Part No. Bottom
.16-.31	CFC-08-M	CFC-08-C
.31-.47	CFC-12-M	CFC-12-C
.47-.63	CFC-16-M	CFC-16-C
.63-.79	CFC-20-M	CFC-20-C
.79-.94	CFC-24-M	CFC-24-C

Tiewrap Plates



Shown assembled



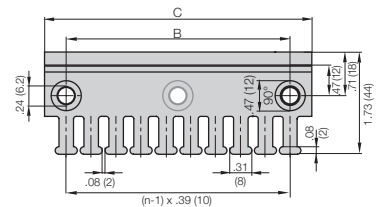
Single tiewrap plate

Option 1:

Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



If used with KMA brackets with profile rail please add "KMA" to the end of the part number.

Example: 3050-ZBKMA

For more information please refer to strain relief section of Chapter 10 in main catalog.

Option 2:

Clip-on Tiewrap plates

Available as a clip-on tiewrap plate without the use of bolts They are inserted and removed with a screwdriver used as a lever. Clip-on tiewrap plates are also available as an attachment to the opening crossbars.



Part No.	Number of Teeth	Width of Strain Relief in. (mm)
3050-ZC	5	1.97 (50)
3075-ZC	7	2.95 (75)

For more information please refer to strain relief section of Chapter 10 in main catalog.

Energy Chain system® E4-1

Series E4-56/H4-56/R4-56

Guide Trough

energy chain® configurator ▶



E4-56
H4-56
R4-56

Width of Crossbar
E4-56-05-200-0

	B_{Ri}	Installation Part No.
-05	3.50 (89)	*
-06	4.09 (104)	94-50-225
-07	4.49 (114)	94-50-225
-08	5.04 (128)	94-50-250
-10	5.47 (139)	94-50-250
-11	5.98 (152)	94-50-275
-12	6.46 (164)	94-50-275
-13	6.97 (177)	94-50-300
-15	7.44 (189)	94-50-300
-16	7.95 (202)	94-50-325
-17	8.42 (214)	94-50-325
-18	8.94 (227)	94-50-350
-20	9.41 (239)	94-50-350
-21	9.92 (252)	94-50-375
-22	10.39 (264)	94-50-375
-23	10.91 (277)	94-50-400
-25	11.38 (289)	94-50-400
-26	11.89 (302)	94-50-425
-27	12.36 (314)	94-50-425
-28	12.87 (327)	94-50-450
-30	13.35 (339)	94-50-450
-31	13.86 (352)	94-50-475
-32	14.33 (364)	94-50-475
-33	14.84 (377)	94-50-500
-35	15.31 (389)	94-50-500
-36	15.82 (402)	94-50-525
-37	16.30 (414)	94-50-525
-38	16.81 (427)	94-50-550
-40	17.28 (439)	94-50-550
-41	17.79 (452)	94-50-575
-42	18.27 (464)	94-50-575
-43	18.78 (477)	94-50-600
-45	19.25 (489)	94-50-600
-46	19.76 (502)	94-50-625
-47	20.24 (514)	94-50-625
-48	20.75 (527)	94-50-650
-50	21.22 (539)	94-50-650
-51	21.73 (552)	94-50-675
-52	22.20 (564)	94-50-675
-53	22.72 (577)	94-50-700
-55	23.19 (589)	94-50-700
-60	25.16 (639)	94-50-750

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required.

- Full travel length of guide trough
Part No. 94-30
- 1/2 travel length glide bars
Part No. 93-01
- Installation sets as end connectors
Part No. 94-50-XX

.XX indicates the length of the profile rails on which the guide trough is mounted. The values and part numbers are specified in the table on the left. The standard length of the trough components and glide bars is 6.56 ft (2m). The required overall length of the guide trough directly correlates to the length of travel.

Example:

Length of travel 164 ft (50 m)
Center mounted

Required guide troughs:

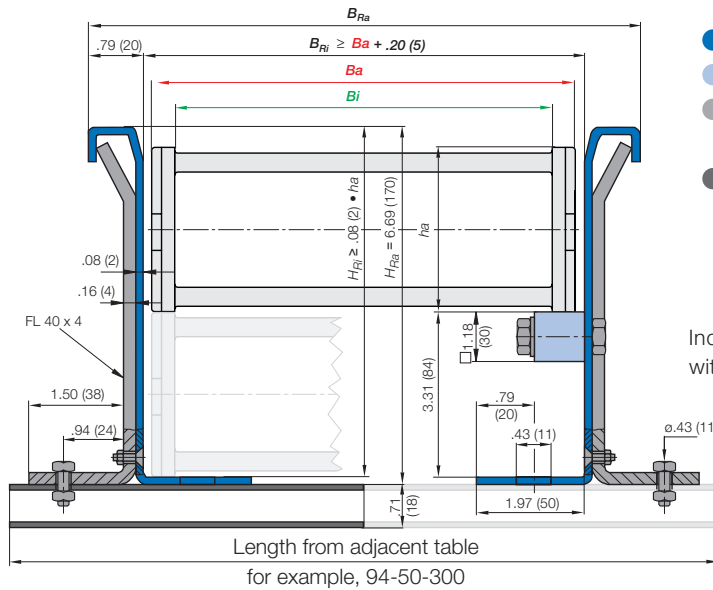
164 ft (50 m) guide trough
82 ft (25 m) glide bars
= 25 sections of 6.56 ft (2 m) guide trough
Part No. 94-30
= 13 sections of 6.56 ft (2 m) glide bars
Part No. 93-01

Required number of installation sets:

= Number of guide trough components + 1
= 25 + 1 = 26
Part number of the installation sets
94-50-XXX

Example:

94-50-400 for 15.75 (400 mm) long profile rail



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

* Specialized guide trough available upon request

Standard length profile rail



Left: Guide trough with glide bars
Right: Guide troughs without glide bars



Installation sets as section connectors

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



E4-80
H4-80
R4-80



Energy Chain system® E4-1 Series E4-80/H4-80/R4-80

Price Index



Series E4-80



Series H4-80



Series R4-80

Special Options Available



Low noise version available with special rubber pads



Cleanroom test upon request



ESD classification: Electrically conductive ESD/ATEX version upon request

Assembly Tips



Opening Energy Chains®: Remove crossbars and clips - Insert screwdriver into the slot, push down, release by lever action



Remove lids/bottoms (Energy Tubes) - Insert screwdriver into the slot, release by lever action

Other Installation Methods

Vertical, hanging ≤ 394 ft (120 m)

Vertical, standing ≤ 19.69 ft (6 m)

Side-mounted, un_supp. ≤ 9.84 ft (3 m)

Rotary requires further calculation

Usage Guidelines



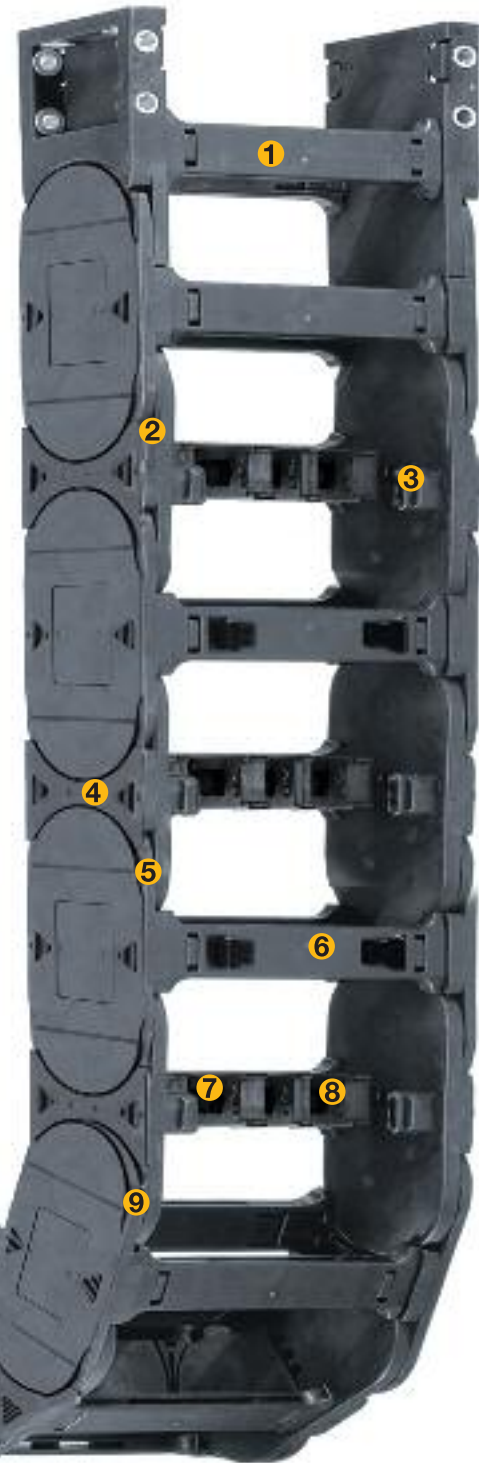
- If quiet operation is required
- If very high speeds and/or accelerations are required
- Long travels
- High additional loads



- When an extremely low vibration Energy Chain®/Energy Tube is required
 - Series E6-80
- When an economic one-sided snap-open Energy Chain®/Energy Tube is required
 - Series 15050/15150/R19850

Features & Benefits

- 1 Wide, rounded plastic crossbars - cable friendly
- 2 Low-noise operation through integrated brake in the radial stop dog system
- 3 Hinged snap-open removable lids along the outer radius of the Energy Tube
- 4 Straight run through inner-/outer-link design
- 5 The tongue and groove design provides greater lateral stability
- 6 QuickLock Crossbar, 450-X-Q, available for faster assembly/disassembly
- 7 New Interior separation kit available
- 8 Crossbars are removable along both radii
- 9 15% more tensile strength (compared to the older E4 series), better unsupported length through improved stop dog system and vertical radial stops
- 10 Version NCST "without camber" simply by turning outer links without unnecessary rework



Also available without camber. Add NCST to the end of the part number.
Ex: E4-80-30-300NCST

Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

16.4 ft (5 m) E4-80-30-300-0

Energy Chain®

With 2 separators 511 assembled every 2nd link

Interior Separation

1 Set E4-800-30-12P

Mounting Bracket

Energy Chain system® E4-1 Series E4-80/H4-80/R4-80 Installation Dimensions

energy chain® configurator

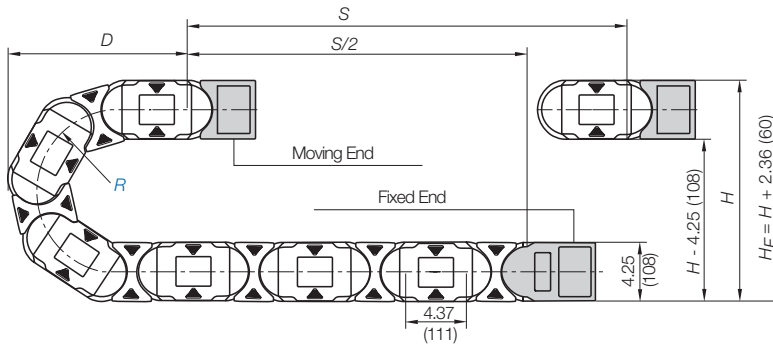
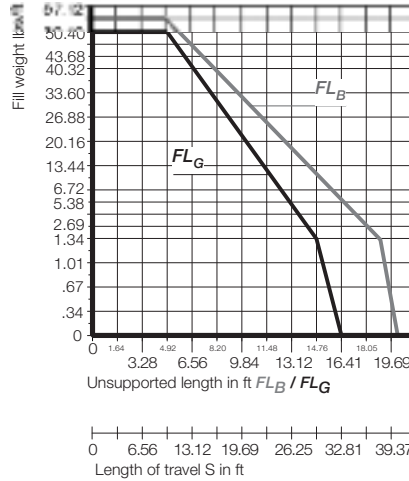
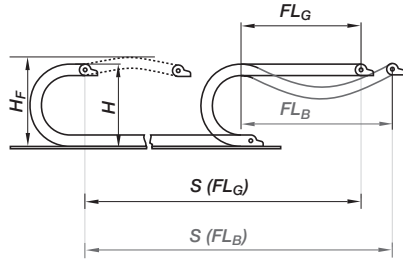


E4-80
H4-80
R4-80

Short travel, unsupported length

- FL_B = unsupported with permitted sag
- FL_G = unsupported with straight upper run

Further information Design, Chapter 1, main catalog



Pitch per link: = 4.37" (111 mm)
Links per ft (m): = 2.75 (9)
For center mount applications:
Chain length = $S/2 + K$

The required clearance height: $H_F = H + 2.36$ in. (60 mm) (with 2.02 lbs/ft (3 kg/m) fill weight).
Please consult igus® if space is particularly restricted.

R	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	19.68 (500)	21.65 (550)	23.62 (600)	39.37 (1000)
H_{+25}	16.06 (408)	20.00 (508)	23.94 (608)	27.87 (708)	31.81 (808)	35.75 (908)	43.62 (1108)	47.56 (1208)	51.50 (1308)	82.99 (2108)
D	12.40 (315)	14.37 (365)	16.34 (415)	18.31 (465)	20.28 (515)	22.24 (565)	26.18 (665)	28.15 (715)	30.12 (765)	45.87 (1165)
K	27.36 (695)	33.66 (855)	39.96 (1010)	45.87 (1165)	52.17 (1325)	58.27 (1480)	70.67 (1795)	76.77 (1950)	83.07 (2110)	132.48 (3365)

Short Travels - Unsupported

Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height
- H_{R1} = Trough inner height
- H_2 = *Mounting height
- D_2 = Overlength - long travels, gliding
- K_2 = *Add-on
- *If the mounting bracket location is set lower



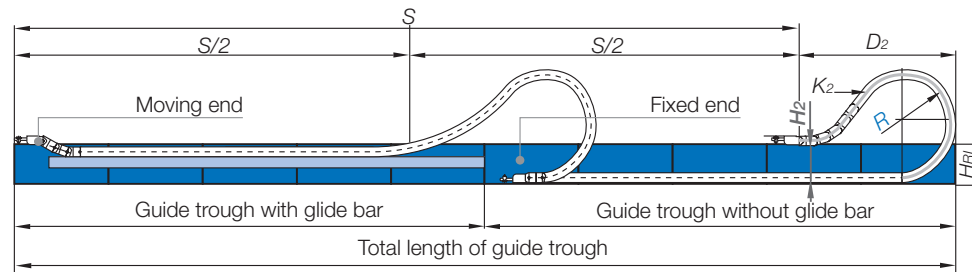
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

For long travels with lowered mounting height

Long travel lengths from 32.8 ft.(10m) to max. 1,312 ft. (400m)

For center mount applications:

$$\text{Chain length} = S/2 + K_2$$



In case of travels between 13 and 32.8 ft (4 and 10 m) we recommend a longer unsupported length.

R	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	19.68 (500)	21.65 (550)	23.62 (600)	39.37 (1000)
H_2	9.53 (242)	9.53 (242)	9.53 (242)	9.53 (242)	9.53 (242)	9.53 (242)	9.53 (242)	-	-	-
D_{+25}	21.65 (550)	31.50 (800)	39.37 (1000)	47.24 (1200)	57.09 (1450)	62.99 (1600)	82.68 (2100)	-	-	-
K_2	35.04 (890)	52.36 (1330)	65.55 (1665)	78.74 (2000)	91.73 (2330)	104.72 (2660)	135.43 (3440)	-	-	-



For support of the lower run, see **Chapter 9** of the main catalog for the **Support Tray tool kit**

Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.
Design, Chapter 1, main catalog

Technical Data

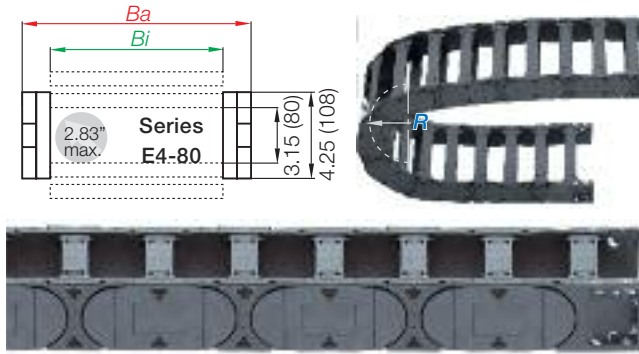
Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB



Details of material properties

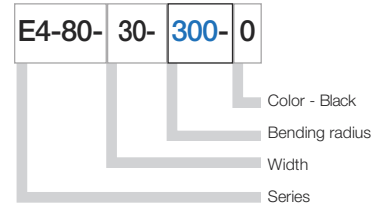
Chapter 1

Series E4-80 - Energy Chain® with crossbars every link

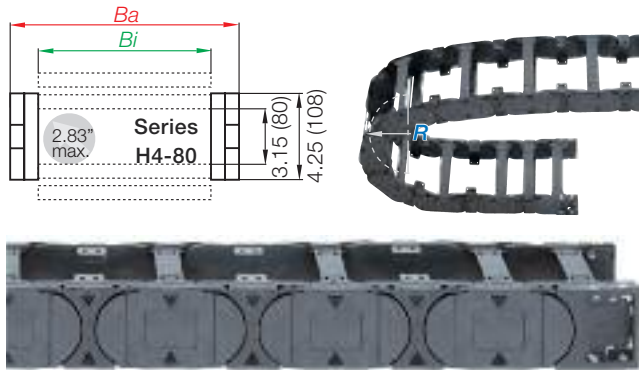


- Crossbars every link
- For use with rigid hydraulic hoses
- For particularly demanding applications
- Can be opened from both sides

Part Number Structure

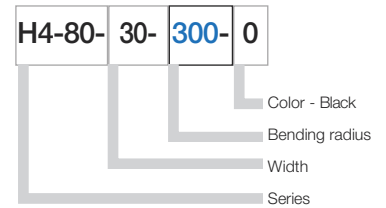


Series H4-80 - Energy Chain® with crossbars every other link

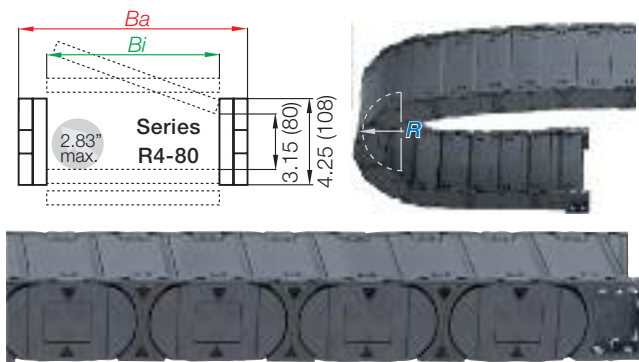


- Crossbars every other link - Standard configuration
- For nearly every situation
- Can be opened from both sides
- Easy assembly
- Stable
- Cost-effective

Part Number Structure

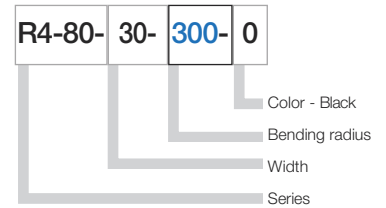


Series R4-80 - fully enclosed Energy Tube

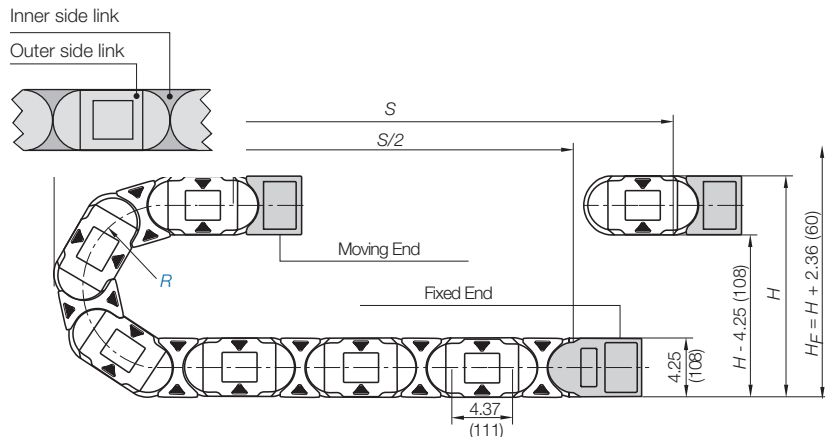
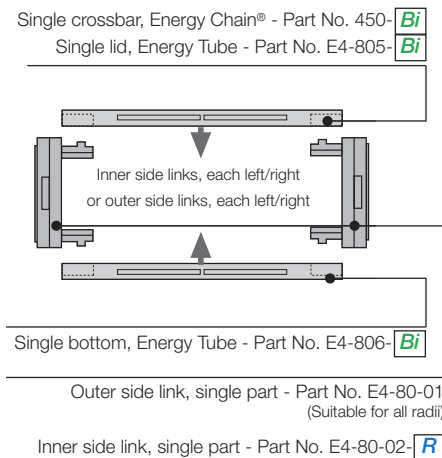


- Fully enclosed
- Excellent cable and hose protection against dirt
- Protection against hot chips up to 1652°F (900°C)
- Lids along inner radius are completely removable
- Lids along the outer radius are single-sided, snap open, hinged on one side as well as completely removable

Part Number Structure



Energy Chain® as separate parts, links and side plates



Energy Chain system® E4-1

Series E4-80/H4-80/R4-80

energy chain® configurator 



E4-80
H4-80
R4-80

Supplement part number with required radius. Example: E4-80-30--0

Pitch: 4.37 in. (91mm) per link links/ft(m) = 2.75 (9)

Part Number			<i>Bi</i>	<i>Ba</i>	Weight		
Crossbars Every link	Crossbars Every other	Tube Version	in. (mm)	in. (mm)	E4-80 lbs/ft (kg/m)	H4-80 lbs/ft (kg/m)	R4-80 lbs/ft (kg/m)
E4-80-05-	H4-80-05-	<input type="text" value=""/> -0	1.97 (50)	3.94 (100)	≈ 3.59 (5.34)	≈ 3.51 (5.22)	-
E4-80-06-	H4-80-06-	<input type="text" value=""/> -0	2.56 (65)	4.53 (115)	≈ 3.64 (5.41)	≈ 3.53 (5.26)	-
E4-80-07-	H4-80-07-	<input type="text" value=""/> -0*	2.95 (75)	4.92 (125)	≈ 3.68 (5.47)	≈ 3.55 (5.29)	-
E4-80-08-	H4-80-08-	<input type="text" value=""/> -0	3.43 (87)	5.39 (137)	≈ 3.74 (5.56)	≈ 3.57 (5.32)	-
E4-80-10-	H4-80-10-	<input type="text" value=""/> -0	3.94 (100)	5.91 (150)	≈ 3.77 (5.61)	≈ 3.60 (5.36)	-
E4-80-11-	H4-80-11-	<input type="text" value=""/> -0	4.41 (112)	6.42 (163)	≈ 3.84 (5.71)	≈ 3.63 (5.40)	-
E4-80-12-	H4-80-12-	<input type="text" value=""/> -0	4.92 (125)	6.89 (175)	≈ 3.88 (5.77)	≈ 3.66 (5.44)	-
E4-80-13-	H4-80-13-	<input type="text" value=""/> -0	5.39 (137)	7.40 (188)	≈ 3.95 (5.88)	≈ 3.69 (5.49)	-
E4-80-15-	H4-80-15-	<input type="text" value=""/> -0	5.91 (150)	7.87 (200)	≈ 3.97 (5.91)	≈ 3.70 (5.51)	-
E4-80-16-	H4-80-16-	<input type="text" value=""/> -0	6.38 (162)	8.39 (213)	≈ 4.03 (6.00)	≈ 3.73 (5.55)	-
E4-80-17-	H4-80-17-	<input type="text" value=""/> -0	6.89 (175)	8.86 (225)	≈ 2.76 (6.11)	≈ 3.77 (5.61)	-
E4-80-18-	H4-80-18-	<input type="text" value=""/> -0	7.36 (187)	9.37 (238)	≈ 4.17 (6.20)	≈ 3.80 (5.65)	-
E4-80-20-	H4-80-20-	R4-80-20- <input type="text" value=""/> -0	7.87 (200)	9.84 (250)	≈ 4.20 (6.25)	≈ 3.82 (5.68)	≈ 6.86 (7.23)
E4-80-21-	H4-80-21-	<input type="text" value=""/> -0	8.35 (212)	10.35 (263)	≈ 4.23 (6.31)	≈ 3.84 (5.71)	-
E4-80-22-	H4-80-22-	<input type="text" value=""/> -0	8.86 (225)	10.83 (275)	≈ 4.27 (6.36)	≈ 3.85 (5.73)	-
E4-80-23-	H4-80-23-	<input type="text" value=""/> -0	9.33 (237)	11.34 (288)	≈ 4.33 (6.45)	≈ 3.88(5.78)	-
E4-80-25-	H4-80-25-	R4-80-25- <input type="text" value=""/> -0	9.84 (250)	11.81 (300)	≈ 4.39 (6.54)	≈ 3.91 (5.82)	≈ 5.42 (8.06)
E4-80-26-	H4-80-26-	<input type="text" value=""/> -0	10.31 (262)	12.32 (313)	≈ 4.45 (6.62)	≈ 3.94 (5.86)	-
E4-80-27-	H4-80-27-	<input type="text" value=""/> -0	10.83 (275)	12.80 (325)	≈ 4.50 (6.70)	≈ 3.96 (5.90)	-
E4-80-28-	H4-80-28-	<input type="text" value=""/> -0	11.30 (287)	13.31 (338)	≈ 4.54 (6.75)	≈ 3.98 (5.93)	-
E4-80-30-	H4-80-30-	R4-80-30- <input type="text" value=""/> -0	11.81 (300)	13.78 (350)	≈ 4.62 (6.87)	≈ 4.03 (5.99)	≈ 5.87 (8.73)
E4-80-31-	H4-80-31-	<input type="text" value=""/> -0	12.28 (312)	14.29 (363)	≈ 4.64 (6.90)	≈ 4.03 (6.00)	-
E4-80-32-	H4-80-32-	<input type="text" value=""/> -0	12.79 (325)	14.76 (375)	≈ 4.70 (6.99)	≈ 4.07 (6.05)	-
E4-80-33-	H4-80-33-	<input type="text" value=""/> -0	13.27 (337)	15.28 (388)	≈ 4.76 (7.09)	≈ 4.10 (6.10)	-
E4-80-35-	H4-80-35-	<input type="text" value=""/> -0	13.78 (350)	15.75 (400)	≈ 4.87 (7.25)	≈ 4.15 (6.18)	-
E4-80-36-	H4-80-36-	<input type="text" value=""/> -0	14.25 (362)	16.26 (413)	≈ 4.82 (7.18)	≈ 2.53 (6.14)	-
E4-80-37-	H4-80-37-	<input type="text" value=""/> -0	14.76 (375)	16.73 (425)	≈ 4.88 (7.26)	≈ 4.15 (6.18)	-
E4-80-38-	H4-80-38-	<input type="text" value=""/> -0	15.24 (387)	17.24 (438)	≈ 4.94 (7.35)	≈ 4.19 (6.23)	-
E4-80-40-	H4-80-40-	R4-80-40- <input type="text" value=""/> -0	15.75 (400)	17.72 (450)	≈ 5.09 (7.57)	≈ 4.26 (6.34)	≈ 6.86 (10.21)
E4-80-41-	H4-80-41-	<input type="text" value=""/> -0	16.22 (412)	18.23 (463)	≈ 5.05 (7.51)	≈ 4.24 (6.31)	-
E4-80-42-	H4-80-42-	<input type="text" value=""/> -0	16.73 (425)	18.70 (475)	≈ 5.21 (7.75)	≈ 4.32 (6.43)	-
E4-80-43-	H4-80-43-	<input type="text" value=""/> -0	17.20 (437)	19.21 (488)	≈ 5.12 (7.62)	≈ 4.27 (6.36)	-
E4-80-45-	H4-80-45-	<input type="text" value=""/> -0	17.72 (450)	19.69 (500)	≈ 5.30 (7.89)	≈ 4.37 (6.50)	-
E4-80-46-	H4-80-46-	<input type="text" value=""/> -0	18.19 (462)	20.20 (513)	≈ 5.27 (7.85)	≈ 4.35 (6.48)	-
E4-80-47-	H4-80-47-	<input type="text" value=""/> -0	18.70 (475)	20.67 (525)	≈ 5.29 (7.88)	≈ 4.366 (6.49)	-
E4-80-48-	H4-80-48-	<input type="text" value=""/> -0	19.17 (487)	21.19 (538)	≈ 5.44 (8.09)	≈ (4.43 6.60)	-
E4-80-50-	H4-80-50-	<input type="text" value=""/> -0	19.69 (500)	21.65 (550)	≈ 5.44 (8.09)	≈ 4.43 (6.60)	-
E4-80-51-	H4-80-51-	<input type="text" value=""/> -0	20.16 (512)	22.16 (563)	≈ 5.49 (8.17)	≈ 4.46 (6.63)	-
E4-80-52-	H4-80-52-	<input type="text" value=""/> -0	20.67 (525)	22.64 (575)	≈ 5.54 (8.24)	≈ 4.48 (6.67)	-
E4-80-53-	H4-80-53-	<input type="text" value=""/> -0	21.14 (537)	23.15 (588)	≈ 5.58 (8.31)	≈ 4.51 (6.71)	-
E4-80-55-	H4-80-55-	<input type="text" value=""/> -0	21.65 (550)	23.62 (600)	≈ 5.82 (8.66)	≈ 4.62 (6.88)	-
E4-80-60-	H4-80-60-	<input type="text" value=""/> -0	23.62 (600)	25.59 (650)	≈ 5.94 (8.84)	≈ 4.68 (6.97)	-

Choose from the radii below for all of the above sizes

Radius (mm) Example: E4-80-30--0

	150	200	250	300	350	400	500	550	600	1000
R	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	19.68 (500)	21.65 (550)	23.62 (600)	39.37 (1000)
H ₂₅ ⁰	16.06 (408)	20.00 (508)	23.94 (608)	27.87 (708)	31.81 (808)	35.75 (908)	43.62 (1108)	47.56 (1208)	51.50 (1308)	82.99 (2108)
D	12.40 (315)	14.37 (365)	16.34 (415)	18.31 (465)	20.28 (515)	22.24 (565)	26.18 (665)	28.15 (715)	30.12 (765)	45.87 (1165)
K	27.36 (695)	33.66 (855)	39.76 (1010)	45.87 (1165)	52.17 (1325)	58.27 (1480)	70.67 (1795)	76.77 (1950)	83.07 (2110)	132.48 (3365)

** This radius is not available for the R9850 Series
*Removable lid only, no hinged option

0 = Standard color black. For other colors see Chapter 1, main catalog
For wider chains see page 68. For large diameter hoses see page 68

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Energy Chain system® E4-1

Series E4-80/H4-80/R4-80

Interior separation

energy chain® configurator ▶



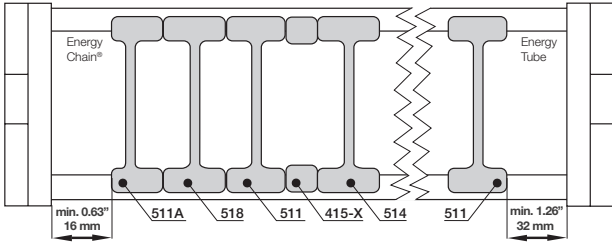
E4-80
H4-80
R4-80



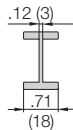
Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.

NOTE: Observe a lateral spacing of at least 1.30 in. (33mm) for Energy Tubes and .63 in. (16mm) for Energy Chain®. There is no minimum spacing needed for side plates



Vertical separator
501



Vertical separator

Unassembled **Part No. 501**

Assembled **Part No. 511**



Locking separator
504



Locking separator (for Energy Chains®)

Unassembled **Part No. 504**

Assembled **Part No. 514**



Locking separator
508



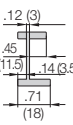
Locking separator (for Energy Chains®)

Unassembled **Part No. 508**

Assembled **Part No. 518**



Asymmetric separator
501A



Asymmetrical separator (for Energy Chains®)

Unassembled **Part No. 501A**

Assembled **Part No. 511A**



Spacers
405-XX



Spacer

(for Energy Chains®)

Unassembled **Part No. 405-XX**

Assembled **Part No. 415-XX**

XX = width of the spacer

Spacers available in the following sizes:

Part No. Unassembled	Part No. Assembled	in.	(mm)
405 -10	415 -10	.39"	(10)
405 -15	415 -15	.59"	(15)
405 -20	415 -20	.79"	(20)
405 -30	415 -30	1.18"	(30)
405 -40	415 -40	1.57"	(40)



- **Standard separator 501 for Energy Chains® and Energy Tubes**

This separator offers safe stability due to its wide base design, also when used with thick cables or hoses.

- **Locking separator 504 for Energy Chains®**

This separator features increased retention force for applications exposed to very high humidity and extreme loads. If locking separators are used, the Energy Chain® is more difficult to open.

- **Locking separator 508 for Energy Tubes**

This separator is used for applications that are exposed to extremely high humidity. The clamp at the side serves to uniformly align the separators. In order to avoid destroying the separators when opening the Energy Chain®, make sure all separators are identically aligned.

- **Asymmetrical separator 501A for Energy Chains®**

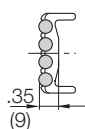
This separator is NOT for Energy Tubes. It features an (18mm) base and can be used in combinations between spacers of different widths and vertical separators in side mounted applications.

- **NOTE ON SPACERS**

Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications.

The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm)). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

Rollclip - minimizes abrasion of particularly sensitive hoses or cables in an Energy Chain®. The integrated rollers compensate for relative movement between the chain and the hose or cable. This reduces the abrasion of the hoses or cables



Rollclip

Unassembled **Part No. 489-27**

Assembled **Part No. 490-27**



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



igus® Energy Chain System®

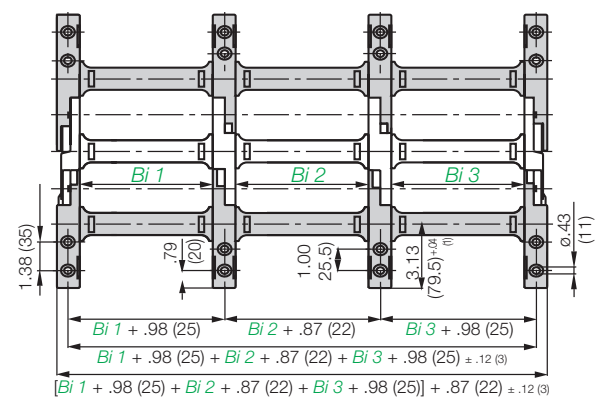


Extension links - for extremely wide Energy Chains® up to 9.84 ft (3m)

- For applications in which particularly high fill weights necessitate extremely wide Energy Chains® (up to 118" (3000 mm))
- The extension link design allows virtually limitless side-by-side attachment of chains
- The unsupported length of a chain can be increased when additional loads are required
- Extension links can be used with Energy Chains®, Energy Tubes or a combination of both
- They are suitable for unsupported and gliding applications in a guide trough
- Energy Chains® with extension links are attached with KMA or steel mounting brackets.

Part number example for Energy Chain®
E4-80-10/20/10-200-0
E4-80-Bi1/Bi2/Bi3-R-0

We **strongly recommend** on-site consultation with an igus® technician for individual advice regarding mounting brackets, guide troughs and other design details.



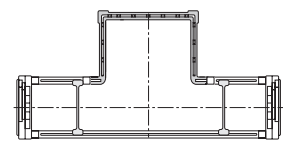
Telephone 1-800-521-2747
Fax 1-401-438-7270

Extender crossbars - For careful guiding of large diameter cables and hoses

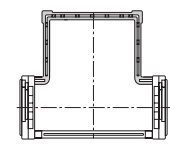
- Intended for cables and hoses with a maximum outer diameter of 10.63 in. (270 mm).
- Can be attached along either the inner or outer radius, inner radius preferred
- Gliding operation with crossbars assembled along the outer radius in conjunction with a special guide trough
- Gliding operation not guaranteed with crossbars assembled along the inner radius
- The extender crossbar can either be attached to the side links directly or can be used in combination with two standard snap-open crossbars.



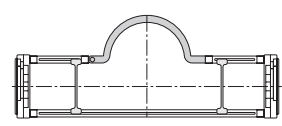
Consult igus® for your extender crossbar applications. We will be happy to assist you with your design layout.



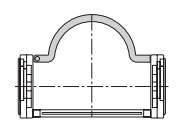
Square extender crossbar combined with standard snap-open crossbars.



Attached directly to the side link.



Round extender crossbar combined with standard snap-open crossbars.



Attached directly to the side link.

Part No.	Max Ø Hose	Style	Installation Side Link	Combined with Snap-Open Crossbars
450-15-RHD115	4.52 (115)	Round	No	Yes
450-17-RD115	4.52 (115)	Round	Yes	No
450-25-D150	5.91 (150)	Square	Yes	No
450-30-D200	7.87 (200)	Square	Yes	No
450-35-D250	8.66 (220)	Square	Yes	No
450-40-D300	10.63 (270)	Square	Yes	No
450-20-HD150	5.91 (150)	Square	No	Yes
450-25-HD200	7.87 (200)	Square	No	Yes
450-30-HD250	8.66 (220)	Square	No	Yes

E4 clip on cable binder

- For side mounted applications
- Serves as a clip-on, lateral guide for hoses and cables on Energy Chains®
- The loops can be adjusted as needed
- Compatible with many E4 Energy Chains®
- Economical
- One clip and one locking band are needed for each chain link



Part No.	Form
450-B12	Locking clip, comprised of a locking element
450-B12-200	Locking band, comprised of a locking element and band; 12 x 1.5 x 200 mm

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

Energy Chain system® E4-1

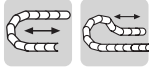
Series E4-80/H4-80/R4-80

Mounting Brackets KMA

energy chain® configurator ▶

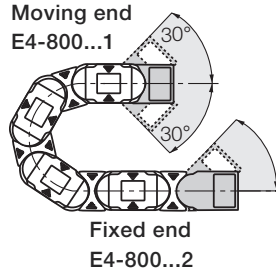


E4-80
H4-80
R4-80

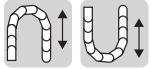
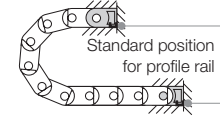


Option 1: pivoting

- Recommended for unsupported and gliding applications
- Attachment capability on all sides
- Bolted connection outside of chain cross-section
- Space restricted conditions
- Corrosion resistant

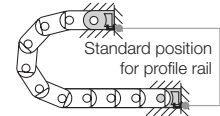
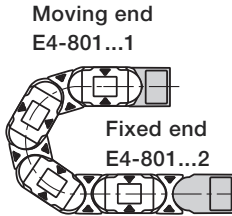


Standard



Option 2: locking

- Profile rail option
- Universal use
- Corrosion resistant
- Vertical hanging/standing travels
- Extreme accelerations



Part Number Structure

E4-800-07-12 P

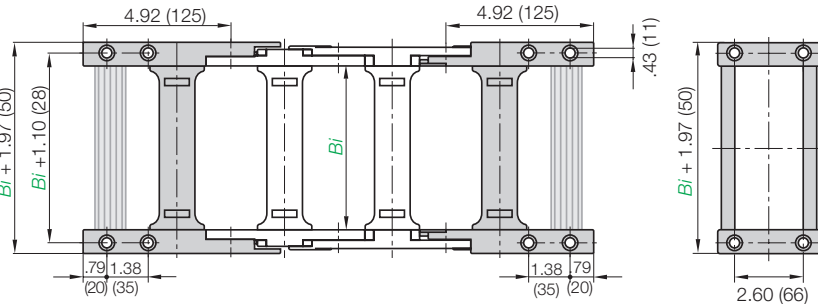
With Profile Rail

Complete Set

Width

E4-800 = Pivoting for chain
R4-800 = Pivoting for tube

E4-801 = Locking for chain
R4-801 = Locking for tube



Part number examples are shown for pivoting brackets for Energy Chain. For locking brackets change part number to 801

Part No. Full Set (pivoting)
Series E4-80 or H4-80
E4-800-Width-12

Part No. Full Set (pivoting)
with profile rail
Series E4-80 or H4-80
E4-800-Width-12P

Part No. Full Set (pivoting)
Tube Series R4-80
R4-800-Width-12

Part No. Full Set (pivoting)
with Profile Rail
Tube Series R4-80
R4-800-Width-12P

Due to the design of the E4-80 series chains, please note the following when ordering brackets:
Even number of links = full set, part number ending in -12
Odd number of links = 2 pieces, part number ending in -2

Width	Part No. Full Set chain/tube		With Profile Rail	Bi in. (mm)	Width	Part No. Full Set chain/tube		With Profile Rail	Bi in. (mm)		
	Pivoting	Locking				Pivoting	Locking				
-05*	E4-800	E4-801	-05-12	P	1.97 (50)	-31	E4-800	E4-801	-31-12	P	12.28 (312)
-06	E4-800	E4-801	-06-12	P	2.56 (65)	-32	E4-800	E4-801	-32-12	P	12.79 (325)
-07	E4-800	E4-801	-07-12	P	2.95 (75)	-33	E4-800	E4-801	-33-12	P	13.27 (337)
-08	E4-800	E4-801	-08-12	P	3.43 (87)	-35	E4-800	E4-801	-35-12	P	13.78 (350)
-10	E4-800	E4-801	-10-12	P	3.94 (100)	-36	E4-800	E4-801	-36-12	P	14.25 (362)
-11	E4-800	E4-801	-11-12	P	4.41 (112)	-37	E4-800	E4-801	-37-12	P	14.76 (375)
-12	E4-800	E4-801	-12-12	P	4.92 (125)	-38	E4-800	E4-801	-38-12	P	15.24 (387)
-13	E4-800	E4-801	-13-12	P	5.39 (137)	-40	E4-800/R4-800	E4-801/R4-801	-40-12	P	15.75 (400)
-15	E4-800	E4-801	-15-12	P	5.91 (150)	-41	E4-800	E4-801	-41-12	P	16.22 (412)
-16	E4-800	E4-801	-16-12	P	6.38 (162)	-42	E4-800	E4-801	-42-12	P	16.73 (425)
-17	E4-800	E4-801	-17-12	P	6.89 (175)	-43	E4-800	E4-801	-43-12	P	17.20 (437)
-18	E4-800	E4-801	-18-12	P	7.36 (187)	-45	E4-800	E4-801	-45-12	P	17.72 (450)
-20	E4-800/R4-800	E4-801/R4-801	-20-12	P	7.87 (200)	-46	E4-800	E4-801	-46-12	P	18.19 (462)
-21	E4-800	E4-801	-21-12	P	8.35 (212)	-47	E4-800	E4-801	-47-12	P	18.70 (475)
-22	E4-800	E4-801	-22-12	P	8.86 (225)	-48	E4-800	E4-801	-48-12	P	19.17 (487)
-23	E4-800	E4-801	-23-12	P	9.33 (237)	-50	E4-800	E4-801	-50-12	P	19.69 (500)
-25	E4-800/R4-800	E4-801/R4-801	-25-12	P	9.84 (250)	-51	E4-800	E4-801	-51-12	P	20.16 (512)
-26	E4-800	E4-801	-26-12	P	10.31 (262)	-52	E4-800	E4-801	-52-12	P	20.67 (525)
-27	E4-800	E4-801	-27-12	P	10.83 (275)	-53	E4-800	E4-801	-53-12	P	21.14 (537)
-28	E4-800	E4-801	-28-12	P	11.30 (287)	-55	E4-800	E4-801	-55-12	P	21.65 (550)
-30	E4-800/R4-800	E4-801/R4-801	-30-12	P	11.81 (300)	-60	E4-800	E4-801	-60-12	P	23.62 (600)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



igus® Energy Chain System®

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Fax 1-401-438-7270

Internet: <http://www.igus.com>
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QuickSpec: <http://www.igus.com/quickspec>

Chainfix clamps for the profile rail



igus® Chainfix strain relief elements are available in either steel or stainless steel. They can be adjusted with a hexagon socket and are available in single, double and triple configurations.

Part No. Single Clamp		Part No. Double Clamp		Part No. Triple Clamp		Cable ø	
Steel	Stainless	Steel	Stainless	Steel	Stainless	in.	(mm)
CFX12-1	CFX12-1E	CFX12-2	CFX12-2E	CFX12-3	-	.24 - .47	(06 - 12)
CFX14-1	CFX14-1E	CFX14-2	CFX14-2E	CFX14-3	-	.47 - .55	(12 - 14)
CFX16-1	CFX16-1E	CFX16-2	CFX16-2E	CFX16-3	-	.55 - .63	(14 - 16)
CFX18-1	CFX18-1E	CFX18-2	CFX18-2E	CFX18-3	-	.63 - .71	(16 - 18)
CFX20-1	CFX20-1E	CFX20-2	CFX20-2E	CFX20-3	-	.71 - .79	(18 - 20)
CFX22-1	CFX22-1E	CFX22-2	CFX22-2E	CFX22-3	-	.79 - .87	(20 - 22)
CFX26-1	CFX26-1E	CFX26-2	CFX26-2E	-	-	.87 - 1.02	(22 - 26)
CFX30-1	CFX30-1E	CFX30-2	CFX30-2E	-	-	1.02 - 1.18	(26 - 30)
CFX34-1	CFX34-1E	CFX34-2	CFX34-2E	-	-	1.18 - 1.34	(30 - 34)
CFX38-1	CFX38-1E	-	-	-	-	1.34 - 1.50	(34 - 38)
CFX42-1	CFX42-1E	-	-	-	-	1.50 - 1.65	(38 - 42)

For more information please refer to strain relief section of Chapter 10 in main catalog

Chainfix Clip

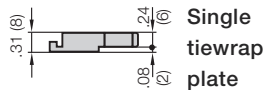
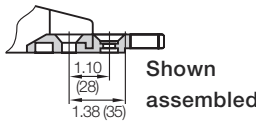


Modular snap-on strain relief device

Chainfix clips are available for cable diameters ranging from .16" (4mm) to .94" (24 mm). They are for assembly on KMA mounting brackets, clip-on strain relief for crossbars as well as profile rails. Quick assembly without the use of tools. **For more information please refer to strain relief section of Chapter 10 in main catalog**

Cable ø	Part No. Clamp	Part No. Bottom
.16-.31 (04-08)	CFC-08-M	CFC-08-C
.31-.47 (08-12)	CFC-12-M	CFC-12-C
.47-.63 (12-16)	CFC-16-M	CFC-16-C
.63-.79 (16-20)	CFC-20-M	CFC-20-C
.79-.94 (20-24)	CFC-24-M	CFC-24-C

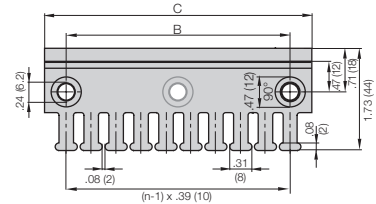
Tiewrap Plates



Option 1: Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



If used with KMA brackets with profile rail please add "KMA" to the end of the part number.

Example: 3050-ZBKMA

For more information please refer to strain relief section of Chapter 10 in main catalog

Option 2: Clip-on Tiewrap plates

Available as a clip-on tiewrap plate without the use of bolts They are inserted and removed with a screwdriver used as a lever. Clip-on tiewrap plates are also available as an attachment to the opening crossbars.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
3050-ZC	5	1.97 (50)
3075-ZC	7	2.95 (75)

For more information please refer to strain relief section of Chapter 10 in main catalog



Energy Chain system® E4-1

Series E4-80/H4-80/R4-80

Guide Trough

energy chain® configurator ▶



E4-80
H4-80
R4-80

Width of Crossbar
E4-80-05-200-0

	B_{Ri}	Installation Part No.
-05	4.13 (105)	96-50-225
-06	4.72 (120)	96-50-250
-07	5.12 (130)	96-50-250
-08	5.59 (142)	96-50-275
-10	6.10 (155)	96-50-275
-11	6.61 (168)	96-50-300
-12	7.09 (180)	96-50-300
-13	7.60 (193)	96-50-325
-15	8.07 (205)	96-50-325
-16	8.58 (218)	96-50-350
-17	9.06 (230)	96-50-350
-18	9.57 (243)	96-50-375
-20	10.04 (255)	96-50-375
-21	10.55 (268)	96-50-400
-22	11.02 (280)	96-50-400
-23	11.54 (293)	96-50-425
-25	12.01 (305)	96-50-425
-26	12.52 (318)	96-50-450
-27	12.99 (330)	96-50-450
-28	13.50 (343)	96-50-475
-30	13.98 (355)	96-50-475
-31	14.49 (368)	96-50-500
-32	14.96 (380)	96-50-500
-33	15.47 (393)	96-50-525
-35	15.94 (405)	96-50-525
-36	16.46 (418)	96-50-550
-37	16.93 (430)	96-50-550
-38	17.44 (443)	96-50-575
-40	17.91 (455)	96-50-575
-41	18.43 (468)	96-50-600
-42	18.90 (480)	96-50-600
-43	19.41 (493)	96-50-625
-45	19.88 (505)	96-50-625
-46	20.39 (518)	96-50-650
-47	20.87 (530)	96-50-650
-48	21.38 (543)	96-50-675
-50	21.85 (555)	96-50-675
-51	22.36 (568)	96-50-700
-52	22.83 (580)	96-50-700
-53	23.35 (593)	96-50-725
-55	23.82 (605)	96-50-725
-60	25.79 (655)	96-50-775

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part No. 99-30
- 1/2 travel length glide bars
Part No. 93-01
- Installation sets as end connectors
Part No. 96-50-XX

-XX indicates the length of the profile rails on which the guide trough is mounted. The values and part numbers are specified in the table on the right. The standard length of the trough components and glide bars is 6.56 ft (2 m). The overall length of the guide trough directly correlates to the length of travel.

Example:

Length of travel 164 ft (50 m)
Center-mounted

Required guide troughs:

164 ft (50 m) guide trough, 82 ft. (25 m) glide bar

= 25 sections of 6.56 ft (2 m) guide trough

Part No. 99-30

= 13 sections of 6.56 ft (2 m) glide bar

Part No. 93-01

Required number of installation set:

= Number of guide trough components + 1

= 25 + 1 = 26

Part No. of the installation sets **96-50-XXX**

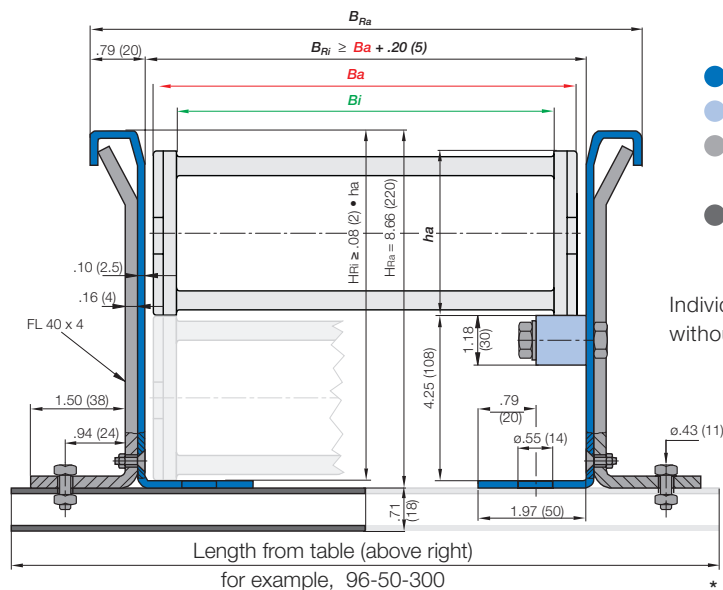
Example: 96-50-400 for 15.75 (400 mm) long profile rail



Left: Guide trough with glide bars
Right: Guide troughs without glide bars



Installation sets as section connectors



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

* Specialized guide trough available upon request

Standard length profile rail

For further technical information on guide troughs
▶ Chapter 9

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index



Series 840

Special Options Available



ESD classification:
Electrically conductive
ESD/ATEX version upon request

Assembly Tips



Opening Energy Chains®: Remove cross-bars and clips - Insert screwdriver into the slot, push down, release by lever action

Other Installation Methods

Vertical, hanging ≤ 394 ft (120 m)

Vertical, standing ≤ 19.69 ft (6 m)

Side-mounted, unSUP. ≤ 19.69 ft (6 m)

Rotary requires further calculation

Usage Guidelines



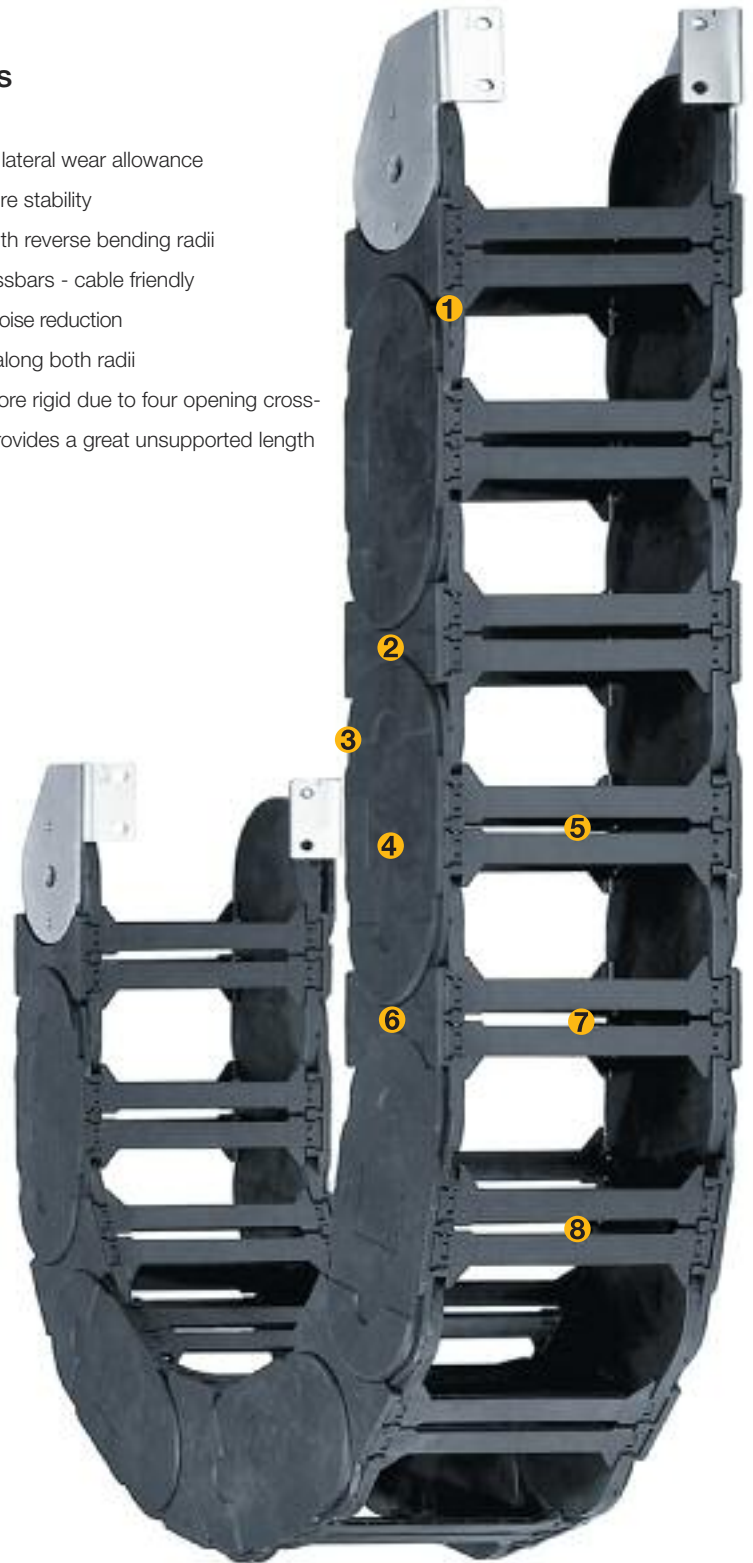
- If a particularly big and stable Energy Chain® is required
- At very high speeds and/or accelerations
- For long travels
- For high additional loads
- Large cable/hose diameters



- If a more stable Energy Chain® with identical inner height is required
➤ Series 800

Features & Benefits

- 1 Dirt-repellent exterior
- 2 Optimized glide pads with lateral wear allowance
- 3 Tongue and groove for more stability
- 4 Energy Chain® available with reverse bending radii
- 5 Wide, rounded plastic crossbars - cable friendly
- 6 Stop dog with "brake" for noise reduction
- 7 Crossbars are removable along both radii
- 8 Each chain link is made more rigid due to four opening cross-bars, and consequently provides a great unsupported length



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

23 ft (7 m) 840-30-350-0



Energy Chain®

With 2 separators 8411 assembled every 2nd link



Interior Separation

1 Set 8000-12



Mounting Bracket

Energy Chain system® Series 840 Installation Dimensions

energy chain® configurator ▶

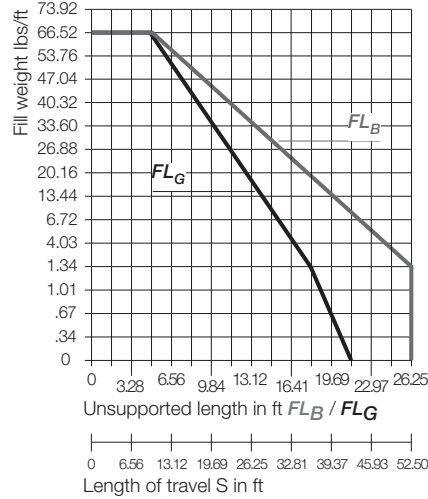
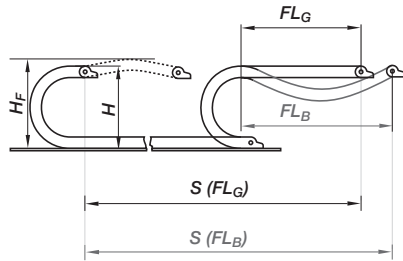
igus®

840

Short travel, unsupported length

- FL_B = unsupported with permitted sag
- FL_G = unsupported with straight upper run

Further information ▶ Design, Chapter 1, main catalog

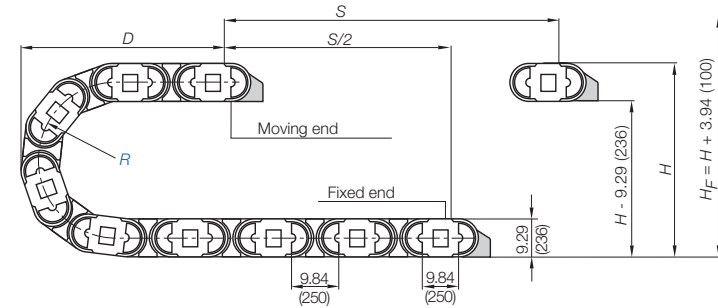


Short Travels - Unsupported

Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height
- H_{ri} = Trough inner height
- H_2 = *Mounting height
- D_2 = Overlength - long travels, gliding
- K_2 = *Add-on
- *If the mounting bracket location is set lower



Pitch per link = 9.84" (250 mm)
Links per ft (m) = 1.22 (4)
For center mount applications:
Chain length = $S/2 + K$

The required clearance height: $H_F = H + 3.94$ in. (100 mm) (with 3.36 lbs/ft (5 kg/m) fill weight). Please consult igus® if space is particularly restricted.

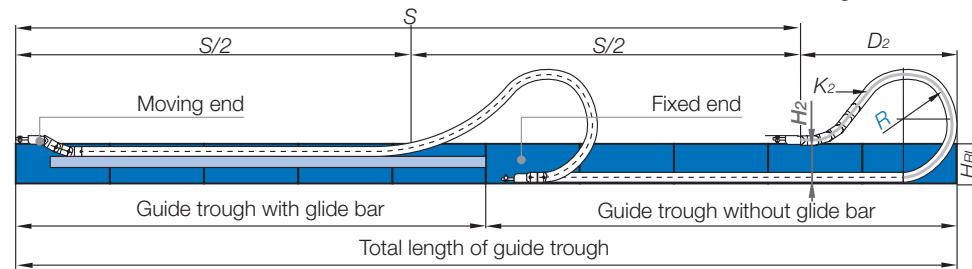
R	12.80 (325)	13.78 (350)	15.75 (400)	17.72 (450)	19.69 (500)	23.62 (600)	29.53 (750)	39.37 (1000)
H^*	34.88 (886)	36.85 (936)	40.79 (1036)	44.72 (1136)	48.66 (1236)	56.53 (1436)	68.34 (1736)	88.03 (2236)
D	28.54 (725)	29.53 (750)	31.50 (800)	33.46 (850)	35.43 (900)	39.37 (1000)	45.27 (1150)	55.12 (1400)
K	60.04 (1525)	62.99 (1600)	69.29 (1760)	75.39 (1915)	81.69 (2075)	93.90 (2385)	112.60 (2860)	143.50 (3645)

For long travels with lowered mounting height

Please consult igus® when choosing to use a lowered mounting height with this series

Long travel lengths from 32.8 ft. (10 m) to max. 1,476 ft. (450 m)

For center mount applications:
Chain length = $S/2 + K_2$



Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.

Design, Chapter 1, main catalog

Technical Data

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB



Details of material properties

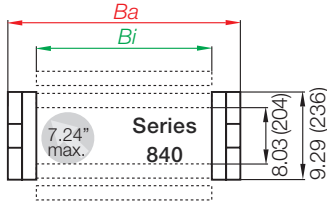
▶ Chapter 1, main catalog



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

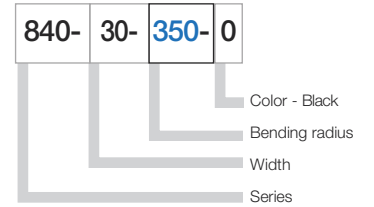


Series 840 - Energy Chain® with crossbars every link



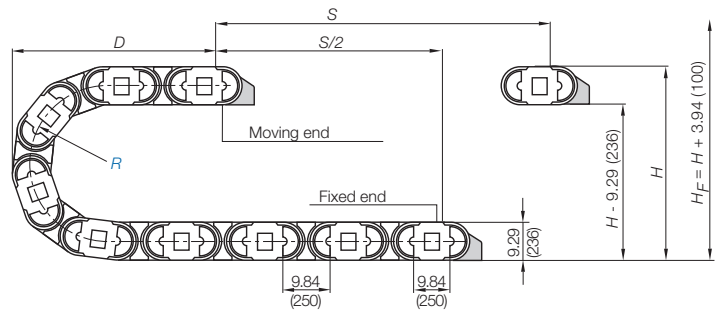
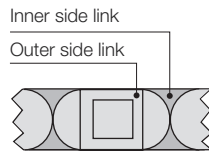
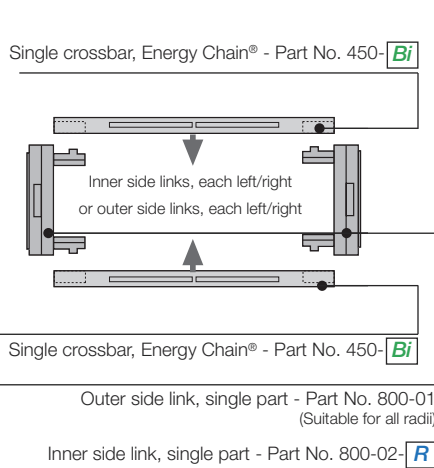
- Crossbars every link
- For use with rigid hydraulic hoses
- For particularly demanding applications
- Can be opened from both sides

Part Number Structure



Telephone 1-800-521-2747
Fax 1-401-438-7270

Energy Chain® as separate parts, links and side plates



Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

Supplement part number with required radius. Example: 840-30-350-0

Pitch: 9.84 in. (250 mm) per link links/ft(m) = 1.22 (4)

Part Number.		<i>Bi</i>	<i>Ba</i>	840
Crossbars		in. (mm)	in. (mm)	lbs/ft (kg/m)
Every link				
840-13-	<input type="text"/> -0	3.94 (100)	6.30 (160)	≈ 9.30 (13.84)
840-15-	<input type="text"/> -0	4.45 (113)	6.81 (173)	≈ 9.32 (13.87)
840-16-	<input type="text"/> -0	4.92 (125)	7.28 (185)	≈ 9.37 (13.95)
840-17-	<input type="text"/> -0	5.43 (138)	7.80 (198)	≈ 9.43 (14.04)
840-18-	<input type="text"/> -0	5.91 (150)	8.27 (210)	≈ 9.49 (14.13)
840-20-	<input type="text"/> -0	6.42 (163)	8.78 (223)	≈ 9.52 (14.17)
840-21-	<input type="text"/> -0	6.89 (175)	9.25 (235)	≈ 9.56 (14.22)
840-22-	<input type="text"/> -0	7.40 (188)	9.76 (248)	≈ 9.59 (14.27)
840-23-	<input type="text"/> -0	7.87 (200)	10.24 (260)	≈ 9.64 (14.35)
840-25-	<input type="text"/> -0	8.38 (213)	10.75 (273)	≈ 9.70 (14.43)
840-26-	<input type="text"/> -0	8.86 (225)	11.22 (285)	≈ 9.74 (14.49)
840-27-	<input type="text"/> -0	9.37 (238)	11.73 (298)	≈ 9.79 (14.57)
840-28-	<input type="text"/> -0	9.84 (250)	12.20 (310)	≈ 9.82 (14.61)
840-30-	<input type="text"/> -0	10.35 (263)	12.72 (323)	≈ 9.89 (14.72)
840-31-	<input type="text"/> -0	10.83 (275)	13.19 (335)	≈ 9.91 (14.75)
840-32-	<input type="text"/> -0	11.34 (288)	13.70 (348)	≈ 9.96 (14.82)
840-33-	<input type="text"/> -0	11.81 (300)	14.17 (360)	≈ 10.02 (14.91)
840-35-	<input type="text"/> -0	12.32 (313)	14.69 (373)	≈ 10.12 (15.06)
840-36-	<input type="text"/> -0	12.80 (325)	15.16 (385)	≈ 10.14 (15.09)
840-37-	<input type="text"/> -0	13.31 (338)	15.67 (398)	≈ 10.15 (15.11)
840-38-	<input type="text"/> -0	13.78 (350)	16.14 (410)	≈ 10.18 (15.15)
840-40-	<input type="text"/> -0	14.29 (363)	16.65 (423)	≈ 10.31 (15.34)
840-41-	<input type="text"/> -0	14.76 (375)	17.13 (435)	≈ 10.34 (15.39)
840-42-	<input type="text"/> -0	15.28 (388)	17.64 (448)	≈ 10.42 (15.50)
840-43-	<input type="text"/> -0	15.75 (400)	18.11 (460)	≈ 10.46 (15.57)
840-45-	<input type="text"/> -0	16.26 (413)	18.62 (473)	≈ 10.50 (15.63)
840-46-	<input type="text"/> -0	16.73 (425)	19.09 (485)	≈ 10.54 (15.69)
840-47-	<input type="text"/> -0	17.24 (438)	19.61 (498)	≈ 10.56 (15.72)
840-48-	<input type="text"/> -0	17.72 (450)	20.08 (510)	≈ 10.62 (15.80)
840-50-	<input type="text"/> -0	18.23 (463)	20.59 (523)	≈ 10.66 (15.87)
840-51-	<input type="text"/> -0	18.70 (475)	21.06 (535)	≈ 10.69 (15.91)
840-52-	<input type="text"/> -0	19.21 (488)	21.57 (548)	≈ 10.70 (15.93)
840-53-	<input type="text"/> -0	19.69 (500)	22.05 (560)	≈ 10.75 (16.00)
840-55-	<input type="text"/> -0	20.20 (513)	22.56 (573)	≈ 10.96 (16.31)
840-60-	<input type="text"/> -0	22.17 (563)	24.53 (623)	≈ (11.07 16.47)

Choose from the radii below for all of the above sizes

Radius (mm) Example: 840-30-350-0

	325	350	400	450	500	600	750	1000
R	12.80 (325)	13.78 (350)	15.75 (400)	17.72 (450)	19.69 (500)	23.62 (600)	29.53 (750)	39.37 (1000)
H*	34.88 (886)	36.85 (936)	40.79 (1036)	44.72 (1136)	48.66 (1236)	56.53 (1436)	68.34 (1736)	88.03 (2236)
D	28.54 (725)	29.53 (750)	31.50 (800)	33.46 (850)	35.43 (900)	39.37 (1000)	45.27 (1150)	55.12 (1400)
K	60.04 (1525)	62.99 (1600)	69.29 (1760)	75.39 (1915)	81.69 (2075)	93.90 (2385)	112.60 (2860)	143.50 (3645)

0 = Standard color black. For other colors see Chapter 1, main catalog

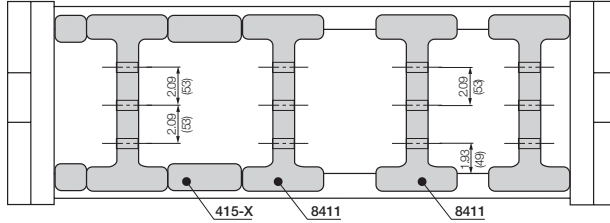
PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



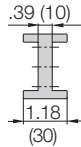


Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.



Vertical separator
8401



Vertical separator

Unassembled	Part No. 8401
Assembled	Part No. 8411



Spacers
405-XX



Spacer (chain only)

Unassembled	Part No. 405.XX
Assembled	Part No. 415.XX

Spacers available in the following sizes:

Part No. Unassembled	Part No. Assembled	in.	(mm)
405 -10	415 -10	.39"	(10)
405 -15	415 -15	.59"	(15)
405 -20	415 -20	.79"	(20)
405 -30	415 -30	1.18"	(30)
405 -40	415 -40	1.57"	(40)

- Standard separator 8401 for Energy Chains®**
 This separator offers safe stability due to its wide base design, also when used with thick cables or hoses.

- NOTE ON SPACERS**
 Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications. The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm)). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

Energy Chain system® E4

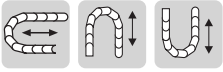
Series 840

Mounting Brackets

energy chain® configurator ▶

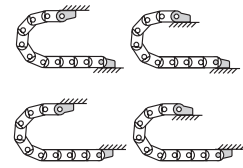
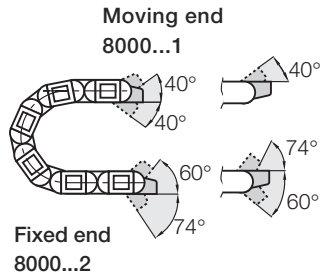


840

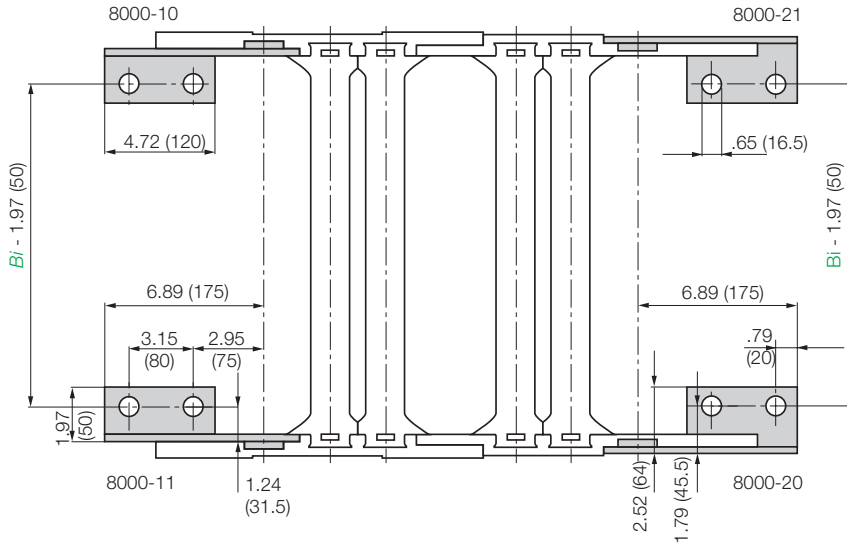


Option 1: pivoting

- For pivoting connections
- One part for all chain widths
- Electrically conductive



Possible installation configurations -



Part No.	Mounting bracket
8000-12	Full set
8000-1	Mounting bracket set moving end (one side) for outer side link
8000-2	Mounting bracket set fixed end (one side) for inner side link

Due to the design of the E4/100 series chains, please note the following when ordering brackets:

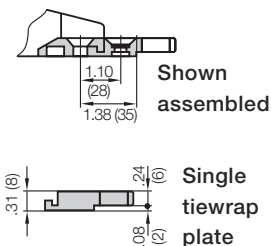
- Even number of links = full set, part number ending in -12
- Odd number of links = 2 pieces, part number ending in -2

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS

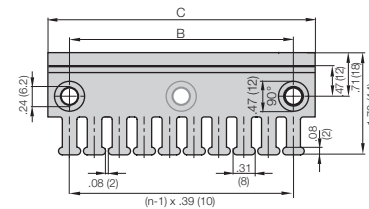
Strain Relief

Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.



Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



For more information please refer to strain relief section of Chapter 10 in main catalog



igus® Energy Chain System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

Width of Crossbar
840-20-200-0

	B_{Ri}	Installation Part No.
-13	6.49 (165)	90-50-350
-15	7.01 (178)	90-50-350
-16	7.48 (190)	90-50-375
-17	7.99 (203)	90-50-375
-18	8.46 (215)	90-50-400
-20	8.98 (228)	90-50-400
-21	9.45 (240)	90-50-425
-22	9.96 (253)	90-50-425
-23	10.43 (265)	90-50-450
-25	10.94 (278)	90-50-450
-26	11.42 (290)	90-50-475
-27	11.93 (303)	90-50-475
-28	12.40 (315)	90-50-500
-30	12.91 (328)	90-50-500
-31	13.39 (340)	90-50-525
-32	13.90 (353)	90-50-525
-33	14.37 (365)	90-50-550
-35	14.88 (378)	90-50-550
-36	15.35 (390)	90-50-575
-37	15.87 (403)	90-50-575
-38	16.34 (415)	90-50-600
-40	16.85 (428)	90-50-600
-41	17.32 (440)	90-50-625
-42	17.83 (453)	90-50-625
-43	18.31 (465)	90-50-650
-45	18.82 (478)	90-50-650
-46	19.29 (490)	90-50-675
-47	19.80 (503)	90-50-675
-48	20.20 (513)	90-50-700
-50	20.79 (528)	90-50-700
-51	21.26 (540)	90-50-725
-52	21.77 (553)	90-50-725
-53	22.24 (565)	90-50-750
-55	22.76 (578)	90-50-750
-60	26.18 (665)	90-50-800

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part No. 90-30
- 1/2 travel length glide bars
Part No. 90-31
- Installation sets as end connectors
Part No. 90-50-XX

-XX indicates the length of the profile rails on which the guide trough is mounted. The values and part numbers are specified in the table on the right. Standard length of the trough components and glide bars is 6.56 ft (2m).

The required overall length of the guide trough directly correlates to the length of travel.

Example:

Length of travel 164 ft (50m)
Center mounted

Required guide troughs:

- 164 ft (50 m) guide trough
- 82 ft (25 m) glide bars
- = 25 sections of (2 m) guide trough without glide bars **Part No. 90-30**
- = 13 section of (2 m) guide troughs with glide bars **Part No. 90-31**

Required number of installation sets:

- = Number of guide trough components + 1
- = 25 + 1 = 26

Part number of the installation sets

90-50-XXX

Example:

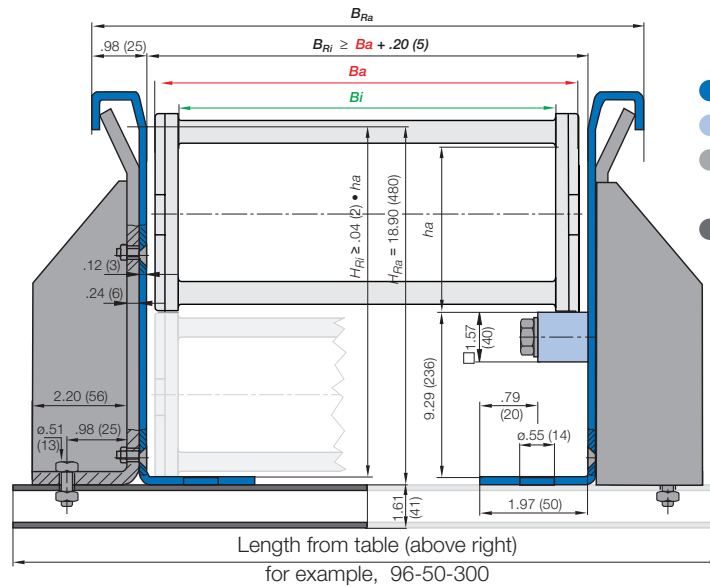
90-50-400 for (400 m) long profile rail



Left: Guide trough with glide bars
Right: Guide troughs without glide bars



Installation sets as section connectors



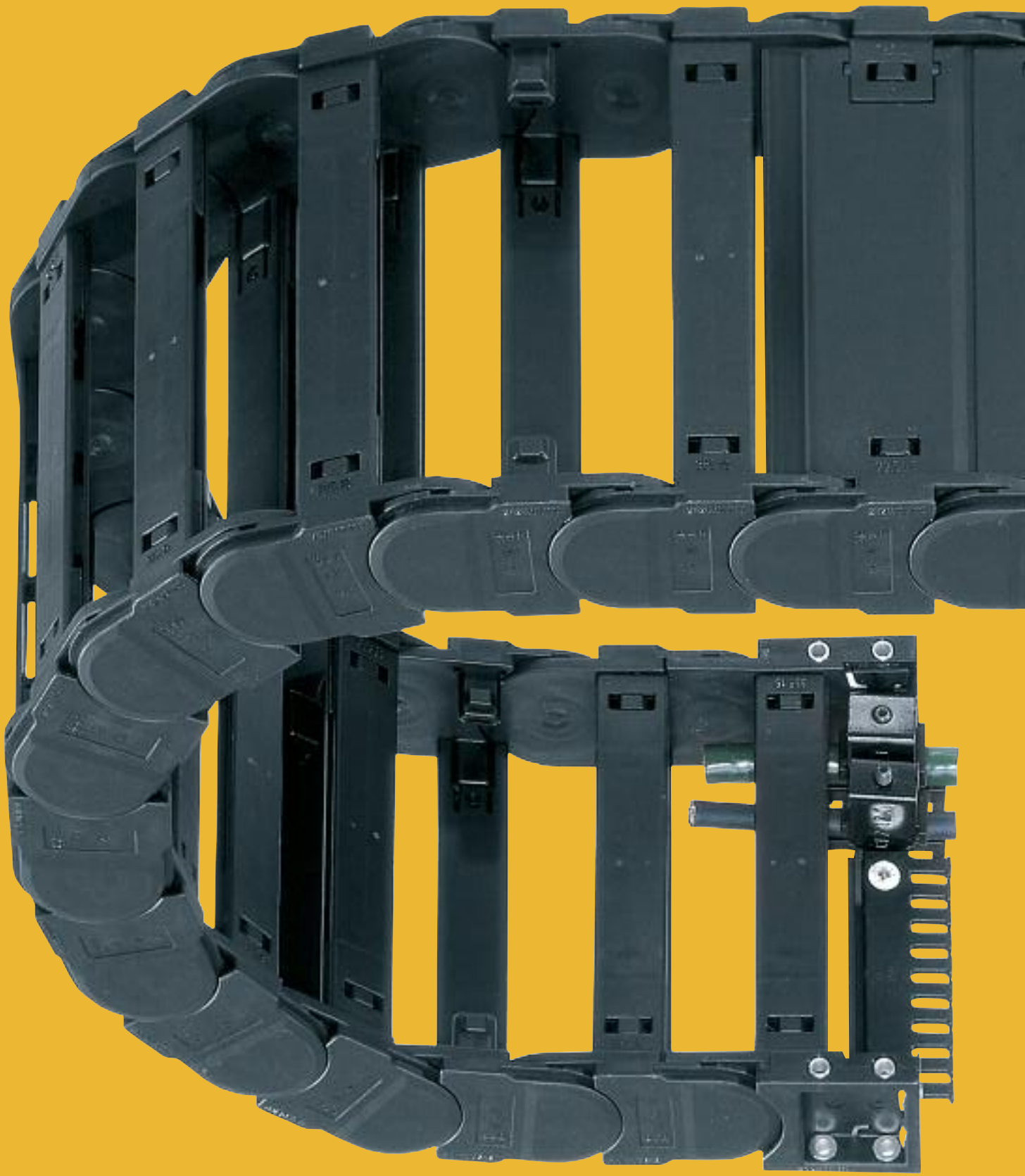
- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

* Specialized guide trough available upon request

For further technical information on guide troughs
➤ Chapter 9

Standard length profile rail





E4/4

E4/4 - for long travels and side-mounted applications

System E4/4 is ideal for extremely long travel lengths and also works especially well in free-hanging, side-mounted applications. The Energy Chain®'s special 'roller' links are the key to enabling longer travels. The side links are designed to create an overlapping multipurpose grip, which increases stability for heavier side loads. E4/4 can also withstand 50 percent greater push-pull forces than the next comparable Energy Chain design and is resistant to dirt and debris. E4/4 is also available in a special conductive plastic called igumid ESD for use in ESD / ATEX applications.

Typical industries and applications

- Unsupported, side mounted applications
- Cranes: RTG, Quay cranes, many more
- Compost plants
- Construction machines
- Gypsum plants, concrete plants, chemical plants
- Agricultural plants
- ESD applications
- Heavy machinery
- Steel plants
- Shipyards
- General machinery



ATEX/ESD: Excellent performance with the special material igumid ESD (upon request) "Rear grip" achieves long-term electrical conductivity



Side-mounted - unsupported



High torsional rigidity



System E4/4 approved with long travels



System E4 - 4-piece Energy Chain® links





Many successful Rol E-Chain® applications, i.e. one of the igus® longest travels at the moment on 2 ship unloaders in Malaysia, both equipped with a Rol E-Chain® at (441.3 m) travel length



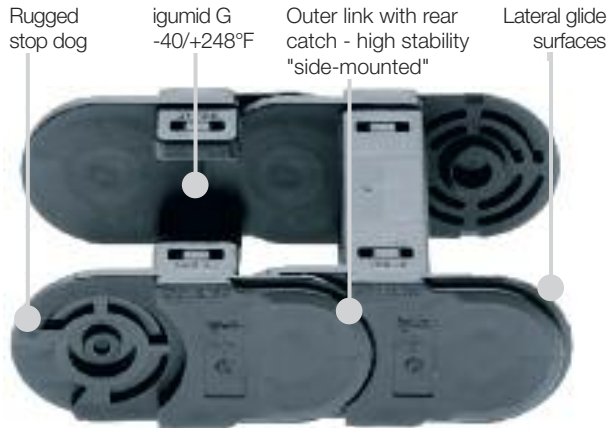
Special case: Side-mounted, unsupported - undercut design offers stability



656 ft. (200 m) travels and more possible

Energy Chain System® E4/4 Selection Guide

energy chain® configurator 



- Best unsupported lengths "side-mounted"
- Rol E-Chain® links available
- For very long travels up to 492-820 ft. (150 - 250 m)
- High torsional rigidity
- Good for tough environments with dirt and debris
- ESD version available
- Interior separation tool box available
- You can find more technical data about the material, chemical resistance, temperatures ► [Design, Chapter 1](#)

Crossbars every link for particularly demanding applications



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Bending radius <i>R</i> in. (mm)
2828	1.25 (32)	1.97-15.75 (50-400)	2.91-16.69 (74-424)	2.13 (54)	2.48-11.81 (63-300)
3838	1.65 (42)	1.97-15.75 (50-400)	3.03-16.81 (77-427)	2.52 (64)	2.95-13.78 (75-350)
4040	2.20 (56)	1.97-23.62 (50-600)	3.39-25.04 (86-636)	3.31 (84)	5.31-19.69 (135-500)
5050	3.15 (80)	1.97-23.62 (50-600)	3.94-25.59 (100-650)	4.25 (108)	5.91-39.37 (150-1000)

Crossbars every 2nd link for almost all applications



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Bending radius <i>R</i> in. (mm)
2828	1.25 (32)	1.97-15.75 (50-400)	2.91-16.69 (74-424)	2.13 (54)	2.48-11.81 (63-300)
3838	1.65 (42)	1.97-15.75 (50-400)	3.03-16.81 (77-427)	2.52 (64)	2.95-13.78 (75-350)
4140	2.20 (56)	1.97-23.62 (50-600)	3.39-25.04 (86-636)	3.31 (84)	5.31-19.69 (135-500)
5050	3.15 (80)	1.97-23.62 (50-600)	3.94-25.59 (100-650)	4.25 (108)	5.91-39.37 (150-1000)

Energy Tubes fully enclosed, excellent cable protection for hot chips up to 1,562°F



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Bending radius <i>R</i> in. (mm)
R7728	1.25 (32)	1.97-11.81 (50-300)	2.91-12.76 (74-324)	2.13 (54)	4.92-11.81 (125-300)
R7838	1.65 (42)	1.97-11.81 (50-300)	3.03-12.87 (77-327)	2.52 (64)	4.92-13.78 (125-350)
R8840	2.20 (56)	2.95-18.19 (75-462)	4.37-19.65 (111-499)	3.31 (84)	5.91-19.69 (150-500)
R9850	3.15 (80)	2.95-18.19 (75-462)	4.92-20.20 (125-513)	4.25 (108)	7.87-39.37 (200-1000)

Energy Chain System® E4/4 Assembly Instructions

Energy Chains® and Energy Tubes - Assembling



1 Remove crossbars at connection point. Slide side links into each other - Press together



2 Join the side links - join the second side link by pressing from the top



3 Join the side links together on the opposite side by applying pressure to the outer link



4 Assemble crossbars - Push down and snap in by using a screwdriver

Assembling continued



5 Assemble clips (Energy Chains® with crossbars every other link) - Push down and snap in



6 Assemble Energy Tube lids/bottoms - Attach to the connector at an angle - Snap in

Energy Chains® and Energy Tubes - Separating



1 Remove crossbars, clips, and lids on two adjacent chain links. Guide the screwdriver into the slot between side links and release it by levering it and separate the Energy Chain®



Energy Chains® - Opening



1 Remove crossbars - Insert screwdriver into the slot, using a lever action, apply pressure to the screwdriver to remove the crossbar.



2 Remove clips - Insert screwdriver into the slot, using a lever action, apply pressure to the screwdriver to remove the clip

Energy Tube - Opening



1 Remove lids/bottoms - Insert screwdriver into the slot, using a lever action apply pressure to the screwdriver to release

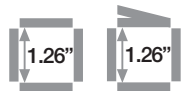


2 Release only **one side** to open the lid

2828
2928
R7728



Energy Chain System® E4/4 Series 2828/2928/R7728



Price Index



Series 2828

Series 2928

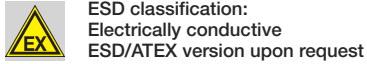


Series R7728

Special Features / Options



Side-mounted - unsupported



ESD classification:
Electrically conductive
ESD/ATEX version upon request



High torsional rigidity

Assembly Tips



Opening Energy Chains®: Remove crossbars and clips - Insert screwdriver into the slot, push down, release by lever action



Remove lids/bottoms (Energy Tubes) - Insert screwdriver into the slot, release by lever action

Other Installation Methods

Vertical, hanging ≤ 230 ft (70 m)

Vertical, standing ≤ 16.4 ft (5 m)

Side-mounted, un_supp. ≤ 6.56 ft (2 m)

Rotary requires further calculation

Usage Guidelines



- If subject to high torsional or shearing forces
- If a side-mounted chain/tube with long unsupported lengths is required
- If subject to very damp environments consistently



- If a quieter version is required
➤ Series 280/290/R770

Features & Benefits

- 1 KMA mounting brackets with attachment points on all sides
- 2 Crossbars on Energy Chains® are removable along both radii
- 3 Hinged snap-open removable lids along outer radius of Energy Tube
- 4 Lateral glide surfaces for side-mounted operation
- 5 High side-mount stability due to undercut
- 6 Locking or pivoting mounting brackets available
- 7 Closed and open styles can be combined
- 8 High torsional rigidity
- 9 Removable lids along inner radius
- 10 Wide, rounded plastic crossbars - cable friendly
- 11 Energy Chain® also available with reverse bending radii



RoI E-Chain® Series
2828R/7728R available
upon request

Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator ▶

9.84 ft (3 m) 2828-30-300-0

Energy Chain®

With 2 separators 281 assembled every 2nd link

Interior Separation

1 Set 282800-30-12P

Mounting Bracket

Energy Chain System® E4/4 Series 2828/2928/R7728 Installation Dimensions

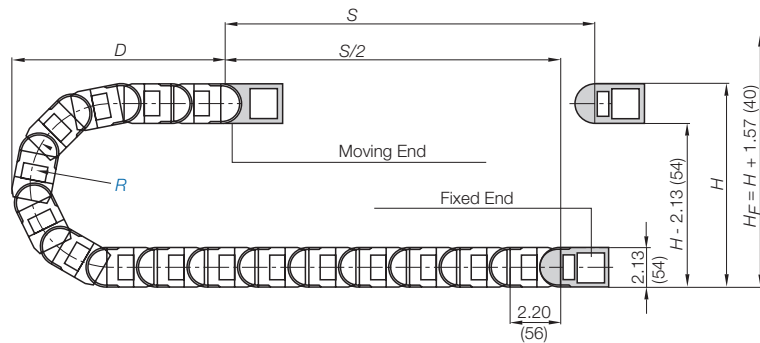
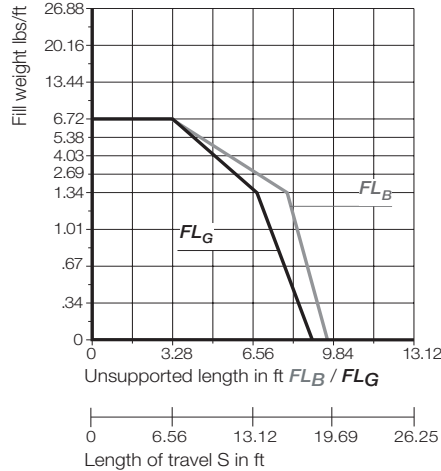
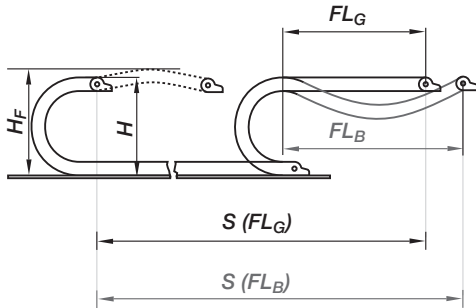
energy chain® configurator



2828
2928
R7728

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1



Pitch per link: = 2.20" (56 mm)
Links per ft (m): = 5.48 (18)
For center mount applications:
Chain length = $S/2 + K$

The required clearance height: $H_F = H + 1.57$ in. (40 mm) (with 1.34 lbs/ft (2 kg/m) fill weight).
Please consult igus® if space is particularly restricted.

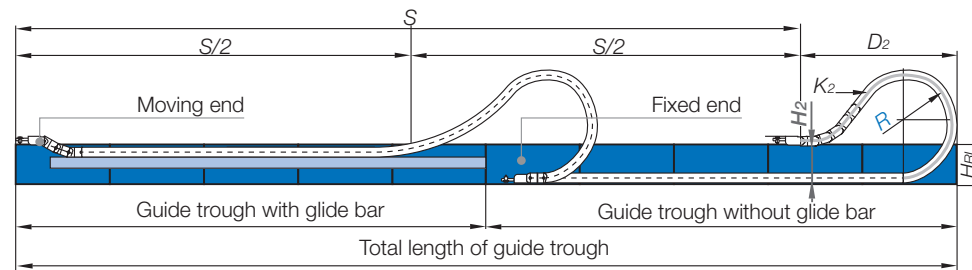
R	2.48 (063)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.66 (220)	9.84 (250)	11.81 (300)
H_{+20}	7.09 (180)	8.07 (205)	10.04 (255)	12.01 (305)	13.98 (355)	15.94 (405)	17.91 (455)	19.49 (495)	21.85 (555)	25.79 (655)
D	5.12 (130)	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	9.84 (250)	10.83 (275)	11.61 (295)	12.80 (325)	14.76 (375)
K	13.39 (340)	14.96 (380)	18.31(465)	21.65 (550)	24.41 (620)	27.56 (700)	30.70 (780)	33.46 (850)	37.01 (940)	43.70 (1110)

For long travels with lowered mounting height

Long travel lengths from 32.8 ft.(10m) to max. 656 ft. (200m)

For center mount applications:

Chain length = $S/2 + K_2$



R	2.48 (063)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.66 (220)	9.84 (250)	11.81 (300)
H_2	-	-	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)
D_{+20}	-	-	14.57 (370)	17.52 (445)	24.61 (625)	25.79 (655)	30.31 (770)	34.25 (870)	36.61 (930)	48.82 (1240)
K_2	-	-	24.25 (616)	30.87 (784)	39.68 (1008)	41.89 (1064)	50.71 (1288)	57.32 (1456)	61.73 (1568)	77.17 (1960)

For support of the lower run, see Chapter 9 for the Support Tray tool kit

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height
- H_{RI} = Trough inner height
- H_2 = *Mounting height
- D_2 = Overlength - long travels, gliding
- K_2 = *Add-on
- *If the mounting bracket location is set lower



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.

Design, Chapter 1

Technical Data

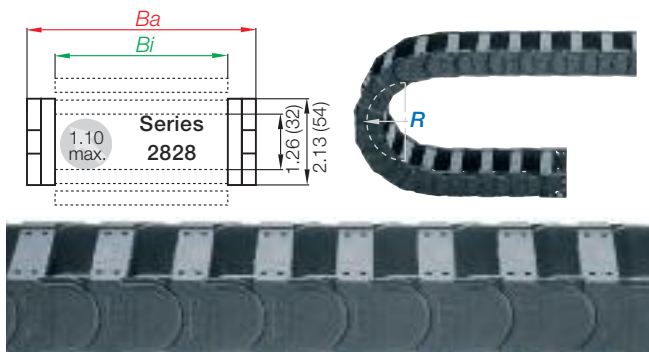


Details of material properties

Chapter 1

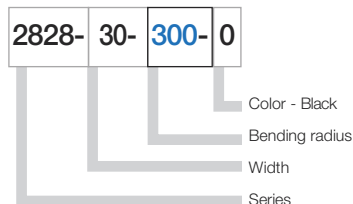
Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

Series 2828 - Energy Chain® with crossbars every link

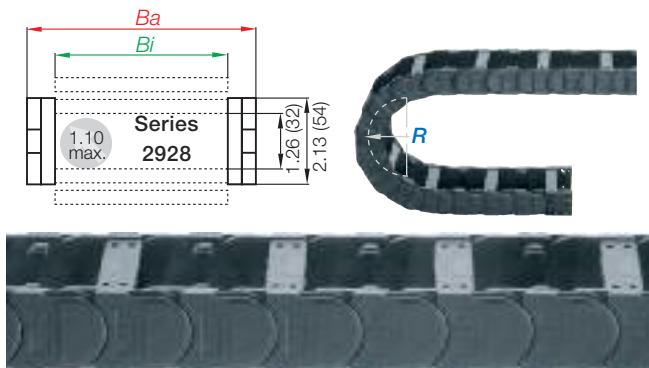


- Crossbars every link
- For use with rigid hydraulic hoses
- For particularly demanding applications
- Can be opened from both sides

Part Number Structure

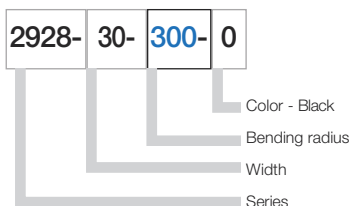


Series 2928 - Energy Chain® with crossbars every other link

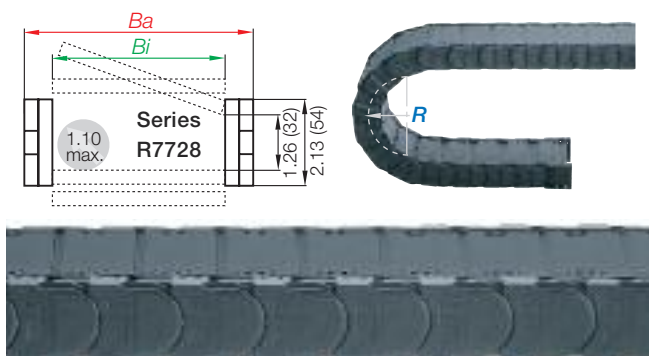


- Crossbars every other link
- Standard configuration
- For nearly every situation
- Can be opened from both sides
- Easy assembly
- Stable
- Cost-effective

Part Number Structure

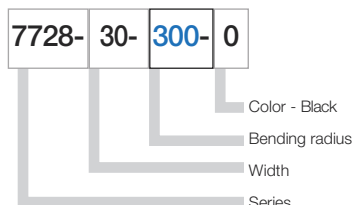


Series R7728 - fully enclosed Energy Tube

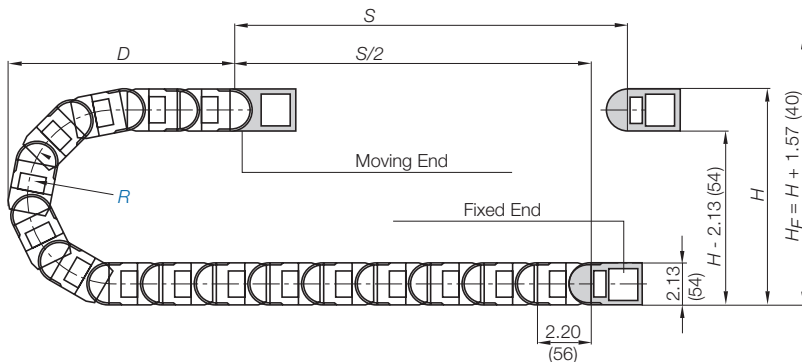
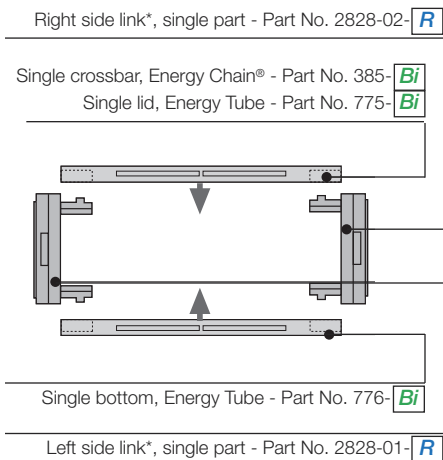


- Fully enclosed
- Excellent cable and hose protection against dirt
- Protection against hot chips up to 1652°F (900°C)
- Lids along inner radius are completely removable
- Lids along the outer radius are single-sided, snap open, hinged on one side as well as completely removable

Part Number Structure



Energy Chain® as separate parts, links and side plates



*View from the fixed point of the Energy Chain®/Energy Tube

Energy Chain System® E4/4

Series 2828/2928/R7728

energy chain® configurator 



2828
2928
R7728

Supplement part number with required radius. Example: 2828-30--0
Pitch: 2.20 in. (56mm) per link links/ft(m) = 5.49 (18)

Part Number			Bi in. (mm)	Ba in. (mm)	Weight		
Crossbars Every Link	Crossbars Every Other	Tube Version			2828 lbs/ft (kg/m)	2928 lbs/ft (kg/m)	R7728 lbs/ft (kg/m)
2828-05-	2928-05-	*7728-05- <input type="text" value="0"/> -0	1.97 (50)	2.91 (74)	≈ 1.16 (1.73)	≈ 1.10 (1.64)	≈ 1.76 (2.63)
2828-06-	2928-06-	<input type="text" value="0"/> -0	2.68 (68)	3.62 (92)	≈ 1.20 (1.79)	≈ 1.12 (1.67)	-
2828-07-	2928-07-	7728-07- <input type="text" value="0"/> -0	2.95 (75)	3.90 (99)	≈ 1.24 (1.84)	≈ 1.14 (1.69)	≈ 1.84 (2.75)
2828-087-	2928-087-	<input type="text" value="0"/> -0	3.43 (87)	4.37 (111)	≈ 1.30 (1.93)	≈ 1.16 (1.73)	-
2828-10-	2928-10-	7728-10- <input type="text" value="0"/> -0	3.94 (100)	4.88 (124)	≈ 1.36 (2.02)	≈ 1.20 (1.78)	≈ 1.90 (2.83)
2828-11-	2928-11-	7728-11- <input type="text" value="0"/> -0	4.25 (108)	5.20 (132)	≈ 1.40 (2.08)	≈ 1.22 (1.81)	≈ 1.98 (2.94)
2828-112-	2928-112-	<input type="text" value="0"/> -0	4.41 (112)	5.39 (137)	≈ 1.44 (2.15)	≈ 1.24 (1.84)	-
2828-12-	2928-12-	7728-12- <input type="text" value="0"/> -0	4.92 (125)	5.87 (149)	≈ 1.48 (2.20)	≈ 1.26 (1.87)	≈ 2.04 (3.03)
2828-137-	2928-137-	<input type="text" value="0"/> -0	5.39 (137)	6.38 (162)	≈ 1.54 (2.29)	≈ 1.28 (1.91)	-
2828-15-	2928-15-	7728-15- <input type="text" value="0"/> -0	5.91 (150)	6.85 (174)	≈ 1.60 (2.38)	≈ 1.32 (1.96)	≈ 2.14 (3.19)
2828-162-	2928-162-	<input type="text" value="0"/> -0	6.38 (162)	7.36 (187)	≈ 1.64 (2.44)	≈ 1.34 (1.99)	-
2828-17-	2928-17-	7728-17- <input type="text" value="0"/> -0	6.61 (168)	7.56 (192)	≈ 1.69 (2.51)	≈ 1.36 (2.02)	≈ 2.28 (3.39)
2828-18-	2928-18-	<input type="text" value="0"/> -0	6.89 (175)	7.83 (199)	≈ 1.72 (2.56)	≈ 1.38 (2.05)	-
2828-187-	2928-187-	<input type="text" value="0"/> -0	7.36 (187)	8.35 (212)	≈ 1.78 (2.65)	≈ 1.40 (2.09)	-
2828-20-	2928-20-	7728-20- <input type="text" value="0"/> -0	7.87 (200)	8.82 (224)	≈ 1.84 (2.74)	≈ 1.44 (2.14)	≈ 2.41 (3.59)
2828-212-	2928-212-	<input type="text" value="0"/> -0	8.35 (212)	9.33 (237)	≈ 1.93 (2.87)	≈ 1.48 (2.20)	-
2828-23-	2928-23-	<input type="text" value="0"/> -0	8.86 (225)	9.80 (249)	≈ 1.96 (2.92)	≈ 1.49 (2.22)	-
2828-237-	2928-237-	<input type="text" value="0"/> -0	9.33 (237)	10.31 (262)	≈ 2.05 (3.05)	≈ 1.54 (2.29)	-
2828-25-	2928-25-	7728-25- <input type="text" value="0"/> -0	9.84 (250)	10.79 (274)	≈ 2.08 (3.10)	≈ 1.56 (2.32)	≈ 2.72 (4.04)
2828-262-	2928-262-	<input type="text" value="0"/> -0	10.31 (262)	11.26 (286)	≈ 2.14 (3.19)	≈ 1.59 (2.36)	-
2828-28	2928-28-	<input type="text" value="0"/> -0	10.83 (275)	11.77 (299)	≈ 2.20 (3.28)	≈ 1.62 (2.41)	-
2828-29-	2928-29-	<input type="text" value="0"/> -0	11.30 (287)	12.28 (312)	≈ 2.26 (3.37)	≈ 1.65 (2.45)	-
2828-30-	2928-30-	7728-30- <input type="text" value="0"/> -0	11.81 (300)	12.76 (324)	≈ 2.33 (3.46)	≈ 1.68 (2.50)	≈ 2.98 (4.43)
2828-312-	2928-312-	<input type="text" value="0"/> -0	12.28 (312)	13.27 (337)	≈ 3.86 (3.59)	≈ 1.72 (2.56)	-
2828-325-	2928-325-	<input type="text" value="0"/> -0	12.79 (325)	13.74 (349)	≈ 2.47 (3.68)	≈ 1.75 (2.60)	-
2828-337-	2928-337-	<input type="text" value="0"/> -0	13.27 (337)	14.25 (362)	≈ 2.53 (3.77)	≈ 1.78 (2.65)	-
2828-350-	2928-350-	<input type="text" value="0"/> -0	13.78 (350)	14.72 (374)	≈ 2.59 (3.86)	≈ 1.81 (2.69)	-
2828-362-	2928-362-	<input type="text" value="0"/> -0	14.25 (362)	15.24 (387)	≈ 2.65 (3.95)	≈ 1.84 (2.74)	-
2828-375-	2928-375-	<input type="text" value="0"/> -0	14.76 (375)	15.71 (399)	≈ 2.72 (4.04)	≈ 1.88 (2.79)	-
2828-387-	2928-387-	<input type="text" value="0"/> -0	15.24 (387)	16.22 (412)	≈ 2.76 (4.11)	≈ 1.90 (2.82)	-
2828-400	2928-400-	<input type="text" value="0"/> -0	15.75 (400)	16.69 (424)	≈ 2.81 (4.18)	≈ 1.92 (2.86)	-

Choose from the radii below for all of the above sizes

Radius (mm) Example: 2828-30--0

	063**	075**	100**	125	150	175	200	220	250	300
R	2.48 (063)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.66 (220)	9.84 (250)	11.81 (300)
H* $\frac{D}{20}$	7.09 (180)	8.07 (205)	10.04 (255)	12.01 (305)	13.98 (355)	15.94 (405)	17.91 (455)	19.49 (495)	21.85 (555)	25.79 (655)
D	5.12 (130)	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	9.84 (250)	10.83 (275)	11.61 (295)	12.80 (325)	14.76 (375)
K	13.39 (340)	14.96 (380)	18.31(465)	21.65 (550)	24.41 (620)	27.56 (700)	30.70 (780)	33.46 (850)	37.01 (940)	43.70 (1110)

** This radius is not available for the R7728 Series

*Removable lid only, no hinged option

0=Standard color black. For other colors see Chapter 1

For wider chains see page 6.13. For large diameter hoses see page 6.13

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

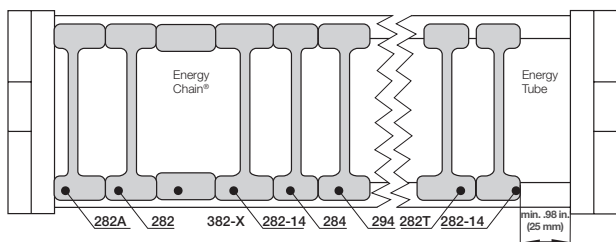




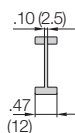
Option 1: Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.

NOTE: Observe a lateral spacing of at least .98 in. (25mm) for Energy Tubes



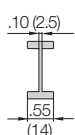
STANDARD
Vertical separator
280



Separator (chain/tube)
Unassembled **Part No. 280**
Assembled **Part No. 281**



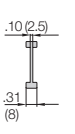
Vertical separator
280-14



Separator (chain/tube)
Unassembled **Part No. 280-14**
Assembled **Part No. 281-14**



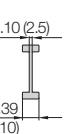
Vertical separator
283



Separator (chain only)
Unassembled **Part No. 283**
Assembled **Part No. 284**



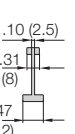
Locking separator
293



Locking Separator (chain only)
Unassembled **Part No. 293**
Assembled **Part No. 294**



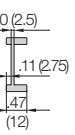
Vertical separator
281T



Vertical Separator (tubes only)
Unassembled **Part No. 281T**
Assembled **Part No. 282T**



Asymmetric separator
281A



Asymmetric separator (chain only)
Unassembled **Part No. 280A**
Assembled **Part No. 281A**



Spacers
381-XX



Spacer (chain only)
Unassembled **Part No. 381-XX**
Assembled **Part No. 382-XX**
XX = width of the spacer

- **Standard separator 280 for Energy Chains® and Energy Tubes**
This separator offers safe stability due to its wide base design, also when used with thick cables or hoses.
- **Vertical separator 280-14 for Energy Chains® and Energy Tubes**
This separator offers safe stability due to its broad base design when used with thick cables or hoses.
- **Vertical separator 283 for Energy Chains®**
This separator features a narrow base for use in applications where a large number of small cables need to be individually separated.
- **Locking separator 293 for Energy Chains®**
This separator is used in applications with very high relative humidity. It features increased retention force which is produced by asymmetrical retention "clamps" attached to the chain's crossbar. Please ensure that they are properly aligned.
- **Vertical separator 281T for Energy Tubes**
It clamps to the fixed radius and remains free along the other radius to facilitate lid removal.
- **Asymmetrical separator 281A for Energy Chains®**
This separator features a (12mm) base. It can be used in combination with spacers of different widths and vertical separators in side mounted applications.

● **NOTE ON SPACERS**

Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications. The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

Spacers available in the following sizes:

Part No.	Part No.	in.	(mm)
Unassembled	Assembled		
381-10	382-10	.39"	(10)
381-15	382-15	.59"	(15)
381-20	382-20	.79"	(20)

Energy Chain System® E4/4

Series 2828/2928/R7728

Interior Separation

energy chain® configurator

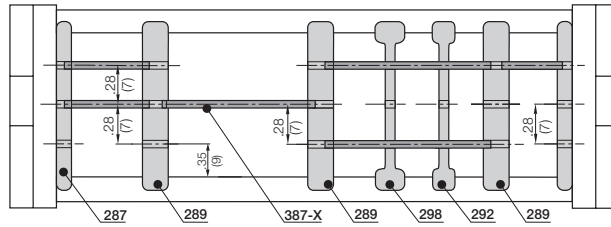


2828
2928
R7728



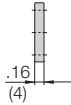
Option 2: Shelves

Energy Chains® and Energy Tubes can be subdivided both vertically and horizontally using the various interior separation elements. ► **Design, Chapter 1** for layout recommendations.



- Side plates 286**

This component is used to form the basic pattern of a shelf system.



Side Plate

Unassembled	Part No. 286
Assembled	Part No. 287

Side plate
286

- Vertical separator 288**

This component is used to form the basic pattern of a shelf system.



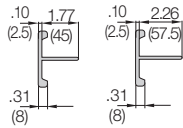
Vertical Separator

Unassembled	Part No. 288
Assembled	Part No. 289

Vertical separator
288

- Locking vertical separator 281-S**

This separator is slotted and able to be combined with shelves



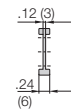
Separators w/Integrated Shelf

Unassembled	Part No. 281-S-45
Assembled	Part No. 282-S-45
Unassembled	Part No. 281-S-57
Assembled	Part No. 282-S-57

Separator with integrated shelf
281-S

- Closed Slotted separators 291**

These are used for complex subdivisions. However, they cannot be retrofitted into an existing interior separation system without removing the shelves first.



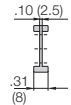
Slotted Separators (chain only)

Unassembled	Part No. 291
Assembled	Part No. 292

Closed slotted separator
291

- Open slotted separator 297**

This separator can be retrofitted into an existing interior separation system without removing the shelves, as long as these shelves fit into the middle slot only.



Slotted Separators, Open

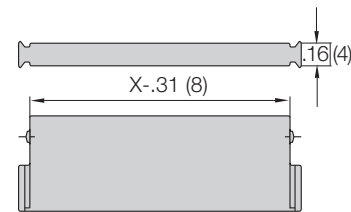
Unassembled	Part No. 297
Assembled	Part No. 298

Open slotted separator
297

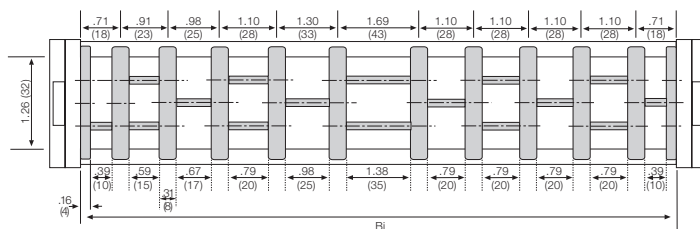
Width X	Usable Width	Part No.	Part No.
in. (mm)	in. (mm)	Unassembled	Assembled
.71 (18)	.39 (10)	386-18	387-18
.91 (23)	.59 (15)	386-23	387-23
.98 (25)	.67 (17)	386-25	387-25
1.10 (28)	.79 (20)	386-28	387-28
1.30 (33)	.98 (25)	386-33	387-33
1.69 (43)	1.38 (35)	386-43	387-43
1.97 (50)	1.65 (42)	386-50	387-50
2.13 (54)	1.81 (46)	386-54	387-54
2.44 (62)	2.13 (54)	386-62	387-62
2.95 (75)	2.64 (67)	386-75	387-75
3.43 (87)	3.12 (87)	386-87	387-87
3.94 (100)	3.62 (92)	386-100	387-100
4.25 (108)	3.94 (100)	386-108	387-108
4.92 (125)	4.61 (117)	386-125	387-125
5.91 (150)	5.59 (142)	386-150	387-150
6.89 (175)	6.57 (167)	386-175	387-175
7.87 (200)	7.56 (192)	386-200	387-200
8.19 (208)	7.87 (200)	386-208	387-208
8.86 (225)	8.54 (217)	386-225	387-225

Shelves 386-XX

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 3 different heights in .28" (7mm) increments



The diagram below is for reference purposes only. Multiple configurations are possible. To create your e-chain shelving cross section please see our online e-chain configurator. Call 1-800-521-2747 for assistance and/or go to igus.com click on the **Products** drop down menu, choose **Energy Chain Cable Carriers** and on the next drop down menu simply click on **e-chain Configurator**.



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



igus® Energy Chain System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

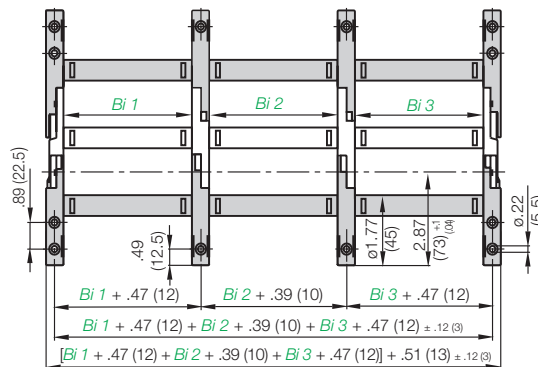


Extension links - for extremely wide Energy Chains® up to 9.84 ft (3m)

- For applications in which particularly high fill weights necessitate extremely wide Energy Chains® (up to 118" (3000 mm))
- The extension link design allows virtually limitless side-by-side attachment of chains
- The unsupported length of a chain can be increased when additional loads are required
- Extension links can be used with Energy Chains®, Energy Tubes or a combination of both
- They are suitable for unsupported and gliding applications in a guide trough
- Energy Chains® with extension links are attached with KMA or steel mounting brackets.

Part number example for Energy Chain®
2828-10/20/10--0
2828-Bi1/Bi2/Bi3--0

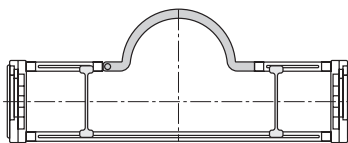
We **strongly recommend** on-site consultation with an igus® technician for individual advice regarding mounting brackets, guide troughs and other design details.



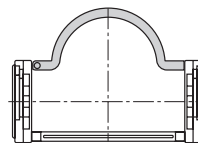
Extender crossbars - For careful guiding of large diameter cables and hoses

- Intended for cables and hoses with a maximum outer diameter of 4.13 in. (105 mm).
- Gliding operation with crossbars assembled along the outer radius in conjunction with a special guide trough
- Gliding operation not guaranteed with crossbars assembled along the inner radius
- The extender crossbar can either be attached to the side links directly or can be used in combination with two standard snap-open crossbars.

Consult igus® for your extender crossbar applications. We will be happy to assist you with your design layout.



Round extender crossbar combined with standard snap-open crossbars.

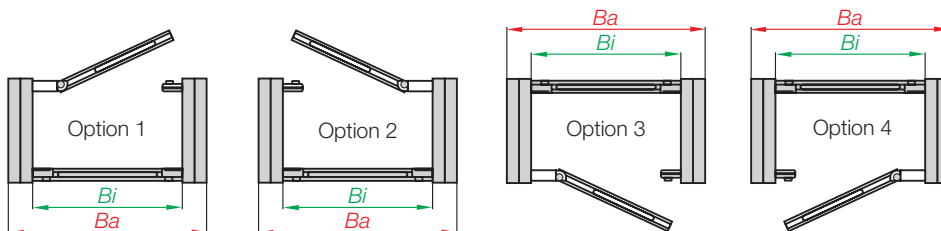


Attached directly to the side link.

Part No.	Max Ø Hose	Style	Installation Side Link	Combined with Snap-Open Crossbars
385-15-RHD115	By request	Round	No	Yes
385-18-RD115	By request	Round	Yes	No

Hinged crossbars

- Typically, Energy Chain® crossbars are completely removable. In cases where it is preferable that the opening crossbars remain on the Energy Chain®, a hinged design has been developed.
- Please consult igus® for design assistance



Energy Chain System® E4/4

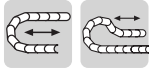
Series 2828/2928/R7728

Mounting Brackets - KMA

energy chain® configurator ▶



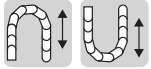
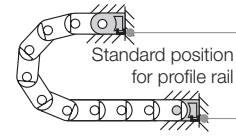
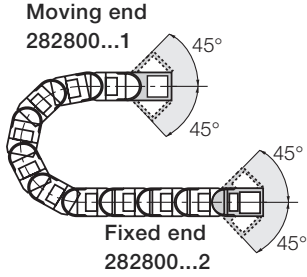
2828
2928
R7728



Standard

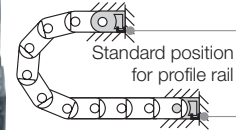
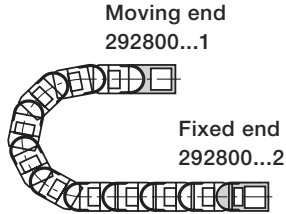
Option 1: pivoting

- Profile rail option
- Universal use
- Corrosion resistant
- Short and long travels
- Space-restricted conditions

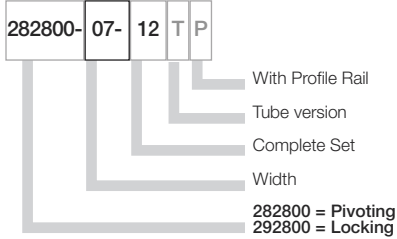


Option 2: locking

- Profile rail option
- Universal use
- Corrosion resistant
- Vertical hanging/standing travels
- Extreme accelerations



Part Number Structure



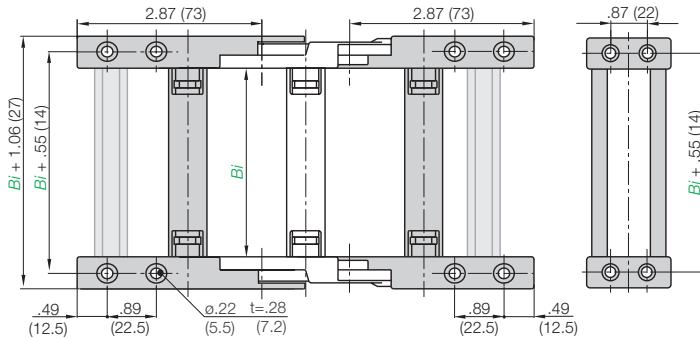
Full set, for both ends:

282800-07-12 Full set, each part with pin/bore

Single-part order:

282800-07-1 Mounting bracket with bore

282800-07-2 Mounting bracket with pin



Part number examples are shown for pivoting brackets. For locking brackets change part number to 292800

Part No. Full Set (pivoting)
Series 2828 or 2928:
282800-Width-12

Part No. Full Set (pivoting)
with profile rail
Series 2828 or 2928
282800-Width-12P

Part No. Full Set (pivoting)
Tube Series R7728
282800-Width-12T

Part No. Full Set (pivoting)
with Profile Rail
Tube Series R7728
282800-Width-12TP

Width	Part No. Full Set		Tube Option	With Profile Rail	Bi in. (mm)	
	Pivoting	Locking				
-05*	282800	292800	-05-12	T	P	1.97 (50)
-06	282800	292800	-06-12		P	2.68 (68)
-07	282800	292800	-07-12	T	P	2.95 (75)
-087	282800	292800	-087-12		P	3.43 (87)
-10	282800	292800	-10-12	T	P	3.94 (100)
-11	282800	292800	-11-12	T	P	4.25 (108)
-112	282800	292800	-112-12		P	4.41 (112)
-12	282800	292800	-12-12	T	P	4.92 (125)
-137	282800	292800	-137-12		P	5.39 (137)
-15	282800	292800	-15-12	T	P	5.91 (150)
-162	282800	292800	-162-12		P	6.38 (162)
-17	282800	292800	-17-12	T	P	6.61 (168)
-18	282800	292800	-18-12		P	6.89 (175)
-187	282800	292800	-187-12		P	7.36 (187)
-20	282800	292800	-20-12	T	P	7.87 (200)
-212	282800	292800	-212-12		P	8.35 (212)

Width	Part No. Full Set		Tube Option	With Profile Rail	Bi in. (mm)	
	Pivoting	Locking				
-23	282800	292800	-23-12		P	8.86 (225)
-237	282800	292800	-237-12		P	9.33 (237)
-25	282800	292800	-25-12	T	P	9.84 (250)
-262	282800	292800	-262-12		P	10.31 (262)
-28	282800	292800	-28-12		P	10.83 (275)
-29	282800	292800	-29-12		P	11.30 (287)
-30	282800	292800	-30-12	T	P	11.81 (300)
-312	282800	292800	-312-12		P	12.28 (312)
-325	282800	292800	-325-12		P	12.79 (325)
-337	282800	292800	-337-12		P	13.27 (337)
-350	282800	292800	-350-12		P	13.78 (350)
-362	282800	292800	-362-12		P	14.25 (362)
-375	282800	292800	-375-12		P	14.76 (375)
-387	282800	292800	-387-12		P	15.24 (387)
-400	282800	292800	-400-12		P	15.75 (400)

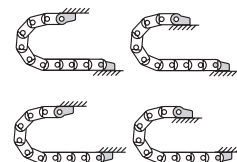
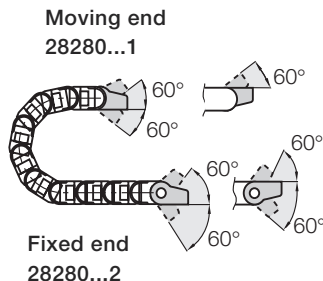
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS





Option 1: pivoting

- For pivoting connections
- One part (two-piece) for all chain widths
- Electrically conductive



Possible installation configurations -

Part No. Mounting Brackets Full Set

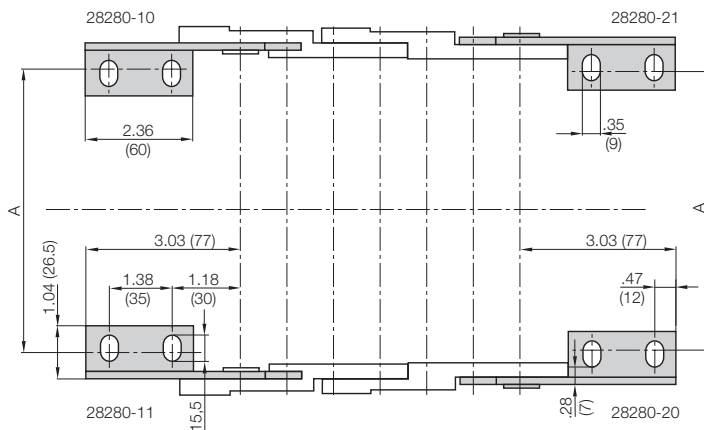
4 parts, 2 with pin, 2 with bore
Series 2828, 2928 or R7728:
28280-12

Part No. Mounting Bracket Moving End

2 parts, 1 left & 1 right
Series 2828, 2928 or R7728:
28280-1

Part No. Mounting Bracket Fixed End

2 parts, 1 left & 1 right
Series 2828, 2928 or R7728:
28280-2



Width of Chain <i>Bi</i>	Mounting Brackets				Mounting Dimension A in. (mm)	Width of Chain <i>Bi</i>	Mounting Brackets				Mounting Dimension A in. (mm)
	Part Number	Full Set	Moving End Only	Fixed End Only			Part Number	Full Set	Moving End Only	Fixed End Only	
1.97 (50)	28280	-12	-1	-2	1.18 (30)	8.86 (225)	28280	-12	-1	-2	8.07 (205)
2.56 (65)	28280	-12	-1	-2	1.77 (45)	9.33 (237)	28280	-12	-1	-2	8.54 (217)
2.95 (75)	28280	-12	-1	-2	2.16 (55)	9.84 (250)	28280	-12	-1	-2	9.05 (230)
3.94 (100)	28280	-12	-1	-2	3.15 (80)	10.31 (262)	28280	-12	-1	-2	9.53 (242)
3.94 (100)	28280	-12	-1	-2	3.15 (80)	10.83 (275)	28280	-12	-1	-2	10.04 (255)
4.41 (112)	28280	-12	-1	-2	3.62 (92)	11.30 (287)	28280	-12	-1	-2	10.51 (267)
3.94 (100)	28280	-12	-1	-2	3.15 (80)	11.81 (300)	28280	-12	-1	-2	11.02 (280)
4.92 (125)	28280	-12	-1	-2	4.13 (105)	12.28 (312)	28280	-12	-1	-2	11.49 (292)
5.39 (137)	28280	-12	-1	-2	4.61 (117)	12.79 (325)	28280	-12	-1	-2	12.00 (305)
5.91 (150)	28280	-12	-1	-2	5.12 (130)	13.27 (337)	28280	-12	-1	-2	12.48 (317)
6.38 (162)	28280	-12	-1	-2	5.59 (142)	13.78 (350)	28280	-12	-1	-2	12.99 (330)
6.89 (175)	28280	-12	-1	-2	6.10 (155)	14.25 (362)	28280	-12	-1	-2	13.46 (342)
7.36 (187)	28280	-12	-1	-2	6.57 (167)	14.76 (375)	28280	-12	-1	-2	13.97 (355)
7.36 (187)	28280	-12	-1	-2	6.57 (167)	15.24 (387)	28280	-12	-1	-2	14.45 (367)
7.87 (200)	28280	-12	-1	-2	7.09 (180)	15.75 (400)	28280	-12	-1	-2	14.96 (380)
8.35 (212)	28280	-12	-1	-2	7.56 (192)						

Chainfix clamps for the profile rail



igus® Chainfix strain relief elements are available in either steel or stainless steel. They can be adjusted with a hexagon socket and are available in single, double and triple configurations.

Part No. Single Clamp		Part No. Double Clamp		Part No. Triple Clamp		Cable ø	
Steel	Stainless	Steel	Stainless	Steel	Stainless	in.	(mm)
CFX12-1M	CFX12-1E	CFX12-2	CFX12-2E	CFX12-3	-	.24 - .47	(06 - 12)
CFX14-1M	CFX14-1E	CFX14-2	CFX14-2E	CFX14-3	-	.47 - .55	(12 - 14)
CFX16-1M	CFX16-1E	CFX16-2	CFX16-2E	CFX16-3	-	.55 - .63	(14 - 16)
CFX18-1M	CFX18-1E	CFX18-2	CFX18-2E	CFX18-3	-	.63 - .71	(16 - 18)
CFX20-1M	CFX20-1E	CFX20-2	CFX20-2E	CFX20-3	-	.71 - .79	(18 - 20)
CFX22-1M	CFX22-1E	CFX22-2	CFX22-2E	CFX22-3	-	.79 - .87	(20 - 22)
CFX26-1M	CFX26-1E	CFX26-2	CFX26-2E	-	-	.87 - 1.02	(22 - 26)
CFX30-1M	CFX30-1E	CFX30-2	CFX30-2E	-	-	1.02 - 1.18	(26 - 30)
CFX34-1M	CFX34-1E	CFX34-2	CFX34-2E	-	-	1.18 - 1.34	(30 - 34)
CFX38-1M	CFX38-1E	-	-	-	-	1.34 - 1.50	(34 - 38)
CFX42-1M	CFX42-1E	-	-	-	-	1.50 - 1.65	(38 - 42)

For more information please refer to strain relief section of Chapter 10

Chainfix Clip

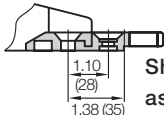


Modular snap-on strain relief device

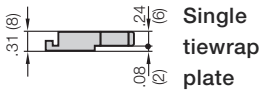
Chainfix clip is available for cable diameters ranging from .16" (4mm) to .94" (24 mm). It is suitable for assembly on KMA mounting brackets, clip-on strain relief for crossbars as well as profile rails. Quick assembly without the use of tools. **For more information please refer to strain relief section of Chapter 10**

Cable ø	Part No. Clamp	Part No. Bottom
.16-.31	CFC-08-M	CFC-08-C
.31-.47	CFC-12-M	CFC-12-C
.47-.63	CFC-16-M	CFC-16-C
.63-.79	CFC-20-M	CFC-20-C
.79-.94	CFC-24-M	CFC-24-C

Tiewrap Plates



Shown assembled

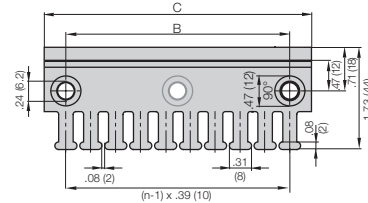


Single tiewrap plate

Option 1:
Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



If used with KMA brackets with profile rail please add "KMA" to the end of the part number.

Example: 3050-ZBKMA

For more information please refer to strain relief section of Chapter 10



Option 2:
Clip-on Tiewrap plates

Available as a clip-on tiewrap plate without the use of bolts. They are inserted and removed with a screwdriver used as a lever. Clip-on tiewrap plates are also available as an attachment to the opening crossbars.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
3050-ZC	5	1.97 (50)
3075-ZC	7	2.95 (75)

For more information please refer to strain relief section of Chapter 10



Option 3:
Clip-on Tiewrap plates for opening crossbars

Clip-on tiewrap plates are also available as an attachment to opening crossbars. They can be positioned at any point along the Energy Chain®.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
3850-ZS	5	1.89 (48)

For more information please refer to strain relief section of Chapter 10



Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part Number 98-30
- 1/2 travel length of glide bars
Part number 92-01
- Installation sets as end connectors
Part Number 93-50-XX

-XX indicates the length of the profile rail on which the guide trough is mounted. The values and part numbers are specified in the table on the left. The standard length of the trough components and glide bars is 6.56 ft (2 m.) The required overall length of the guide trough directly correlates to the length of travel.

Width of Crossbar
280-05-200-0

	B_{Ri}	Installation Part No.
-05	3.11 (79)	93-50-200
-06	3.82 (97)	93-50-225
-07	4.09 (104)	93-50-225
-087	4.57 (116)	93-50-225
-10	5.08 (129)	93-50-250
-11	5.39 (137)	93-50-250
-112	5.59 (142)	93-50-250
-12	6.06 (154)	93-50-275
-137	6.57 (167)	93-50-275
-15	7.05 (179)	93-50-300
-162	7.56 (192)	93-50-300
-17	7.76 (197)	93-50-325
-18	8.03 (204)	93-50-325
-187	8.54 (217)	93-50-325
-20	9.02 (229)	93-50-350
-212	9.53 (242)	93-50-350
-23	10.00 (254)	93-50-375
-237	10.51 (267)	93-50-375
-25	10.98 (279)	93-50-400
-262	11.50 (292)	93-50-400
-28	11.97 (304)	93-50-425
-29	12.48 (317)	93-50-425
-30	12.95 (329)	93-50-450
-312	13.46 (342)	93-50-450
-325	13.94 (354)	93-50-475
-337	14.45 (367)	93-50-475
-350	14.92 (379)	93-50-500
-362	15.43 (392)	93-50-500
-375	15.91 (404)	93-50-525
-387	16.42 (417)	93-50-525
-400	16.89 (429)	93-50-550

Example:

Length of travel 164 ft (50 m)
Center mounted

Required guide troughs:

164 ft (50 m) guide trough
82 ft (25 m) glide bar
= 25 sections of 6.56 ft (2 m) guide trough

Part No. 98-30

= 13 sections of 6.56 ft (2 m) glide bar

Part No. 92-01

Required number of installation sets:

= Number of guide trough components + 1
= 25 + 1 = 26

Part number of the installation sets

93-50-XXX

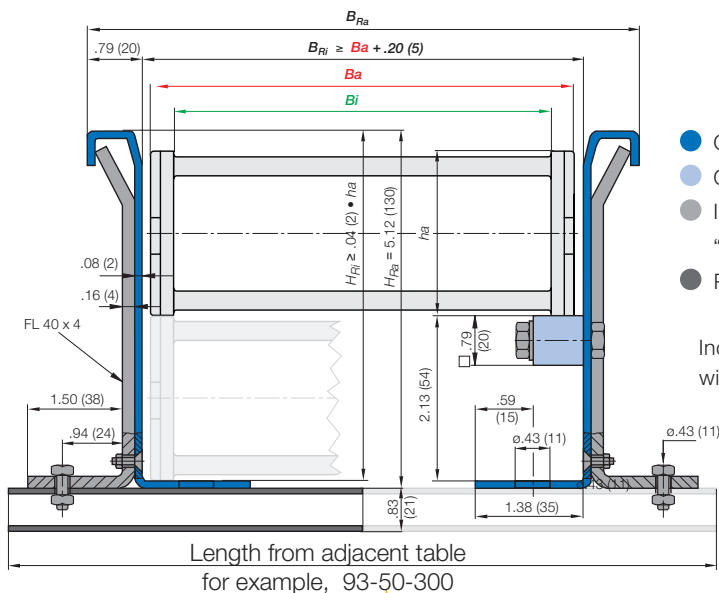
Example: 93-50-400 for 15.75 (400 mm) long profile rail.



Left: Guide trough with glide bars
Right: Guide troughs without glide bars



Installation sets as section connectors



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

* Specialized guide trough available upon request

For further technical information on guide troughs
▶ Chapter 9

Standard length profile rail



High unsupported lengths and perfect suitability for circular movements (RBR-versions) are some features for the E4/4-System

Roll instead of gliding: Rol E-Chain®

Special solution for long travels. 75% less drive power (gliding application) with igus® Rol E-Chain®.

Series 2828R - Order example 2828R-30-220-0

Further information: Call igus at 800-521-2747



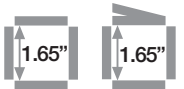
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



3838
3938
R7838



Energy Chain System® E4/4 Series 3838/3938/R7838



Price Index



Series 3838

Series 3938



Series R7838

Special Features / Options



Side-mounted - unsupported



ESD classification:
Electrically conductive
ESD/ATEX version upon request



High torsional rigidity

Assembly Tips



Opening Energy Chains®: Remove crossbars and clips - Insert screwdriver into the slot, push down, release by lever action



Remove lids/bottoms (Energy Tubes) - Insert screwdriver into the slot, release by lever action

Other Installation Methods

Vertical, hanging ≤ 328 ft (100 m)

Vertical, standing ≤ 19.69 ft (6 m)

Side-mounted, un supp. ≤ 8.20 ft (2.5 m)

Rotary requires further calculation

Usage Guidelines



- If subject to high torsional or shearing forces
- For side mounted applications involving long unsupported lengths
- For long-term operation in very moist environments



- If a quieter version is required
➤ Series 380/390/R780

Features & Benefits

- 1 KMA mounting brackets with attachment points on all sides
- 2 Crossbars on Energy Chains® are removable along both radii
- 3 Hinged snap-open removable lids along outer radius of Energy Tube
- 4 Lateral glide surfaces for side-mounted operation
- 5 High side-mount stability due to undercut
- 6 Locking or pivoting mounting brackets available
- 7 Closed and open styles can be combined
- 8 High torsional rigidity
- 9 Lids and crossbars are removable along both radii
- 10 Wide, rounded plastic crossbars - cable friendly
- 11 Energy Chain® also available with reverse bending radii



RoI E-Chain® Series
3838R/7838R available
upon request

Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator ▶

13.12 ft (4 m) 3838-30-300-0

Energy Chain®

With 2 separators 381 assembled every 2nd link

Interior Separation

1 Set 383800-30-12P

Mounting Bracket

Energy Chain System® E4/4 Series 3838/3938/R7838 Installation Dimensions

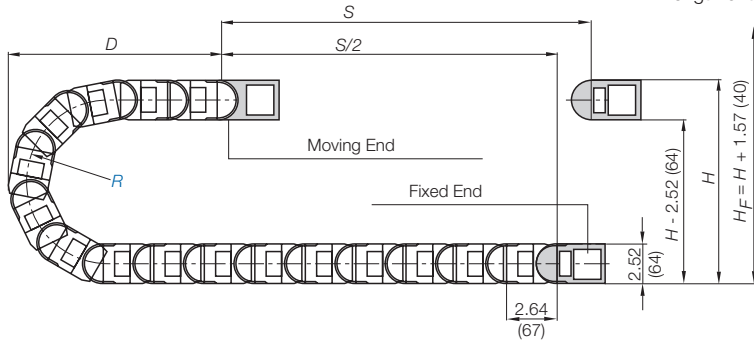
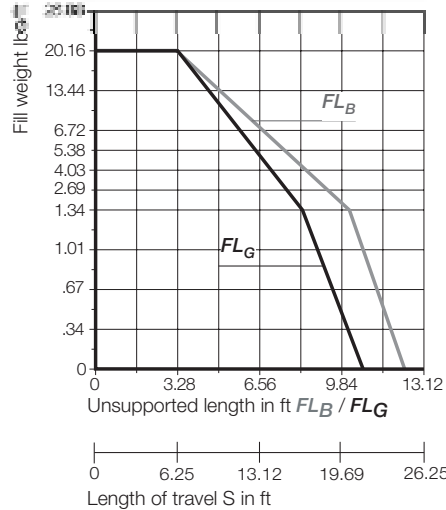
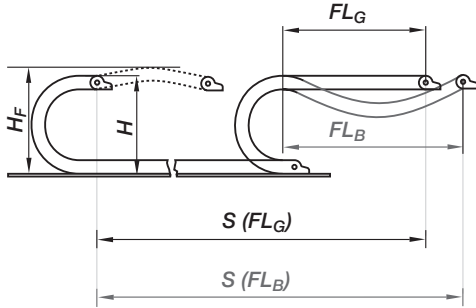
energy chain® configurator ▶



3838
3938
R7838

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



Pitch per link = 2.64" (67 mm)
Links per ft (m) = 4.57 (15)
For center mount applications:
Chain length = $\frac{S}{2} + K$

The required clearance height: $H_F = H + 1.57$ in. (40 mm) (with 1.34 lbs/ft (2 kg/m) fill weight).
Please consult igus® if space is particularly restricted.

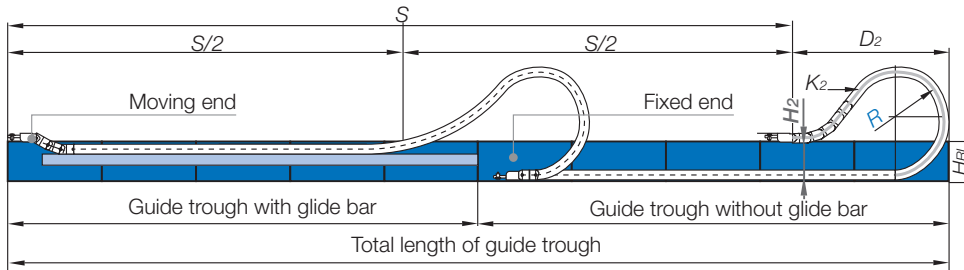
R	2.95 (075)	3.94 (100)	4.53 (115)	4.92 (125)	5.91 (150)	6.69 (170)	7.87 (200)	8.46 (215)	9.84 (250)	11.81 (300)	13.78 (350)
H $\frac{D}{20}$	8.46 (215)	10.43 (265)	11.61 (295)	12.40 (315)	14.37 (365)	15.94 (405)	18.31 (465)	19.49 (495)	22.24 (565)	26.18 (665)	30.12 (765)
D	6.85 (174)	7.83 (199)	8.43 (214)	8.82 (224)	9.80 (249)	10.59 (269)	11.77 (299)	12.36 (314)	13.74 (349)	15.71 (399)	17.68 (449)
K	14.57 (370)	17.72 (450)	19.69 (500)	20.87 (530)	24.02 (610)	26.38 (670)	30.12 (765)	31.89 (810)	36.22 (920)	42.52 (1080)	48.62 (1235)

For long travels with lowered mounting height

Long travel lengths from 32.8 ft. (10 m) to max. 919 ft. (280 m)

For center mount applications:

Chain length = $\frac{S}{2} + K_2$



R	2.95 (075)	3.94 (100)	4.53 (115)	4.92 (125)	5.91 (150)	6.69 (170)	7.87 (200)	8.46 (215)	9.84 (250)	11.81 (300)	13.78 (350)
H_2	-	-	7.32 (186)	7.32 (186)	7.32 (186)	7.32 (186)	7.32 (186)	7.32 (186)	7.32 (186)	7.32 (186)	7.32 (186)
$D_2 + 25$	-	-	17.12 (435)	18.70 (475)	22.44 (570)	27.17 (690)	30.71 (780)	34.06 (865)	39.76 (1010)	45.28 (1150)	59.06 (1500)
K_2	-	-	29.02 (737)	31.65 (804)	39.57 (1005)	44.84 (1139)	52.76 (1340)	55.39 (1407)	65.94 (1675)	76.50 (1943)	94.96 (2412)



For support of the lower run, see Chapter 9 for the Support Tray tool kit

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to Installation dimensions for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{safety buffer}$
 - H_F = Required clearance height
 - H_{in} = Trough inner height
 - H_2 = *Mounting height
 - D_2 = Overlength - long travels, gliding
 - K_2 = *Further add-on
- *If the mounting bracket location is set lower



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.

Design, Chapter 1

Technical Data

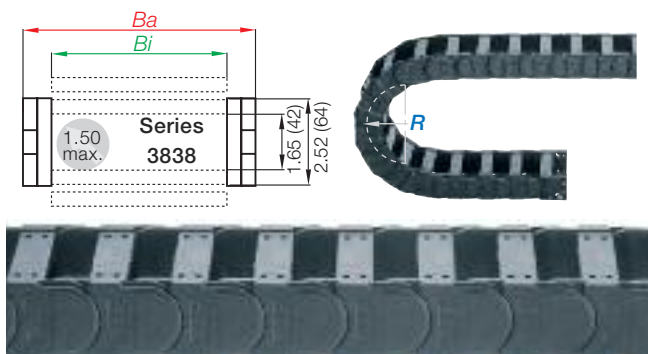


Details of material properties

▶ Chapter 1

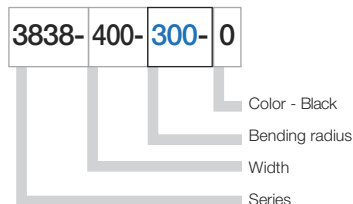
Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

Series 3838 - Energy Chain® with crossbars every link

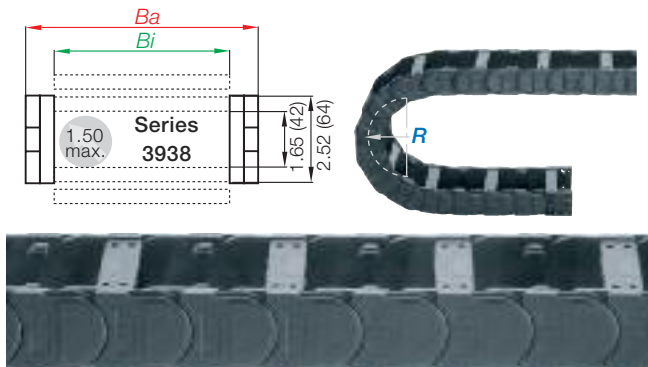


- Crossbars every link
- For use with rigid hydraulic hoses
- For particularly demanding applications
- Can be opened from both sides

Part Number Structure

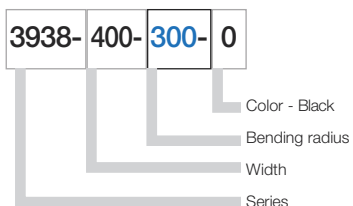


Series 3938 - Energy Chain® with crossbars every other link

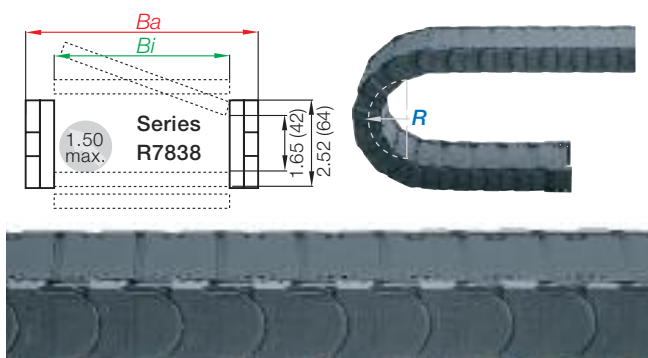


- Crossbars every other link
- Standard configuration
- For nearly every situation
- Can be opened from both sides
- Easy assembly
- Stable
- Cost-effective

Part Number Structure

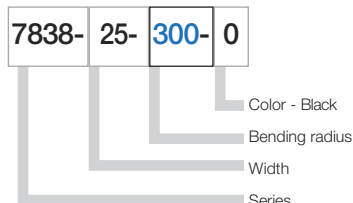


Series R7838 - fully enclosed Energy Tube

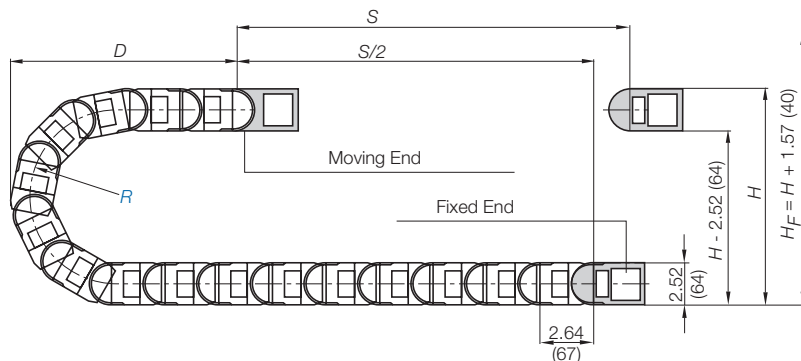
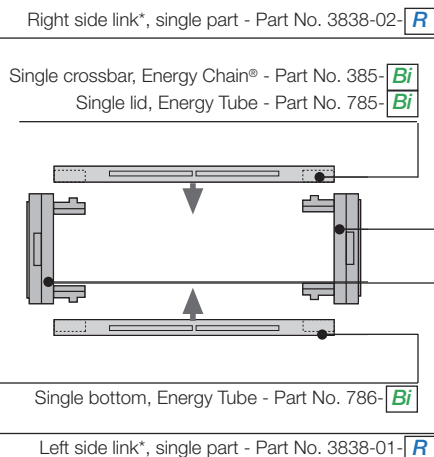


- Fully enclosed
- Excellent cable and hose protection against dirt
- Protection against hot chips up to 1652°F (900°C)
- Lids along inner radius are completely removable
- Lids along the outer radius are single-sided, snap open, hinged on one side as well as completely removable

Part Number Structure



Energy Chain® as separate parts, links and side plates



*View from the fixed point of the Energy Chain®/Energy Tube

Energy Chain System® E4/4

Series 3838/3938/R7838

energy chain® configurator 



3838
3938
R7838

Supplement part number with required radius. Example: 3838-30--0
Pitch: 2.64 in. (67mm) per link, links/ft(m) = 4.57 (15)

Part Number			<i>Bi</i>		<i>Ba</i>		Weight		
Crossbars Every Link	Crossbars Every Other	Tube Version	in. (mm)	in. (mm)	3838 lbs/ft (kg/m)	3938 lbs/ft (kg/m)	R7838 lbs/ft (kg/m)		
3838-05-	3938-05-	*7838-05-	<input type="text" value="300"/> -0	1.97 (50)	3.03 (77)	≈ 1.38 (2.06)	≈ 1.33 (1.98)	≈ 1.51 (2.25)	
3838-06-	3938-06-		<input type="text" value="300"/> -0	2.68 (68)	3.74 (95)	≈ 1.40 (2.09)	≈ 1.34 (1.99)	-	
3838-07-	3938-07-	7838-07-	<input type="text" value="300"/> -0	2.95 (75)	4.02 (102)	≈ 1.42 (2.12)	≈ 1.35 (2.01)	≈ 1.60 (2.38)	
3838-087-	3938-087-		<input type="text" value="300"/> -0	3.43 (87)	4.53 (115)	≈ 1.47 (2.18)	≈ 1.37 (2.04)	-	
3838-10-	3938-10-	7838-10-	<input type="text" value="300"/> -0	3.94 (100)	5.00 (127)	≈ 1.51 (2.25)	≈ 1.40 (2.08)	≈ 1.75 (2.60)	
3838-11-	3938-11-	7838-11-	<input type="text" value="300"/> -0	4.25 (108)	5.31 (135)	≈ 1.55 (2.30)	≈ 1.41 (2.10)	≈ 1.78 (2.65)	
3838-112-	3938-112-		<input type="text" value="300"/> -0	4.41 (112)	5.51 (140)	≈ 1.55 (2.30)	≈ 1.41 (2.10)	-	
3838-12-	3938-12-	7838-12-	<input type="text" value="300"/> -0	4.92 (125)	5.98 (152)	≈ 1.61 (2.40)	≈ 1.44 (2.15)	≈ 1.89 (2.81)	
3838-137-	3938-137-		<input type="text" value="300"/> -0	5.39 (137)	6.50 (165)	≈ 1.64 (2.44)	≈ 1.46 (2.17)	-	
3838-15-	3938-15-	7838-15-	<input type="text" value="300"/> -0	5.91 (150)	6.97 (177)	≈ 1.70 (2.53)	≈ 1.49 (2.21)	≈ 2.06 (3.07)	
3838-162-	3938-162-		<input type="text" value="300"/> -0	6.38 (162)	7.48 (190)	≈ 1.71 (2.55)	≈ 1.49 (2.22)	-	
3838-17-	3938-17-	7838-17-	<input type="text" value="300"/> -0	6.61 (168)	7.68 (195)	≈ 1.76 (2.62)	≈ 1.52 (2.26)	≈ 2.18 (3.24)	
3838-18-	3938-18-		<input type="text" value="300"/> -0	6.89 (175)	7.95 (202)	≈ 1.76 (2.62)	≈ 1.52 (2.26)	-	
3838-187-	3938-187-		<input type="text" value="300"/> -0	7.36 (187)	8.46 (215)	≈ 1.81 (2.69)	≈ 1.55 (2.30)	-	
3838-20-	3938-20-	7838-20-	<input type="text" value="300"/> -0	7.87 (200)	8.94 (227)	≈ 1.86 (2.77)	≈ 1.57 (2.33)	≈ 2.37 (3.53)	
3838-212-	3938-212-		<input type="text" value="300"/> -0	8.35 (212)	9.45 (240)	≈ 1.91 (2.84)	≈ 1.59 (2.37)	-	
3838-23-	3938-23-		<input type="text" value="300"/> -0	8.86 (225)	9.92 (252)	≈ 1.96 (2.92)	≈ 1.62 (2.41)	-	
3838-237-	3938-237-		<input type="text" value="300"/> -0	9.33 (237)	10.43 (265)	≈ 1.99 (2.96)	≈ 1.63 (2.43)	-	
3838-25-	3938-25-	7838-25-	<input type="text" value="300"/> -0	9.84 (250)	10.91 (277)	≈ 2.05 (3.05)	≈ 1.66 (2.47)	≈ 2.91 (4.33)	
3838-262-	3938-262-		<input type="text" value="300"/> -0	10.31 (262)	11.42 (290)	≈ 2.06 (3.06)	≈ 1.67 (2.48)	-	
3838-28	3938-28-		<input type="text" value="300"/> -0	10.83 (275)	11.89 (302)	≈ 2.13 (3.17)	≈ 1.70 (2.53)	-	
3838-29-	3938-29-		<input type="text" value="300"/> -0	11.30 (287)	12.40 (315)	≈ 2.14 (3.19)	≈ 1.71 (2.54)	-	
3838-30-	3938-30-	7838-30-	<input type="text" value="300"/> -0	11.81 (300)	12.87 (327)	≈ 2.23 (3.32)	≈ 1.75 (2.61)	≈ 3.29 (4.89)	
3838-312-	3938-312-		<input type="text" value="300"/> -0	12.28 (312)	13.39 (340)	≈ 2.24 (3.34)	≈ 1.76 (2.62)	-	
3838-325-	3938-325-		<input type="text" value="300"/> -0	12.79 (325)	13.86 (352)	≈ 2.29 (3.41)	≈ 1.79 (2.66)	-	
3838-337-	3938-337-		<input type="text" value="300"/> -0	13.27 (337)	14.37 (365)	≈ 2.33 (3.46)	≈ 1.80 (2.68)	-	
3838-350-	3938-350-		<input type="text" value="300"/> -0	13.78 (350)	15.41 (377)	≈ 2.47 (3.68)	≈ 1.88 (2.79)	-	
3838-362-	3938-362-		<input type="text" value="300"/> -0	14.25 (362)	15.36 (390)	≈ 2.51 (3.74)	≈ 1.90 (2.82)	-	
3838-375-	3938-375-		<input type="text" value="300"/> -0	14.76 (375)	15.83 (402)	≈ 2.55 (3.79)	≈ 1.91 (2.84)	-	
3838-387-	3938-387-		<input type="text" value="300"/> -0	15.24 (387)	16.34 (415)	≈ 2.59 (3.85)	≈ 1.93 (2.87)	-	
3838-400	3938-400-		<input type="text" value="300"/> -0	15.75 (400)	16.81 (427)	≈ 2.62 (3.90)	≈ 1.95 (2.90)	-	

Choose from the radii below for all of the above sizes

Radius (mm) Example: 3838-07--0

	075**	100**	115**	125**	150	170	200	215	250	300	350
R	2.95 (075)	3.94 (100)	4.53 (115)	4.92 (125)	5.91 (150)	6.69 (170)	7.87 (200)	8.46 (215)	9.84 (250)	11.81 (300)	13.78 (350)
H $\frac{0}{20}$	8.46 (215)	10.43 (265)	11.61 (295)	12.40 (315)	14.37 (365)	15.94 (405)	18.31 (465)	19.49 (495)	22.24 (565)	26.18 (665)	30.12 (765)
D	6.85 (174)	7.83 (199)	8.43 (214)	8.82 (224)	9.80 (249)	10.59 (269)	11.77 (299)	12.36 (314)	13.74 (349)	15.71 (399)	17.68 (449)
K	14.57 (370)	17.72 (450)	19.69 (500)	20.87 (530)	24.02 (610)	26.38 (670)	30.12 (765)	31.89 (810)	36.22 (920)	42.52 (1080)	48.62 (1235)

** This radius is not available for the R7838 Series
*Removable lid only, no hinged option

0=Standard color black. For other colors see Chapter 1
For wider chains see page 6.25. For large diameter hoses see page 6.25

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

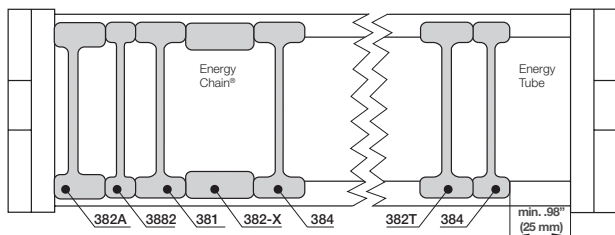




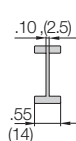
Option 1: Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.

NOTE: Observe a lateral spacing of at least .98 in. (25mm) for Energy Tubes



STANDARD
Vertical separator
380

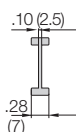


Separator (chain/tube)
Unassembled **Part No. 380**
Assembled **Part No. 381**

- **Standard separator 380 for Energy Chains® and Energy Tubes**
This separator offers safe stability due to its wide base design, also when used with thick cables or hoses.



Vertical separator
3881

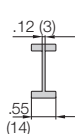


Separator (chain only)
Unassembled **Part No. 3881**
Assembled **Part No. 3882**

- **Vertical separator 3881 for Energy Chains®**
This separator features a narrow 7mm base for applications where a large number of small cables need to be individually separated.



Vertical separator
380T

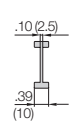


Vertical Separator (tubes only)
Unassembled **Part No. 380T**
Assembled **Part No. 381T**

- **Locking separator 380T for Energy Tubes**
It clamps to the fixed radius and remains free along the other radius to facilitate lid removal. When installing please ensure they are identically aligned.



Vertical separator
383

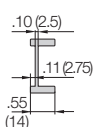


Separator (chain only)
Unassembled **Part No. 383**
Assembled **Part No. 384**

- **Vertical separator 383 for Energy Chains®**
This separator features an increased retention force for applications exposed to very high humidity or extreme loads. It features asymmetric claws for the crossbar which results in the increased retention force.



Asymmetric separator
381A



Asymmetric separator (chain only)
Unassembled **Part No. 381A**
Assembled **Part No. 382A**

- **Asymmetrical separator 381A for Energy Chains®**
This separator features an (14mm) base. It can be used in combinations between spacers of different widths and vertical separators in side mounted applications.



Spacers
381-XX



Spacer (chain only)
Unassembled **Part No. 381-XX**
Assembled **Part No. 382-XX**
XX = width of the spacer

- **NOTE ON SPACERS**
Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications. The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

Spacers available in the following sizes:

Part No.	Part No.	in.	(mm)
Unassembled	Assembled		
381 -10	382 -10	.39"	(10)
381 -15	382 -15	.59"	(15)
381 -20	382 -20	.79"	(20)

Energy Chain System® E4/4

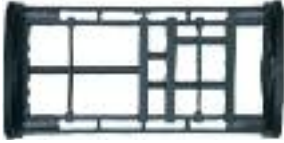
Series 3838/3938/R7838

Interior Separation

energy chain® configurator ▶

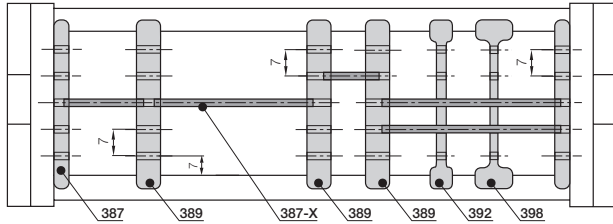


3838
3938
R7838



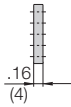
Option 2: Shelves

Energy Chains® and Energy Tubes can be subdivided both vertically and horizontally using the various interior separation elements. ▶ **Design, Chapter 1** for layout recommendations.



- **Side plates 386**

This component is used to form the basic pattern of a shelf system.



Side Plate

Unassembled	Part No. 386
Assembled	Part No. 387

Side plate
386



- **Vertical separator 388**

This component is used to form the basic pattern of a shelf system.



Vertical Separator

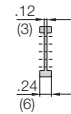
Unassembled	Part No. 388
Assembled	Part No. 389

Vertical separator
388



- **Closed slotted separators 391**

These are used for complex subdivisions. However, they cannot be retrofitted into an existing interior separation system without removing the shelves first.



Slotted Separators

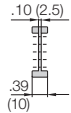
Unassembled	Part No. 391
Assembled	Part No. 392

Closed slotted separator
391



- **Open slotted separator 397**

This separator can be retrofitted into an existing interior separation system without removing the shelves, as long as these shelves fit into the 3 middle slots only.



Slotted Separators, Open

Unassembled	Part No. 397
Assembled	Part No. 398

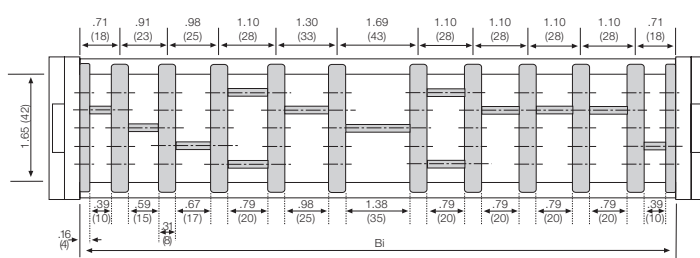
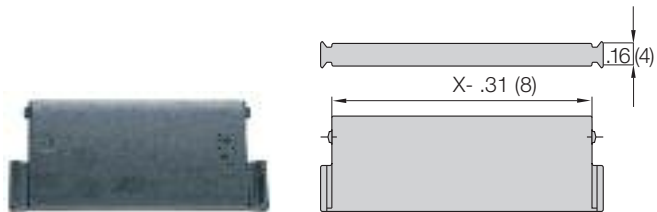
Open slotted separator
397



Width X in. (mm)	Usable Width in. (mm)	Part No.	
		Unassembled	Assembled
.71 (18)	.39 (10)	386-18	387-18
.91 (23)	.59 (15)	386-23	387-23
.98 (25)	.67 (17)	386-25	387-25
1.10 (28)	.79 (20)	386-28	387-28
1.30 (33)	.98 (25)	386-33	387-33
1.69 (43)	1.38 (35)	386-43	387-43
1.97 (50)	1.65 (42)	386-50	387-50
2.13 (54)	1.81 (46)	386-54	387-54
2.44 (62)	2.13 (54)	386-62	387-62
2.95 (75)	2.64 (67)	386-75	387-75
3.43 (87)	3.12 (87)	386-87	387-87
3.94 (100)	3.62 (92)	386-100	387-100
4.25 (108)	3.94 (100)	386-108	387-108
4.92 (125)	4.61 (117)	386-125	387-125
5.91 (150)	5.59 (142)	386-150	387-150
6.89 (175)	6.57 (167)	386-175	387-175
7.87 (200)	7.56 (192)	386-200	387-200
8.19 (208)	7.87 (200)	386-208	387-208

Shelves 386-XX

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 5 different heights in .28" (7mm) increments



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



igus® Energy Chain System®

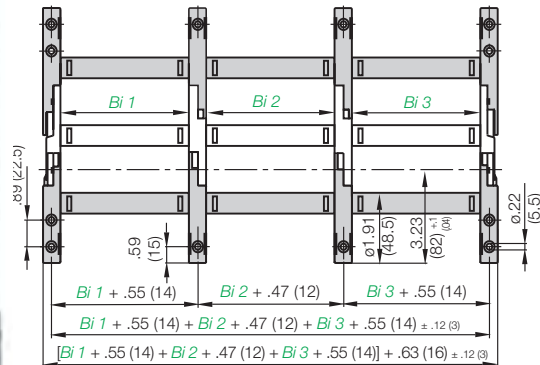


Extension links - for extremely wide Energy Chains® up to 9.84 ft (3m)

- For applications in which particularly high fill weights necessitate extremely wide Energy Chains® (up to 118" (3000 mm))
- The extension link design allows virtually limitless side-by-side attachment of chains
- The unsupported length of a chain can be increased when additional loads are required
- Extension links can be used with Energy Chains®, Energy Tubes or a combination of both
- They are suitable for unsupported and gliding applications in a guide trough
- Energy Chains® with extension links are attached with KMA or steel mounting brackets.

Part number example for Energy Chain®
3838-10/20/10-200-0
3838-Bi1/Bi2/Bi3-R-0

We **strongly recommend** on-site consultation with an igus® technician for individual advice regarding mounting brackets, guide troughs and other design details.



Telephone 1-800-521-2747
Fax 1-401-438-7270

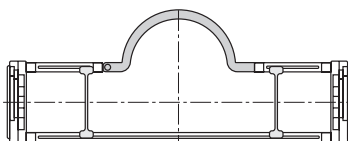
Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>



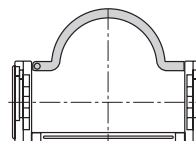
Extender crossbars - For careful guiding of large diameter cables and hoses

- Intended for cables and hoses with a maximum outer diameter of 4.53 in. (115 mm).
- Gliding operation with crossbars assembled along the outer radius in conjunction with a special guide trough
- Gliding operation not guaranteed with crossbars assembled along the inner radius
- The extender crossbar can either be attached to the side links directly or can be used in combination with two standard snap-open crossbars.

Consult igus® for your extender crossbar applications. We will be happy to assist you with your design layout.



Round extender crossbar combined with standard snap-open crossbars.

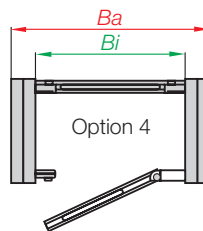
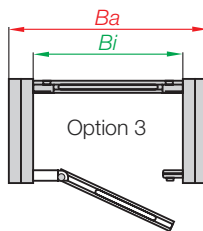
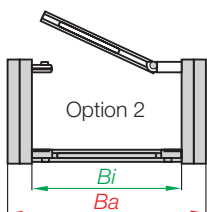
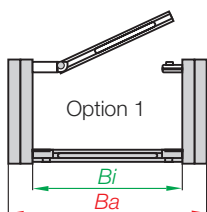


Attached directly to the side link.

Part No.	Max Ø Hose	Style	Installation Side Link	Combined with Snap-Open Crossbars
385-15-RHD115	By request	Round	No	Yes
385-18-RD115	By request	Round	Yes	No

Hinged crossbars

- Typically, Energy Chain® crossbars are completely removable. In cases where it is preferable that the opening crossbars remain on the Energy Chain®, a hinged design has been developed.
- Please consult igus® for design assistance



Energy Chain System® E4/4

Series 3838/3938/R7838

Mounting Brackets - KMA

energy chain® configurator ▶

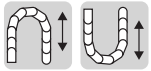
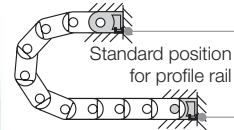
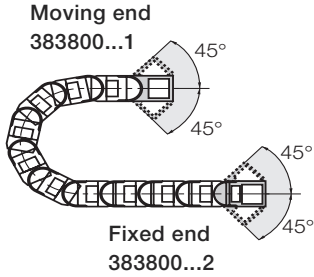


3838
3938
R7838



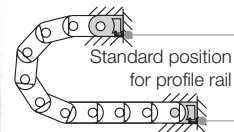
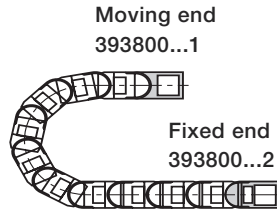
Option 1: KMA pivoting

- Profile rail option
- Universal use
- Corrosion resistant
- Short and long travels
- Space-restricted conditions



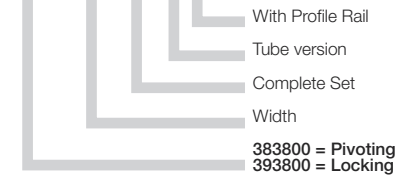
Option 2: KMA locking

- Profile rail option
- Universal use
- Corrosion resistant
- Vertical hanging/standing travels
- Extreme accelerations



Part Number Structure

383800-07-12TP



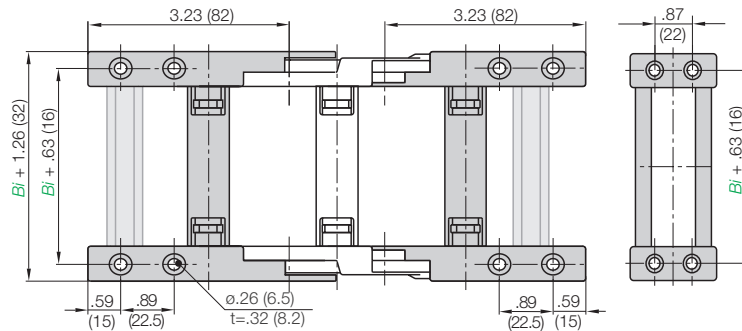
Full set, for both ends:

383800-05-12 Full set, each part with pin/bore

Single-part order:

383800-05-1 Mounting bracket with bore

383800-05-2 Mounting bracket with pin



Part number examples are shown for pivoting brackets. For locking brackets change part number to 393800

Part No. Full Set (pivoting)
Series 3838 or 3938:
383800-Width-12

Part No. Full Set (pivoting)
with profile rail
Series 3838 or 3938
383800-Width-12P

Part No. Full Set (pivoting)
Tube Series R7838
383800-Width-12T

Part No. Full Set (pivoting)
with Profile Rail
Series 7838
383800-Width-12TP

Width	Part No. Full Set		Tube Option	With Profile Rail	Bi in. (mm)	
	Pivoting	Locking				
-05*	383800	393800	-05-12	T	P	1.97 (50)
-06	383800	393800	-06-12		P	2.68 (68)
-07	383800	393800	-07-12	T	P	2.95 (75)
-087	383800	393800	-087-12		P	3.43 (87)
-10	383800	393800	-10-12	T	P	3.94 (100)
-11	383800	393800	-11-12	T	P	4.25 (108)
-112	383800	393800	-112-12		P	4.41 (112)
-12	383800	393800	-12-12	T	P	4.92 (125)
-137	383800	393800	-137-12		P	5.39 (137)
-15	383800	393800	-15-12	T	P	5.91 (150)
-162	383800	393800	-162-12		P	6.38 (162)
-17	383800	393800	-17-12	T	P	6.61 (168)
-18	383800	393800	-18-12		P	6.89 (175)
-187	383800	393800	-187-12		P	7.36 (187)
-20	383800	393800	-20-12	T	P	7.87 (200)
-212	383800	393800	-212-12		P	8.35 (212)

Width	Part No. Full Set		Tube Option	With Profile Rail	Bi in. (mm)	
	Pivoting	Locking				
-23	383800	393800	-23-12		P	8.86 (225)
-237	383800	393800	-237-12		P	9.33 (237)
-25	383800	393800	-25-12	T	P	9.84 (250)
-262	383800	393800	-262-12		P	10.31 (262)
-28	383800	393800	-28-12		P	10.83 (275)
-29	383800	393800	-29-12		P	11.30 (287)
-30	383800	393800	-30-12	T	P	11.81 (300)
-312	383800	393800	-312-12		P	12.28 (312)
-325	383800	393800	-325-12		P	12.79 (325)
-337	383800	393800	-337-12		P	13.27 (337)
-350	383800	393800	-350-12		P	13.78 (350)
-362	383800	393800	-362-12		P	14.25 (362)
-375	383800	393800	-375-12		P	14.76 (375)
-387	383800	393800	-387-12		P	15.24 (387)
-400	383800	393800	-400-12		P	15.75 (400)

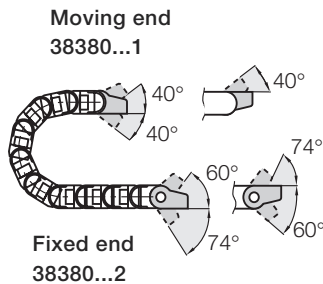
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS





Option 1: pivoting

- For pivoting connections
- One part (two-piece) for all chain widths
- Electrically conductive



Possible installation configurations -

Part No. Mounting Brackets Full Set

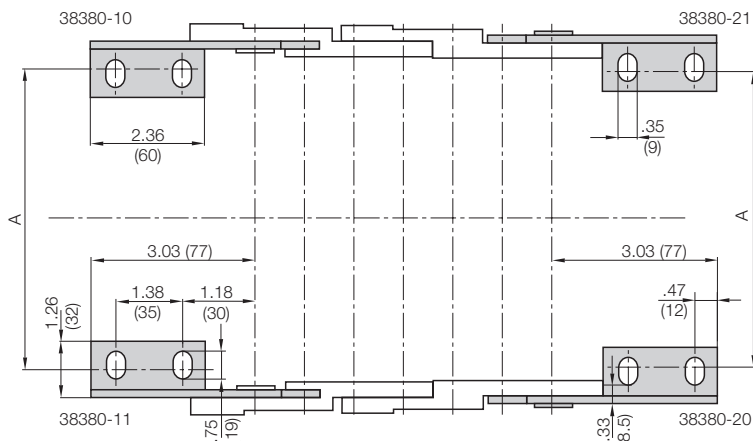
4 parts, 2 with pin, 2 with bore
Series 3838, 3938 or R7838:
38380-Width-12

Part No. Mounting Bracket Moving End

2 parts, 1 left & 1 right
Series 3838, 3938 or R7838:
38380-Width-1

Part No. Mounting Bracket Fixed End

2 parts, 1 left & 1 right
Series 3838, 3938 or R7838:
38380-Width-2



Width of Chain <i>B_i</i>	Mounting Brackets				Mounting Dimension A in. (mm)	Width of Chain <i>B_i</i>	Mounting Brackets				Mounting Dimension A in. (mm)
	Part Number	Full Set	Moving End Only	Fixed End Only			Part Number	Full Set	Moving End Only	Fixed End Only	
1.97 (50)	38380	-12	-1	-2	3.54 (90)	9.33 (237)	38380	-12	-1	-2	8.22 (209)
2.68 (68)	38380	-12	-1	-2	1.57 (40)	9.84 (250)	38380	-12	-1	-2	8.74 (222)
2.95 (75)	38380	-12	-1	-2	18.5 (47)	10.31 (262)	38380	-12	-1	-2	9.21 (234)
3.43 (87)	38380	-12	-1	-2	2.32 (59)	10.83 (275)	38380	-12	-1	-2	9.72 (247)
3.94 (100)	38380	-12	-1	-2	2.83 (72)	11.30 (287)	38380	-12	-1	-2	10.19 (259)
4.25 (108)	38380	-12	-1	-2	3.14 (80)	11.81 (300)	38380	-12	-1	-2	10.70 (272)
4.41 (112)	38380	-12	-1	-2	3.30 (84)	12.28 (312)	38380	-12	-1	-2	11.18 (284)
4.92 (125)	38380	-12	-1	-2	3.81 (97)	12.79 (325)	38380	-12	-1	-2	11.69 (297)
5.39 (137)	38380	-12	-1	-2	4.29 (109)	13.27 (337)	38380	-12	-1	-2	12.16 (309)
5.91 (150)	38380	-12	-1	-2	4.80 (122)	13.78 (350)	38380	-12	-1	-2	12.67 (322)
6.38 (162)	38380	-12	-1	-2	5.27 (134)	14.25 (362)	38380	-12	-1	-2	13.14 (334)
6.61 (168)	38380	-12	-1	-2	5.51 (140)	14.76 (375)	38380	-12	-1	-2	13.66 (347)
6.89 (175)	38380	-12	-1	-2	5.78 (147)	15.24 (387)	38380	-12	-1	-2	14.13 (359)
7.36 (187)	38380	-12	-1	-2	6.25 (159)	15.75 (400)	38380	-12	-1	-2	4.64 (372)
7.87 (200)	38380	-12	-1	-2	6.77 (172)	21.65 (550)	38380	-12	-1	-2	20.55 (522)
8.35 (212)	38380	-12	-1	-2	7.24 (184)	23.62 (600)	38380	-12	-1	-2	22.51 (572)
8.86 (225)	38380	-12	-1	-2	7.75 (197)						

*Mounting bracket feet must face outward

Energy Chain System® E4/4

Series 3838/3938/R7838

Strain Relief

energy chain® configurator 



3838
3938
R7838

Chainfix clamps for the profile rail



igus® Chainfix strain relief elements are available in either steel or stainless steel. They can be adjusted with a hexagon socket and are available in single, double and triple configurations.

Part No. Single Clamp		Part No. Double Clamp		Part No. Triple Clamp		Cable ø	
Steel	Stainless	Steel	Stainless	Steel	Stainless	in.	(mm)
CFX12-1	CFX12-1E	CFX12-2	CFX12-2E	CFX12-3	-	.24 - .47	(06 - 12)
CFX14-1	CFX14-1E	CFX14-2	CFX14-2E	CFX14-3	-	.47 - .55	(12 - 14)
CFX16-1	CFX16-1E	CFX16-2	CFX16-2E	CFX16-3	-	.55 - .63	(14 - 16)
CFX18-1	CFX18-1E	CFX18-2	CFX18-2E	CFX18-3	-	.63 - .71	(16 - 18)
CFX20-1	CFX20-1E	CFX20-2	CFX20-2E	CFX20-3	-	.71 - .79	(18 - 20)
CFX22-1	CFX22-1E	CFX22-2	CFX22-2E	CFX22-3	-	.79 - .87	(20 - 22)
CFX26-1	CFX26-1E	CFX26-2	CFX26-2E	-	-	.87 - 1.02	(22 - 26)
CFX30-1	CFX30-1E	CFX30-2	CFX30-2E	-	-	1.02 - 1.18	(26 - 30)
CFX34-1	CFX34-1E	CFX34-2	CFX34-2E	-	-	1.18 - 1.34	(30 - 34)
CFX38-1	CFX38-1E	-	-	-	-	1.34 - 1.50	(34 - 38)
CFX42-1	CFX42-1E	-	-	-	-	1.50 - 1.65	(38 - 42)

For more information please refer to strain relief section of Chapter 10

Chainfix Clip

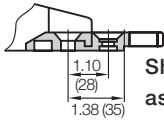


Modular snap-on strain relief device

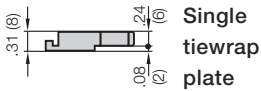
Chainfix clip is available for cable diameters ranging from .16" (4mm) to .94" (24 mm). It is suitable for assembly on KMA mounting brackets, clip-on strain relief for crossbars as well as profile rails. Quick assembly without the use of tools. **For more information please refer to strain relief section of Chapter 10**

Cable ø		Part No.	Part No.
in.	(mm)	Clamp	Bottom
.16-.31	(04-08)	CFC-08-M	CFC-08-C
.31-.47	(08-12)	CFC-12-M	CFC-12-C
.47-.63	(12-16)	CFC-16-M	CFC-16-C
.63-.79	(16-20)	CFC-20-M	CFC-20-C
.79-.94	(20-24)	CFC-24-M	CFC-24-C

Tiewrap Plates



Shown assembled



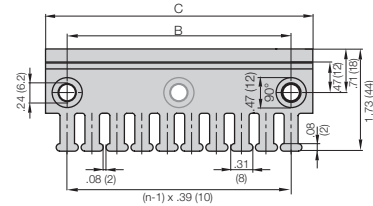
Single tiewrap plate

Option 1:

Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



If used with KMA brackets with profile rail please add "KMA" to the end of the part number.

Example: 3050-ZBKMA

For more information please refer to strain relief section of Chapter 10

Option 2:

Clip-on Tiewrap plates

Available as a clip-on tiewrap plate without the use of bolts. They are inserted and removed with a screwdriver used as a lever. Clip-on tiewrap plates are also available as an attachment to the opening crossbars.



Part No.	Number of Teeth	Width of Strain Relief in. (mm)
3050-ZC	5	1.97 (50)
3075-ZC	7	2.95 (75)

For more information please refer to strain relief section of Chapter 10

Option 3:

Clip-on Tiewrap plates for opening crossbars

Clip-on tiewrap plates are also available as an attachment to opening crossbars. They can be positioned at any point along the Energy Chain®.



Part No.	Number of Teeth	Width of Strain Relief in. (mm)
3850-ZS	5	1.89 (48)

For more information please refer to strain relief section of Chapter 10

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part No. 93-30
- 1/2 travel length of glide bars
Part No. 93-01
- Installation sets as end connectors
Part No. 93-50-XX

-XX indicates the length of the profile rail on which the guide trough is mounted. The values and part numbers are specified in the table below. The standard length of the trough components and glide bars is 6.56 ft (2 m). The required overall length of the guide trough directly correlates to the length of travel

Width of Crossbar
380-05-200-0

	B_{Ri}	Installation Part No.
-05	3.23 (82)	93-50-200
-06	3.94 (100)	93-50-225
-07	4.21 (107)	93-50-225
-087	4.72 (120)	93-50-250
-10	5.20 (132)	93-50-250
-11	5.51 (140)	93-50-250
-112	5.71 (145)	93-50-275
-12	6.18 (157)	93-50-275
-137	6.69 (170)	93-50-300
-15	7.16 (182)	93-50-300
-162	7.68 (195)	93-50-325
-17	7.87 (200)	93-50-325
-18	8.15 (207)	93-50-325
-187	8.66 (220)	93-50-350
-20	9.13 (232)	93-50-350
-212	9.65 (245)	93-50-375
-23	10.12 (257)	93-50-375
-237	10.63 (270)	93-50-400
-25	11.10 (282)	93-50-400
-262	11.61 (295)	93-50-425
-28	12.09 (307)	93-50-425
-29	12.60 (320)	93-50-450
-30	13.07 (332)	93-50-450
-312	13.58 (345)	93-50-475
-325	14.06 (357)	93-50-475
-337	14.57 (370)	93-50-500
-350	15.04 (382)	93-50-500
-362	15.55 (395)	93-50-525
-375	16.02 (407)	93-50-525
-387	16.53 (420)	93-50-550
-400	17.01 (432)	93-50-550

Example:

Length of travel 164 ft (50 m)
Center mounted

Required guide troughs:

164 ft (50 m) guide trough,
82 ft (25 m) glide bar
= 25 sections of 6.56 ft (2 m) guide trough

Part No. 93-30

= 13 sections of 6.56 ft (2 m) glide bar

Part No. 93-01

Required number of installation sets:

= Number of guide trough components + 1
= 25 + 1 = 26

Part No. of the installation sets **93-50-XXX**

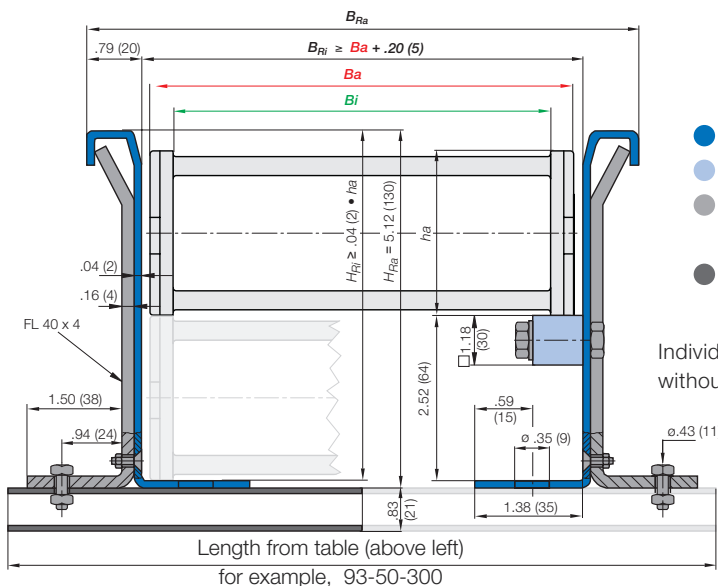
Example: 93-50-400 for 15.75 (400 mm) long profile rail



Left: Guide trough with glide bars
Right: Guide troughs without glide bars



Installation sets as section connectors



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

* Specialized guide trough available upon request

Standard length profile rail



E4/4 as ZigZag version in this crane.

Roll instead of gliding: Rol E-Chain®

Special solution for long travels. 75% less drive power (gliding application) with igus® Rol E-Chain®.

Series 3838R - Order example 3838R-30-220-0

Further information: Call igus® at 800-521-2747



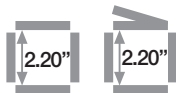
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RfQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



4040
4140
R8840



Energy Chain System® E4/4 Series 4040/4140/R8840

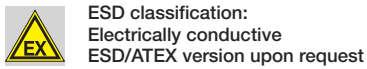
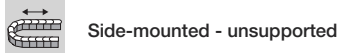


Price Index



Series R8840

Special Features / Options



Assembly Tips



Opening Energy Chains®: Remove cross-bars and clips - Insert screwdriver into the slot, push down, release by lever action



Remove lids/bottoms (Energy Tubes) - Insert screwdriver into the slot, release by lever action

Other Installation Methods

- Vertical, hanging ≤ 328 ft (100 m)
- Vertical, standing ≤ 19.69 ft (6 m)
- Side-mounted, unassup. ≤ 9.84 ft (3 m)
- Rotary requires further calculation

Usage Guidelines

- +** If subject to high torsional or shearing forces
- For side mounted applications involving long unsupported lengths
- For long-term operation in very moist environments

- If a quieter version is required
➤ **Series 400/410/R880**
- If a simple low-cost solution is required
➤ **Series 14040/R18840**
- When very long travels or high additional loads are involved
➤ **Series 4040HD**

Features & Benefits

- 1 KMA mounting brackets with attachment points on all sides
- 2 Crossbars on Energy Chains® are removable along both radii
- 3 Hinged, snap-open, removable lids along outer radius of Energy Tube
- 4 Lateral glide surfaces for side-mounted operation
- 5 High side-mount stability due to undercut
- 6 Locking or pivoting mounting brackets available
- 7 Strain relief elements can be integrated with the mounting bracket
- 8 Closed and open styles can be combined
- 9 High torsional rigidity
- 10 Removable lids along inner radius
- 11 Wide, rounded plastic crossbars - cable friendly
- 12 Energy Chain® also available with reverse bending radii



RoI E-Chain® Series 4040R/8840R available upon request

Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

[energy chain® configurator](#) ▶

16.4 ft (5 m) **4040-30-300-0**

Energy Chain®

With 2 separators **411** assembled every 2nd link

Interior Separation

1 Set **404000-30-12P**

Mounting Bracket

Energy Chain System® E4/4 Series 4040/4140/R8840 Installation Dimensions

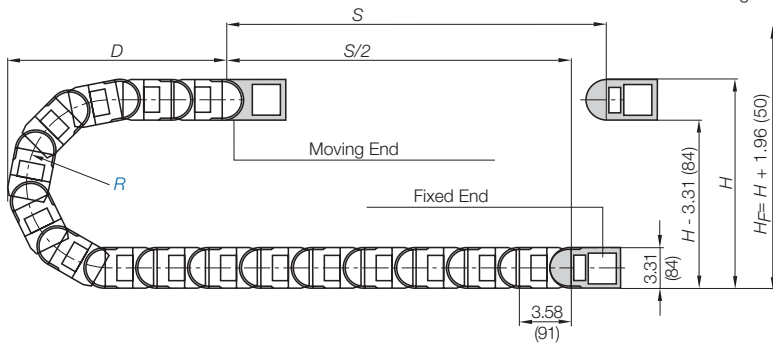
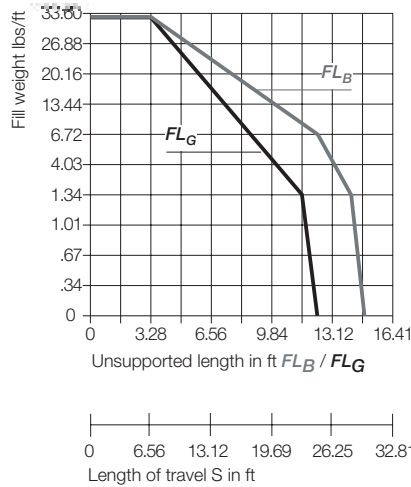
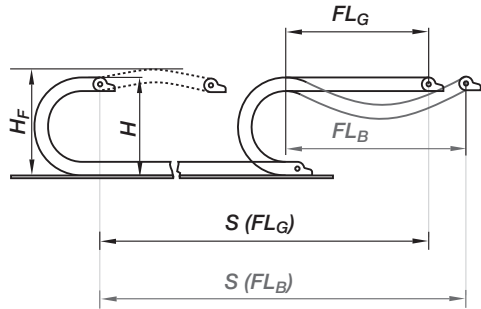
energy chain® configurator



4040
4140
R8840

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1



Pitch per link: = 3.58" (91 mm)
Links per ft (m): = 3.35 (11)
For center mount applications:
Chain length = $S/2 + K$

The required clearance height: $H_f = H + 1.96$ in. (50 mm) (with 2.02 lbs/ft (3 kg/m) fill weight).
Please consult igus® if space is particularly restricted.

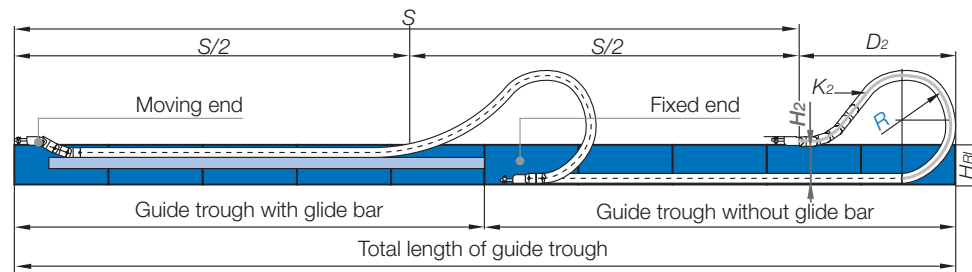
R	5.31 (135)	5.91 (150)	6.89 (175)	7.87 (200)	9.45 (240)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	19.68 (500)
H_{in}^{+25}	14.17 (360)	15.16 (385)	17.13 (435)	19.09 (485)	22.24 (565)	23.03 (585)	26.97 (685)	30.91 (785)	34.84 (885)	42.72 (1085)
D	10.63 (270)	11.22 (285)	12.20 (310)	13.19 (335)	14.76 (375)	15.16 (385)	17.13 (435)	19.09 (485)	21.06 (535)	25.00 (635)
K	25.59 (650)	29.53 (750)	32.48 (825)	35.43 (900)	40.16 (1020)	41.34 (1050)	48.23 (1225)	52.76 (1340)	57.09 (1450)	69.88 (1775)

For long travels with lowered mounting height

Long travel lengths from 32.8 ft.(10m) to max. 984 ft. (300m)

For center mount applications:

Chain length: = $S/2 + K_2$



R	5.31 (135)	5.91 (150)	6.89 (175)	7.87 (200)	9.45 (240)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	19.68 (500)
H_2	-	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)
D_2^{+25}	-	18.90 (480)	23.62 (600)	28.74 (730)	36.61 (930)	37.01 (940)	46.46 (1180)	56.69 (1440)	60.24 (1530)	72.83 (1850)
K_2	-	32.24 (819)	42.99 (1092)	50.16 (274)	60.91 (1547)	60.91 (1547)	78.82 (2002)	93.15 (2366)	100.31 (2548)	125.39 (3185)



For support of the lower run, see Chapter 9 for the Support Tray tool kit

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to Installation dimensions for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{safety buffer}$
 - H_f = Required clearance height
 - H_{in} = Trough inner height
 - H_2 = *Mounting height
 - D_2 = Overlength - long travels, gliding
 - K_2 = *Add-on
- *If the mounting bracket location is set lower



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.
Design, Chapter 1



Technical Data

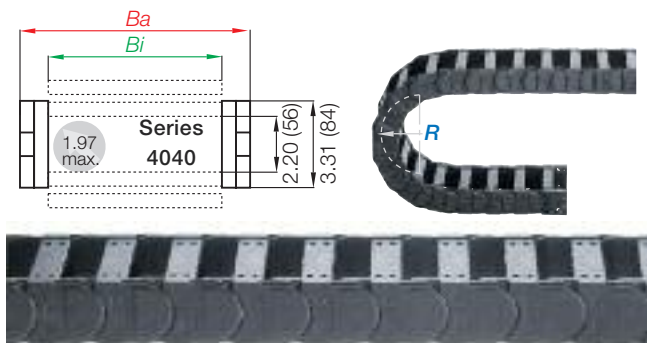


Details of material properties

Chapter 1

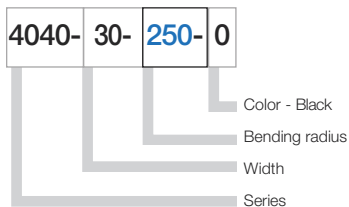
Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

Series 4040 - Energy Chain® with crossbars every link

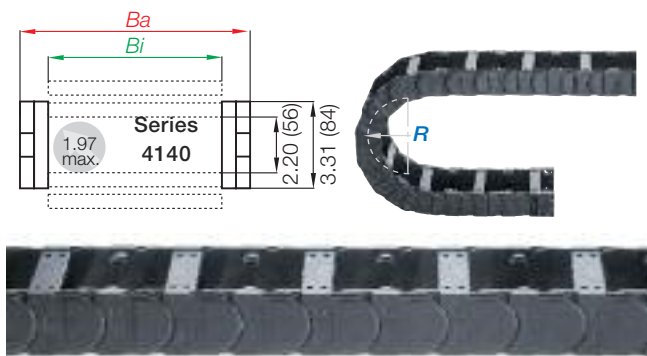


- Crossbars every link
- For use with rigid hydraulic hoses
- For particularly demanding applications
- Can be opened from both sides

Part Number Structure

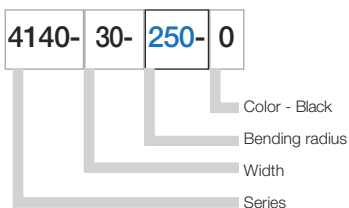


Series 4140 - Energy Chain® with crossbars every other link

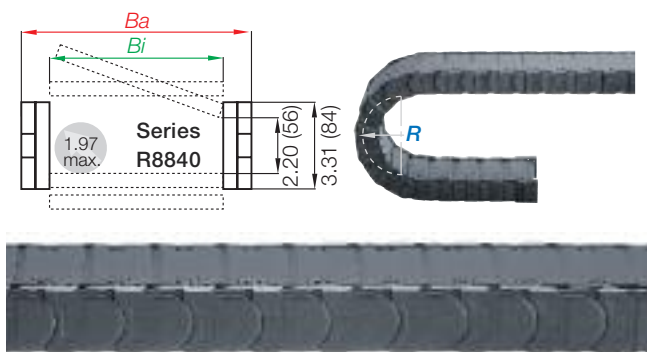


- Crossbars every other link - Standard configuration
- For nearly every situation
- Can be opened from both sides
- Easy assembly
- Stable
- Cost-effective

Part Number Structure

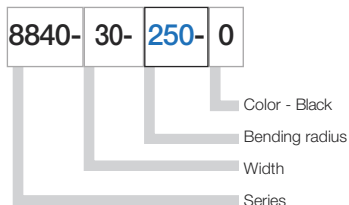


Series R8840 - fully enclosed Energy Tube

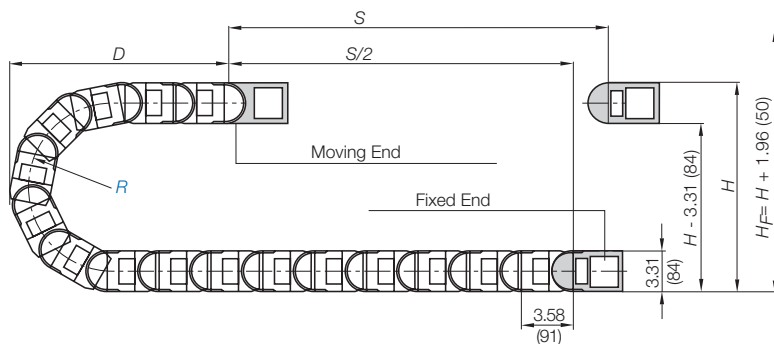
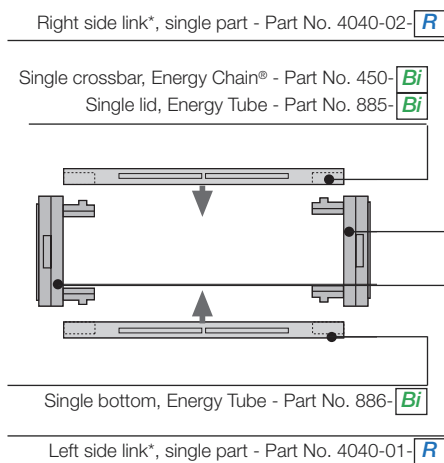


- Fully enclosed
- Excellent cable and hose protection against dirt
- Protection against hot chips up to 1652°F (900°C)
- Lids along inner radius are completely removable
- Lids along the outer radius are single-sided, snap open, hinged on one side as well as completely removable

Part Number Structure



Energy Chain® as separate parts, links and side plates



*View from the fixed point of the Energy Chain®/Energy Tube

Energy Chain System® E4/4

Series 4040/4140/R8840

energy chain® configurator 



4040
4140
R8840

Supplement part number with required radius. Example: 4040-30-300-0

Pitch: 3.58 in. (91mm) per link links/ft(m) = 3.35 (11)

Part Number.			<i>Bi</i>	<i>Ba</i>	4040	4140	R8840
Crossbars Every link	Crossbars Every other	Tube Version	in. (mm)	in. (mm)	lbs/ft (kg/m)	lbs/ft (kg/m)	lbs/ft (kg/m)
4040-05-	4140-05-	<input type="checkbox"/> -0	1.97 (50)	3.39 (86)	≈ 2.45 (3.65)	≈ 2.63 (3.58)	-
4040-06-	4140-06-	<input type="checkbox"/> -0	2.56 (65)	3.98 (101)	≈ 2.47 (3.67)	≈ 2.15 (3.60)	-
4040-07-	4140-07-	8840-07- <input type="checkbox"/> -0*	2.95 (75)	4.37 (111)	≈ 2.54 (3.78)	≈ 2.31 (3.70)	≈ 2.85 (4.24)
4040-08-	4140-08-	<input type="checkbox"/> -0	3.43 (87)	4.84 (123)	≈ 2.57 (3.83)	≈ 2.52 (3.75)	-
4040-10-	4140-10-	8840-10- <input type="checkbox"/> -0	3.94 (100)	5.35 (136)	≈ 2.66 (3.96)	≈ 2.37 (3.78)	≈ 3.04 (4.52)
4040-11-	4140-11-	-	4.41 (112)	5.87 (149)	≈ 2.75 (4.09)	≈ 2.42 (3.85)	-
4040-12-	4140-12-	8840-12- <input type="checkbox"/> -0	4.92 (125)	6.34 (161)	≈ 2.80 (4.16)	≈ 2.44 (3.88)	≈ 3.28 (4.88)
4040-13-	4140-13-	<input type="checkbox"/> -0	5.39 (137)	6.85 (174)	≈ 2.88 (4.29)	≈ 2.49 (3.95)	-
4040-15-	4140-15-	8840-15- <input type="checkbox"/> -0	5.91 (150)	7.32 (186)	≈ 2.93 (4.36)	≈ 2.51 (3.98)	≈ 3.57 (5.31)
4040-16-	4140-16-	<input type="checkbox"/> -0	6.38 (162)	7.83 (199)	≈ 3.00 (4.47)	≈ 2.54 (4.04)	-
4040-17-	4140-17-	<input type="checkbox"/> -0	6.89 (175)	8.31 (211)	≈ 3.08 (4.58)	≈ 2.58 (4.09)	-
4040-18-	4140-18-	<input type="checkbox"/> -0	7.36 (187)	8.81 (224)	≈ 3.15 (4.69)	≈ 2.61 (4.15)	-
4040-20-	4140-20-	8840-20- <input type="checkbox"/> -0	7.87 (200)	9.29 (236)	≈ 3.17 (4.71)	≈ 2.63 (4.16)	≈ 3.96 (5.89)
4040-21-	4140-21-	<input type="checkbox"/> -0	8.35 (212)	9.80 (249)	≈ 3.24 (4.82)	≈ 2.66 (4.21)	-
4040-22-	4140-22-	<input type="checkbox"/> -0	8.86 (225)	10.28 (261)	≈ 3.28 (4.88)	≈ 2.68 (4.25)	-
4040-23-	4140-23-	<input type="checkbox"/> -0	9.33 (237)	10.79 (274)	≈ 3.37 (5.02)	≈ 2.73 (4.31)	-
4040-25-	4140-25-	8840-25- <input type="checkbox"/> -0	9.84 (250)	11.26 (286)	≈ 3.43 (5.10)	≈ 2.76 (4.36)	≈ 4.44 (6.61)
4040-26-	4140-26-	<input type="checkbox"/> -0	10.31 (262)	11.77 (299)	≈ 3.49 (5.19)	≈ 2.79 (4.40)	-
4040-27-	4140-27-	8840-27- <input type="checkbox"/> -0	10.83 (275)	12.24 (311)	≈ 3.56 (5.30)	≈ 2.82 (4.46)	≈ 4.63 (6.89)
4040-28-	4140-28-	<input type="checkbox"/> -0	11.30 (287)	12.76 (324)	≈ 3.58 (5.32)	≈ 2.83 (4.47)	-
4040-30-	4140-30-	8840-30- <input type="checkbox"/> -0	11.81 (300)	13.23 (336)	≈ 3.72 (5.54)	≈ 2.90 (4.58)	≈ 4.89 (7.27)
4040-31-	4140-31-	<input type="checkbox"/> -0	12.28 (312)	13.74 (349)	≈ 3.72 (5.54)	≈ 2.90 (4.58)	-
4040-32-	4140-32-	<input type="checkbox"/> -0	12.79 (325)	14.21 (361)	≈ 3.78 (5.63)	≈ 2.94 (4.62)	-
4040-33-	4140-33-	<input type="checkbox"/> -0	13.27 (337)	14.72 (374)	≈ 3.90 (5.81)	≈ 3.00 (4.71)	-
4040-35-	4140-35-	8840-35- <input type="checkbox"/> -0	13.78 (350)	15.20 (386)	≈ 4.01 (5.96)	≈ 3.04 (4.79)	≈ 5.39 (8.02)
4040-36-	4140-36-	<input type="checkbox"/> -0	14.25 (362)	15.71 (399)	≈ 4.01 (5.96)	≈ 3.04 (4.79)	-
4040-37-	4140-37-	<input type="checkbox"/> -0	14.76 (375)	16.18 (411)	≈ 4.02 (5.98)	≈ 3.05 (4.80)	-
4040-38-	4140-38-	<input type="checkbox"/> -0	15.24 (387)	16.69 (424)	≈ 4.08 (6.07)	≈ 3.08 (4.84)	-
4040-40-	4140-40-	8840-40- <input type="checkbox"/> -0	15.75 (400)	17.17 (436)	≈ 4.21 (6.27)	≈ 3.15 (4.94)	≈ 6.04 (8.98)
4040-41-	4140-41-	<input type="checkbox"/> -0	16.22 (412)	17.68 (449)	≈ 4.31 (6.42)	≈ 3.20 (5.02)	-
4040-42-	4140-42-	<input type="checkbox"/> -0	16.73 (425)	18.15 (461)	≈ 4.42 (6.58)	≈ 3.25 (5.09)	-
4040-43-	4140-43-	<input type="checkbox"/> -0	17.20 (437)	18.66 (474)	≈ 4.46 (6.64)	≈ 3.27 (5.13)	-
4040-45-	4140-45-	<input type="checkbox"/> -0	17.72 (450)	19.13 (486)	≈ 4.51 (6.71)	≈ 3.30 (5.16)	-
4040-46-	4140-46-	8840-46- <input type="checkbox"/> -0	18.19 (462)	19.65 (499)	≈ 4.52 (6.73)	≈ 3.31 (5.17)	≈ 6.34 (9.44)
4040-47-	4140-47-	<input type="checkbox"/> -0	18.70 (475)	20.12 (511)	≈ 4.61 (6.86)	≈ 3.35 (5.24)	-
4040-48-	4140-48-	<input type="checkbox"/> -0	19.17 (487)	20.63 (524)	≈ 4.61 (6.86)	≈ 3.37 (5.24)	-
4040-50-	4140-50-	<input type="checkbox"/> -0	19.69 (500)	21.10 (536)	≈ 4.70 (7.00)	≈ 3.39 (5.30)	-
4040-51-	4140-51-	<input type="checkbox"/> -0	20.16 (512)	21.61 (549)	≈ 4.72 (7.02)	≈ 3.40 (5.31)	-
4040-52-	4140-52-	<input type="checkbox"/> -0	20.67 (525)	22.09 (561)	≈ 4.74 (7.06)	≈ 3.41 (5.34)	-
4040-53-	4140-53-	<input type="checkbox"/> -0	21.14 (537)	22.60 (574)	≈ 4.85 (7.22)	≈ 3.47 (5.41)	-
4040-55-	4140-55-	<input type="checkbox"/> -0	21.65 (550)	23.07 (586)	≈ 5.17 (7.70)	≈ 3.63 (5.65)	-
4040-60-	4140-60-	<input type="checkbox"/> -0	23.62 (600)	25.04 (636)	≈ 5.31 (7.90)	≈ 3.70 (5.75)	-

Choose from the radii below for all of the above sizes

Radius (mm) Example: 4040-30-300-0

	135**	150	175	200	240	250	300	350	400	500
R	5.31 (135)	5.91 (150)	6.89 (175)	7.87 (200)	9.45 (240)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	19.68 (500)
H* ₊₂₅	14.17 (360)	15.16 (385)	17.13 (435)	19.09 (485)	22.24 (565)	23.03 (585)	26.97 (685)	30.91 (785)	34.84 (885)	42.72 (1085)
D	10.63 (270)	11.22 (285)	12.20 (310)	13.19 (335)	14.76 (375)	15.16 (385)	17.13 (435)	19.09 (485)	21.06 (535)	25.00 (635)
K	25.59 (650)	29.53 (750)	32.48 (825)	35.43 (900)	40.16 (1020)	41.34 (1050)	48.23 (1225)	52.76 (1340)	57.09 (1450)	69.88 (1775)

** This radius is not available for the R8840 Series

*Removable lid only, no hinged option

0=Standard color black. For other colors see Chapter 1

For wider chains see page 6.37. For large diameter hoses see page 6.37

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



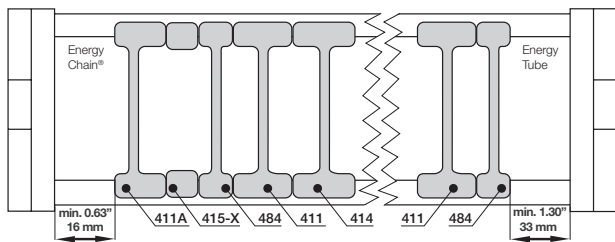
igus® Energy Chain System®



Option 1: Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.

NOTE: Observe a lateral spacing of at least 1.30 in. (33mm) for Energy Tubes and .63 in. (16mm) for Energy Chain®. There is no minimum spacing needed for side plates



Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>



		STANDARD Vertical separator 401		Vertical separator Unassembled Part No. 401 Assembled Part No. 411
		Vertical separator 483		Vertical separator Unassembled Part No. 483 Assembled Part No. 484
		Locking separator 404		Locking separator (chain only) Unassembled Part No. 404 Assembled Part No. 414
		Locking separator 406		Locking separator (tube only) Unassembled Part No. 406 Assembled Part No. 416
		Asymmetric separator 401A		Asymmetrical separator (chain only) Unassembled Part No. 401A Assembled Part No. 411A
		Spacers 405-XX		Spacer (chain only) Unassembled Part No. 405-XX Assembled Part No. 415-XX XX = width of the spacer

- **Standard separator 401 for Energy Chains® and Energy Tubes**
This separator offers safe stability due to its wide base design, also when used with thick cables or hoses.
- **Vertical separator 483 for Energy Chains® and Energy Tubes**
This separator offers a narrow base for applications where a large number of small cables need to be individually separated.
- **Locking separator 404 for Energy Chains®**
This separator features increased retention force for applications exposed to very high humidity and extreme loads. The extra retention force is achieved by asymmetric claws for the crossbar. Take care to ensure proper alignment.
- **Locking separator 406 for Energy Tubes**
It features a single sided, secure fit, and can be placed on the lid or the bottom of the Energy Tube. The single side locking design helps to eliminate difficulties in assembling the opposite cover or crossbar
- **Asymmetrical separator 401A for Energy Chains®**
This separator features an (18mm) base. It can be used in combinations between spacers of different widths and vertical separators in side mounted applications.
- **NOTE ON SPACERS**
Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications. The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

Spacers available in the following sizes:

Part No.	Part No.	in.	(mm)
Unassembled	Assembled		
405 -10	415 -10	.39"	(10)
405 -15	415 -15	.59"	(15)
405 -20	415 -20	.79"	(20)
405 -30	415 -30	1.18"	(30)
405 -40	415 -40	1.57"	(40)

Energy Chain System® E4/4

Series 4040/4140/R8840

Interior Separation

energy chain® configurator ▶



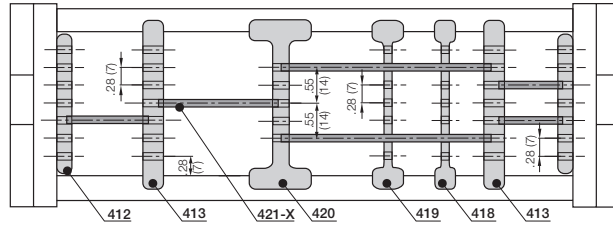
4040
4140
R8840



Option 2: Shelves

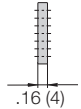
Energy Chains® and Energy Tubes can be subdivided both vertically and horizontally using the various interior separation elements.

► **Design, Chapter 1** for layout recommendations.



- **Side plates 402**

This component is used to form the basic pattern of a shelf system.



Side plate

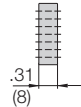
Unassembled	Part No. 402
Assembled	Part No. 412

Side plate 402



- **Vertical separator 403**

This component is used to form the basic pattern of a shelf system.



Vertical separator

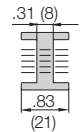
Unassembled	Part No. 403
Assembled	Part No. 413

Vertical separator 403



- **Locking vertical separator 410**

This separator is slotted and able to be combined with shelves. For Energy Chains® only.



Locking vertical separator

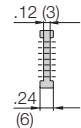
Unassembled	Part No. 410
Assembled	Part No. 420

Locking vertical separator 410



- **Slotted separators 408**

These are used for very complex subdivisions. However, they cannot be retrofitted into an existing separation system without removing the shelves first.



Slotted separators, closed

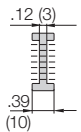
Unassembled	Part No. 408
Assembled	Part No. 418

Closed slotted separator 408



- **Slotted separator 409**

This separator can be retrofitted into an existing interior separation system without removing the shelves, as long as these shelves fit into any of the 3 middle slots



Slotted separators, open

Unassembled	Part No. 409
Assembled	Part No. 419

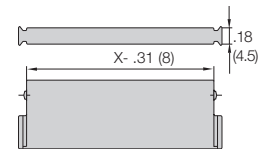
Open slotted separator 409



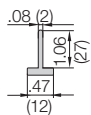
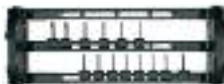
Shelves 420-XX

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 7 different heights in .28" (7mm) increments

Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled
.71 (18)	.39 (10)	420-18	421-18	2.95 (75)	2.64 (67)	420-75	421-75
.91 (23)	.59 (15)	420-23	421-23	3.46 (88)	3.15 (80)	420-88	421-88
.98 (25)	.67 (17)	420-25	421-25	3.94 (100)	3.62 (92)	420-100	421-100
1.10 (28)	.79 (20)	420-28	421-28	4.92 (125)	4.61(117)	420-125	421-125
1.30 (33)	.98 (25)	420-33	421-33	5.91 (150)	5.59(142)	420-150	421-150
1.69 (43)	1.38 (35)	420-43	421-43	6.89 (175)	6.57(167)	420-175	421-175
1.97 (50)	1.65 (42)	420-50	421-50	7.36 (187)	7.05(179)	420-187	421-187
2.44 (62)	2.13 (54)	420-62	421-62	7.87 (200)	7.56(192)	420-200	421-200



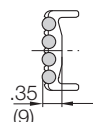
Center crossbar - developed for applications involving a very large number of thin cables, individually separated. This offers the option of subdividing the Energy Chain® into upper and lower halves, with mutually independent separators.



Center crossbar

Unassembled	Part No. 405
Assembled	Part No. 415

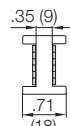
Rollclip - minimizes abrasion of particularly sensitive hoses or cables in an Energy Chain®. The integrated rollers compensate for relative movement between the chain and the hose or cable. This reduces the abrasion of the hoses or cables



Rollclip

Unassembled	Part No. 489-27
Assembled	Part No. 490-27

Roller separator - performs a similar function to the Rollclip, but doubles as a separator. Consult igus® if you have any questions regarding the roller separator.



Center crossbar

Unassembled	Part No. 429
Assembled	Part No. 430

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



igus® Energy Chain System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>



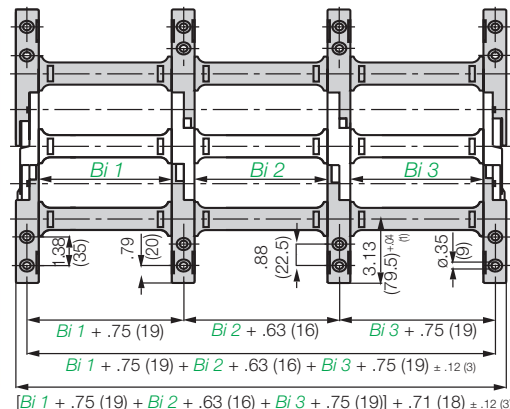
Part number example for Energy Chain®

4040-10/20/10-200-0
4040-Bi1/Bi2/Bi3-R-0

We **strongly** recommend on-site consultation with an igus® technician for individual advice regarding mounting brackets, guide troughs and other design details.

Extension links - for extremely wide Energy Chains® up to 9.84 ft (3m)

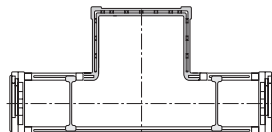
- For applications in which particularly high fill weights necessitate extremely wide Energy Chains® (up to 118" (3000 mm))
- The extension link design allows virtually limitless side-by-side attachment of chains
- The unsupported length of a chain can be increased when additional loads are required
- Extension links can be used with Energy Chains®, Energy Tubes or a combination of both
- They are suitable for unsupported and gliding applications in a guide trough
- Energy Chains® with extension links are attached with KMA or steel mounting brackets.



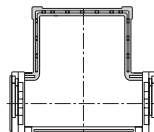
Consult igus® for your extender crossbar applications. We will be happy to assist you with your design layout.

Extender crossbars - For careful guiding of large diameter cables and hoses

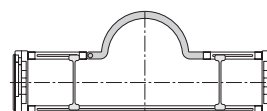
- Intended for cables and hoses with a maximum outer diameter of 9.64 in. (245 mm).
- Can be attached along either the inner or outer radius, inner radius preferred
- Gliding operation with crossbars assembled along the outer radius in conjunction with a special guide trough
- Gliding operation not guaranteed with crossbars assembled along the inner radius
- The extender crossbar can either be attached to the side links directly or can be used in combination with two standard snap-open crossbars.



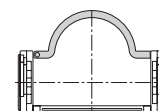
Square extender crossbar combined with standard snap-open crossbars.



Attached directly to the side link.



Round extender crossbar combined with standard snap-open crossbars.



Attached directly to the side link.

Part No.	Max Ø Hose	Style	Installation Side Link	Combined with Snap-Open Crossbars
450-15-RHD115	By request	Round	Yes	No
450-17-RD115	By request	Round	No	Yes
450-25-D150	By request	Square	Yes	No
450-30-D200	By request	Square	Yes	No
450-35-D250	By request	Square	Yes	No
450-40-D300	By request	Square	Yes	No
450-20-HD150	By request	Square	No	Yes
450-25-HD200	By request	Square	No	Yes
450-30-HD250	By request	Square	No	Yes

E4 clip on cable binder

- For side mounted applications
- Serves as a clip-on, lateral guide for hoses and cables on Energy Chains®
- The loops can be adjusted as needed

- Compatible with many E4 Energy Chains®
- Economical
- One clip and one locking band are needed for each chain link



Part No.	Form
450-B12	Locking clip, comprised of a locking element
450-B12-200	Locking band, comprised of a locking element and band; 12 x 1.5 x 200 mm

Energy Chain System® E4/4

Series 4040/4140/R8840

Mounting Brackets - KMA

energy chain® configurator

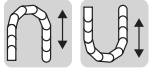
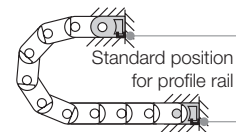
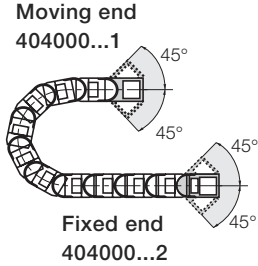


4040
4140
R8840



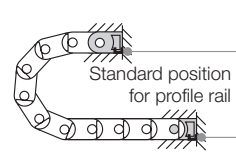
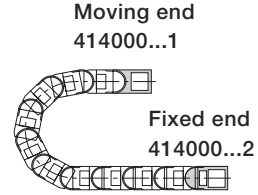
Option 1: KMA pivoting

- Profile rail option
- Universal use
- Corrosion resistant
- Short and long travels
- Space-restricted conditions

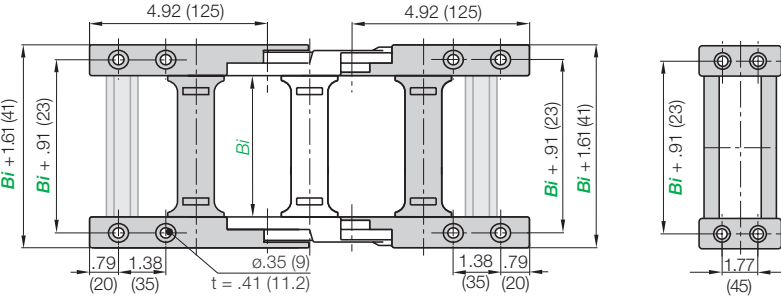
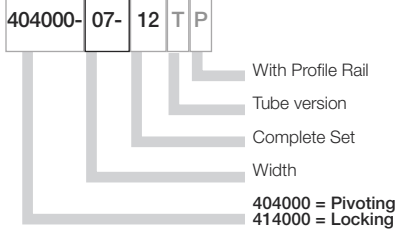


Option 2: KMA locking

- Profile rail option
- Universal use
- Corrosion resistant
- Extreme accelerations
- Vertical hanging/standing travels



Part Number Structure



Full set, for both ends:

404000-05-12 Full set, each part with pin/bore

Single-part order:

404000-05-1 Mounting bracket with bore
404000-05-2 Mounting bracket with pin

Part number examples are shown for pivoting brackets. For locking brackets change part number to 414000

Part No. Full Set (pivoting)
Series 4040 or 4140:
404000-Width-12

Part No. Full Set (pivoting)
with profile rail
Series 4040 or 4140
404000-Width-12P

Part No. Full Set (pivoting)
Tube Series R8840
404000-Width-12T

Part No. Full Set (pivoting)
with Profile Rail
Series R8840
404000-Width-12TP

Width	Part No. Full Set		Tube Option	With Profile Rail	Bi in. (mm)	Width	Part No. Full Set		Tube Option	With Profile Rail	Bi in. (mm)
	Pivoting	Locking					Pivoting	Locking			
-05	404000	414000	-05-12	P	1.97 (50)	-31	404000	414000	-31-12	P	12.28 (312)
-06	404000	414000	-06-12	P	2.56 (65)	-32	404000	414000	-32-12	P	12.79 (325)
-07	404000	414000	-07-12	T	2.95 (75)	-33	404000	414000	-33-12	P	13.27 (337)
-08	404000	414000	-08-12	P	3.43 (87)	-35	404000	414000	-35-12	T	13.78 (350)
-10	404000	414000	-10-12	T	3.94 (100)	-36	404000	414000	-36-12	P	14.25 (362)
-11	404000	414000	-11-12	P	4.41 (112)	-37	404000	414000	-37-12	P	14.76 (375)
-12	404000	414000	-12-12	T	4.92 (125)	-38	404000	414000	-38-12	P	15.24 (387)
-13	404000	414000	-13-12	P	5.39 (137)	-40*	404000	414000	-40-12	T	15.75 (400)
-15	404000	414000	-15-12	T	5.91 (150)	-41	404000	414000	-41-12	P	16.22 (412)
-16	404000	414000	-16-12	P	6.38 (162)	-42	404000	414000	-42-12	P	16.73 (425)
-17	404000	414000	-17-12	P	6.89 (175)	-43	404000	414000	-43-12	P	17.20 (437)
-18	404000	414000	-18-12	P	7.36 (187)	-45	404000	414000	-45-12	P	17.72 (450)
-20	404000	414000	-20-12	T	7.87 (200)	-46	404000	414000	-46-12	T	18.19 (462)
-21	404000	414000	-21-12	P	8.35 (212)	-47	404000	414000	-47-12	P	18.70 (475)
-22	404000	414000	-22-12	P	8.86 (225)	-48	404000	414000	-48-12	P	19.17 (487)
-23	404000	414000	-23-12	P	9.33 (237)	-50	404000	414000	-50-12	P	19.69 (500)
-25	404000	414000	-25-12	T	9.84 (250)	-51	404000	414000	-51-12	P	20.16 (512)
-26	404000	414000	-26-12	P	10.31 (262)	-52	404000	414000	-52-12	P	20.67 (525)
-27	404000	414000	-27-12	T	10.83 (275)	-53	404000	414000	-53-12	P	21.14 (537)
-28	404000	414000	-28-12	P	11.30 (287)	-55	404000	414000	-55-12	P	21.65 (550)
-30	404000	414000	-30-12	T	11.81 (300)	-60	404000	414000	-60-12	P	23.62 (600)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



4040
4140
R8840



Energy Chain System® E4/4 Series 4040/4140/R8840 Mounting Brackets - Steel

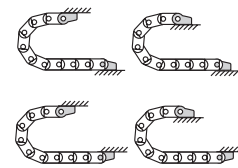
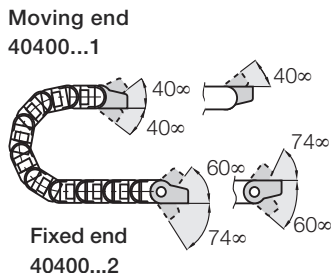
energy chain® configurator

igus® Energy Chain System®



Option 1: pivoting

- For pivoting connections
- One part for all chain widths
- Electrically conductive



Possible installation configurations -

Part No. Mounting Brackets Full Set

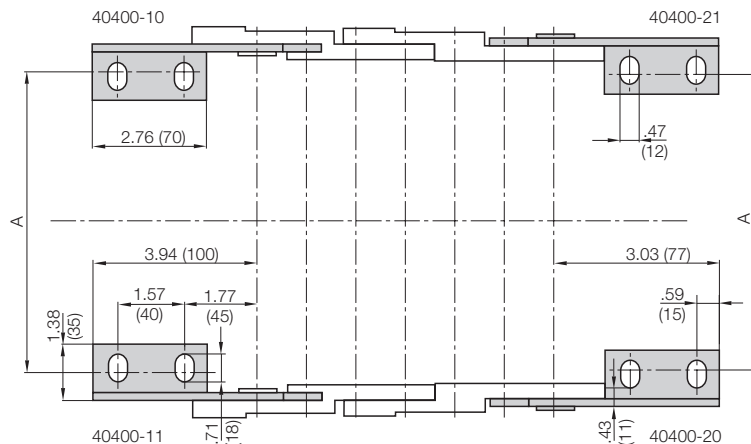
4 parts, 2 with pin, 2 with bore
Series 4040, 4140 or R8840:
40400-12

Part No. Mounting Bracket Moving End

2 parts, 1 left & 1 right with bore
Series 4040, 4140 or R8840
40400-1

Part No. Mounting Bracket Fixed End

2 parts, 1 left & 1 right with pin
Series 4040, 4140 or R8840
40400-2



Bracket Mounting dimensions

Width of Chain <i>Bi</i>	Mounting Brackets			Mounting Dimension A in. (mm)
	Part Number	Full Set	Moving End Only / Fixed End Only	
1.97 (50)*	40400	-12	-1 -2	3.78 (96)
2.56 (65)	40400	-12	-1 -2	1.57 (40)
2.95 (75)	40400	-12	-1 -2	1.96 (50)
3.43 (87)	40400	-12	-1 -2	2.44 (62)
3.94 (100)	40400	-12	-1 -2	2.95 (75)
4.41 (112)	40400	-12	-1 -2	3.42 (87)
4.92 (125)	40400	-12	-1 -2	3.93 (100)
5.39 (137)	40400	-12	-1 -2	4.40 (112)
5.91 (150)	40400	-12	-1 -2	4.92 (125)
6.38 (162)	40400	-12	-1 -2	5.39 (137)
6.89 (175)	40400	-12	-1 -2	5.90 (150)
7.36 (187)	40400	-12	-1 -2	6.37 (162)
7.87 (200)	40400	-12	-1 -2	6.88 (175)
8.35 (212)	40400	-12	-1 -2	7.36 (187)
8.86 (225)	40400	-12	-1 -2	7.87 (200)
9.33 (237)	40400	-12	-1 -2	8.34 (212)
9.84 (250)	40400	-12	-1 -2	8.85 (225)
10.31 (262)	40400	-12	-1 -2	9.33 (237)
10.83 (275)	40400	-12	-1 -2	9.84 (250)
11.30 (287)	40400	-12	-1 -2	10.31 (262)
11.81 (300)	40400	-12	-1 -2	10.82 (275)

Width of Chain <i>Bi</i>	Mounting Brackets			Mounting Dimension A in. (mm)
	Part Number	Full Set	Moving End Only / Fixed End Only	
12.28 (312)	40400	-12	-1 -2	11.29 (287)
12.79 (325)	40400	-12	-1 -2	11.81 (300)
13.27 (337)	40400	-12	-1 -2	12.28 (312)
13.78 (350)	40400	-12	-1 -2	12.79 (325)
14.25 (362)	40400	-12	-1 -2	13.26 (337)
14.76 (375)	40400	-12	-1 -2	13.77 (350)
15.24 (387)	40400	-12	-1 -2	14.25 (362)
15.75 (400)	40400	-12	-1 -2	14.76 (375)
16.22 (412)	40400	-12	-1 -2	15.23 (387)
16.73 (425)	40400	-12	-1 -2	15.74 (400)
17.20 (437)	40400	-12	-1 -2	16.22 (412)
17.72 (450)	40400	-12	-1 -2	16.73 (425)
18.19 (462)	40400	-12	-1 -2	17.20 (437)
18.70 (475)	40400	-12	-1 -2	17.71 (450)
19.17 (487)	40400	-12	-1 -2	18.18 (462)
19.69 (500)	40400	-12	-1 -2	18.70 (475)
20.16 (512)	40400	-12	-1 -2	19.17 (487)
20.67 (525)	40400	-12	-1 -2	19.68 (500)
21.14 (537)	40400	-12	-1 -2	20.15 (512)
21.65 (550)	40400	-12	-1 -2	20.66 (525)
23.62 (600)	40400	-12	-1 -2	22.63 (575)

*Mounting bracket feet must face outward

Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

Energy Chain System® E4/4

Series 4040/4140/R8840

Strain Relief

energy chain® configurator 



4040
4140
R8840

Chainfix clamps for the profile rail



igus® Chainfix strain relief elements are available in either steel or stainless steel. They can be adjusted with a hexagon socket and are available in single, double and triple configurations.

Part No. Single Clamp		Part No. Double Clamp		Part No. Triple Clamp		Cable ø	
Steel	Stainless	Steel	Stainless	Steel	Stainless	in.	(mm)
CFX12-1	CFX12-1E	CFX12-2	CFX12-2E	CFX12-3	-	.24 - .47	(06 - 12)
CFX14-1	CFX14-1E	CFX14-2	CFX14-2E	CFX14-3	-	.47 - .55	(12 - 14)
CFX16-1	CFX16-1E	CFX16-2	CFX16-2E	CFX16-3	-	.55 - .63	(14 - 16)
CFX18-1	CFX18-1E	CFX18-2	CFX18-2E	CFX18-3	-	.63 - .71	(16 - 18)
CFX20-1	CFX20-1E	CFX20-2	CFX20-2E	CFX20-3	-	.71 - .79	(18 - 20)
CFX22-1	CFX22-1E	CFX22-2	CFX22-2E	CFX22-3	-	.79 - .87	(20 - 22)
CFX26-1	CFX26-1E	CFX26-2	CFX26-2E	-	-	.87 - 1.02	(22 - 26)
CFX30-1	CFX30-1E	CFX30-2	CFX30-2E	-	-	1.02 - 1.18	(26 - 30)
CFX34-1	CFX34-1E	CFX34-2	CFX34-2E	-	-	1.18 - 1.34	(30 - 34)
CFX38-1	CFX38-1E	-	-	-	-	1.34 - 1.50	(34 - 38)
CFX42-1	CFX42-1E	-	-	-	-	1.50 - 1.65	(38 - 42)

For more information please refer to strain relief section of Chapter 10

Chainfix Clip

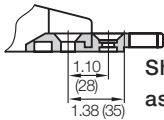


Modular snap-on strain relief device

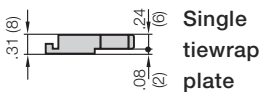
Chainfix clip is available for cable diameters ranging from .16" (4mm) to .94" (24 mm). It is suitable for assembly on KMA mounting brackets, clip-on strain relief for crossbars as well as profile rails. Quick assembly without the use of tools. **For more information please refer to strain relief section of Chapter 10**

Cable ø	Part No. Clamp	Part No. Bottom
.16-.31	CFC-08-M	CFC-08-C
.31-.47	CFC-12-M	CFC-12-C
.47-.63	CFC-16-M	CFC-16-C
.63-.79	CFC-20-M	CFC-20-C
.79-.94	CFC-24-M	CFC-24-C

Tiewrap Plates



Shown assembled

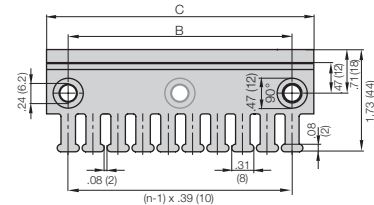


Single tiewrap plate

Option 1: Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



If used with KMA brackets with profile rail please add "KMA" to the end of the part number.

Example: 3050-ZBKMA

For more information please refer to strain relief section of Chapter 10



Option 2: Clip-on Tiewrap plates

Available as a clip-on tiewrap plate without the use of bolts They are inserted and removed with a screwdriver used as a lever. Clip-on tiewrap plates are also available as an attachment to the opening crossbars.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
3050-ZC	5	1.97 (50)
3075-ZC	7	2.95 (75)

For more information please refer to strain relief section of Chapter 10



Option 3: Clip-on Tiewrap plates for opening crossbars

Clip-on tiewrap plates are also available as an attachment to opening crossbars. They can be positioned at any point along the Energy Chain®.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
4550-ZS	5	1.89 (48)
4575-ZS	7	2.91 (74)

For more information please refer to strain relief section of Chapter 10

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Width of Crossbar
4040-05-200-0

	B_{Ri}	Installation Part No.
-05	3.50 (89)	*
-06	4.23 (104)	94-50-225
-07	4.49 (114)	94-50-225
-08	5.04 (128)	94-50-250
-10	5.47 (139)	94-50-250
-11	5.98 (152)	94-50-275
-12	6.46 (164)	94-50-275
-13	6.97 (177)	94-50-300
-15	7.44 (189)	94-50-300
-16	7.95 (202)	94-50-325
-17	8.42 (214)	94-50-325
-18	8.94 (227)	94-50-350
-20	9.41 (239)	94-50-350
-21	9.92 (252)	94-50-375
-22	10.39 (264)	94-50-375
-23	10.91 (277)	94-50-400
-25	11.38 (289)	94-50-400
-26	11.89 (302)	94-50-425
-27	12.36 (314)	94-50-425
-28	12.87 (327)	94-50-450
-30	13.35 (339)	94-50-450
-31	13.86 (352)	94-50-475
-32	14.33 (364)	94-50-475
-33	14.84 (377)	94-50-500
-35	15.31 (389)	94-50-500
-36	15.82 (402)	94-50-525
-37	16.30 (414)	94-50-525
-38	16.81 (427)	94-50-550
-40	17.28 (439)	94-50-550
-41	17.79 (452)	94-50-575
-42	18.27 (464)	94-50-575
-43	18.78 (477)	94-50-600
-45	19.25 (489)	94-50-600
-46	19.76 (502)	94-50-625
-47	20.24 (514)	94-50-625
-48	20.75 (527)	94-50-650
-50	21.22 (539)	94-50-650
-51	21.73 (552)	94-50-675
-52	22.20 (564)	94-50-675
-53	22.72 (577)	94-50-700
-55	23.19 (589)	94-50-700
-60	25.28 (639)	94-50-750

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required.

- Full travel length of guide trough
Part No. 94-30
- 1/2 travel length glide bars
Part No. 93-01
- Installation sets as end connectors
Part No. 94-50-XX

.XX indicates the length of the profile rails on which the guide trough is mounted. The values and part numbers are specified in the table on the left. The standard length of the trough components and glide bars is 6.56 ft (2 m). The required overall length of the guide trough directly correlates to the length of travel.

Example:

Length of travel 164 ft (50 m)
Center mounted

Required guide troughs:

164 ft (50 m) guide trough
82 ft (25 m) glide bars
= 25 sections of 6.56 ft (2 m) guide trough

Part No. 94-30

= 13 sections of 6.56 ft (2 m) glide bars

Part No. 93-01

Required number of installation sets:

= Number of guide trough components + 1
= 25 + 1 = 26

Part number of the installation sets

94-50-XXX

Example:

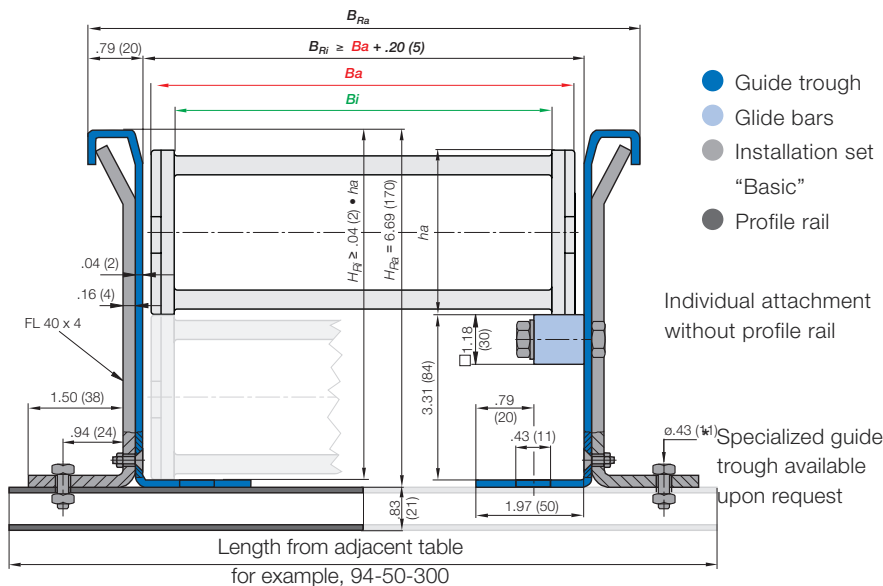
94-50-400 for 15.75 (400 mm) long profile rail



Left: Guide trough with glide bars
Right: Guide troughs without glide bars



Installation sets as section connectors



Standard length profile rail

For further technical information on guide troughs
▶ Chapter 9



The maintenance-free Series 4040 protects the igus® Chainflex® motor and signal cables during the lifting and lowering movements of the tidal turbine and also protects them against aggressive ambient conditions. The travel distance amounts to approx. 65.6 ft. (20 m) in vertical direction above and underwater

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Rol instead of gliding: Rol E-Chain®

Special solution for long travels. 75% less drive power (gliding application) with igus® Rol E-Chain®.

Series 4040R - Order example 4040RHD-30-250-0

Further information: Call igus® at 800-521-2747



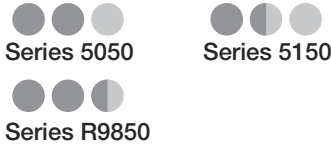
5050
5150
R9850



Energy Chain System® E4/4 Series 5050/5150/R9850



Price Index



Special Features / Options

- Side-mounted - unsupported
- ESD classification:
Electrically conductive
ESD/ATEX version upon request
- High torsional rigidity

Assembly Tips



Opening Energy Chains®: Remove crossbars and clips - Insert screwdriver into the slot, push down, release by lever action



Remove lids/bottoms (Energy Tubes) - Insert screwdriver into the slot, release by lever action

Other Installation Methods

- Vertical, hanging ≤ 394 ft (120 m)
- Vertical, standing ≤ 19.69 ft (6 m)
- Side-mounted, un supp. ≤ 9.84 ft (3 m)
- Rotary requires further calculation

Usage Guidelines

- If subject to high torsional forces
 - For side-mounted applications involving long unsupported lengths
 - If subject to very dirty or dusty environments

- If a simpler low-cost solution is required
 - Series 15050/R19850
 - When very long travels or high additional loads are involved
 - Series 5050HD/R9850HD

Features & Benefits

- 1 KMA mounting brackets with attachment points on all sides
- 2 Crossbars on Energy Chains® are removable along both radii
- 3 Hinged, snap-open, removable lids along outer radius of Energy Tube
- 4 Lateral glide surfaces for side-mounted operation
- 5 Strain relief elements can be integrated with the mounting bracket
- 6 Wide, rounded plastic crossbars - cable friendly
- 7 High torsional rigidity
- 8 Closed and open styles can be combined
- 9 High side-mount stability due to undercut
- 10 Numerous interior separation possibilities
- 11 Energy Chain® also available with reverse bending radii



Rol E-Chain® Series 5050R/9850R available upon request



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

[energy chain® configurator](#) ▶

16.4 ft (5 m) 5050-30-300-0

Energy Chain®

With 2 separators 511 assembled every 2nd link

Interior Separation

1 Set 505000-30-12P

Mounting Bracket

Energy Chain System® E4/4

Series 5050/5150/R9850

Installation Dimensions

energy chain® configurator

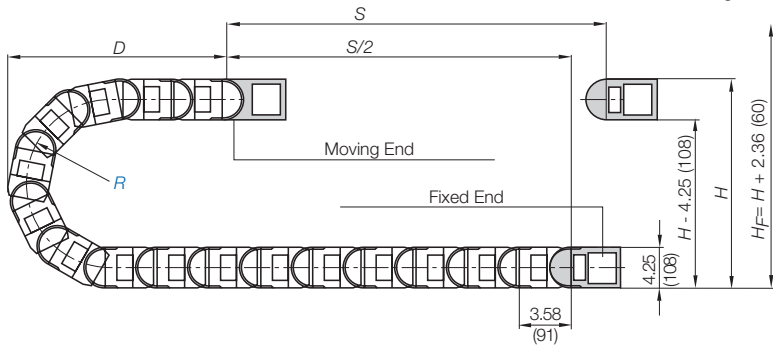
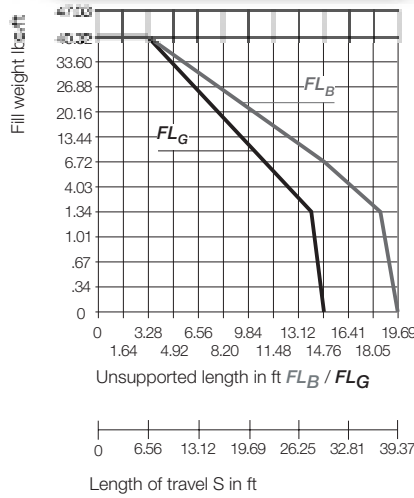
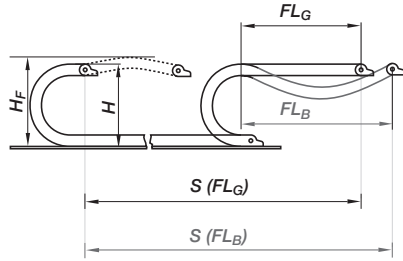


5050
5150
R9850

Short travel, unsupported length

- FL_B = unsupported with permitted sag
- FL_G = unsupported with straight upper run

Further information Design, Chapter 1



Pitch per link = 3.58" (91 mm)
Links per ft (m) = 3.35 (11)
For center mount applications:
Chain length = $S/2 + K$

The required clearance height: $H_F = H + 2.36$ in. (60 mm) (with 2.02 lbs/ft (3 kg/m) fill weight).
Please consult igus® if space is particularly restricted.

R	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	19.68 (500)	21.65 (550)	23.62 (600)	25.59 (650)	39.37 (1000)
H_{25}^0	16.06 (408)	20.00 (508)	23.94 (608)	27.87 (708)	31.81 (808)	35.75 (908)	43.62 (1108)	47.56 (1208)	51.50 (1308)	55.43 (1408)	82.99 (2108)
D	11.61 (295)	13.58 (345)	15.55 (395)	17.52 (445)	19.49 (495)	21.46 (545)	25.39 (645)	27.36 (695)	29.33 (745)	31.30 (795)	45.08 (1145)
K	25.79 (655)	32.09 (815)	38.19 (970)	44.29 (1125)	50.59 (1285)	56.69 (1440)	69.09 (1755)	75.20 (1910)	81.50 (2070)	87.60 (2225)	128.15 (3255)

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{safety buffer}$
 - H_F = Required clearance height
 - H_{in} = Trough inner height
 - H_2 = *Mounting height
 - D_2 = Overlength - long travels, gliding
 - K_2 = *Add-on
- *If the mounting bracket location is set lower



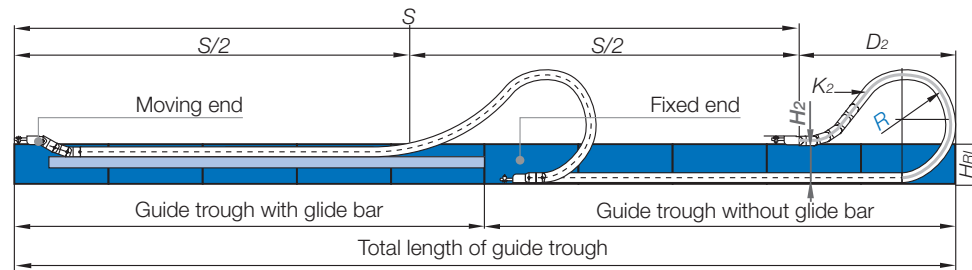
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

For long travels with lowered mounting height

Long travel lengths from 32.8 ft.(10m) to max. 1,312 ft. (400m)

For center mount applications:

Chain length = $S/2 + K_2$



Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.
Design, Chapter 1

R	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	19.68 (500)	21.65 (550)	23.62 (600)	25.59 (650)	39.37 (1000)
H_2	9.53 (242)	9.53 (242)	9.53 (242)	9.53 (242)	9.53 (242)	9.53 (242)	9.53 (242)	9.53 (242)	9.53 (242)	-	-
D_{2+25}	21.65 (550)	31.50 (800)	37.40 (950)	47.24 (1200)	61.02 (1550)	66.93 (1700)	85.63 (2175)	93.11 (2365)	101.57 (2580)	-	-
K_2	35.83 (910)	50.16 (1274)	64.49 (1638)	78.82 (2002)	96.73 (2457)	107.48 (2730)	136.14 (3458)	143.31 (3640)	175.55 (4459)	-	-



For support of the lower run, see Chapter 9 for the **Support Tray tool kit**

Technical Data



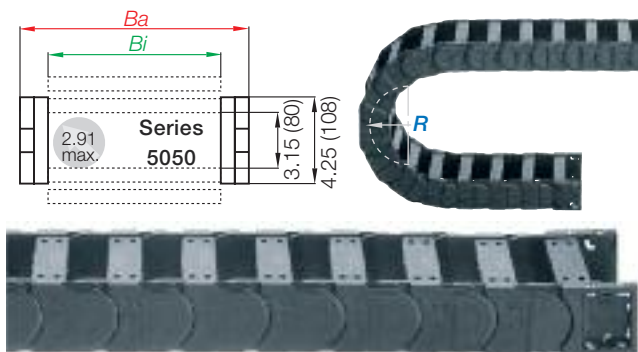
Details of material properties

Chapter 1

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

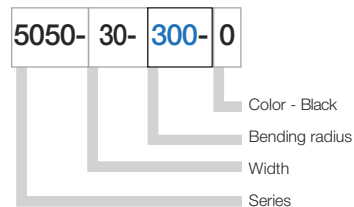


Series 5050 - Energy Chain® with crossbars every link

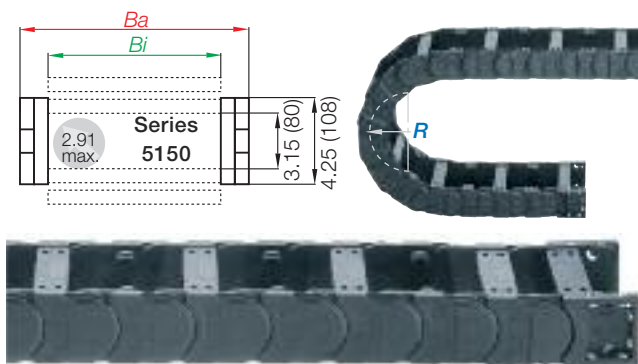


- Crossbars every link
- For use with rigid hydraulic hoses
- For particularly demanding applications
- Can be opened from both sides

Part Number Structure

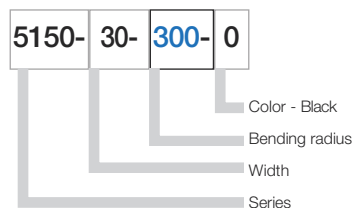


Series 5150 - Energy Chain® with crossbars every other link

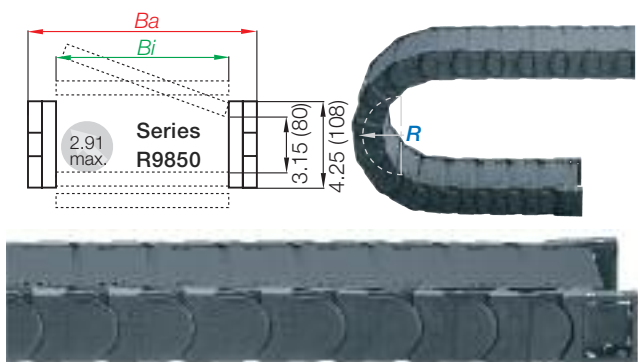


- Crossbars every other link - Standard configuration
- For nearly every situation
- Can be opened from both sides
- Easy assembly
- Stable
- Cost-effective

Part Number Structure

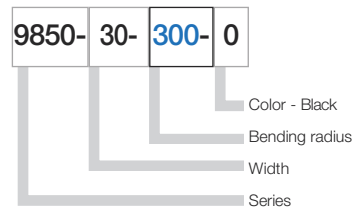


Series R9850 - fully enclosed Energy Tube

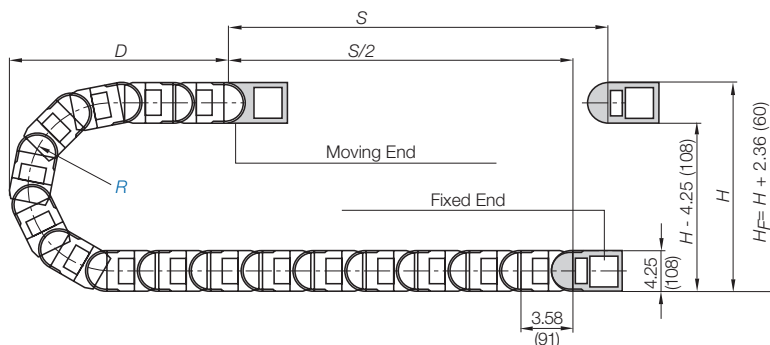
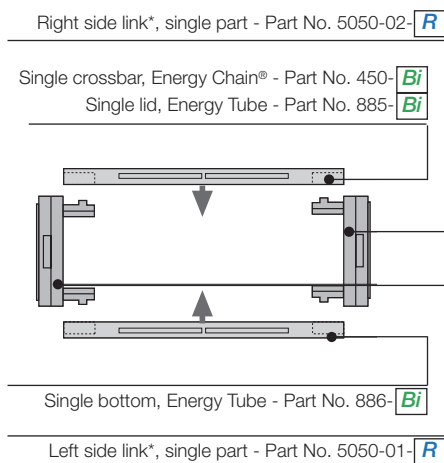


- Fully enclosed
- Excellent cable and hose protection against dirt
- Protection against hot chips up to 1652°F (900°C)
- Lids along inner radius are completely removable
- Lids along the outer radius are single-sided, snap open, hinged on one side as well as completely removable

Part Number Structure



Energy Chain® as separate parts, links and side plates



*View from the fixed point of the Energy Chain®/Energy Tube

Energy Chain System® E4/4

Series 5050/5150/R9850

energy chain® configurator 



5050
5150
R9850

Supplement part number with required radius. Example: 5050-30-300-0

Pitch: 3.58 in. (91mm) per link links/ft(m) = 3.35 (11)

Part Number.			<i>Bi</i>	<i>Ba</i>	5050	5150	R9850
Crossbars Every link	Crossbars Every other	Tube Version	in. (mm)	in. (mm)	lbs/ft (kg/m)	lbs/ft (kg/m)	lbs/ft (kg/m)
5050-05-	5150-05-	<input type="checkbox"/> -0	1.97 (50)	3.94 (100)	≈ 3.78 (5.63)	≈ 3.78 (5.62)	-
5050-06-	5150-06-	<input type="checkbox"/> -0	2.56 (65)	4.53 (115)	≈ 3.83 (5.70)	≈ 3.82 (5.68)	-
5050-07-	5150-07-	9850-07- <input type="checkbox"/> -0*	2.95 (75)	4.92 (125)	≈ 3.89 (5.79)	≈ 3.83 (5.70)	≈4.19 (6.24)
5050-08-	5150-08-	<input type="checkbox"/> -0	3.43 (87)	5.39 (137)	≈ 3.96 (5.89)	≈ 3.87 (5.76)	-
5050-10-	5150-10-	9850-10- <input type="checkbox"/> -0	3.94 (100)	5.91 (150)	≈ 4.00 (5.96)	≈3.89 (5.79)	≈4.38 (6.52)
5050-11-	5150-11-	-	4.41 (112)	6.42 (163)	≈ 4.09 (6.09)	≈3.93 (5.85)	-
5050-12-	5150-12-	9850-12- <input type="checkbox"/> -0	4.92 (125)	6.89 (175)	≈ 4.14 (6.16)	≈3.96 (5.89)	≈4.63 (6.89)
5050-13-	5150-13-	<input type="checkbox"/> -0	5.39 (137)	7.40 (188)	≈ 4.23 (6.29)	≈4.00 (5.95)	-
5050-15-	5150-15-	9850-15- <input type="checkbox"/> -0	5.91 (150)	7.87 (200)	≈ 4.27 (6.36)	≈4.02 (5.98)	≈4.92 (7.32)
5050-16-	5150-16-	<input type="checkbox"/> -0	6.38 (162)	8.39 (213)	≈ 4.35 (6.47)	≈4.06 (6.04)	-
5050-17-	5150-17-	<input type="checkbox"/> -0	6.89 (175)	8.86 (225)	≈ 4.42 (6.58)	≈4.09 (6.09)	-
5050-18-	5150-18-	<input type="checkbox"/> -0	7.36 (187)	9.37 (238)	≈ 4.50 (6.69)	≈4.13 (6.15)	-
5050-20-	5150-20-	9850-20- <input type="checkbox"/> -0	7.87 (200)	9.84 (250)	≈ 4.51 (6.71)	≈4.14 (6.16)	≈5.30 (7.89)
5050-21-	5150-21-	<input type="checkbox"/> -0	8.35 (212)	10.35 (263)	≈ 4.58 (6.82)	≈4.18 (6.22)	-
5050-22-	5150-22-	<input type="checkbox"/> -0	8.86 (225)	10.83 (275)	≈ 4.63 (6.89)	≈4.20 (6.25)	-
5050-23-	5150-23-	<input type="checkbox"/> -0	9.33 (237)	11.34 (288)	≈ 4.72 (7.02)	≈4.24 (6.31)	-
5050-25-	5150-25-	9850-25- <input type="checkbox"/> -0	9.84 (250)	11.81 (300)	≈ 4.78 (7.11)	≈4.27 (6.36)	≈5.79 (8.61)
5050-26-	5150-26-	<input type="checkbox"/> -0	10.31 (262)	12.32 (313)	≈ 4.83 (7.19)	≈4.30 (6.40)	-
5050-27-	5150-27-	9850-27- <input type="checkbox"/> -0	10.83 (275)	12.80 (325)	≈ 4.91 (7.30)	≈4.34 (6.46)	≈5.93 (8.82)
5050-28-	5150-28-	<input type="checkbox"/> -0	11.30 (287)	13.31 (338)	≈ 4.93 (7.33)	≈4.35 (6.47)	-
5050-30-	5150-30-	9850-30- <input type="checkbox"/> -0	11.81 (300)	13.78 (350)	≈ 5.07 (7.55)	≈4.42 (6.58)	≈6.23 (9.27)
5050-31-	5150-31-	<input type="checkbox"/> -0	12.28 (312)	14.29 (363)	≈ 5.09 (7.58)	≈4.43 (6.60)	-
5050-32-	5150-32-	<input type="checkbox"/> -0	12.79 (325)	14.76 (375)	≈ 5.13 (7.63)	≈4.45 (6.62)	-
5050-33-	5150-33-	<input type="checkbox"/> -0	13.27 (337)	15.28 (388)	≈ 5.25 (7.81)	≈4.51 (6.71)	-
5050-35-	5150-35-	9850-35- <input type="checkbox"/> -0	13.78 (350)	15.75 (400)	≈ 5.35 (7.96)	≈4.56 (6.79)	≈6.73 (10.02)
5050-36-	5150-36-	<input type="checkbox"/> -0	14.25 (362)	16.26 (413)	≈ 5.36 (7.97)	≈4.57 (6.80)	-
5050-37-	5150-37-	<input type="checkbox"/> -0	14.76 (375)	16.73 (425)	≈ 5.37 (7.99)	≈4.57 (6.80)	-
5050-38-	5150-38-	<input type="checkbox"/> -0	15.24 (387)	17.24 (438)	≈ 5.42 (8.07)	≈4.60 (6.84)	-
5050-40-	5150-40-	9850-40- <input type="checkbox"/> -0	15.75 (400)	17.72 (450)	≈ 5.56 (8.27)	≈4.66 (6.94)	≈7.38 (10.98)
5050-41-	5150-41-	<input type="checkbox"/> -0	16.22 (412)	18.23 (463)	≈ 5.66 (8.43)	≈4.72 (7.02)	-
5050-42-	5150-42-	<input type="checkbox"/> -0	16.73 (425)	18.70 (475)	≈ 5.77 (8.58)	≈4.77 (7.10)	-
5050-43-	5150-43-	<input type="checkbox"/> -0	17.20 (437)	19.21 (488)	≈ 5.81 (8.65)	≈4.79 (7.13)	-
5050-45-	5150-45-	<input type="checkbox"/> -0	17.72 (450)	19.69 (500)	≈ 5.85 (8.71)	≈4.81 (7.16)	-
5050-46-	5150-46-	9850-46- <input type="checkbox"/> -0	18.19 (462)	20.20 (513)	≈ 5.87 (8.73)	≈4.82 (7.17)	≈7.69 (11.44)
5050-47-	5150-47-	<input type="checkbox"/> -0	18.70 (475)	20.67 (525)	≈ 5.96 (8.87)	≈4.87 (7.24)	-
5050-48-	5150-48-	<input type="checkbox"/> -0	19.17 (487)	21.99 (538)	≈ 5.97 (8.88)	≈4.88 (7.26)	-
5050-50-	5150-50-	<input type="checkbox"/> -0	19.69 (500)	21.65 (550)	≈ 6.05 (9.00)	≈4.91 (7.30)	-
5050-51-	5150-51-	<input type="checkbox"/> -0	20.16 (512)	22.16 (563)	≈ 6.06 (9.02)	≈4.92 (7.32)	-
5050-52-	5150-52-	<input type="checkbox"/> -0	20.67 (525)	22.64 (575)	≈ 6.09 (9.06)	≈4.93 (7.34)	-
5050-53-	5150-53-	<input type="checkbox"/> -0	21.14 (537)	23.15 (588)	≈ 6.20 (9.22)	≈4.98 (7.41)	-
5050-55-	5150-55-	<input type="checkbox"/> -0	21.65 (550)	23.62 (600)	≈ 6.52 (9.70)	≈5.15 (7.66)	-
5050-60-	5150-60-	<input type="checkbox"/> -0	23.62 (600)	25.59 (650)	≈ 6.65 (9.90)	≈5.21 (7.76)	-

Choose from the radii below for all of the above sizes

Radius (mm) Example: 5050-30-300-0

	150	200	250	300	350	400	500	550	600	650	1000
R	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	19.68 (500)	21.65 (550)	23.62 (600)	25.59 (650)	39.37 (1000)
H ₂₅	16.06 (408)	20.00 (508)	23.94 (608)	27.87 (708)	31.81 (808)	35.75 (908)	43.62 (1108)	47.56 (1208)	51.50 (1308)	55.43 (1408)	82.99 (2108)
D	11.61 (295)	13.58 (345)	15.55 (395)	17.52 (445)	19.49 (495)	21.46 (545)	25.39 (645)	27.36 (695)	29.33 (745)	31.30 (795)	45.08 (1145)
K	25.79 (655)	32.09 (815)	38.19 (970)	44.29 (1125)	50.59 (1285)	56.69 (1440)	69.09 (1755)	75.20 (1910)	81.50 (2070)	87.60 (2225)	128.15 (3255)

** This radius is not available for the R9850 Series

*Removable lid only, no hinged option

0=Standard color black. For other colors see Chapter 1

For wider chains see page 6.49. For large diameter hoses see page 6.49

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS

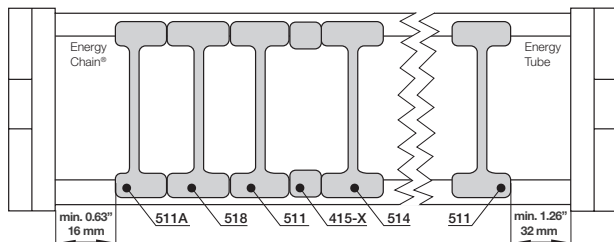




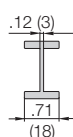
Option 1: Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.

NOTE: Observe a lateral spacing of at least 1.30 in. (33mm) for Energy Tubes and .63 in. (16mm) for Energy Chain®. There is no minimum spacing needed for side plates



STANDARD
Vertical separator
501



Vertical separator

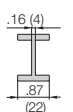
Unassembled **Part No. 501**
Assembled **Part No. 511**

● **Standard separator 501 for Energy Chains® and Energy Tubes**

This separator offers safe stability due to its wide base design, also when used with thick cables or hoses.



Locking separator
504



Locking separator (chain only)

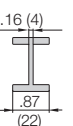
Unassembled **Part No. 504**
Assembled **Part No. 514**

● **Locking separator 504 for Energy Chains®**

This separator features increased retention force for applications exposed to very high humidity and extreme loads. If locking separators are used, the Energy Chain® is more difficult to open.



Locking separator
508



Locking separator (chain only)

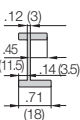
Unassembled **Part No. 508**
Assembled **Part No. 518**

● **Locking separator 508 for Energy Tubes**

This separator is used for applications that are exposed to extremely high humidity. The clamp at the side serves to uniformly align the separators. In order to avoid destroying the separators when opening the Energy Chain®, make sure all separators are identically aligned.



Asymmetric separator
501A



Asymmetrical separator (chain only)

Unassembled **Part No. 501A**
Assembled **Part No. 511A**

● **Asymmetrical separator 501A for Energy Chains®**

This separator features an (18mm) base. It can be used in combinations between spacers of different widths and vertical separators in side mounted applications.



Spacers
405-XX



Spacer (chain only)

Unassembled **Part No. 405-XX**
Assembled **Part No. 415-XX**
XX = width of the spacer

● **NOTE ON SPACERS**

Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications. The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm)). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

Spacers available in the following sizes:

Part No.	Part No.	in.	(mm)
Unassembled	Assembled		
405 -10	415 -10	.39"	(10)
405 -15	415 -15	.59"	(15)
405 -20	415 -20	.79"	(20)
405 -30	415 -30	1.18"	(30)
405 -40	415 -40	1.57"	(40)



Energy Chain System® E4/4

Series 5050/5150/R9850

Interior Separation

energy chain® configurator ▶



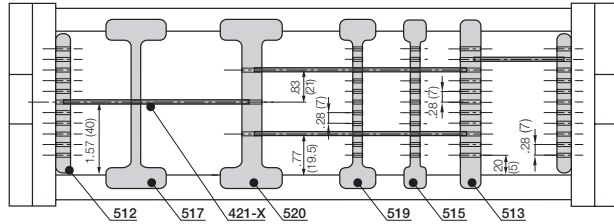
5050
5150
R9850



Option 2: Shelves

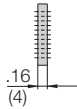
Energy Chains® and Energy Tubes can be subdivided both vertically and horizontally using the various interior separation elements.

► **Design, Chapter 1** for layout recommendations.



- **Side plates 502**

This component is used to form the basic pattern of a shelf system.



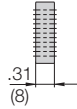
Side plate

Unassembled	Part No. 502
Assembled	Part No. 512

Side plate
502

- **Vertical separator 503**

This component is used to form the basic pattern of a shelf system.



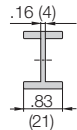
Vertical separator

Unassembled	Part No. 503
Assembled	Part No. 513

Vertical separator
503

- **Locking vertical separator 507**

This separator features increased retention force for applications exposed to very high humidity and extreme loads. The extra retention force is achieved by asymmetric claws for the crossbar. Take care to ensure proper alignment.



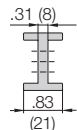
Locking vertical separator

Unassembled	Part No. 507
Assembled	Part No. 517

Locking vertical
separator
507

- **Locking vertical separator 510**

This separator is slotted and able to be combined with shelves. For Energy Chains® only.



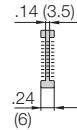
Locking vertical separator

Unassembled	Part No. 510
Assembled	Part No. 520

Locking vertical
separator
510

- **Slotted separators 505**

These are used for very complex subdivisions. However, they cannot be retrofitted into an existing separation system without removing the shelves first.



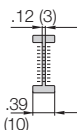
Slotted separators, closed

Unassembled	Part No. 505
Assembled	Part No. 515

Closed slotted
separator
505

- **Slotted separator 509**

This separator can be retrofitted into an existing interior separation system without removing the shelves, as long as these shelves fit into any of the 7 middle slots



Slotted separators, open

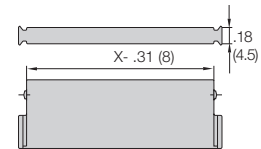
Unassembled	Part No. 509
Assembled	Part No. 519

Open slotted
separator
509

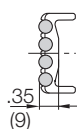
Shelves 420-XX

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 7 different heights in .28" (7mm) increments

Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled
.71 (18)	.39 (10)	420-18	421-18	2.95 (75)	2.64 (67)	420-75	421-75
.91 (23)	.59 (15)	420-23	421-23	3.46 (88)	3.15 (80)	420-88	421-88
.98 (25)	.67 (17)	420-25	421-25	3.94 (100)	3.62 (92)	420-100	421-100
1.10 (28)	.79 (20)	420-28	421-28	4.92 (125)	4.61(117)	420-125	421-125
1.30 (33)	.98 (25)	420-33	421-33	5.91 (150)	5.59(142)	420-150	421-150
1.69 (43)	1.38 (35)	420-43	421-43	6.89 (175)	6.57(167)	420-175	421-175
1.97 (50)	1.65 (42)	420-50	421-50	7.36 (187)	7.05(179)	420-187	421-187
2.44 (62)	2.13 (54)	420-62	421-62	7.87 (200)	7.56(192)	420-200	421-200



Rollclip - minimizes abrasion of particularly sensitive hoses or cables in an Energy Chain®. The integrated rollers compensate for relative movement between the chain and the hose or cable. This reduces the abrasion of the hoses or cables



Rollclip

Unassembled	Part No. 489-27
Assembled	Part No. 490-27



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



5050
5150
R9850



Energy Chain System® E4/4 Series 5050/5150/R9850 Special Accessories

energy chain® configurator

igus® Energy Chain System®



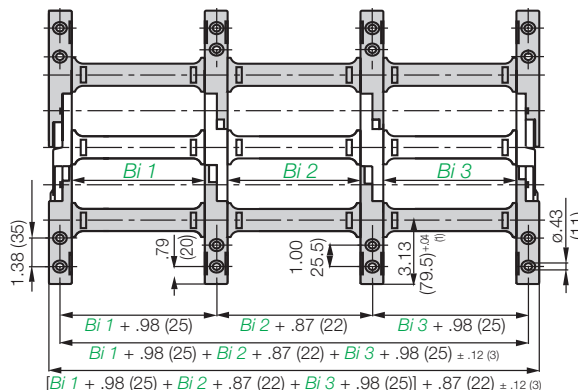
Extension links - for extremely wide Energy Chains® up to 9.84 ft (3m)

- For applications in which particularly high fill weights necessitate extremely wide Energy Chains® (up to 118" (3000 mm))
- The extension link design allows virtually limitless side-by-side attachment of chains
- The unsupported length of a chain can be increased when additional loads are required
- Extension links can be used with Energy Chains®, Energy Tubes or a combination of both
- They are suitable for unsupported and gliding applications in a guide trough
- Energy Chains® with extension links are attached with KMA or steel mounting brackets.

Part number example for Energy Chain®

5050-10/20/10-200-0
5050-Bi1/Bi2/Bi3-R-0

We **strongly recommend** on-site consultation with an igus® technician for individual advice regarding mounting brackets, guide troughs and other design details.



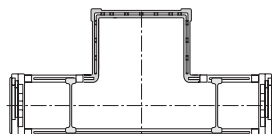
Telephone 1-800-521-2747
Fax 1-401-438-7270

Extender crossbars - For careful guiding of large diameter cables and hoses

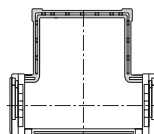
- Intended for cables and hoses with a maximum outer diameter of 10.63 in. (270 mm).
- Can be attached along either the inner or outer radius, inner radius preferred
- Gliding operation with crossbars assembled along the outer radius in conjunction with a special guide trough
- Gliding operation not guaranteed with crossbars assembled along the inner radius
- The extender crossbar can either be attached to the side links directly or can be used in combination with two standard snap-open crossbars.



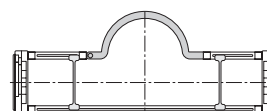
Consult igus® for your extender crossbar applications. We will be happy to assist you with your design layout.



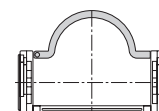
Square extender crossbar combined with standard snap-open crossbars.



Attached directly to the side link.



Round extender crossbar combined with standard snap-open crossbars.



Attached directly to the side link.

Part No.	Max Ø Hose	Style	Installation Side Link	Combined with Snap-Open Crossbars
450-15-RHD115	By request	Round	Yes	No
450-17-RD115	By request	Round	No	Yes
450-25-D150	By request	Square	Yes	No
450-30-D200	By request	Square	Yes	No
450-35-D250	By request	Square	Yes	No
450-40-D300	By request	Square	Yes	No
450-20-HD150	By request	Square	No	Yes
450-25-HD200	By request	Square	No	Yes
450-30-HD250	By request	Square	No	Yes

E4 clip on cable binder

- For side mounted applications
- Serves as a clip-on, lateral guide for hoses and cables on Energy Chains®
- The loops can be adjusted as needed

- Compatible with many E4 Energy Chains®
- Economical
- One clip and one locking band are needed for each chain link



Part No.	Form
450-B12	Locking clip, comprised of a locking element
450-B12-200	Locking band, comprised of a locking element and band; 12 x 1.5 x 200 mm

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

6.119

Energy Chain System® E4/4

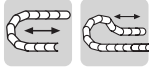
Series 5050/5150/R9850

Mounting Brackets - KMA

energy chain® configurator



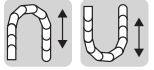
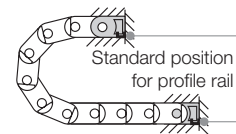
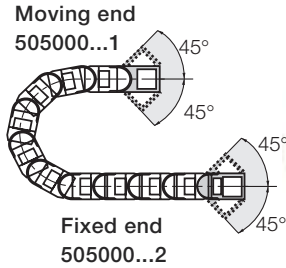
5050
5150
R9850



Standard

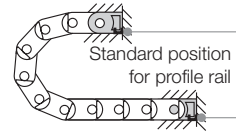
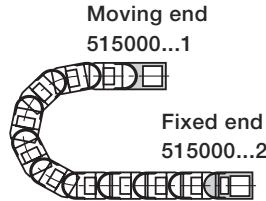
Option 1: KMA pivoting

- Profile rail option
- Universal use
- Corrosion resistant
- Short and long travels
- Space-restricted conditions

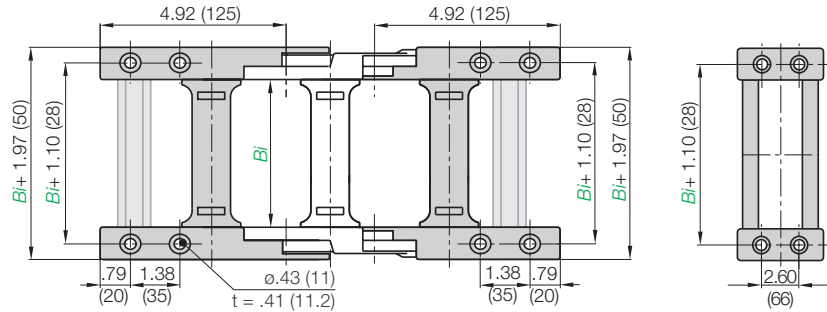
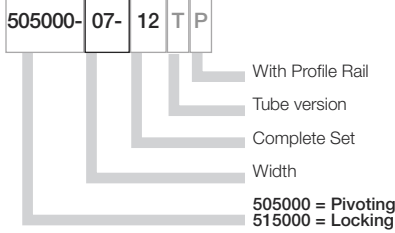


Option 2: KMA locking

- Profile rail option
- Universal use
- Corrosion resistant
- Extreme accelerations
- Vertical hanging/standing travels



Part Number Structure



Full set, for both ends:

505000-05-12 Full set, each part with pin/bore

Single-part order:

505000-05-1 Mounting bracket with bore
505000-05-2 Mounting bracket with pin

Part number examples are shown for pivoting brackets. For locking brackets change part number to 515000

Part No. Full Set (pivoting)
Series 5050 or 5150:
505000-Width-12

Part No. Full Set (pivoting)
with profile rail
Series 5050 or 5150
505000-Width-12P

Part No. Full Set (pivoting)
Tube Series R9850
505000-Width-12T

Part No. Full Set (pivoting)
with Profile Rail
Series R9850
505000-Width-12TP

Width	Part No. Full Set		Tube Option	With Profile Rail	Bi in. (mm)	Width	Part No. Full Set		Tube Option	With Profile Rail	Bi in. (mm)
	Pivoting	Locking					Pivoting	Locking			
-05	505000	515000	-05-12	P	1.97 (50)	-31	505000	515000	-31-12	P	12.28 (312)
-06	505000	515000	-06-12	P	2.56 (65)	-32	505000	515000	-32-12	P	12.79 (325)
-07	505000	515000	-07-12	T	2.95 (75)	-33	505000	515000	-33-12	P	13.27 (337)
-08	505000	515000	-08-12	P	3.43 (87)	-35	505000	515000	-35-12	T	13.78 (350)
-10	505000	515000	-10-12	T	3.94 (100)	-36	505000	515000	-36-12	P	14.25 (362)
-11	505000	515000	-11-12	P	4.41 (112)	-37	505000	515000	-37-12	P	14.76 (375)
-12	505000	515000	-12-12	T	4.92 (125)	-38	505000	515000	-38-12	P	15.24 (387)
-13	505000	515000	-13-12	P	5.39 (137)	-40*	505000	515000	-40-12	T	15.75 (400)
-15	505000	515000	-15-12	T	5.91 (150)	-41	505000	515000	-41-12	P	16.22 (412)
-16	505000	515000	-16-12	P	6.38 (162)	-42	505000	515000	-42-12	P	16.73 (425)
-17	505000	515000	-17-12	P	6.89 (175)	-43	505000	515000	-43-12	P	17.20 (437)
-18	505000	515000	-18-12	P	7.36 (187)	-45	505000	515000	-45-12	P	17.72 (450)
-20	505000	515000	-20-12	T	7.87 (200)	-46	505000	515000	-46-12	T	18.19 (462)
-21	505000	515000	-21-12	P	8.35 (212)	-47	505000	515000	-47-12	P	18.70 (475)
-22	505000	515000	-22-12	P	8.86 (225)	-48	505000	515000	-48-12	P	19.17 (487)
-23	505000	515000	-23-12	P	9.33 (237)	-50	505000	515000	-50-12	P	19.69 (500)
-25	505000	515000	-25-12	T	9.84 (250)	-51	505000	515000	-51-12	P	20.16 (512)
-26	505000	515000	-26-12	P	10.31 (262)	-52	505000	515000	-52-12	P	20.67 (525)
-27	505000	515000	-27-12	T	10.83 (275)	-53	505000	515000	-53-12	P	21.14 (537)
-28	505000	515000	-28-12	P	11.30 (287)	-55	505000	515000	-55-12	P	21.65 (550)
-30	505000	515000	-30-12	T	11.81 (300)	-60	505000	515000	-60-12	P	23.62 (600)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



5050
5150
R9850



Energy Chain System® E4/4 Series 5050/5150/R9850 Mounting Brackets - Steel

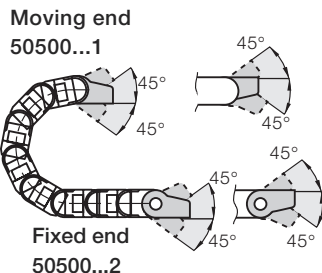
energy chain® configurator ▶

igus® Energy Chain System®



Option 1: pivoting

- For pivoting connections
- One part for all chain widths
- Electrically conductive



Possible installation configurations -

Part No. Mounting Brackets Full Set

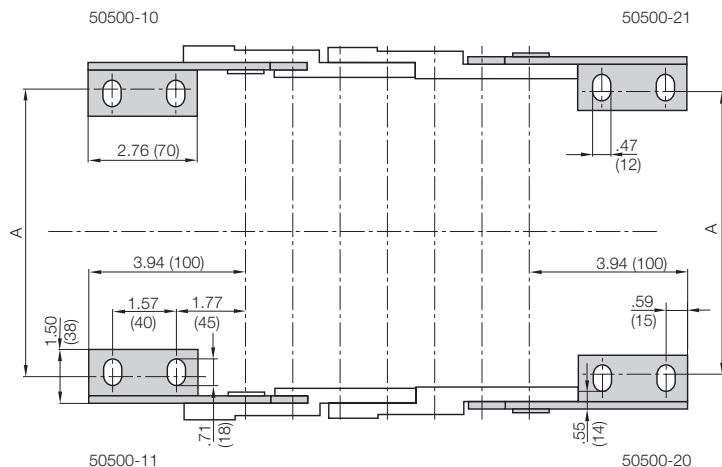
4 parts, 2 with pin, 2 with bore
Series 5050, 5150 or R9850:
50500-12

Part No. Mounting Bracket Moving End

2 parts, 1 left & 1 right with bore
Series 5050, 5150 or R9850:
50500-1

Part No. Mounting Bracket Fixed End

2 parts, 1 left & 1 right with pin
Series 5050, 5150 or R9850:
50500-2



Bracket mounting dimensions

Width of Chain <i>Bi</i>	Mounting Brackets			Mounting Dimension A in. (mm)	Width of Chain <i>Bi</i>	Mounting Brackets			Mounting Dimension A in. (mm)		
	Part Number	Full Set	Moving End Only			Fixed End Only	Part Number	Full Set		Moving End Only	Fixed End Only
1.97 (50)	50500	-12	-1	-2	4.33 (110)	12.28 (312)	50500	-12	-1	-2	11.22 (285)
2.56 (65)	50500	-12	-1	-2	1.49 (38)	12.79 (325)	50500	-12	-1	-2	11.73 (298)
2.95 (75)	50500	-12	-1	-2	1.88 (48)	13.27 (337)	50500	-12	-1	-2	12.20 (310)
3.43 (87)	50500	-12	-1	-2	2.36 (60)	13.78 (350)	50500	-12	-1	-2	12.71 (323)
3.94 (100)	50500	-12	-1	-2	2.87 (73)	14.25 (362)	50500	-12	-1	-2	13.18 (335)
4.41 (112)	50500	-12	-1	-2	3.34 (85)	14.76 (375)	50500	-12	-1	-2	13.70 (348)
4.92 (125)	50500	-12	-1	-2	3.85 (98)	15.24 (387)	50500	-12	-1	-2	14.17 (360)
5.39 (137)	50500	-12	-1	-2	4.33 (110)	15.75 (400)	50500	-12	-1	-2	14.68 (373)
5.91 (150)	50500	-12	-1	-2	4.84 (123)	16.22 (412)	50500	-12	-1	-2	15.15 (385)
6.38 (162)	50500	-12	-1	-2	5.31 (135)	16.73 (425)	50500	-12	-1	-2	15.66 (398)
6.89 (175)	50500	-12	-1	-2	5.82 (148)	17.20 (437)	50500	-12	-1	-2	16.14 (410)
7.36 (187)	50500	-12	-1	-2	6.29 (160)	17.72 (450)	50500	-12	-1	-2	16.65 (423)
7.87 (200)	50500	-12	-1	-2	6.81 (173)	18.19 (462)	50500	-12	-1	-2	17.12 (435)
8.35 (212)	50500	-12	-1	-2	7.28 (185)	18.70 (475)	50500	-12	-1	-2	17.63 (448)
8.86 (225)	50500	-12	-1	-2	7.79 (198)	19.17 (487)	50500	-12	-1	-2	18.11 (460)
9.33 (237)	50500	-12	-1	-2	8.26 (210)	19.69 (500)	50500	-12	-1	-2	18.62 (473)
9.84 (250)	50500	-12	-1	-2	8.77 (223)	20.16 (512)	50500	-12	-1	-2	19.09 (485)
10.31 (262)	50500	-12	-1	-2	9.25 (235)	20.67 (525)	50500	-12	-1	-2	19.60 (498)
10.83 (275)	50500	-12	-1	-2	9.76 (248)	21.14 (537)	50500	-12	-1	-2	20.07 (510)
11.30 (287)	50500	-12	-1	-2	10.23 (260)	21.65 (550)	50500	-12	-1	-2	20.59 (523)
11.81 (300)	50500	-12	-1	-2	10.74 (273)	23.62 (600)	50500	-12	-1	-2	22.55 (573)

*Mounting bracket feet must face outward

Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

Energy Chain System® E4/4

Series 5050/5150/R9850

Strain Relief

energy chain® configurator 



5050
5150
R9850

Chainfix clamps for the profile rail



igus® Chainfix strain relief elements are available in either steel or stainless steel. They can be adjusted with a hexagon socket and are available in single, double and triple configurations.

Part No. Single Clamp		Part No. Double Clamp		Part No. Triple Clamp		Cable ø	
Steel	Stainless	Steel	Stainless	Steel	Stainless	in.	(mm)
CFX12-1	CFX12-1E	CFX12-2	CFX12-2E	CFX12-3	-	.24 - .47	(06 - 12)
CFX14-1	CFX14-1E	CFX14-2	CFX14-2E	CFX14-3	-	.47 - .55	(12 - 14)
CFX16-1	CFX16-1E	CFX16-2	CFX16-2E	CFX16-3	-	.55 - .63	(14 - 16)
CFX18-1	CFX18-1E	CFX18-2	CFX18-2E	CFX18-3	-	.63 - .71	(16 - 18)
CFX20-1	CFX20-1E	CFX20-2	CFX20-2E	CFX20-3	-	.71 - .79	(18 - 20)
CFX22-1	CFX22-1E	CFX22-2	CFX22-2E	CFX22-3	-	.79 - .87	(20 - 22)
CFX26-1	CFX26-1E	CFX26-2	CFX26-2E	-	-	.87 - 1.02	(22 - 26)
CFX30-1	CFX30-1E	CFX30-2	CFX30-2E	-	-	1.02 - 1.18	(26 - 30)
CFX34-1	CFX34-1E	CFX34-2	CFX34-2E	-	-	1.18 - 1.34	(30 - 34)
CFX38-1	CFX38-1E	-	-	-	-	1.34 - 1.50	(34 - 38)
CFX42-1	CFX42-1E	-	-	-	-	1.50 - 1.65	(38 - 42)

For more information please refer to strain relief section of Chapter 10

Chainfix Clip

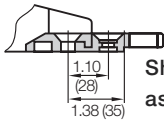


Modular snap-on strain relief device

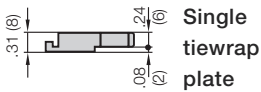
Chainfix clip is available for cable diameters ranging from .16" (4mm) to .94" (24 mm). It is suitable for assembly on KMA mounting brackets, clip-on strain relief for crossbars as well as profile rails. Quick assembly without the use of tools. **For more information please refer to strain relief section of Chapter 10**

Cable ø	Part No. Clamp	Part No. Bottom
.16-.31	CFC-08-M	CFC-08-C
.31-.47	CFC-12-M	CFC-12-C
.47-.63	CFC-16-M	CFC-16-C
.63-.79	CFC-20-M	CFC-20-C
.79-.94	CFC-24-M	CFC-24-C

Tiewrap Plates



Shown assembled

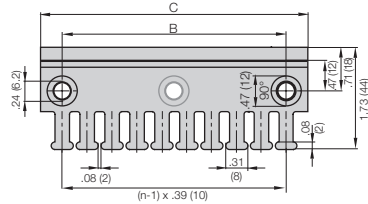


Single tiewrap plate

Option 1: Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



If used with KMA brackets with profile rail please add "KMA" to the end of the part number.

Example: 3050-ZBKMA

For more information please refer to strain relief section of Chapter 10



Option 2: Clip-on Tiewrap plates

Available as a clip-on tiewrap plate without the use of bolts They are inserted and removed with a screwdriver used as a lever. Clip-on tiewrap plates are also available as an attachment to the opening crossbars.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
3050-ZC	5	1.97 (50)
3075-ZC	7	2.95 (75)

For more information please refer to strain relief section of Chapter 10



Option 3: Clip-on Tiewrap plates for opening crossbars

Clip-on tiewrap plates are also available as an attachment to opening crossbars. They can be positioned at any point along the Energy Chain®.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
4550-ZS	5	1.89 (48)
4575-ZS	7	2.91 (74)

For more information please refer to strain relief section of Chapter 10

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Width of Crossbar
5050-05-200-0

	B_{Ri}	Installation Part No.
-05	4.13 (105)	96-50-225
-06	4.72 (120)	96-50-250
-07	5.12 (130)	96-50-250
-08	5.59 (142)	96-50-275
-10	6.10 (155)	96-50-275
-11	6.61 (168)	96-50-300
-12	7.09 (180)	96-50-300
-13	7.60 (193)	96-50-325
-15	8.07 (205)	96-50-325
-16	8.58 (218)	96-50-350
-17	9.06 (230)	96-50-350
-18	9.57 (243)	96-50-375
-20	10.04 (255)	96-50-375
-21	10.55 (268)	96-50-400
-22	11.02 (280)	96-50-400
-23	11.54 (293)	96-50-425
-25	12.01 (305)	96-50-425
-26	12.52 (318)	96-50-450
-27	12.99 (330)	96-50-450
-28	13.50 (343)	96-50-475
-30	13.98 (355)	96-50-475
-31	14.49 (368)	96-50-500
-32	14.96 (380)	96-50-500
-33	15.47 (393)	96-50-525
-35	15.94 (405)	96-50-525
-36	16.46 (418)	96-50-550
-37	16.93 (430)	96-50-550
-38	17.44 (443)	96-50-575
-40	17.91 (455)	96-50-575
-41	18.43 (468)	96-50-600
-42	18.90 (480)	96-50-600
-43	19.41 (493)	96-50-625
-45	19.88 (505)	96-50-625
-46	20.39 (518)	96-50-650
-47	20.87 (530)	96-50-650
-48	21.38 (543)	96-50-675
-50	21.85 (555)	96-50-675
-51	22.36 (568)	96-50-700
-52	22.83 (580)	96-50-700
-53	23.35 (593)	96-50-725
-55	23.82 (605)	96-50-725
-60	25.79 (655)	96-50-775

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part No. 99-30
- 1/2 travel length glide bars
Part No. 93-01
- Installation sets as end connectors
Part No. 96-50-XX

-XX indicates the length of the profile rails on which the guide trough is mounted. The values and part numbers are specified in the table on the right. The standard length of the trough components and glide bars is 6.56 ft (2 m). The overall length of the guide trough directly correlates to the length of travel.

Example:
Length of travel 164 ft (50 m)
Center-mounted

Required guide troughs:
164 ft (50 m) guide trough, 82 ft. (25 m) glide bar
= 25 sections of 6.56 ft (2 m) guide trough

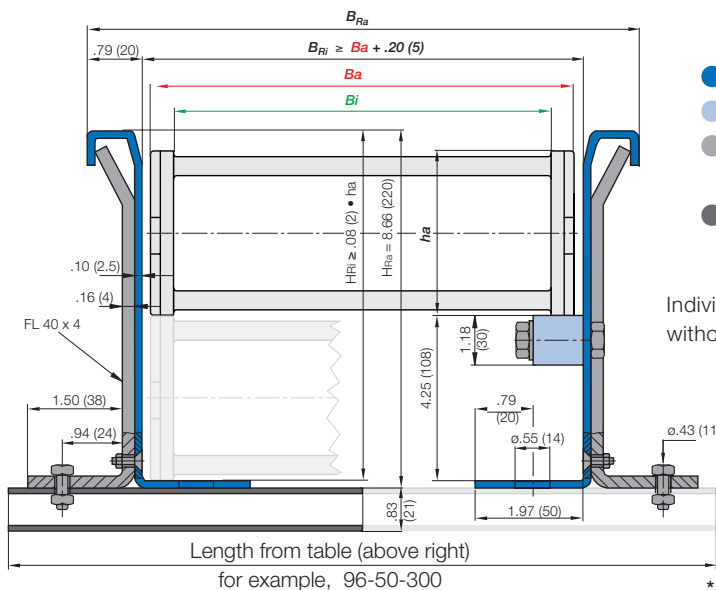
Part No. 99-30
= 13 sections of 6.56 ft (2 m) glide bar

Part No. 93-01
Required number of installation set:
= Number of guide trough components + 1
= 25 + 1 = 26
Part No. of the installation sets **96-50-XXX**
Example: 96-50-400 for 15.75 (400 mm) long profile rail



Left: Guide trough with glide bars
Right: Guide troughs without glide bars

Installation sets as section connectors



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

* Specialized guide trough available upon request

Standard length profile rail

For further technical information on guide troughs
▶ Chapter 9

Energy Chain System® E4/4
Series 5050/5150/R9850
Application Example

energy chain® configurator ▶

igus®

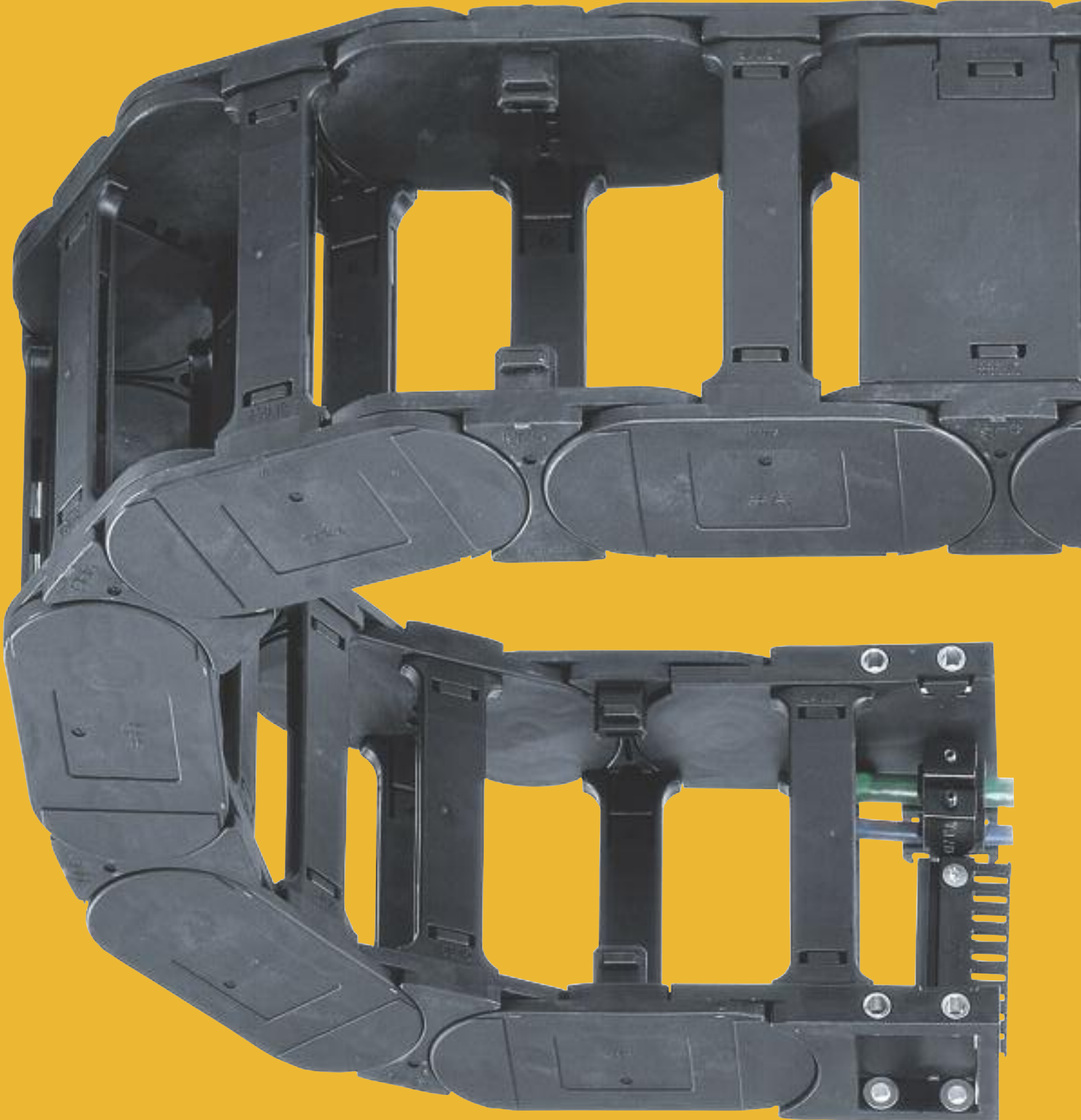
5050
5150
R9850



Very robust E4/4 Energy Chain® Series 5050 with middle strap in a steel factory. Heat and dust are no problem for the maintenance-free igus® Energy Chain® which has been in operation for 3 years.

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS







E4/100

E4/100 - for smooth running and easy assembly

E4/00 has a unique design featuring inner and outer side links, which makes it extremely easy to assemble and disassemble on site. E4/00 can reduce noise by up to 50 percent and can handle high fill weights, high accelerations and high speeds. Available from stock.

Typical industries and applications

- Robotics and handling
- Material handling
- Freezing environment
- Construction machinery
- Machine tools
- Woodworking machinery
- Machines of all kinds
- Semicon
- Cleanroom
- Welding machines
- General machinery



IPA Certificate, Cleanroom ISO Class 3 (DIN 14644-1) at $v = 1$ m/s for Series 280-10-100-0 tested with igus® Chainflex® cables



ATEX/ESD: Excellent performance with the special material igumid ESD (upon request) "Rear grip" achieves long-term electrical conductivity



High torsional rigidity



System E4/4 approved with long travels



System E4 - 4-piece Energy Chain® links





Long unsupported spans, high stability



Quiet and strong - ideal for handling applications

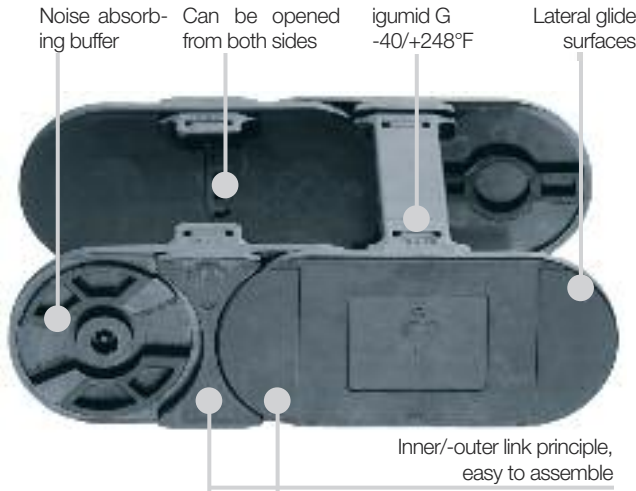


Sturdy design for construction equipment

Energy Chain System® E4/100

Selection Guide

energy chain® configurator 



- Lowest noise in its class
- Further noise reduction with rubber pads (Series E4/101)
- Broad application spectrum
- Numerous interior separation possibilities
- Wide range of modular accessories
- Widths up to 118" (3000 mm) using extension links
- Maximum stability in the igus® range
- Can be opened along both the inner and outer radii
- Maximum travel: 656 - 1,312 ft. (200 - 400 m)
- You can find more technical data about the material, chemical resistance, temperatures ► **Design, Chapter 1**

Crossbars every link for particularly demanding applications



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Bending radius <i>R</i> in. (mm)
220	1.10 (28)	1.57-11.81 (40-300)	2.36-12.60 (60-320)	1.65 (42)	2.16-9.84 (55-250)
280	1.26 (32)	1.97-15.75 (50-400)	2.87-16.65 (73-423)	2.13 (54)	2.48-11.81 (63-300)
380	1.65 (42)	1.97-15.75 (50-400)	2.99-16.77 (76-426)	2.52 (64)	2.95-13.78 (75-350)
400	2.20 (56)	1.97-23.62 (50-600)	3.31-24.96 (84-634)	3.31 (84)	5.31-19.69 (135-500)
600	4.25 (108)	7.87-23.62 (200-600)	9.92-25.67 (252-652)	5.51 (140)	7.87-39.37 (200-1000)
640	4.41 (112)	3.43-22.13 (87-562)	5.47-24.17 (139-614)	5.51 (140)	7.87-39.37 (200-1000)
800	7.87 (200)	7.87-23.62 (200-600)	9.84-25.98 (250-660)	9.29 (236)	12.80-39.37 (325-1000)

Crossbars every 2nd link for almost all applications



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Bending radius <i>R</i> in. (mm)
290	1.26 (32)	1.97-15.75 (50-400)	2.87-16.65 (73-423)	2.13 (54)	2.48-11.81 (63-300)
390	1.65 (42)	1.97-15.75 (50-400)	2.99-16.77 (76-426)	2.52 (64)	2.95-13.78 (75-350)
410	2.20 (56)	1.97-23.62 (50-600)	3.31-24.96 (84-634)	3.31 (84)	5.31-19.69 (135-500)
601	4.25 (108)	7.87-23.62 (200-600)	9.92-25.67 (252-652)	5.51 (140)	7.87-39.37 (200-1000)

Energy Tubes fully enclosed, excellent cable protection



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Bending radius <i>R</i> in. (mm)
R760	1.10 (28)	1.97-11.81 (50-300)	2.76-12.60 (70-320)	1.65 (42)	2.95-9.84 (75-250)
R770	1.26 (32)	1.97-11.81 (50-300)	2.87-12.72 (73-323)	2.13 (54)	4.92-11.81 (125-300)
R780	1.65 (42)	1.97-11.81 (50-300)	2.99-12.83 (76-326)	2.52 (64)	4.92-13.78 (125-350)
R880	2.20 (56)	2.95-18.19 (75-462)	4.29-19.57 (109-497)	3.31 (84)	5.91-19.69 (150-500)
R608	4.25 (108)	7.87-15.75 (200-400)	9.92-17.80 (252-452)	5.51 (140)	9.84-39.37 (250-1000)

Energy Chain System® E4/100

Assembly instructions

Energy Chains® - Opening



1 Remove crossbars - Insert screwdriver into the slot, using a lever action, apply pressure to the screwdriver to remove the crossbar.



2 Remove clips - Insert screwdriver into the slot, using a lever action, apply pressure to the screwdriver to remove the clip

Energy Tube - Opening



1 Remove lids/bottoms - Insert screwdriver into the slot, using a lever action apply pressure to the screwdriver to release



2 Release only **one side** to open the lid

Energy Chains® and Energy Tubes - Assembling



1 Line up two inner side links side by side. Attach an outer side link between



2 Assemble crossbars - push down and snap in using a screwdriver



3 Assemble clips (for Energy Chains with crossbars every other link) - push down and snap in using a screwdriver



4 Assemble Energy Tube lids and bottoms - Attach to the connector at an angle and snap in place

Energy Chains® and Energy Tubes - Separating



1 Remove crossbars, clips, lids and bottoms at the outer links



2 Insert screwdriver into the slot between the side links. Using a lever action, release the side links



3 Remove the outer links

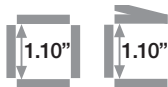


4 Separate the Energy Chain®

220
R760



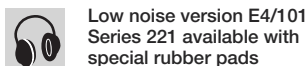
Energy Chain System® E4/100 Series 220/R760



Price Index



Special Features / Options



Low noise version E4/101 Series 221 available with special rubber pads



Cleanroom test upon request



ESD classification: Electrically conductive ESD/ATEX version upon request

Assembly Tips



Opening Energy Chains®: Remove cross-bars and clips - Insert screwdriver into the slot, push down, release by lever action



Remove lids/bottoms (Energy Tubes) - Insert screwdriver into the slot, release by lever action

Other Installation Methods

- Vertical, hanging ≤ 262 ft (80 m)
- Vertical, standing ≤ 16.4 ft (5 m)
- Side-mounted, un supp. ≤ 6.56 ft (2 m)
- Rotary requires further calculation

Usage Guidelines



- If quiet operation is required
- If very high speeds and/or accelerations are required
- Long travels
- High fill weights



- For zig-zag lift applications
➤ **System E4/4**
- For side-mounted applications
➤ **System E4/4**
- If an extremely vibration-free Energy Chain® is necessary
➤ **Series E6-29/R6-29**

Features & Benefits

- 1 Locking or pivoting mounting brackets available
- 2 KMA mounting brackets with attachment points on all sides
- 3 Optimized glide pads with lateral wear allowance
- 4 Hinged snap-open removable lids along the outer radius of the Energy tube
- 5 Integrated strain relief possible
- 6 Closed and open styles can be combined
- 7 Crossbars on Energy Chains® are removable along both radii
- 8 Wide, rounded crossbars
- 9 Numerous interior separation possibilities
- 10 Stop dog with "brake" for noise reduction
- 11 Energy Chains® also available with reverse bending radius "RBR"



Also available as E4/00-NC without camber: 220-NC

Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

[energy chain® configurator](#)

9.84 ft (3 m) **220-300-250-0**

Energy Chain®

With 2 separators **2211** assembled every 2nd link

Interior Separation

1 Set **2200-300-1-12**

Mounting Bracket

Energy Chain System® E4/100

Series 220/R760

Installation Dimensions

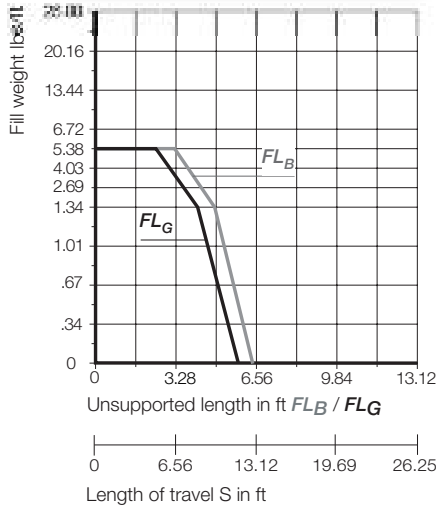
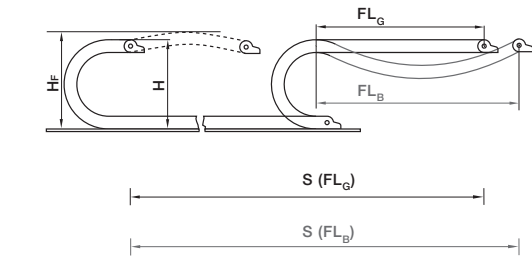
energy chain® configurator



220
R760

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ► Design, Chapter 1



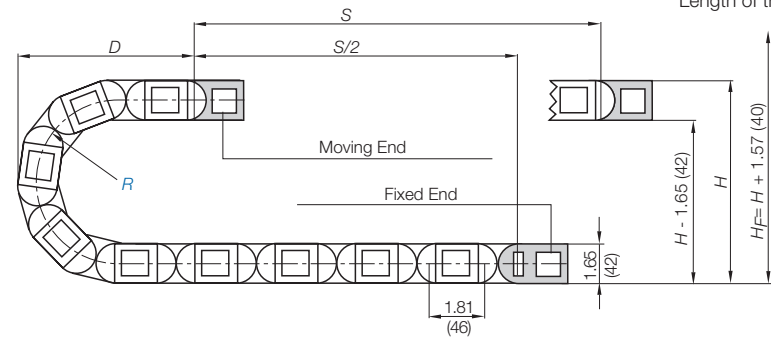
Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{safety buffer}$
 - H_f = Required clearance height
 - H_{in} = Trough inner height
 - H_2 = *Mounting height
 - D_2 = Overlength - long travels, gliding
 - K_2 = *Add-on
- *If the mounting bracket location is set lower



Pitch per link = 1.81" (46 mm)
Links per ft (m) = 6.71 (22)
For center mount applications:
Chain length = $S/2 + K$

The required clearance height: $H_f = H + 1.57$ in. (40 mm) (with .67 lbs/ft (1 kg/m) fill weight). Please consult igus® if space is particularly restricted.

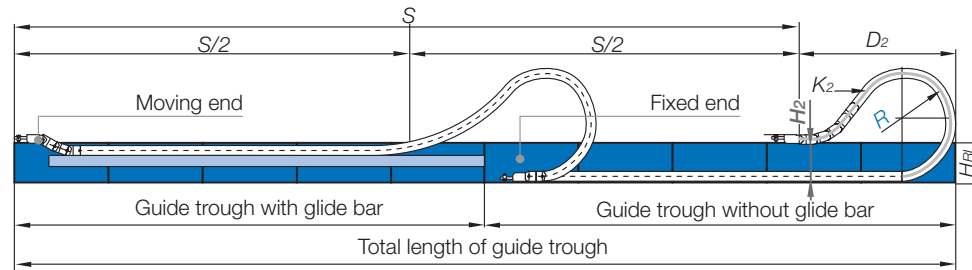
R	2.17 (055**)	2.48 (063*)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)
H	6.06 (154)	6.69 (170)	7.64 (194)	9.61 (244)	11.57 (294)	13.54 (344)	15.51 (394)	17.48 (444)	21.42 (544)
D	4.92 (125)	5.24 (133)	5.71 (145)	6.69 (170)	7.68 (195)	8.66 (220)	9.65 (245)	10.63 (270)	12.60 (320)
K	10.43 (265)	11.42 (290)	12.99 (330)	16.14 (410)	19.09 (485)	22.24 (565)	25.39 (645)	28.54 (725)	34.65 (880)

**Not available for R760

For long travels with lowered mounting height

Long travel lengths from 32.8 ft.(10m) to max. 656 ft. (200m)

For center mount applications:
Chain length = $S/2 + K_2$



R	2.17 (055**)	2.48 (063**)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)
H_2	-	-	-	6.22 (158)	6.22 (158)	6.22 (158)	6.22 (158)	6.22 (158)	6.22 (158)
D_2	-	-	-	13.78 (350)	19.29 (490)	20.87 (530)	25.79 (655)	28.74 (730)	36.81 (935)
K_2	-	-	-	23.54 (598)	30.79 (782)	36.22 (920)	43.46 (1104)	48.90 (1242)	63.39 (1610)



For support of the lower run, see Chapter 9 for the Support Tray tool kit

**Not available for R760

Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough. Design, Chapter 1

Technical Data



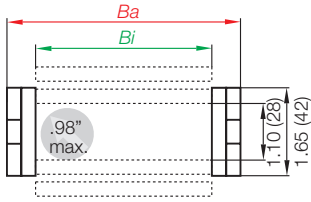
Details of material properties
► Chapter 1

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

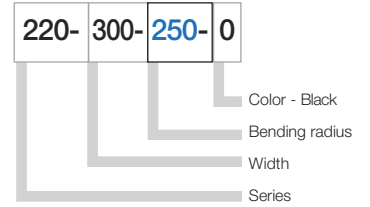


Series 220 - Energy Chain® with crossbars every link

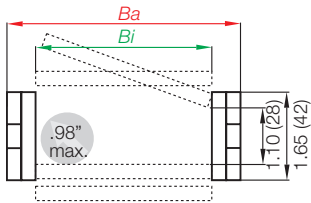


- Robust solution with crossbars every link
- Can be opened from two sides
- Removable crossbars

Part Number Structure

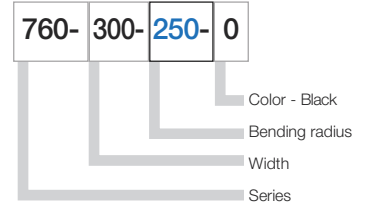


Series R760 - fully enclosed Energy Tube

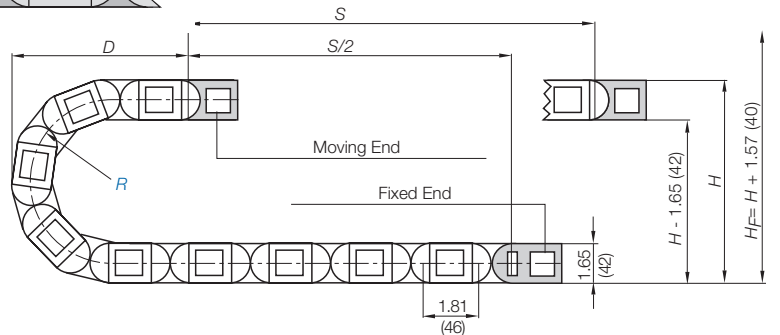
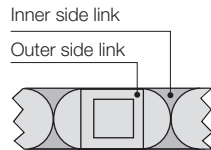
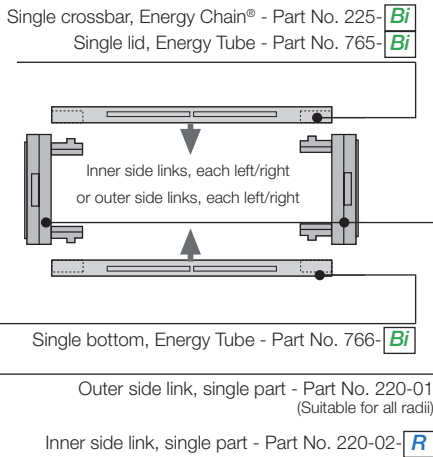


- Fully enclosed
- Excellent cable and hose protection against dirt
- Protection against hot chips up to 1652°F (900°C)
- Lids along inner radius are completely removable
- Lids along the outer radius are single-sided, snap open, hinged on one side as well as completely removable

Part Number Structure



Energy Chain® as separate parts, links and side plates



Energy Chain System® E4/100

Series 220/R760

energy chain® configurator 



220
R760

Supplement part number with required radius. Example: 220-300--0

Pitch: 1.81 in. (46mm) per link links/ft(m) = 6.71 (22)

Part Number.			<i>Bi</i>	<i>Ba</i>	220	R760
Crossbars	Tube		in. (mm)	in. (mm)	lbs/ft (kg/m)	lbs/ft (kg/m)
Every link	Version					
220-040-	<input type="text" value=""/> -0		1.57 (40)	2.36 (60)	≈ 0.71 (1.06)	-
220-050-	760-050- <input type="text" value=""/> -0		1.97 (50)	2.76 (70)	≈ 0.74 (1.10)	≈ 0.84 (1.25)
220-062-	<input type="text" value=""/> -0		2.44 (62)	3.23 (82)	≈ 0.77 (1.14)	-
220-070-	<input type="text" value=""/> -0		2.76 (70)	3.54 (90)	≈ 0.79 (1.18)	-
220-075-	760-075- <input type="text" value=""/> -0		2.95 (75)	3.74 (95)	≈ 0.81 (1.21)	≈ 0.97 (1.44)
220-087-	<input type="text" value=""/> -0		3.43 (87)	4.21 (107)	≈ 0.85 (1.27)	-
220-100-	760-100- <input type="text" value=""/> -0		3.94 (100)	4.72 (120)	≈ 0.89 (1.32)	≈ 1.10 (1.64)
220-125-	760-125- <input type="text" value=""/> -0		4.92 (125)	5.71 (145)	≈ 0.96 (1.43)	≈ 1.24 (1.84)
220-150-	760-150- <input type="text" value=""/> -0		5.91 (150)	6.69 (170)	≈ 1.03 (1.54)	≈ 1.36 (2.02)
220-175-	760-175- <input type="text" value=""/> -0		6.89 (175)	7.68 (195)	≈ 1.11 (1.65)	≈ 1.52 (2.26)
220-200-	760-200- <input type="text" value=""/> -0		7.87 (200)	8.66 (220)	≈ 1.18 (1.76)	≈ 1.61 (2.40)
220-225-	760-225- <input type="text" value=""/> -0		8.86 (225)	9.65 (245)	≈ 1.26 (1.87)	≈ 1.72 (2.56)
220-250-	760-250- <input type="text" value=""/> -0		9.84 (250)	10.63 (270)	≈ 1.33 (1.98)	≈ 1.92 (2.85)
220-275-	<input type="text" value=""/> -0		10.83 (275)	11.61 (295)	≈ 1.40 (2.09)	-
220-300-	760-300- <input type="text" value=""/> -0		11.81 (300)	12.60 (320)	≈ 1.48 (2.20)	≈ 2.16 (3.21)

Choose from the radii below for all of the above sizes

Radius (mm) Example: 220-300--0

	055*	063*	075	100	125	150	175	200	250
<i>R</i>	2.17 (055*)	2.48 (063*)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)
<i>H</i>	6.06 (154)	6.69 (170)	7.64 (194)	9.61 (244)	11.57 (294)	13.54 (344)	15.51 (394)	17.48 (444)	21.42 (544)
<i>D</i>	4.92 (125)	5.24 (133)	5.71 (145)	6.69 (170)	7.68 (195)	8.66 (220)	9.65 (245)	10.63 (270)	12.60 (320)
<i>K</i>	10.43 (265)	11.42 (290)	12.99 (330)	16.14 (410)	19.09 (485)	22.24 (565)	25.39 (645)	28.54 (725)	34.65 (880)

** This radius is not available for the R760 Series

0=Standard color black. For other colors see Chapter 1

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS

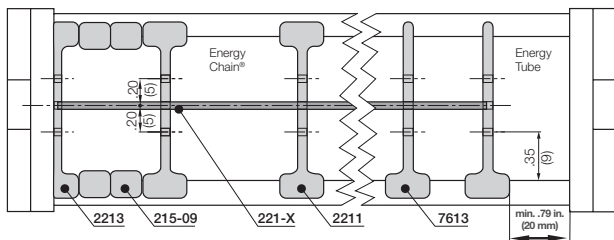




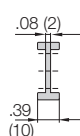
Option 1: Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.

NOTE: Observe a lateral spacing of at least .79 in. (20mm) for Energy Tubes and



STANDARD Vertical separator 2201

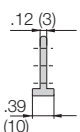


Vertical separator (Chain only)
Unassembled Part No. 2201
Assembled Part No. 2211

- **Standard separator 2201 for Energy Chains®**
This separator is used for vertical subdivision. Because they are slotted, separators can also be used horizontally to form simple compartments.



Vertical separator 7603

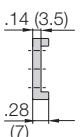


Vertical separator (tube only)
Unassembled Part No. 7603
Assembled Part No. 7613

- **Vertical separator 7603 for Energy Tubes**
This separator is used for vertical subdivision. Because they are slotted, separators can also be used horizontally to form simple compartments.



Side plate 2203

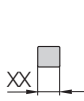


Side plate (chain only)
Unassembled Part No. 2203
Assembled Part No. 2213

- **Side plate 2203 for Energy Chains®**
Used in conjunction with full-width shelf 220-X, this option is used for applications involving many thin cables with similar diameters.



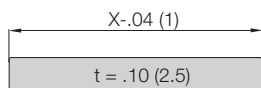
Spacers 205-09



Spacer (chain only)
Unassembled Part No. 205-09
Assembled Part No. 215-09

- **NOTE ON SPACERS**
Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications. The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

Full-width shelf 220-XX



Width X in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Part No. Unassembled	Part No. Assembled
1.57 (040)	220-40	221-40	3.94 (100)	220-100	221-100
1.97 (050)	220-50	221-50	4.92 (125)	220-125	221-125
2.44 (062)	220-62	221-62	5.91 (150)	220-150	221-150
2.76 (070)	220-70	221-70	6.89 (175)	220-175	221-175
2.95 (075)	220-75	221-75	7.87 (200)	220-200	221-200
3.43 (087)	220-87	221-87			

Energy Chain System® E4/100

Series 220/R760

Interior Separation

energy chain® configurator ▶



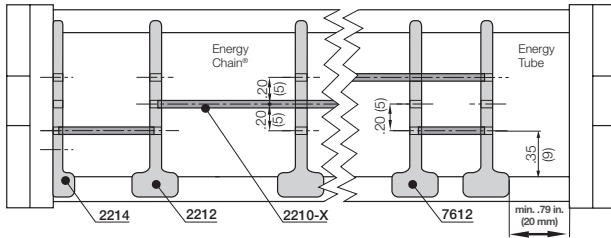
220
R760



Option 2: Shelves

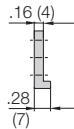
Energy Chains® and Energy Tubes can be subdivided both vertically and horizontally using the various interior separation elements.

▶ Design, Chapter 1 for layout recommendations.



• Side plates 2204

This component is used to form the basic pattern of a shelf system.



Side plate

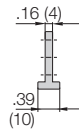
Unassembled	Part No. 2204
Assembled	Part No. 2214

Side plate
2204



• Vertical separator 2202 for Energy Chain®

This component is used to form the basic pattern of a shelf system.



Vertical separator (chain only)

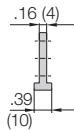
Unassembled	Part No. 2202
Assembled	Part No. 2212

Vertical separator
2202



• Vertical separator 7602 for Energy Tube

This separator is slotted and able to be combined with shelves



Vertical separator (tube only)

Unassembled	Part No. 7602
Assembled	Part No. 7612

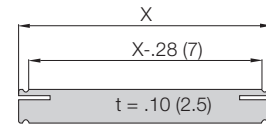
Vertical separator
7602



Shelves 420-XX

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 7 different heights in .28" (7mm) increments

Width X in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Part No. Unassembled	Part No. Assembled
.71 (18)	2200-18	2210-18	1.89 (48)	2200-48	2210-48
.91 (23)	2200-23	2210-23	2.28 (58)	2200-58	2210-58
1.10 (28)	2200-28	2210-28	2.68 (68)	2200-68	2210-68
1.30 (33)	2200-33	2210-33	2.87 (73)	2200-73	2210-73
1.50 (38)	2200-38	2210-38	3.46 (88)	2200-88	2210-88
1.69 (43)	2200-43	2210-43	3.90 (99)	2200-99	2210-99



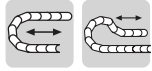
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



igus® Energy Chain System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

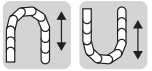
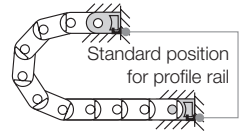
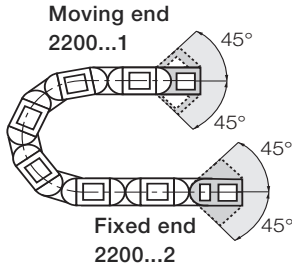
Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>



Standard

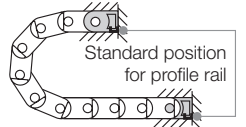
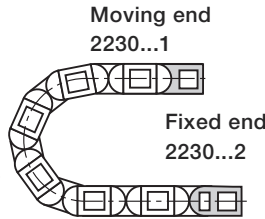
Option 1: pivoting

- Universal use
- Corrosion resistant
- Short and long travels
- Space-restricted conditions

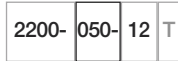


Option 2: locking

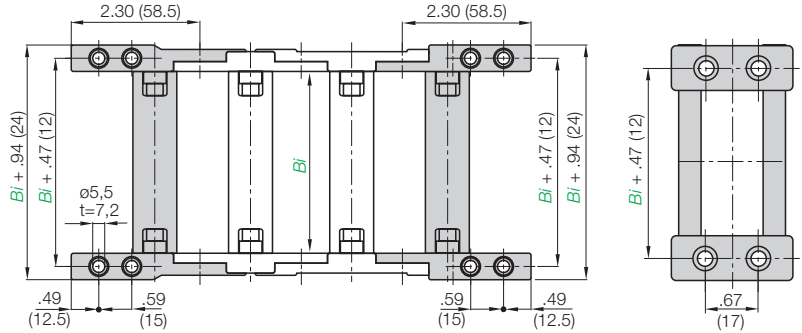
- Universal use
- Corrosion resistant
- Extreme accelerations
- Vertical hanging/standing travels



Part Number Structure



Tube version
Complete Set
Width
2220 = Pivoting
2230 = Locking



Part number examples are shown for pivoting brackets. For locking brackets change part number to 2230

Part No. Full Set (pivoting)
Series 220
2220-Width-12

Part No. Full Set (pivoting)
Tube Series R760
2220-Width-12T

Due to the design of the E4/100 series chains,
please note the following when ordering brackets:

Even number of links = full set, part number ending in -12
Odd number of links = 2 pieces, part number ending in -2

Width	Part No. Full Set		Tube Option	Bi in. (mm)
	Pivoting	Locking		
-040	2220	2230	-040-12	1.57 (40)
-050	2220	2230	-050-12 T	1.97 (50)
-062	2220	2230	-062-12	2.44 (62)
-070	2220	2230	-070-12	2.76 (70)
-075	2220	2230	-075-12 T	2.95 (75)
-087	2220	2230	-087-12	3.43 (87)
-100	2220	2230	-100-12 T	3.94 (100)
-125	2220	2230	-125-12 T	4.92 (125)
-150	2220	2230	-150-12 T	5.91 (150)
-175	2220	2230	-175-12 T	6.89 (175)
-200	2220	2230	-200-12 T	7.87 (200)
-225	2220	2230	-225-12 T	8.86 (225)
-250	2220	2230	-250-12 T	9.84 (250)
-275	2220	2230	-275-12 T	10.83 (275)
-300	2220	2230	-300-12 T	11.81 (300)

Energy Chain System® E4/100 Series 220/R760 Guide Troughs

energy chain® configurator ▶



220
R760

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part No. 96-30
- 1/2 travel length of glide bars
Part No. 92-01
- Installation sets as end connectors
Part No. 95-50-XX

-XX indicates the length of the profile rail on which the guide trough is mounted. The values and part numbers are specified in the table on the left. Standard length of the trough components and glide bars is 6.56 ft (2m). The required overall length of the guide trough directly correlates to the length of travel.

Example:
Length of travel 164 ft. (50 m)
Center mounted

Required guide troughs:
164 ft (50 m) guide trough,
82 ft (25 m) glide bar
= 25 sections of 6.56 ft (2 m) guide trough

Part No. 96-30
= 13 sections of 6.56 ft. (2 m) glide bar

Part No. 92-01
Required number of installation sets
= Number of guide trough
components + 1
= 25 + 1 = 26

Part number of the installation sets
95-50-XXX

Example: 95-50-400 for
15.75 (400 mm) long profile rail



Left: Guide trough with glide bars

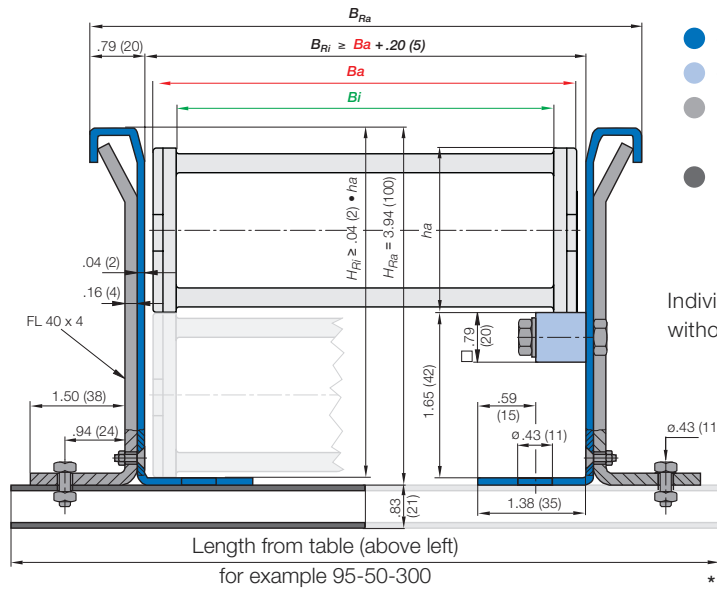
Right: Guide troughs without glide bars



Installation sets as section connectors

Width of Crossbar
220-040-200-0

	B_{Ri}	Installation Part No.
-040	2.56 (65)	*
-050	2.95 (75)	95-50-200
-062	3.43 (87)	95-50-200
-070	3.74 (95)	95-50-200
-075	3.94 (100)	95-50-225
-100	4.92 (125)	95-50-250
-125	5.91 (150)	95-50-275
-150	6.89 (175)	95-50-300
-175	7.87 (200)	95-50-325
-200	8.86 (225)	95-50-350
-225	9.84 (250)	95-50-375
-250	10.83 (275)	95-50-400
-275	11.81 (300)	95-50-425
-300	12.80 (325)	95-50-450



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

* Specialized guide trough available upon request

Standard length profile rail

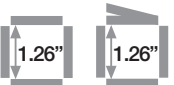
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



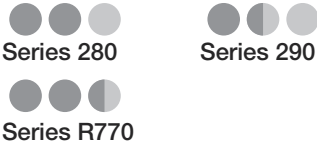
280
290
R770






Energy Chain System® E4/100 Series 280/290/R770



Price Index



Special Features / Options

-  Low noise version E4/101 Series 281 available with special rubber pads
-  IPA Certificate, Cleanroom ISO Class 3 (DIN 14644-1) at v = 1 m/s for Series 280.10.100.0 tested with igus® Chainflex® cables
-  ESD classification: Electrically conductive ESD/ATEX version upon request

Assembly Tips



Opening Energy Chains®: Remove crossbars and clips - Insert screwdriver into the slot, push down, release by lever action





Remove lids/bottoms (Energy Tubes) - Insert screwdriver into the slot, release by lever action

Other Installation Methods

- Vertical, hanging ≤ 262 ft (80 m)
- Vertical, standing ≤ 16.4 ft (5 m)
- Side-mounted, un_supp. ≤ 4.92 ft (1.5 m)
- Rotary requires further calculation

Usage Guidelines

- 
 - If quiet operation is required
 - If very high speeds and/or accelerations are required
 - Long travels
 - High fill weights
- 
 - If long, side-mounted, unsupported length is required
➤ **Series 2828/2928/R7728**
 - If single-radius accessibility is sufficient
➤ **Series 26/27/27i, Chapter 4**

Features & Benefits

- 1** KMA mounting brackets with attachment points on all sides
- 2** Locking or pivoting mounting brackets available
- 3** Crossbars on Energy Chains® are removable along both radii
- 4** Hinged snap-open removable lids along the outer radius of the Energy tube
- 5** Closed and open styles can be combined
- 6** Optimized glide pads with lateral wear allowance
- 7** Integrated strain relief possible
- 8** Numerous interior separation possibilities
- 9** Wide, rounded crossbars
- 10** Stop dog with “brake” for noise reduction
- 11** Energy Chains® also available with reverse bending radius “RBR”




Also available as E4/00-NC without camber: 280-NCST

Order Example: Complete Energy Chain®


Please indicate chain length or number of links. Example:

[energy chain® configurator](#) ▶


13.12 ft (4 m) **280-30-300-0**

 **Energy Chain®**

With 2 separators **282** assembled every 2nd link

 **Interior Separation**

1 Set **2800-30-12P**

 **Mounting Bracket**

Energy Chain System® E4/100 Series 280/290/R770 Installation Dimensions

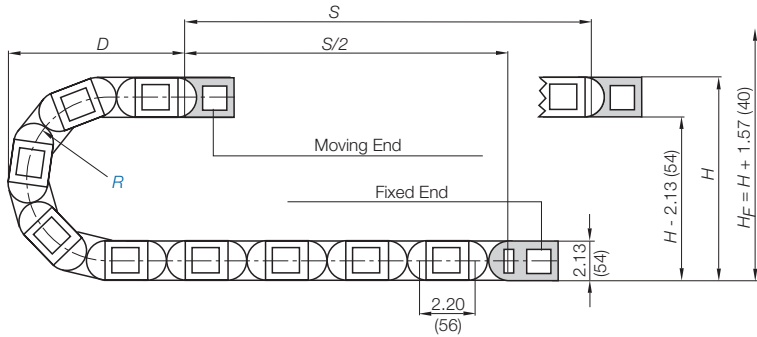
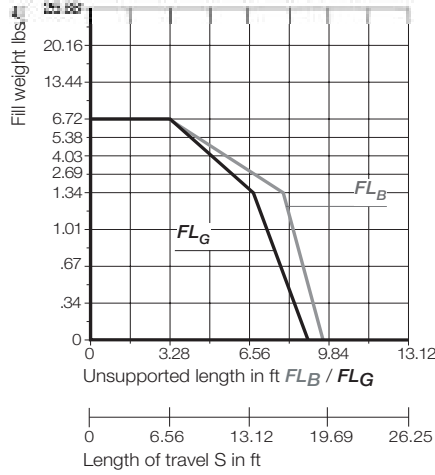
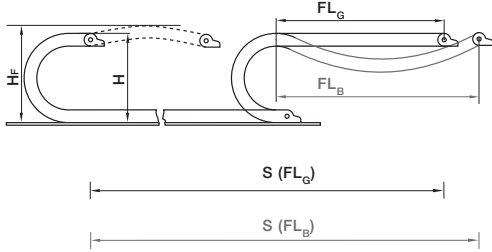
energy chain® configurator ▶



280
290
R770

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



The required clearance height: $H_F = H + 1.57$ in. (40 mm) (with 1.34 lbs/ft (2 kg/m) fill weight).
Please consult igus® if space is particularly restricted.

Short Travels - Unsupported

Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

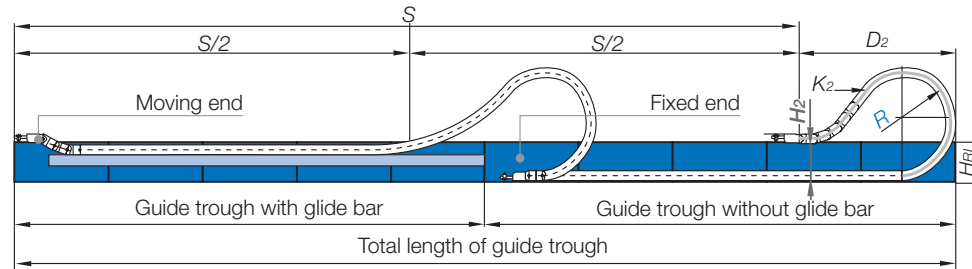
- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{safety buffer}$
 - H_F = Required clearance height
 - H_{in} = Trough inner height
 - H_2 = *Mounting height
 - D_2 = Overlength - long travels, gliding
 - K_2 = *Add-on
- *If the mounting bracket location is set lower

R	2.48 (063**)	2.95 (075**)	3.94 (100**)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.66 (220)	9.84 (250)	11.81 (300)
H_{+20}^0	7.09 (180)	8.07 (205)	10.04 (255)	12.01 (305)	13.98 (355)	15.51 (405)	17.91 (455)	19.49 (495)	21.85 (555)	25.79 (655)
D	5.75 (146)	6.22 (158)	7.20 (183)	8.19 (208)	9.17 (233)	10.16 (258)	11.14 (283)	11.93 (303)	13.11 (333)	15.08 (383)
K	12.20 (310)	13.78 (350)	16.93 (430)	19.88 (505)	23.03 (585)	26.18 (665)	29.33 (745)	31.69 (805)	35.43 (900)	41.54 (1055)

**Not available for R770

For long travels with lowered mounting height

Long travel lengths from 32.8 ft.(10m) to max. 656 ft. (200m)



For center mount applications:
Chain length: = $\frac{S}{2} + K_2$

Long Travels - Gliding

If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.
Design, Chapter 1

R	2.48 (063**)	2.95 (075**)	3.94 (100**)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.66 (220)	9.84 (250)	11.81 (300)
H_2	-	-	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)	6.54 (166)
D_{+25}	-	-	14.57 (370)	18.50 (470)	19.69 (500)	25.79 (655)	30.31 (770)	35.43 (900)	36.61 (930)	43.31 (1100)
K_2	-	-	24.25 (616)	30.87 (784)	35.27 (896)	44.10 (1120)	50.71 (1288)	57.32 (1456)	61.73 (1568)	75.00 (1904)

For support of the lower run, see Chapter 9 for the Support Tray tool kit

**Not available for R770

Technical Data

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB



Details of material properties

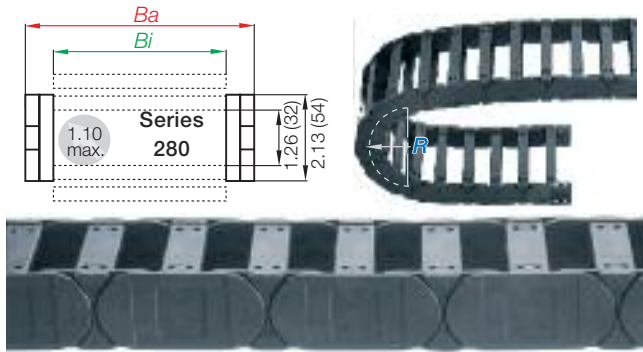
▶ Chapter 1

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



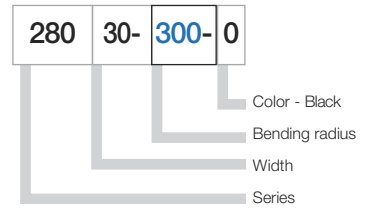
6.140

Series 280 - Energy Chain® with crossbars every link

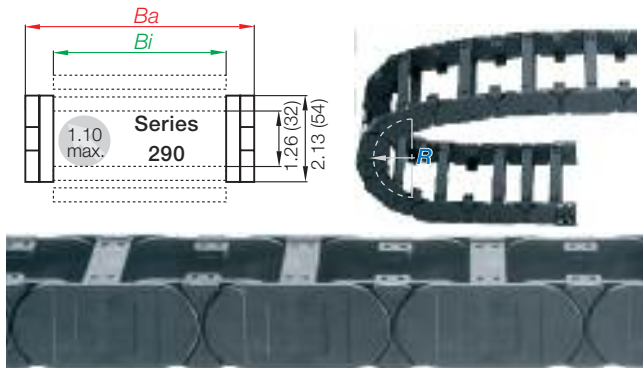


- Crossbars every link
- For use with rigid hydraulic hoses
- For particularly demanding applications
- Can be opened from both sides

Part Number Structure

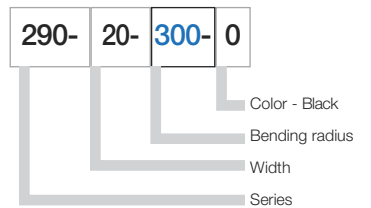


Series 290 - Energy Chain® with crossbars every other link

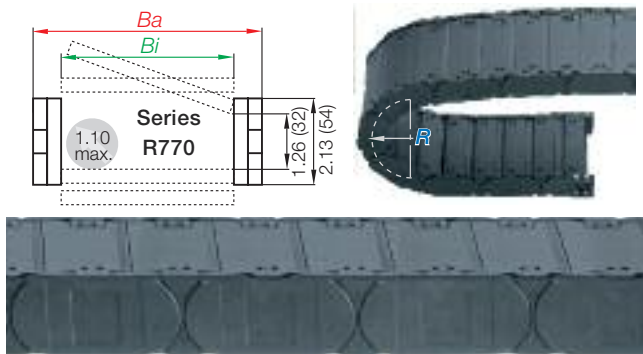


- Crossbars every other link
- Standard configuration
- For nearly every situation
- Can be opened from both sides
- Easy assembly
- Stable
- Cost-effective

Part Number Structure

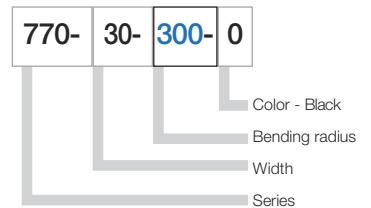


Series R770 - fully enclosed Energy Tube

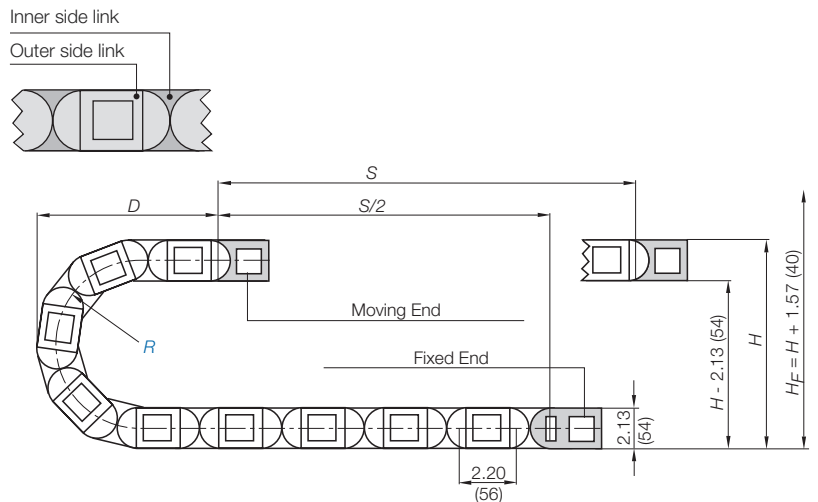
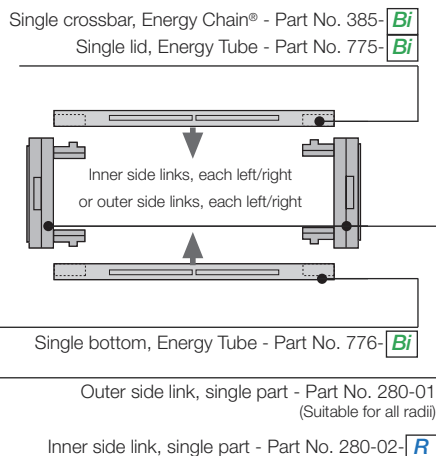


- Fully enclosed
- Excellent cable and hose protection against dirt
- Protection against hot chips up to 1652°F (900°C)
- Lids along inner radius are completely removable
- Lids along the outer radius are single-sided, snap open, hinged on one side as well as completely removable

Part Number Structure



Energy Chain® as separate parts, links and side plates



Energy Chain System® E4/100

Series 280/290/R770

energy chain® configurator ▶



280
290
R770

Supplement part number with required radius. Example: 280-30-300-0
Pitch: 2.20 in. (56mm) per link links/ft(m) = 5.49 (18)

Part Number			<i>Bi</i>		<i>Ba</i>		Weight		
Crossbars Every link	Crossbars Every other	Tube Version	in. (mm)	in. (mm)	280 lbs/ft (kg/m)	290 lbs/ft (kg/m)	R770 lbs/ft (kg/m)		
280-05-	290-05-	*770-05-	<input type="text"/> -0*	1.97 (50)	2.87 (73)	≈ 1.16 (1.73)	≈ 1.10 (1.64)	≈ 1.76 (2.63)	
280-06-	290-06-		<input type="text"/> -0	2.68 (68)	3.58 (91)	≈ 1.20 (1.79)	≈ 1.12 (1.67)	–	
280-07-	290-07-	770-07-	<input type="text"/> -0	2.95 (75)	3.86 (98)	≈ 1.24 (1.84)	≈ 1.14 (1.69)	≈ 1.84 (2.75)	
280-087-	290-087-		<input type="text"/> -0	3.43 (87)	4.33 (110)	≈ 1.30 (1.93)	≈ 1.16 (1.73)	–	
280-10-	290-10-	770-10-	<input type="text"/> -0	3.94 (100)	4.84 (123)	≈ 1.36 (2.02)	≈ 1.20 (1.78)	≈ 1.90 (2.83)	
280-11-	290-11-	770-11-	<input type="text"/> -0	4.25 (108)	5.16 (131)	≈ 1.40 (2.08)	≈ 1.22 (1.81)	≈ 1.98 (2.94)	
280-112-	290-112-		<input type="text"/> -0	4.41 (112)	5.35 (136)	≈ 1.44 (2.15)	≈ 1.24 (1.84)	–	
280-12-	290-12-	770-12-	<input type="text"/> -0	4.92 (125)	5.83 (148)	≈ 1.48 (2.20)	≈ 1.26 (1.87)	≈ 2.04 (3.03)	
280-137-	290-137-		<input type="text"/> -0	5.39 (137)	6.34 (161)	≈ 1.54 (2.29)	≈ 1.28 (1.91)	–	
280-15-	290-15-	770-15-	<input type="text"/> -0	5.91 (150)	6.81 (173)	≈ 1.60 (2.38)	≈ 1.32 (1.96)	≈ 2.14 (3.19)	
280-162-	290-162-		<input type="text"/> -0	6.38 (162)	7.32 (186)	≈ 1.64 (2.44)	≈ 1.34 (1.99)	–	
280-17-	290-17-	770-17-	<input type="text"/> -0	6.61 (168)	7.52 (191)	≈ 1.69 (2.51)	≈ 1.36 (2.02)	≈ 2.28 (3.39)	
280-18-	290-18-		<input type="text"/> -0	6.89 (175)	7.80 (198)	≈ 1.72 (2.56)	≈ 1.38 (2.05)	–	
280-187-	290-187-		<input type="text"/> -0	7.36 (187)	8.31 (211)	≈ 1.78 (2.65)	≈ 1.40 (2.09)	–	
280-20-	290-20-	770-20-	<input type="text"/> -0	7.87 (200)	8.78 (223)	≈ 1.84 (2.74)	≈ 1.44 (2.14)	≈ 2.41 (3.59)	
280-212-	290-212-		<input type="text"/> -0	8.35 (212)	9.29 (236)	≈ 1.93 (2.87)	≈ 1.48 (2.20)	–	
280-23-	290-23-		<input type="text"/> -0	8.86 (225)	9.76 (248)	≈ 1.96 (2.92)	≈ 1.49 (2.22)	–	
280-237-	290-237-		<input type="text"/> -0	9.33 (237)	10.28 (261)	≈ 2.05 (3.05)	≈ 1.54 (2.29)	–	
280-25-	290-25-	770-25-	<input type="text"/> -0	9.84 (250)	10.75 (273)	≈ 2.08 (3.10)	≈ 1.56 (2.32)	≈ 2.72 (4.04)	
280-262-	290-262-		<input type="text"/> -0	10.31 (262)	11.26 (286)	≈ 2.14 (3.19)	≈ 1.59 (2.36)	–	
280-28	290-28-		<input type="text"/> -0	10.83 (275)	11.73 (298)	≈ 2.20 (3.28)	≈ 1.62 (2.41)	–	
280-29-	290-29-		<input type="text"/> -0	11.30 (287)	12.24 (311)	≈ 2.26 (3.37)	≈ 1.65 (2.45)	–	
280-30-	290-30-	770-30-	<input type="text"/> -0	11.81 (300)	12.72 (323)	≈ 2.33 (3.46)	≈ 1.68 (2.50)	≈ 2.98 (4.43)	
280-312-	290-312-		<input type="text"/> -0	12.28 (312)	13.23 (336)	≈ 3.86 (3.59)	≈ 1.72 (2.56)	–	
280-325-	290-325-		<input type="text"/> -0	12.79 (325)	13.70 (348)	≈ 2.47 (3.68)	≈ 1.75 (2.60)	–	
280-337-	290-337-		<input type="text"/> -0	13.27 (337)	14.21 (361)	≈ 2.53 (3.77)	≈ 1.78 (2.65)	–	
280-350-	290-350-		<input type="text"/> -0	13.78 (350)	14.69 (373)	≈ 2.59 (3.86)	≈ 1.81 (2.69)	–	
280-362-	290-362-		<input type="text"/> -0	14.25 (362)	15.20 (386)	≈ 2.65 (3.95)	≈ 1.84 (2.74)	–	
280-375-	290-375-		<input type="text"/> -0	14.76 (375)	15.67 (398)	≈ 2.72 (4.04)	≈ 1.88 (2.79)	–	
280-387-	290-387-		<input type="text"/> -0	15.24 (387)	16.18 (411)	≈ 2.76 (4.11)	≈ 1.90 (2.82)	–	
280-400	290-400-		<input type="text"/> -0	15.75 (400)	16.65 (423)	≈ 2.81 (4.18)	≈ 1.92 (2.86)	–	

Choose from the radii below for all of the above sizes

Radius (mm) Example: 280-07-150-0

	063**	075**	100**	125	150	175	200	220	250	300
<i>R</i>	2.48 (063*)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.66 (220)	9.84 (250)	11.81 (300)
<i>H</i> $\frac{0}{20}$	7.09 (180)	8.07 (205)	10.04 (255)	12.01 (305)	13.98 (355)	15.94 (405)	17.91 (455)	19.49 (495)	21.85 (555)	25.79 (655)
<i>D</i>	5.75 (146)	6.22 (158)	7.20 (183)	8.19 (208)	9.17 (233)	10.16 (258)	11.14 (283)	11.93 (303)	13.11 (333)	15.08 (383)
<i>K</i>	12.20 (310)	13.78 (350)	16.93 (430)	19.88 (505)	23.03 (585)	26.18 (665)	29.33 (745)	31.69 (805)	35.43 (900)	41.54 (1055)

** This radius is not available for the R770 Series

*Removable lid only, no hinged option

0=Standard color black. For other colors see Chapter 1

For wider chains see page 6.75. For large diameter hoses see page 6.75

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS

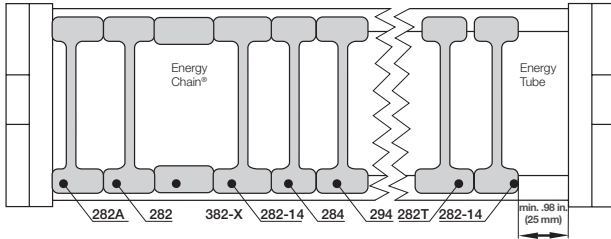




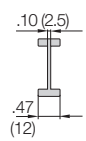
Option 1: Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.

NOTE: Observe a lateral spacing of at least .98 in. (25mm) for Energy Tubes

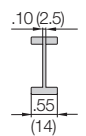


STANDARD
Vertical separator
280



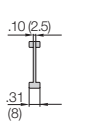
Separator (chain/tube)
Unassembled **Part No. 280**
Assembled **Part No. 281**

Vertical separator
280 -14



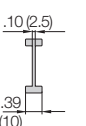
Separator (chain/tube)
Unassembled **Part No. 280-14**
Assembled **Part No. 281-14**

Vertical separator
283



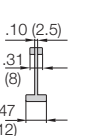
Separator (chain only)
Unassembled **Part No. 283**
Assembled **Part No. 284**

Locking separator
293



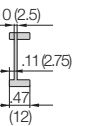
Locking Separator (chain only)
Unassembled **Part No. 293**
Assembled **Part No. 294**

Locking separator
281T



Locking Separator (tubes only)
Unassembled **Part No. 281T**
Assembled **Part No. 282T**

Asymmetric separator
281A



Asymmetric separator (chain only)
Unassembled **Part No. 280A**
Assembled **Part No. 281A**

Spacers
381-XX



Spacer (chain only)
Unassembled **Part No. 381-XX**
Assembled **Part No. 382-XX**
XX = width of the spacer

- **Standard separator 280 for Energy Chains® and Energy Tubes**
This separator offers safe stability due to its wide base design, also when used with thick cables or hoses.
- **Vertical separator 280-14 for Energy Chains® and Energy Tubes**
This separator offers safe stability due to its broad base design when used with thick cables or hoses.
- **Vertical separator 283 for Energy Chains®**
This separator features a narrow base for use in applications where a large number of small cables need to be individually separated.
- **Locking separator 293 for Energy Chains®**
This separator is used in applications with very high relative humidity. It features increased retention force which is produced by asymmetrical retention "clamps" attached to the chain's crossbar. Please ensure that they are properly aligned.
- **Locking separator 281T for Energy Tubes**
It clamps to the fixed radius and remains free along the other radius to facilitate lid removal.
- **Asymmetrical separator 281A for Energy Chains®**
This separator features an (12mm) base. It can be used in combinations between spacers of different widths and vertical separators in side mounted applications.
- **NOTE ON SPACERS**
Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications. The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

Spacers available in the following sizes:

Part No.	Part No.	in.	(mm)
Unassembled	Assembled		
381 -10	382 -10	.39"	(10)
381 -15	382 -15	.59"	(15)
381 -20	382 -20	.79"	(20)

Energy Chain System® E4/100

Series 280/290/R770

Interior Separation

energy chain® configurator ▶

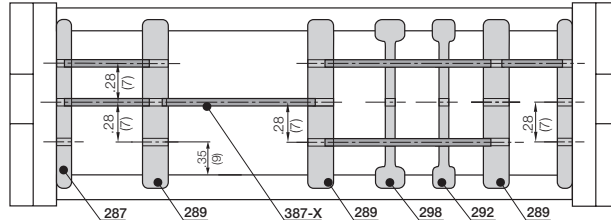


280
290
R770



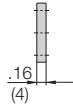
Option 2: Shelves

Energy Chains® and Energy Tubes can be subdivided both vertically and horizontally using the various interior separation elements. ▶ **Design, Chapter 1** for layout recommendations.



- Side plates 286**

This component is used to form the basic pattern of a shelf system.



Side Plate

Unassembled	Part No. 286
Assembled	Part No. 287

Side plate
286



- Vertical separator 288**

This component is used to form the basic pattern of a shelf system.



Vertical Separator

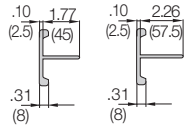
Unassembled	Part No. 288
Assembled	Part No. 289

Vertical separator
288



- Locking vertical separator 281-S**

This separator is slotted and able to be combined with shelves



Separators w/Integrated Shelf

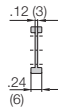
Unassembled	Part No. 281-S-45
Assembled	Part No. 282-S-45
Unassembled	Part No. 281-S-57
Assembled	Part No. 282-S-57

Separator with integrated shelf
281-S



- Closed Slotted separators 291**

These are used for complex subdivisions. However, they cannot be retrofitted into an existing interior separation system without removing the shelves first.



Slotted Separators

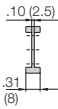
Unassembled	Part No. 291
Assembled	Part No. 292

Closed slotted separator
291



- Open slotted separator 297**

This separator can be retrofitted into an existing interior separation system without removing the shelves, as long as these shelves fit into the middle slot only.



Slotted Separators, Open

Unassembled	Part No. 297
Assembled	Part No. 298

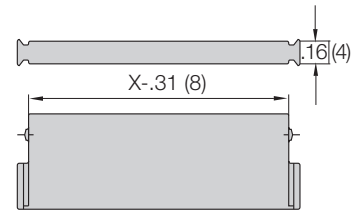
Open slotted separator
297



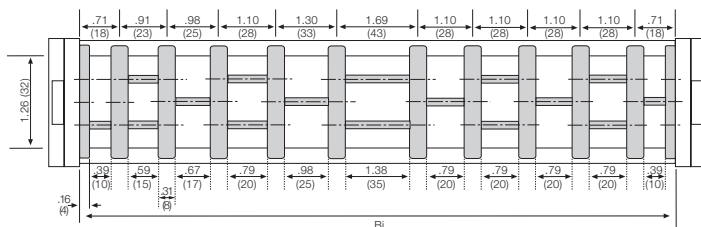
Width X in. (mm)	Usable Width in. (mm)	Part No.	
		Unassembled	Assembled
.71 (18)	.39 (10)	386-18	387-18
.91 (23)	.59 (15)	386-23	387-23
.98 (25)	.67 (17)	386-25	387-25
1.10 (28)	.79 (20)	386-28	387-28
1.30 (33)	.98 (25)	386-33	387-33
1.69 (43)	1.38 (35)	386-43	387-43
1.97 (50)	1.65 (42)	386-50	387-50
2.13 (54)	1.81 (46)	386-54	387-54
2.44 (62)	2.13 (54)	386-62	387-62
2.95 (75)	2.64 (67)	386-75	387-75
3.43 (87)	3.12 (87)	386-87	387-87
3.94 (100)	3.62 (92)	386-100	387-100
4.25 (108)	3.94 (100)	386-108	387-108
4.92 (125)	4.61 (117)	386-125	387-125
5.91 (150)	5.59 (142)	386-150	387-150
6.89 (175)	6.57 (167)	386-175	387-175
7.87 (200)	7.56 (192)	386-200	387-200
8.19 (208)	7.87 (200)	386-208	387-208

Shelves 386-XX

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 3 different heights in .28" (7mm) increments



The diagram below is for reference purposes only. Multiple configurations are possible. To create your e-chain shelving cross section please see our online e-chain configurator. Call 1-800-521-2747 for assistance and/or go to igus.com click on the **Products** drop down menu, choose **Energy Chain Cable Carriers** and on the next drop down menu simply click on **e-chain Configurator**.



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



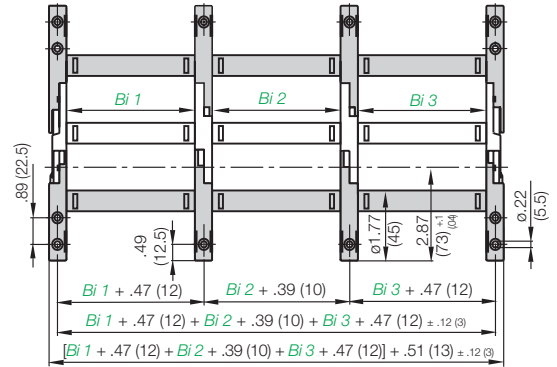


Extension links - for extremely wide Energy Chains® up to 9.84 ft (3m)

- For applications in which particularly high fill weights necessitate extremely wide Energy Chains®
- The extension link design allows virtually limitless side-by-side attachment of chains
- The unsupported length of a chain can be increased when additional loads are required
- Extension links can be used with Energy Chains®, Energy Tubes or a combination of both
- They are suitable for unsupported and gliding applications in a guide trough
- Energy Chains® with extension links are attached with KMA or steel mounting brackets.

Part number example for Energy Chain®
280-10/20/10-**200**-0
280-*Bi1/Bi2/Bi3*-**R**-0

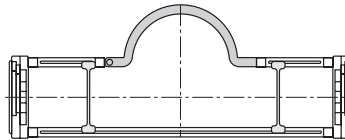
We **strongly recommend** on-site consultation with an igus® technician for individual advice regarding mounting brackets, guide troughs and other design details.



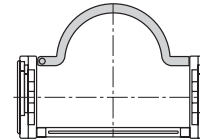
Extender crossbars - For careful guiding of large diameter cables and hoses

- Intended for cables and hoses with a maximum outer diameter of 4.13 in. (105 mm).
- Gliding operation with crossbars assembled along the outer radius in conjunction with a special guide trough
- Gliding operation not guaranteed with crossbars assembled along the inner radius
- The extender crossbar can either be attached to the side links directly or can be used in combination with two standard snap-open crossbars.

Consult igus® for your extender crossbar applications. We will be happy to assist you with your design layout.



Round extender crossbar combined with standard snap-open crossbars.

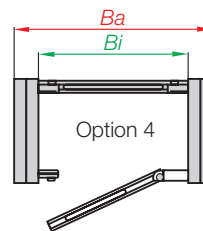
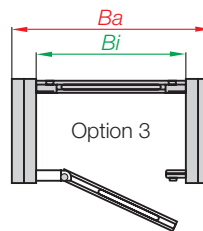
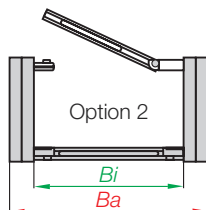
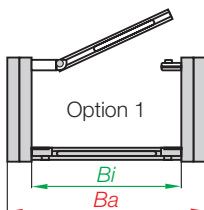


Attached directly to the side link.

Part No.	Max Ø Hose in. (mm)	Style	Installation Side Link	Combined with Snap-Open Crossbars
385-15-RHD115	4.13 (105)	Round	No	Yes
385-18-RD115	4.13 (105)	Round	Yes	No

Hinged crossbars

- Typically, Energy Chain® crossbars are completely removable. In cases where it is preferable that the opening crossbars remain on the Energy Chain®, a hinged design has been developed.
- Please consult igus® for design assistance



Energy Chain System® E4/100

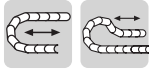
Series 280/290/R770

Mounting Brackets - KMA

energy chain® configurator ▶



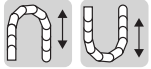
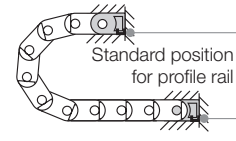
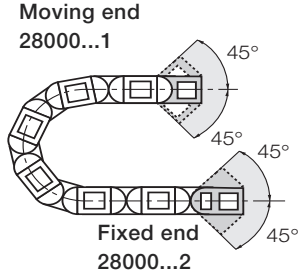
280
290
R770



Standard

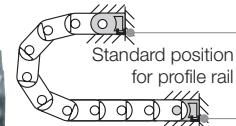
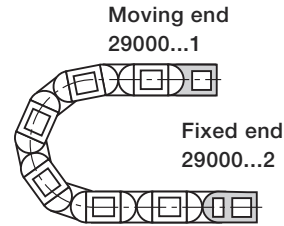
Option 1: pivoting

- Profile rail option
- Universal use
- Corrosion resistant
- Short and long travels
- Space-restricted conditions

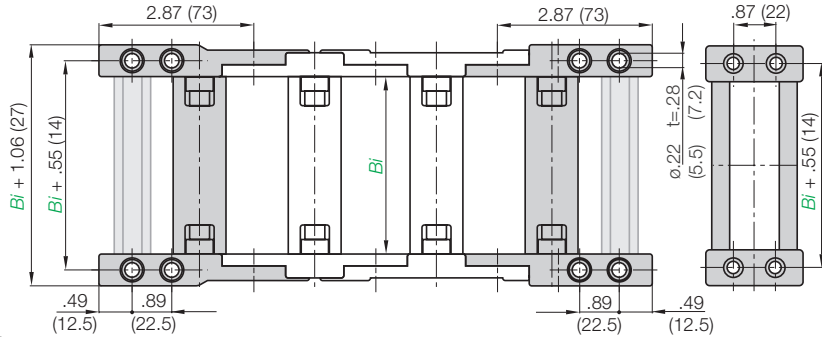
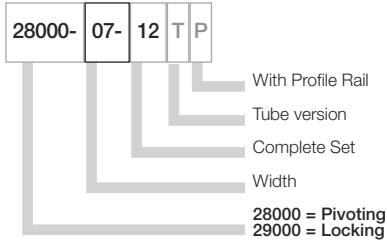


Option 2: locking

- Profile rail option
- Universal use
- Corrosion resistant
- Vertical hanging/standing travels
- Extreme accelerations



Part Number Structure



Due to the design of the E4/100 series chains, please note the following when ordering brackets:

- Even number of links = full set, part number ending in -12
- Odd number of links = 2 pieces, part number ending in -2

Part number examples are shown for pivoting brackets. For locking brackets change part number to 29000

Part No. Full Set (pivoting)	Part No. Full Set (pivoting)	Part No. Full Set (pivoting)	Part No. Full Set (pivoting)
Series 2828 or 290:	with profile rail	Tube Series R770	with Profile Rail
28000-Width-12	Series 2828 or 290	28000-Width-12T	Series 770
	28000-Width-12P		28000-Width-12TP

Width	Part No. Full Set		Tube Option	With Profile Rail	Bi in. (mm)	Width	Part No. Full Set		Tube Option	With Profile Rail	Bi in. (mm)		
	Pivoting	Locking					Pivoting	Locking					
-05*	28000	29000	-05-12	T	P	1.97 (50)	-23	28000	29000	-23-12	P	8.86 (225)	
-06	28000	29000	-06-12		P	2.68 (68)	-237	28000	29000	-237-12	P	9.33 (237)	
-07	28000	29000	-07-12	T	P	2.95 (75)	-25	28000	29000	-25-12	T	P	9.84 (250)
-087	28000	29000	-087-12		P	3.43 (87)	-262	28000	29000	-262-12	P	10.31 (262)	
-10	28000	29000	-10-12	T	P	3.94 (100)	-28	28000	29000	-28-12	P	10.83 (275)	
-11	28000	29000	-11-12	T	P	4.25 (108)	-29	28000	29000	-29-12	P	11.30 (287)	
-112	28000	29000	-112-12		P	4.41 (112)	-30	28000	29000	-30-12	T	P	11.81 (300)
-12	28000	29000	-12-12	T	P	4.92 (125)	-312	28000	29000	-312-12	P	12.28 (312)	
-137	28000	29000	-137-12		P	5.39 (137)	-325	28000	29000	-325-12	P	12.79 (325)	
-15	28000	29000	-15-12	T	P	5.91 (150)	-337	28000	29000	-337-12	P	13.27 (337)	
-162	28000	29000	-162-12		P	6.38 (162)	-350	28000	29000	-350-12	P	13.78 (350)	
-17	28000	29000	-17-12	T	P	6.61 (168)	-362	28000	29000	-362-12	P	14.25 (362)	
-18	28000	29000	-18-12		P	6.89 (175)	-375	28000	29000	-375-12	P	14.76 (375)	
-187	28000	29000	-187-12		P	7.36 (187)	-387	28000	29000	-387-12	P	15.24 (387)	
-20	28000	29000	-20-12	T	P	7.87 (200)	-400	28000	29000	-400-12	P	15.75 (400)	
-212	28000	29000	-212-12		P	8.35 (212)							

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



igus® Energy Chain System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

Chainfix clamps for the profile rail



igus® Chainfix strain relief elements are available in either steel or stainless steel. They can be adjusted with a hexagon socket and are available in single, double and triple configurations.

Part No. Single Clamp		Part No. Double Clamp		Part No. Triple Clamp		Cable ø	
Steel	Stainless	Steel	Stainless	Steel	Stainless	in.	(mm)
CFX12-1M	CFX12-1E	CFX12-2	CFX12-2E	CFX12-3	-	.24 - .47	(06 - 12)
CFX14-1M	CFX14-1E	CFX14-2	CFX14-2E	CFX14-3	-	.47 - .55	(12 - 14)
CFX16-1M	CFX16-1E	CFX16-2	CFX16-2E	CFX16-3	-	.55 - .63	(14 - 16)
CFX18-1M	CFX18-1E	CFX18-2	CFX18-2E	CFX18-3	-	.63 - .71	(16 - 18)
CFX20-1M	CFX20-1E	CFX20-2	CFX20-2E	CFX20-3	-	.71 - .79	(18 - 20)
CFX22-1M	CFX22-1E	CFX22-2	CFX22-2E	CFX22-3	-	.79 - .87	(20 - 22)
CFX26-1M	CFX26-1E	CFX26-2	CFX26-2E	-	-	.87 - 1.02	(22 - 26)
CFX30-1M	CFX30-1E	CFX30-2	CFX30-2E	-	-	1.02 - 1.18	(26 - 30)
CFX34-1M	CFX34-1E	CFX34-2	CFX34-2E	-	-	1.18 - 1.34	(30 - 34)
CFX38-1M	CFX38-1E	-	-	-	-	1.34 - 1.50	(34 - 38)
CFX42-1M	CFX42-1E	-	-	-	-	1.50 - 1.65	(38 - 42)

For more information please refer to strain relief section of Chapter 10

Chainfix Clip

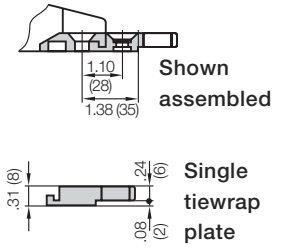


Modular snap-on strain relief device

Chainfix clip is available for cable diameters ranging from .16" (4mm) to .94" (24 mm). It is suitable for assembly on KMA mounting brackets, clip-on strain relief for crossbars as well as profile rails. Quick assembly without the use of tools. **For more information please refer to strain relief section of Chapter 10**

Cable ø	Part No. Clamp	Part No. Bottom
.16-.31 (04-08)	CFC-08-M	CFC-08-C
.31-.47 (08-12)	CFC-12-M	CFC-12-C
.47-.63 (12-16)	CFC-16-M	CFC-16-C
.63-.79 (16-20)	CFC-20-M	CFC-20-C
.79-.94 (20-24)	CFC-24-M	CFC-24-C

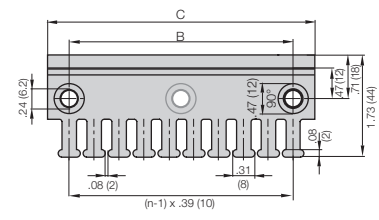
Tiewrap Plates



Option 1: Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



If used with KMA brackets with profile rail please add "KMA" to the end of the part number.
Example: 3050-ZBKMA

For more information please refer to strain relief section of Chapter 10



Option 2: Clip-on Tiewrap plates

Available as a clip-on tiewrap plate without the use of bolts They are inserted and removed with a screwdriver used as a lever. Clip-on tiewrap plates are also available as an attachment to the opening crossbars.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
3050-ZC	5	1.97 (50)
3075-ZC	7	2.95 (75)

For more information please refer to strain relief section of Chapter 10



Option 3: Clip-on Tiewrap plates for opening crossbars

Clip-on tiewrap plates are also available as an attachment to opening crossbars. They can be positioned at any point along the Energy Chain®.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
3850-ZS	5	1.89 (48)

For more information please refer to strain relief section of Chapter 10

Energy Chain System® E4/100

Series 280/290/R770

Guide Troughs

energy chain® configurator ▶



280
290
R770

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part Number 98-30
- 1/2 travel length of glide bars
Part number 92-01
- Installation sets as end connectors
Part Number 93-50-XX

-XX indicates the length of the profile rail on which the guide trough is mounted. The values and part numbers are specified in the table on the left. The standard length of the trough components and glide bars is 6.56 ft (2 m.) The required overall length of the guide trough directly correlates to the length of travel.

Example:

Length of travel 164 ft (50 m)
Center mounted

Required guide troughs:

164 ft (50 m) guide trough
82 ft (25 m) glide bar

= 25 sections of 6.56 ft (2 m) guide trough

Part No. 98-30

= 13 sections of 6.56 ft (2 m) glide bar

Part No. 92-01

Required number of installation sets:

= Number of guide trough components + 1
= 25 + 1 = 26

Part number of the installation sets

93-50-XXX

Example: 93-50-400 for 15.75" (400 mm) long profile rail.



Left: Guide trough with glide bars

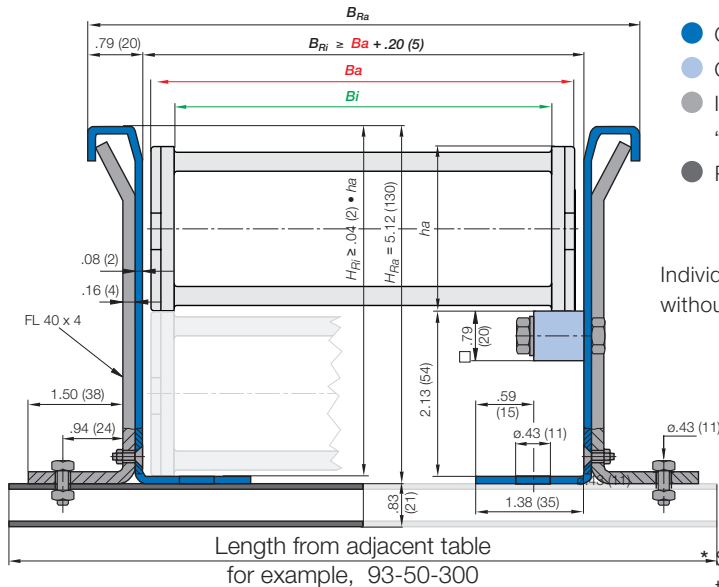
Right: Guide troughs without glide bars



Installation sets as section connectors

Width of Crossbar
280-05-200-0

	B_{Ri}	Installation Part No.
-05	3.15 (78)	93-50-200
-06	3.86 (96)	93-50-225
-07	4.13 (103)	93-50-225
-087	4.61 (115)	93-50-225
-10	5.12 (128)	93-50-250
-11	5.43 (136)	93-50-250
-112	5.59 (141)	93-50-250
-12	6.10 (153)	93-50-275
-137	6.57 (166)	93-50-275
-15	7.09 (178)	93-50-300
-162	7.56 (191)	93-50-300
-17	7.80 (196)	93-50-325
-18	8.07 (203)	93-50-325
-187	8.54 (216)	93-50-325
-20	9.06 (228)	93-50-350
-212	9.53 (241)	93-50-350
-23	10.04 (253)	93-50-375
-237	10.51 (266)	93-50-375
-25	11.02 (278)	93-50-400
-262	11.50 (291)	93-50-400
-28	12.01 (303)	93-50-425
-29	12.48 (316)	93-50-425
-30	12.99 (328)	93-50-450
-312	13.46 (341)	93-50-450
-325	13.98 (353)	93-50-475
-337	14.45 (366)	93-50-475
-350	14.96 (378)	93-50-500
-362	15.43 (391)	93-50-500
-375	15.94 (403)	93-50-525
-387	16.42 (416)	93-50-525
-400	16.93 (428)	93-50-550



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

*Specialized guide trough available upon request

Standard length profile rail

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



380
390
R780



Energy Chain System® E4/100 Series 380/390/R780



Price Index



Series 380



Series 390



Series R780

Special Features / Options



Low noise version E4/101
Series 381 available with
special rubber pads



Cleanroom test upon request



ESD classification:
Electrically conductive
ESD/ATEX version upon request

Assembly Tips



Opening Energy Chains®: Remove crossbars and clips - Insert screwdriver into the slot, push down, release by lever action



Remove lids/bottoms (Energy Tubes) - Insert screwdriver into the slot, release by lever action

Other Installation Methods

Vertical, hanging ≤ 328 ft (100 m)

Vertical, standing ≤ 19.69 ft (6 m)

Side-mounted, un_supp. ≤ 6.56 ft (2 m)

Rotary requires further calculation

Usage Guidelines



- If quiet operation is required
- If very high speeds and/or accelerations are required
- Long travels
- High fill weights



- If long, side-mounted, unsupported length is required
➤ Series 3838/3938/R7838
- If single-radius accessibility is sufficient
➤ Series 340/350, Chapter 4

Features & Benefits

- 1 KMA mounting brackets with attachment points on all sides
- 2 Locking or pivoting mounting brackets available
- 3 Crossbars on Energy Chains® are removable along both radii
- 4 Hinged snap-open removable lids along the outer radius of the Energy tube
- 5 Optimized glide pads with lateral wear allowance
- 6 Closed and open styles can be combined
- 7 Integrated strain relief possible
- 8 Stop dog with "brake" for noise reduction
- 9 Numerous interior separation possibilities
- 10 Wide, rounded crossbars
- 11 Energy Chains® also available with reverse bending radius "RBR"



Also available as
E4/00-NC without camber:
380-NCST

Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

[energy chain® configurator](#) ▶

16.4 ft (5 m) **380-20-300-0**

Energy Chain®

With 2 separators **382** assembled every 2nd link

Interior Separation

1 Set **38000-20-12P**

Mounting Bracket

Energy Chain System® E4/100

Series 380/390/R780

Installation Dimensions

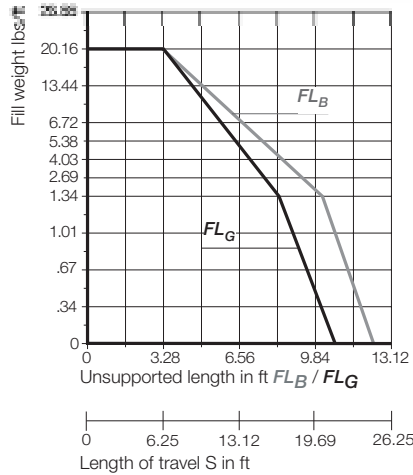
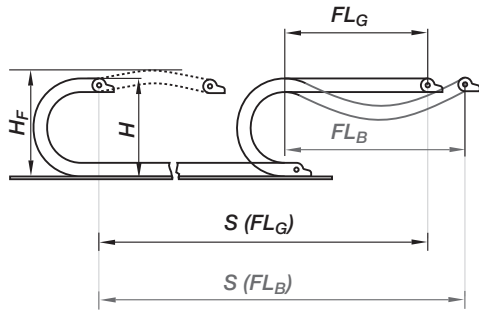
energy chain® configurator



380
390
R780

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1



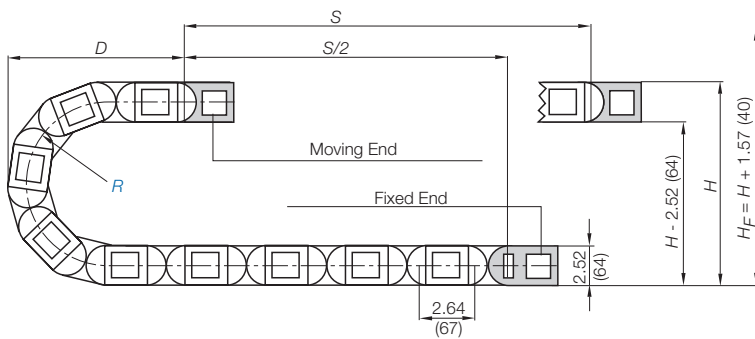
Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{safety buffer}$
 - H_F = Required clearance height
 - H_{in} = Trough inner height
 - H_2 = *Mounting height
 - D_2 = Overlength - long travels, gliding
 - K_2 = *Add-on
- *If the mounting bracket location is set lower



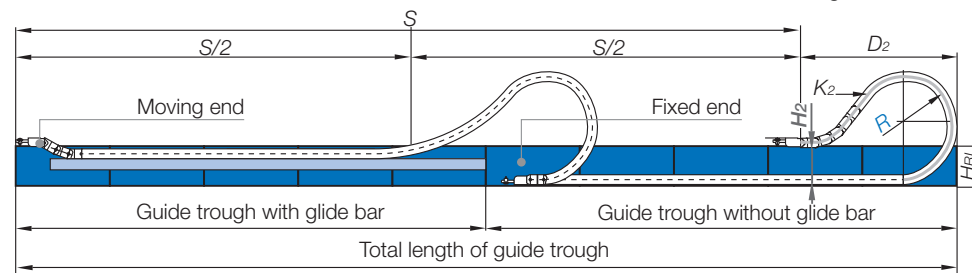
Pitch per link = 2.64" (67 mm)
Links per ft (m) = 4.57 (15)
For center mount applications:
Chain length = $\frac{S}{2} + K$

The required clearance height: $H_F = H + 1.57$ in. (40 mm) (with 1.34 lbs/ft (2 kg/m) fill weight. Please consult igus® if space is particularly restricted.

R	2.95 (075)	3.94 (100)	4.53 (115)	4.92 (125)	5.91 (150)	6.69 (170)	7.87 (200)	8.46 (215)	9.84 (250)	11.81 (300)	13.78 (350)
H ± 0	8.46 (215)	10.43 (265)	11.61 (295)	12.40 (315)	14.37 (365)	15.94 (405)	18.31 (465)	19.49 (495)	22.24 (565)	26.18 (665)	30.12 (765)
D	6.85 (174)	7.83 (199)	8.43 (214)	8.82 (224)	9.80 (249)	10.59 (269)	11.77 (299)	12.36 (314)	13.74 (349)	15.71 (399)	17.68 (449)
K	14.57 (370)	17.72 (450)	19.69 (500)	20.87 (530)	24.02 (610)	26.38 (670)	30.12 (765)	31.89 (810)	36.22 (920)	42.52 (1080)	48.62 (1235)

For long travels with lowered mounting height

Long travel lengths from 32.8 ft. (10 m) to max. 984 ft. (300 m)



For center mount applications:
Chain length = $\frac{S}{2} + K_2$

Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.

Design, Chapter 1

R	2.95 (075)	3.94 (100)	4.53 (115)	4.92 (125)	5.91 (150)	6.69 (170)	7.87 (200)	8.46 (215)	9.84 (250)	11.81 (300)	13.78 (350)
H_2	-	-	-	7.32 (186)	7.32 (186)	7.32 (186)	7.32 (186)	7.32 (186)	7.32 (186)	7.32 (186)	7.32 (186)
$D_2 \pm 0$	-	-	-	18.70 (475)	22.44 (570)	24.41 (620)	30.71 (780)	34.06 (865)	40.55 (1030)	45.28 (1150)	59.06 (1500)
K_2	-	-	-	31.65 (804)	36.93 (938)	42.20 (1072)	52.76 (1340)	55.39 (1407)	65.94 (1675)	76.50 (1943)	94.96 (2412)



For support of the lower run, see Chapter 9 for the Support Tray tool kit

Technical Data



Details of material properties

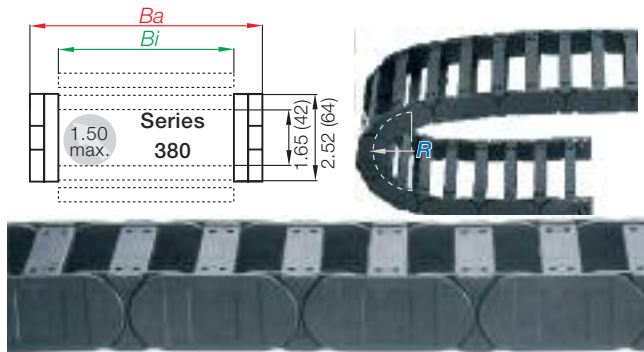
Chapter 1

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

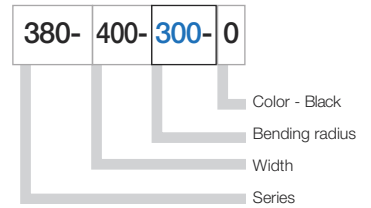


Series 380 - Energy Chain® with crossbars every link

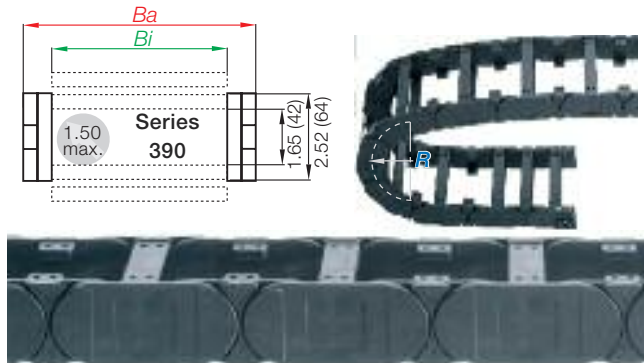


- Crossbars every link
- For use with rigid hydraulic hoses
- For particularly demanding applications
- Can be opened from both sides

Part Number Structure

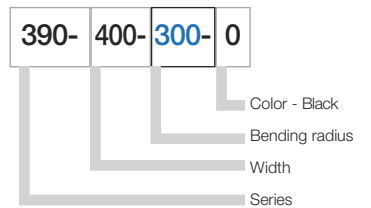


Series 390 - Energy Chain® with crossbars every other link

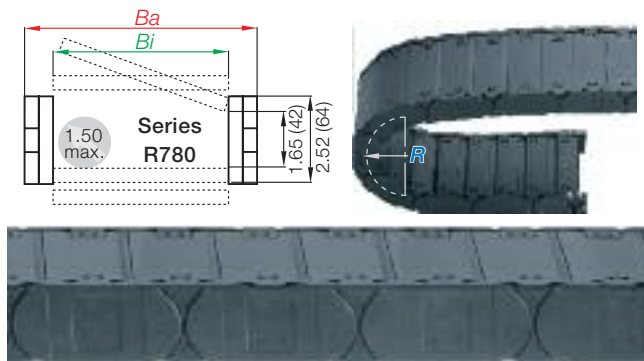


- Crossbars every other link
- Standard configuration
- For nearly every situation
- Can be opened from both sides
- Easy assembly
- Stable
- Cost-effective

Part Number Structure

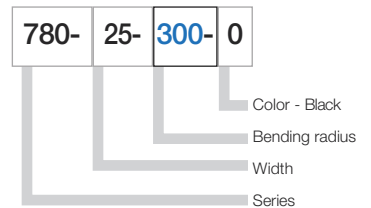


Series R780 - fully enclosed Energy Tube

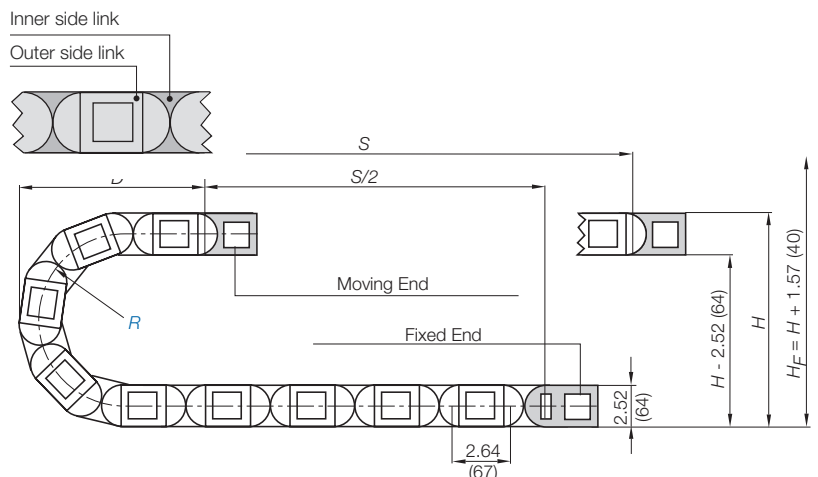
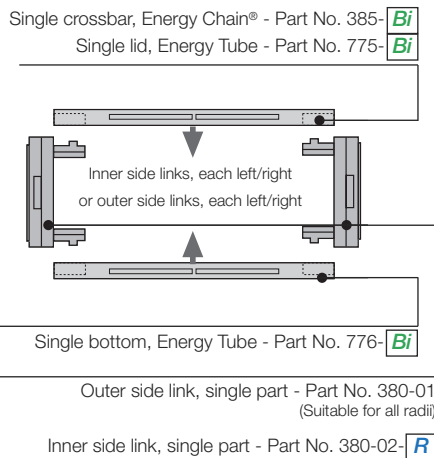


- Fully enclosed
- Excellent cable and hose protection against dirt
- Protection against hot chips up to 1652°F (900°C)
- Lids along inner radius are completely removable
- Lids along the outer radius are single-sided, snap open, hinged on one side as well as completely removable

Part Number Structure



Energy Chain® as separate parts, links and side plates



Energy Chain System® E4/100

Series 380/390/R780



380
390
R780

Supplement part number with required radius. Example: 380-30-300-0
Pitch: 2.64 in. (67mm) per link, links/ft(m) = 4.57 (15)

Part Number			Weight					
Crossbars	Crossbars	Tube	<i>Bi</i>	<i>Ba</i>	380	390	R780	
Every link	Every other	Version	in. (mm)	in. (mm)	lbs/ft (kg/m)	lbs/ft (kg/m)	lbs/ft (kg/m)	
380-05-	390-05-	*780-05-	<input type="text"/> -0	1.97 (50)	2.99 (76)	≈ 1.38 (2.06)	≈ 1.33 (1.98)	≈ 1.51 (2.25)
380-06-	390-06-		<input type="text"/> -0	2.68 (68)	3.70 (94)	≈ 1.40 (2.09)	≈ 1.34 (1.99)	–
380-07-	390-07-	780-07-	<input type="text"/> -0	2.95 (75)	3.98 (101)	≈ 1.42 (2.12)	≈ 1.35 (2.01)	≈ 1.60 (2.38)
380-087-	390-087-		<input type="text"/> -0	3.43 (87)	4.49 (114)	≈ 1.47 (2.18)	≈ 1.37 (2.04)	–
380-10-	390-10-	780-10-	<input type="text"/> -0	3.94 (100)	4.96 (126)	≈ 1.51 (2.25)	≈ 1.40 (2.08)	≈ 1.75 (2.60)
380-11-	390-11-	780-11-	<input type="text"/> -0	4.25 (108)	5.28 (134)	≈ 1.55 (2.30)	≈ 1.41 (2.10)	≈ 1.78 (2.65)
380-112-	390-112-		<input type="text"/> -0	4.41 (112)	5.47 (139)	≈ 1.55 (2.30)	≈ 1.41 (2.10)	–
380-12-	390-12-	780-12-	<input type="text"/> -0	4.92 (125)	5.94 (151)	≈ 1.61 (2.40)	≈ 1.44 (2.15)	≈ 1.89 (2.81)
380-137-	390-137-		<input type="text"/> -0	5.39 (137)	6.46 (164)	≈ 1.64 (2.44)	≈ 1.46 (2.17)	–
380-15-	390-15-	780-15-	<input type="text"/> -0	5.91 (150)	6.93 (176)	≈ 1.70 (2.53)	≈ 1.49 (2.21)	≈ 2.06 (3.07)
380-162-	390-162-		<input type="text"/> -0	6.38 (162)	7.44 (189)	≈ 1.71 (2.55)	≈ 1.49 (2.22)	–
380-17-	390-17-	780-17-	<input type="text"/> -0	6.61 (168)	7.64 (194)	≈ 1.76 (2.62)	≈ 1.52 (2.26)	≈ 2.18 (3.24)
380-18-	390-18-		<input type="text"/> -0	6.89 (175)	7.91 (201)	≈ 1.76 (2.62)	≈ 1.52 (2.26)	–
380-187-	390-187-		<input type="text"/> -0	7.36 (187)	8.43 (214)	≈ 1.81 (2.69)	≈ 1.55 (2.30)	–
380-20-	390-20-	780-20-	<input type="text"/> -0	7.87 (200)	8.90 (226)	≈ 1.86 (2.77)	≈ 1.57 (2.33)	≈ 2.37 (3.53)
380-212-	390-212-		<input type="text"/> -0	8.35 (212)	9.41 (239)	≈ 1.91 (2.84)	≈ 1.59 (2.37)	–
380-23-	390-23-		<input type="text"/> -0	8.86 (225)	9.88 (251)	≈ 1.96 (2.92)	≈ 1.62 (2.41)	–
380-237-	390-237-		<input type="text"/> -0	9.33 (237)	10.39 (264)	≈ 1.99 (2.96)	≈ 1.63 (2.43)	–
380-25-	390-25-	780-25-	<input type="text"/> -0	9.84 (250)	10.87 (276)	≈ 2.05 (3.05)	≈ 1.66 (2.47)	≈ 2.91 (4.33)
380-262-	390-262-		<input type="text"/> -0	10.31 (262)	11.38 (289)	≈ 2.06 (3.06)	≈ 1.67 (2.48)	–
380-28	390-28-		<input type="text"/> -0	10.83 (275)	11.85 (301)	≈ 2.13 (3.17)	≈ 1.70 (2.53)	–
380-29-	390-29-		<input type="text"/> -0	11.30 (287)	12.36 (314)	≈ 2.14 (3.19)	≈ 1.71 (2.54)	–
380-30-	390-30-	780-30-	<input type="text"/> -0	11.81 (300)	12.83 (326)	≈ 2.23 (3.32)	≈ 1.75 (2.61)	≈ 3.29 (4.89)
380-312-	390-312-		<input type="text"/> -0	12.28 (312)	13.35 (339)	≈ 2.24 (3.34)	≈ 1.76 (2.62)	–
380-325-	390-325-		<input type="text"/> -0	12.79 (325)	13.82 (351)	≈ 2.29 (3.41)	≈ 1.79 (2.66)	–
380-337-	390-337-		<input type="text"/> -0	13.27 (337)	14.33 (364)	≈ 2.33 (3.46)	≈ 1.80 (2.68)	–
380-350-	390-350-		<input type="text"/> -0	13.78 (350)	14.80 (376)	≈ 2.47 (3.68)	≈ 1.88 (2.79)	–
380-362-	390-362-		<input type="text"/> -0	14.25 (362)	15.31 (389)	≈ 2.51 (3.74)	≈ 1.90 (2.82)	–
380-375-	390-375-		<input type="text"/> -0	14.76 (375)	15.83 (402)	≈ 2.55 (3.79)	≈ 1.91 (2.84)	–
380-387-	390-387-		<input type="text"/> -0	15.24 (387)	16.30 (414)	≈ 2.59 (3.85)	≈ 1.93 (2.87)	–
380-400	390-400-		<input type="text"/> -0	15.75 (400)	16.77 (426)	≈ 2.62 (3.90)	≈ 1.95 (2.90)	–

Choose from the radii below for all of the above sizes

Radius (mm) Example: 380-30-150-0

	075**	100**	115**	125	150	170	200	215	250	300	350
R	2.95 (075)	3.94 (100)	4.53 (115)	4.92 (125)	5.91 (150)	6.69 (170)	7.87 (200)	8.46 (215)	9.84 (250)	11.81 (300)	13.78 (350)
H $\frac{1}{20}$	8.46 (215)	10.43 (265)	11.61 (295)	12.40 (315)	14.37 (365)	15.94 (405)	18.31 (465)	19.49 (495)	22.24 (565)	26.18 (665)	30.12 (765)
D	6.85 (174)	7.83 (199)	8.43 (214)	8.82 (224)	9.80 (249)	10.59 (269)	11.77 (299)	12.36 (314)	13.74 (349)	15.71 (399)	17.68 (449)
K	14.57 (370)	17.72 (450)	19.69 (500)	20.87 (530)	24.02 (610)	26.38 (670)	30.12 (765)	31.89 (810)	36.22 (920)	42.52 (1080)	48.62 (1235)

** This radius is not available for the R780 Series

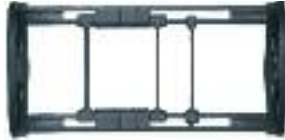
*Removable lid only, no hinged option

0=Standard color black. For other colors see Chapter 1

For wider chains see page 6.85. For large diameter hoses see page 6.85

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS

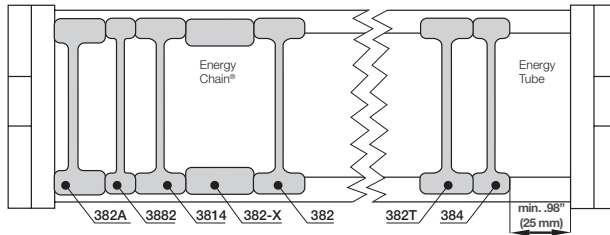




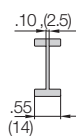
Option 1: Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.

NOTE: Observe a lateral spacing of at least .98 in. (25mm) for Energy Tubes



STANDARD
Vertical separator
380



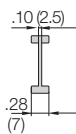
Separator (chain/tube)

Unassembled	Part No. 380
Assembled	Part No. 381

- **Standard separator 380 for Energy Chains® and Energy Tubes**
This separator offers safe stability due to its wide base design, also when used with thick cables or hoses.



Vertical separator
3881



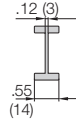
Separator (chain only)

Unassembled	Part No. 3881
Assembled	Part No. 3882

- **Vertical separator 3881 for Energy Chains®**
This separator features a narrow 7mm base for applications where a large number of small cables need to be individually separated.



Vertical separator
380T



Vertical Separator (tubes only)

Unassembled	Part No. 380T
Assembled	Part No. 381T

- **Locking separator 380T for Energy Tubes**
It clamps to the fixed radius and remains free along the other radius to facilitate lid removal. When installing please ensure they are identically aligned.



Vertical separator
383



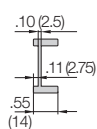
Separator (chain only)

Unassembled	Part No. 383
Assembled	Part No. 384

- **Vertical separator 383 for Energy Chains®**
This separator features an increased retention force for applications exposed to very high humidity or extreme loads. It features asymmetric claws for the crossbar which results in the increased retention force.



Asymmetric separator
381A



Asymmetric separator (chain only)

Unassembled	Part No. 381A
Assembled	Part No. 382A

- **Asymmetrical separator 381A for Energy Chains®**
This separator features an (14mm) base. It can be used in combinations between spacers of different widths and vertical separators in side mounted applications.



Spacers
381-XX



Spacer (chain only)

Unassembled	Part No. 381-XX
Assembled	Part No. 382-XX

XX = width of the spacer

• **NOTE ON SPACERS**

Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications. The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

Spacers available in the following sizes:

Part No. Unassembled	Part No. Assembled	in.	(mm)
381 -10	382 -10	.39"	(10)
381 -15	382 -15	.59"	(15)
381 -20	382 -20	.79"	(20)

Energy Chain System® E4/100

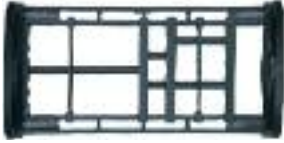
Series 380/390/R780

Interior Separation

energy chain® configurator ▶

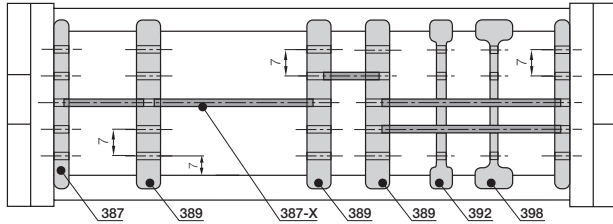


380
390
R780



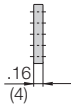
Option 2: Shelves

Energy Chains® and Energy Tubes can be subdivided both vertically and horizontally using the various interior separation elements. ▶ **Design, Chapter 1** for layout recommendations.



- **Side plates 386**

This component is used to form the basic pattern of a shelf system.



Side Plate

Unassembled	Part No. 386
Assembled	Part No. 387

Side plate
386



- **Vertical separator 388**

This component is used to form the basic pattern of a shelf system.



Vertical Separator

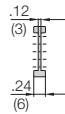
Unassembled	Part No. 388
Assembled	Part No. 389

Vertical separator
388



- **Closed Slotted separators 391**

These are used for complex subdivisions. However, they cannot be retrofitted into an existing interior separation system without removing the shelves first.



Slotted Separators

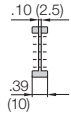
Unassembled	Part No. 391
Assembled	Part No. 392

Closed slotted separator
391



- **Open slotted separator 397**

This separator can be retrofitted into an existing interior separation system without removing the shelves, as long as these shelves fit into the middle 3 slots only.



Slotted Separators, Open

Unassembled	Part No. 397
Assembled	Part No. 398

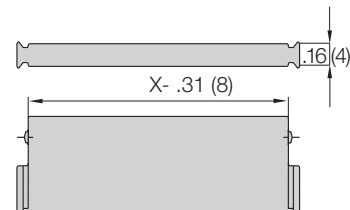
Open slotted separator
397



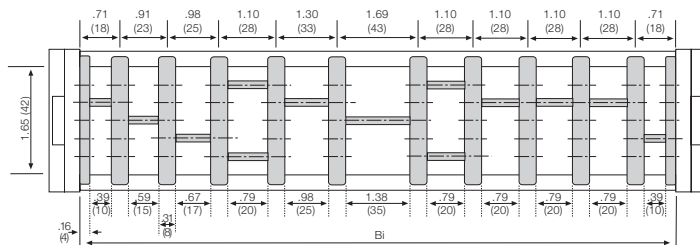
Width X in. (mm)	Usable Width in. (mm)	Part No.	
		Unassembled	Assembled
.71 (18)	.39 (10)	386-18	387-18
.91 (23)	.59 (15)	386-23	387-23
.98 (25)	.67 (17)	386-25	387-25
1.10 (28)	.79 (20)	386-28	387-28
1.30 (33)	.98 (25)	386-33	387-33
1.69 (43)	1.38 (35)	386-43	387-43
1.97 (50)	1.65 (42)	386-50	387-50
2.13 (54)	1.81 (46)	386-54	387-54
2.44 (62)	2.13 (54)	386-62	387-62
2.95 (75)	2.64 (67)	386-75	387-75
3.43 (87)	3.12 (87)	386-87	387-87
3.94 (100)	3.62 (92)	386-100	387-100
4.25 (108)	3.94 (100)	386-108	387-108
4.92 (125)	4.61 (117)	386-125	387-125
5.91 (150)	5.59 (142)	386-150	387-150
6.89 (175)	6.57 (167)	386-175	387-175
7.87 (200)	7.56 (192)	386-200	387-200
8.19 (208)	7.87 (200)	386-208	387-208

Shelves 386-XX

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 5 different heights in .28" (7mm) increments



The diagram below is for reference purposes only. Multiple configurations are possible. To create your e-chain shelving cross section please see our online e-chain configurator. Call 1-800-521-2747 for assistance and/or go to igus.com click on the **Products** drop down menu, choose **Energy Chain Cable Carriers** and on the next drop down menu simply click on **e-chain Configurator**.



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



igus® Energy Chain System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

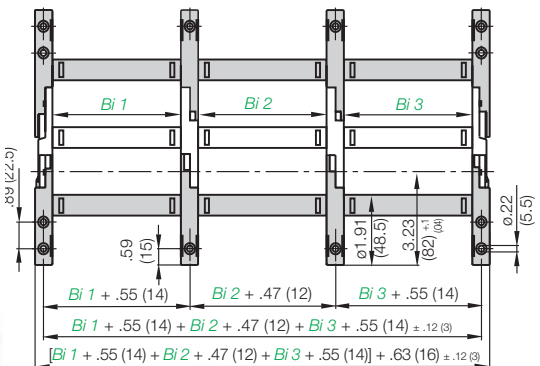


Part number example for Energy Chain®
380-10/20/10-200-0
380-Bi1/Bi2/Bi3-R-0

We **strongly recommend** on-site consultation with an igus® technician for individual advice regarding mounting brackets, guide troughs and other design details.

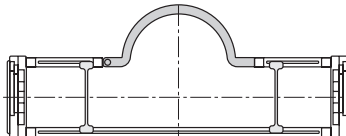
Extension links - for extremely wide Energy Chains® up to 9.84 ft (3m)

- For applications in which particularly high fill weights necessitate extremely wide Energy Chains®
- The extension link design allows virtually limitless side-by-side attachment of chains
- The unsupported length of a chain can be increased when additional loads are required
- Extension links can be used with Energy Chains®, Energy Tubes or a combination of both
- They are suitable for unsupported and gliding applications in a guide trough
- Energy Chains® with extension links are attached with KMA or steel mounting brackets.

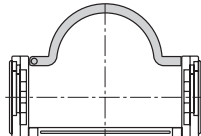


Extender crossbars - For careful guiding of large diameter cables and hoses

- Intended for cables and hoses with a maximum outer diameter of 4.53 in. (115 mm).
- Gliding operation with crossbars assembled along the outer radius in conjunction with a special guide trough
- Gliding operation not guaranteed with crossbars assembled along the inner radius
- The extender crossbar can either be attached to the side links directly or can be used in combination with two standard snap-open crossbars.



Round extender crossbar combined with standard snap-open crossbars.



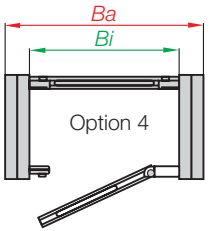
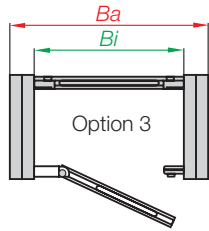
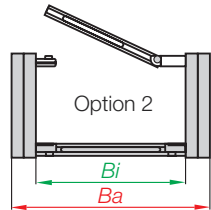
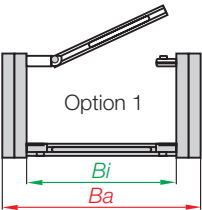
Attached directly to the side link.

Consult igus® for your extender crossbar applications. We will be happy to assist you with your design layout.

Part No.	Max Ø Hose in. (mm)	Style	Installation Side Link	Combined with Snap-Open Crossbars
385-15-RHD115	4.53 (115)	Round	No	Yes
385-18-RD115	4.53 (115)	Round	Yes	No

Hinged crossbars

- Typically, Energy Chain® crossbars are completely removable. In cases where it is preferable that the opening crossbars remain on the Energy Chain®, a hinged design has been developed.
- Please consult igus® for design assistance



Energy Chain System® E4/100

Series 380/390/R780

Mounting Brackets - KMA

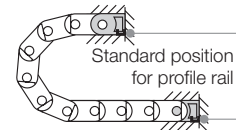
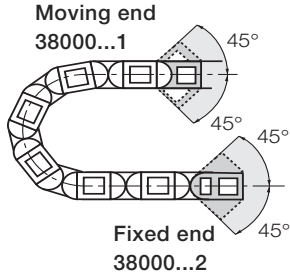
energy chain® configurator ▶



380
390
R780

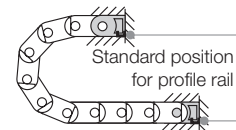
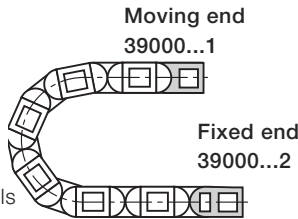
Option 1: KMA pivoting

- Profile rail option
- Universal use
- Corrosion resistant
- Short and long travels
- Space-restricted conditions

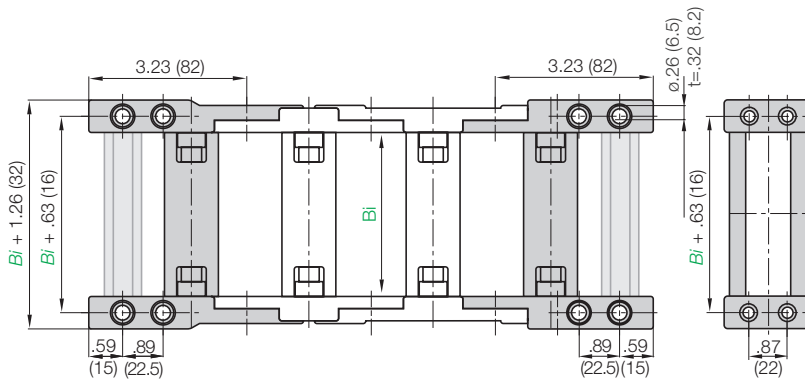
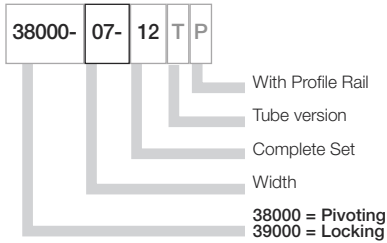


Option 2: KMA locking

- Profile rail option
- Universal use
- Corrosion resistant
- Vertical hanging/standing travels
- Extreme accelerations



Part Number Structure



Due to the design of the E4/100 series chains, please note the following when ordering brackets:

Even number of links = full set, part number ending in -12
 Odd number of links = 2 pieces, part number ending in -2

Part number examples are shown for pivoting brackets. For locking brackets change part number to 39000

Width	Part No. Full Set (pivoting)		Tube Option	With Profile Rail	Bi in. (mm)	Part No. Full Set (pivoting)		Tube Option	With Profile Rail	Bi in. (mm)			
	Pivoting	Locking				Pivoting	Locking						
-05*	38000	39000	-05-12	T	P	1.97 (50)	-23	38000	39000	-23-12	P	8.86 (225)	
-06	38000	39000	-06-12		P	2.68 (68)	-237	38000	39000	-237-12	P	9.33 (237)	
-07	38000	39000	-07-12	T	P	2.95 (75)	-25	38000	39000	-25-12	T	P	9.84 (250)
-087	38000	39000	-087-12		P	3.43 (87)	-262	38000	39000	-262-12	P	10.31 (262)	
-10	38000	39000	-10-12	T	P	3.94 (100)	-28	38000	39000	-28-12	P	10.83 (275)	
-11	38000	39000	-11-12	T	P	4.25 (108)	-29	38000	39000	-29-12	P	11.30 (287)	
-112	38000	39000	-112-12		P	4.41 (112)	-30	38000	39000	-30-12	T	P	11.81 (300)
-12	38000	39000	-12-12	T	P	4.92 (125)	-312	38000	39000	-312-12	P	12.28 (312)	
-137	38000	39000	-137-12		P	5.39 (137)	-325	38000	39000	-325-12	P	12.79 (325)	
-15	38000	39000	-15-12	T	P	5.91 (150)	-337	38000	39000	-337-12	P	13.27 (337)	
-162	38000	39000	-162-12		P	6.38 (162)	-350	38000	39000	-350-12	P	13.78 (350)	
-17	38000	39000	-17-12	T	P	6.61 (168)	-362	38000	39000	-362-12	P	14.25 (362)	
-18	38000	39000	-18-12		P	6.89 (175)	-375	38000	39000	-375-12	P	14.76 (375)	
-187	38000	39000	-187-12		P	7.36 (187)	-387	38000	39000	-387-12	P	15.24 (387)	
-20	38000	39000	-20-12	T	P	7.87 (200)	-400	38000	39000	-400-12	P	15.75 (400)	
-212	38000	39000	-212-12		P	8.35 (212)							

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Chainfix clamps for the profile rail



igus® Chainfix strain relief elements are available in either steel or stainless steel. They can be adjusted with a hexagon socket and are available in single, double and triple configurations.

Part No. Single Clamp		Part No. Double Clamp		Part No. Triple Clamp		Cable ø	
Steel	Stainless	Steel	Stainless	Steel	Stainless	in.	(mm)
CFX12-1	CFX12-1E	CFX12-2	CFX12-2E	CFX12-3	-	.24 - .47	(06 - 12)
CFX14-1	CFX14-1E	CFX14-2	CFX14-2E	CFX14-3	-	.47 - .55	(12 - 14)
CFX16-1	CFX16-1E	CFX16-2	CFX16-2E	CFX16-3	-	.55 - .63	(14 - 16)
CFX18-1	CFX18-1E	CFX18-2	CFX18-2E	CFX18-3	-	.63 - .71	(16 - 18)
CFX20-1	CFX20-1E	CFX20-2	CFX20-2E	CFX20-3	-	.71 - .79	(18 - 20)
CFX22-1	CFX22-1E	CFX22-2	CFX22-2E	CFX22-3	-	.79 - .87	(20 - 22)
CFX26-1	CFX26-1E	CFX26-2	CFX26-2E	-	-	.87 - 1.02	(22 - 26)
CFX30-1	CFX30-1E	CFX30-2	CFX30-2E	-	-	1.02 - 1.18	(26 - 30)
CFX34-1	CFX34-1E	CFX34-2	CFX34-2E	-	-	1.18 - 1.34	(30 - 34)
CFX38-1	CFX38-1E	-	-	-	-	1.34 - 1.50	(34 - 38)
CFX42-1	CFX42-1E	-	-	-	-	1.50 - 1.65	(38 - 42)

For more information please refer to strain relief section of Chapter 10

Chainfix Clip



Modular snap-on strain relief device

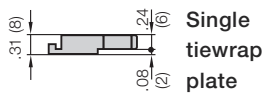
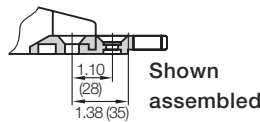
Chainfix clip is available for cable diameters ranging from .16" (4mm) to .94" (24 mm). It is suitable for assembly on KMA mounting brackets, clip-on strain relief for crossbars as well as profile rails. Quick assembly without the use of tools. **For more information please refer to strain relief section of Chapter 10**

Cable ø	Part No. Clamp	Part No. Bottom
.16-.31 (04-08)	CFC-08-M	CFC-08-C
.31-.47 (08-12)	CFC-12-M	CFC-12-C
.47-.63 (12-16)	CFC-16-M	CFC-16-C
.63-.79 (16-20)	CFC-20-M	CFC-20-C
.79-.94 (20-24)	CFC-24-M	CFC-24-C

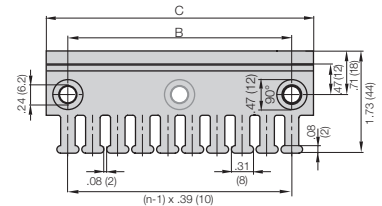
Tiewrap Plates

Option 1: Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.



Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



If used with KMA brackets with profile rail please add "KMA" to the end of the part number.

Example: 3050-ZBKMA

For more information please refer to strain relief section of Chapter 10



Option 2: Clip-on Tiewrap plates

Available as a clip-on tiewrap plate without the use of bolts They are inserted and removed with a screwdriver used as a lever. Clip-on tiewrap plates are also available as an attachment to the opening crossbars.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
3050-ZC	5	1.97 (50)
3075-ZC	7	2.95 (75)

For more information please refer to strain relief section of Chapter 10



Option 3: Clip-on Tiewrap plates for opening crossbars

Clip-on tiewrap plates are also available as an attachment to opening crossbars. They can be positioned at any point along the Energy Chain®.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
3850-ZS	5	1.89 (48)

For more information please refer to strain relief section of Chapter 10

Energy Chain System® E4/100

Series 380/390/R780

Guide Trough

energy chain® configurator ▶

igus®

380
390
R780

Width of Crossbar
380-05-200-0

	B_{Ri}	Installation Part No.
-05	3.19 (81)	93-50-200
-06	3.90 (99)	93-50-225
-07	4.17 (106)	93-50-225
-087	4.69 (119)	93-50-250
-10	5.16 (131)	93-50-250
-11	5.47 (139)	93-50-250
-112	5.67 (144)	93-50-275
-12	6.14 (156)	93-50-275
-137	6.65 (169)	93-50-300
-15	7.12 (181)	93-50-300
-162	7.64 (194)	93-50-325
-17	7.83 (199)	93-50-325
-18	8.11 (206)	93-50-325
-187	8.62 (219)	93-50-350
-20	9.09 (231)	93-50-350
-212	9.61 (244)	93-50-375
-23	10.08 (256)	93-50-375
-237	10.59 (269)	93-50-400
-25	11.06 (281)	93-50-400
-262	11.57 (294)	93-50-425
-28	12.05 (306)	93-50-425
-29	12.56 (319)	93-50-450
-30	13.03 (331)	93-50-450
-312	13.54 (344)	93-50-475
-325	14.01 (356)	93-50-475
-337	14.52 (369)	93-50-500
-350	15.00 (381)	93-50-500
-362	15.51 (394)	93-50-525
-375	16.02 (407)	93-50-525
-387	16.50 (419)	93-50-550
-400	16.97 (431)	93-50-550

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part No. 93-30
- 1/2 travel length of glide bars
Part No. 93-30
- Installation sets as end connectors
Part No. 93-50-XX

-XX indicates the length of the profile rail on which the guide trough is mounted. The values and part numbers are specified in the table below. The standard length of the trough components and glide bars is 6.56 ft (2 m). The required overall length of the guide trough directly correlates to the length of travel

Example:

Length of travel 164 ft (50 m)
Center mounted

Required guide troughs:

164 ft (50 m) guide trough,
82 ft (25 m) glide bar
= 25 sections of 6.56 ft (2 m) guide trough

Part No. 93-30

= 13 sections of 6.56 ft (2 m) glide bar

Part No. 93-01

Required number of installation sets:

= Number of guide trough components + 1
= 25 + 1 = 26

Part No. of the installation sets **93-50-XXX**

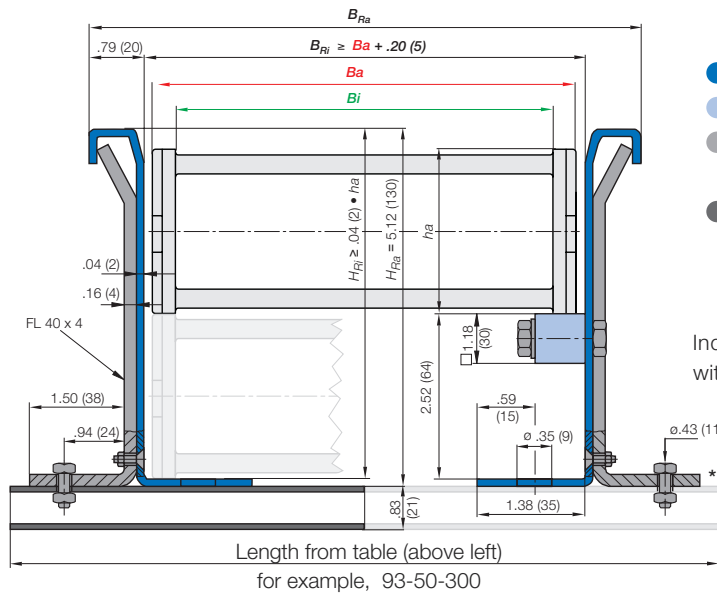
Example: 93-50-400 for 15.75 (400 mm) long profile rail



Left: Guide trough with glide bars
Right: Guide troughs without glide bars



Installation sets as section connectors



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

* Specialized guide trough available upon request

Standard length profile rail

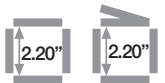
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



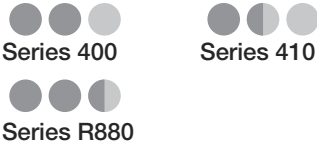
400
410
R880



Energy Chain System® E4/100 Series 400/410/R880



Price Index



Special Features / Options

- Low noise version E4/101 Series 401 available with special rubber pads
- Cleanroom test upon request
- ESD classification: Electrically conductive ESD/ATEX version upon request

Assembly Tips



Opening Energy Chains®: Remove crossbars and clips - Insert screwdriver into the slot, push down, release by lever action



Remove lids/bottoms (Energy Tubes) - Insert screwdriver into the slot, release by lever action

Other Installation Methods

- Vertical, hanging ≤ 328 ft (100 m)
- Vertical, standing ≤ 19.69 ft (6 m)
- Side-mounted, un supp. ≤ 8.20 ft (2.5 m)
- Rotary requires further calculation

Usage Guidelines

- When quiet operation is required
- When very high speeds and/or accelerations are required
- For long travels
- For high fill weights

- When side-mounting with a long unsupported length is required
 - Series 4040/4041/R8840
- When a simpler, low-cost solution is required
 - Series 14040/R18840
- If an extreme vibration-free solution is required
 - Series 14040/R18840

Features & Benefits

- 1 KMA mounting brackets with attachment points on all sides
- 2 Crossbars on Energy Chains® are removable along both radii
- 3 Stop dog with brake for noise reduction
- 4 Hinged snap-open removable lids along the outer radius
- 5 Optimized glide pads with lateral wear allowance
- 6 Integrated strain relief possible
- 7 Locking or pivoting mounting brackets available
- 8 Dirt-repellent exterior
- 9 Closed and open styles can be combined
- 10 Wide, rounded crossbars
- 11 Numerous interior separation possibilities
- 12 Energy Chains® also available with reverse bending radius "RBR"



Also available as E4/00-NC without camber: 400-NCST



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

9.84 ft (3 m) 400-30-300-0

With 2 separators 411 assembled every 2nd link

1 Set 40000-30-12P

energy chain® configurator

- Energy Chain®
- Interior separation
- Mounting bracket

Energy Chain System® E4/100

Series 400/410/R880

Installation Dimensions

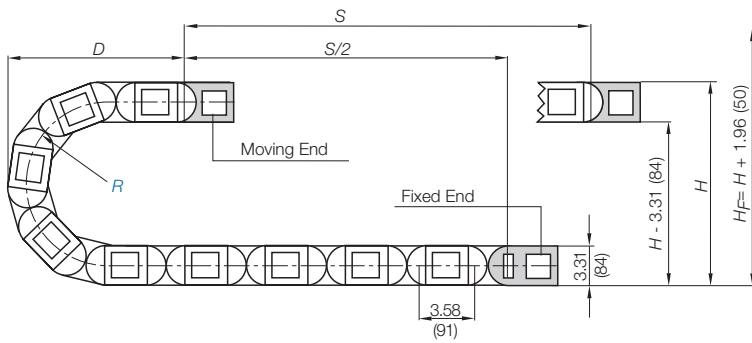
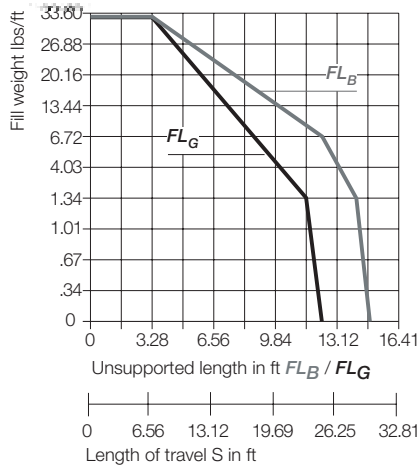
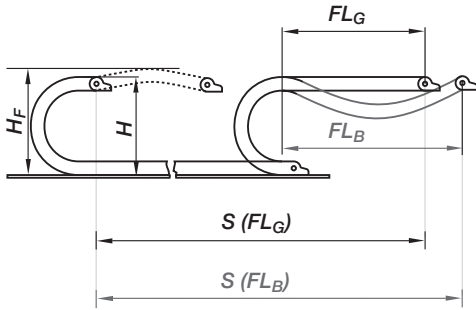
energy chain® configurator



400
410
R880

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1



Pitch per link = 3.58" (91 mm)
Links per ft (m) = 3.35 (11)
For center mount applications:
Chain length = $S/2 + K$

The required clearance height: $H_F = H + 1.96$ in. (50 mm) (with 2.02 lbs/ft (3 kg/m) fill weight. Please consult igus® if space is particularly restricted.

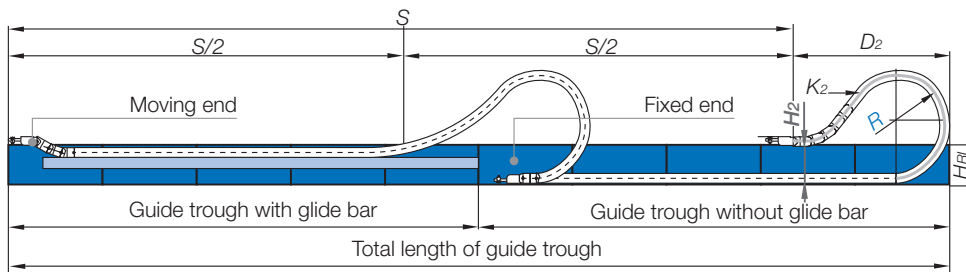
R	5.31 (135)	5.91 (150)	6.89 (175)	7.87 (200)	9.45 (240)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	19.68 (500)
H_F^{*25}	14.17 (360)	15.16 (385)	17.13 (435)	19.09 (485)	22.24 (565)	23.03 (585)	26.97 (685)	30.91 (785)	34.84 (885)	42.72 (1085)
D	10.63 (270)	11.22 (285)	12.20 (310)	13.19 (335)	14.76 (375)	15.16 (385)	17.13 (435)	19.09 (485)	21.06 (535)	25.00 (635)
K	25.59 (650)	29.53 (750)	32.48 (825)	35.43 (900)	40.16 (1020)	41.34 (1050)	48.23 (1225)	52.76 (1340)	57.09 (1450)	69.88 (1775)

For long travels with lowered mounting height

Long travel lengths from 32.8 ft.(10m) to max. 1,312.4 ft. (400m)

For center mount applications:

Chain length = $S/2 + K_2$



R	5.31 (135)	5.91 (150)	6.89 (175)	7.87 (200)	9.45 (240)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	19.68 (500)
H_2	-	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)
D_2	-	18.90 (480)	23.62 (600)	28.74 (730)	36.22 (920)	37.40 (950)	46.46 (1180)	56.69 (1440)	60.24 (1530)	74.80 (1900)
K_2	-	32.24 (819)	42.99 (1092)	50.16 (1274)	60.91 (1547)	60.91 (1547)	78.82 (2002)	89.57 (2275)	100.31 (2548)	128.98 (3276)



For support of the lower run, see Chapter 9 for the Support Tray tool kit

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to Installation dimensions for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - H_F = Required clearance height
 - H_{R1} = Trough inner height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{safety buffer}$
 - D_2 = Overlength - long travels, gliding
 - $K_2 = *$ Add-on
 - $H_2 = *$ Mounting height
- *If the mounting bracket location is set lower



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.

Design, Chapter 1

Technical Data



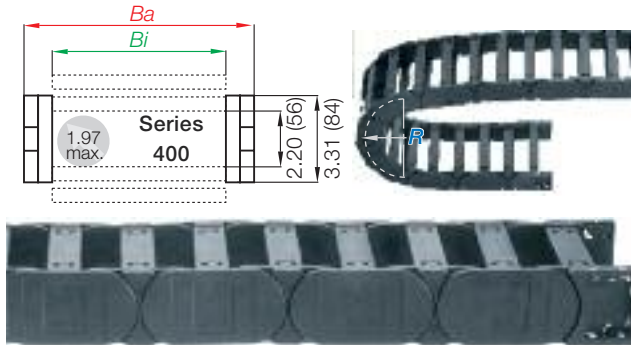
Details of material properties

Design, Chapter 1



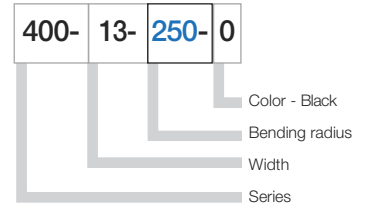
6.160

Series 400 - Energy Chain® with crossbars every link

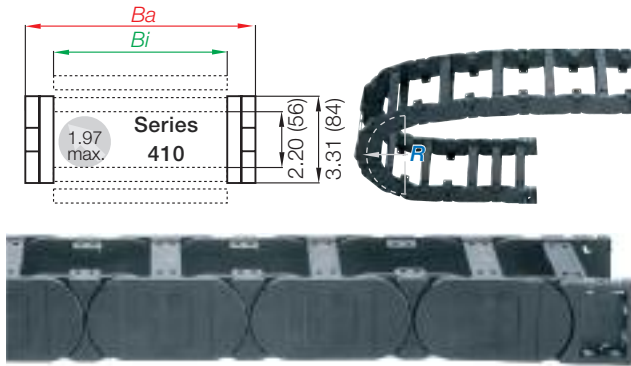


- Crossbars every link
- For use with rigid hydraulic hoses
- For particularly demanding applications
- Can be opened from both sides

Part Number Structure

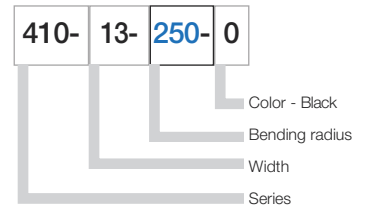


Series 410 - Energy Chain® with crossbars every other link

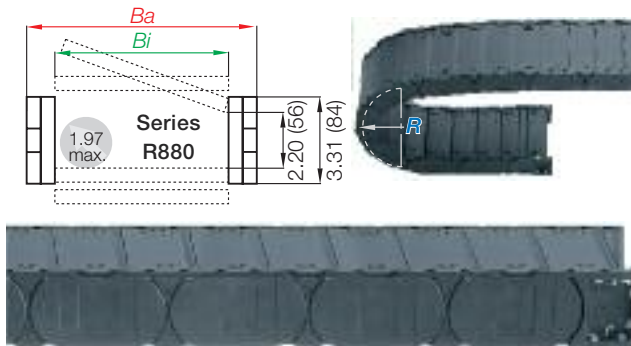


- Crossbars every other link
- Standard configuration
- For nearly every situation
- Can be opened from both sides
- Easy assembly
- Stable
- Cost-effective

Part Number Structure

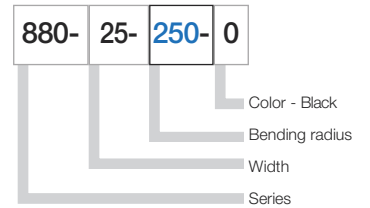


Series R880 - fully enclosed Energy Tube

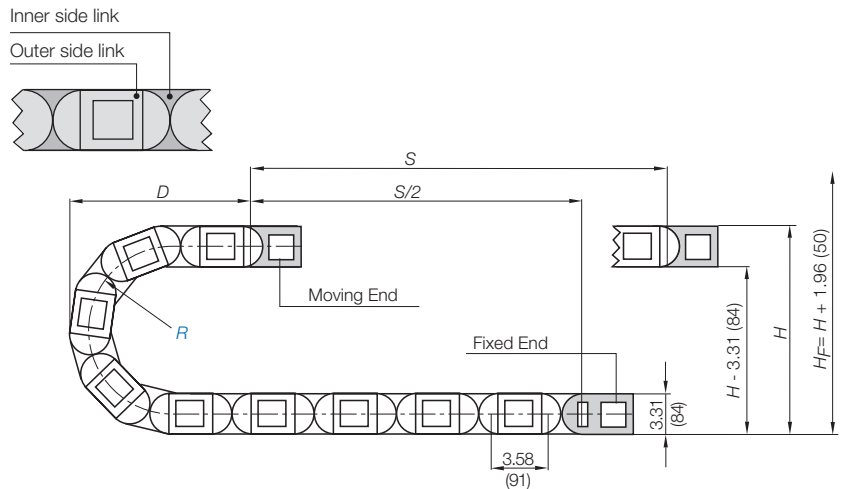
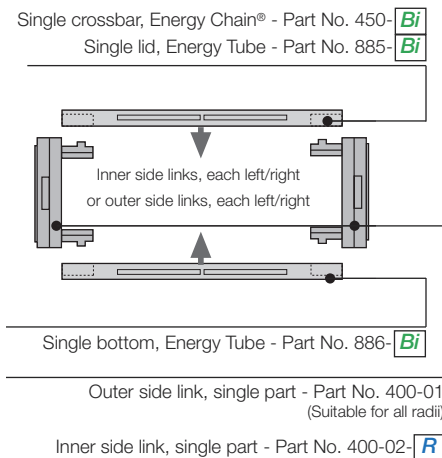


- Fully enclosed
- Excellent cable and hose protection against dirt
- Protection against hot chips up to 1,562°F (850°C)
- Lids along inner radius are completely removable
- Lids along the outer radius are single-sided, snap open, hinged on one side as well as completely removable

Part Number Structure



Energy Chain® as separate parts, links and side plates



Energy Chain System® E4/100

Series 400/410/R880

energy chain® configurator 



400
410
R880

Supplement part number with required radius. Example: 400-30-300-0

Pitch: 3.58 in. (91mm) per link links/ft(m) = 3.35 (11)

Part Number.				<i>Bi</i>	<i>Ba</i>	400	410	R880	
Crossbars	Crossbars	Tube		in. (mm)	in. (mm)	lbs/ft (kg/m)	lbs/ft (kg/m)	lbs/ft (kg/m)	
Every link	Every other	Version							
400-05-	410-05-	<input type="checkbox"/>	-0	1.97 (50)	3.31 (84)	≈ 2.31 (3.44)	≈ 2.10 (3.12)	-	
400-06-	410-06-	<input type="checkbox"/>	-0	2.56 (65)	3.90 (99)	≈ 2.35 (3.50)	≈ 2.15 (3.20)	-	
400-07-	410-07-	880-07-	<input type="checkbox"/> -0*	2.95 (75)	4.29 (109)	≈ 2.37 (3.53)	≈ 2.31 (3.44)	≈ 2.67 (3.98)	
400-10-	410-10-	880-10-	<input type="checkbox"/>	-0	3.94 (100)	5.28 (134)	≈ 2.49 (3.71)	≈ 2.37 (3.53)	≈ 2.87 (4.27)
400-11-	410-11-	-	<input type="checkbox"/>	-0	4.41 (112)	5.79 (147)	≈ 2.58 (3.84)	≈ 2.42 (3.60)	-
400-12-	410-12-	880-12-	<input type="checkbox"/>	-0	4.92 (125)	6.26 (159)	≈ 2.63 (3.91)	≈ 2.44 (3.63)	≈ 3.11 (4.63)
400-13-	410-13-		<input type="checkbox"/>	-0	5.39 (137)	6.77 (172)	≈ 2.72 (4.04)	≈ 2.49 (3.70)	-
400-15-	410-15-	880-15-	<input type="checkbox"/>	-0	5.91 (150)	7.24 (184)	≈ 2.76 (4.10)	≈ 2.51 (3.73)	≈ 3.40 (5.06)
400-16-	410-16-		<input type="checkbox"/>	-0	6.38 (162)	7.76 (197)	≈ 2.83 (4.21)	≈ 2.54 (3.78)	-
400-17-	410-17-		<input type="checkbox"/>	-0	6.89 (175)	8.23 (209)	≈ 2.90 (4.32)	≈ 2.58 (3.84)	-
400-18-	410-18-		<input type="checkbox"/>	-0	7.36 (187)	8.74 (222)	≈ 2.98 (4.43)	≈ 2.61 (3.89)	-
400-20-	410-20-	880-20-	<input type="checkbox"/>	-0	7.87 (200)	9.21 (234)	≈ 3.00 (4.46)	≈ 2.63 (3.91)	≈ 3.78 (5.63)
400-21-	410-21-		<input type="checkbox"/>	-0	8.35 (212)	9.72 (247)	≈ 3.07 (4.57)	≈ 2.66 (3.96)	-
400-22-	410-22-		<input type="checkbox"/>	-0	8.86 (225)	10.20 (259)	≈ 3.11 (4.63)	≈ 2.68 (3.99)	-
400-23-	410-23-		<input type="checkbox"/>	-0	9.33 (237)	10.71 (272)	≈ 3.20 (4.76)	≈ 2.73 (4.06)	-
400-25-	410-25-	880-25-	<input type="checkbox"/>	-0	9.84 (250)	11.18 (284)	≈ 3.26 (4.85)	≈ 2.76 (4.10)	≈ 4.27 (6.36)
400-26-	410-26-		<input type="checkbox"/>	-0	10.31 (262)	11.69 (297)	≈ 3.32 (4.94)	≈ 2.79 (4.15)	-
400-27-	410-27-	880-27-	<input type="checkbox"/>	-0	10.83 (275)	12.17 (309)	≈ 3.39 (5.05)	≈ 2.82 (4.20)	≈ 4.52 (6.72)
400-28-	410-28-		<input type="checkbox"/>	-0	11.30 (287)	12.68 (322)	≈ 3.41 (5.07)	≈ 2.83 (4.21)	-
400-30-	410-30-	880-30-	<input type="checkbox"/>	-0	11.81 (300)	13.15 (334)	≈ 3.56 (5.29)	≈ 2.90 (4.32)	≈ 4.72 (7.02)
400-31-	410-31-		<input type="checkbox"/>	-0	12.28 (312)	13.66 (347)	≈ 3.56 (5.29)	≈ 2.90 (4.32)	-
400-32-	410-32-		<input type="checkbox"/>	-0	12.79 (325)	14.13 (359)	≈ 3.62 (5.38)	≈ 2.94 (4.37)	-
400-33-	410-33-		<input type="checkbox"/>	-0	13.27 (337)	14.65 (372)	≈ 3.74 (5.56)	≈ 3.00 (4.46)	-
400-35-	410-35-	880-35-	<input type="checkbox"/>	-0	13.78 (350)	15.12 (384)	≈ 3.84 (5.71)	≈ 3.04 (4.53)	≈ 5.19 (7.72)
400-36-	410-36-		<input type="checkbox"/>	-0	14.25 (362)	15.63 (397)	≈ 3.84 (5.71)	≈ 3.04 (4.53)	-
400-37-	410-37-		<input type="checkbox"/>	-0	14.76 (375)	16.10 (409)	≈ 3.85 (5.73)	≈ 3.05 (4.54)	-
400-38-	410-38-		<input type="checkbox"/>	-0	15.24 (387)	16.61 (422)	≈ 3.91 (5.82)	≈ 3.08 (4.59)	-
400-40-	410-40-	880-40-	<input type="checkbox"/>	-0	15.75 (400)	17.09 (434)	≈ 4.05 (6.02)	≈ 3.15 (4.69)	≈ 5.86 (8.72)
400-41-	410-41-		<input type="checkbox"/>	-0	16.22 (412)	17.60 (447)	≈ 4.15 (6.17)	≈ 3.20 (4.76)	-
400-42-	410-42-		<input type="checkbox"/>	-0	16.73 (425)	18.07 (459)	≈ 4.25 (6.33)	≈ 3.25 (4.84)	-
400-43-	410-43-		<input type="checkbox"/>	-0	17.20 (437)	18.58 (472)	≈ 4.29 (6.39)	≈ 3.27 (4.87)	-
400-45-	410-45-		<input type="checkbox"/>	-0	17.72 (450)	19.06 (484)	≈ 4.34 (6.46)	≈ 3.30 (4.91)	-
400-46-	410-46-	880-46-	<input type="checkbox"/>	-0	18.19 (462)	19.57 (497)	≈ 4.35 (6.48)	≈ 3.31 (4.92)	≈ 6.18 (9.19)
400-47-	410-47-		<input type="checkbox"/>	-0	18.70 (475)	20.04 (509)	≈ 4.44 (6.61)	≈ 3.35 (4.98)	-
400-48-	410-48-		<input type="checkbox"/>	-0	19.17 (487)	20.55 (522)	≈ 4.47 (6.65)	≈ 3.37 (5.01)	-
400-50-	410-50-		<input type="checkbox"/>	-0	19.69 (500)	21.02 (534)	≈ 4.53 (6.74)	≈ 3.39 (5.05)	-
400-51-	410-51-		<input type="checkbox"/>	-0	20.16 (512)	21.54 (547)	≈ 4.55 (6.77)	≈ 3.40 (5.06)	-
400-52-	410-52-		<input type="checkbox"/>	-0	20.67 (525)	22.01 (559)	≈ 4.58 (6.81)	≈ 3.41 (5.08)	-
400-53-	410-53-		<input type="checkbox"/>	-0	21.14 (537)	22.52 (572)	≈ 4.68 (6.96)	≈ 3.47 (5.16)	-
400-55-	410-55-		<input type="checkbox"/>	-0	21.65 (550)	22.99 (584)	≈ 5.01 (7.45)	≈ 3.63 (5.40)	-
400-60-	410-60-		<input type="checkbox"/>	-0	23.62 (600)	24.96 (634)	≈ 5.14 (7.65)	≈ 3.70 (5.50)	-

Choose from the radii below for all of the above sizes

Radius (mm) Example: 400-30-300-0

	135**	150	175	200	240	250	300	350	400	500
R	5.31 (135)	5.91 (150)	6.89 (175)	7.87 (200)	9.45 (240)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	19.69 (500)
H ^{*,25}	14.17 (360)	15.16 (385)	17.13 (435)	19.09 (485)	22.24 (565)	23.03 (585)	26.97 (685)	30.91 (785)	34.84 (885)	42.72 (1085)
D	10.63 (270)	11.22 (285)	12.20 (310)	13.19 (335)	14.76 (375)	15.16 (385)	17.13 (435)	19.09 (485)	21.06 (535)	25.00 (635)
K	25.59 (650)	29.53 (750)	32.48 (825)	35.43 (900)	40.16 (1020)	41.34 (1050)	48.23 (1225)	52.76 (1340)	57.09 (1450)	69.88 (1775)

** This radius is not available for the R880 Series

*Removable lid only, no hinged option

0=Standard color black. For other colors see Chapter 1

For wider chains see page 6.95. For large diameter hoses see page 6.95

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

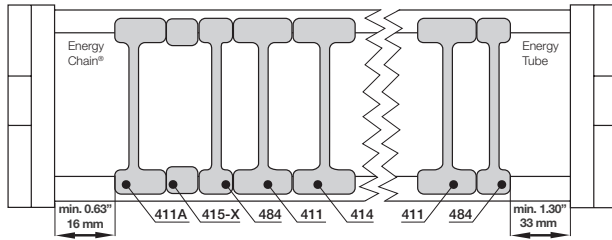




Option 1: Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.

NOTE: Observe a lateral spacing of at least 1.26 in. (32mm) for Energy Tubes and .63 in. (16mm) for Energy Chain®. There is no minimum spacing needed for side plates

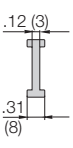


STANDARD
Vertical separator
401



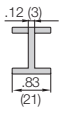
Vertical separator
Unassembled **Part No. 401**
Assembled **Part No. 411**

Vertical separator
483



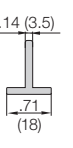
Vertical separator
Unassembled **Part No. 483**
Assembled **Part No. 484**

Locking separator
404



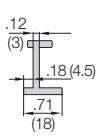
Locking separator (chain only)
Unassembled **Part No. 404**
Assembled **Part No. 414**

Locking separator
406



Locking separator (tube only)
Unassembled **Part No. 406**
Assembled **Part No. 416**

Asymmetric separator
401A



Asymmetrical separator (chain only)
Unassembled **Part No. 401A**
Assembled **Part No. 411A**

Spacers
405-XX



Spacer (chain only)
Unassembled **Part No. 405-XX**
Assembled **Part No. 415-XX**
XX = width of the spacer

- **Standard separator 401 for Energy Chains® and Energy Tubes**
This separator offers safe stability due to its wide base design, also when used with thick cables or hoses.
- **Vertical separator 483 for Energy Chains® and Energy Tubes**
This separator offers a narrow base for applications where a large number of small cables need to be individually separated.
- **Locking separator 404 for Energy Chains®**
This separator features increased retention force for applications exposed to very high humidity and extreme loads. The extra retention force is achieved by asymmetric claws for the crossbar. Take care to ensure proper alignment.
- **Locking separator 406 for Energy Tubes**
It features a single sided, secure fit, and can be placed on the lid or the bottom of the Energy Tube. The single side locking design helps to eliminate difficulties in assembling the opposite cover or crossbar
- **Asymmetrical separator 401A for Energy Chains®**
This separator features an .71" (18mm) base. It can be used in combinations between spacers of different widths and vertical separators in side mounted applications.
- **NOTE ON SPACERS**
Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications. The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

Spacers available in the following sizes:

Part No.	Part No.	in.	(mm)
Unassembled	Assembled		
405 -10	415 -10	.39"	(10)
405 -15	415 -15	.59"	(15)
405 -20	415 -20	.79"	(20)
405 -30	415 -30	1.18"	(30)
405 -40	415 -40	1.57"	(40)

Energy Chain System® E4/100

Series 400/410/R880

Interior Separation

energy chain® configurator ▶



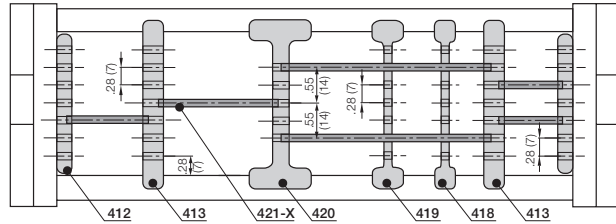
400
410
R880



Option 2: Shelves

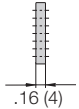
Energy Chains® and Energy Tubes can be subdivided both vertically and horizontally using the various interior separation elements.

► **Design, Chapter 1** for layout recommendations.



- **Side plates 402**

This component is used to form the basic pattern of a shelf system.



Side plate

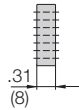
Unassembled	Part No. 402
Assembled	Part No. 412

Side plate 402



- **Vertical separator 403**

This component is used to form the basic pattern of a shelf system.



Vertical separator

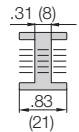
Unassembled	Part No. 403
Assembled	Part No. 413

Vertical separator 403



- **Locking vertical separator 410**

This separator is slotted and able to be combined with shelves



Locking vertical separator

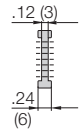
Unassembled	Part No. 410
Assembled	Part No. 420

Locking vertical separator 410



- **Slotted separators, closed 408**

These are used for very complex subdivisions. However, they cannot be retrofitted into an existing separation system without removing the shelves first.



Slotted separators, closed

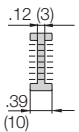
Unassembled	Part No. 408
Assembled	Part No. 418

Closed slotted separator 408



- **Slotted separator 409**

This separator can be retrofitted into an existing interior separation system without removing the shelves, as long as these shelves fit into any of the 3 middle slots



Slotted separators, open

Unassembled	Part No. 409
Assembled	Part No. 419

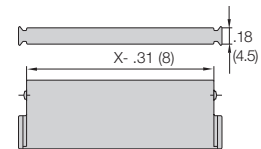
Open slotted separator 409



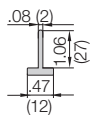
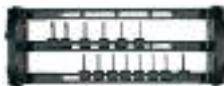
Shelves 420-XX

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 7 different heights in .28" (7mm) increments

Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled
.71 (18)	.39 (10)	420-18	421-18	2.95 (75)	2.64 (67)	420-75	421-75
.91 (23)	.59 (15)	420-23	421-23	3.46 (88)	3.15 (80)	420-88	421-88
.98 (25)	.67 (17)	420-25	421-25	3.94 (100)	3.62 (92)	420-100	421-100
1.10 (28)	.79 (20)	420-28	421-28	4.92 (125)	4.61 (117)	420-125	421-125
1.30 (33)	.98 (25)	420-33	421-33	5.91 (150)	5.59 (142)	420-150	421-150
1.69 (43)	1.38 (35)	420-43	421-43	6.89 (175)	6.57 (167)	420-175	421-175
1.97 (50)	1.65 (42)	420-50	421-50	7.36 (187)	7.05 (179)	420-187	421-187
2.44 (62)	2.13 (54)	420-62	421-62	7.87 (200)	7.56 (192)	420-200	421-200



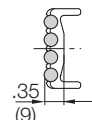
Center crossbar - developed for applications involving a very large number of thin cables, individually separated. This offers the option of subdividing the Energy Chain® into upper and lower halves, with mutually independent separators.



Center crossbar

Unassembled	Part No. 405
Assembled	Part No. 415

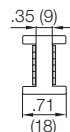
Rollclip - minimizes abrasion of particularly sensitive hoses or cables in an Energy Chain®. The integrated rollers compensate for relative movement between the chain and the hose or cable. This reduces the abrasion of the hoses or cables



Rollclip

Unassembled	Part No. 489-27
Assembled	Part No. 490-27

Roller separator - performs a similar function to the Rollclip, but doubles as a separator. Consult igus® if you have any questions regarding the roller separator.



Center crossbar

Unassembled	Part No. 429
Assembled	Part No. 430

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



400
410
R880



Energy Chain System® E4/100 Series 400/410/R880 Special Accessories

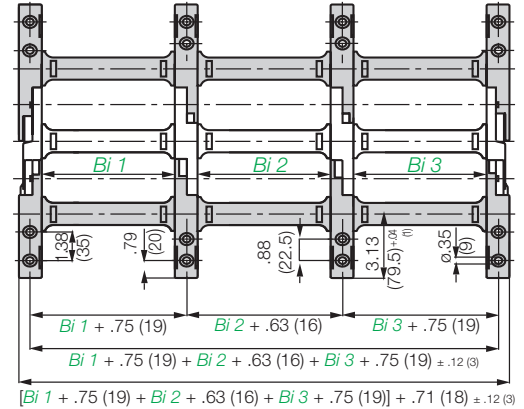
energy chain® configurator ▶

igus® Energy Chain System®



Extension links - for extremely wide Energy Chains® up to 9.84 ft (3m)

- For applications in which particularly high fill weights necessitate extremely wide Energy Chains®
- The extension link design allows virtually limitless side-by-side attachment of chains
- The unsupported length of a chain can be increased when additional loads are required
- Extension links can be used with Energy Chains®, Energy Tubes or a combination of both
- They are suitable for unsupported and gliding applications in a guide trough
- Energy Chains® with extension links are attached with KMA or steel mounting brackets.



Part number example for Energy Chain®
400-10/20/10--0
400-Bi1/Bi2/Bi3--0

We strongly recommend on-site consultation with an igus® technician for individual advice regarding mounting brackets, guide troughs and other design details.

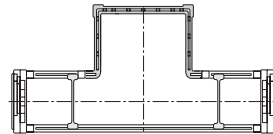
Telephone 1-800-521-2747
Fax 1-401-438-7270

Extender crossbars - For careful guiding of large diameter cables and hoses

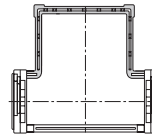
- Intended for cables and hoses with a maximum outer diameter of 9.65 in. (245 mm).
- Can be attached along either the inner or outer radius, inner radius preferred
- Gliding operation with crossbars assembled along the outer radius in conjunction with a special guide trough
- Gliding operation not guaranteed with crossbars assembled along the inner radius
- The extender crossbar can either be attached to the side links directly or can be used in combination with two standard snap-open crossbars.



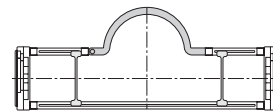
Consult igus® for your extender crossbar applications. We will be happy to assist you with your design layout.



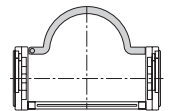
Square extender crossbar combined with standard snap-open crossbars.



Attached directly to the side link.



Round extender crossbar combined with standard snap-open crossbars.



Attached directly to the side link.

Part No.	Max Ø Hose	Style	Installation Side Link	Combined with Snap-Open Crossbars
450-15-RHD115	By request	Round	Yes	No
450-17-RD115	By request	Round	No	Yes
450-25-D150	By request	Square	Yes	No
450-30-D200	By request	Square	Yes	No
450-35-D250	By request	Square	Yes	No
450-40-D300	By request	Square	Yes	No
450-20-HD150	By request	Square	No	Yes
450-25-HD200	By request	Square	No	Yes
450-30-HD250	By request	Square	No	Yes

E4 clip on cable binder

- For side mounted applications
- Serves as a clip-on, lateral guide for hoses and cables on Energy Chains®
- The loops can be adjusted as needed

- Compatible with many E4 Energy Chains®
- Economical
- One clip and one locking band are needed for each chain link



Part No.	Form
450-B12	Locking clip, comprised of a locking element
450-B12-200	Locking band, comprised of a locking element and band; 12 x 1.5 x 200 mm

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

6.165

Energy Chain System® E4/100

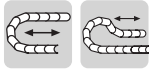
Series 400/410/R880

Mounting Brackets, KMA

energy chain® configurator ▶



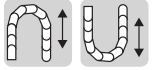
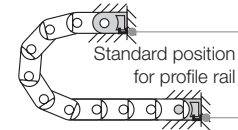
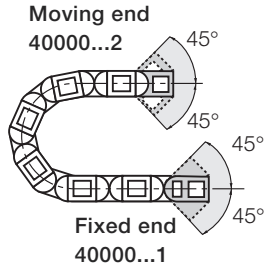
400
410
R880



Standard

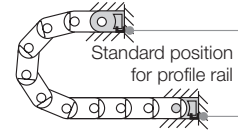
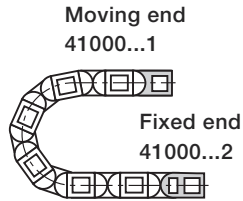
Option 1: pivoting

- Profile rail option
- Universal use
- Corrosion resistant
- Short and long travels
- Space-restricted conditions

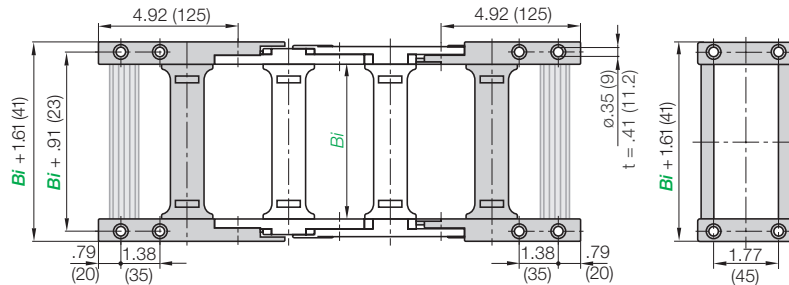
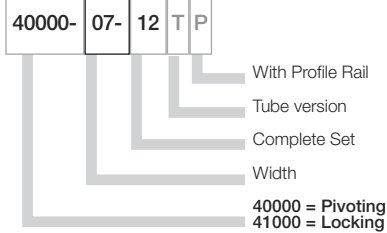


Option 2: locking

- Profile rail option
- Universal use
- Corrosion resistant
- Extreme accelerations
- Vertical hanging/standing travels



Part Number Structure



Due to the design of the E4/100 series chains, please note the following when ordering brackets:

Even number of links = full set, part number ending in -12
Odd number of links = 2 pieces, part number ending in -2

Part number examples are shown for pivoting brackets. For locking brackets change part number to 41000

Part No. Full Set (pivoting)
Series 400 or 410:
40000-Width-12

Part No. Full Set (pivoting)
with profile rail
Series 400 or 410
40000-Width-12P

Part No. Full Set (pivoting)
Tube Series R880
40000-Width-12T

Part No. Full Set (pivoting)
with Profile Rail
Series 880
40000-Width-12TP

Width	Part No. Full Set		Tube Option	With Profile Rail	Bi in. (mm)
	Pivoting	Locking			
-05	40000	41000	-05-12	P	1.97 (50)
-06	40000	41000	-06-12	P	2.56 (65)
-07	40000	41000	-07-12	T P	2.95 (75)
-10	40000	41000	-10-12	T P	3.94 (100)
-11	40000	41000	-11-12	P	4.41 (112)
-12	40000	41000	-12-12	T P	4.92 (125)
-13	40000	41000	-13-12	P	5.39 (137)
-15	40000	41000	-15-12	T P	5.91 (150)
-16	40000	41000	-16-12	P	6.38 (162)
-17	40000	41000	-17-12	P	6.89 (175)
-18	40000	41000	-18-12	P	7.36 (187)
-20	40000	41000	-20-12	T P	7.87 (200)
-21	40000	41000	-21-12	P	8.35 (212)
-22	40000	41000	-22-12	P	8.86 (225)
-23	40000	41000	-23-12	P	9.33 (237)
-25	40000	41000	-25-12	T P	9.84 (250)
-26	40000	41000	-26-12	P	10.31 (262)
-27	40000	41000	-27-12	T P	10.83 (275)
-28	40000	41000	-28-12	P	11.30 (287)
-30	40000	41000	-30-12	T P	11.81 (300)
-31	40000	41000	-31-12	P	12.28 (312)

Width	Part No. Full Set		Tube Option	With Profile Rail	Bi in. (mm)
	Pivoting	Locking			
-32	40000	41000	-32-12	P	12.79 (325)
-33	40000	41000	-33-12	P	13.27 (337)
-35	40000	41000	-35-12	T P	13.78 (350)
-36	40000	41000	-36-12	P	14.25 (362)
-37	40000	41000	-37-12	P	14.76 (375)
-38	40000	41000	-38-12	P	15.24 (387)
-40	40000	41000	-40-12	T P	15.75 (400)
-41	40000	41000	-41-12	P	16.22 (412)
-42	40000	41000	-42-12	P	16.73 (425)
-43	40000	41000	-43-12	P	17.20 (437)
-45	40000	41000	-45-12	P	17.72 (450)
-46	40000	41000	-46-12	T P	18.19 (462)
-47	40000	41000	-47-12	P	18.70 (475)
-48	40000	41000	-48-12	P	19.17 (487)
-50	40000	41000	-50-12	P	19.69 (500)
-51	40000	41000	-51-12	P	20.16 (512)
-52	40000	41000	-52-12	P	20.67 (525)
-53	40000	41000	-53-12	P	21.14 (537)
-55	40000	41000	-55-12	P	21.65 (550)
-60	40000	41000	-60-12	P	23.62 (600)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

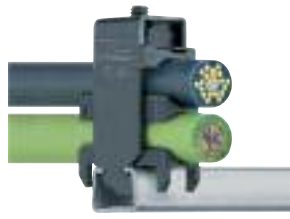


igus® Energy Chain System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

Chainfix clamps for the profile rail



igus® Chainfix strain relief elements are available in either steel or stainless steel. They can be adjusted with a hexagon socket and are available in single, double and triple configurations.

Part No. Single Clamp		Part No. Double Clamp		Part No. Triple Clamp		Cable ø	
Steel	Stainless	Steel	Stainless	Steel	Stainless	in.	(mm)
CFX12-1	CFX12-1E	CFX12-2	CFX12-2E	CFX12-3	-	.24 - .47	(06 - 12)
CFX14-1	CFX14-1E	CFX14-2	CFX14-2E	CFX14-3	-	.47 - .55	(12 - 14)
CFX16-1	CFX16-1E	CFX16-2	CFX16-2E	CFX16-3	-	.55 - .63	(14 - 16)
CFX18-1	CFX18-1E	CFX18-2	CFX18-2E	CFX18-3	-	.63 - .71	(16 - 18)
CFX20-1	CFX20-1E	CFX20-2	CFX20-2E	CFX20-3	-	.71 - .79	(18 - 20)
CFX22-1	CFX22-1E	CFX22-2	CFX22-2E	CFX22-3	-	.79 - .87	(20 - 22)
CFX26-1	CFX26-1E	CFX26-2	CFX26-2E	-	-	.87 - 1.02	(22 - 26)
CFX30-1	CFX30-1E	CFX30-2	CFX30-2E	-	-	1.02 - 1.18	(26 - 30)
CFX34-1	CFX34-1E	CFX34-2	CFX34-2E	-	-	1.18 - 1.34	(30 - 34)
CFX38-1	CFX38-1E	-	-	-	-	1.34 - 1.50	(34 - 38)
CFX42-1	CFX42-1E	-	-	-	-	1.50 - 1.65	(38 - 42)

For more information please refer to strain relief section of Chapter 10

Chainfix Clip

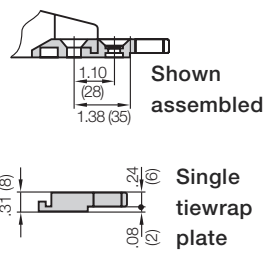


Modular snap-on strain relief device

Chainfix clip is available for cable diameters ranging from .16" (4mm) to .94" (24 mm). It is suitable for assembly on KMA mounting brackets, clip-on strain relief for crossbars as well as profile rails. Quick assembly without the use of tools. **For more information please refer to strain relief section of Chapter 10**

Cable ø	Part No. Clamp	Part No. Bottom
.16-.31	CFC-08-M	CFC-08-C
.31-.47	CFC-12-M	CFC-12-C
.47-.63	CFC-16-M	CFC-16-C
.63-.79	CFC-20-M	CFC-20-C
.79-.94	CFC-24-M	CFC-24-C

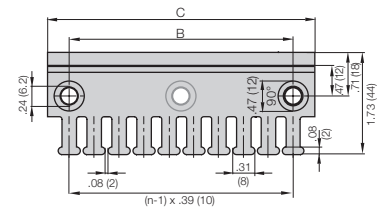
Tiewrap Plates



Option 1: Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



If used with KMA brackets with profile rail please add "KMA" to the end of the part number.
Example: 3050-ZBKMA

For more information please refer to strain relief section of Chapter 10



Option 2: Clip-on Tiewrap plates

Available as a clip-on tiewrap plate without the use of bolts They are inserted and removed with a screwdriver used as a lever. Clip-on tiewrap plates are also available as an attachment to the opening crossbars.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
3050-ZC	5	1.97 (50)
3075-ZC	7	2.95 (75)

For more information please refer to strain relief section of Chapter 10



Option 3: Clip-on Tiewrap plates for opening crossbars

Clip-on tiewrap plates are also available as an attachment to opening crossbars. They can be positioned at any point along the Energy Chain®.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
4550-ZS	5	1.89 (48)
4575-ZS	7	2.91 (74)

For more information please refer to strain relief section of Chapter 10

Energy Chain System® E4/100

Series 400/410/R880

Guide Trough

energy chain® configurator ▶



400
410
R880

Width of Crossbar
400-05-200-0

	B_{Ri}	Installation Part No.
-05	3.50 (89)	*
-06	4.09 (104)	94-50-225
-07	4.49 (114)	94-50-225
-10	5.47 (139)	94-50-250
-11	5.98 (152)	94-50-275
-12	6.46 (164)	94-50-275
-13	6.97 (177)	94-50-300
-15	7.44 (189)	94-50-300
-16	7.95 (202)	94-50-325
-17	8.42 (214)	94-50-325
-18	8.94 (227)	94-50-350
-20	9.41 (239)	94-50-350
-21	9.92 (252)	94-50-375
-22	10.39 (264)	94-50-375
-23	10.91 (277)	94-50-400
-25	11.38 (289)	94-50-400
-26	11.89 (302)	94-50-425
-27	12.36 (314)	94-50-425
-28	12.87 (327)	94-50-450
-30	13.35 (339)	94-50-450
-31	13.86 (352)	94-50-475
-32	14.33 (364)	94-50-475
-33	14.84 (377)	94-50-500
-35	15.31 (389)	94-50-500
-36	15.82 (402)	94-50-525
-37	16.30 (414)	94-50-525
-38	16.81 (427)	94-50-550
-40	17.28 (439)	94-50-550
-41	17.79 (452)	94-50-575
-42	18.27 (464)	94-50-575
-43	18.78 (477)	94-50-600
-45	19.25 (489)	94-50-600
-46	19.76 (502)	94-50-625
-47	20.24 (514)	94-50-625
-48	20.75 (527)	94-50-650
-50	21.22 (539)	94-50-650
-51	21.73 (552)	94-50-675
-52	22.20 (564)	94-50-675
-53	22.72 (577)	94-50-700
-55	23.19 (589)	94-50-700
-60	25.16 (639)	94-50-750

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required.

- Full travel length of guide trough
Part No. 94-30
- 1/2 travel length glide bars
Part No. 93-01
- Installation sets as end connectors
Part No. 94-50-XX

.XX indicates the length of the profile rails on which the guide trough is mounted. The values and part numbers are specified in the table on the left. The standard length of the trough components and glide bars is 6.56 ft (2m). The required overall length of the guide trough directly correlates to the length of travel.

Example:

Length of travel 164 ft (50 m)
Center mounted

Required guide troughs:

164 ft (50 m) guide trough
82 ft (25 m) glide bars
= 25 sections of 6.56 ft (2 m) guide trough
Part No. 94-30
= 13 sections of 6.56 ft (2 m) glide bars
Part No. 93-01

Required number of installation sets:

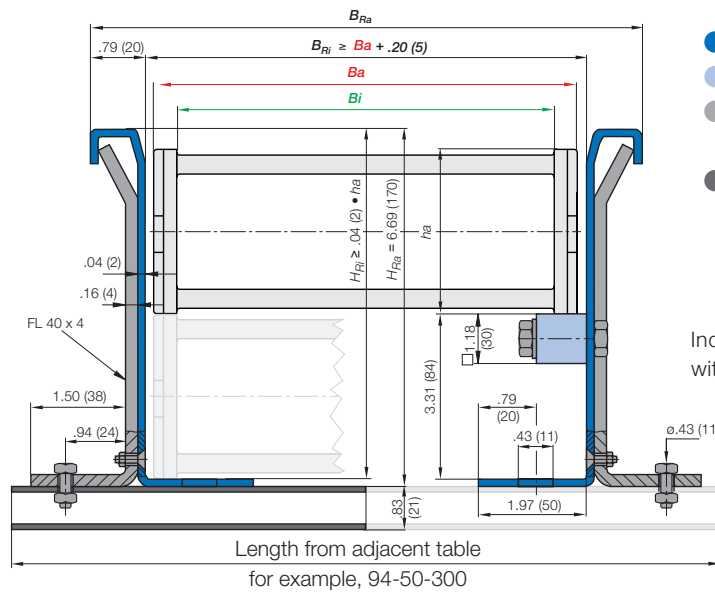
= Number of guide trough components + 1
= 25 + 1 = 26

Part number of the installation sets

94-50-XXX

Example:

94-50-400 for 15.75 (400 mm) long profile rail



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

* Specialized guide trough available upon request

Standard length profile rail



Left: Guide trough with glide bars
Right: Guide troughs without glide bars



Installation sets as section connectors

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



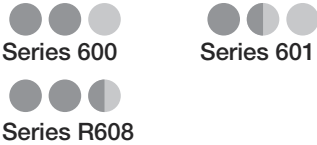
600
601
R608



Energy Chain System® E4/100 Series 600/601/R608



Price Index



Special Features / Options



This E4 Series is a low-noise version



Cleanroom test upon request



ESD classification:
Electrically conductive
ESD/ATEX version upon request

Assembly Tips



Opening Energy Chains®: Remove crossbars and clips - Insert screwdriver into the slot, push down, release by lever action



Remove lids/bottoms (Energy Tubes) - Insert screwdriver into the slot, release by lever action

Other Installation Methods

Vertical, hanging ≤ 394 ft (120 m)

Vertical, standing ≤ 19.69 ft (6 m)

Side-mounted, un_supp. ≤ 19.69 ft (6 m)

Rotary requires further calculation

Usage Guidelines



- When quiet operation is required
- When very high speeds and/or accelerations are required
- For long travels
- For high fill weights



- When a simpler, low-cost solution is required
➤ Series 1640
- If an increased inner height is required
➤ Series 640

Features & Benefits

- 1 Hinged snap-open removable lids along the outer radius
- 2 Optimized glide pads with lateral wear allowance
- 3 Closed and open styles can be combined
- 4 Wide, rounded crossbars
- 5 Dirt-repellent exterior
- 6 Numerous interior separation possibilities
- 7 Stop dog with brake for noise reduction
- 8 Crossbars on Energy Chains® are removable along both radii
- 9 Energy Chains® also available with reverse bending radius "RBR"



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator ▶

19.69 ft (6 m) 600-30-300-0



Energy Chain®

With 2 separators 6011 assembled every 2nd link



Interior Separation

1 Set 6000-12



Mounting Bracket

Energy Chain System® E4/100

Series 600/601/R608

Installation Dimensions

energy chain® configurator ▶

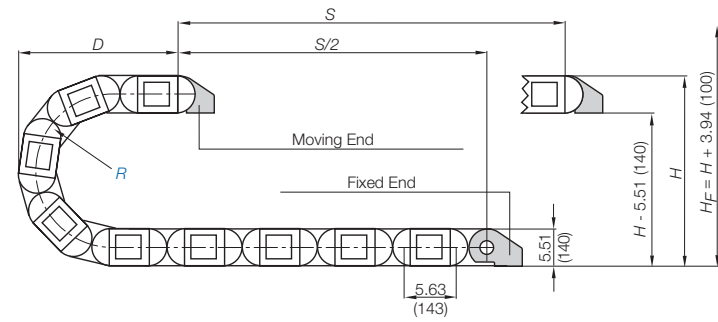
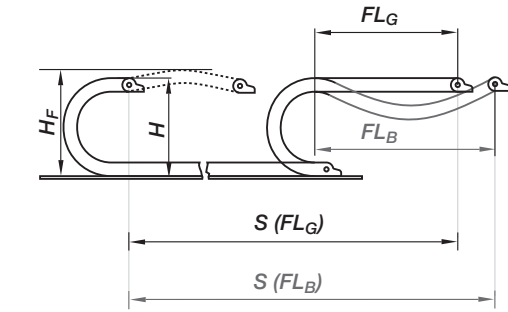
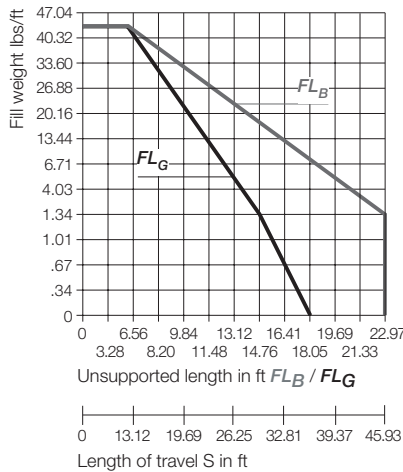


600
601
R608

Short travel, unsupported length

- FL_B = unsupported with permitted sag
- FL_G = unsupported with straight upper run

Further information ▶ Design, Chapter 1



Pitch per link: = 5.63" (143 mm)
Links per foot (m): = 2.13 (7)
For center mount applications:
Chain length = $S/2 + K$

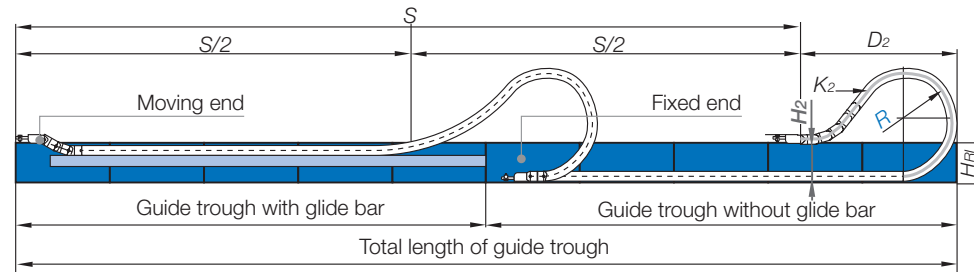
The required clearance height: $H_F = H + 3.94$ in. (100 mm) (with 3.36 lbs/ft (5 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	19.69 (500)	21.65 (550)	23.62 (600)	29.53 (750)	39.37 (1000)
H	21.46 (545)	25.39 (645)	29.41 (747)	33.27 (845)	37.20 (945)	41.14 (1045)	45.08 (1145)	49.02 (1245)	52.95 (1345)	64.76 (1645)	84.45 (2145)
D	16.34 (415)	18.31 (465)	20.27 (515)	22.24 (565)	24.21 (615)	26.18 (665)	28.15 (715)	30.12 (765)	32.09 (815)	37.99 (965)	47.83 (1215)
K	36.22 (920)	42.52 (1080)	48.82 (1240)	55.12 (1400)	61.42 (1560)	67.72 (1720)	73.62 (1870)	79.53 (2020)	85.63 (2175)	104.72 (2660)	135.24 (3435)

For long travels with lowered mounting height

Long travel lengths from 32.8 ft. (10 m) to max. 1,476 ft. (450 m)

For center mount applications:
Chain length: = $S/2 + K_2$



R	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	19.69 (500)	21.65 (550)	23.62 (600)	29.53 (750)	39.37 (1000)
H_2	12.80 (325)	12.80 (325)	12.80 (325)	12.80 (325)	12.80 (325)	12.80 (325)	12.80 (325)	12.80 (325)	12.80 (325)	12.80 (325)	-
D_{2+20}	35.43 (900)	39.37 (1000)	43.31 (1100)	49.21 (1250)	57.09 (1450)	62.99 (1600)	66.93 (1700)	74.80 (1900)	80.71 (2050)	112.20 (2850)	-
K_2	61.93 (1573)	67.56 (1716)	73.19 (1859)	90.08 (2288)	101.33 (2574)	112.60 (2860)	123.86 (3146)	135.12 (3432)	152.01 (3861)	197.05 (5005)	-

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{safety buffer}$
 - $H_F = H + 3.94$ in. (100 mm) height
 - $H_{in} =$ Trough inner height
 - $H_2 =$ *Mounting height
 - $D_2 =$ Overlength - long travels, gliding
 - $K_2 =$ *Add-on
- *If the mounting bracket location is set lower



PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS

Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough. **Design, Chapter 1**

Technical Data

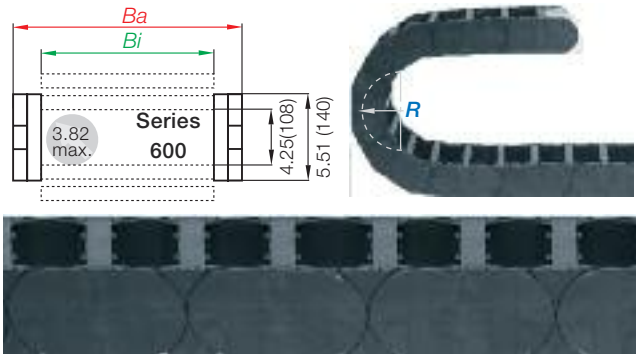


Details of material properties

▶ Chapter 1

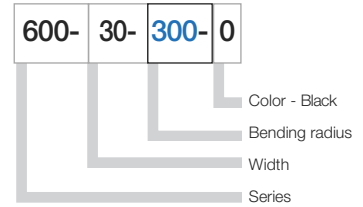
Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

Series 600 - Energy Chain® with crossbars every link

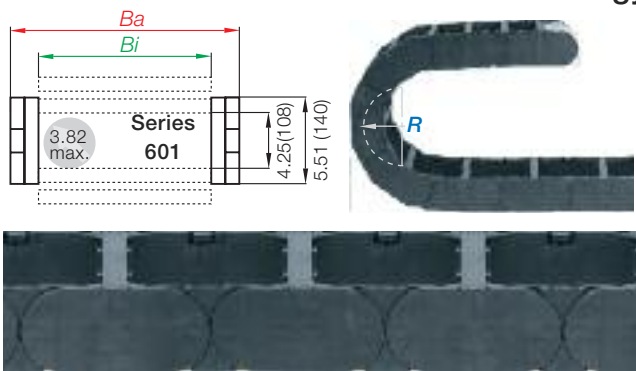


- Crossbars every link
- For use with rigid hydraulic hoses
- For particularly demanding applications
- Can be opened from both sides

Part Number Structure

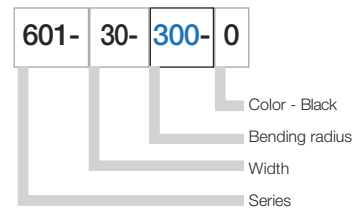


Series 601 - Energy Chain® with crossbars every other link

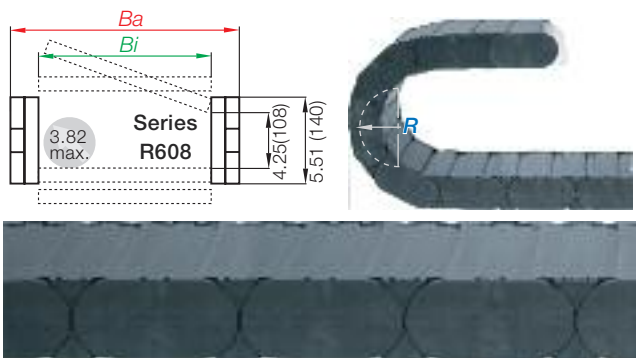


- Crossbars every other link - Standard configuration
- For nearly every situation
- Can be opened from both sides
- Easy assembly
- Stable
- Cost-effective

Part Number Structure

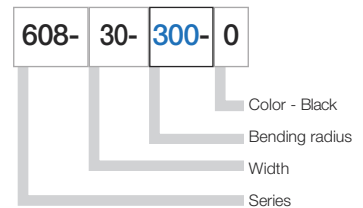


Series R608 - fully enclosed Energy Tube

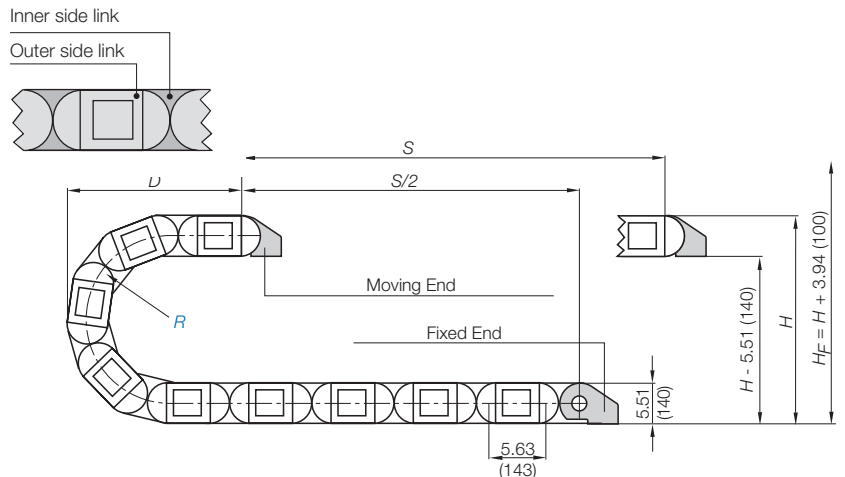
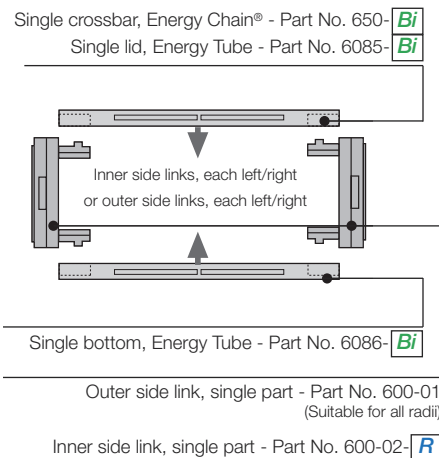


- Fully enclosed
- Excellent cable and hose protection against dirt
- Protection against hot chips up to 1652°F (900°C)
- Lids along inner radius are completely removable
- Lids along the outer radius are single-sided, snap open, hinged on one side as well as completely removable

Part Number Structure



Energy Chain® as separate parts, links and side plates



Supplement part number with required radius. Example: 600-30--0
Pitch: 5.63 in. (143 mm) per link links/ft(m) = 2.13 (7)

Part Number.					<i>Bi</i>	<i>Ba</i>	600	601	R608
Crossbars Every link	Crossbars Every other	Tube Version			in. (mm)	in. (mm)	lbs/ft (kg/m)	lbs/ft (kg/m)	lbs/ft (kg/m)
600-20-	601-20-	608-20-	<input type="text" value="300"/>	-0	7.87 (200)	9.92 (252)	≈ 3.00 (4.46)	≈ 2.63 (3.91)	*
600-25-	601-25-	608-25-	<input type="text" value="300"/>	-0	9.84 (250)	11.89 (302)	≈ 3.26 (4.85)	≈ 2.76 (4.10)	*
600-30-	601-30-	608-30-	<input type="text" value="300"/>	-0	11.81 (300)	13.86 (352)	≈ 3.55 (5.29)	≈ 2.90 (4.32)	*
600-32-	601-32-		<input type="text" value="300"/>	-0	12.60 (320)	14.65 (372)	≈ 3.62 (5.38)	≈ 2.94 (4.37)	-
600-35-	601-35-	608-35-	<input type="text" value="300"/>	-0	13.78 (350)	15.83 (402)	≈ 3.84 (5.71)	≈ 3.04 (4.53)	*
600-40-	601-40-	608-40-	<input type="text" value="300"/>	-0	15.75 (400)	17.80 (452)	≈ 4.05 (6.02)	≈ 3.15 (4.69)	*
600-45-	601-45-		<input type="text" value="300"/>	-0	17.72 (450)	19.76 (502)	≈ 4.34 (6.46)	≈ 3.30 (4.91)	-
600-50-	601-50-		<input type="text" value="300"/>	-0	19.69 (500)	21.73 (552)	≈ 4.53 (6.74)	≈ 3.39 (5.05)	-
600-55-	601-55-		<input type="text" value="300"/>	-0	21.65 (550)	23.70 (602)	≈ 5.01 (7.45)	≈ 3.63 (5.40)	-
600-60-	601-60-		<input type="text" value="300"/>	-0	23.62 (600)	25.67 (652)	≈ 5.14 (7.65)	≈ 3.70 (5.50)	-

Choose from the radii below for all of the above sizes
Radius (mm) Example: 600-30--0

	200**	250	300	350	400	450	500	550	600	750	1000
<i>R</i>	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	19.69 (500)	21.65 (550)	23.62 (600)	29.53 (750)	39.37 (1000)
<i>H</i>	21.46 (545)	25.39 (645)	29.41 (747)	33.27 (845)	37.20 (945)	41.14 (1045)	45.08 (1145)	49.02 (1245)	52.95 (1345)	64.76 (1645)	84.45 (2145)
<i>D</i>	16.34 (415)	18.31 (465)	20.27 (515)	22.24 (565)	24.21 (615)	26.18 (665)	28.15 (715)	30.12 (765)	32.09 (815)	37.99 (965)	47.83 (1215)
<i>K</i>	36.22 (920)	42.52 (1080)	48.82 (1240)	55.12 (1400)	61.42 (1560)	67.72 (1720)	73.62 (1870)	79.53 (2020)	85.63 (2175)	104.72 (2660)	135.24 (3435)

** This radius is not available for the R608 Series
*Upon request

0=Standard color black. For other colors see Chapter 1





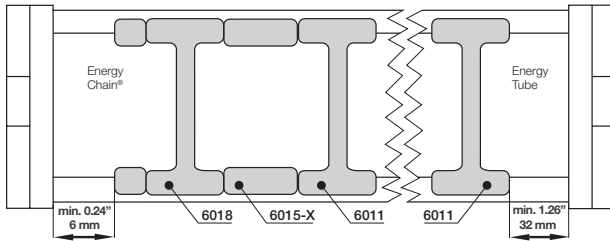
Option 1: Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.

NOTE: Observe a lateral spacing of at least 1.26 in. (32mm) for Energy Tubes and .63 in. (16mm) for Energy Chain®. There is no minimum spacing needed for side plates

Exception: Minimum spacing

Locking separator 6008 = .91" (23 mm)



Vertical separator
6001



Vertical separator

Unassembled **Part No. 6001**

Assembled **Part No. 6011**

- **Standard separator 6001 for Energy Chains® and Energy Tubes**

This separator offers safe stability due to its wide base design, also when used with thick cables or hoses.



Locking separator
6008



Locking separator (chain only)

Unassembled **Part No. 6008**

Assembled **Part No. 6018**

- **Locking separator 6008 for Energy Chains®**

This separator features increased retention force for applications exposed to very high humidity and extreme loads. The extra retention force is achieved by asymmetric claws for the crossbar. Take care to ensure proper alignment.



Spacers
6005-XX



Spacer (chain only)

Unassembled **Part No. 6005-XX**

Assembled **Part No. 6015-XX**

- **NOTE ON SPACERS**

Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications. The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

Spacers available in the following sizes:

Part No. Unassembled	Part No. Assembled	in.	(mm)
6005 -10	6015 -10	.39"	(10)
6005 -15	6015 -15	.59"	(15)
6005 -20	6015 -20	.79"	(20)

Energy Chain System® E4/100

Series 600/601/R608

Interior Separation

energy chain® configurator ▶



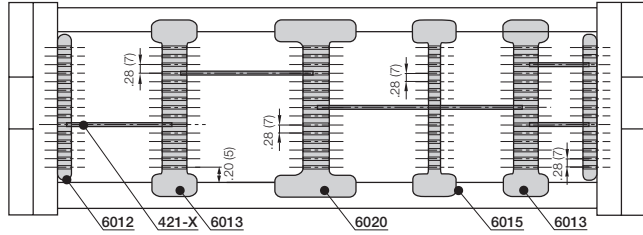
600
601
R608



Option 2: Shelves

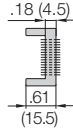
Energy Chains® and Energy Tubes can be subdivided both vertically and horizontally using the various interior separation elements.

► **Design, Chapter 1** for layout recommendations.



- **Side plates 6002**

This component is used to form the basic pattern of a shelf system.



Side plate

Unassembled	Part No. 6002
Assembled	Part No. 6012

Side plate
6002



- **Vertical separator 6003**

This component is used to form the basic pattern of a shelf system.



Vertical separator

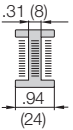
Unassembled	Part No. 6003
Assembled	Part No. 6013

Vertical separator
6003



- **Locking vertical separator 6010**

This separator is slotted and able to be combined with shelves



Locking vertical separator

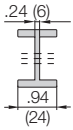
Unassembled	Part No. 6010
Assembled	Part No. 6020

Locking vertical separator
6010



- **Slotted separators 6004**

These are used for very complex subdivisions. However, they cannot be retrofitted into an existing separation system without removing the shelves first.



Slotted separators, closed

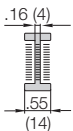
Unassembled	Part No. 6004
Assembled	Part No. 6014

Closed slotted separator
6004



- **Slotted separator 6005**

This separator can be retrofitted into an existing interior separation system without removing the shelves, as long as these shelves fit into any of the 11 middle slots



Slotted separators, open

Unassembled	Part No. 6005
Assembled	Part No. 6015

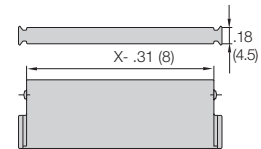
Open slotted separator
6005



Shelves 420-XX

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 7 different heights in .28" (7mm) increments

Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled
.71 (18)	.39 (10)	420-18	421-18	2.95 (75)	2.64 (67)	420-75	421-75
.91 (23)	.59 (15)	420-23	421-23	3.46 (88)	3.15 (80)	420-88	421-88
.98 (25)	.67 (17)	420-25	421-25	3.94 (100)	3.62 (92)	420-100	421-100
1.10 (28)	.79 (20)	420-28	421-28	4.92 (125)	4.61 (117)	420-125	421-125
1.30 (33)	.98 (25)	420-33	421-33	5.91 (150)	5.59 (142)	420-150	421-150
1.69 (43)	1.38 (35)	420-43	421-43	6.89 (175)	6.57 (167)	420-175	421-175
1.97 (50)	1.65 (42)	420-50	421-50	7.36 (187)	7.05 (179)	420-187	421-187
2.44 (62)	2.13 (54)	420-62	421-62	7.87 (200)	7.56 (192)	420-200	421-200



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



600
601
R608



Energy Chain System® E4/100 Series 600/601/R608 Mounting Brackets - Steel Strain Relief

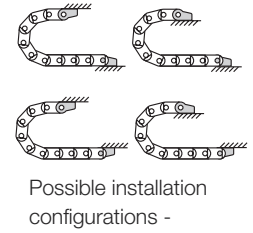
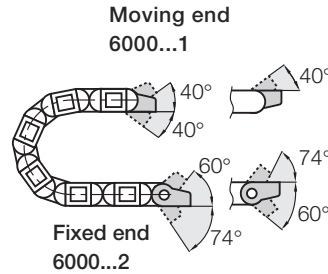
energy chain® configurator

igus® Energy Chain System®



Option 1: pivoting

- For pivoting connections
- One part for all chain widths
- Electrically conductive



Telephone 1-800-521-2747
Fax 1-401-438-7270

Part No. Mounting Brackets Full Set

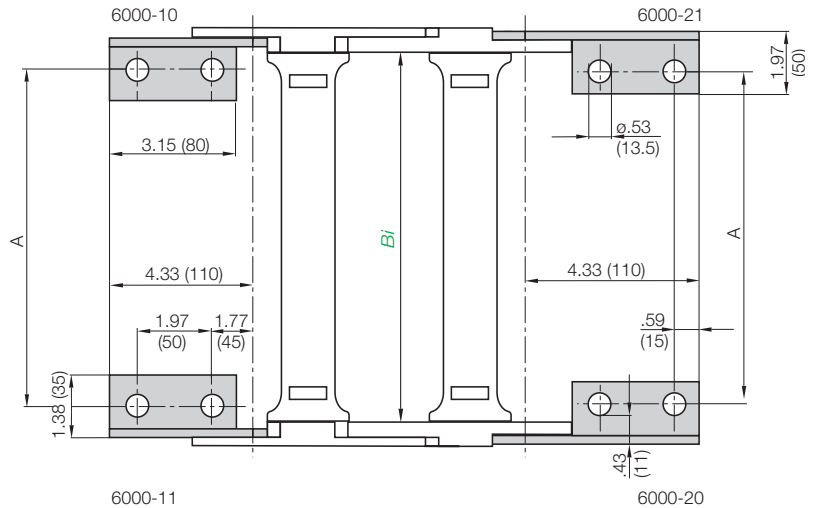
4 parts, 2 with pin, 2 with bore
Series 600/601/R608
6000-12

Part No. Mounting Bracket Moving End

2 parts, 1 left & 1 right with bore
Series 600/601/R608
6000-1

Part No. Mounting Bracket Fixed End

2 parts, 1 left & 1 right with pin
Series 600/601/R608
6000-2



Bracket Mounting Dimensions

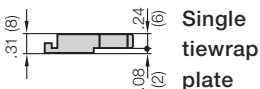
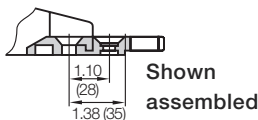
Width of Chain <i>Bi</i>	Part Number	Mounting Brackets			A in. (mm)
		Full Set	Moving End Only	Fixed End Only	
7.87 (200)	6000	-12	-1	-2	6.69 (170)
9.84 (250)	6000	-12	-1	-2	8.66 (220)
11.81 (300)	6000	-12	-1	-2	10.63 (270)
12.60 (320)	6000	-12	-1	-2	14.42 (290)
13.78 (350)	6000	-12	-1	-2	12.60 (320)
15.75 (400)	6000	-12	-1	-2	14.57 (370)
17.72 (450)	6000	-12	-1	-2	16.54 (420)
19.69 (500)	6000	-12	-1	-2	18.50 (470)
21.65 (550)	6000	-12	-1	-2	20.47 (520)
23.62 (600)	6000	-12	-1	-2	22.48 (570)

Due to the design of the E4/100 series chains, please note the following when ordering brackets:

Even number of links = full set, part number ending in -12
Odd number of links = 2 pieces, part number ending in -1

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

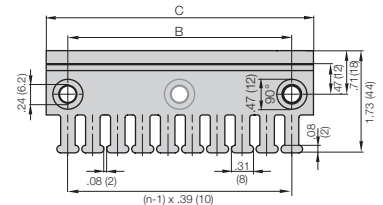
Strain Relief



Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



For more information please refer to strain relief section of Chapter 10

Energy Chain System® E4/100

Series 600/601/R608

Guide Trough

energy chain® configurator ▶



600
601
R608

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part No. 97-30
- 1/2 travel length glide bars
Part No. 93-01
- Installation sets as end connectors
Part No. 97-50-XX

-XX indicates the length of the profile rails on which the guide trough is mounted. The values and part numbers are specified in the table below. The standard length of the trough components and glide bars is 6.56 ft (2 m). The overall length of the guide trough directly correlates to the length of travel.

Example:
Length of travel 164 ft (50 m)
Center-mounted

Required guide troughs:
164 ft (50 m) guide trough, 82 ft. (25 m) glide bar
= 25 sections of 6.56 ft (2 m) guide trough

Part No. 97-30
= 13 sections of 6.56 ft (2 m) glide bar

Part No. 93-01
Required number of installation set:
= Number of guide trough components + 1
= 25 + 1 = 26

Part No. of the installation sets **97-50-XXX**
Example:
97-50-400 for 15.75 (400 mm) long profile rail



Left: Guide trough with glide bars
Right: Guide troughs without glide bars

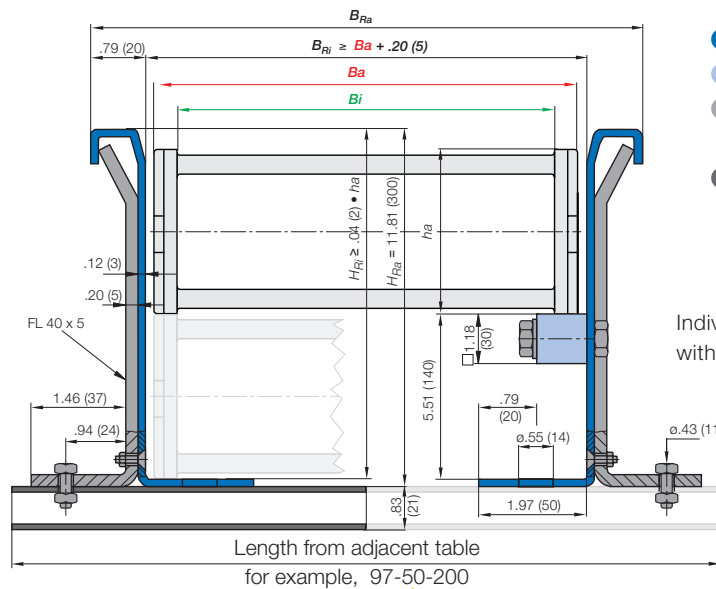


Installation sets as section connectors

Width of Crossbar
600-05-200-0

	B_{Ri}	Installation Part No.
-20	10.12 (257)	97-50-375
-25	12.09 (307)	97-50-425
-30	14.06 (357)	97-50-475
-32	14.84 (377)	97-50-500
-35	16.02 (407)	97-50-525
-40	17.99 (457)	97-50-575
-45	19.96 (507)	97-50-625
-50	21.93 (557)	97-50-675
-55	23.90 (607)	97-50-725
-60	25.87 (657)	97-50-775

Standard length profile rail



Individual attachment without profile rail

* Specialized guide trough available upon request

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index


Series 640

Special Features / Options


This E4 Series is a low-noise version



Cleanroom test upon request



ESD classification:
Electrically conductive
ESD/ATEX version upon request

Assembly Tips


Opening Energy Chains®: Remove crossbars and clips - Insert screwdriver into the slot, push down, release by lever action

Other Installation Methods

Vertical, hanging ≤ 394 ft (120 m)

Vertical, standing ≤ 19.69 ft (6 m)

Side-mounted, un supp. ≤ 13.12 ft (4 m)

Rotary requires further calculation

Usage Guidelines


- When quiet operation is required
- When very high speeds and/or accelerations are required
- For long travels
- For high fill weights



- When a simpler, low-cost solution is required
➤ **Series 1640**
- If higher stability is required
➤ **Series 600/601/R608**
- If an enclosed solution is required
➤ **Series R608**

Features & Benefits

- 1 Crossbars on Energy Chains® are removable along both radii
- 2 Dirt-repellent exterior
- 3 Optimum ratio of inner height to outer height
- 4 Numerous interior separation possibilities
- 5 Optimized glide pads with lateral wear allowance
- 6 Wide, rounded crossbars
- 7 Stop dog with brake for noise reduction
- 8 Energy Chains® also available with reverse bending radius "RBR"


Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator

13.12 ft (4 m) **640-33-300-0**



Energy Chain®

With 2 separators **6411** assembled every 2nd link



Interior Separation

1 Set **6000-12**



Mounting Bracket

Energy Chain System® E4/100

Series 640

Installation Dimensions

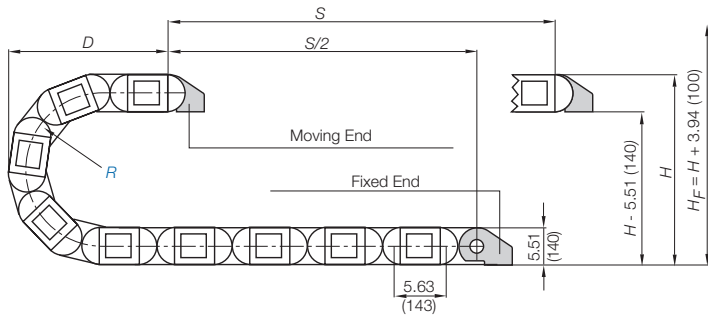
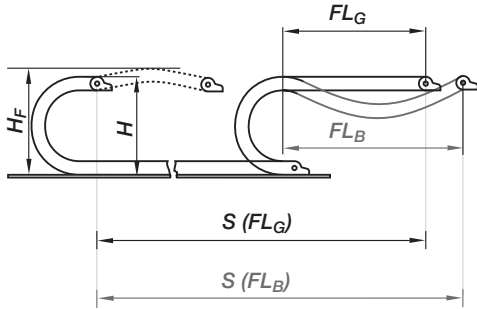
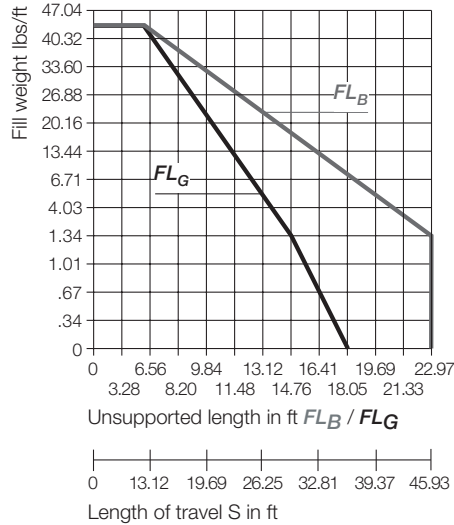
energy chain® configurator ▶



640

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



Pitch per link = 5.63" (143 mm)
 Links per ft (m) = 2.13 (7)
 For center mount applications:
 Chain length = $S/2 + K$

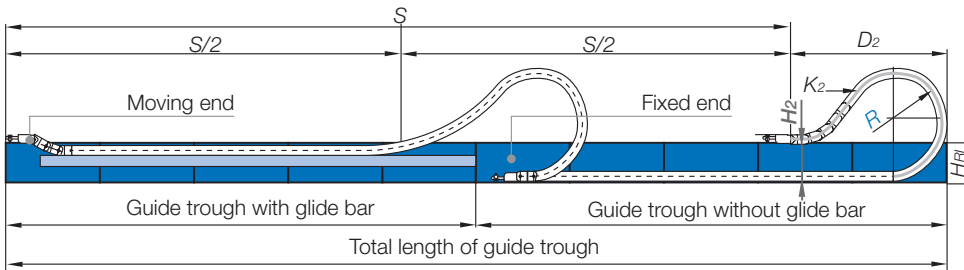
The required clearance height: $H_F = H + 3.94$ in. (100 mm) (with 3.36 lbs/ft (5 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	19.69 (500)	21.65 (550)	23.62 (600)	29.53 (750)	39.37 (1000)
H	21.46 (545)	25.39 (645)	29.41 (747)	33.27 (845)	37.20 (945)	41.14 (1045)	45.08 (1145)	49.02 (1245)	52.95 (1345)	64.76 (1645)	84.45 (2145)
D	16.34 (415)	18.31 (465)	20.27 (515)	22.24 (565)	24.21 (615)	26.18 (665)	28.15 (715)	30.12 (765)	32.09 (815)	37.99 (965)	47.83 (1215)
K	36.22 (920)	42.52 (1080)	48.82 (1240)	55.12 (1400)	61.42 (1560)	67.72 (1720)	73.62 (1870)	79.53 (2020)	85.63 (2175)	104.72 (2660)	135.24 (3435)

For long travels with lowered mounting height

Long travel lengths from 32.8 ft. (10 m) to max. 1,476 ft. (450 m)

For center mount applications:
 Chain length = $S/2 + K_2$



R	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	19.69 (500)	21.65 (550)	23.62 (600)	29.53 (750)	39.37 (1000)
H_2	12.80 (325)	12.80 (325)	12.80 (325)	12.80 (325)	12.80 (325)	12.80 (325)	12.80 (325)	12.80 (325)	12.80 (325)	12.80 (325)	-
D_2+20	(800)	35.43 (900)	43.31 (1100)	47.24 (1200)	56.30 (1430)	62.20 (1580)	66.93 (1700)	72.83 (1850)	80.71 (2050)	112.20 (2850)	-
K_2	50.67 (1287)	56.30 (1430)	73.19 (1859)	84.45 (2145)	101.33 (2574)	112.60 (2860)	123.86 (3146)	135.12 (3432)	152.01 (3861)	197.05 (5005)	-

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{safety buffer}$
 - H_F = Required clearance height
 - H_{in} = Trough inner height
 - H_2 = *Mounting height
 - D_2 = Overlength - long travels, gliding
 - K_2 = *Add-on
- *If the mounting bracket location is set lower



PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.

Design, Chapter 1

Technical Data



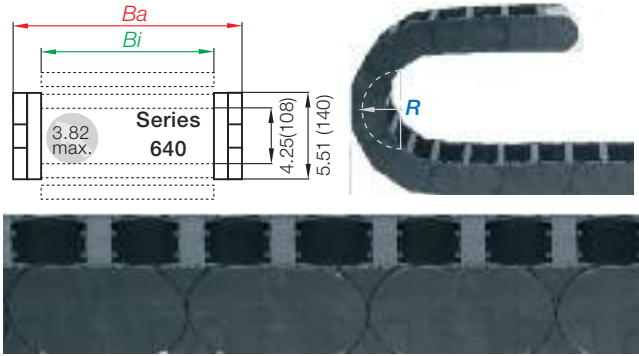
Details of material properties

▶ Chapter 1

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

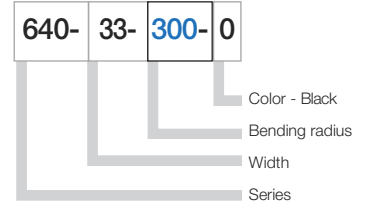
6.178

Series 600 - Energy Chain® with crossbars every link

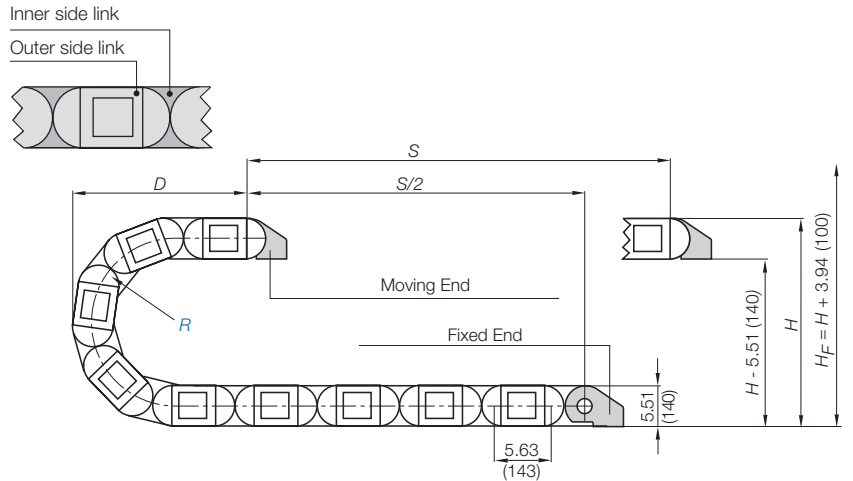
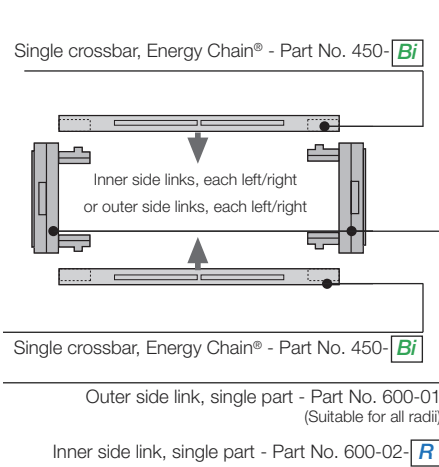


- Crossbars every link
- For use with rigid hydraulic hoses
- For particularly demanding applications
- Can be opened from both sides

Part Number Structure



Energy Chain® as separate parts, links and side plates



Energy Chain System® E4/100

Series 640

energy chain® configurator 



640

Supplement part number with required radius. Example: 640-33--0

Pitch: 5.63 in. (143 mm) per link links/ft(m) = 2.13 (7)

Part Number.		<i>Bi</i>	<i>Ba</i>	640
Crossbars	Every link	in. (mm)	in. (mm)	lbs/ft (kg/m)
640-12-	<input type="text" value=""/> -0	3.43 (87)	5.47 (139)	≈ 5.09 (7.57)
640-13-	<input type="text" value=""/> -0	3.90 (99)	5.98 (152)	≈ 5.15 (7.66)
640-15-	<input type="text" value=""/> -0	4.41 (112)	6.46 (164)	≈ 5.17 (7.70)
640-16-	<input type="text" value=""/> -0	4.88 (124)	6.97 (177)	≈ 5.22 (7.77)
640-17-	<input type="text" value=""/> -0	5.39 (137)	7.44 (189)	≈ 5.27 (7.84)
640-18-	<input type="text" value=""/> -0	5.87 (149)	7.95 (202)	≈ 5.32 (7.91)
640-20-	<input type="text" value=""/> -0	6.38 (162)	8.43 (214)	≈ 5.32 (7.92)
640-21-	<input type="text" value=""/> -0	6.85 (174)	8.94 (227)	≈ 5.37 (7.99)
640-22-	<input type="text" value=""/> -0	7.36 (187)	9.41 (239)	≈ 5.40 (8.04)
640-23-	<input type="text" value=""/> -0	7.83 (199)	9.92 (252)	≈ 5.46 (8.12)
640-25-	<input type="text" value=""/> -0	8.35 (212)	10.39 (264)	≈ 5.50 (8.18)
640-26-	<input type="text" value=""/> -0	8.82 (224)	10.91 (277)	≈ 5.53 (8.23)
640-27-	<input type="text" value=""/> -0	9.33 (237)	11.38 (289)	≈ 5.58 (8.30)
640-28-	<input type="text" value=""/> -0	9.80 (249)	11.89 (302)	≈ 5.59 (8.32)
640-30-	<input type="text" value=""/> -0	10.31 (262)	12.36 (314)	≈ 5.69 (8.39)
640-31-	<input type="text" value=""/> -0	10.79 (274)	12.87 (327)	≈ 5.69 (8.46)
640-32-	<input type="text" value=""/> -0	11.30 (287)	13.35 (339)	≈ 5.73 (8.51)
640-33-	<input type="text" value=""/> -0	11.81 (300)	13.86 (352)	≈ 5.79 (8.62)
640-35-	<input type="text" value=""/> -0	12.28 (312)	14.33 (364)	≈ 5.86 (8.68)
640-36-	<input type="text" value=""/> -0	12.76 (324)	14.84 (377)	≈ 5.86 (8.72)
640-37-	<input type="text" value=""/> -0	13.27 (337)	15.31 (389)	≈ 5.87 (8.74)
640-38-	<input type="text" value=""/> -0	13.74 (349)	15.83 (402)	≈ 5.91 (8.79)
640-40-	<input type="text" value=""/> -0	14.25 (362)	16.30 (414)	≈ 5.99 (8.92)
640-41-	<input type="text" value=""/> -0	14.72 (374)	16.81 (427)	≈ 6.06 (9.02)
640-42-	<input type="text" value=""/> -0	15.24 (387)	17.28 (439)	≈ 6.12 (9.11)
640-43-	<input type="text" value=""/> -0	15.71 (399)	17.80 (452)	≈ 6.16 (9.16)
640-45-	<input type="text" value=""/> -0	16.22 (412)	18.27 (464)	≈ 6.18 (9.20)
640-46-	<input type="text" value=""/> -0	16.69 (424)	18.78 (477)	≈ 6.19 (9.21)
640-47-	<input type="text" value=""/> -0	17.20 (437)	19.25 (489)	≈ 6.25 (9.26)
640-48-	<input type="text" value=""/> -0	17.67 (449)	19.76 (502)	≈ 6.25 (9.30)
640-50-	<input type="text" value=""/> -0	18.19 (462)	20.24 (514)	≈ 6.30 (9.38)
640-51-	<input type="text" value=""/> -0	18.66 (474)	20.75 (527)	≈ 6.31 (9.39)
640-52-	<input type="text" value=""/> -0	19.17 (487)	21.22 (539)	≈ 6.33 (9.42)
640-53-	<input type="text" value=""/> -0	19.65 (499)	21.73 (552)	≈ 6.40 (9.52)
640-55-	<input type="text" value=""/> -0	20.16 (512)	22.20 (564)	≈ 6.61 (9.83)
640-60-	<input type="text" value=""/> -0	22.13 (562)	24.17 (614)	≈ 6.69 (9.95)

Choose from the radii below for all of the above sizes

	200	250	300	350	400	450	500	550	600	750	1000
<i>R</i>	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	19.69 (500)	21.65 (550)	23.62 (600)	29.53 (750)	39.37 (1000)
<i>H</i>	21.46 (545)	25.39 (645)	29.41 (747)	33.27 (845)	37.20 (945)	41.14 (1045)	45.08 (1145)	49.02 (1245)	52.95 (1345)	64.76 (1645)	84.45 (2145)
<i>D</i>	16.34 (415)	18.31 (465)	20.27 (515)	22.24 (565)	24.21 (615)	26.18 (665)	28.15 (715)	30.12 (765)	32.09 (815)	37.99 (965)	47.83 (1215)
<i>K</i>	36.22 (920)	42.52 (1080)	48.82 (1240)	55.12 (1400)	61.42 (1560)	67.72 (1720)	73.62 (1870)	79.53 (2020)	85.63 (2175)	104.72 (2660)	135.24 (3435)

0=Standard color black. For other colors see Chapter 1

For wider chains see page 6.113. For large diameter hoses see page 6.113

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFG: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS





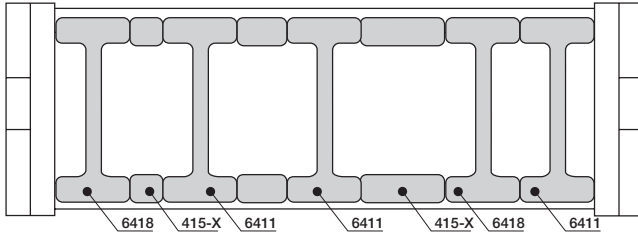
Option 1: Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.

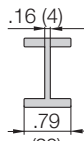
NOTE: Observe a lateral spacing of at least 1.26 in. (32mm) for Energy Tubes and .63 in. (16mm) for Energy Chain®. There is no minimum spacing needed for side plates

Exception: Minimum spacing

Locking separator 6008 = .91" (23 mm)



Vertical separator 6401



Vertical separator

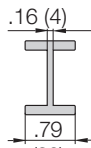
Unassembled **Part No. 6401**

Assembled **Part No. 6411**

- **Standard separator 6401 for Energy Chains®**
 This separator offers safe stability due to its wide base design, also when used with thick cables or hoses.



Locking separator 6408



Locking separator (chain only)

Unassembled **Part No. 6408**

Assembled **Part No. 6418**

- **Locking separator 6408 for Energy Chains®**
 This separator is used for applications that are exposed to extremely high humidity. The clamp at the side serves to uniformly align the separators. In order to avoid destroying the separators when opening the Energy Chain®, make sure all separators are identically aligned.



Spacers 405-XX



Spacer (chain only)

Unassembled **Part No. 405-XX**

Assembled **Part No. 415-XX**

- **NOTE ON SPACERS**
 Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications. The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

Spacers available in the following sizes:

Part No.	Part No.	in.	(mm)
Unassembled	Assembled		
405 -10	415 -10	.39"	(10)
405 -15	415 -15	.59"	(15)
405 -20	415 -20	.79"	(20)
405 -30	415 -30	1.18"	(30)
405 -40	415 -40	1.57"	(40)

Energy Chain System® E4/100

Series 640

Interior Separation

energy chain® configurator ▶



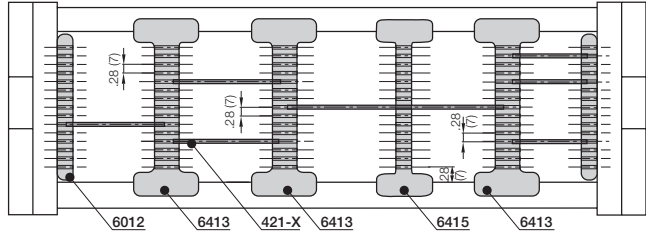
640



Option 2: Shelves

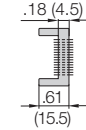
Energy Chains® and Energy Tubes can be subdivided both vertically and horizontally using the various interior separation elements.

► **Design, Chapter 1** for layout recommendations.



- **Side plates 6002**

This component is used to form the basic pattern of a shelf system.



Side plate

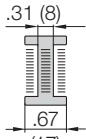
Unassembled	Part No. 6002
Assembled	Part No. 6012

Side plate
6002



- **Vertical separator 6403**

This component is used to form the basic pattern of a shelf system.



Vertical separator

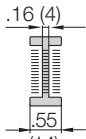
Unassembled	Part No. 6403
Assembled	Part No. 6413

Vertical separator
6403



- **Slotted separator 6405**

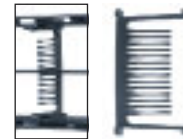
This separator can be retrofitted into an existing interior separation system without removing the shelves, as long as these shelves fit into any of the 13 middle slots



Slotted separators, open

Unassembled	Part No. 6405
Assembled	Part No. 6415

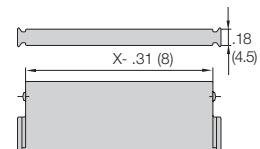
Open slotted separator
6405



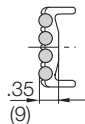
Shelves 420-XX

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 7 different heights in .28" (7mm) increments

Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled
.71 (18)	.39 (10)	420-18	421-18	2.95 (75)	2.64 (67)	420-75	421-75
.91 (23)	.59 (15)	420-23	421-23	3.46 (88)	3.15 (80)	420-88	421-88
.98 (25)	.67 (17)	420-25	421-25	3.94 (100)	3.62 (92)	420-100	421-100
1.10 (28)	.79 (20)	420-28	421-28	4.92 (125)	4.61(117)	420-125	421-125
1.30 (33)	.98 (25)	420-33	421-33	5.91 (150)	5.59(142)	420-150	421-150
1.69 (43)	1.38 (35)	420-43	421-43	6.89 (175)	6.57(167)	420-175	421-175
1.97 (50)	1.65 (42)	420-50	421-50	7.36 (187)	7.05(179)	420-187	421-187
2.44 (62)	2.13 (54)	420-62	421-62	7.87 (200)	7.56(192)	420-200	421-200



Rollclip - minimizes abrasion of particularly sensitive hoses or cables in an Energy Chain®. The integrated rollers compensate for relative movement between the chain and the hose or cable. This reduces the abrasion of the hoses or cables



Rollclip

Unassembled	Part No. 489-27
Assembled	Part No. 490-27



PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS

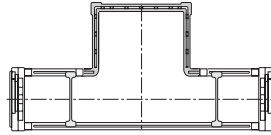




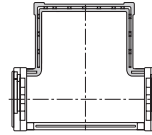
Consult igus® for your extender crossbar applications. We will be happy to assist you with your design layout.

Extender crossbars - For careful guiding of large diameter cables and hoses

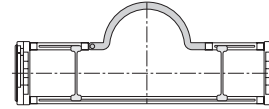
- Intended for cables and hoses with a maximum outer diameter of 11.81 in. (300 mm).
- Can be attached along either the inner or outer radius, inner radius preferred
- Gliding operation with crossbars assembled along the outer radius in conjunction with a special guide trough
- Gliding operation not guaranteed with crossbars assembled along the inner radius
- The extender crossbar can either be attached to the side links directly or can be used in combination with two standard snap-open crossbars.



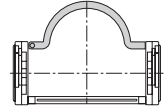
Square extender crossbar combined with standard snap-open crossbars.



Attached directly to the side link.



Round extender crossbar combined with standard snap-open crossbars.



Attached directly to the side link.

Part No.	Max Ø Hose	Style	Installation Side Link	Combined with Snap-Open Crossbars
450-15-RHD115	By request	Round	Yes	No
450-17-RD115	By request	Round	No	Yes
450-25-D150	By request	Square	Yes	No
450-30-D200	By request	Square	Yes	No
450-35-D250	By request	Square	Yes	No
450-40-D300	By request	Square	Yes	No
450-20-HD150	By request	Square	No	Yes
450-25-HD200	By request	Square	No	Yes
450-30-HD250	By request	Square	No	Yes


E4 clip on cable binder

- For side mounted applications
- Serves as a clip-on, lateral guide for hoses and cables on Energy Chains®
- The loops can be adjusted as needed
- Compatible with many E4 Energy Chains®
- Economical
- One clip and one locking band are needed for each chain link



Part No.	Form
450-B12	Locking clip, comprised of a locking element
450-B12-200	Locking band, comprised of a locking element and band; 12 x 1.5 x 200 mm

Energy Chain System® E4/100

Series 640

Mounting Brackets - Steel

energy chain® configurator ▶

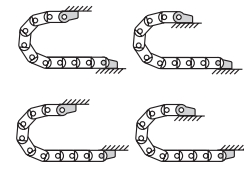
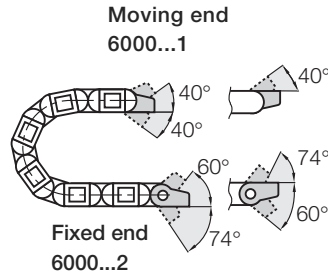


640



Option 1: pivoting

- For pivoting connections
- One part for all chain widths
- Electrically conductive



Possible installation configurations -

Part No. Mounting Brackets Full Set

4 parts, 2 with pin, 2 with bore
Series 640

6000-12

Part No. Mounting Bracket Moving End

2 parts, 1 left & 1 right with bore
Series 640

6000-1

Part No. Mounting Bracket Fixed End

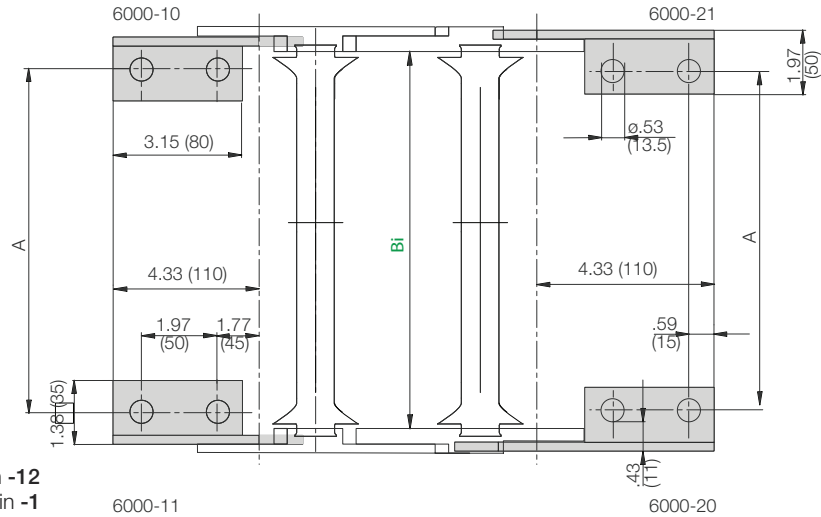
2 parts, 1 left & 1 right with pin
Series 640

6000-2

Due to the design of the E4/100 series chains, please note the following when ordering brackets:

Even number of links = full set, part number ending in -12

Odd number of links = 2 pieces, part number ending in -1



Bracket Mounting Dimensions

Width of Chain B_i	Mounting Brackets				Mounting Dimension A in. (mm)	Width of Chain B_i	Mounting Brackets				Mounting Dimension A in. (mm)
	Part Number	Full Set	Moving End Only	Fixed End Only			Part Number	Full Set	Moving End Only	Fixed End Only	
3.43 (87)	6000	-12	-1	-2	2.24 (57)	12.28 (312)	6000	-12	-1	-2	11.10 (282)
3.90 (99)	6000	-12	-1	-2	2.72 (69)	12.76 (324)	6000	-12	-1	-2	11.57 (294)
4.41 (112)	6000	-12	-1	-2	3.23 (82)	13.27 (337)	6000	-12	-1	-2	12.09 (307)
4.88 (124)	6000	-12	-1	-2	3.70 (94)	13.74 (349)	6000	-12	-1	-2	12.56 (319)
5.39 (137)	6000	-12	-1	-2	4.21 (107)	14.25 (362)	6000	-12	-1	-2	13.07 (332)
5.87 (149)	6000	-12	-1	-2	4.69 (119)	14.72 (374)	6000	-12	-1	-2	13.54 (344)
6.38 (162)	6000	-12	-1	-2	5.20 (132)	15.24 (387)	6000	-12	-1	-2	14.06 (357)
6.85 (174)	6000	-12	-1	-2	5.67 (144)	15.71 (399)	6000	-12	-1	-2	14.53 (369)
7.36 (187)	6000	-12	-1	-2	6.18 (157)	16.22 (412)	6000	-12	-1	-2	15.04 (382)
7.83 (199)	6000	-12	-1	-2	6.65 (169)	16.69 (424)	6000	-12	-1	-2	15.51 (394)
8.35 (212)	6000	-12	-1	-2	7.16 (182)	17.20 (437)	6000	-12	-1	-2	16.02 (407)
8.82 (224)	6000	-12	-1	-2	7.64 (194)	17.68 (449)	6000	-12	-1	-2	16.49 (419)
9.33 (237)	6000	-12	-1	-2	8.15 (207)	18.19 (462)	6000	-12	-1	-2	17.01 (432)
9.80 (249)	6000	-12	-1	-2	8.62 (219)	18.66 (474)	6000	-12	-1	-2	17.48 (444)
10.31 (262)	6000	-12	-1	-2	9.13 (232)	19.17 (487)	6000	-12	-1	-2	17.99 (457)
10.79 (274)	6000	-12	-1	-2	9.61 (244)	19.65 (499)	6000	-12	-1	-2	18.46 (469)
11.30 (287)	6000	-12	-1	-2	10.12 (257)	20.16 (512)	6000	-12	-1	-2	18.98 (482)
11.77 (299)	6000	-12	-1	-2	10.59 (269)	22.13 (562)	6000	-12	-1	-2	20.94 (532)

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Width of Crossbar
640-12-200-0

	B_{Ri}	Installation Part No.
-12	5.67 (144)	97-50-275
-13	6.18 (157)	97-50-275
-15	6.65 (169)	97-50-300
-16	7.16 (182)	97-50-300
-17	6.46 (164)	97-50-325
-18	8.15 (207)	97-50-325
-20	8.62 (219)	97-50-350
-21	9.13 (232)	97-50-350
-22	9.61 (244)	97-50-375
-23	10.12 (257)	97-50-375
-25	10.59 (269)	97-50-400
-26	11.10 (282)	97-50-400
-27	11.57 (294)	97-50-425
-28	12.09 (307)	97-50-425
-30	12.56 (319)	97-50-450
-31	13.07 (332)	97-50-450
-32	13.54 (344)	97-50-475
-33	14.06 (357)	97-50-475
-35	14.53 (369)	97-50-500
-36	15.04 (382)	97-50-500
-37	15.51 (394)	97-50-525
-38	16.02 (407)	97-50-525
-40	16.50 (419)	97-50-550
-41	17.01 (432)	97-50-550
-42	17.48 (444)	97-50-575
-43	17.99 (457)	97-50-575
-45	18.46 (469)	97-50-600
-46	18.98 (482)	97-50-600
-47	19.45 (494)	97-50-625
-48	19.96 (507)	97-50-625
-50	20.43 (519)	97-50-650
-51	20.94 (532)	97-50-650
-52	21.42 (544)	97-50-675
-53	21.93 (557)	97-50-675
-55	22.40 (569)	97-50-700
-60	24.37 (619)	97-50-750

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part No. 97-30
- 1/2 travel length glide bars
Part No. 93-01
- Installation sets as end connectors
Part No. 97-50-XX

-XX indicates the length of the profile rails on which the guide trough is mounted. The values and part numbers are specified in the table on the left. The standard length of the trough components and glide bars is 6.56 ft (2 m). The overall length of the guide trough directly correlates to the length of travel.

Example:

Length of travel 164 ft (50 m)
Center-mounted

Required guide troughs:

164 ft (50 m) guide trough, 82 ft. (25 m) glide bar
= 25 sections of 6.56 ft (2 m) guide trough
Part No. 97-30
= 13 sections of 6.56 ft (2 m) glide bar
Part No. 93-01

Required number of installation sets:

= Number of guide trough components + 1
= 25 + 1 = 26

Part No. of the installation sets **97-50-XXX**

Example:

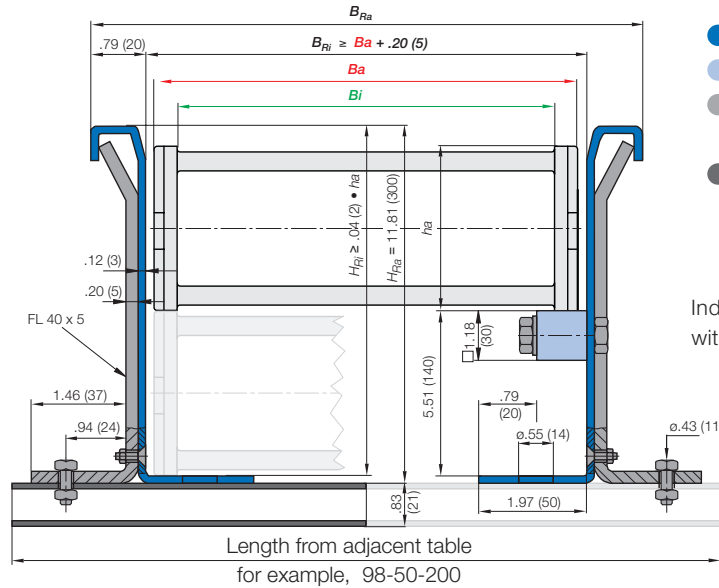
97-50-400 for 15.75 (400 mm) long profile rail



Left: Guide trough with glide bars
Right: Guide troughs without glide bars



Installation sets as section connectors

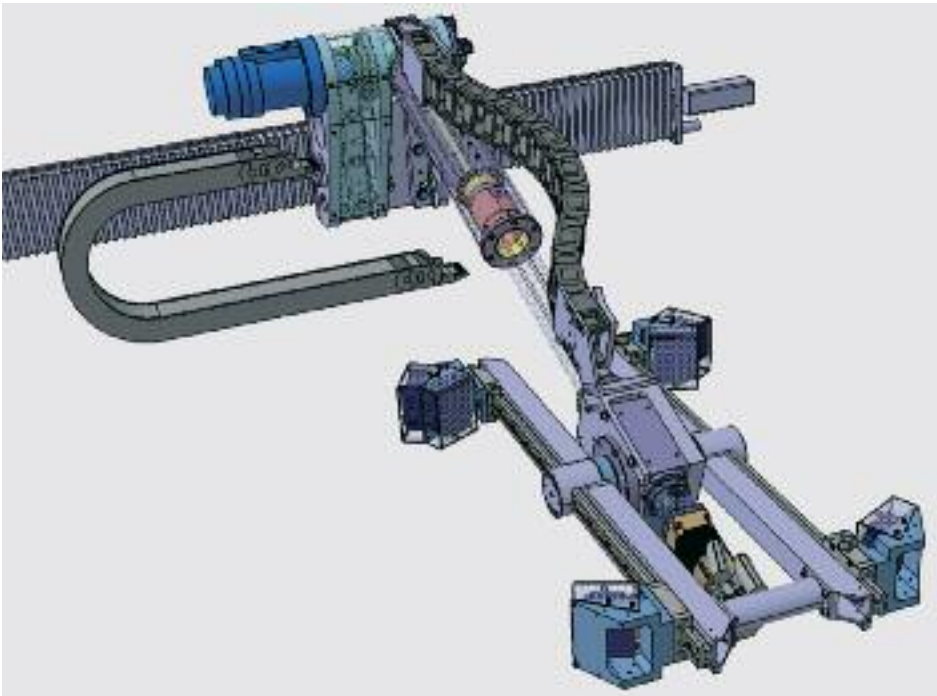


- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

* Specialized guide trough available upon request

Standard length profile rail



Friction welding machine - Special E4/00 version bend in two directions

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index


Series 800

Special Features / Options


ESD classification:
Electrically conductive
ESD/ATEX version upon request

Assembly Tips


Opening Energy Chains®: Remove crossbars and clips - Insert screwdriver into the slot, push down, release by lever action

Other Installation Methods

Vertical, hanging ≤ 394 ft (120 m)

Vertical, standing ≤ 19.69 ft (6 m)

Side-mounted, un supp. ≤ 19.69 ft (6 m)

Rotary requires further calculation

Usage Guidelines


- If a particularly large and rigid Energy Chain® is required
- For very high speeds and/or accelerations
- For long travels
- For high additional loads

Features & Benefits

- 1 Dirt-repellent exterior
- 2 Optimized glide pads with lateral wear allowance
- 3 Wide, rounded crossbars
- 4 Stop dog with brake for noise reduction
- 5 Crossbars on Energy Chains® are removable along both radii
- 6 Each chain link consists of four opening crossbars which increases its rigidity and allows for a greater unsupported length
- 7 Undercut for more stability
- 8 Energy Chains also available with reverse bending radius "RBR"


Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator

16.4 ft (5 m) 800-30-350-0



Energy Chain®

With 2 separators 8011 assembled every 2nd link



Interior Separation

1 Set 8000-12



Mounting Bracket

Energy Chain System® E4/100

Series 800

Installation Dimensions

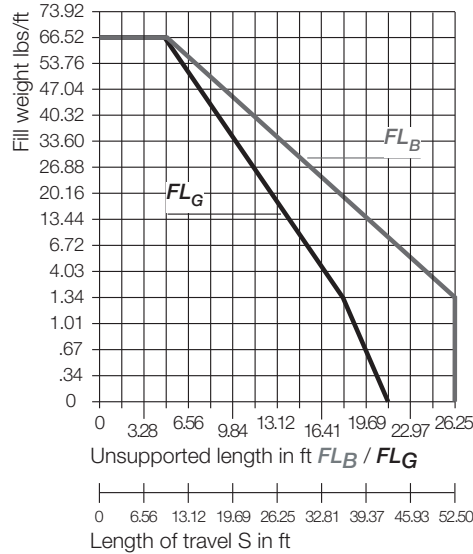
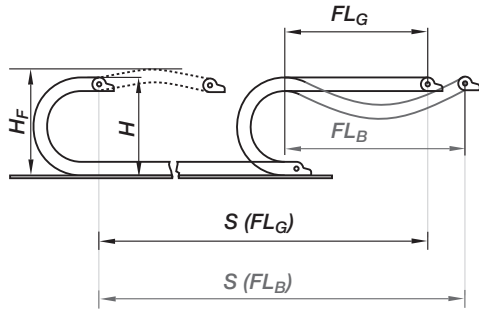
energy chain® configurator ▶



800

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



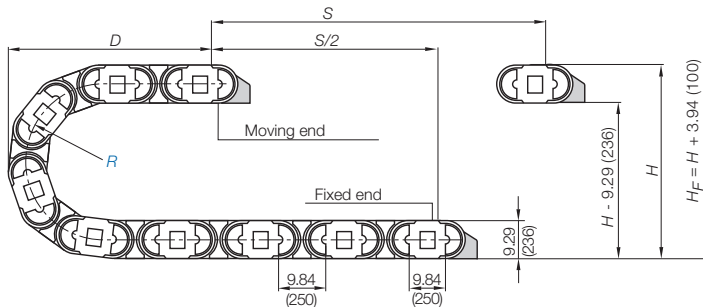
Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{safety buffer}$
- H_F = Required clearance height
- H_{R1} = Trough inner height
- H_2 = *Mounting height
- D_2 = Overlength - long travels, gliding
- K_2 = *Add-on
- *If the mounting bracket location is set lower



Pitch per link = 9.84" (250 mm)
 Links per ft (m) = 1.22 (4)
 For center mount applications:
 Chain length = $\frac{S}{2} + K$

The required clearance height: $H_F = H + 3.94$ in. (100 mm) (with 3.36 lbs/ft (5 kg/m) fill weight. Please consult igus® if space is particularly restricted.

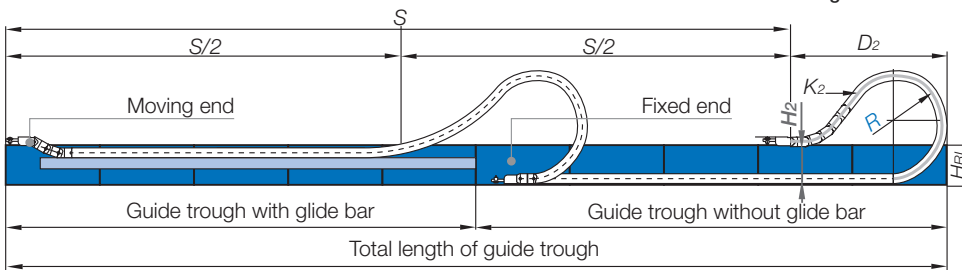
R	12.80 (325)	13.78 (350)	15.75 (400)	17.72 (450)	19.69 (500)	23.62 (600)	29.53 (750)	39.37 (1000)
H^*	34.88 (886)	36.85 (936)	40.79 (1036)	44.72 (1136)	48.66 (1236)	56.53 (1436)	68.35 (1736)	88.03 (2236)
D	28.54 (725)	29.53 (750)	31.50 (800)	33.46 (850)	35.43 (900)	39.37 (1000)	45.27 (1150)	55.12 (1400)
K	60.04 (1525)	62.99 (1600)	69.29 (1760)	75.39 (1915)	81.69 (2075)	93.90 (2385)	112.60 (2860)	143.50 (3645)

For long travels with lowered mounting height

Please consult igus® when choosing to use a lowered mounting height with this series

Long travel lengths from 32.8 ft. (10 m) to max. 1,476 ft. (450 m)

For center mount applications:
 Chain length = $\frac{S}{2} + K_2$



Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.

Design, Chapter 1

Technical Data

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB



Details of material properties

▶ Chapter 1

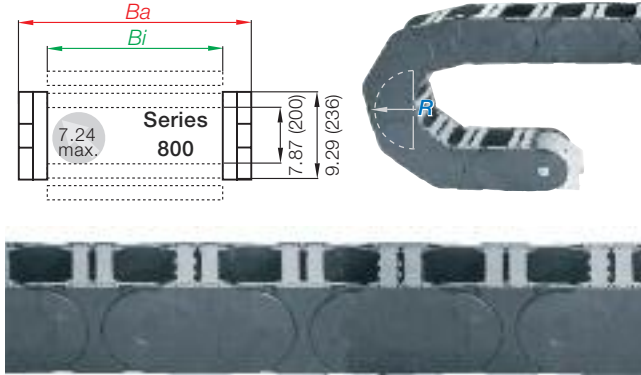


PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



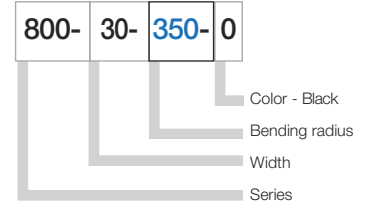
6.188

Series 800 - Energy Chain® with crossbars every link



- Crossbars every link
- For use with rigid hydraulic hoses
- For particularly demanding applications
- Can be opened from both sides

Part Number Structure



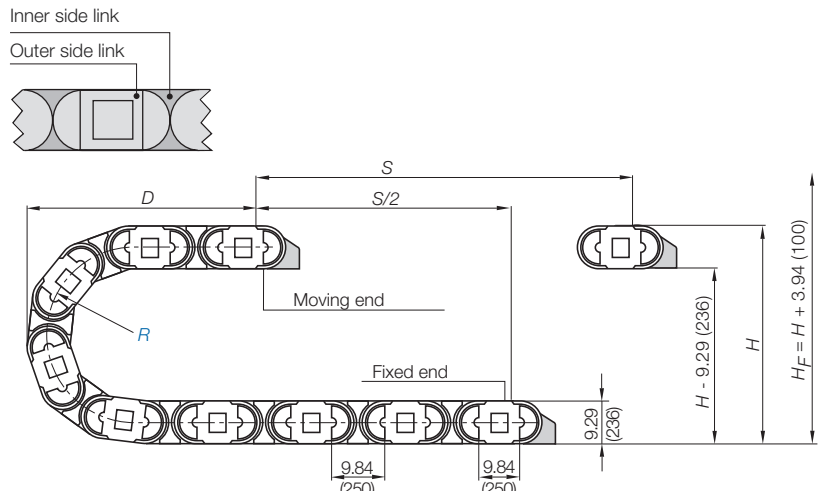
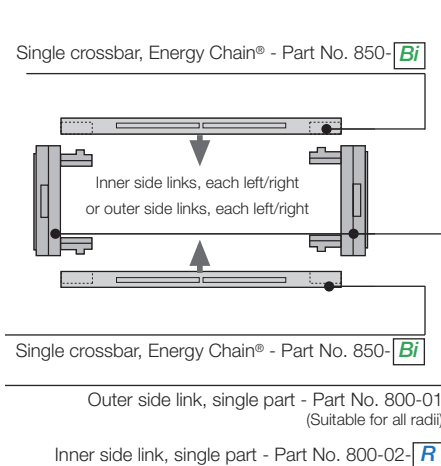
Supplement part number with required radius. Example: 800-30-350-0
Pitch: 9.84 in. (250 mm) per link links/ft(m) = 1.22 (4)

Part Number.		Bi	Ba	800
Crossbars	Every link	in. (mm)	in. (mm)	lbs/ft (kg/m)
800-20-	<input type="checkbox"/> -0	7.87 (200)	10.24 (260)	≈ 10.14 (15.09)
800-25-	<input type="checkbox"/> -0	9.84 (250)	12.20 (310)	≈ 10.42 (15.50)
800-30-	<input type="checkbox"/> -0	11.81 (300)	14.17 (360)	≈ 10.68 (15.89)
800-32-	<input type="checkbox"/> -0	12.80 (325)	15.16 (385)	≈ 10.79 (16.05)
800-35-	<input type="checkbox"/> -0	13.78 (350)	16.14 (410)	≈ 10.90 (16.22)
800-40-	<input type="checkbox"/> -0	15.75 (400)	18.11 (460)	≈ 11.25 (16.74)
800-45-	<input type="checkbox"/> -0	17.72 (450)	20.08 (510)	≈ 11.34 (16.88)
800-50-	<input type="checkbox"/> -0	19.69 (500)	22.04 (560)	≈ 11.58 (17.23)
800-55-	<input type="checkbox"/> -0	21.65 (550)	24.02 (610)	≈ 11.85 (17.63)
800-60-	<input type="checkbox"/> -0	23.62 (600)	25.98 (660)	≈ 12.22 (18.19)

Choose from the radii below for all of the above sizes

	Radius (mm)							
	325	350	400	450	500	600	750	1000
R	12.80 (325)	13.78 (350)	15.75 (400)	17.72 (450)	19.69 (500)	23.62 (600)	29.53 (750)	39.37 (1000)
H*	34.88 (886)	36.85 (936)	40.79 (1036)	44.72 (1136)	48.66 (1236)	56.53 (1436)	60.47 (1536)	88.03 (2236)
D	28.54 (725)	29.53 (750)	31.50 (800)	33.46 (850)	35.43 (900)	39.37 (1000)	45.27 (1150)	55.12 (1400)
K	60.04 (1525)	62.99 (1600)	69.29 (1760)	75.39 (1915)	81.69 (2075)	93.90 (2385)	112.60 (2860)	143.50 (3645)

Energy Chain® as separate parts, links and side plates





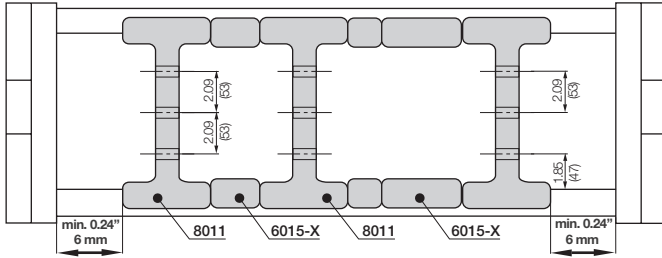
Option 1: Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.

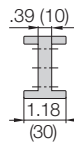
NOTE: Observe a lateral spacing of at least 1.26 in. (32mm) for Energy Tubes and .63 in. (16mm) for Energy Chain®. There is no minimum spacing needed for side plates

Exception: Minimum spacing

Locking separator 6008 = .91" (23 mm)



Vertical separator
8001



Vertical separator

Unassembled **Part No. 8001**
Assembled **Part No. 8011**

- **Standard separator 8001 for Energy Chains®**
This separator offers safe stability due to its wide base design, also when used with thick cables or hoses.



Spacers
6005-XX



Spacer (chain only)

Unassembled **Part No. 6005**
Assembled **Part No. 6015**

- **NOTE ON SPACERS**
Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications. The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm)). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

Spacers available in the following sizes:

Part No. Unassembled	Part No. Assembled	in.	(mm)
6005 -10	6015 -10	.39"	(10)
6005 -15	6015 -15	.59"	(15)
6005 -20	6015 -20	.79"	(20)

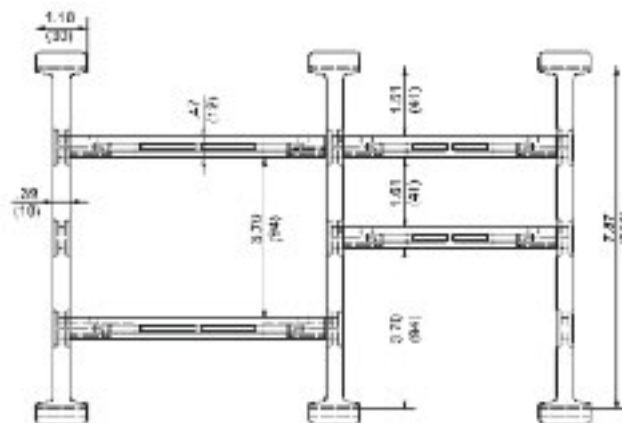
Modular E4 shelving system safeguards large cables - Series 800



Modular Shelving

Single sided snap in tab

Unassembled **Part No. 8001H1**
Assembled **Part No. 8011H1**



Modular Shelving

Double sided snap in tab

Unassembled **Part No. 8001H2**
Assembled **Part No. 8011H2**

- Easy assembly
- Robust, also for large cable diameters
- Modular
- Widths from 50 to 600 mm
- For use with **vertical separator 8001** and **crossbar 450-XX**

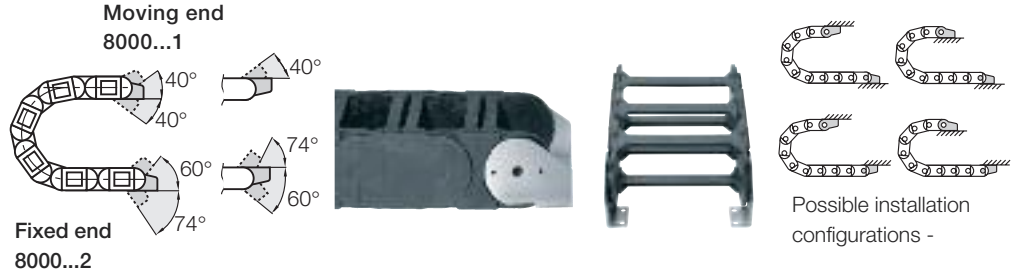


igus® Energy Chain System®



Option 1: pivoting

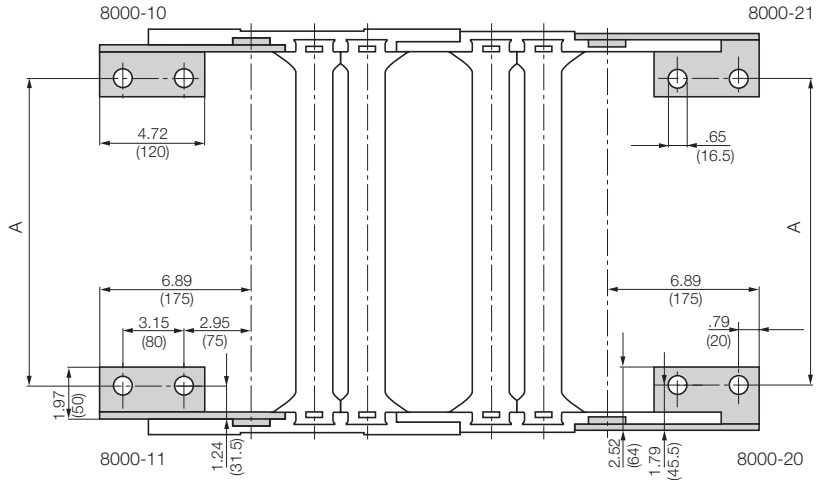
- For pivoting connections
- One part for all chain widths
- Electrically conductive



Part No. Mounting Brackets Full Set
 4 parts, 2 with pin, 2 with bore
 Series 800
8000-12

Part No. Mounting Bracket Moving End
 2 parts, 1 left & 1 right with bore
 Series 800
8000-1

Part No. Mounting Bracket Fixed End
 2 parts, 1 left & 1 right with pin
 Series 800
8000-2



Bracket Mounting Dimensions

Mounting Brackets

Width of Chain <i>Bi</i>	Part Number	Full Set	Moving End Only	Fixed End Only	A in. (mm)
7.87 (200)	8000	-12	-1	-2	5.91 (150)
9.84 (250)	8000	-12	-1	-2	7.87 (200)
11.81 (300)	8000	-12	-1	-2	9.84 (250)
12.80 (325)	8000	-12	-1	-2	10.83 (275)
13.78 (350)	8000	-12	-1	-2	11.81 (300)
15.75 (400)	8000	-12	-1	-2	13.78 (350)
17.72 (450)	8000	-12	-1	-2	15.75 (400)
19.69 (500)	8000	-12	-1	-2	17.72 (450)
21.65 (550)	8000	-12	-1	-2	19.69 (500)
23.62 (600)	8000	-12	-1	-2	21.65 (550)

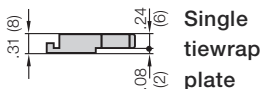
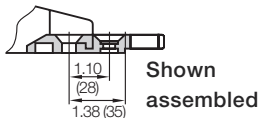
Due to the design of the E4/100 series chains, please note the following when ordering brackets:

Even number of links = full set, part number ending in -12
 Odd number of links = 2 pieces, part number ending in -1

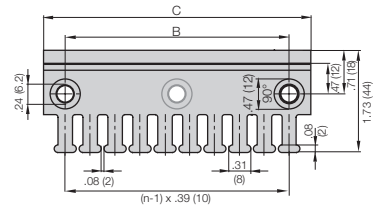
Strain Relief

Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.



Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



For more information please refer to strain relief section of Chapter 10

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec: <http://www.igus.com/quickspec>

Energy Chain System® E4/100

Series 800

Guide Trough

energy chain® configurator ▶



800

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part No. 90-30
- 1/2 travel length glide bars
Part No. 90-31
- Installation sets as end connectors
Part No. 90-50-XX

-XX indicates the length of the profile rails on which the guide trough is mounted. The values and part numbers are specified in the table on the right. Standard length of the trough components and glide bars is 6.56 ft (2m).

The required overall length of the guide trough directly correlates to the length of travel.

Example:
Length of travel 164 ft (50m)
Center mounted

Required guide troughs:
164 ft (50 m) guide trough
82 ft (25 m) glide bars
= 25 sections of (2 m) guide trough
without glide bars **Part No. 90-30**
= 13 section of (2 m) guide troughs
with glide bars **Part No. 90-31**
Required number of installation sets:
= Number of guide trough components + 1
= 25 + 1 = 26
Part number of the installation sets
90-50-XXX
Example:
90-50-400 for (400 m) long profile rail



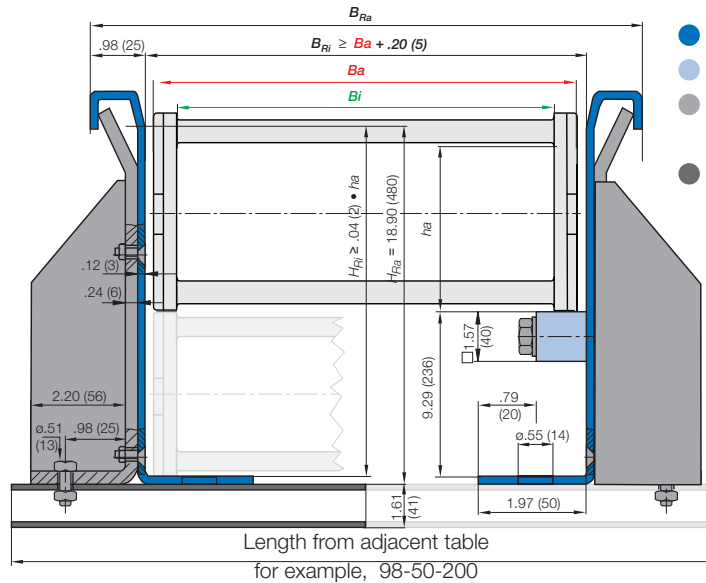
Left: Guide trough with glide bars
Right: Guide troughs without glide bars



Installation sets as section connectors

Width of Crossbar
640-12-200-0

	B_{Ri}	Installation Part No.
-20	10.43 (265)	90-50-450
-25	12.40 (315)	90-50-500
-30	14.37 (365)	90-50-550
-32	15.35 (390)	90-50-575
-35	16.33 (415)	90-50-600
-40	18.31 (465)	90-50-650
-45	20.28 (515)	90-50-700
-50	22.24 (565)	90-50-750
-55	24.21 (615)	90-50-800
-60	26.18 (665)	90-50-850



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Standard length profile rail

Individual attachment without profile rail

* Specialized guide trough available upon request

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS







hooks.

claws.

E4/Light

E4/light - stable, lightweight and cost-effective

System E4/Light – E4 'light' features smaller side links (all sizes and styles) and thinner crossbars (specifically styles 14240 and 14340) when compared to igus®' standard E4 cable carriers. It's cost-effective, lightweight and still offers a large interior space for multiple cables and hoses. E4 light works especially for unsupported, short travel applications and is also ideal in hanging and short-standing designs.

Typical industries and applications

- Machine tools
- Material handling
- Stone cutting machines
- Woodworking machines
- General machinery
- Vehicles
- Construction machinery
- Limited long travel applications



ATEX/ESD: Excellent performance with the special material igumid ESD (upon request) "Rear grip" achieves long-term electrical conductivity



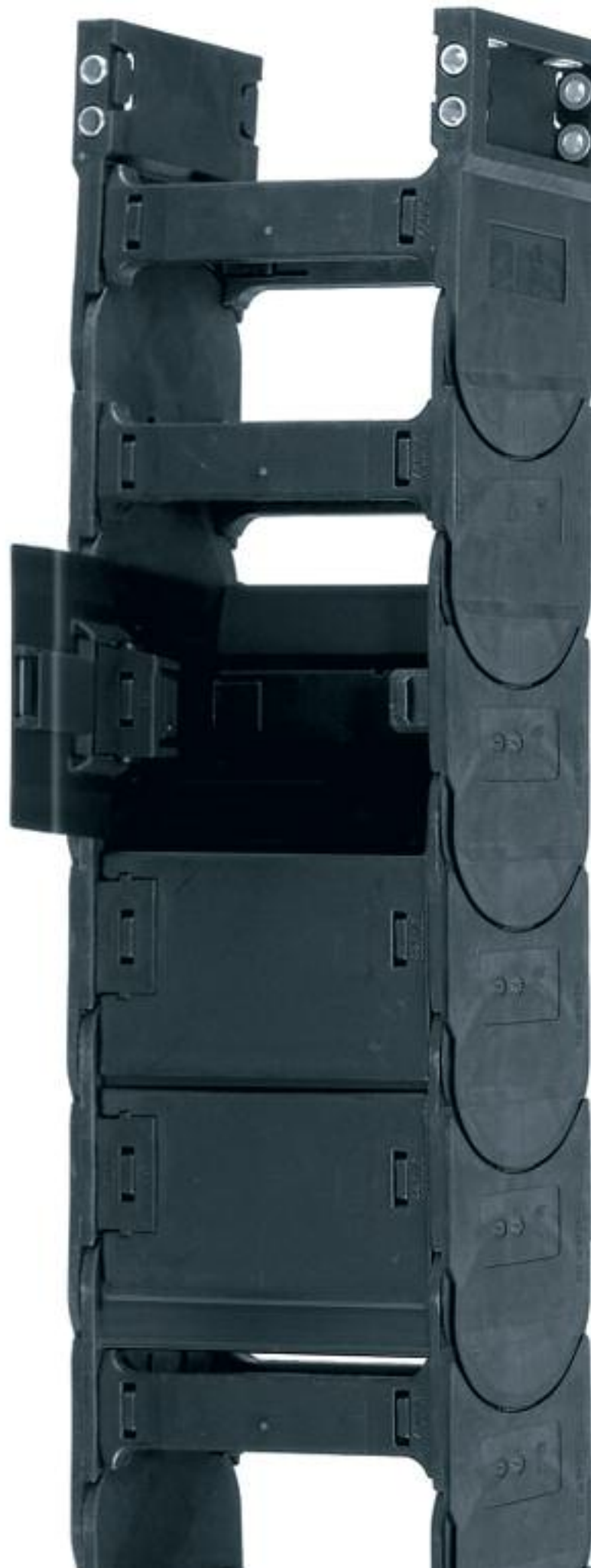
Side-mounted - unsupported



High torsional rigidity



System E4/4 approved
with long travels





E4/light Energy Chains® and Energy Tubes are ideal in Machine Tools



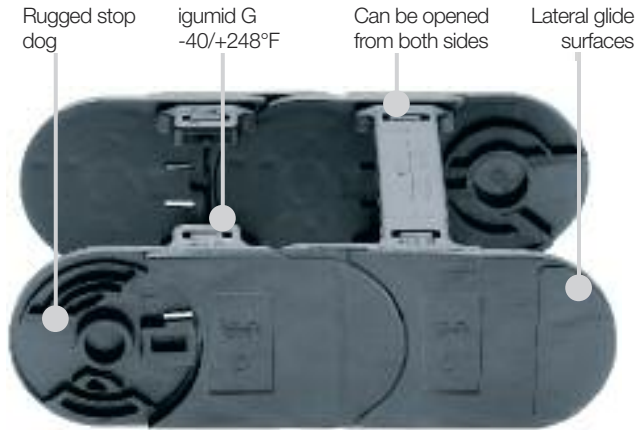
E4/light is popular for hanging applications



With the space-saving igus® E4 Polymer Energy Chains® the overall dimension for the installation for this crane system was considerably reduced

Energy Chain System® E4 Light Selection Guide

energy chain® configurator 



E4/light version with the approved E4/4 Series undercut design

- Lightweight
- Optimized ratio of interior and exterior dimension
- Cost-effective
- Numerous interior separation possibilities
- Wide range of modular accessories
- Narrow outer links
- Maximum stability in the igus® range
- Maximum travel: 492 - 820 ft (150 - 250 m)
- You can find more technical data about the material, chemical resistance, temperatures ► **Design, Chapter 1**

Crossbars every link for particularly demanding applications



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Bending radius <i>R</i> in. (mm)
14040	2.20 (56)	1.97-23.62 (50-600)	2.99-24.65 (76-626)	3.31 (84)	5.31-19.69 (135-500)
14240	2.44 (62)	1.97-15.75 (50-400)	2.99-16.77 (76-426)	3.31 (84)	5.31-19.69 (135-500)
15050	3.15 (80)	1.97-23.62 (50-600)	3.15-24.80 (80-630)	4.25 (108)	5.91-19.69 (150-500)
1640	4.41 (112)	1.97-23.62 (50-600)	3.31-24.96 (84-634)	5.51 (140)	7.87-23.62 (200-600)

Crossbars every 2nd link for almost all applications



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Bending radius <i>R</i> in. (mm)
14140	2.20 (56)	1.97-23.62 (50-600)	2.99-24.65 (76-626)	3.31 (84)	5.31-19.69 (135-500)
14340	2.44 (62)	1.97-15.75 (50-400)	2.99-16.77 (76-426)	3.31 (84)	5.31-19.69 (135-500)
15150	3.15 (80)	1.97-23.62 (50-600)	3.15-24.80 (80-630)	4.25 (108)	5.91-19.69 (150-500)

Energy Tubes fully enclosed, excellent cable protection

Available for certain widths and radii



Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Bending radius <i>R</i> in. (mm)
R18840	2.20 (56)	2.95-18.19 (75-462)	3.98-19.25 (101-489)	3.31 (84)	5.91-19.69 (150-500)
R19850	3.15 (80)	2.95-18.19 (75-462)	4.13-19.41 (105-493)	4.25 (108)	7.87-19.69 (200-500)
R1608	4.41 (112)	7.87-15.75 (200-400)	9.21-17.09 (234-434)	5.51 (140)	9.84-23.62 (250-600)

Energy Chain System® E4 Light Assembly instructions

Energy Chains® and Energy Tubes - Assembling



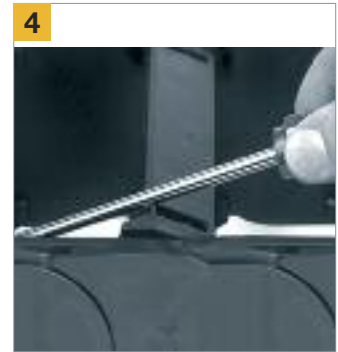
1 Position at one side ...



2 ... and snap in



3 Position opposite side.
Press together and snap in



4 Assemble crossbars - push down and snap in using a screwdriver

Assembling continued



5 Assemble clips (for Energy Chains with crossbars every other link) - push down and snap in using a screwdriver



6 Assemble Energy Tube lids and bottoms - Attach to the connector at an angle and snap in place

Energy Chains® - Opening



1 Remove crossbars - Insert screwdriver into the slot, using a lever action, apply pressure to the screwdriver to remove the crossbar.



2 Remove clips - Insert screwdriver into the slot, using a lever action, apply pressure to the screwdriver to remove the clip

Energy Tube - Opening



1 Remove lids/bottoms - Insert screwdriver into the slot, using a lever action apply pressure to the screwdriver to release



2 Release only **one side** to open the lid

Energy Chains® and Energy Tubes - Separating



1 Remove crossbars, clips, lids and bottoms at the outer links

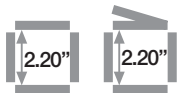


2 Insert screwdriver into the slot between the side links. Using a lever action, release the side links

14040
14140
R18840



Energy Chain System® E4 Light Series 14040/14140/R18840



Price Index



Series 14040



Series 14140



Series R18840

Special Features / Options



ESD classification:
Electrically conductive
ESD/ATEX version upon request



High torsional rigidity



Side-mounted - unsupported

Assembly Tips



Opening Energy Chains®: Remove cross-bars and clips - Insert screwdriver into the slot, push down, release by lever action



Remove lids/bottoms (Energy Tubes) - Insert screwdriver into the slot, release by lever action

Other Installation Methods

Vertical, hanging ≤ 262 ft (80 m)

Vertical, standing ≤ 19.69 ft (6 m)

Side-mounted, un supp. ≤ 6.56 ft (2 m)

Rotary requires further calculation

Usage Guidelines



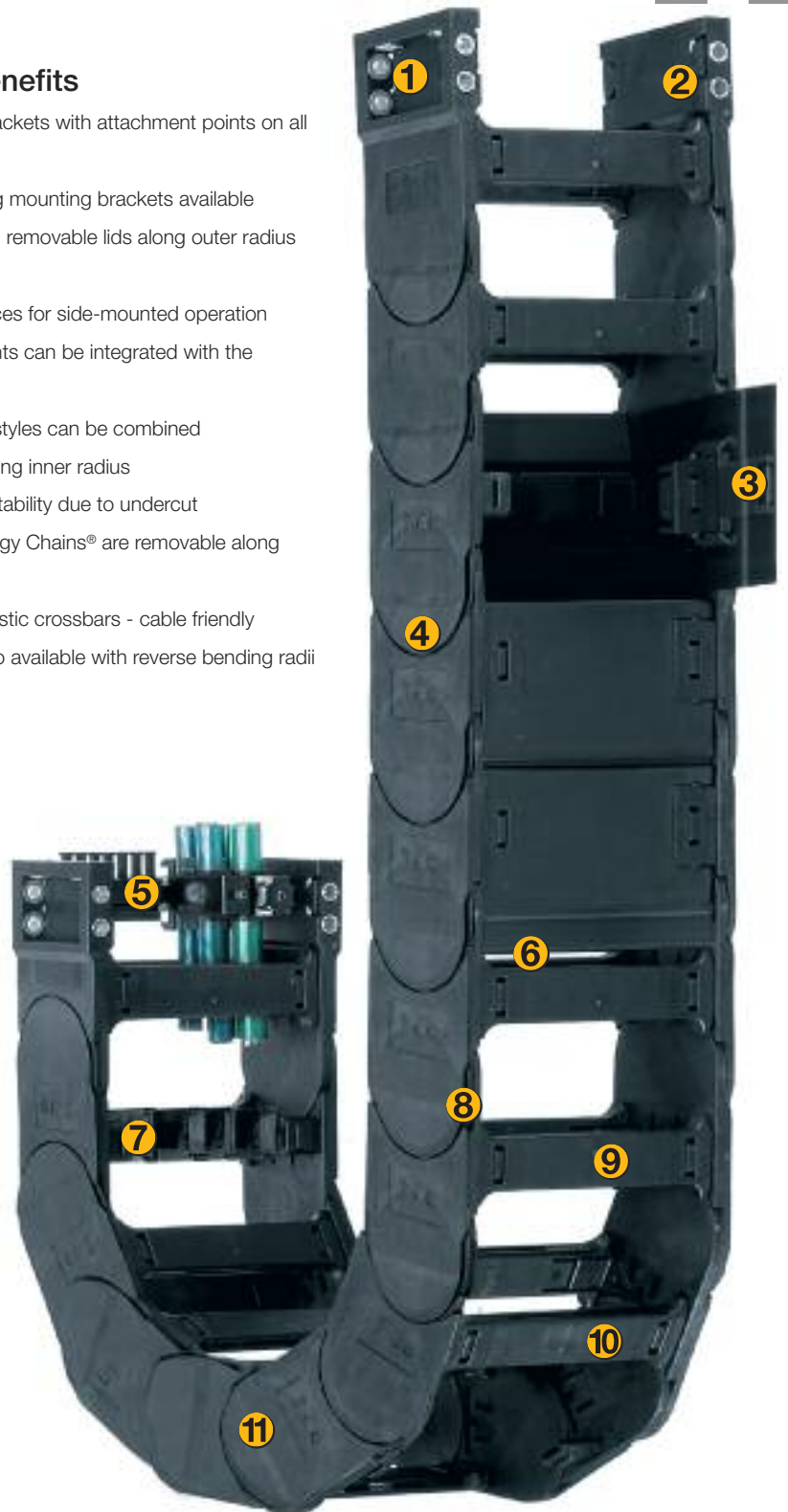
- If a simpler low-cost solution is required
- For maximum inner width with minimal outer width
- If the Series 400 is too large



- If a quieter version is required
➤ Series 400/410/R880
- If side-mounted chain/tube with a long unsupported travel is required
➤ Series 4040/4140/R8840
- If more inner height is required
➤ Series 14240/14340

Features & Benefits

- 1 KMA mounting brackets with attachment points on all sides
- 2 Locking or pivoting mounting brackets available
- 3 Hinged snap-open removable lids along outer radius of Energy Tube
- 4 Lateral glide surfaces for side-mounted operation
- 5 Strain relief elements can be integrated with the mounting bracket
- 6 Closed and open styles can be combined
- 7 Removable lids along inner radius
- 8 High side-mount stability due to undercut
- 9 Crossbars on Energy Chains® are removable along both radii
- 10 Wide, rounded plastic crossbars - cable friendly
- 11 Energy Chain® also available with reverse bending radii



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator ▶

16.4 ft (5 m) 14040-30-300-0

Energy Chain®

With 2 separators 411 assembled every 2nd link

Interior Separation

1 Set 141400-30-12P

Mounting Bracket

Energy Chain System® E4 Light Series 14040/14140/R18840 Installation Dimensions

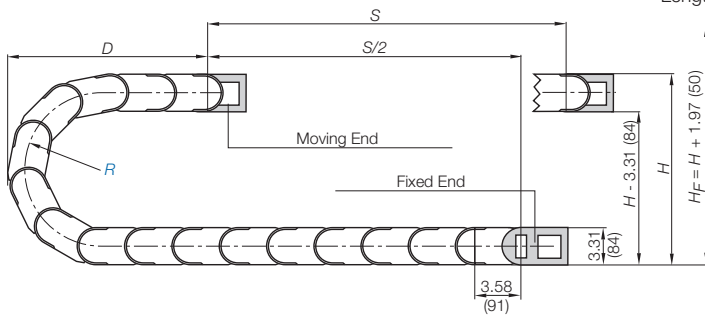
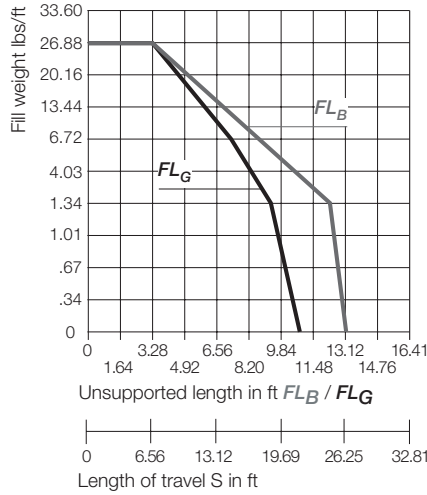
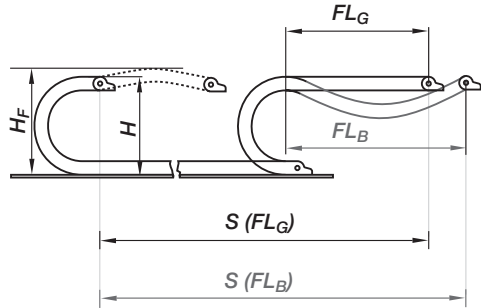
energy chain® configurator ▶

igus®

14040
14140
R18840

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



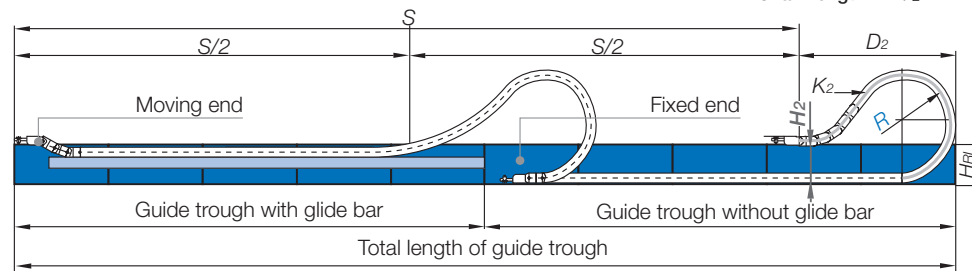
Pitch per link = 3.58" (91 mm)
Links per ft (m) = 3.35 (11)
For center mount applications:
Chain length = $\frac{S}{2} + K$

The required clearance height: $H_F = H + 1.97$ in. (50 mm) (with 1.34 lbs/ft (2 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	5.31 (135)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)	11.81 (300)	15.75 (400)	19.68 (500)
H_F^{*25}	14.17 (360)	15.16 (385)	17.13 (435)	19.09 (485)	23.03 (585)	26.97 (685)	34.84 (885)	42.72 (1085)
D	10.63 (270)	11.22 (285)	12.20 (310)	13.19 (335)	15.16 (385)	17.13 (435)	21.06 (535)	25.00 (635)
K	25.59 (650)	29.53 (750)	32.48 (825)	35.43 (900)	41.34 (1050)	48.23 (1225)	57.09 (1450)	69.88 (1775)

For long travels with lowered mounting height

Long travel lengths from 32.8 ft.(10m) to max. 492 ft. (150m)



For center mount applications:
Chain length = $\frac{S}{2} + K_2$

R	5.31 (135)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)	11.81 (300)	15.75 (400)	19.68 (500)
H_2	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)
D_2^{*25}	15.35 (390)	17.72 (450)	20.87 (530)	27.95 (710)	36.22 (920)	44.09 (1120)	60.24 (1530)	72.05 (1830)
K_2	28.66 (728)	32.24 (819)	39.41 (1001)	50.16 (1274)	64.49 (1638)	75.23 (1911)	100.31 (2548)	125.39 (3185)



For support of the lower run, see Chapter 9 for the Support Tray tool kit

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to Installation dimensions for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{safety buffer}$
 - H_F = Required clearance height
 - HRI = Trough inner height
 - H_2 = *Mounting height
 - D_2 = Overlength - long travels, gliding
 - K_2 = *Add-on
- *If the mounting bracket location is set lower



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.

Design, Chapter 1

Technical Data



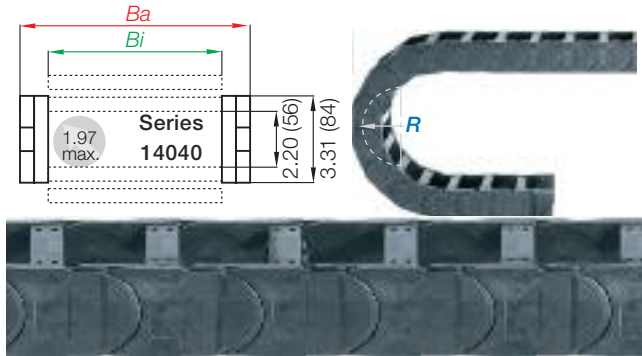
Details of material properties

▶ Chapter 1

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

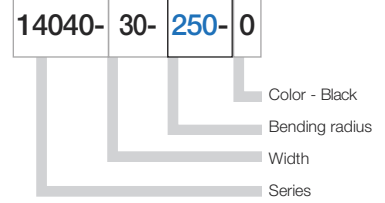
6.200

Series 14040 - Energy Chain® with crossbars every link

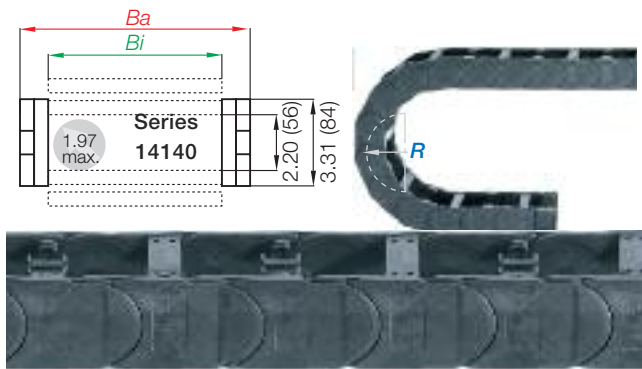


- Crossbars every link
- For use with rigid hydraulic hoses
- For particularly demanding applications
- Can be opened from both sides

Part Number Structure

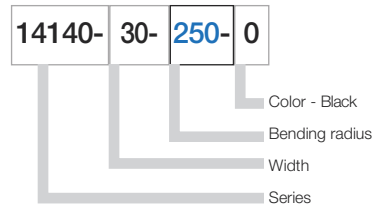


Series 14140 - Energy Chain® with crossbars every other link

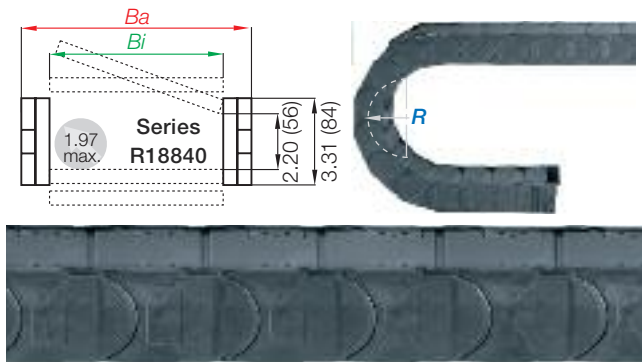


- Crossbars every other link - Standard configuration
- For nearly every situation
- Can be opened from both sides
- Easy assembly
- Stable
- Cost-effective

Part Number Structure

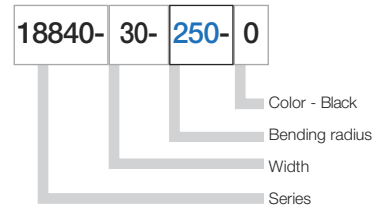


Series R18840 - fully enclosed Energy Tube

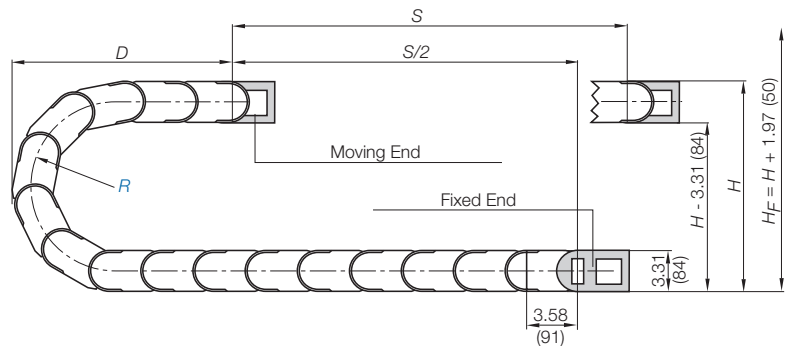
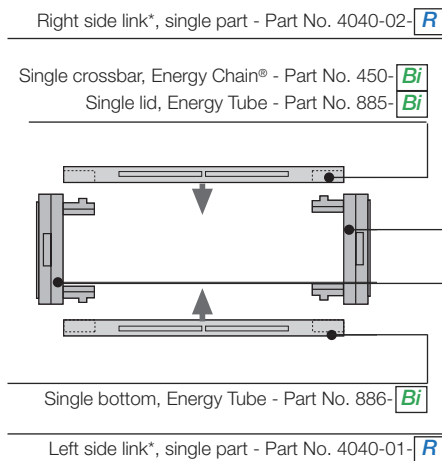


- Fully enclosed
- Excellent cable and hose protection against dirt
- Protection against hot chips up to 1652°F (900°C)
- Lids along inner radius are completely removable
- Lids along the outer radius are single-sided, snap open, hinged on one side as well as completely removable

Part Number Structure



Energy Chain® as separate parts, links and side plates



*View from the fixed point of the Energy Chain®/Energy Tube

Energy Chain System® E4 Light

Series 14040/14140/R18840

energy chain® configurator 



14040
14140
R18840

Supplement part number with required radius. Example: 14040-30-300-0

Pitch: 3.58 in. (91mm) per link links/ft(m) = 3.35 (11)

Part Number.		Tube		<i>Bi</i>	<i>Ba</i>	14040	14140	R18840
Crossbars Every link	Crossbars Every other	Version		in. (mm)	in. (mm)	lbs/ft (kg/m)	lbs/ft (kg/m)	lbs/ft (kg/m)
14040-05-	14140-05-		<input type="checkbox"/> -0	1.97 (50)	2.99 (76)	≈ 1.79 (2.66)	≈ 1.67 (2.48)	-
14040-06-	14140-06-		<input type="checkbox"/> -0	2.56 (65)	3.58 (91)	≈ 1.66 (2.47)	≈ 1.69 (2.51)	-
14040-07-	14140-07-	18840-07-	<input type="checkbox"/> -0*	2.95 (75)	3.98 (101)	≈ 1.85 (2.75)	≈ 1.51 (2.25)	≈ 2.15 (3.20)
14040-08-	14140-08-		<input type="checkbox"/> -0	3.43 (87)	4.45 (113)	≈ 1.91 (2.84)	≈ 1.61 (2.44)	-
14040-10-	14140-10-	18840-10-	<input type="checkbox"/> -0	3.94 (100)	4.96 (126)	≈ 1.97 (2.93)	≈ 1.75 (2.61)	≈ 2.35 (3.49)
14040-11-	14140-11-	-	<input type="checkbox"/> -0	4.41 (112)	5.47 (139)	≈ 2.06 (3.06)	≈ 1.79 (2.67)	-
14040-12-	14140-12-	18840-12-	<input type="checkbox"/> -0	4.92 (125)	5.94 (151)	≈ 2.10 (3.12)	≈ 1.82 (2.71)	≈ 2.59 (3.85)
14040-13-	14140-13-		<input type="checkbox"/> -0	5.39 (137)	6.46 (164)	≈ 2.19 (3.26)	≈ 1.86 (2.77)	-
14040-15-	14140-15-	18840-15-	<input type="checkbox"/> -0	5.91 (150)	6.93 (176)	≈ 2.23 (3.32)	≈ 1.89 (2.81)	≈ 2.88 (4.28)
14040-16-	14140-16-		<input type="checkbox"/> -0	6.38 (162)	7.44 (189)	≈ 2.30 (3.43)	≈ 1.92 (2.86)	-
14040-17-	14140-17-		<input type="checkbox"/> -0	6.89 (175)	7.91 (201)	≈ 2.38 (3.54)	≈ 1.96 (2.92)	≈ 3.05 (4.54)
14040-18-	14140-18-		<input type="checkbox"/> -0	7.36 (187)	8.43 (214)	≈ 2.45 (3.65)	≈ 2.00 (2.97)	-
14040-20-	14140-20-	18840-20-	<input type="checkbox"/> -0	7.87 (200)	8.90 (226)	≈ 2.47 (3.67)	≈ 2.00 (2.98)	≈ 3.26 (4.85)
14040-21-	14140-21-		<input type="checkbox"/> -0	8.35 (212)	9.41 (239)	≈ 2.54 (3.78)	≈ 2.04 (3.04)	-
14040-22-	14140-22-		<input type="checkbox"/> -0	8.86 (225)	9.88 (251)	≈ 2.59 (3.85)	≈ 2.06 (3.07)	-
14040-23-	14140-23-		<input type="checkbox"/> -0	9.33 (237)	10.39 (264)	≈ 2.67 (3.98)	≈ 2.11 (3.14)	-
14040-25-	14140-25-	18840-25-	<input type="checkbox"/> -0	9.84 (250)	10.87 (276)	≈ 2.73 (4.07)	≈ 2.14 (3.18)	≈ 3.75 (5.58)
14040-26-	14140-26-		<input type="checkbox"/> -0	10.31 (262)	11.38 (289)	≈ 2.80 (4.16)	≈ 2.16 (3.22)	-
14040-27-	14140-27-	18840-27-	<input type="checkbox"/> -0	10.83 (275)	11.85 (301)	≈ 2.87 (4.27)	≈ 2.20 (3.28)	≈ 3.93 (5.85)
14040-28-	14140-28-		<input type="checkbox"/> -0	11.30 (287)	12.36 (314)	≈ 2.88 (4.29)	≈ 2.21 (3.29)	-
14040-30-	14140-30-	18840-30-	<input type="checkbox"/> -0	11.81 (300)	12.83 (326)	≈ 3.03 (4.51)	≈ 2.28 (3.40)	≈ 4.19 (6.24)
14040-31-	14140-31-		<input type="checkbox"/> -0	12.28 (312)	13.35 (339)	≈ 3.07 (4.57)	≈ 2.30 (3.42)	-
14040-32-	14140-32-		<input type="checkbox"/> -0	12.79 (325)	13.82 (351)	≈ 3.09 (4.60)	≈ 2.31 (3.44)	-
14040-33-	14140-33-		<input type="checkbox"/> -0	13.27 (337)	14.33 (364)	≈ 3.21 (4.77)	≈ 2.37 (3.53)	-
14040-35-	14140-35-	18840-35-	<input type="checkbox"/> -0	13.78 (350)	14.80 (376)	≈ 3.31 (4.93)	≈ 2.43 (3.61)	≈ 4.70 (6.99)
14040-36-	14140-36-		<input type="checkbox"/> -0	14.25 (362)	15.31 (389)	≈ 3.32 (4.94)	≈ 2.43 (3.61)	-
14040-37-	14140-37-		<input type="checkbox"/> -0	14.76 (375)	15.79 (401)	≈ 3.33 (4.95)	≈ 2.43 (3.62)	-
14040-38-	14140-38-		<input type="checkbox"/> -0	15.24 (387)	16.30 (414)	≈ 3.39 (5.04)	≈ 2.46 (3.66)	-
14040-40-	14140-40-	18840-40-	<input type="checkbox"/> -0	15.75 (400)	16.77 (426)	≈ 3.52 (5.24)	≈ 2.53 (3.76)	≈ 5.34 (7.94)
14040-41-	14140-41-		<input type="checkbox"/> -0	16.22 (412)	17.28 (439)	≈ 3.62 (5.39)	≈ 2.58 (3.84)	-
14040-42-	14140-42-		<input type="checkbox"/> -0	16.73 (425)	17.76 (451)	≈ 3.72 (5.54)	≈ 2.63 (3.92)	-
14040-43-	14140-43-		<input type="checkbox"/> -0	17.20 (437)	18.27 (464)	≈ 3.77 (5.61)	≈ 2.65 (3.95)	-
14040-45-	14140-45-		<input type="checkbox"/> -0	17.72 (450)	18.74 (476)	≈ 3.82 (5.68)	≈ 2.67 (3.98)	-
14040-46-	14140-46-	18840-46-	<input type="checkbox"/> -0	18.19 (462)	19.25 (489)	≈ 3.83 (5.70)	≈ 2.68 (3.99)	≈ 5.64 (8.40)
14040-47-	14140-47-		<input type="checkbox"/> -0	18.70 (475)	19.72 (501)	≈ 3.92 (5.83)	≈ 2.73 (4.06)	-
14040-48-	14140-48-		<input type="checkbox"/> -0	19.17 (487)	20.24 (514)	≈ 3.94 (5.86)	≈ 2.74 (4.08)	-
14040-50-	14140-50-		<input type="checkbox"/> -0	19.69 (500)	20.71 (526)	≈ 4.00 (5.96)	≈ 2.78 (4.13)	-
14040-51-	14140-51-		<input type="checkbox"/> -0	20.16 (512)	21.22 (539)	≈ 4.02 (5.98)	≈ 2.78 (4.14)	-
14040-52-	14140-52-		<input type="checkbox"/> -0	20.67 (525)	21.69 (551)	≈ 4.05 (6.03)	≈ 2.80 (4.16)	-
14040-53-	14140-53-		<input type="checkbox"/> -0	21.14 (537)	22.20 (564)	≈ 4.15 (6.18)	≈ 2.85 (4.24)	-
14040-55-	14140-55-		<input type="checkbox"/> -0	21.65 (550)	22.68 (576)	≈ 4.48 (6.67)	≈ 3.01 (4.48)	-
14040-60-	14140-60-		<input type="checkbox"/> -0	23.62 (600)	24.65 (626)	≈ 4.69 (6.98)	≈ 3.08 (4.58)	-

Choose from the radii below for all of the above sizes

Radius (mm) Example: 14040-300-0

	135**	150	175	200	250	300	400	500
R	5.31 (135)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)	11.81 (300)	15.75 (400)	19.68 (500)
H ^{±0.25}	14.17 (360)	15.16 (385)	17.13 (435)	19.09 (485)	23.03 (585)	26.97 (685)	34.84 (885)	42.72 (1085)
D	10.63 (270)	11.22 (285)	12.20 (310)	13.19 (335)	15.16 (385)	17.13 (435)	21.06 (535)	25.00 (635)
K	25.59 (650)	29.53 (750)	32.48 (825)	35.43 (900)	41.34 (1050)	48.23 (1225)	57.09 (1450)	69.88 (1775)

** This radius is not available for the R18840 Series
*Removable lid only, no hinged option

0=Standard color black. For other colors see Chapter 1
For wider chains see page 6.135. For large diameter hoses see page 6.135

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS

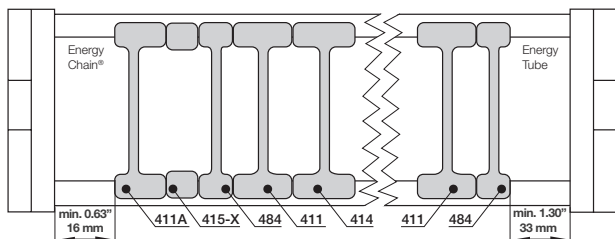




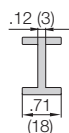
Option 1: Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.

NOTE: Observe a lateral spacing of at least 1.30 in. (33mm) for Energy Tubes and .63 in. (16mm) for Energy Chain®. There is no minimum spacing needed for side plates



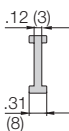
STANDARD
Vertical separator
401



Vertical separator

Unassembled	Part No. 401
Assembled	Part No. 411

Vertical separator
483



Vertical separator

Unassembled	Part No. 483
Assembled	Part No. 484

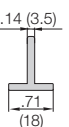
Locking separator
404



Locking separator (chain only)

Unassembled	Part No. 404
Assembled	Part No. 414

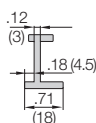
Locking separator
406



Locking separator (tube only)

Unassembled	Part No. 406
Assembled	Part No. 416

Asymmetric separator
401A



Asymmetrical separator (chain only)

Unassembled	Part No. 401A
Assembled	Part No. 411A

Spacers
405-XX



Spacer (chain only)

Unassembled	Part No. 405-XX
Assembled	Part No. 415-XX

XX = width of the spacer

Spacers available in the following sizes:

Part No.	Part No.	in.	(mm)
Unassembled	Assembled		
405 -10	415 -10	.39"	(10)
405 -15	415 -15	.59"	(15)
405 -20	415 -20	.79"	(20)
405 -30	415 -30	1.18"	(30)
405 -40	415 -40	1.57"	(40)

- **Standard separator 401 for Energy Chains® and Energy Tubes**

This separator offers safe stability due to its wide base design, also when used with thick cables or hoses.

- **Vertical separator 483 for Energy Chains® and Energy Tubes**

This separator offers a narrow base for applications where a large number of small cables need to be individually separated.

- **Locking separator 404 for Energy Chains®**

This separator features increased retention force for applications exposed to very high humidity and extreme loads. The extra retention force is achieved by asymmetric claws for the crossbar. Take care to ensure proper alignment.

- **Locking separator 406 for Energy Tubes**

It features a single sided, secure fit, and can be placed on the lid or the bottom of the Energy Tube. The single side locking design helps to eliminate difficulties in assembling the opposite cover or crossbar

- **Asymmetrical separator 401A for Energy Chains®**

This separator features an (18mm) base. It can be used in combinations between spacers of different widths and vertical separators in side mounted applications.

- **NOTE ON SPACERS**

Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications. The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

Energy Chain System® E4 Light Series 14040/14140/R18840 Interior Separation

energy chain® configurator ▶



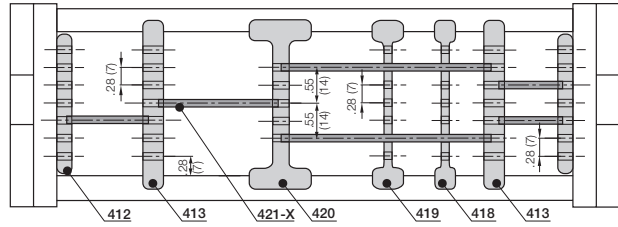
14040
14140
R18840



Option 2: Shelves

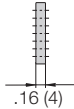
Energy Chains® and Energy Tubes can be subdivided both vertically and horizontally using the various interior separation elements.

► **Design, Chapter 1** for layout recommendations.



- **Side plates 402**

This component is used to form the basic pattern of a shelf system.



Side plate

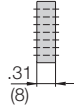
Unassembled	Part No. 402
Assembled	Part No. 412

Side plate 402



- **Vertical separator 403**

This component is used to form the basic pattern of a shelf system.



Vertical separator

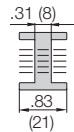
Unassembled	Part No. 403
Assembled	Part No. 413

Vertical separator 403



- **Locking vertical separator 410**

This separator is slotted and able to be combined with shelves. For Energy Chains® only.



Locking vertical separator

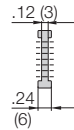
Unassembled	Part No. 410
Assembled	Part No. 420

Locking vertical separator 410



- **Slotted separators 408**

These are used for very complex subdivisions. However, they cannot be retrofitted into an existing separation system without removing the shelves first.



Slotted separators, closed

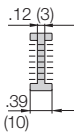
Unassembled	Part No. 408
Assembled	Part No. 418

Closed slotted separator 408



- **Slotted separator 409**

This separator can be retrofitted into an existing interior separation system without removing the shelves, as long as these shelves fit into any of the 3 middle slots



Slotted separators, open

Unassembled	Part No. 409
Assembled	Part No. 419

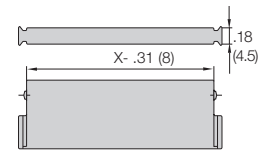
Open slotted separator 409



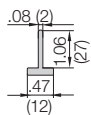
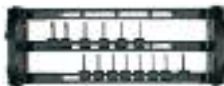
Shelves 420-XX

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 7 different heights in .28" (7mm) increments

Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled
.71 (18)	.39 (10)	420-18	421-18	2.95 (75)	2.64 (67)	420-75	421-75
.91 (23)	.59 (15)	420-23	421-23	3.46 (88)	3.15 (80)	420-88	421-88
.98 (25)	.67 (17)	420-25	421-25	3.94 (100)	3.62 (92)	420-100	421-100
1.10 (28)	.79 (20)	420-28	421-28	4.92 (125)	4.61(117)	420-125	421-125
1.30 (33)	.98 (25)	420-33	421-33	5.91 (150)	5.59(142)	420-150	421-150
1.69 (43)	1.38 (35)	420-43	421-43	6.89 (175)	6.57(167)	420-175	421-175
1.97 (50)	1.65 (42)	420-50	421-50	7.36 (187)	7.05(179)	420-187	421-187
2.44 (62)	2.13 (54)	420-62	421-62	7.87 (200)	7.56(192)	420-200	421-200



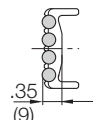
Center crossbar - developed for applications involving a very large number of thin cables, individually separated. This offers the option of subdividing the Energy Chain® into upper and lower halves, with mutually independent separators.



Center crossbar

Unassembled	Part No. 405
Assembled	Part No. 415

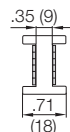
Rollclip - minimizes abrasion of particularly sensitive hoses or cables in an Energy Chain®. The integrated rollers compensate for relative movement between the chain and the hose or cable. This reduces the abrasion of the hoses or cables



Rollclip

Unassembled	Part No. 489-27
Assembled	Part No. 490-27

Roller separator - performs a similar function to the Rollclip, but doubles as a separator. Consult igus® if you have any questions regarding the roller separator.



Center crossbar

Unassembled	Part No. 429
Assembled	Part No. 430

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



14040
14140
R18840



Energy Chain System® E4 Light Series 14040/14140/R18840 Special Accessories

energy chain® configurator

igus® Energy Chain
System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

6.205

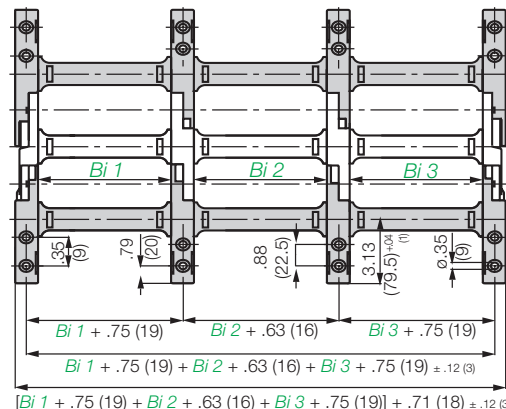


Part number example for
Energy Chain®
14040-10/20/10- 200 -0
14040-*Bi1/Bi2/Bi3*- R -0

We strongly recommend on-site consultation with an igus® technician for individual advice regarding mounting brackets, guide troughs and other design details.

Extension links - for extremely wide Energy Chains® up to 9.84 ft (3m)

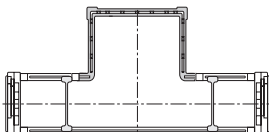
- For applications in which particularly high fill weights necessitate extremely wide Energy Chains®
- The extension link design allows virtually limitless side-by-side attachment of chains
- The unsupported length of a chain can be increased when additional loads are required
- Extension links can be used with Energy Chains®, Energy Tubes or a combination of both
- They are suitable for unsupported and gliding applications in a guide trough
- Energy Chains® with extension links are attached with KMA or steel mounting brackets.



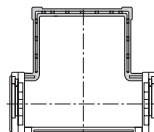
Consult igus® for your extender crossbar applications. We will be happy to assist you with your design layout.

Extender crossbars - For careful guiding of large diameter cables and hoses

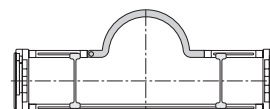
- Intended for cables and hoses with a maximum outer diameter of 9.64 in. (245 mm).
- Can be attached along either the inner or outer radius, inner radius preferred
- Gliding operation with crossbars assembled along the outer radius in conjunction with a special guide trough
- Gliding operation not guaranteed with crossbars assembled along the inner radius
- The extender crossbar can either be attached to the side links directly or can be used in combination with two standard snap-open crossbars.



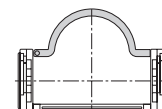
Square extender crossbar combined with standard snap-open crossbars.



Attached directly to the side link.



Round extender crossbar combined with standard snap-open crossbars.



Attached directly to the side link.

Part No.	Max Ø Hose	Style	Installation Side Link	Combined with Snap-Open Crossbars
450-15-RHD115	By request	Round	Yes	No
450-17-RD115	By request	Round	No	Yes
450-25-D150	By request	Square	Yes	No
450-30-D200	By request	Square	Yes	No
450-35-D250	By request	Square	Yes	No
450-40-D300	By request	Square	Yes	No
450-20-HD150	By request	Square	No	Yes
450-25-HD200	By request	Square	No	Yes
450-30-HD250	By request	Square	No	Yes

E4 clip on cable binder

- For side mounted applications
- Serves as a clip-on, lateral guide for hoses and cables on Energy Chains®
- The loops can be adjusted as needed

- Compatible with many E4 Energy Chains®
- Economical
- One clip and one locking band are needed for each chain link



Part No.	Form
450-B12	Locking clip, comprised of a locking element
450-B12-200	Locking band, comprised of a locking element and band; 12 x 1.5 x 200 mm

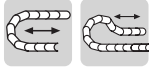


Energy Chain System® E4 Light Series 14040/14140/R18840 Mounting Brackets - KMA

energy chain® configurator ▶



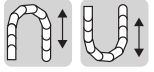
14040
14140
R18840



Standard

Option 1: KMA pivoting

- Profile rail option
- Universal use
- Corrosion resistant
- Short and long travels
- Space-restricted conditions

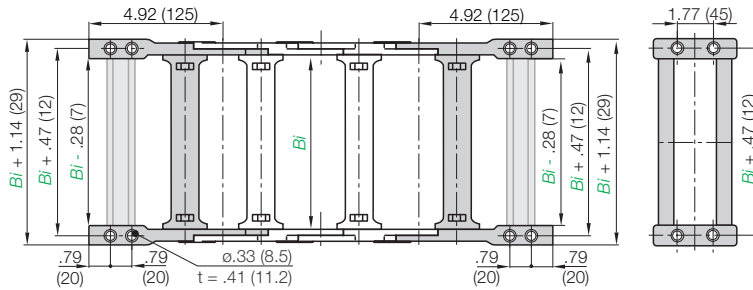
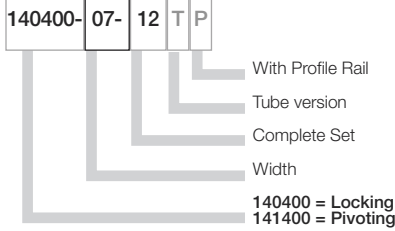


Option 2: KMA locking

- Profile rail option
- Universal use
- Corrosion resistant
- Extreme accelerations
- Vertical hanging/standing travels



Part Number Structure



Full set, for both ends:

140400-05-12 Full set, each part with pin/bore

Single-part order:

140400-05-1 Mounting bracket with bore

140400-05-2 Mounting bracket with pin

Part number examples are shown for pivoting brackets. For locking brackets change part number to 140400

Part No. Full Set (pivoting)

Series 14040 or 14140:

141400-Width-12

Part No. Full Set (pivoting)

with profile rail

Series 14040 or 14140

141400-Width-12P

Part No. Full Set (pivoting)

Tube Series R18840

141400-Width-12T

Part No. Full Set (pivoting)

with Profile Rail

Series R18840

141400-Width-12TP

Width	Part No. Full Set		Tube Option	With Profile Rail	Bi in. (mm)	Width	Part No. Full Set		Tube Option	With Profile Rail	Bi in. (mm)
	Locking	Pivoting					Locking	Pivoting			
-05	140400	141400		P	1.97 (50)	-31	140400	141400	-31-12	P	12.28 (312)
-06	140400	141400		P	2.56 (65)	-32	140400	141400	-32-12	P	12.79 (325)
-07	140400	141400	T	P	2.95 (75)	-33	140400	141400	-33-12	P	13.27 (337)
-08	140400	141400		P	3.43 (87)	-35	140400	141400	-35-12	T	13.78 (350)
-10	140400	141400	T	P	3.94 (100)	-36	140400	141400	-36-12	P	14.25 (362)
-11	140400	141400		P	4.41 (112)	-37	140400	141400	-37-12	P	14.76 (375)
-12	140400	141400	T	P	4.92 (125)	-38	140400	141400	-38-12	P	15.24 (387)
-13	140400	141400		P	5.39 (137)	-40*	140400	141400	-40-12	T	15.75 (400)
-15	140400	141400	T	P	5.91 (150)	-41	140400	141400	-41-12	P	16.22 (412)
-16	140400	141400		P	6.38 (162)	-42	140400	141400	-42-12	P	16.73 (425)
-17	140400	141400		P	6.89 (175)	-43	140400	141400	-43-12	P	17.20 (437)
-18	140400	141400		P	7.36 (187)	-45	140400	141400	-45-12	P	17.72 (450)
-20	140400	141400	T	P	7.87 (200)	-46	140400	141400	-46-12	T	18.19 (462)
-21	140400	141400		P	8.35 (212)	-47	140400	141400	-47-12	P	18.70 (475)
-22	140400	141400		P	8.86 (225)	-48	140400	141400	-48-12	P	19.17 (487)
-23	140400	141400		P	9.33 (237)	-50	140400	141400	-50-12	P	19.69 (500)
-25	140400	141400	T	P	9.84 (250)	-51	140400	141400	-51-12	P	20.16 (512)
-26	140400	141400		P	10.31 (262)	-52	140400	141400	-52-12	P	20.67 (525)
-27	140400	141400	T	P	10.83 (275)	-53	140400	141400	-53-12	P	21.14 (537)
-28	140400	141400		P	11.30 (287)	-55	140400	141400	-55-12	P	21.65 (550)
-30	140400	141400	T	P	11.81 (300)	-60	140400	141400	-60-12	P	23.62 (600)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Chainfix clamps for the profile rail



igus® Chainfix strain relief elements are available in either steel or stainless steel. They can be adjusted with a hexagon socket and are available in single, double and triple configurations.

Part No. Single Clamp		Part No. Double Clamp		Part No. Triple Clamp		Cable ø	
Steel	Stainless	Steel	Stainless	Steel	Stainless	in.	(mm)
CFX12-1	CFX12-1E	CFX12-2	CFX12-2E	CFX12-3	-	.24 - .47	(06 - 12)
CFX14-1	CFX14-1E	CFX14-2	CFX14-2E	CFX14-3	-	.47 - .55	(12 - 14)
CFX16-1	CFX16-1E	CFX16-2	CFX16-2E	CFX16-3	-	.55 - .63	(14 - 16)
CFX18-1	CFX18-1E	CFX18-2	CFX18-2E	CFX18-3	-	.63 - .71	(16 - 18)
CFX20-1	CFX20-1E	CFX20-2	CFX20-2E	CFX20-3	-	.71 - .79	(18 - 20)
CFX22-1	CFX22-1E	CFX22-2	CFX22-2E	CFX22-3	-	.79 - .87	(20 - 22)
CFX26-1	CFX26-1E	CFX26-2	CFX26-2E	-	-	.87 - 1.02	(22 - 26)
CFX30-1	CFX30-1E	CFX30-2	CFX30-2E	-	-	1.02 - 1.18	(26 - 30)
CFX34-1	CFX34-1E	CFX34-2	CFX34-2E	-	-	1.18 - 1.34	(30 - 34)
CFX38-1	CFX38-1E	-	-	-	-	1.34 - 1.50	(34 - 38)
CFX42-1	CFX42-1E	-	-	-	-	1.50 - 1.65	(38 - 42)

For more information please refer to strain relief section of Chapter 10

Chainfix Clip



Modular snap-on strain relief device

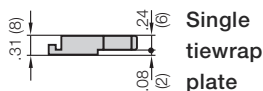
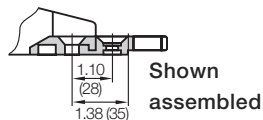
Chainfix clip is available for cable diameters ranging from .16" (4mm) to .94" (24 mm). It is suitable for assembly on KMA mounting brackets, clip-on strain relief for crossbars as well as profile rails. Quick assembly without the use of tools. **For more information please refer to strain relief section of Chapter 10**

Cable ø	Part No. Clamp	Part No. Bottom
.16-.31 (04-08)	CFC-08-M	CFC-08-C
.31-.47 (08-12)	CFC-12-M	CFC-12-C
.47-.63 (12-16)	CFC-16-M	CFC-16-C
.63-.79 (16-20)	CFC-20-M	CFC-20-C
.79-.94 (20-24)	CFC-24-M	CFC-24-C

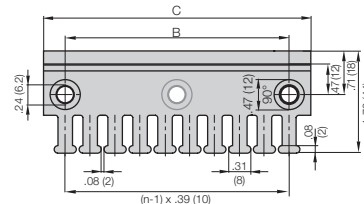
Tiewrap Plates

**Option 1:
Tiewrap plates as an individual part**

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.



Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



If used with KMA brackets with profile rail please add "KMA" to the end of the part number.
Example: 3050-ZBKMA

For more information please refer to strain relief section of Chapter 10

**Option 2:
Clip-on Tiewrap plates**

Available as a clip-on tiewrap plate without the use of bolts They are inserted and removed with a screwdriver used as a lever. Clip-on tiewrap plates are also available as an attachment to the opening crossbars.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
3050-ZC	5	1.97 (50)
3075-ZC	7	2.95 (75)

For more information please refer to strain relief section of Chapter 10



**Option 3:
Clip-on Tiewrap plates for opening crossbars**

Clip-on tiewrap plates are also available as an attachment to opening crossbars. They can be positioned at any point along the Energy Chain®.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
4550-ZS	5	1.89 (48)
4575-ZS	7	2.91 (74)

For more information please refer to strain relief section of Chapter 10



Energy Chain System® E4 Light Series 14040/14140/R18840 Guide Trough

energy chain® configurator ▶



14040
14140
R18840

Width of Crossbar
14040-05-200-0

	B_{Ri}		Installation Part No.
-05	3.19 (81)	*	
-06	3.78 (96)	*	
-07	4.17 (106)		94-50-225
-10	5.16 (131)		94-50-250
-11	5.63 (143)		94-50-275
-12	6.14 (156)		94-50-275
-13	6.61 (168)		94-50-300
-15	7.13 (181)		94-50-300
-16	7.60 (193)		94-50-325
-17	8.11 (206)		94-50-325
-18	8.58 (218)		94-50-350
-20	9.09 (231)		94-50-350
-21	9.57 (243)		94-50-375
-22	10.08 (256)		94-50-375
-23	10.55 (268)		94-50-400
-25	11.06 (281)		94-50-400
-26	11.54 (293)		94-50-425
-27	12.05 (306)		94-50-425
-28	12.52 (318)		94-50-450
-30	13.03 (331)		94-50-450
-31	13.50 (343)		94-50-475
-32	14.02 (356)		94-50-475
-33	14.49 (368)		94-50-500
-35	15.00 (381)		94-50-500
-36	15.47 (393)		94-50-525
-37	15.98 (406)		94-50-525
-38	16.46 (418)		94-50-550
-40	16.97 (431)		94-50-550
-41	17.44 (443)		94-50-575
-42	17.95 (456)		94-50-575
-43	18.43 (468)		94-50-600
-45	18.94 (481)		94-50-600
-46	19.41 (493)		94-50-625
-47	19.92 (506)		94-50-625
-48	20.59 (518)		94-50-650
-50	20.91 (531)		94-50-650
-51	21.38 (543)		94-50-675
-52	21.89 (556)		94-50-675
-53	22.36 (568)		94-50-700
-55	22.87 (581)		94-50-700
-60	24.84 (631)		94-50-750

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part No. 94-30
- 1/2 travel length glide bars
Part No. 93-01
- Installation sets as end connectors
Part No. 94-50-XX

.XX indicates the length of the profile rails on which the guide trough is mounted. The values and part numbers are specified in the table on the left. The standard length of the trough components and glide bars is 6.56 ft (2 m). The required overall length of the guide trough directly correlates to the length of travel.

Example:
Length of travel 164 ft (50 m)
Center mounted

Required guide troughs
164 ft (50 m) guide trough
82 ft (25 m) glide bars
= 25 sections of 6.56 ft (2 m) guide trough
Part No. 94-30
= 13 sections of 6.56 ft (2 m) glide bars
Part No. 93-01

Required number of installation sets:
= Number of guide trough components + 1
= 25 + 1 = 26
Part number of the installation sets
94-50-XXX

Example:
94-50-400 for 15.75 (400 mm) long profile rail

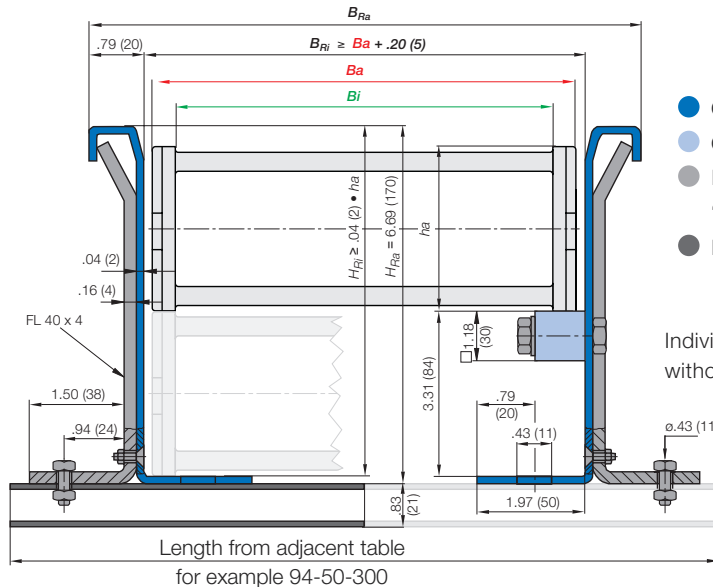


Installation sets as section connectors



Left: Guide trough with glide bars
Right: Guide troughs without glide bars

* Specialized guide trough available upon request



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

Standard length profile rail

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



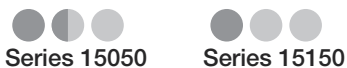
15050
15150
R19850



Energy Chain System® E4 Light Series 15050/15150/R19850



Price Index



Series 15050

Series 15150



Series R19850

Special Features / Options

ESD classification:
Electrically conductive
ESD/ATEX version upon request

High torsional rigidity

Side-mounted - unsupported

Assembly Tips



Opening Energy Chains®: Remove crossbars and clips - Insert screwdriver into the slot, push down, release by lever action



Remove lids/bottoms (Energy Tubes) - Insert screwdriver into the slot, release by lever action

Other Installation Methods

Vertical, hanging ≤ 328 ft (100 m)

Vertical, standing ≤ 19.69 ft (6 m)

Side-mounted, un supp. ≤ 6.56 ft (2 m)

Rotary requires further calculation

Usage Guidelines



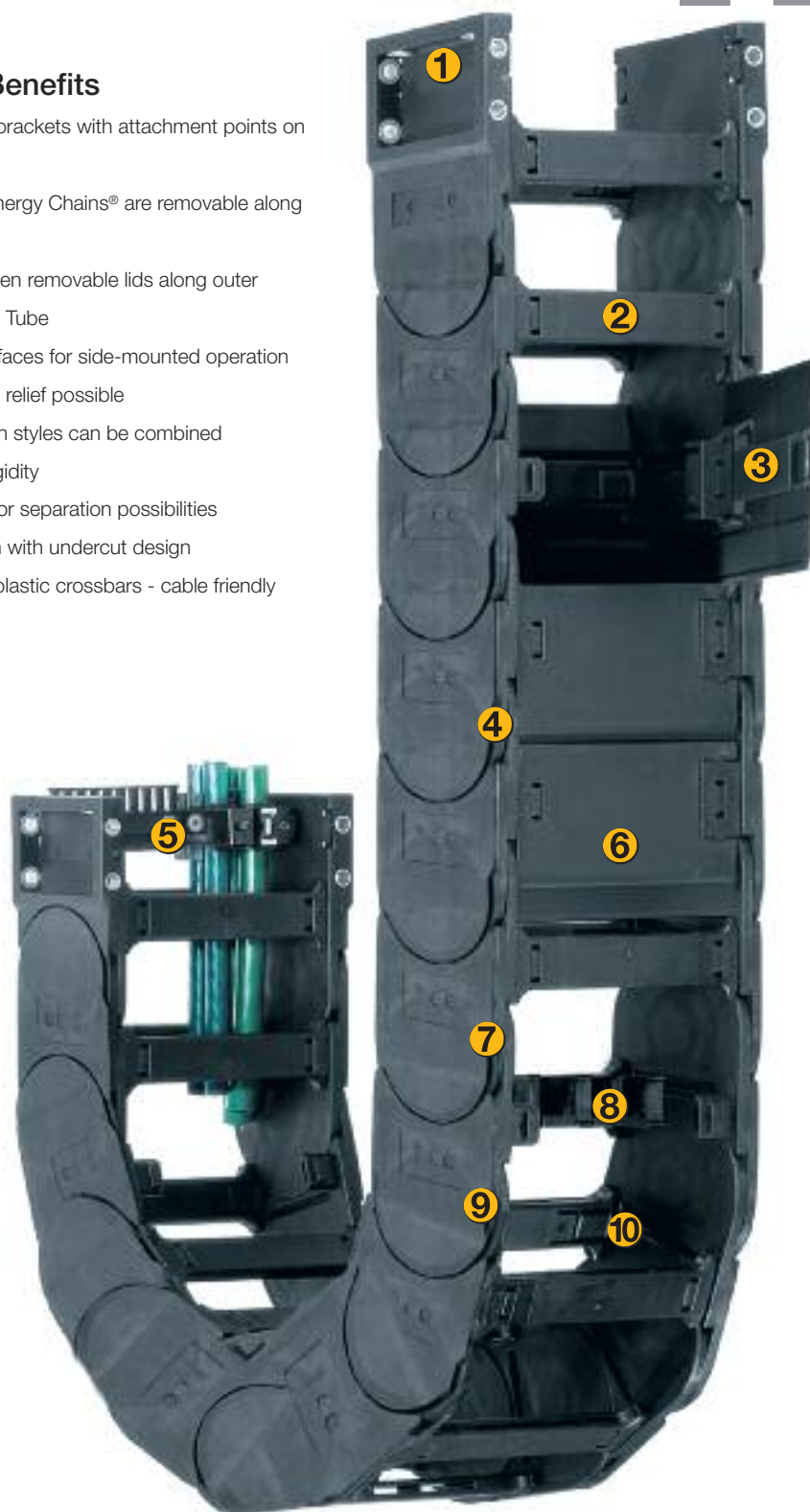
- If a simpler low-cost solution is required
- For maximum inner width with minimal outer width
- If the Series 5050 is too large



- If side-mounted chain/tube with a long unsupported travel is required
➤ Series 5050/5150/R9850

Features & Benefits

- 1 KMA mounting brackets with attachment points on all sides
- 2 Crossbars on Energy Chains® are removable along both radii
- 3 Hinged snap-open removable lids along outer radius of Energy Tube
- 4 Lateral glide surfaces for side-mounted operation
- 5 Integrated strain relief possible
- 6 Closed and open styles can be combined
- 7 High torsional rigidity
- 8 Numerous interior separation possibilities
- 9 Stronger version with undercut design
- 10 Wide, rounded plastic crossbars - cable friendly



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

[energy chain® configurator](#) ▶

16.4 ft (5 m) 15050-30-300-0

Energy Chain®

With 2 separators 511 assembled every 2nd link

Interior Separation

1 Set 150500-30-12P

Mounting Bracket

Energy Chain System® E4 Light Series 15050/15150/R19850 Installation Dimensions

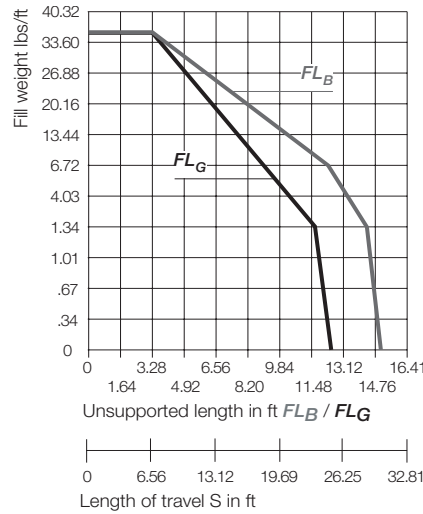
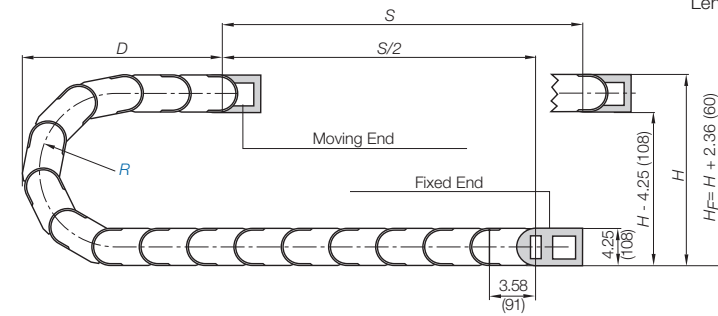
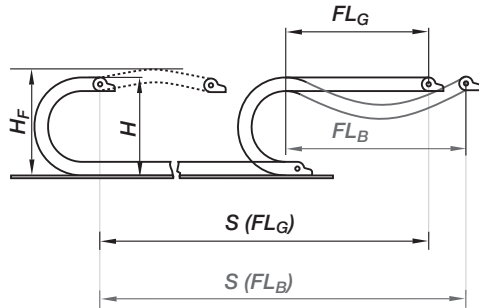
energy chain® configurator



15050
15150
R19850

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1



Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{safety buffer}$
 - $H_F = \text{Required clearance height}$
 - $H_{in} = \text{Trough inner height}$
 - $H_2 = \text{*Mounting height}$
 - $D_2 = \text{Overlength - long travels, gliding}$
 - $K_2 = \text{*Add-on}$
- *If the mounting bracket location is set lower

Pitch per link: = 3.58" (91 mm)
Links per ft (m): = 3.35 (11)
For center mount applications:
Chain length = $S/2 + K$

The required clearance height: $H_F = H + 2.36$ in. (60 mm) (with 2.02 lbs/ft (3 kg/m) fill weight. Please consult igus® if space is particularly restricted.

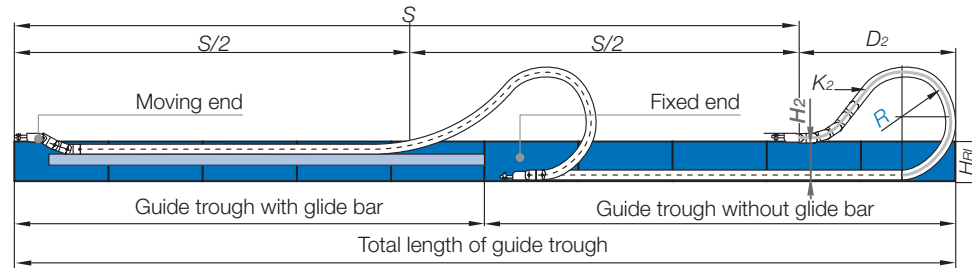
R	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	19.68 (500)
H_F^{*25}	16.14 (410)	20.08 (510)	24.02 (610)	27.95 (710)	31.89 (810)	35.83 (910)	43.70 (1110)
D	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	19.69 (500)	21.65 (550)	25.59 (650)
K	29.53 (750)	35.43 (900)	41.34 (1050)	48.23 (1225)	54.13 (1375)	57.09 (1450)	65.94 (1675)

For long travels with lowered mounting height

Long travel lengths from 32.8 ft.(10m) to max. 820 ft. (250m)

For center mount applications:

Chain length: = $S/2 + K_2$



Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.

Design, Chapter 1

R	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	19.68 (500)
H_2	9.53 (242)	9.53 (242)	9.53 (242)	9.53 (242)	9.53 (242)	9.53 (242)	9.53 (242)
D_2^{*25}	21.65 (550)	31.50 (800)	37.40 (950)	47.24 (1200)	61.02 (1550)	66.93 (1700)	85.63 (2175)
K_2	35.83 (910)	50.16 (1274)	64.49 (1638)	78.82 (2002)	96.73 (2457)	107.48 (2730)	136.14 (3458)



For support of the lower run, see Chapter 9 for the Support Tray tool kit

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

Technical Data



Details of material properties

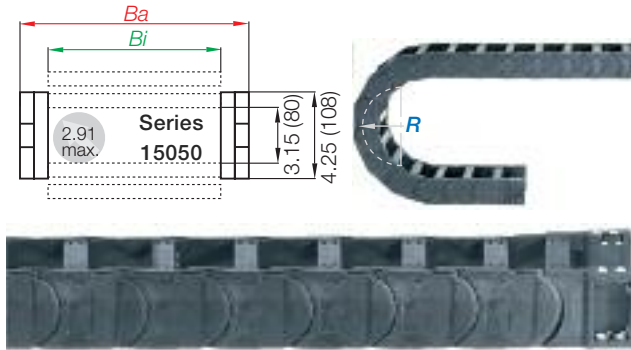
Chapter 1

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



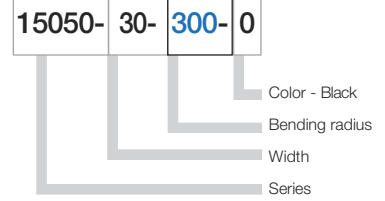
6.210

Series 15050 - Energy Chain® with crossbars every link

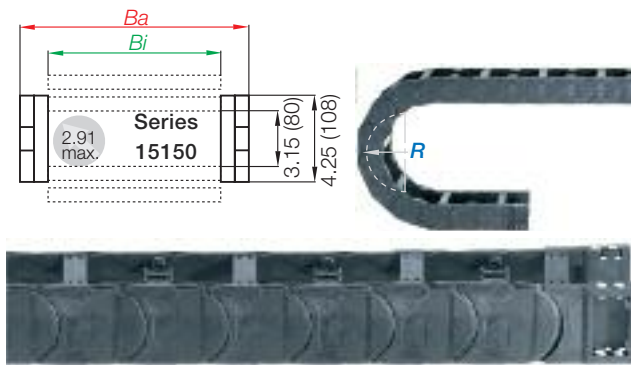


- Crossbars every link
- For use with rigid hydraulic hoses
- For particularly demanding applications
- Can be opened from both sides

Part Number Structure

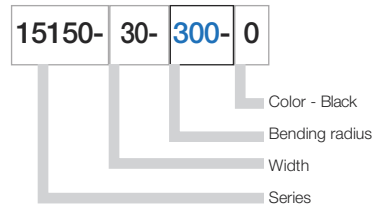


Series 15150 - Energy Chain® with crossbars every other link

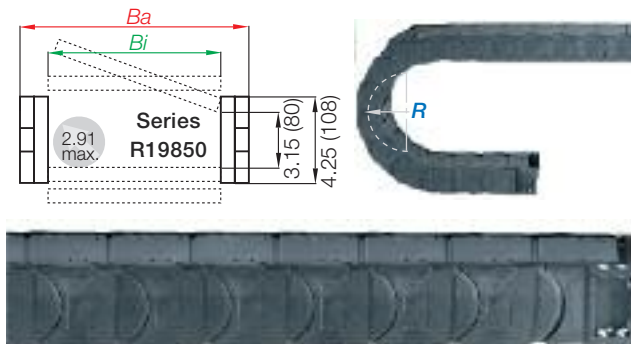


- Crossbars every other link - Standard configuration
- For nearly every situation
- Can be opened from both sides
- Easy assembly
- Stable
- Cost-effective

Part Number Structure

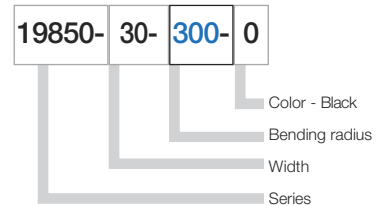


Series R19850 - fully enclosed Energy Tube

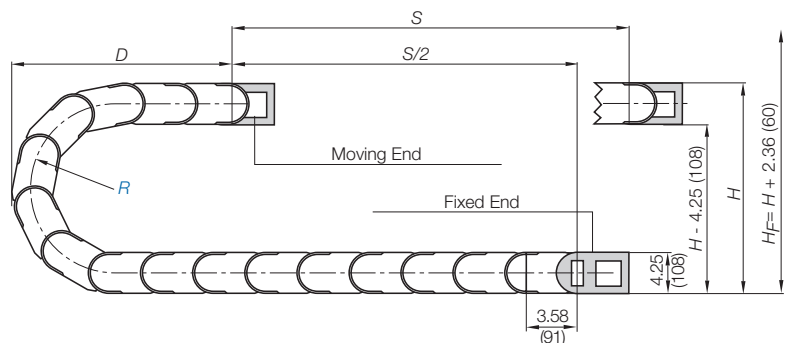
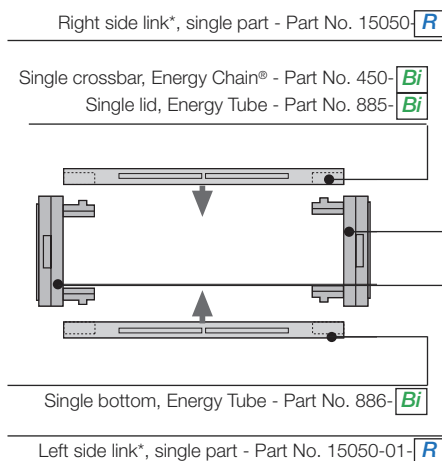


- Fully enclosed
- Excellent cable and hose protection against dirt
- Protection against hot chips up to 1652°F (900°C)
- Lids along inner radius are completely removable
- Lids along the outer radius are single-sided, snap open, hinged on one side as well as completely removable

Part Number Structure



Energy Chain® as separate parts, links and side plates



*View from the fixed point of the Energy Chain®/Energy Tube

Energy Chain System® E4 Light

Series 15050/15150/R19850

energy chain® configurator 



15050
15150
R19850

Supplement part number with required radius. Example: 15050-30-300-0

Pitch: 3.58 in. (91mm) per link links/ft(m) = 3.35 (11)

Part Number.		Tube	<i>Bi</i>	<i>Ba</i>	15050	15150	R19850
Crossbars Every link	Crossbars Every other	Version	in. (mm)	in. (mm)	lbs/ft (kg/m)	lbs/ft (kg/m)	lbs/ft (kg/m)
15050-05-	15150-05-	<input type="checkbox"/> -0	1.97 (50)	3.15 (80)	≈2.59 (3.85)	≈ 2.58 (3.84)	-
15050-06-	15150-06-	<input type="checkbox"/> -0	2.56 (65)	3.74 (95)	≈2.65 (3.95)	≈ 2.61 (3.88)	-
15050-07-	15150-07-	19850-07- <input type="checkbox"/> -0*	2.95 (75)	4.13 (105)	≈2.69 (4.00)	≈ 2.63 (3.92)	≈ 3.00 (4.46)
15050-08-	15150-08-	<input type="checkbox"/> -0	3.43 (87)	4.61 (117)	≈ 2.72 (4.05)	≈ 2.66 (3.96)	-
15050-10-	15150-10-	19850-10- <input type="checkbox"/> -0	3.94 (100)	5.12 (130)	≈ 2.81 (4.18)	≈ 2.69 (4.00)	≈ 3.18 (4.74)
15050-11-	15150-11-	-	4.41 (112)	5.63 (143)	≈ 2.90 (4.31)	≈ 2.73 (4.07)	-
15050-12-	15150-12-	19850-12- <input type="checkbox"/> -0	4.92 (125)	6.10 (155)	≈ 2.94 (4.38)	≈ 2.76 (4.10)	≈ 3.43 (5.10)
15050-13-	15150-13-	<input type="checkbox"/> -0	5.39 (137)	6.61 (168)	≈ 3.03 (4.51)	≈ 2.80 (4.17)	-
15050-15-	15150-15-	19850-15- <input type="checkbox"/> -0	5.91 (150)	7.09 (180)	≈ 3.08 (4.58)	≈ 2.82 (4.20)	≈ 3.72 (5.53)
15050-16-	15150-16-	<input type="checkbox"/> -0	6.38 (162)	7.60 (193)	≈ 3.15 (4.69)	≈ 2.86 (4.26)	-
15050-17-	15150-17-	<input type="checkbox"/> -0	6.89 (175)	8.07 (205)	≈ 3.23 (4.80)	≈ 2.90 (4.31)	-
15050-18-	15150-18-	<input type="checkbox"/> -0	7.36 (187)	8.58 (218)	≈ 3.30 (4.91)	≈ 2.94 (4.37)	-
15050-20-	15150-20-	19850-20- <input type="checkbox"/> -0	7.87 (200)	9.06 (230)	≈ 3.31 (4.93)	≈ 2.94 (4.38)	≈ 4.11 (6.11)
15050-21-	15150-21-	<input type="checkbox"/> -0	8.35 (212)	9.57 (243)	≈ 3.39 (5.04)	≈ 2.98 (4.43)	-
15050-22-	15150-22-	<input type="checkbox"/> -0	8.86 (225)	10.04 (255)	≈ 3.43 (5.10)	≈ 3.00 (4.47)	-
15050-23-	15150-23-	<input type="checkbox"/> -0	9.33 (237)	10.55 (268)	≈ 3.52 (5.24)	≈ 3.04 (4.53)	-
15050-25-	15150-25-	19850-25- <input type="checkbox"/> -0	9.84 (250)	11.02 (280)	≈ 3.57 (5.32)	≈ 3.08 (4.58)	≈ 4.59 (6.83)
15050-26-	15150-26-	<input type="checkbox"/> -0	10.31 (262)	11.54 (293)	≈ 3.64 (5.41)	≈ 3.10 (4.62)	-
15050-27-	15150-27-	19850-27- <input type="checkbox"/> -0	10.83 (275)	12.01 (305)	≈ 3.71 (5.52)	≈ 3.14 (4.68)	≈ 4.87 (7.26)
15050-28-	15150-28-	<input type="checkbox"/> -0	11.30 (287)	12.52 (318)	≈ 3.72 (5.54)	≈ 3.15 (4.69)	-
15050-30-	15150-30-	19850-30- <input type="checkbox"/> -0	11.81 (300)	12.99 (330)	≈ 3.87 (5.76)	≈ 3.23 (4.80)	≈ 5.03 (7.49)
15050-31-	15150-31-	<input type="checkbox"/> -0	12.28 (312)	13.50 (343)	≈ 3.90 (5.80)	≈ 3.24 (4.82)	-
15050-32-	15150-32-	<input type="checkbox"/> -0	12.79 (325)	13.98 (355)	≈ 3.93 (5.85)	≈ 3.25 (4.84)	-
15050-33-	15150-33-	<input type="checkbox"/> -0	13.27 (337)	14.49 (368)	≈ 4.05 (6.03)	≈ 3.31 (4.93)	-
15050-35-	15150-35-	19850-35- <input type="checkbox"/> -0	13.78 (350)	14.96 (380)	≈ 4.15 (6.18)	≈ 3.37 (5.01)	≈ 5.54 (8.24)
15050-36-	15150-36-	<input type="checkbox"/> -0	14.25 (362)	15.47 (393)	≈ 4.16 (6.19)	≈ 3.37 (5.02)	-
15050-37-	15150-37-	<input type="checkbox"/> -0	14.76 (375)	15.94 (405)	≈ 4.17 (6.20)	≈ 3.37 (5.02)	-
15050-38-	15150-38-	<input type="checkbox"/> -0	15.24 (387)	16.46 (418)	≈ 4.23 (6.29)	≈ 3.40 (5.06)	-
15050-40-	15150-40-	19850-40- <input type="checkbox"/> -0	15.75 (400)	16.93 (430)	≈ 4.36 (6.49)	≈ 3.47 (5.16)	≈ 6.18 (9.20)
15050-41-	15150-41-	<input type="checkbox"/> -0	16.22 (412)	17.44 (443)	≈ 4.46 (6.64)	≈ 3.52 (5.24)	-
15050-42-	15150-42-	<input type="checkbox"/> -0	16.73 (425)	17.91 (455)	≈ 4.57 (6.80)	≈ 3.57 (5.31)	-
15050-43-	15150-43-	<input type="checkbox"/> -0	17.20 (437)	18.43 (468)	≈ 4.61 (6.86)	≈ 3.60 (5.35)	-
15050-45-	15150-45-	<input type="checkbox"/> -0	17.72 (450)	18.90 (480)	≈ 4.66 (6.93)	≈ 3.62 (5.38)	-
15050-46-	15150-46-	19850-46- <input type="checkbox"/> -0	18.19 (462)	19.41 (493)	≈ 4.67 (6.95)	≈ 3.62 (5.39)	≈ 6.49 (9.66)
15050-47-	15150-47-	<input type="checkbox"/> -0	18.70 (475)	19.88 (505)	≈ 4.76 (7.08)	≈ 3.67 (5.46)	-
15050-48-	15150-48-	<input type="checkbox"/> -0	19.17 (487)	20.39 (518)	≈ 4.81 (7.16)	≈ 3.69 (5.49)	-
15050-50-	15150-50-	<input type="checkbox"/> -0	19.69 (500)	20.87 (530)	≈ 4.85 (7.22)	≈ 3.71 (5.52)	-
15050-51-	15150-51-	<input type="checkbox"/> -0	20.16 (512)	21.38 (543)	≈ 4.87 (7.24)	≈ 3.72 (5.53)	-
15050-52-	15150-52-	<input type="checkbox"/> -0	20.67 (525)	21.85 (555)	≈ 4.89 (7.28)	≈ 3.74 (5.56)	-
15050-53-	15150-53-	<input type="checkbox"/> -0	21.14 (537)	22.36 (568)	≈ 5.00 (7.44)	≈ 3.78 (5.63)	-
15050-55-	15150-55-	<input type="checkbox"/> -0	21.65 (550)	22.83 (580)	≈ 5.32 (7.92)	≈ 3.94 (5.87)	-
15050-60-	15150-60-	<input type="checkbox"/> -0	23.62 (600)	24.80 (630)	≈ 5.46 (8.12)	≈ 4.01 (5.97)	-

Choose from the radii below for all of the above sizes

Radius (mm) Example: 15050-30-300-0

	150**	200	250	300	350	400	500
R	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	19.68 (500)
H ^{±0.25}	16.14 (410)	20.08 (510)	24.02 (610)	27.95 (710)	31.89 (810)	35.83 (910)	43.70 (1110)
D	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	19.69 (500)	21.65 (550)	25.59 (650)
K	29.53 (750)	35.43 (900)	41.34 (1050)	48.23 (1225)	54.13 (1375)	57.09 (1450)	65.94 (1675)

** This radius is not available for the R19850 Series

0=Standard color black. For other colors see Chapter 1
For wider chains see page 6.145. For large diameter hoses see page 6.145

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

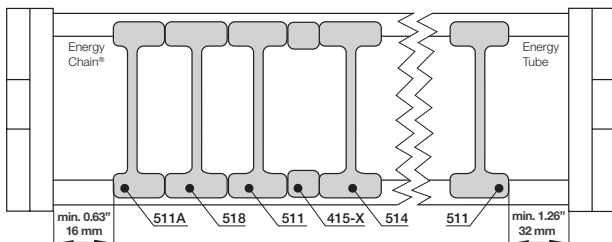




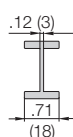
Option 1: Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.

NOTE: Observe a lateral spacing of at least 1.30 in. (33mm) for Energy Tubes and .63 in. (16mm) for Energy Chain®. There is no minimum spacing needed for side plates



STANDARD
Vertical
separator
501



Vertical separator

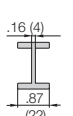
Unassembled	Part No. 501
Assembled	Part No. 511

- **Standard separator 501 for Energy Chains® and Energy Tubes**

This separator offers safe stability due to its wide base design, also when used with thick cables or hoses.



Locking
separator
504



Locking separator (chain only)

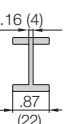
Unassembled	Part No. 504
Assembled	Part No. 514

- **Locking separator 504 for Energy Chains®**

This separator features increased retention force for applications exposed to very high humidity and extreme loads. If locking separators are used, the Energy Chain® is more difficult to open.



Locking
separator
508



Locking separator (chain only)

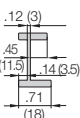
Unassembled	Part No. 508
Assembled	Part No. 518

- **Locking separator 508 for Energy Tubes**

This separator is used for applications that are exposed to extremely high humidity. The clamp at the side serves to uniformly align the separators. In order to avoid destroying the separators when opening the Energy Chain®, make sure all separators are identically aligned.



Asymmetric
separator
501A



Asymmetrical separator (chain only)

Unassembled	Part No. 501A
Assembled	Part No. 511A

- **Asymmetrical separator 501A for Energy Chains®**

This separator features an (18mm) base. It can be used in combinations between spacers of different widths and vertical separators in side mounted applications.



Spacers
405-XX



Spacer (chain only)

Unassembled	Part No. 405-XX
Assembled	Part No. 415-XX

XX = width of the spacer

- **NOTE ON SPACERS**

Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications. The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm)). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

Spacers available in the following sizes:

Part No.	Part No.	in.	(mm)
Unassembled	Assembled		
405 -10	415 -10	.39"	(10)
405 -15	415 -15	.59"	(15)
405 -20	415 -20	.79"	(20)
405 -30	415 -30	1.18"	(30)
405 -40	415 -40	1.57"	(40)



Energy Chain System® E4 Light Series 15050/15150/R19850 Interior Separation

energy chain® configurator ▶



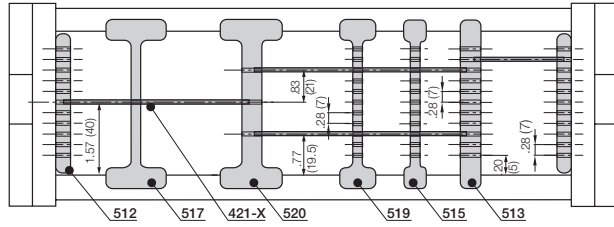
15050
15150
R19850



Option 2: Shelves

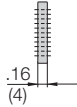
Energy Chains® and Energy Tubes can be subdivided both vertically and horizontally using the various interior separation elements.

► **Design, Chapter 1** for layout recommendations.



- **Side plates 502**

This component is used to form the basic pattern of a shelf system.



Side plate

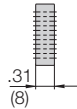
Unassembled	Part No. 502
Assembled	Part No. 512

Side plate
502



- **Vertical separator 503**

This component is used to form the basic pattern of a shelf system.



Vertical separator

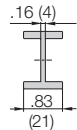
Unassembled	Part No. 503
Assembled	Part No. 513

Vertical separator
503



- **Locking vertical separator 507**

This separator features increased retention force for applications exposed to very high humidity and extreme loads. The extra retention force is achieved by asymmetric claws for the crossbar. Take care to ensure proper alignment.



Locking vertical separator

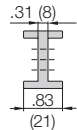
Unassembled	Part No. 507
Assembled	Part No. 517

Locking vertical
separator
507



- **Locking vertical separator 510**

This separator is slotted and able to be combined with shelves. For Energy Chains® only.



Locking vertical separator

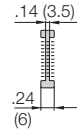
Unassembled	Part No. 510
Assembled	Part No. 520

Locking vertical
separator
510



- **Slotted separators 505**

These are used for very complex subdivisions. However, they cannot be retrofitted into an existing separation system without removing the shelves first.



Slotted separators, closed

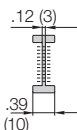
Unassembled	Part No. 505
Assembled	Part No. 515

Closed slotted
separator
505



- **Slotted separator 509**

This separator can be retrofitted into an existing interior separation system without removing the shelves, as long as these shelves fit into any of the 7 middle slots



Slotted separators, open

Unassembled	Part No. 509
Assembled	Part No. 519

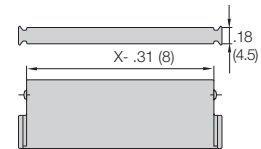
Open slotted
separator
509



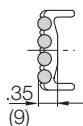
Shelves 420-XX

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 7 different heights in .28" (7mm) increments

Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled
.71 (18)	.39 (10)	420-18	421-18	2.95 (75)	2.64 (67)	420-75	421-75
.91 (23)	.59 (15)	420-23	421-23	3.46 (88)	3.15 (80)	420-88	421-88
.98 (25)	.67 (17)	420-25	421-25	3.94 (100)	3.62 (92)	420-100	421-100
1.10 (28)	.79 (20)	420-28	421-28	4.92 (125)	4.61 (117)	420-125	421-125
1.30 (33)	.98 (25)	420-33	421-33	5.91 (150)	5.59 (142)	420-150	421-150
1.69 (43)	1.38 (35)	420-43	421-43	6.89 (175)	6.57 (167)	420-175	421-175
1.97 (50)	1.65 (42)	420-50	421-50	7.36 (187)	7.05 (179)	420-187	421-187
2.44 (62)	2.13 (54)	420-62	421-62	7.87 (200)	7.56 (192)	420-200	421-200



Rollclip - minimizes abrasion of particularly sensitive hoses or cables in an Energy Chain®. The integrated rollers compensate for relative movement between the chain and the hose or cable. This reduces the abrasion of the hoses or cables



Rollclip

Unassembled	Part No. 489-27
Assembled	Part No. 490-27



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



15050
15150
R19850



Energy Chain System® E4 Light Series 15050/15150/R19850 Special Accessories

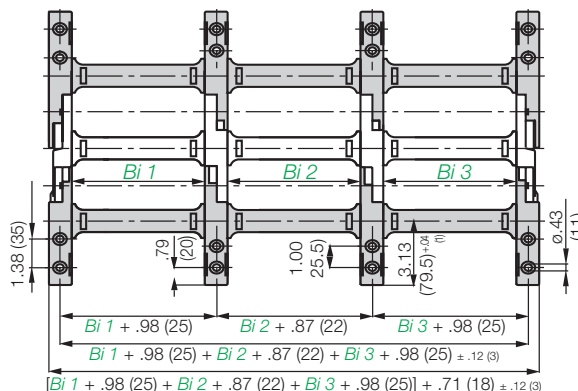
energy chain® configurator

igus® Energy Chain
System®



Extension links - for extremely wide Energy Chains® up to 9.84 ft (3m)

- For applications in which particularly high fill weights necessitate extremely wide Energy Chains®
- The extension link design allows virtually limitless side-by-side attachment of chains
- The unsupported length of a chain can be increased when additional loads are required
- Extension links can be used with Energy Chains®, Energy Tubes or a combination of both
- They are suitable for unsupported and gliding applications in a guide trough
- Energy Chains® with extension links are attached with KMA or steel mounting brackets.



Part number example for Energy Chain®

15050-10/20/10--0
15050-*Bi1/Bi2/Bi3*--0

We strongly recommend on-site consultation with an igus® technician for individual advice regarding mounting brackets, guide troughs and other design details.

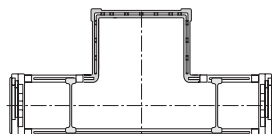
Telephone 1-800-521-2747
Fax 1-401-438-7270



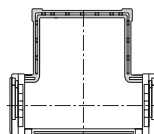
Consult igus® for your extender crossbar applications. We will be happy to assist you with your design layout.

Extender crossbars - For careful guiding of large diameter cables and hoses

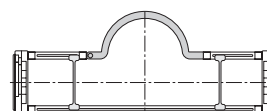
- Intended for cables and hoses with a maximum outer diameter of 10.63 in. (270 mm).
- Can be attached along either the inner or outer radius, inner radius preferred
- Gliding operation with crossbars assembled along the outer radius in conjunction with a special guide trough
- Gliding operation not guaranteed with crossbars assembled along the inner radius
- The extender crossbar can either be attached to the side links directly or can be used in combination with two standard snap-open crossbars.



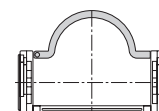
Square extender crossbar combined with standard snap-open crossbars.



Attached directly to the side link.



Round extender crossbar combined with standard snap-open crossbars.



Attached directly to the side link.

Part No.	Max Ø Hose	Style	Installation Side Link	Combined with Snap-Open Crossbars
450-15-RHD115	By request	Round	Yes	No
450-17-RD115	By request	Round	No	Yes
450-25-D150	By request	Square	Yes	No
450-30-D200	By request	Square	Yes	No
450-35-D250	By request	Square	Yes	No
450-40-D300	By request	Square	Yes	No
450-20-HD150	By request	Square	No	Yes
450-25-HD200	By request	Square	No	Yes
450-30-HD250	By request	Square	No	Yes

E4 clip on cable binder

- For side mounted applications
- Serves as a clip-on, lateral guide for hoses and cables on Energy Chains®
- The loops can be adjusted as needed

- Compatible with many E4 Energy Chains®
- Economical
- One clip and one locking band are needed for each chain link



Part No.	Form
450-B12	Locking clip, comprised of a locking element
450-B12-200	Locking band, comprised of a locking element and band; 12 x 1.5 x 200 mm

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

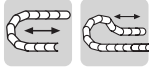
6.215

Energy Chain System® E4 Light Series 15050/15150/R19850 Mounting Brackets - KMA

energy chain® configurator ▶



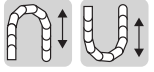
15050
15150
R19850



Standard

Option 1: KMA pivoting

- Profile rail option
- Universal use
- Corrosion resistant
- Short and long travels
- Space-restricted conditions



Option 2: KMA locking

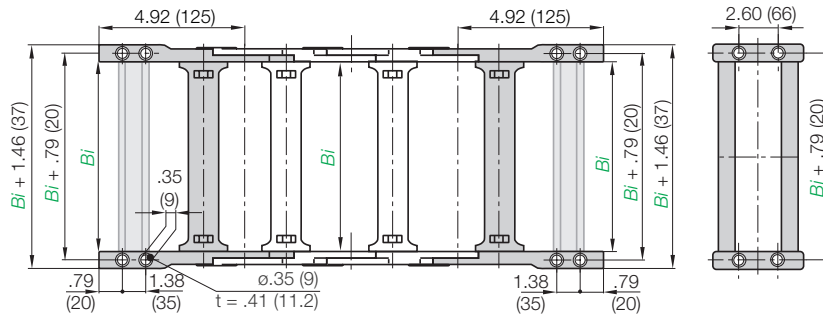
- Profile rail option
- Universal use
- Corrosion resistant
- Extreme accelerations
- Vertical hanging/standing travels



Part Number Structure

150500-07-12TP

- With Profile Rail
 - Tube version
 - Complete Set
 - Width
- 150500 = Pivoting
151500 = Locking



Full set, for both ends:

150500-05-12 Full set, each part with pin/bore

Single-part order:

150500-05-1 Mounting bracket with bore
150500-05-2 Mounting bracket with pin

Part number examples are shown for pivoting brackets. For locking brackets change part number to 151500

Part No. Full Set (pivoting)
Series 15050 or 15150:
150500-Width-12

Part No. Full Set (pivoting)
with profile rail
Series 15050 or 15150
150500-Width-12P

Part No. Full Set (pivoting)
Tube Series R19850
150500-Width-12T

Part No. Full Set (pivoting)
with Profile Rail
Series R19850
150500-Width-12TP

Width	Part No. Full Set		Tube Option	With Profile Rail	Bi in. (mm)	Width	Part No. Full Set		Tube Option	With Profile Rail	Bi in. (mm)
	Pivoting	Locking					Pivoting	Locking			
-05	150500	151500	-05-12	P	1.97 (50)	-31	150500	151500	-31-12	P	12.28 (312)
-06	150500	151500	-06-12	P	2.56 (65)	-32	150500	151500	-32-12	P	12.79 (325)
-07	150500	151500	-07-12	T	2.95 (75)	-33	150500	151500	-33-12	P	13.27 (337)
-10	150500	151500	-10-12	T	3.94 (100)	-35	150500	151500	-35-12	T	13.78 (350)
-11	150500	151500	-11-12	P	4.41 (112)	-36	150500	151500	-36-12	P	14.25 (362)
-12	150500	151500	-12-12	T	4.92 (125)	-37	150500	151500	-37-12	P	14.76 (375)
-13	150500	151500	-13-12	P	5.39 (137)	-38	150500	151500	-38-12	P	15.24 (387)
-15	150500	151500	-15-12	T	5.91 (150)	-40*	150500	151500	-40-12	T	15.75 (400)
-16	150500	151500	-16-12	P	6.38 (162)	-41	150500	151500	-41-12	P	16.22 (412)
-17	150500	151500	-17-12	P	6.89 (175)	-42	150500	151500	-42-12	P	16.73 (425)
-18	150500	151500	-18-12	P	7.36 (187)	-43	150500	151500	-43-12	P	17.20 (437)
-20	150500	151500	-20-12	T	7.87 (200)	-45	150500	151500	-45-12	P	17.72 (450)
-21	150500	151500	-21-12	P	8.35 (212)	-46	150500	151500	-46-12	T	18.19 (462)
-22	150500	151500	-22-12	P	8.86 (225)	-47	150500	151500	-47-12	P	18.70 (475)
-23	150500	151500	-23-12	P	9.33 (237)	-48	150500	151500	-48-12	P	19.17 (487)
-25	150500	151500	-25-12	T	9.84 (250)	-50	150500	151500	-50-12	P	19.69 (500)
-26	150500	151500	-26-12	P	10.31 (262)	-51	150500	151500	-51-12	P	20.16 (512)
-27	150500	151500	-27-12	T	10.83 (275)	-52	150500	151500	-52-12	P	20.67 (525)
-28	150500	151500	-28-12	P	11.30 (287)	-53	150500	151500	-53-12	P	21.14 (537)
-30	150500	151500	-30-12	T	11.81 (300)	-55	150500	151500	-55-12	P	21.65 (550)
						-60	150500	151500	-60-12	P	23.62 (600)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



15050
15150
R19850



Energy Chain System® E4 Light Series 15050/15150/R19850 Mounting Brackets - Steel

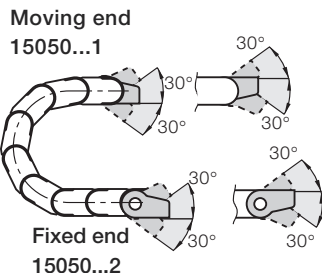
energy chain® configurator

igus® Energy Chain
System®



Option 1: pivoting

- For pivoting connections
- One part for all chain widths
- Electrically conductive



Possible installation configurations -

Part No. Mounting Brackets Full Set

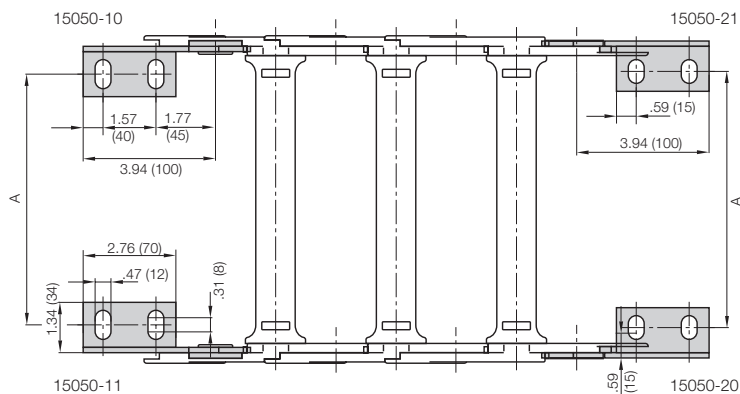
4 parts, 2 with pin, 2 with bore
Series 15050, 15150 or R19850:
15050-12

Part No. Mounting Bracket Moving End

2 parts, 1 left & 1 right with bore
Series 15050, 15150 or R19850:
15050-1

Part No. Mounting Bracket Fixed End

2 parts, 1 left & 1 right with pin
Series 15050, 15150 or R19850:
15050-2



Bracket Mounting Dimensions

Width of Chain <i>Bi</i>	Mounting Brackets				Mounting Dimension A in. (mm)	Width of Chain <i>Bi</i>	Mounting Brackets				Mounting Dimension A in. (mm)
	Part Number	Full Set	Moving End Only	Fixed End Only			Part Number	Full Set	Moving End Only	Fixed End Only	
1.97 (50)	15050	-12	-1	-2	1.02 (26)	12.79 (325)	15050	-12	-1	-2	11.85 (301)
2.56 (65)	15050	-12	-1	-2	1.61 (41)	13.27 (337)	15050	-12	-1	-2	12.32 (313)
2.95 (75)	15050	-12	-1	-2	2.01 (51)	13.78 (350)	15050	-12	-1	-2	12.83 (326)
3.94 (100)	15050	-12	-1	-2	2.99 (76)	14.25 (362)	15050	-12	-1	-2	15.28 (388)
4.41 (112)	15050	-12	-1	-2	3.46 (88)	14.76 (375)	15050	-12	-1	-2	13.82 (351)
4.92 (125)	15050	-12	-1	-2	3.98 (101)	15.24 (387)	15050	-12	-1	-2	14.29 (363)
5.39 (137)	15050	-12	-1	-2	4.45 (113)	15.75 (400)	15050	-12	-1	-2	14.80 (376)
5.91 (150)	15050	-12	-1	-2	4.96 (126)	16.22 (412)	15050	-12	-1	-2	15.28 (388)
6.38 (162)	15050	-12	-1	-2	5.43 (138)	16.73 (425)	15050	-12	-1	-2	15.79 (401)
6.89 (175)	15050	-12	-1	-2	5.94 (151)	17.20 (437)	15050	-12	-1	-2	16.26 (413)
7.36 (187)	15050	-12	-1	-2	6.42 (163)	17.72 (450)	15050	-12	-1	-2	16.77 (426)
7.87 (200)	15050	-12	-1	-2	6.93 (176)	18.19 (462)	15050	-12	-1	-2	17.24 (438)
8.35 (212)	15050	-12	-1	-2	7.40 (188)	18.70 (475)	15050	-12	-1	-2	17.76 (451)
8.86 (225)	15050	-12	-1	-2	7.91 (201)	19.17 (487)	15050	-12	-1	-2	18.23 (463)
9.33 (237)	15050	-12	-1	-2	8.39 (213)	19.69 (500)	15050	-12	-1	-2	18.74 (476)
9.84 (250)	15050	-12	-1	-2	8.90 (226)	20.16 (512)	15050	-12	-1	-2	19.21 (488)
10.31 (262)	15050	-12	-1	-2	9.37 (238)	20.67 (525)	15050	-12	-1	-2	19.72 (501)
10.83 (275)	15050	-12	-1	-2	9.88 (251)	21.14 (537)	15050	-12	-1	-2	20.20 (513)
11.30 (287)	15050	-12	-1	-2	10.35 (263)	21.65 (550)	15050	-12	-1	-2	20.71 (526)
11.81 (300)	15050	-12	-1	-2	10.87 (276)	23.62 (600)	15050	-12	-1	-2	22.68 (576)
12.28 (312)	15050	-12	-1	-2	11.34 (288)						

Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

Energy Chain System® E4 Light

Series 15050/15150/R19850

Strain Relief

energy chain® configurator 



15050
15150
R19850

Chainfix clamps for the profile rail



igus® Chainfix strain relief elements are available in either steel or stainless steel. They can be adjusted with a hexagon socket and are available in single, double and triple configurations.

Part No. Single Clamp		Part No. Double Clamp		Part No. Triple Clamp		Cable ø	
Steel	Stainless	Steel	Stainless	Steel	Stainless	in.	(mm)
CFX12-1	CFX12-1E	CFX12-2	CFX12-2E	CFX12-3	-	.24 - .47	(06 - 12)
CFX14-1	CFX14-1E	CFX14-2	CFX14-2E	CFX14-3	-	.47 - .55	(12 - 14)
CFX16-1	CFX16-1E	CFX16-2	CFX16-2E	CFX16-3	-	.55 - .63	(14 - 16)
CFX18-1	CFX18-1E	CFX18-2	CFX18-2E	CFX18-3	-	.63 - .71	(16 - 18)
CFX20-1	CFX20-1E	CFX20-2	CFX20-2E	CFX20-3	-	.71 - .79	(18 - 20)
CFX22-1	CFX22-1E	CFX22-2	CFX22-2E	CFX22-3	-	.79 - .87	(20 - 22)
CFX26-1	CFX26-1E	CFX26-2	CFX26-2E	-	-	.87 - 1.02	(22 - 26)
CFX30-1	CFX30-1E	CFX30-2	CFX30-2E	-	-	1.02 - 1.18	(26 - 30)
CFX34-1	CFX34-1E	CFX34-2	CFX34-2E	-	-	1.18 - 1.34	(30 - 34)
CFX38-1	CFX38-1E	-	-	-	-	1.34 - 1.50	(34 - 38)
CFX42-1	CFX42-1E	-	-	-	-	1.50 - 1.65	(38 - 42)

For more information please refer to strain relief section of Chapter 10

Chainfix Clip

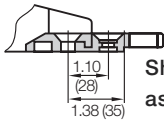


Modular snap-on strain relief device

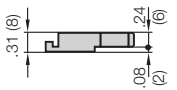
Chainfix clip is available for cable diameters ranging from .16" (4mm) to .94" (24 mm). It is suitable for assembly on KMA mounting brackets, clip-on strain relief for crossbars as well as profile rails. Quick assembly without the use of tools. **For more information please refer to strain relief section of Chapter 10**

Cable ø	Part No. Clamp	Part No. Bottom
in.	(mm)	
.16-.31	CFC-08-M	CFC-08-C
.31-.47	CFC-12-M	CFC-12-C
.47-.63	CFC-16-M	CFC-16-C
.63-.79	CFC-20-M	CFC-20-C
.79-.94	CFC-24-M	CFC-24-C

Tiewrap Plates



Shown assembled



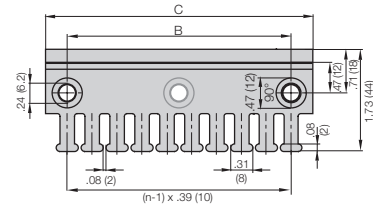
Single tiewrap plate

Option 1:

Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



If used with KMA brackets with profile rail please add "KMA" to the end of the part number.

Example: 3050-ZBKMA

For more information please refer to strain relief section of Chapter 10



Option 2: Clip-on Tiewrap plates

Available as a clip-on tiewrap plate without the use of bolts They are inserted and removed with a screwdriver used as a lever. Clip-on tiewrap plates are also available as an attachment to the opening crossbars.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
3050-ZC	5	1.97 (50)
3075-ZC	7	2.95 (75)

For more information please refer to strain relief section of Chapter 10



Option 3: Clip-on Tiewrap plates for opening crossbars

Clip-on tiewrap plates are also available as an attachment to opening crossbars. They can be positioned at any point along the Energy Chain®.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
4550-ZS	5	1.89 (48)
4575-ZS	7	2.91 (74)

For more information please refer to strain relief section of Chapter 10

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Width of Crossbar
15050-05-200-0

	B_{Ri}	Installation Part No.
-05	3.35 (85) *	
-07	4.33 (110)	96-50-225
-10	5.31 (135)	96-50-250
-11	5.83 (148)	96-50-275
-12	6.30 (160)	96-50-275
-13	6.81 (173)	96-50-300
-15	7.28 (185)	96-50-300
-16	7.80 (198)	96-50-325
-17	8.27 (210)	96-50-325
-18	8.78 (223)	96-50-350
-20	9.25 (235)	96-50-350
-21	9.76 (248)	96-50-375
-22	10.24 (260)	96-50-375
-23	10.75 (273)	96-50-400
-25	11.22 (285)	96-50-400
-26	11.73 (298)	96-50-425
-27	12.20 (310)	96-50-425
-28	12.72 (323)	96-50-450
-30	13.19 (335)	96-50-450
-31	13.70 (348)	96-50-475
-32	14.17 (360)	96-50-475
-33	14.69 (373)	96-50-500
-35	15.16 (385)	96-50-500
-36	15.67 (398)	96-50-525
-37	16.14 (410)	96-50-525
-38	16.65 (423)	96-50-550
-40	17.13 (435)	96-50-550
-41	17.63 (448)	96-50-575
-42	18.11 (460)	96-50-575
-43	18.62 (473)	96-50-600
-45	19.09 (485)	96-50-600
-46	19.61 (498)	96-50-625
-47	20.08 (510)	96-50-625
-48	20.59 (523)	96-50-650
-50	21.06 (535)	96-50-650
-51	21.57 (548)	96-50-675
-52	22.04 (560)	96-50-675
-53	22.56 (573)	96-50-700
-55	23.03 (585)	96-50-700
-60	25.00 (635)	96-50-750

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part No. 99-30
- 1/2 travel length glide bars
Part No. 93-01
- Installation sets as end connectors
Part No. 96-50-XX

-XX indicates the length of the profile rails on which the guide trough is mounted. The values and part numbers are specified in the table on the left. The standard length of the trough components and glide bars is 6.56 ft (2 m). The overall length of the guide trough directly correlates to the length of travel.

Example:

Length of travel 164 ft (50 m)
Center-mounted

Required guide troughs:

164 ft (50 m) guide trough, 82 ft. (25 m) glide bar
= 25 sections of 6.56 ft (2 m) guide trough

Part No. 99-30

= 13 sections of 6.56 ft (2 m) glide bar

Part No. 93-01

Required number of installation set:

= Number of guide trough components + 1
= 25 + 1 = 26

Part No. of the installation sets **96-50-XXX**

Example:

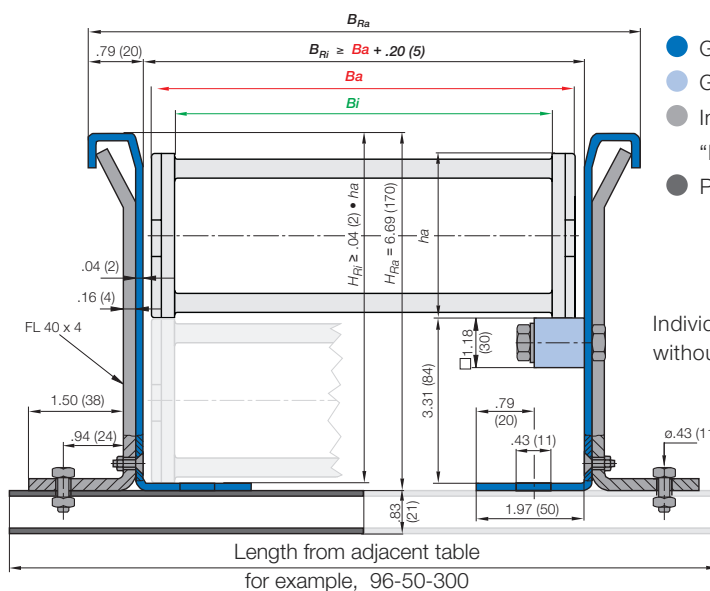
96-50-400 for 15.75 (400 mm) long profile rail



Left: Guide trough with glide bars
Right: Guide troughs without glide bars



Installation sets as section connectors



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

* Specialized guide trough available upon request

Standard length profile rail

Energy Chain System® E4 Light Series 15050/15150/R19850 Application Example

energy chain® configurator ▶

igus®

15050
15150
R19850



Spray-painting robot with System E4 Energy Chain® used in an ATEX version made of igumid ESD. High accelerations of up to 19.69 f/s^2 (6 m/s^2) and high braking rates with a weight of the robot of approximately one ton



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



1640
R1608



Energy Chain System® E4 Light Series 1640/R1608



Price Index



Series 1640



Series R1608

Special Features / Options



ESD classification:
Electrically conductive
ESD/ATEX version upon request



High torsional rigidity



Side-mounted - unsupported

Assembly Tips



Opening Energy Chains®: Remove cross-bars and clips - Insert screwdriver into the slot, push down, release by lever action



Remove lids/bottoms (Energy Tubes) - Insert screwdriver into the slot, release by lever action

Other Installation Methods

Vertical, hanging ≤ 328 ft (100 m)

Vertical, standing ≤ 16.4 ft (5 m)

Side-mounted, unassup. ≤ 6.56 ft (2 m)

Rotary requires further calculation

Usage Guidelines



- If a simpler, low-cost solution is required
- If optimized interior space is required
- If the Series 400 is too large



- If maximum stability is required
➤ Series 600/R608

Features & Benefits

- 1 Numerous interior separation possibilities
- 2 Hinged snap-open removable lids along outer radius of Energy Tube
- 3 Lateral glide surfaces for side-mounted operation
- 4 Closed and open styles can be combined
- 5 Removable lids along inner radius
- 6 Wide, rounded plastic crossbars - cable friendly
- 7 Dirt repellent exterior
- 8 Energy Chain® also available with reverse bending radii



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

[energy chain® configurator](#) ▶

6.56 ft (2 m) 1640-30-300-0



Energy Chain®

With 2 separators 6411 assembled every 2nd link



Interior Separation

1 Set 16000-12



Mounting Bracket

Energy Chain System® E4 Light Series 1640/R1608 Installation Dimensions

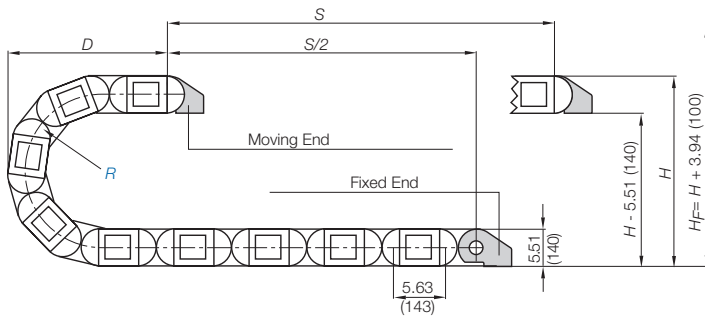
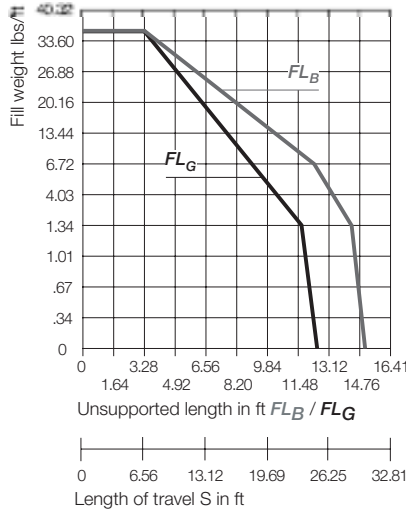
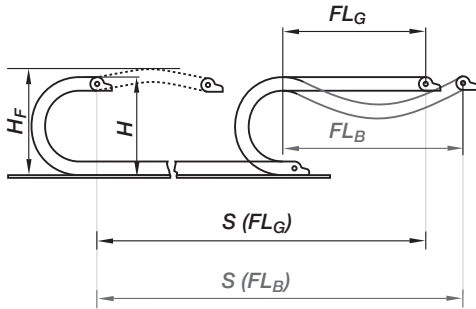
energy chain® configurator ▶

igus®

1640
R1608

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



Pitch per link: = 5.63" (143 mm)
Links per ft (m): = 2.13 (7)
For center mount applications:
Chain length = $S/2 + K$

The required clearance height: $H_F = H + 3.94$ in. (100 mm) with 3.36 lbs/ft (5 kg/m) fill weight. Please consult igus® if space is particularly restricted.

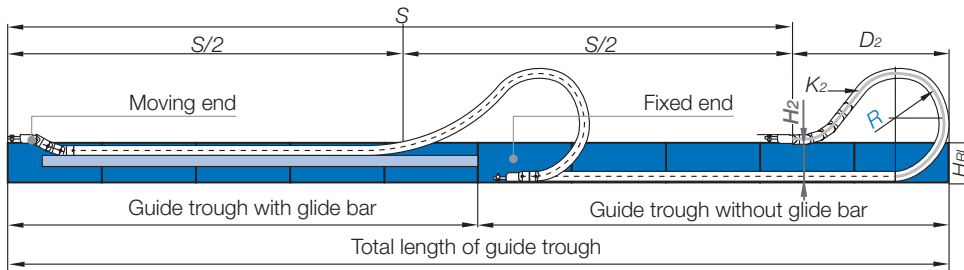
R	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	19.69 (500)	21.65 (550)	23.62 (600)
H	21.46 (545)	25.39 (645)	29.41 (747)	33.27 (845)	37.20 (945)	41.14 (1045)	45.08 (1145)	49.02 (1245)	52.95 (1345)
D	16.34 (415)	18.31 (465)	20.27 (515)	22.24 (565)	24.21 (615)	26.18 (665)	28.15 (715)	30.12 (765)	32.09 (815)
K	36.22 (920)	42.52 (1080)	48.82 (1240)	55.12 (1400)	61.42 (1560)	67.72 (1720)	73.62 (1870)	79.53 (2020)	85.63 (2175)

For long travels with lowered mounting height

Long travel lengths from 32.8 ft. (10 m) to max. 1,312 ft. (400 m)

For center mount applications:

Chain length: = $S/2 + K_2$



R	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	19.69 (500)	21.65 (550)	23.62 (600)
H_2	12.80 (325)	12.80 (325)	12.80 (325)	12.80 (325)	12.80 (325)	12.80 (325)	12.80 (325)	12.80 (325)	12.80 (325)
D_{2+20}	35.43 (900)	39.37 (1000)	43.31 (1100)	49.21 (1200)	57.09 (1450)	62.99 (1600)	66.93 (1700)	74.80 (1900)	80.71 (2050)
K_2	61.93 (1573)	67.56 (1716)	73.19 (1859)	90.08 (2288)	101.33 (2574)	112.60 (2860)	123.86 (3146)	135.12 (3432)	152.01 (3861)

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{safety buffer}$
 - H_F = Required clearance height
 - H_{in} = Trough inner height
 - H_2 = *Mounting height
 - D_2 = Overlength - long travels, gliding
 - K_2 = *Add-on
- *If the mounting bracket location is set lower



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough. **Design, Chapter 1**

Technical Data

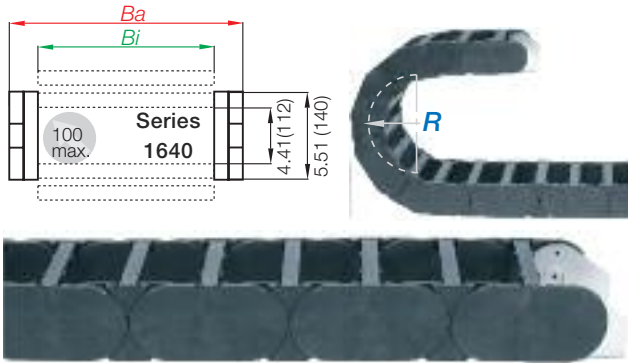


Details of material properties

▶ Chapter 1

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

Series 1640 - Energy Chain® with crossbars every link

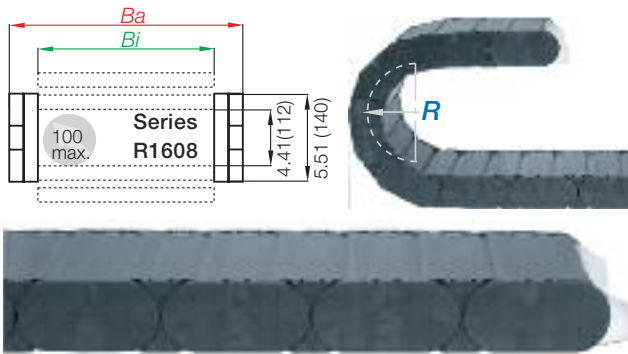


- Crossbars every link
- For use with rigid hydraulic hoses
- For particularly demanding applications
- Can be opened from both sides

Part Number Structure



Series R1608 - fully enclosed Energy Tube

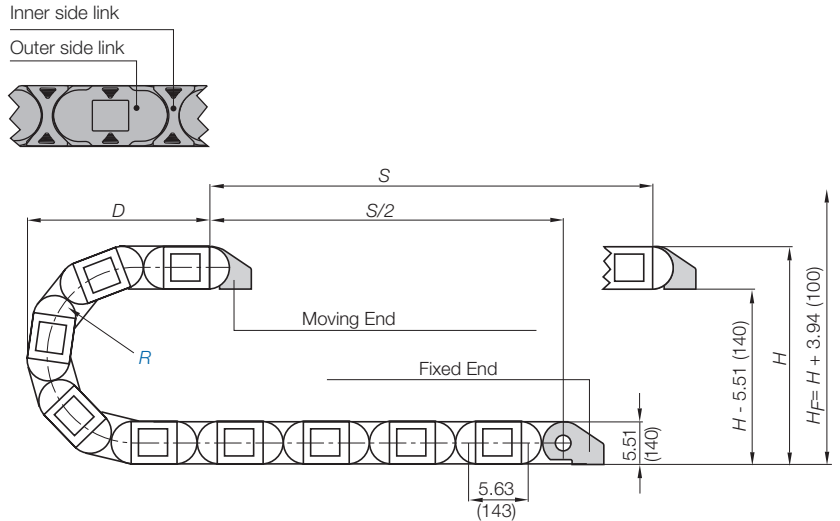
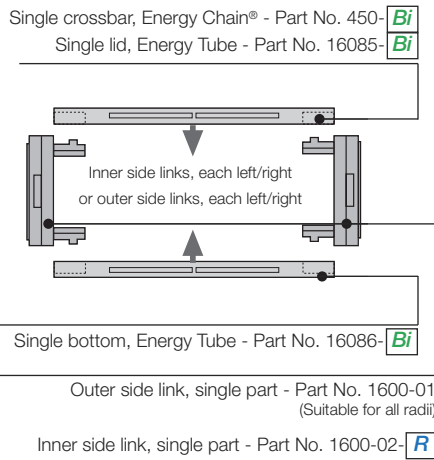


- Fully enclosed
- Excellent cable and hose protection against dirt
- Protection against hot chips up to 1652°F (900°C)
- Lids along inner radius are completely removable
- Lids along the outer radius are single-sided, snap open, hinged on one side as well as completely removable

Part Number Structure



Energy Chain® as separate parts, links and side plates



Energy Chain System® E4 Light Series 1640/R1608

energy chain® configurator 



1640
R1608

Supplement part number with required radius. Example: 1640-30--0

Pitch: 5.63 in. (143mm) per link links/ft(m) = 2.13 (7)

Part Number.		<i>Bi</i>	<i>Ba</i>	1640	R1608
Crossbars	Tube	in. (mm)	in. (mm)	lbs/ft (kg/m)	lbs/ft (kg/m)
Every link	Version				
1640-05-	<input type="checkbox"/> -0	1.97 (50)	3.31 (84)	≈ 3.43 (5.10)	-
1640-06-	<input type="checkbox"/> -0	2.56 (65)	3.90 (99)	≈ 3.48 (5.18)	-
1640-07-	<input type="checkbox"/> -0	2.95 (75)	4.29 (109)	≈ 3.54 (5.27)	-
1640-08-	<input type="checkbox"/> -0	3.43 (87)	4.76 (121)	≈ 3.57 (5.31)	-
1640-10-	<input type="checkbox"/> -0	3.94 (100)	5.28 (134)	≈ 3.60 (5.36)	-
1640-11-	<input type="checkbox"/> -0	4.41 (112)	5.75 (146)	≈ 3.66 (5.45)	-
1640-12-	<input type="checkbox"/> -0	4.92 (125)	6.26 (159)	≈ 3.72 (5.54)	-
1640-13-	<input type="checkbox"/> -0	5.39 (137)	6.73 (171)	≈ 3.78 (5.63)	-
1640-15-	<input type="checkbox"/> -0	5.91 (150)	7.24 (184)	≈ 3.81 (5.67)	-
1640-16-	<input type="checkbox"/> -0	6.38 (162)	7.72 (196)	≈ 3.86 (5.74)	-
1640-17-	<input type="checkbox"/> -0	6.89 (175)	8.23 (209)	≈ 3.90 (5.81)	-
1640-18-	<input type="checkbox"/> -0	7.36 (187)	8.70 (221)	≈ 3.95 (5.88)	-
1640-20-	1608-20- <input type="checkbox"/> -0	7.87 (200)	9.21 (234)	≈ 3.96 (5.89)	Upon request
1640-21-	<input type="checkbox"/> -0	8.35 (212)	9.69 (246)	≈ 4.00 (5.96)	-
1640-22-	<input type="checkbox"/> -0	8.86 (225)	10.20 (259)	≈ 4.04 (6.01)	-
1640-23-	<input type="checkbox"/> -0	9.33 (237)	10.67 (271)	≈ 4.09 (6.09)	-
1640-25-	1608-25- <input type="checkbox"/> -0	9.84 (250)	11.18 (284)	≈ 4.13 (6.15)	Upon request
1640-26-	<input type="checkbox"/> -0	10.31 (262)	11.65 (296)	≈ 4.17 (6.20)	-
1640-27-	<input type="checkbox"/> -0	10.83 (275)	12.17 (309)	≈ 4.21 (6.27)	-
1640-28-	<input type="checkbox"/> -0	11.30 (287)	12.64 (321)	≈ 4.23 (6.29)	-
1640-30-	1608-30- <input type="checkbox"/> -0	11.81 (300)	13.15 (334)	≈ 4.26 (6.34)	Upon request
1640-31-	<input type="checkbox"/> -0	12.28 (312)	13.62 (346)	≈ 4.31 (6.41)	-
1640-32-	<input type="checkbox"/> -0	12.79 (325)	14.13 (359)	≈ 4.35 (6.48)	-
1640-33-	<input type="checkbox"/> -0	13.27 (337)	14.61 (371)	≈ 4.43 (6.59)	-
1640-35-	1608-35- <input type="checkbox"/> -0	13.78 (350)	15.12 (384)	≈ 4.44 (6.61)	Upon request
1640-36-	<input type="checkbox"/> -0	14.25 (362)	15.59 (396)	≈ 4.48 (6.67)	-
1640-37-	<input type="checkbox"/> -0	14.76 (375)	16.10 (409)	≈ 4.51 (6.71)	-
1640-38-	<input type="checkbox"/> -0	15.24 (387)	16.57 (421)	≈ 4.54 (6.76)	-
1640-40-	1608-40- <input type="checkbox"/> -0	15.75 (400)	17.09 (434)	≈ 4.63 (6.89)	Upon request
1640-41-	<input type="checkbox"/> -0	16.22 (412)	17.56 (446)	≈ 4.70 (6.99)	-
1640-42-	<input type="checkbox"/> -0	16.73 (425)	18.07 (459)	≈ 4.76 (7.08)	-
1640-43-	<input type="checkbox"/> -0	17.20 (437)	18.54 (471)	≈ 4.79 (7.13)	-
1640-45-	<input type="checkbox"/> -0	17.72 (450)	19.06 (484)	≈ 4.82 (7.17)	-
1640-46-	<input type="checkbox"/> -0	18.19 (462)	19.53 (496)	≈ 4.82 (7.18)	-
1640-47-	<input type="checkbox"/> -0	18.70 (475)	20.04 (509)	≈ 4.85 (7.22)	-
1640-48-	<input type="checkbox"/> -0	19.17 (487)	20.51 (521)	≈ 4.89 (7.27)	-
1640-50-	<input type="checkbox"/> -0	19.69 (500)	21.02 (534)	≈ 4.94 (7.35)	-
1640-51-	<input type="checkbox"/> -0	20.16 (512)	21.50 (546)	≈ 4.95 (7.36)	-
1640-52-	<input type="checkbox"/> -0	20.67 (525)	22.01 (559)	≈ 4.97 (7.39)	-
1640-53-	<input type="checkbox"/> -0	21.14 (537)	22.48 (571)	≈ 5.03 (7.49)	-
1640-55-	<input type="checkbox"/> -0	21.65 (550)	22.99 (584)	≈ 5.24 (7.80)	-
1640-60-	<input type="checkbox"/> -0	23.62 (600)	24.96 (634)	≈ 5.32 (7.92)	-

Choose from the radii below for all of the above sizes

Radius (mm) Example: 1640-30--0

	200**	250	300	350	400	450	500	550	600
R	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	19.84 (450)	19.68 (500)	21.65 (550)	23.62 (600)
H	21.46 (545)	25.39 (645)	29.41 (747)	33.27 (845)	37.20 (945)	41.14 (1045)	45.08 (1145)	49.02 (1245)	52.95 (1345)
D	16.34 (415)	18.31 (465)	20.27 (515)	22.24 (565)	24.21 (615)	26.18 (665)	28.15 (715)	30.12 (765)	32.09 (815)
K	36.22 (920)	42.52 (1080)	48.82 (1240)	55.12 (1400)	61.42 (1560)	67.72 (1720)	73.62 (1870)	79.53 (2020)	85.63 (2175)

** This radius is not available for the R880 Series

For wider chains see page 6.157. For large diameter hoses see page 6.157

0=Standard color black. For other colors see Chapter 1

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

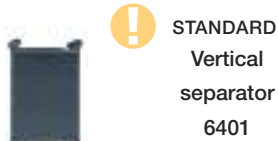
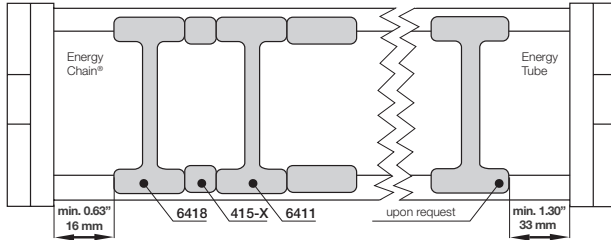




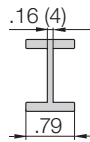
Option 1: Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.

NOTE: Observe a lateral spacing of at least 1.30 in. (33mm) for Energy Tubes and .63 in. (16mm) for Energy Chain®. There is no minimum spacing needed for side plates



STANDARD
Vertical separator
6401

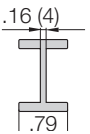


Vertical separator
Unassembled **Part No. 6401**
Assembled **Part No. 6411**

- **Standard separator 6401 for Energy Chains® and Energy Tubes**
This separator offers safe stability due to its wide base design, also when used with thick cables or hoses.



Locking separator
6408



Locking separator (chain only)
Unassembled **Part No. 6408**
Assembled **Part No. 6418**

- **Locking separator 6408 for Energy Chains®**
This separator features increased retention force for applications exposed to very high humidity and extreme loads. The extra retention force is achieved by asymmetric claws for the crossbar. Take care to ensure proper alignment.



Spacers
405-XX



Spacer (chain only)
Unassembled **Part No. 405-XX**
Assembled **Part No. 415-XX**
XX = width of the spacer

- **NOTE ON SPACERS**
Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications. The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

Spacers available in the following sizes:

Part No.	Part No.	in.	(mm)
Unassembled	Assembled		
405 -10	415 -10	.39"	(10)
405 -15	415 -15	.59"	(15)
405 -20	415 -20	.79"	(20)
405 -30	415 -30	1.18"	(30)
405 -40	415 -40	1.57"	(40)



Energy Chain System® E4 Light Series 1640/R1608 Interior Separation

energy chain® configurator ▶



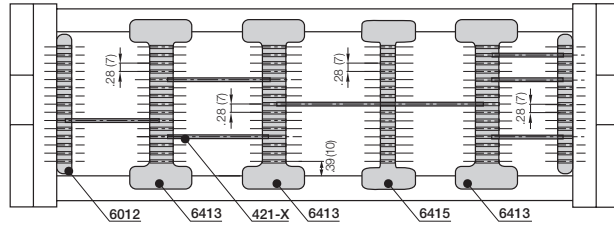
1640
R1608



Option 2: Shelves

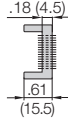
Energy Chains® and Energy Tubes can be subdivided both vertically and horizontally using the various interior separation elements.

► **Design, Chapter 1** for layout recommendations.



- **Side plates 6002**

This component is used to form the basic pattern of a shelf system.



Side plate

Unassembled	Part No. 6002
Assembled	Part No. 6012

Side plate
6002



- **Vertical separator 6403**

This component is used to form the basic pattern of a shelf system.



Vertical separator

Unassembled	Part No. 6403
Assembled	Part No. 6413

Vertical separator
6403



- **Locking vertical separator 6003**

This component is used to form the basic pattern of a shelf system.



Locking vertical separator

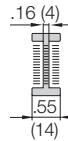
Unassembled	Part No. 6003
Assembled	Part No. 6013

Vertical separator
6003



- **Slotted separators 6405 for Energy Chains®**

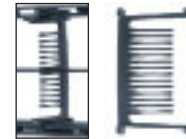
This separator can be retrofitted into an existing interior separation system without removing the shelves, as long as these shelves fit into any of the 13 middle slots



Slotted separators, open

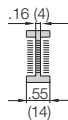
Unassembled	Part No. 6405
Assembled	Part No. 6415

Closed slotted
separator
6405



- **Slotted separator 6005 for Energy Tubes**

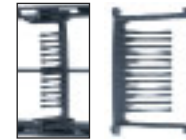
This separator can be retrofitted into an existing interior separation system without removing the shelves, as long as these shelves fit into any of the 13 middle slots



Slotted separators, open

Unassembled	Part No. 6005
Assembled	Part No. 6015

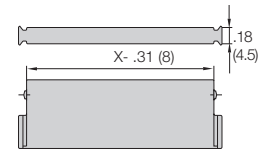
Open slotted
separator
6005



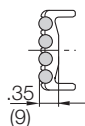
Shelves 420-XX

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 7 different heights in .28" (7mm) increments

Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled
.71 (18)	.39 (10)	420-18	421-18	2.95 (75)	2.64 (67)	420-75	421-75
.91 (23)	.59 (15)	420-23	421-23	3.46 (88)	3.15 (80)	420-88	421-88
.98 (25)	.67 (17)	420-25	421-25	3.94 (100)	3.62 (92)	420-100	421-100
1.10 (28)	.79 (20)	420-28	421-28	4.92 (125)	4.61 (117)	420-125	421-125
1.30 (33)	.98 (25)	420-33	421-33	5.91 (150)	5.59 (142)	420-150	421-150
1.69 (43)	1.38 (35)	420-43	421-43	6.89 (175)	6.57 (167)	420-175	421-175
1.97 (50)	1.65 (42)	420-50	421-50	7.36 (187)	7.05 (179)	420-187	421-187
2.44 (62)	2.13 (54)	420-62	421-62	7.87 (200)	7.56 (192)	420-200	421-200



Rollclip - minimizes abrasion of particularly sensitive hoses or cables in an Energy Chain®. The integrated rollers compensate for relative movement between the chain and the hose or cable. This reduces the abrasion of the hoses or cables



Rollclip

Unassembled	Part No. 489-27
Assembled	Part No. 490-27



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

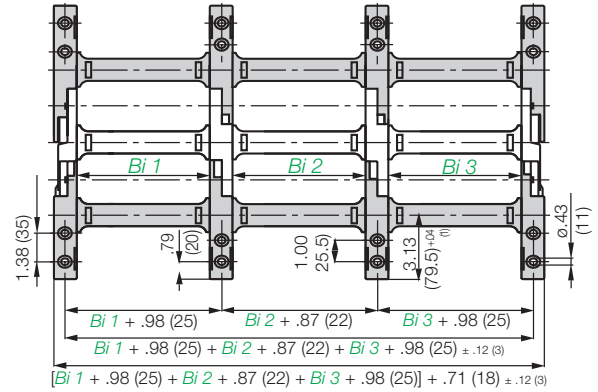


igus® Energy Chain
System®



Extension links - for extremely wide Energy Chains® up to 9.84 ft (3m)

- For applications in which particularly high fill weights necessitate extremely wide Energy Chains®
- The extension link design allows virtually limitless side-by-side attachment of chains
- The unsupported length of a chain can be increased when additional loads are required
- Extension links can be used with Energy Chains®, Energy Tubes or a combination of both
- They are suitable for unsupported and gliding applications in a guide trough
- Energy Chains® with extension links are attached with KMA or steel mounting brackets.



Part number example for Energy Chain®

1640-10/20/10-**200**-0

1640-**Bi1/Bi2/Bi3**-**R**-0

We **strongly recommend** on-site consultation with an igus® technician for individual advice regarding mounting brackets, guide troughs and other design details.

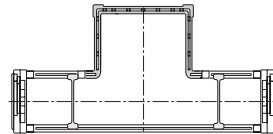
Telephone 1-800-521-2747
Fax 1-401-438-7270



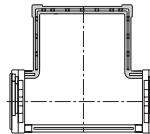
Extender crossbars - For careful guiding of large diameter cables and hoses

- Intended for cables and hoses with a maximum outer diameter of 11.81 in. (300 mm).
- Can be attached along either the inner or outer radius, inner radius preferred
- Gliding operation with crossbars assembled along the outer radius in conjunction with a special guide trough
- Gliding operation not guaranteed with crossbars assembled along the inner radius
- The extender crossbar can either be attached to the side links directly or can be used in combination with two standard snap-open crossbars.

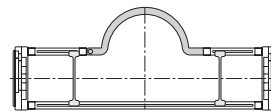
Consult igus® for your extender crossbar applications. We will be happy to assist you with your design layout.



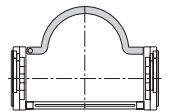
Square extender crossbar combined with standard snap-open crossbars.



Attached directly to the side link.



Round extender crossbar combined with standard snap-open crossbars.



Attached directly to the side link.

Part No.	Max Ø Hose	Style	Installation Side Link	Combined with Snap-Open Crossbars
450-15-RHD115	By request	Round	No	Yes
450-17-RD115	By request	Round	Yes	No
450-25-D150	By request	Square	Yes	No
450-30-D200	By request	Square	Yes	No
450-35-D250	By request	Square	Yes	No
450-40-D300	By request	Square	Yes	No
450-20-HD150	By request	Square	No	Yes
450-25-HD200	By request	Square	No	Yes
450-30-HD250	By request	Square	No	Yes

E4 clip on cable binder

- For side mounted applications
- Serves as a clip-on, lateral guide for hoses and cables on Energy Chains®
- The loops can be adjusted as needed

- Compatible with many E4 Energy Chains®
- Economical
- One clip and one locking band are needed for each chain link



Part No.	Form
450-B12	Locking clip, comprised of a locking element
450-B12-200	Locking band, comprised of a locking element and band; 12 x 1.5 x 200 mm

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

Energy Chain System® E4 Light Series 1640/R1608 Mounting Brackets - Steel

energy chain® configurator ▶

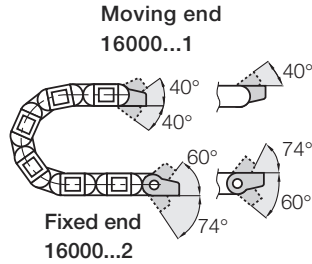
igus®

1640
R1608



Option 1: pivoting

- For pivoting connections
- One part for all chain widths
- Electrically conductive



Possible installation configurations -

Part No. Mounting Brackets Full Set

4 parts, 2 with pin, 2 with bore
Series 1640 or R1608
16000-12

Part No. Mounting Bracket Moving End

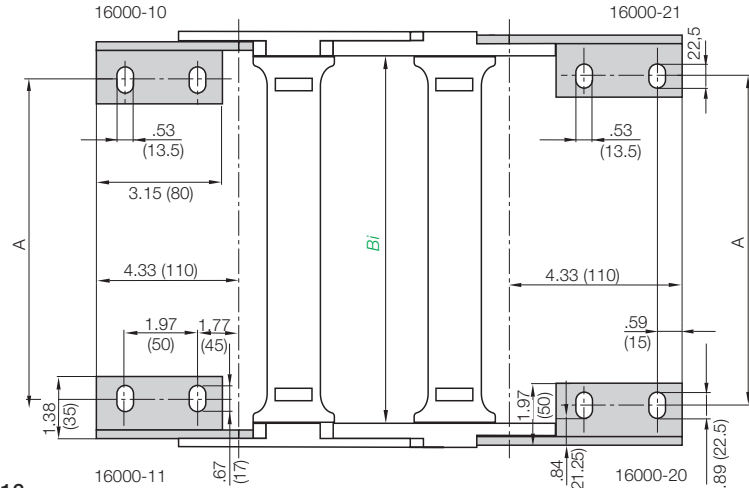
2 parts, 1 left & 1 right with bore
Series 1640 or R1608
16000-1

Part No. Mounting Bracket Fixed End

2 parts, 1 left & 1 right with pin
Series 1640 or R1608
16000-2

Due to the design of the E4/100 series chains,
please note the following when ordering brackets:

Even number of links = full set, part number ending in -12
Odd number of links = 2 pieces, part number ending in -1



Bracket Mounting dimensions

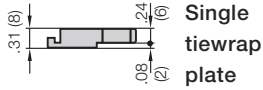
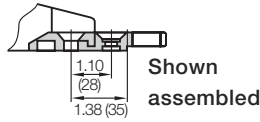
Mounting Brackets						Mounting Brackets					
Width of Chain <i>Bi</i>	Part Number	Full Set	Moving End Only	Fixed End Only	A in. (mm)	Width of Chain <i>Bi</i>	Part Number	Full Set	Moving End Only	Fixed End Only	A in. (mm)
1.97 (50)	16000	-12	-1	-2	.79 (20)	12.28 (312)	16000	-12	-1	-2	11.10 (282)
2.56 (65)	16000	-12	-1	-2	1.38 (35)	12.79 (325)	16000	-12	-1	-2	11.61 (295)
2.95 (75)	16000	-12	-1	-2	1.77 (45)	13.27 (337)	16000	-12	-1	-2	12.09 (307)
3.43 (87)	16000	-12	-1	-2	2.24 (57)	13.78 (350)	16000	-12	-1	-2	12.60 (320)
3.94 (100)	16000	-12	-1	-2	2.76 (70)	14.25 (362)	16000	-12	-1	-2	13.07 (332)
4.41 (112)	16000	-12	-1	-2	3.23 (82)	14.76 (375)	16000	-12	-1	-2	13.58 (345)
4.92 (125)	16000	-12	-1	-2	3.74 (95)	15.24 (387)	16000	-12	-1	-2	14.06 (357)
5.39 (137)	16000	-12	-1	-2	4.21 (107)	15.75 (400)	16000	-12	-1	-2	14.57 (370)
5.91 (150)	16000	-12	-1	-2	4.72 (120)	16.22 (412)	16000	-12	-1	-2	15.04 (382)
6.38 (162)	16000	-12	-1	-2	5.20 (132)	16.73 (425)	16000	-12	-1	-2	15.55 (395)
6.89 (175)	16000	-12	-1	-2	5.71 (145)	17.20 (437)	16000	-12	-1	-2	16.02 (407)
7.36 (187)	16000	-12	-1	-2	6.18 (157)	17.72 (450)	16000	-12	-1	-2	16.54 (420)
7.87 (200)	16000	-12	-1	-2	6.69 (170)	18.19 (462)	16000	-12	-1	-2	17.01 (432)
8.35 (212)	16000	-12	-1	-2	7.16 (182)	18.70 (475)	16000	-12	-1	-2	17.52 (445)
8.86 (225)	16000	-12	-1	-2	7.68 (195)	19.17 (487)	16000	-12	-1	-2	17.99 (457)
9.33 (237)	16000	-12	-1	-2	8.15 (207)	19.69 (500)	16000	-12	-1	-2	18.50 (470)
9.84 (250)	16000	-12	-1	-2	8.66 (220)	20.16 (512)	16000	-12	-1	-2	18.98 (482)
10.31 (262)	16000	-12	-1	-2	9.13 (232)	20.67 (525)	16000	-12	-1	-2	19.49 (495)
10.83 (275)	16000	-12	-1	-2	9.65 (245)	21.14 (537)	16000	-12	-1	-2	19.96 (507)
11.30 (287)	16000	-12	-1	-2	10.12 (257)	21.65 (550)	16000	-12	-1	-2	20.47 (520)
11.81 (300)	16000	-12	-1	-2	10.63 (270)	23.62 (600)	16000	-12	-1	-2	22.44 (570)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

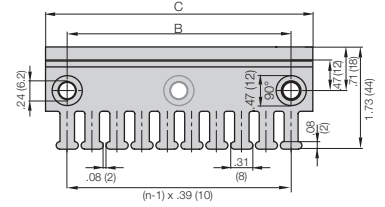


Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.



Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



For more information please refer to strain relief section of Chapter 10

Energy Chain System® E4 Light Series 1640/R1608 Guide Trough

energy chain® configurator ▶



1640
R1608

Width of Crossbar
1640-12-250-0

	B_{Ri}	Installation Part No.
-05	3.50 (89) *	
-06	4.09 (104)	97-50-225
-07	4.49 (114)	97-50-250
-10	5.47 (139)	97-50-275
-11	5.94 (151)	97-50-275
-12	6.46 (164)	97-50-300
-13	6.93 (176)	97-50-300
-15	7.44 (189)	97-50-325
-16	7.91 (201)	97-50-325
-17	8.43 (214)	97-50-350
-18	8.90 (226)	97-50-350
-20	9.41 (239)	97-50-375
-21	9.88 (251)	97-50-375
-22	10.39 (264)	97-50-400
-23	10.87 (276)	97-50-400
-25	11.38 (289)	97-50-425
-26	11.85 (301)	97-50-425
-27	12.36 (314)	97-50-450
-28	12.83 (326)	97-50-450
-30	13.35 (339)	97-50-475
-31	13.82 (351)	97-50-475
-32	14.33 (364)	97-50-500
-33	14.80 (376)	97-50-500
-35	15.31 (389)	97-50-525
-36	15.79 (401)	97-50-525
-37	16.30 (414)	97-50-550
-38	16.77 (426)	97-50-550
-40	17.28 (439)	97-50-575
-41	17.76 (451)	97-50-575
-42	18.27 (464)	97-50-600
-43	18.74 (476)	97-50-600
-45	19.25 (489)	97-50-625
-46	19.72 (501)	97-50-625
-47	20.24 (514)	97-50-650
-48	20.71 (526)	97-50-650
-50	21.22 (539)	97-50-675
-51	21.69 (551)	97-50-675
-52	22.20 (564)	97-50-700
-53	22.68 (576)	97-50-700
-55	23.19 (589)	97-50-725
-60	25.16 (639)	97-50-775

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part No. 97-30
- 1/2 travel length glide bars
Part No. 93-01
- Installation sets as end connectors
Part No. 97-50-XX

-XX indicates the length of the profile rails on which the guide trough is mounted. The values and part numbers are specified in the table on the left. The standard length of the trough components and glide bars is 6.56 ft (2 m). The overall length of the guide trough directly correlates to the length of travel.

Example:

Length of travel 164 ft (50 m)
Center-mounted

Required guide troughs:

164 ft (50 m) guide trough, 82 ft. (25 m) glide bar
= 25 sections of 6.56 ft (2 m) guide trough

Part No. 97-30

= 13 sections of 6.56 ft (2 m) glide bar

Part No. 93-01

Required number of installation set:

= Number of guide trough components + 1
= 25 + 1 = 26

Part No. of the installation sets **97-50-XXX**

Example:

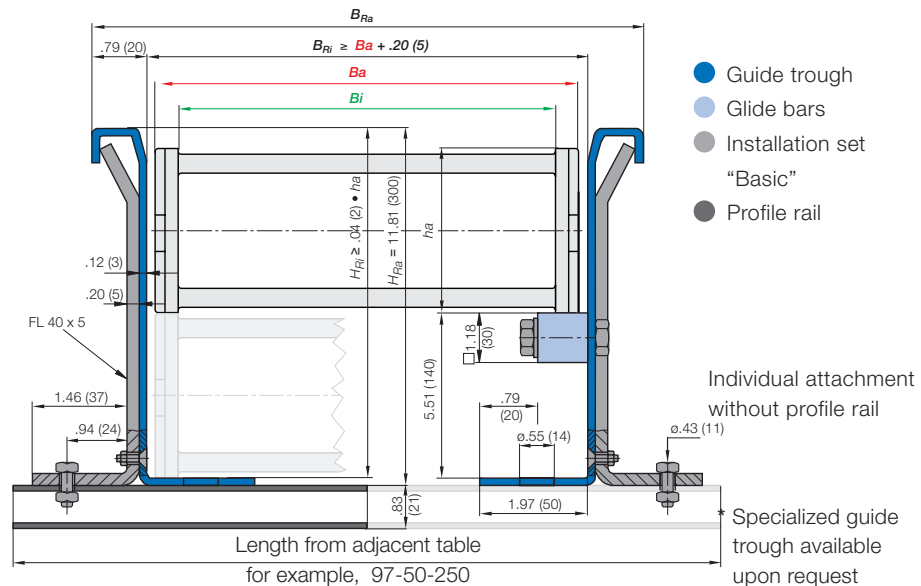
97-50-400 for 15.75 (400 mm) long profile rail



Left: Guide trough with glide bars
Right: Guide troughs without glide bars



Installation sets as section connectors



Standard length profile rail

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



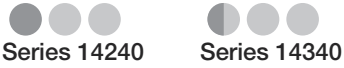
14240
14340




Energy Chain System® E4 Light Series 14240/14340


2.44"


Price Index



Special Features / Options

 ESD classification:
Electrically conductive
ESD/ATEX version upon request

 High torsional rigidity

 Side-mounted - unsupported

Assembly Tips



Opening Energy Chains®: Remove cross-bars and clips - Insert screwdriver into the slot, push down, release by lever action

Other Installation Methods

- Vertical, hanging ≤ 262 ft (80 m)
- Vertical, standing ≤ 19.69 ft (6 m)
- Side-mounted, un supp. ≤ 6.56 ft (2 m)
- Rotary requires further calculation

Usage Guidelines



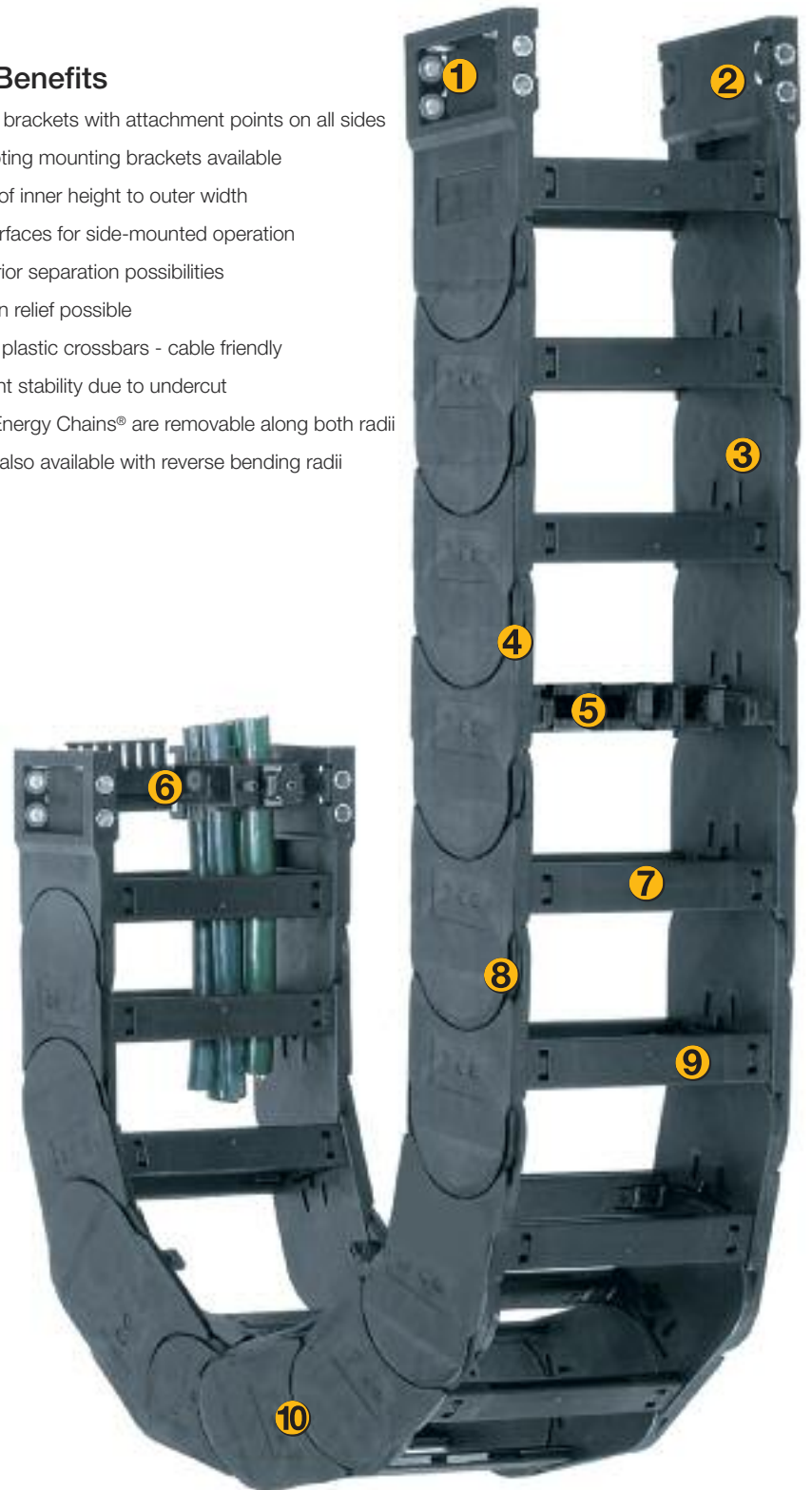
- If a simpler low-cost solution is required
- If optimized interior space is required
- If the Series 400 is too large



- If a quieter version is required
➤ Series 400/410/R880
- If side-mounted chain/tube with a long unsupported travel is required
➤ Series 4040/4140/R8840
- If more inner height is required
➤ Series 15050/15150/R19850

Features & Benefits


- 1 KMA mounting brackets with attachment points on all sides
- 2 Locking or pivoting mounting brackets available
- 3 Optimum ratio of inner height to outer width
- 4 Lateral glide surfaces for side-mounted operation
- 5 Numerous interior separation possibilities
- 6 Integrated strain relief possible
- 7 Wide, rounded plastic crossbars - cable friendly
- 8 High side-mount stability due to undercut
- 9 Crossbars on Energy Chains® are removable along both radii
- 10 Energy Chain® also available with reverse bending radii




Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

19.69 ft (6 m) **14240-30-300-0**

 Energy Chain®

With 2 separators **417** assembled every 2nd link

 Interior Separation

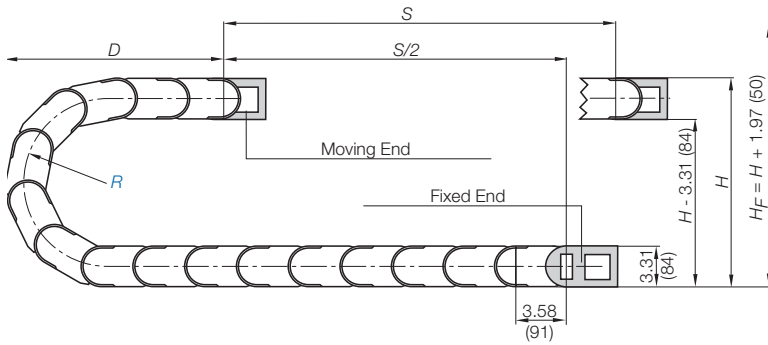
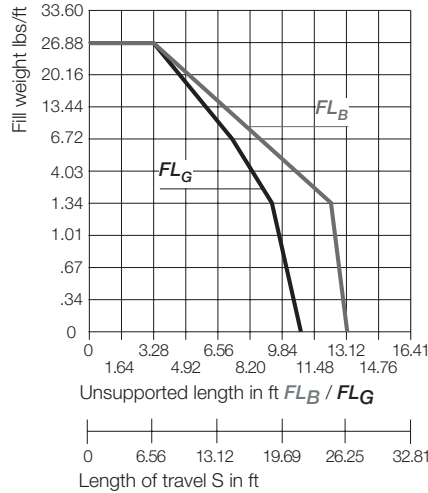
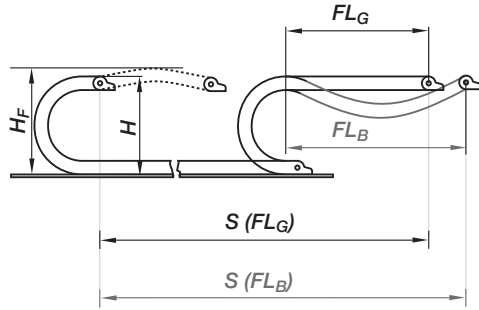
1 Set **142400-30-12P**

 Mounting Bracket

Energy Chain System® E4 Light Series 14240/14340 Installation Dimensions

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ► Design, Chapter 1



Pitch per link = 3.58" (91 mm)
Links per ft (m) = 3.35 (11)
For center mount applications:
Chain length = $S/2 + K$

The required clearance height: $H_F = H + 1.97$ in. (50 mm) (with 1.34 lbs/ft (2 kg/m) fill weight). Please consult igus® if space is particularly restricted.

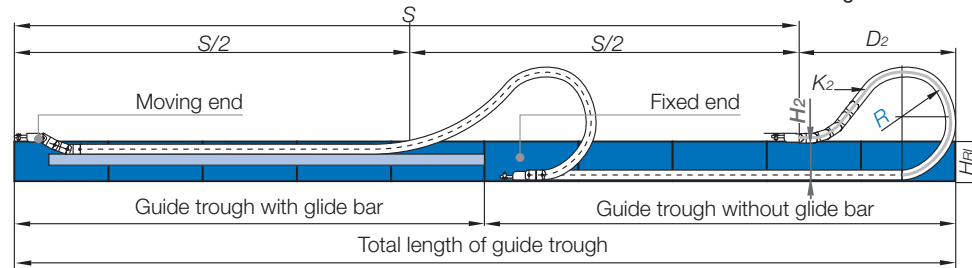
R	5.31 (135)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)	11.81 (300)	15.75 (400)	19.68 (500)
H^*_{+25}	14.17 (360)	15.16 (385)	17.13 (435)	19.09 (485)	23.03 (585)	26.97 (685)	34.84 (885)	42.72 (1085)
D	10.63 (270)	11.22 (285)	12.20 (310)	13.19 (335)	15.16 (385)	17.13 (435)	21.06 (535)	25.00 (635)
K	25.59 (650)	29.53 (750)	32.48 (825)	35.43 (900)	41.34 (1050)	48.23 (1225)	57.09 (1450)	69.88 (1775)

For long travels with lowered mounting height

Long travel lengths from 32.8 ft.(10m) to max. 492 ft. (150m)

For center mount applications:

$$\text{Chain length} = S/2 + K_2$$



R	5.31 (135)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)	11.81 (300)	15.75 (400)	19.68 (500)
H_2	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)	10.47 (266)
D_2 +25	15.35 (390)	17.72 (450)	21.65 (550)	27.95 (710)	36.22 (920)	44.09 (1120)	60.24 (1530)	72.83 (1850)
K_2	28.66 (728)	32.24 (819)	39.41 (1001)	50.16 (1274)	64.49 (1638)	75.23 (1911)	100.31 (2548)	125.39 (3185)

For support of the lower run, see Chapter 9 for the Support Tray tool kit

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	max. 32.8 ft/s (10 m/s) / max. 164 ft/s ² (50 m/s ²)
Material - permitted temperature	igumid G / -40°F (-40°C) up to +248°F (+120°C)
Flammability Class, igumid G	VDE 0304 IIC UL94 HB

igus®

14240
14340

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to Installation dimensions for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{safety buffer}$
 - H_F = Required clearance height
 - H_{in} = Trough inner height
 - H_2 = *Mounting height
 - D_2 = Overlength - long travels, gliding
 - K_2 = *Add-on
- *If the mounting bracket location is set lower

2.44"

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.

Design, Chapter 1

Technical Data

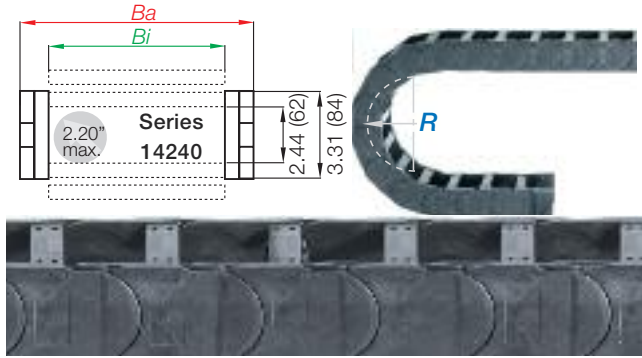


Details of material properties

► Chapter 1

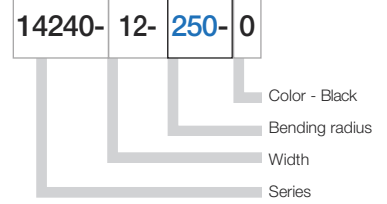
6.232

Series 14240 - Energy Chain® with crossbars every link

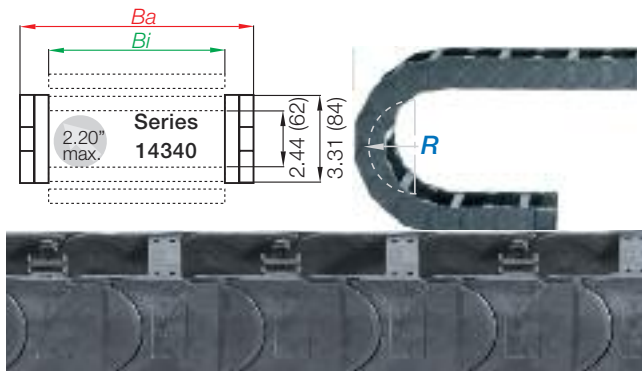


- Crossbars every link
- For use with rigid hydraulic hoses
- For particularly demanding applications
- Can be opened from both sides

Part Number Structure

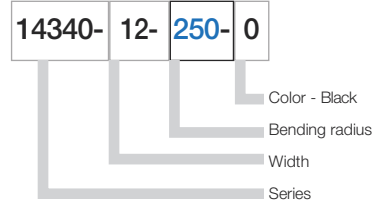


Series 14340 - Energy Chain® with crossbars every other link

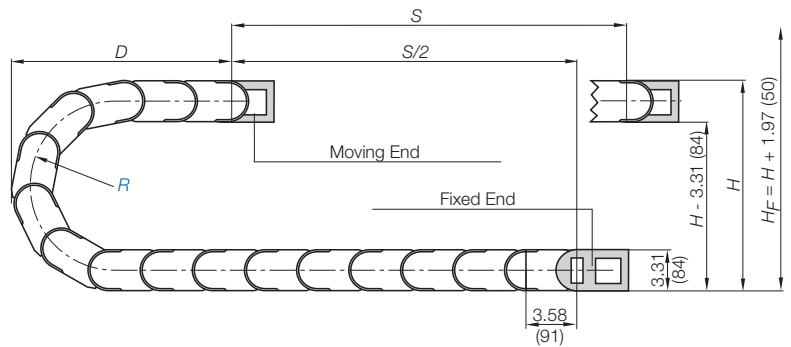
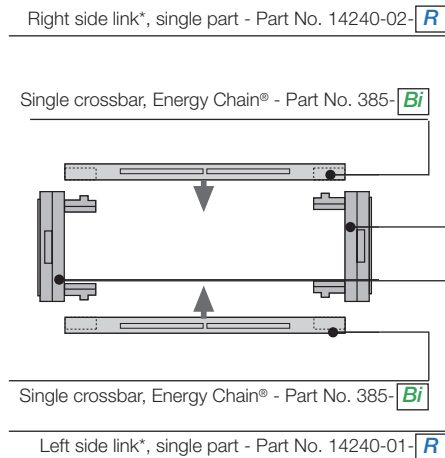


- Crossbars every other link - Standard configuration
- For nearly every situation
- Can be opened from both sides
- Easy assembly
- Stable
- Cost-effective

Part Number Structure



Energy Chain® as separate parts, links and side plates



*View from the fixed point of the Energy Chain®/Energy Tube

Energy Chain System® E4 Light Series 14240/14340

energy chain® configurator 



14240
14340

Supplement part number with required radius. Example: 14240-30--0

Pitch: 3.58 in. (91mm) per link links/ft(m) = 3.35 (11)

Part Number.				<i>Bi</i>	<i>Ba</i>	14240	14340
Crossbars	Crossbars			in. (mm)	in. (mm)	lbs/ft (kg/m)	lbs/ft (kg/m)
Every link	Every other						
14240-05-	14340-05-	<input type="text" value=""/>	-0	1.97 (50)	2.99 (76)	≈1.59 (2.37)	≈ 1.56 (2.32)
14240-06-	14340-06-	<input type="text" value=""/>	-0	2.68 (68)	3.70 (94)	≈ 1.6 (2.40)	≈ 1.57 (2.33)
14240-07-	14340-07-	<input type="text" value=""/>	-0	2.95 (75)	3.98 (101)	≈ 1.63 (2.42)	≈ 1.57 (2.34)
14240-087-	14340-087-	<input type="text" value=""/>	-0	3.43 (87)	4.49 (114)	≈ 1.66 (2.47)	≈ 1.59 (2.36)
14240-10-	14340-10-	<input type="text" value=""/>	-0	3.94 (100)	4.96 (126)	≈ 1.69 (2.52)	≈ 1.61 (2.39)
14240-11-	14340-11-	<input type="text" value=""/>	-0	4.25 (108)	5.28 (134)	≈ 1.71 (2.55)	≈ 1.61 (2.40)
14240-112-	14340-112-	<input type="text" value=""/>	-0	4.41 (112)	5.47 (139)	≈ 1.71 (2.55)	≈ 1.62 (2.41)
14240-12-	14340-12-	<input type="text" value=""/>	-0	4.92 (125)	5.94 (151)	≈ 1.76 (2.62)	≈ 1.64 (2.44)
14240-137-	14340-137-	<input type="text" value=""/>	-0	5.39 (137)	6.46 (164)	≈ 1.79 (2.66)	≈ 1.65 (2.46)
14240-15-	14340-15-	<input type="text" value=""/>	-0	5.91 (150)	6.93 (176)	≈ 1.83 (2.72)	≈ 1.67 (2.49)
14240-162-	14340-162-	<input type="text" value=""/>	-0	6.38 (162)	7.44 (189)	≈ 1.83 (2.73)	≈ 1.67 (2.49)
14240-17-	14340-17-	<input type="text" value=""/>	-0	6.61 (168)	7.64 (194)	≈ 1.88 (2.79)	≈ 1.69 (2.52)
14240-18-	14340-18-	<input type="text" value=""/>	-0	6.89 (175)	7.91 (201)	≈ 1.90 (2.82)	≈ 1.70 (2.53)
14240-187-	14340-187-	<input type="text" value=""/>	-0	7.36 (187)	8.43 (214)	≈ 1.91 (2.84)	≈ 1.71 (2.55)
14240-20-	14340-20-	<input type="text" value=""/>	-0	7.87 (200)	8.90 (226)	≈ 1.94 (2.89)	≈ 1.73 (2.58)
14240-212-	14340-212-	<input type="text" value=""/>	-0	8.35 (212)	9.41 (239)	≈ 1.98 (2.95)	≈ 1.75 (2.60)
14240-22-	14340-23-	<input type="text" value=""/>	-0	8.86 (225)	9.88 (251)	≈ 2.02 (3.01)	≈ 1.77 (2.63)
14240-237-	14340-237-	<input type="text" value=""/>	-0	9.33 (237)	10.39 (264)	≈ 2.04 (3.04)	≈ 1.78 (2.65)
14240-25-	14340-25-	<input type="text" value=""/>	-0	9.84 (250)	10.87 (276)	≈ 2.08 (3.10)	≈ 1.80 (2.68)
14240-262-	14340-262-	<input type="text" value=""/>	-0	10.31 (262)	11.38 (289)	≈ 2.09 (3.11)	≈ 1.81 (2.69)
14240-27-	14340-28-	<input type="text" value=""/>	-0	10.83 (275)	11.85 (301)	≈ 2.14 (3.19)	≈ 1.83 (2.72)
14240-28-	14340-29-	<input type="text" value=""/>	-0	11.30 (287)	12.36 (314)	≈ 2.15 (3.20)	≈ 1.83 (2.73)
14240-30-	14340-30-	<input type="text" value=""/>	-0	11.81 (300)	12.83 (326)	≈ 2.22 (3.30)	≈ 1.87 (2.78)
14240-312-	14340-312-	<input type="text" value=""/>	-0	12.28 (312)	13.35 (339)	≈ 2.22 (3.31)	≈ 1.88 (2.79)
14240-325-	14340-325-	<input type="text" value=""/>	-0	12.79 (325)	13.82 (351)	≈ 2.26 (3.37)	≈ 1.89 (2.81)
14240-337-	14340-337-	<input type="text" value=""/>	-0	13.27 (337)	14.33 (364)	≈ 2.28 (3.40)	≈ 1.90 (2.83)
14240-350-	14340-350-	<input type="text" value=""/>	-0	13.78 (350)	14.80 (376)	≈ 2.39 (3.56)	≈ 1.96 (2.91)
14240-362-	14340-362-	<input type="text" value=""/>	-0	14.25 (362)	15.31 (389)	≈ 2.43 (3.61)	≈ 1.97 (2.93)
14240-375-	14340-375-	<input type="text" value=""/>	-0	14.76 (375)	15.79 (401)	≈ 2.45 (3.64)	≈ 1.98 (2.95)
14240-387-	14340-387-	<input type="text" value=""/>	-0	15.24 (387)	16.30 (414)	≈ 2.48 (3.69)	≈ 2.00 (2.97)
14240-400-	14340-400-	<input type="text" value=""/>	-0	15.75 (400)	16.77 (426)	≈ 2.51 (3.73)	≈ 2.0 (2.99)

Choose from the radii below for all of the above sizes

Radius (mm) Example: 14240-30--0

	135	150	175	200	250	300	400	500
R	5.31 (135)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)	11.81 (300)	15.75 (400)	19.68 (500)
H ⁺ ₂₅	14.17 (360)	15.16 (385)	17.13 (435)	19.09 (485)	23.03 (585)	26.97 (685)	34.84 (885)	42.72 (1085)
D	10.63 (270)	11.22 (285)	12.20 (310)	13.19 (335)	15.16 (385)	17.13 (435)	21.06 (535)	25.00 (635)
K	25.59 (650)	29.53 (750)	32.48 (825)	35.43 (900)	41.34 (1050)	48.23 (1225)	57.09 (1450)	69.88 (1775)

*Removable lid only, no hinged option

For large diameter hoses see page 6.167

0=Standard color black. For other colors see Chapter 1

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



14240
14340



Energy Chain System® E4 Light Series 14240/14340 Interior Separation

energy chain® configurator ▶

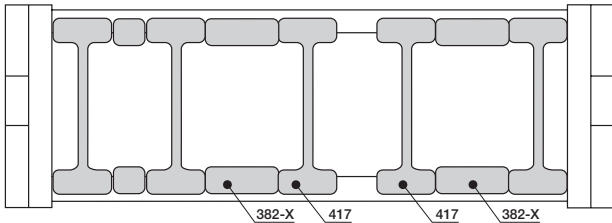
igus® Energy Chain
System®



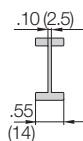
Option 1: Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.

NOTE: Observe a lateral spacing of at least 1.30 in. (33mm) for Energy Tubes and .63 in. (16mm) for Energy Chain®. There is no minimum spacing needed for side plates



Vertical separator
407



Vertical separator

Unassembled	Part No. 407
Assembled	Part No. 417



Spacers
405-XX



Spacer (chain only)

Unassembled	Part No. 381-XX
Assembled	Part No. 382-XX

XX = width of the spacer

- **Standard separator 407 for Energy Chains® and Energy Tubes**

This separator offers safe stability due to its wide base design, also when used with thick cables or hoses.

- **NOTE ON SPACERS**

Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications. The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm)). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

Spacers available in the following sizes:

Part No.	Part No.	in.	(mm)
Unassembled	Assembled		
381-10	382-10	.39"	(10)
381-15	382-15	.59"	(15)
381-20	382-20	.79"	(20)

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

Energy Chain System® E4 Light

Series 14240/14340

Interior Separation

energy chain® configurator ▶



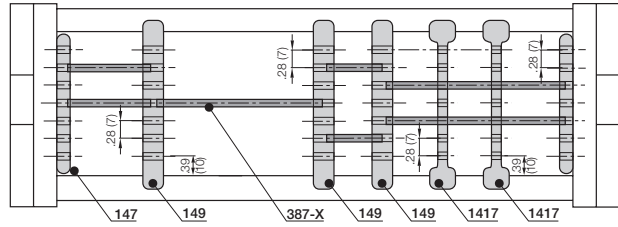
14240
14340



Option 2: Shelves

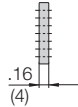
Energy Chains® and Energy Tubes can be subdivided both vertically and horizontally using the various interior separation elements.

► **Design, Chapter 1** for layout recommendations.



- **Side plates 146**

This component is used to form the basic pattern of a shelf system.



Side plate

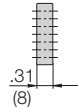
Unassembled	Part No. 146
Assembled	Part No. 147

Side plate
146



- **Vertical separator 148**

This component is used to form the basic pattern of a shelf system.



Vertical separator

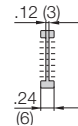
Unassembled	Part No. 148
Assembled	Part No. 149

Vertical separator
148



- **Slotted separators 1407**

These are used for very complex subdivisions. However, they cannot be retrofitted into an existing separation system without removing the shelves first.



Slotted separators, closed

Unassembled	Part No. 1407
Assembled	Part No. 1417

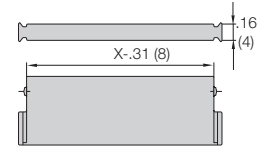
Closed slotted separator
1407



Shelves 420-XX

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 7 different heights in .28" (7mm) increments

Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled
.71 (18)	.39 (10)	386-18	387-18	2.95 (75)	2.64 (67)	386-75	387-75
.91 (23)	.59 (15)	386-23	387-23	3.43 (87)	3.11 (79)	386-87	387-87
.98 (25)	.67 (17)	386-25	387-25	3.94 (100)	3.62 (92)	386-100	387-100
1.10 (28)	.79 (20)	386-28	387-28	4.25 (108)	3.94 (100)	386-108	387-108
1.30 (33)	.98 (25)	386-33	387-33	4.92 (125)	4.61 (117)	386-125	387-125
1.69 (43)	1.38 (35)	386-43	387-43	5.91 (150)	5.59 (142)	386-150	387-150
1.97 (50)	1.65 (42)	386-50	387-50	6.89 (175)	6.57 (167)	386-175	387-175
2.13 (54)	1.81 (46)	386-54	387-54	7.87 (200)	7.56 (192)	386-200	387-200
2.44 (62)	2.13 (54)	386-62	387-62	8.19 (208)	7.87 (200)	386-208	387-208



PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS

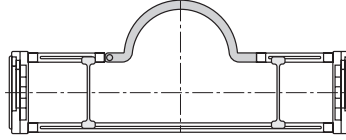




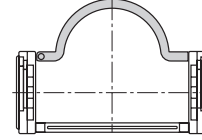
Consult igus® for your extender crossbar applications. We will be happy to assist you with your design layout.

Extender crossbars - For careful guiding of large diameter cables and hoses

- Intended for cables and hoses with a maximum outer diameter of 4.53 in. (115 mm).
- Gliding operation with crossbars assembled along the outer radius in conjunction with a special guide trough
- Gliding operation not guaranteed with crossbars assembled along the inner radius
- The extender crossbar can either be attached to the side links directly or can be used in combination with two standard snap-open crossbars.



Round extender crossbar combined with standard snap-open crossbars.

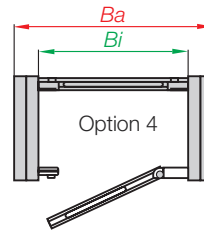
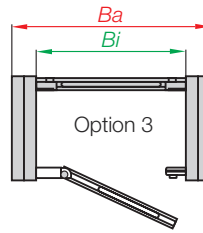
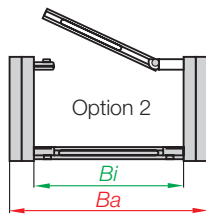
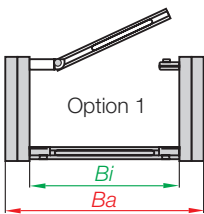


Attached directly to the side link.

Part No.	Max Ø Hose in. (mm)	Style	Installation Side Link	Combined with Snap-Open Crossbars
385-15-RHD115	4.53 (115)	Round	No	Yes
385-18-RD115	4.53 (115)	Round	Yes	No

Hinged crossbars

- Typically, Energy Chain® crossbars are completely removable. In cases where it is preferable that the opening crossbars remain on the Energy Chain®, a hinged design has been developed.
- Please consult igus® for design assistance



Energy Chain System® E4 Light

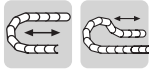
Series 14240/14340

Mounting Brackets

energy chain® configurator ▶



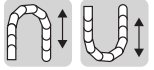
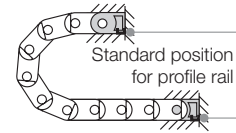
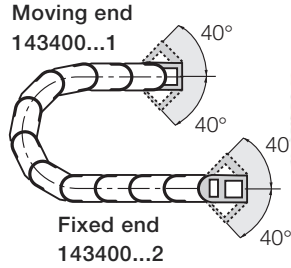
14240
14340



Standard

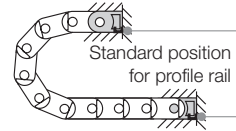
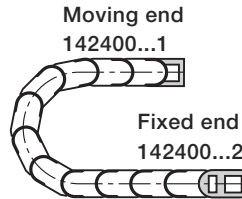
Option 1: KMA pivoting

- Profile rail option
- Universal use
- Corrosion resistant
- Short and long travels
- Space-restricted conditions



Option 2: KMA locking

- Profile rail option
- Universal use
- Corrosion resistant
- Extreme accelerations
- Vertical hanging/standing travels



Part Number Structure

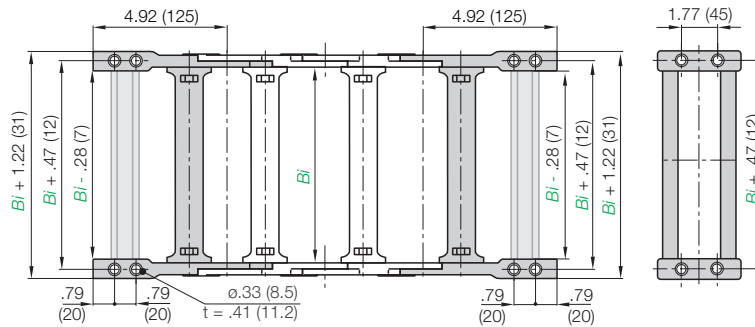
143400-07-12 P

With Profile Rail

Complete Set

Width

143400 = Pivoting
142400 = Locking



Full set, for both ends:

143400-05-12 Full set, each part with pin/bore

Single-part order:

143400-05-1 Mounting bracket with bore

143400-05-2 Mounting bracket with pin

Part number examples are shown for pivoting brackets. For locking brackets change part number to 142400

Part No. Full Set (pivoting)

Series 14240 or 14340:

143400-Width-12

Part No. Full Set (pivoting)

with profile rail

Series 14240 or 14340

143400-Width-12P

Width	Part No. Full Set		With Profile Rail	Bi in. (mm)	Width	Part No. Full Set		With Profile Rail	Bi in. (mm)		
	Pivoting	Locking				Pivoting	Locking				
-05	143400	142400	-05-12	P	1.97 (50)	-23	143400	142400	-23-12	P	8.86 (225)
-06	143400	142400	-06-12	P	2.68 (68)	-237	143400	142400	-237-12	P	9.33 (237)
-07	143400	142400	-07-12	P	2.95 (75)	-25	143400	142400	-25-12	P	9.84 (250)
-087	143400	142400	-087-12	P	3.43 (87)	-262	143400	142400	-262-12	P	10.31 (262)
-10	143400	142400	-10-12	P	3.94 (100)	-28	143400	142400	-28-12	P	10.83 (275)
-11	143400	142400	-11-12	P	4.25 (108)	-29	143400	142400	-29-12	P	11.30 (287)
-112	143400	142400	-112-12	P	4.41 (112)	-30	143400	142400	-30-12	P	11.81 (300)
-12	143400	142400	-12-12	P	4.92 (125)	-312	143400	142400	-312-12	P	12.28 (312)
-137	143400	142400	-137-12	P	5.39 (137)	-325	143400	142400	-325-12	P	12.79 (325)
-15	143400	142400	-15-12	P	5.91 (150)	-337	143400	142400	-337-12	P	13.27 (337)
-162	143400	142400	-162-12	P	6.38 (162)	-350	143400	142400	-350-12	P	13.78 (350)
-17	143400	142400	-17-12	P	6.61 (168)	-362	143400	142400	-362-12	P	14.25 (362)
-18	143400	142400	-18-12	P	6.89 (175)	-375	143400	142400	-375-12	P	14.76 (375)
-187	143400	142400	-187-12	P	7.36 (187)	-387	143400	142400	-387-12	P	15.24 (387)
-20	143400	142400	-20-12	P	7.87 (200)	-400	143400	142400	-400-12	P	15.75 (400)
-212	143400	142400	-212-12	P	8.35 (212)						

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Chainfix clamps for the profile rail



igus® Chainfix strain relief elements are available in either steel or stainless steel. They can be adjusted with a hexagon socket and are available in single, double and triple configurations.

Part No. Single Clamp		Part No. Double Clamp		Part No. Triple Clamp		Cable ø	
Steel	Stainless	Steel	Stainless	Steel	Stainless	in.	(mm)
CFX12-1	CFX12-1E	CFX12-2	CFX12-2E	CFX12-3	-	.24 - .47	(06 - 12)
CFX14-1	CFX14-1E	CFX14-2	CFX14-2E	CFX14-3	-	.47 - .55	(12 - 14)
CFX16-1	CFX16-1E	CFX16-2	CFX16-2E	CFX16-3	-	.55 - .63	(14 - 16)
CFX18-1	CFX18-1E	CFX18-2	CFX18-2E	CFX18-3	-	.63 - .71	(16 - 18)
CFX20-1	CFX20-1E	CFX20-2	CFX20-2E	CFX20-3	-	.71 - .79	(18 - 20)
CFX22-1	CFX22-1E	CFX22-2	CFX22-2E	CFX22-3	-	.79 - .87	(20 - 22)
CFX26-1	CFX26-1E	CFX26-2	CFX26-2E	-	-	.87 - 1.02	(22 - 26)
CFX30-1	CFX30-1E	CFX30-2	CFX30-2E	-	-	1.02 - 1.18	(26 - 30)
CFX34-1	CFX34-1E	CFX34-2	CFX34-2E	-	-	1.18 - 1.34	(30 - 34)
CFX38-1	CFX38-1E	-	-	-	-	1.34 - 1.50	(34 - 38)
CFX42-1	CFX42-1E	-	-	-	-	1.50 - 1.65	(38 - 42)

For more information please refer to strain relief section of Chapter 10

Chainfix Clip

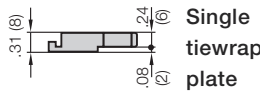
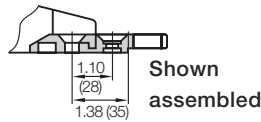


Modular snap-on strain relief device

Chainfix clip is available for cable diameters ranging from .16" (4mm) to .94" (24 mm). It is suitable for assembly on KMA mounting brackets, clip-on strain relief for crossbars as well as profile rails. Quick assembly without the use of tools. **For more information please refer to strain relief section of Chapter 10**

Cable ø	Part No. Clamp	Part No. Bottom
.16-.31 (04-08)	CFC-08-M	CFC-08-C
.31-.47 (08-12)	CFC-12-M	CFC-12-C
.47-.63 (12-16)	CFC-16-M	CFC-16-C
.63-.79 (16-20)	CFC-20-M	CFC-20-C
.79-.94 (20-24)	CFC-24-M	CFC-24-C

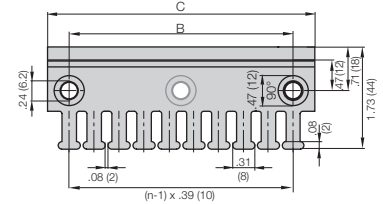
Tiewrap Plates



**Option 1:
Tiewrap plates as an individual part**

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



If used with KMA brackets with profile rail please add "KMA" to the end of the part number.

Example: 3050-ZBKMA

For more information please refer to strain relief section of Chapter 10



**Option 2:
Clip-on Tiewrap plates**

Available as a clip-on tiewrap plate without the use of bolts They are inserted and removed with a screwdriver used as a lever. Clip-on tiewrap plates are also available as an attachment to the opening crossbars.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
3050-ZC	5	1.97 (50)
3075-ZC	7	2.95 (75)

For more information please refer to strain relief section of Chapter 10



**Option 3:
Clip-on Tiewrap plates for opening crossbars**

Clip-on tiewrap plates are also available as an attachment to opening crossbars. They can be positioned at any point along the Energy Chain®.

Part No.	Number of Teeth	Width of Strain Relief in. (mm)
3850-ZS	5	1.89 (48)

For more information please refer to strain relief section of Chapter 10

Energy Chain System® E4 Light Series 14240/14340 Guide Trough

energy chain® configurator ▶



14240
14340

Width of Crossbar
14240-05-200-0

	B_{Ri}	Installation Part No.
-05	3.19 (81)	*
-06	3.90 (99)	*
-07	4.17 (106)	94-50-225
-087	4.65 (118)	94-50-250
-10	5.16 (131)	94-50-250
-11	5.47 (139)	94-50-250
-112	5.63 (143)	94-50-275
-12	6.14 (156)	94-50-275
-137	6.61 (168)	94-50-300
-15	7.12 (181)	94-50-300
-162	7.60 (193)	94-50-325
-17	7.83 (199)	94-50-325
-18	8.11 (206)	94-50-325
-187	8.58 (218)	94-50-350
-20	9.09 (231)	94-50-350
-212	9.57 (243)	94-50-375
-23	10.08 (256)	94-50-375
-237	10.55 (268)	94-50-400
-25	11.06 (281)	94-50-400
-262	11.54 (293)	94-50-425
-28	12.05 (306)	94-50-425
-29	12.52 (318)	94-50-450
-30	13.03 (331)	94-50-450
-312	13.50 (343)	94-50-475
-325	14.02 (356)	94-50-475
-337	14.49 (368)	94-50-500
-350	15.00 (381)	94-50-500
-362	15.47 (393)	94-50-525
-375	15.98 (406)	94-50-525
-387	16.46 (418)	94-50-550
-400	16.97 (431)	94-50-550

Guide troughs are used with applications where the upper run of the Energy Chair® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part No. 94-30
- 1/2 travel length glide bars
Part No. 93-01
- Installation sets as end connectors
Part No. 94-50-XX

.XX indicates the length of the profile rails on which the guide trough is mounted. The values and part numbers are specified in the table on the left. The standard length of the trough components and glide bars is 6.56 ft (2 m). The required overall length of the guide trough directly correlates to the length of travel.

Example:

Length of travel 164 ft (50 m)
Center mounted

Required guide troughs

164 ft (50 m) guide trough
82 ft (25 m) glide bars
= 25 sections of 6.56 ft (2 m) guide trough

Part No. 94-30

= 13 sections of 6.56 ft (2 m) glide bars

Part No. 93-01

Required number of installation sets:

= Number of guide trough components + 1
= 25 + 1 = 26

Part number of the installation sets

94-50-XXX

Example:

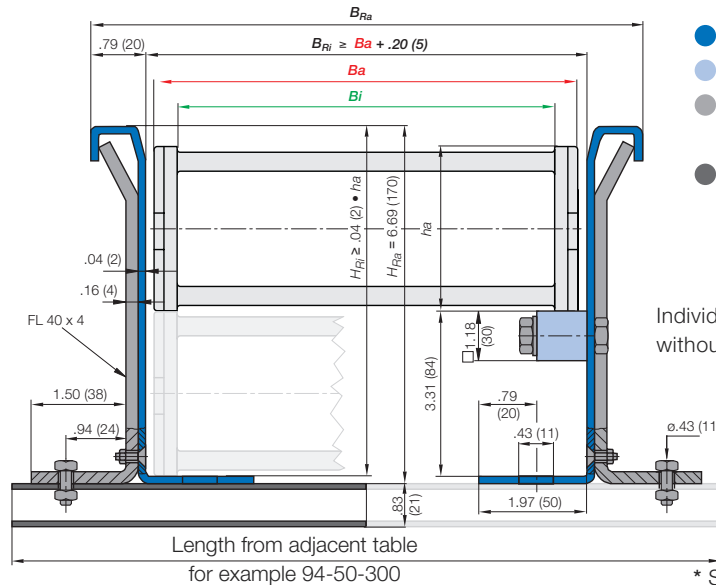
94-50-400 for 15.75 (400 mm) long profile rail



Left: Guide trough with glide bars
Right: Guide troughs without glide bars



Installation sets as section connectors



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

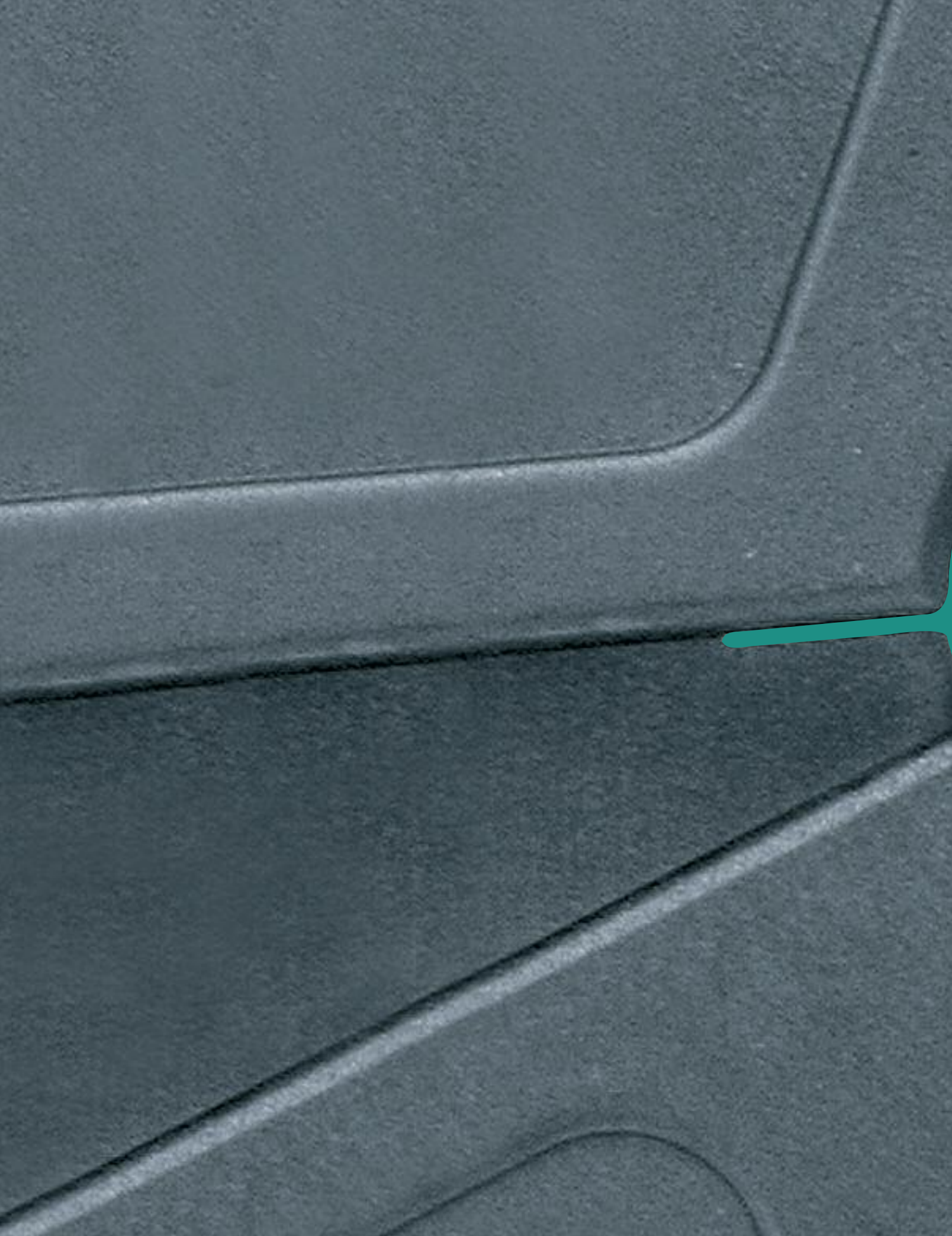
Individual attachment without profile rail

* Specialized guide trough available upon request

Standard length profile rail

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS







E6

E6 - 6-piece Energy Chains® - Extremely low- noise, minimum vibrations

The E6 Series offers numerous advantages in addition to long life cycles. It provides extremely quiet, low-vibration operation. It minimizes the polygon effect which can occur during the rolling motion of an Energy Chain®. The ultra-low noise levels have been confirmed in a recent report by the Rheinland Technical Inspection Agency. Our extensive delivery program offers the right chain size for any application; a wide range of interior separators are also available. The same applies to the mounting brackets. .

Typical industries and applications

- Cleanroom
- Printing machines
- Handling & robot
- Machine Tools
- Measuring machines
- Semiconductor industries
- Medical industries
- Electronic industries
- General machinery



System E6 - Extremely
low noise - TÜV certified



System E6 -
6-piece link-design

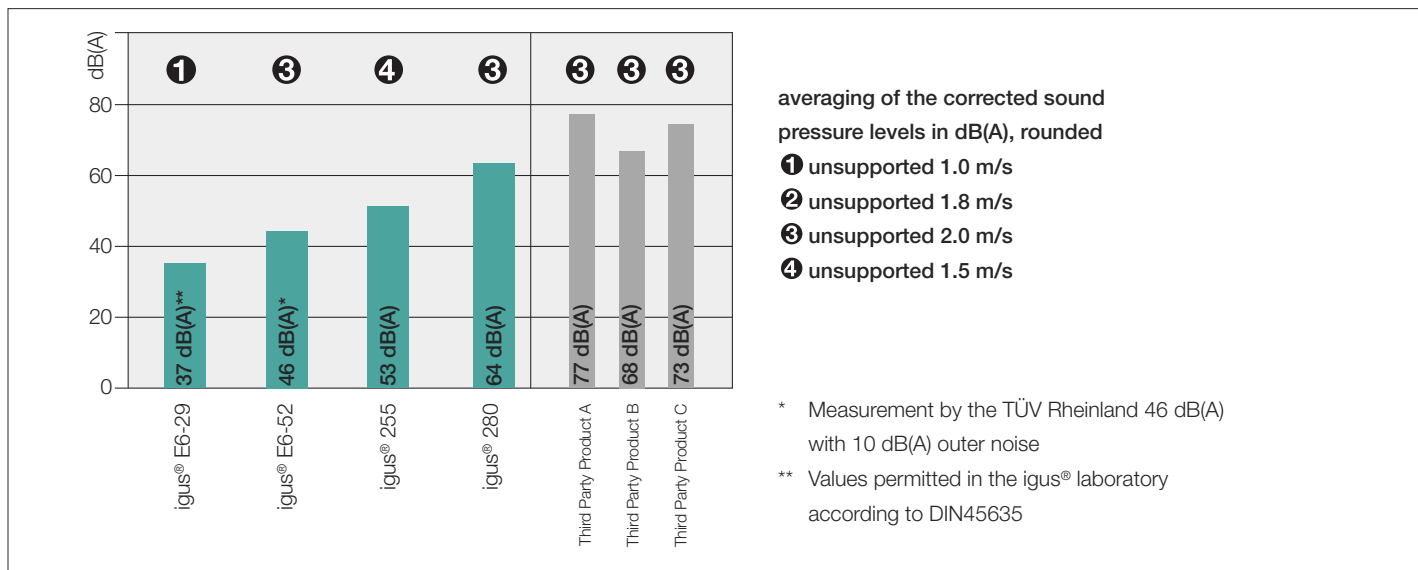


LEVEL 1 absorption confirmed by IPA-Fraunhofer-Institut according to SEMI E78-0998 for the E6 standard material. Special material "igumid ESD" for ESD/ATEX applications available on request. Continuously constant conductance value as there are no pin-bore connection (no air gaps).



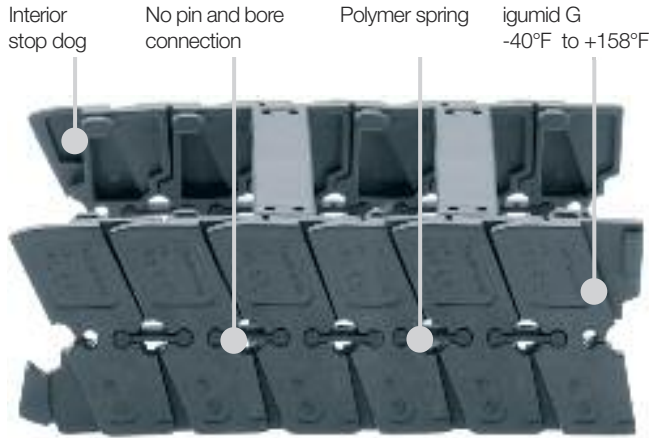


A linear drive provides for highly dynamic feed of PCBs. This system is twice as fast as handling units with a toothed-belt drive; designed to withstand high dynamic loads, the E6 Energy Chains® ensure a supply of power, coolant and control data with ultra-low noise and vibration



IPA classification - Report IG0704-400:

- Special material "cleanroom" - **Class 1 according to standard DIN EN ISO 14644-1** - Note: None of the classes corresponding to the DIN EN ISO 14644-1 Class 1 is included in the US standard at $v = (0.5 \text{ m/s})$, $a = (1.0 \text{ m/s}^2)$ - Series E6-29-060-150-0-CR
- Standard material - **Class 3 according to standard DIN EN ISO 14644-1** (according to US Fed. Stand. 209E, Class 1) at $v = (0.5 \text{ m/s})$, $a = (1.0 \text{ m/s}^2)$ Series E6-29-060-150-0 and $v = 1 \text{ m/s}$, $a = 2 \text{ m/s}^2$ Series E6-29-050-055-0 with inserted cables CF34-15-04, CF9-05-12, CF11-02-01-02-PBA-LC-D



E6 Energy Chain - 6 pieces per link

- Extremely low-noise operation - 37 dB(A)* depending on the speed
- Snap-open lids along both radii
- Available as closed tube for some types
- High stability "unsupported"
- For high speed and high accelerations
- Modular design, can be shortened and lengthened
- Minimum vibrations, high stability and tensile strength
- Various interior separations available
- KMA mounting brackets available with integrated strain relief
- E6 adapter link - for gliding applications - minimizes excess lengths in end positions - quick and easy assembly
- You can find more technical data about the material, chemical resistance, temperatures ► **Design, Chapter 1**

Series	Inner height <i>hi</i> in. (mm)	Inner width <i>Bi</i> in. (mm)	Outer width <i>Ba</i> in. (mm)	Outer height <i>ha</i> in. (mm)	Bending radius <i>R</i> in. (mm)
E6-29	1.14 (29)	1.18-4.72 (30-120)	1.81-5.35 (46-136)	1.38 (35)	2.17-5.91 (55-150)
R6-29	1.10 (28)	1.18-4.72 (30-120)	1.81-5.35 (46-136)	1.38 (35)	2.17-5.91 (55-150)
E6-35	1.38 (35)	1.18-4.72 (30-120)	1.97-5.51 (50-140)	1.65 (42)	2.17-5.91 (55-100)
E6-40	1.57 (40)	1.57-11.81 (40-300)	2.36-12.60 (60-320)	2.12 (54)	2.48-7.87 (63-200)
R6-40	1.57 (40)	2.44 (62)	3.23 (82)	2.12 (54)	2.48-7.87 (63-200)
E6-52	2.05 (52)	1.57-11.81 (40-300)	2.52-12.76 (64-324)	2.56 (65)	2.95-9.84 (75-250)
R6-52	2.05 (52)	1.97-6.89 (50-175)	2.91-7.83 (74-199)	2.56 (65)	2.95-9.84 (75-250)
E6-62	2.44 (62)	1.97-15.75 (50-400)	3.39-17.17 (86-436)	3.31 (84)	4.53-13.78 (115-350)
E6-80L	3.15 (80)	3.53-21.65 (87-550)	4.53-22.76 (115-578)	4.25 (108)	6.89 (175)
E6-80	3.15 (80)	1.97-23.62 (50-600)	3.94-25.59 (100-650)	4.25 (108)	5.91-17.72 (150-450)

Selected noise tests - External noise corrected measurement values

E-Chain® Series	Averaging of the corrected sound pressure levels	Test method
igus® Series E6-29*	≈ 37 dB(A)	unsupported v = 3.28 ft/s (1.0 m/s)
igus® Series E6-52*	≈ 41 dB(A)	unsupported, side mounted v = 1.64 ft/s (0.5 m/s)
igus® Series E6-52	≈ 46 dB(A)	unsupported v = 6.56 ft/s (2.0 m/s)
Chain 1 Third-party product	≈ 77 dB(A)	unsupported v = 6.56 ft/s (2.0 m/s)
Chain 2 Third-party product	≈ 68 dB(A)	unsupported v = 6.56 ft/s (2.0 m/s)
Chain 3 Third-party product	≈ 73 dB(A)	unsupported v = 6.56 ft/s (2.0 m/s)

Source: TÜV Rheinland *Source: igus® laboratory

Noise level ≤ 46 dB(A)

A measurement conducted by the Rhineland Technical Inspection Authority (TÜV Rheinland) in May 2002 indicates a value of ≤ 46 dB(A) at 6.56 ft/s (2 m/s) and with an unsupported length of 4.92 ft (1.5 m) with **Series E6-52-100-100-0**, and all this with at least 10 dB(A) sound pressure level generated by external noise.

We have received an official noise certificate from the Rhineland Technical Inspection Authority (TÜV Rheinland Berlin Brandenburg) and we are happy to provide you with a copy upon request.



Energy Chain System® E6 Assembly Instructions

System E6 Energy Chains® - Assembling



1 Position side links ...



2 ... gently twist and snap in



3 Gently insert connector by using a hammer



4 Position crossbars.
Push down and snap in

Energy Tubes - Assembling Lids



1 Insert lid ...



2 ... push down and snap in



1 Lever with screwdriver ...



2 ... and remove lids by hand

System E6 Energy Chains® - Separating



1 Lever crossbars with screwdriver



2 Tap gently to remove connectors



3 Twist and ...



4 ... separate side links

Price Index



Series E6-29

Special Features / Options



Extremely low noise
Test results upon request



IPA Certificate: Class 1, according to standard DIN EN ISO 14644-1 for the E6 system (Series E6-29-060-150-0-CR, (v = 1.64 ft/s, a = 3.28 ft/s²))



LEVEL 1 absorption confirmed by IPA-Fraunhofer-Institute according to SEMI E78-0998 for the E6 standard material

Assembly Tips



To close, push and click shut

Other Installation Methods

Vertical, hanging ≤ 98.4 ft (30 m)

Vertical, standing ≤ 6.56 ft (2 m)

Side-mounted, un supp. =

possible to a limited extent

Unsupported length of upper run upon request

Usage Guidelines



- If a low-noise version is required
- For very high speeds and/or accelerations
- If large stresses and thrust forces are present
- For small bending radii
- If less vibration is required
- Minimal abrasion, suitable for cleanrooms



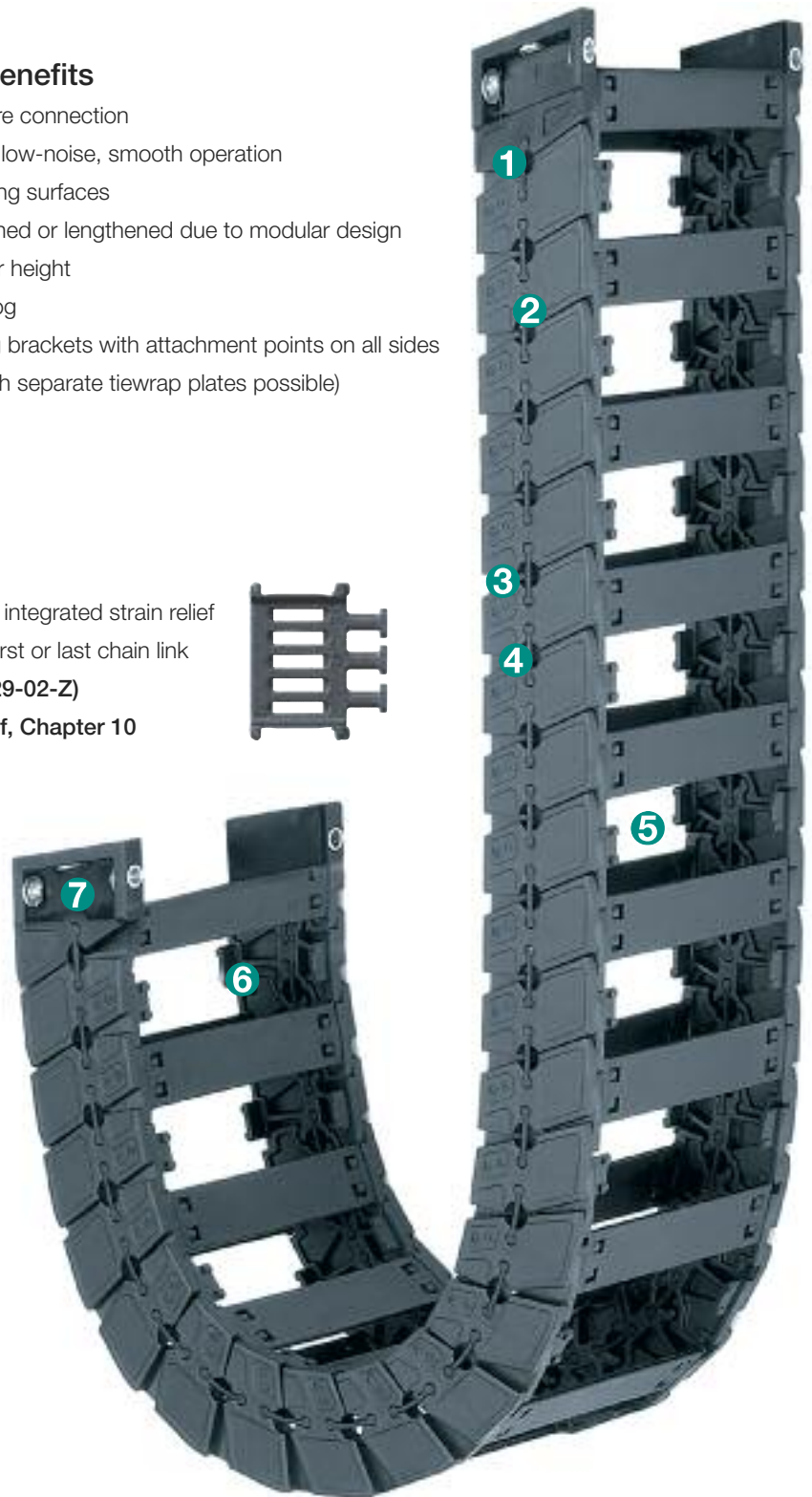
- For side-mounted applications
 - Series 200240/250 E2 Medium
- For RBR (reverse bending radii)
 - Series 200240/250 E2 Medium
- For high additional loads
 - Series 200240/250 E2 Medium
- For very dirty environments
 - Series R6-29

7.7

Features & Benefits

- 1 No pin and bore connection
- 2 Small pitch for low-noise, smooth operation
- 3 Very large gliding surfaces
- 4 Can be shortened or lengthened due to modular design
- 5 Increased inner height
- 6 Interior stop dog
- 7 KMA mounting brackets with attachment points on all sides
(strain relief with separate tiewrap plates possible)

- Also available:
Separator with integrated strain relief for use in the first or last chain link (Part No. E6-29-02-Z)
➤ Strain Relief, Chapter 10



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

6.56 ft (2 m) E6-29-100-075-0

With 2 separators E6-29-11 assembled every 2nd link

1 Set E6-290-100-12

energy chain® configurator ▶



Energy Chain®



Interior Separation



Mounting Bracket

Energy Chain System® E6 Series E6-29 Installation Dimensions

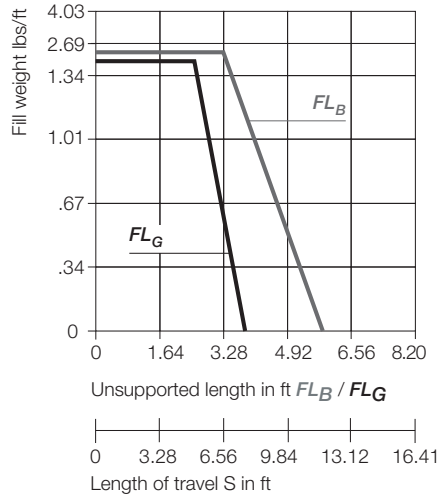
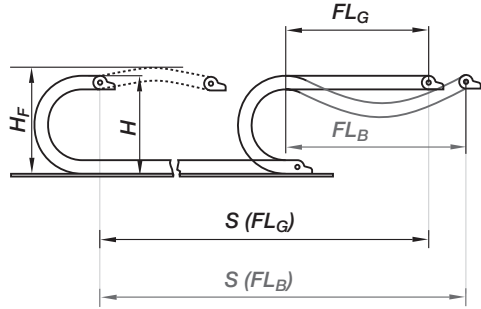
energy chain® configurator ▶



E6-29

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



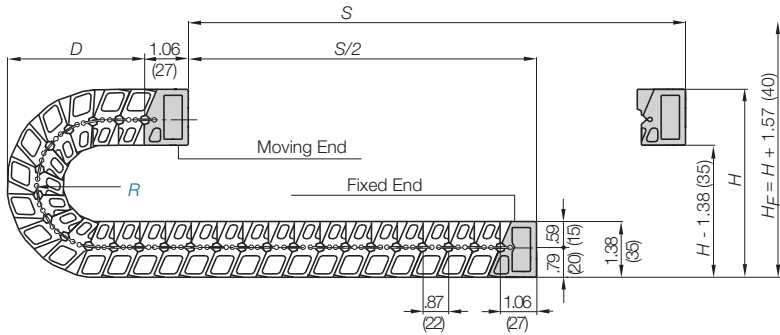
Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{"safety buffer"}$
- $H_F = \text{Required clearance height}$



Pitch per link = .87" (22 mm)

Links per ft (m) = 13.79 (46)

For center mount applications:

Chain length = $\frac{S}{2} + K$

The required clearance height: $H_F = H + 1.57$ in. (40 mm) (with 1.34 lbs/ft (2.0 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	2.17 (055)	2.95 (075)	3.94 (100)	5.91 (150)
H	7.09 (180)	8.66 (220)	10.63 (270)	14.57 (370)
D	3.82 (97)	4.61 (117)	5.59 (142)	7.56 (192)
K	8.66 (220)	11.02 (280)	14.17 (360)	20.47 (520)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	upon request
Permitted temperature	-40°F (-40°C) up to +158°F (+70°C)
Flammability Class	VDE 0304 IIC UL94 HB

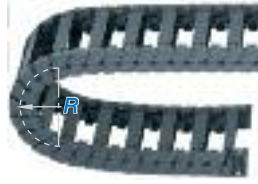
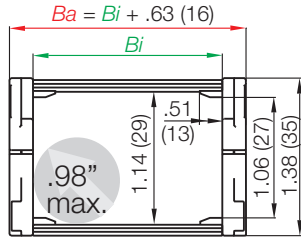
Technical Data



Details of material properties

▶ Design, Chapter 1

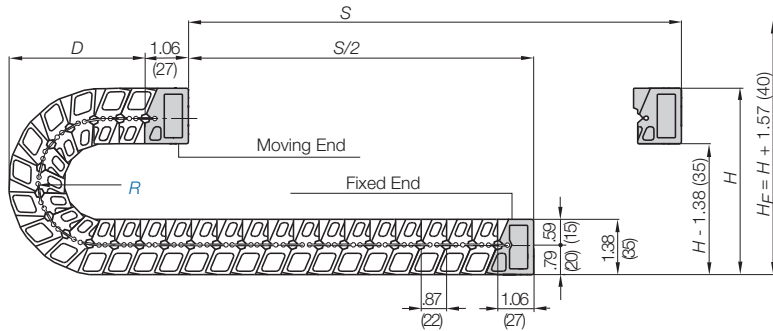
Series E6-29 - Energy Chain® with crossbars every link



Part Number Structure



- Color - Black
- Bending radius
- Width
- Series



Supplement part number with required radius. Example: E6-29-100-**100**-0
Pitch: .87 in. (22 mm) per link links/ft (m) = 13.79 (46)

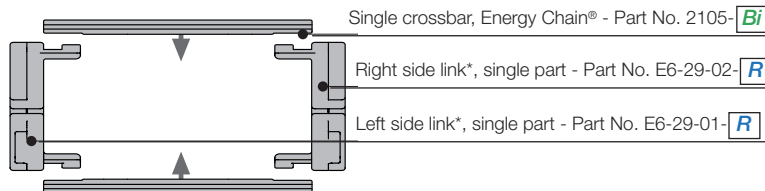
Part Number	Bi in. (mm)	Ba in. (mm)	Weight lbs/ft (kg/m)
E6-29-030- <input type="text"/> -0	1.18 (30)	1.81 (46)	≈ 0.49 (0.73)
E6-29-040- <input type="text"/> -0	1.57 (40)	2.20 (56)	≈ 0.50 (0.75)
E6-29-050- <input type="text"/> -0	1.97 (50)	2.60 (66)	≈ 0.52 (0.78)
E6-29-060- <input type="text"/> -0	2.36 (60)	2.99 (76)	≈ 0.54 (0.80)
E6-29-070- <input type="text"/> -0	2.76 (70)	3.39 (86)	≈ 0.56 (0.83)
E6-29-080- <input type="text"/> -0	3.15 (80)	3.78 (96)	≈ 0.57 (0.85)
E6-29-090- <input type="text"/> -0	3.54 (90)	4.17 (106)	≈ 0.59 (0.88)
E6-29-100- <input type="text"/> -0	3.94 (100)	4.57 (116)	≈ 0.60 (0.90)
E6-29-110- <input type="text"/> -0	4.33 (110)	4.96 (126)	≈ 0.62 (0.93)
E6-29-120- <input type="text"/> -0	4.72 (120)	5.35 (136)	≈ 0.64 (0.95)

Choose from the radii below for all of the above sizes

Radius (mm) Example: E6-29-100-**100**-0

	055	075	100	150
R	2.17 (055)	2.95 (075)	3.94 (100)	5.91 (150)
H	7.09 (180)	8.66 (220)	10.63 (270)	14.57 (370)
D	3.82 (97)	4.61 (117)	5.59 (142)	7.56 (192)
K	8.66 (220)	11.02 (280)	14.17 (360)	20.47 (520)

Energy Chain® as separate parts, links and side plates

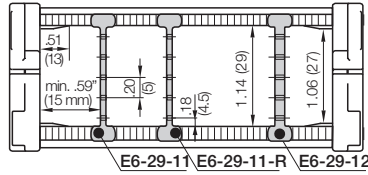


Polymer spring as single part -
Part No. E6-29-140

*View from the fixed point of the Energy Chain®/Energy Tube

Option 1: Vertical separators

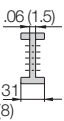
Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.



STANDARD

● Slotted vertical separator E6-29-01

This separator is used for general subdivision of Energy Chains®. Can be used in combination with full-width shelf 111-X



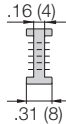
Vertical Separator

Unassembled Part No. E6-29-01

Assembled Part No. E6-29-11

● Vertical separator E6-29-02

For use with side plate E6-29-13, full-width shelf 221-X and shelf 2210-X



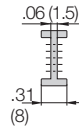
Vertical Separator

Unassembled Part No. E6-29-02

Assembled Part No. E6-29-12

● Locking separator E6-29-01R

Can be locked onto crossbars in .08" (2mm) increments. For side-mounted applications use with full-width shelf 111-X



Vertical Separator

Unassembled Part No. E6-29-01R

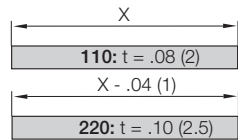
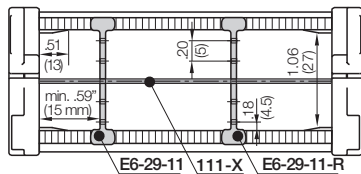
Assembled Part No. E6-29-11R

Option 2: Full-width shelf

For applications involving many thin cables with similar or identical diameters.

Full-width shelf 111-X can be used with vertical separator E6-29-11 and locking separator E6-29-11-R.

Full-width shelf 221-X can be used with vertical separator E6-29-12, side plate E6-29-13



Shelves 110-X/220-XX

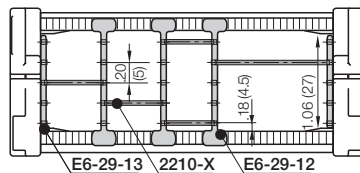
Shelves can be inserted at 5 different heights in .20" (5mm) increments

Width X in. (mm)	Part No.		Part No.	
	Unassembled		Assembled	
	110-X	220-X	111-X	221-X
1.18 (030)	110-30	220-30	111-30	221-30
1.57 (040)	110-40	220-40	111-40	221-40
1.97 (050)	110-50	220-50	111-50	221-50
2.36 (060)	110-60	220-60	111-60	221-60
2.76 (070)	110-70	220-70	111-70	221-70
3.15 (080)	110-80	220-80	111-80	221-80
3.54 (090)	110-90	220-90	111-90	221-90
3.94 (100)	110-100	220-100	111-100	221-100
4.33 (110)	110-110	220-110	111-110	221-110
4.72 (120)	110-120	220-120	111-120	221-120

Option 3: Shelves

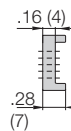
These components form the basic pattern of a shelf system.

Shelves of various widths can be arranged at 5 different heights in .20" (5mm) increments



● Side plate, slotted

This separator is used for general subdivision of Energy Chains®.



Slotted Separator

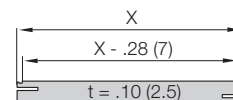
Unassembled Part No. E6-29-03

Assembled Part No. E6-29-13

Shelves 2200-XX

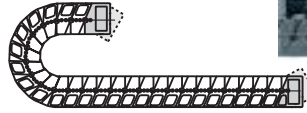
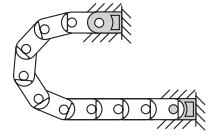
Shelf 2210-X can be used with vertical separator E6-29-12 and side plate E6-29-13

Width X in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Part No. Unassembled	Part No. Assembled
.71 (18)	2200-18	2210-18	1.89 (48)	2200-48	2210-48
.91 (23)	2200-23	2210-23	2.28 (58)	2200-58	2210-58
1.10 (28)	2200-28	2210-28	2.68 (68)	2200-68	2210-68
1.30 (33)	2200-33	2210-33	2.87 (73)	2200-73	2210-73
1.50 (38)	2200-38	2210-38	3.46 (88)	2200-88	2210-88
1.69 (43)	2200-43	2210-43	3.90 (99)	2200-99	2210-99

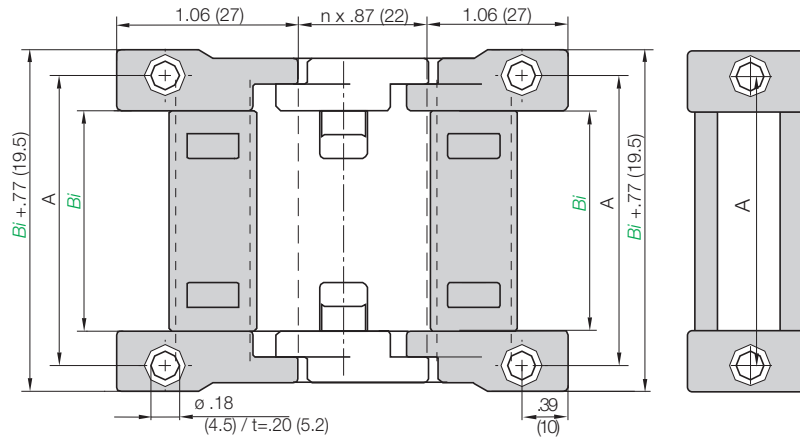
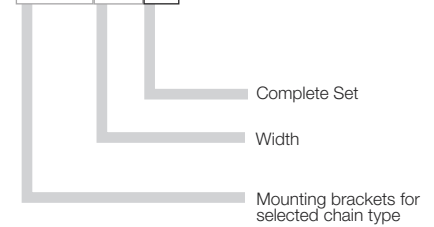



Option 1: KMA - Pivoting

- Bolted connection outside of the chain cross-section
- Recommended for unsupported applications (for gliding applications please contact igus®)
- Confined installation conditions
- Attachment capability on all sides

Moving end
E6-290...2

Fixed end
E6-290...1


Possible installation configurations -


Part Number Structure
E6-290-030-12

Full set, for both ends:
E6-290-030-12 Full set, both fixed and moving end

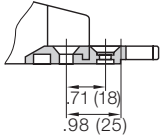
Single-part order:
E6-290-030-1 Mounting bracket fixed end

E6-290-030-2 Mounting bracket moving end

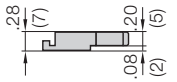
For Series	Part No. Full Set	Dimension A in. (mm)
E6-290-030	E6-290-030-12	1.57 (40)
E6-290-040	E6-290-040-12	1.97 (50)
E6-290-050	E6-290-050-12	2.36 (60)
E6-290-060	E6-290-060-12	2.76 (70)
E6-290-070	E6-290-070-12	3.15 (80)
E6-290-080	E6-290-080-12	3.54 (90)
E6-290-090	E6-290-090-12	3.94 (100)
E6-290-100	E6-290-100-12	4.33 (110)
E6-290-110	E6-290-110-12	4.72 (120)
E6-290-120	E6-290-120-12	5.12 (130)

Tiewrap Plates

Option 1:
Tiewrap plates as an individual part

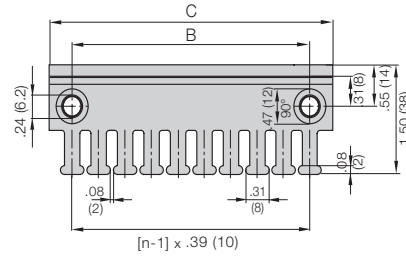


Shown assembled



Single tie-wrap plate

Tiewrap Plates	n Number of Teeth	Dimension C	Dimension B
2020-ZB	3	1.18 (30)	.59 (15)
2030-ZB	4	1.57 (40)	.79 (20)
2040-ZB	5	1.97 (50)	1.18 (30)
2050-ZB	6	2.36 (60)	1.57 (40)
2070-ZB	8	3.15 (80)	2.36 (60)
2090-ZB	9	3.54 (90)	2.76 (70)
2100-ZB	10	3.94 (100)	3.15 (80)
2120-ZB	12	4.72 (120)	3.94 (100)



Other strain relief elements - optional
▶ Strain Relief, Chapter 10

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Guide Troughs

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part Number 92-30
- 1/2 travel length of glide bars
Part Number 92-01
- Installation sets as end connectors
Part Number 92-50-XX

-XX indicates the length of the profile rail on which the guide trough is mounted. The values and part numbers are specified in the table on the left. The standard length of the trough components and glide bars is 6.56 ft (2 m.) The required overall length of the guide trough directly correlates to the length of travel.

Example:
Length of travel 164 ft (50 m)
Center mounted

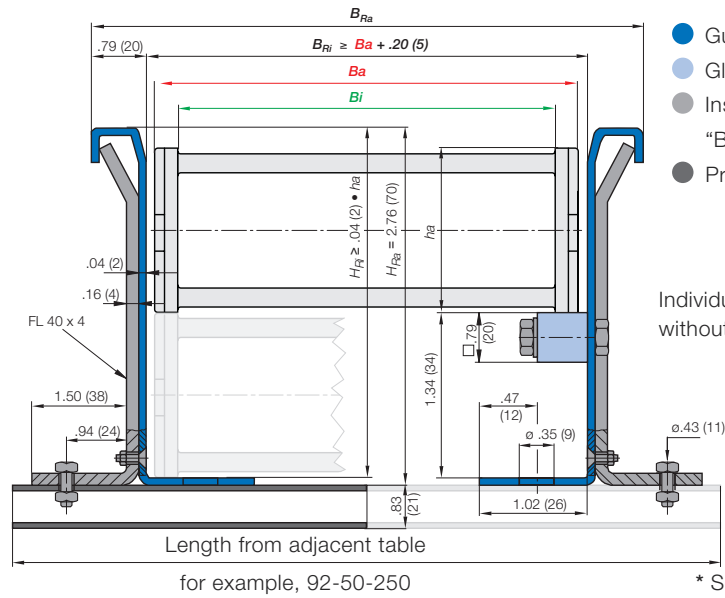
Required guide troughs:
164 ft (50 m) guide trough
82 ft (25 m) glide bar
= 25 sections of 6.56 ft (2 m) guide trough
Part No. 92-30
= 13 sections of 6.56 ft (2 m) glide bar
Part No. 92-01

Required number of installation sets:
= Number of guide trough components + 1
= 25 + 1 = 26
Part number of the installation sets

Example: 92-50-400 for 15.75" (400 mm) long profile rail.



Crossbar Width E6-29-100-100-0	Dimension D	Installation Part No.
-030	2.01 (51)	*
-040	2.40 (61)	92-50-175
-050	2.80 (71)	92-50-200
-060	3.19 (81)	92-50-200
-070	3.58 (91)	92-50-200
-080	3.98 (101)	92-50-225
-090	4.37 (111)	92-50-225
-100	4.76 (121)	92-50-250
-110	5.16 (131)	92-50-250
-120	5.55 (141)	92-50-250



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

Length from adjacent table
for example, 92-50-250

Standard length profile rail

* Specialized guide trough available upon request

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index


Series R6-29

Special Features / Options


Extremely low noise
Test results upon request



IPA Certificate: Class 1, according to standard DIN EN ISO 14644-1 for the E6 system (Series E6-29-060-150-0-CR, (v = 1.64 ft/s, a = 3.28 ft/s²))



LEVEL 1 absorption confirmed by IPA-Fraunhofer-Institute according to SEMI E78-0998 for the E6 standard material

Assembly Tips


Lever and remove lids

Other Installation Methods

Vertical, hanging ≤ 98.4 ft (30 m)

Vertical, standing ≤ 6.56 ft (2 m)

Side-mounted, un supp. = possible to a limited extent

Unsupported length of upper run upon request

Usage Guidelines


- If a low-noise version is required
- For very high speeds and/or accelerations
- Protection against dirt and chips
- For small bending radii
- If less vibration is required
- Minimal abrasion, suitable for cleanrooms



- For side-mounted applications
 - Series 2480 E2 Tubes
- For RBR (reverse bending radii)
 - Series 2480 E2 Tubes
- For high additional loads
 - Series 2480 E2 Tubes

Features & Benefits

- 1 Fully enclosed Energy Tube
- 2 No pin and bore connection
- 3 Interior stop dog
- 4 Very large gliding surfaces
- 5 KMA mounting brackets with attachment points on all sides (strain relief with separate tiewrap plates possible)
- 6 Can be shortened or lengthened due to modular design
- 7 Small pitch for low-noise, smooth operation


Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

[energy chain® configurator](#)

6.56 ft (2 m) R6-29-080-100-0



Energy Tube

With 2 separators R6-29-11 assembled every 2nd link



Interior Separation

1 Set R6-290-080-12



Mounting Bracket

Energy Chain System® E6 Series R6-29 Installation Dimensions

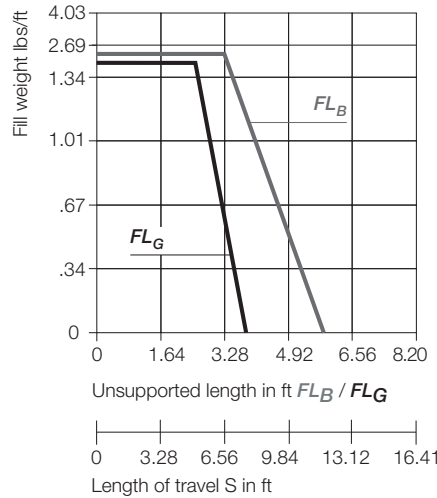
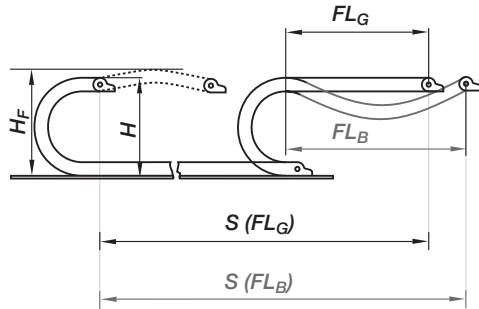
energy chain® configurator ▶



R6-29

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



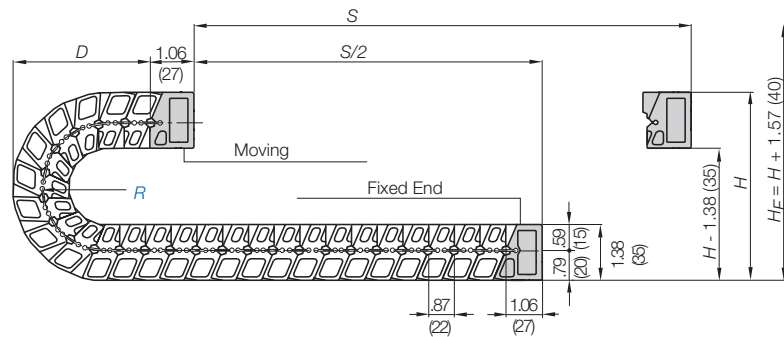
Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{"safety buffer"}$
- H_F = Required clearance height



Pitch per link = .87" (22 mm)
Links per ft (m) = 13.79 (46)
For center mount applications:
Chain length = $\frac{S}{2} + K$

The required clearance height: $H_F = H + 1.57$ in. (40 mm) (with 1.34 lbs/ft (2.0 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	2.17 (055)	2.95 (075)	3.94 (100)	5.91 (150)
H	7.09 (180)	8.66 (220)	10.63 (270)	14.57 (370)
D	3.82 (97)	4.61 (117)	5.59 (142)	7.56 (192)
K	8.66 (220)	11.02 (280)	14.17 (360)	20.47 (520)

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	upon request
Permitted temperature	-40°F (-40°C) up to +158°F (+70° C)
Flammability Class	VDE 0304 IIC UL94 HB

Technical Data



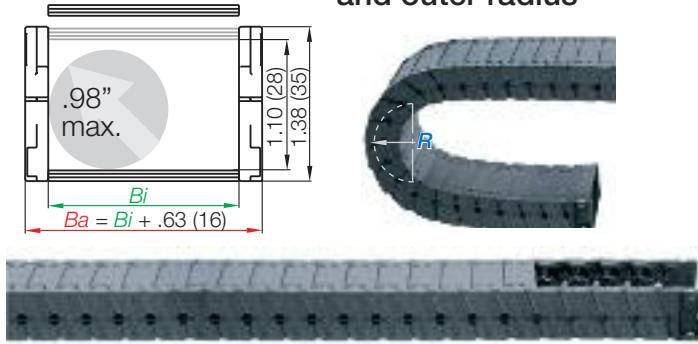
Details of material properties

▶ Design, Chapter 1

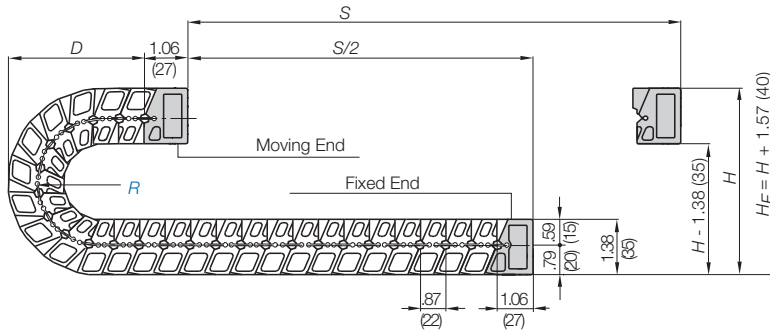
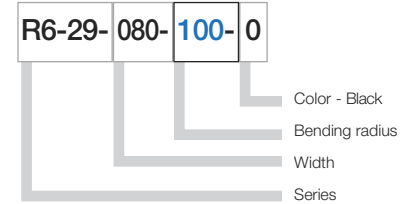
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Series R6-29 - Energy Tube, removable lids along the inner and outer radius



Part Number Structure



Supplement part number with required radius. Example: R6-29-080-100-0
Pitch: .87 in. (22 mm) per link links/ft (m) = 13.79 (46)

Part Number	Bi in. (mm)	Ba in. (mm)	Weight lbs/ft (kg/m)
R6-29-030-□-0	1.18 (30)	1.81 (46)	≈ 0.54 (0.80)
R6-29-040-□-0	1.57 (40)	2.20 (56)	≈ 0.57 (0.85)
R6-29-050-□-0	1.97 (50)	2.60 (66)	≈ 0.60 (0.89)
R6-29-060-□-0	2.36 (60)	2.99 (76)	≈ 0.63 (0.94)
R6-29-080-□-0	3.15 (80)	3.78 (96)	≈ 0.69 (1.03)
R6-29-100-□-0	3.94 (100)	4.57 (116)	≈ 0.76 (1.13)
R6-29-110-□-0	4.33 (110)	4.96 (126)	≈ 0.79 (1.18)
R6-29-120-□-0	4.72 (120)	5.35 (136)	≈ 0.82 (1.22)

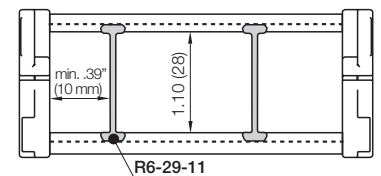
Choose from the radii below for all of the above sizes

Radius (mm) Example: R6-29-080-100-0

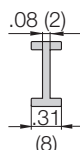
	055	075	100	150
R	2.17 (055)	2.95 (075)	3.94 (100)	5.91 (150)
H	7.09 (180)	8.66 (220)	10.63 (270)	14.57 (370)
D	3.82 (97)	4.61 (117)	5.59 (142)	7.56 (192)
K	8.66 (220)	11.02 (280)	14.17 (360)	20.47 (520)

Option 1: Vertical separators

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.



Vertical separator R6-29-01



Vertical Separator

Unassembled Part No. R6-29-01

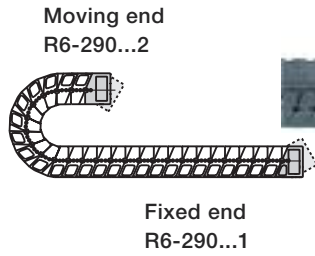
Assembled Part No. R6-29-11

- Vertical separator R6-29-01
This separator is used for general subdivision of Energy Tubes.
- Separator snaps onto either the bottom of the carrier or the lid. Stays attached to that side. Opposite side can be removed.

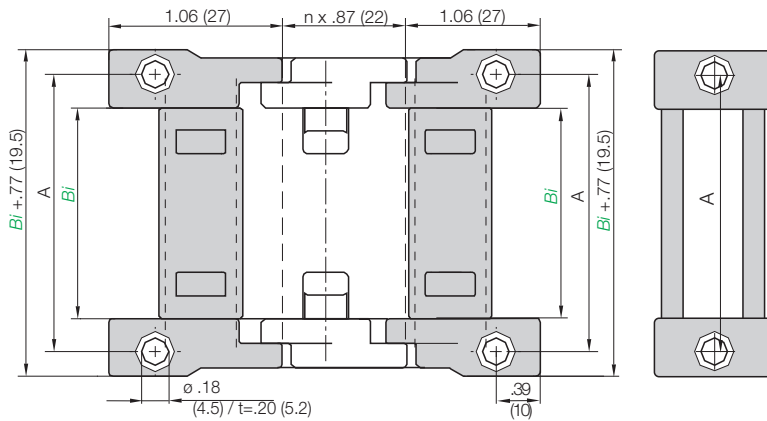


Option 1: KMA - Pivoting

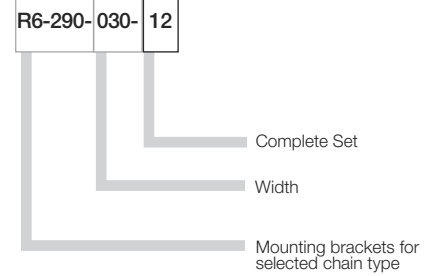
- Bolted connection outside of the chain cross-section
- Recommended for unsupported applications (for gliding applications please contact igus®)
- Confined installation conditions
- Attachment capability on all sides



Possible installation configurations -



Part Number Structure



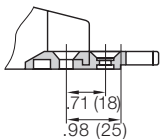
For Series	Part No. Full Set	Dimension A in. (mm)
R6-290-030	R6-290-030-12	1.57 (40)
R6-290-040	R6-290-040-12	1.97 (50)
R6-290-050	R6-290-050-12	2.36 (60)
R6-290-060	R6-290-060-12	2.76 (70)
R6-290-080	R6-290-080-12	3.54 (90)
R6-290-100	R6-290-100-12	4.33 (110)
R6-290-110	R6-290-110-12	4.72 (120)
R6-290-120	R6-290-120-12	5.12 (130)

Full set, for both ends:
R6-290-030-12 Full set, both fixed and moving end
 Single-part order:
R6-290-025-1 Mounting bracket fixed end
R6-290-025-2 Mounting bracket moving end

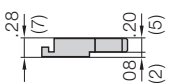
Tiewrap Plates

Option 1: Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

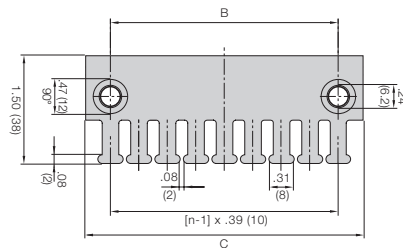


Shown assembled



Single tie-wrap plate

Tiewrap Plates	n Number of Teeth	Dimension C	Dimension B
2020-ZB	3	1.18 (30)	.59 (15)
2030-ZB	4	1.57 (40)	.79 (20)
2040-ZB	5	1.97 (50)	1.18 (30)
2050-ZB	6	2.36 (60)	1.57 (40)
2070-ZB	8	3.15 (80)	2.36 (60)
2090-ZB	9	3.54 (90)	2.76 (70)
2100-ZB	10	3.94 (100)	3.15 (80)
2120-ZB	12	4.72 (120)	3.94 (100)



If used with KMA brackets with profile rail please add "KMA" to the end of the part number.

Example: 2020-ZBKMA

Other strain relief elements
 ▶ Strain Relief, Chapter 10



Guide Troughs

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part Number 92-30
- 1/2 travel length of glide bars
Part Number 92-01
- Installation sets as end connectors
Part Number 92-50-XX

-XX indicates the length of the profile rail on which the guide trough is mounted. The values and part numbers are specified in the table on the left. The standard length of the trough components and glide bars is 6.56 ft (2 m.) The required overall length of the guide trough directly correlates to the length of travel.

Example:
Length of travel 164 ft (50 m)
Center mounted

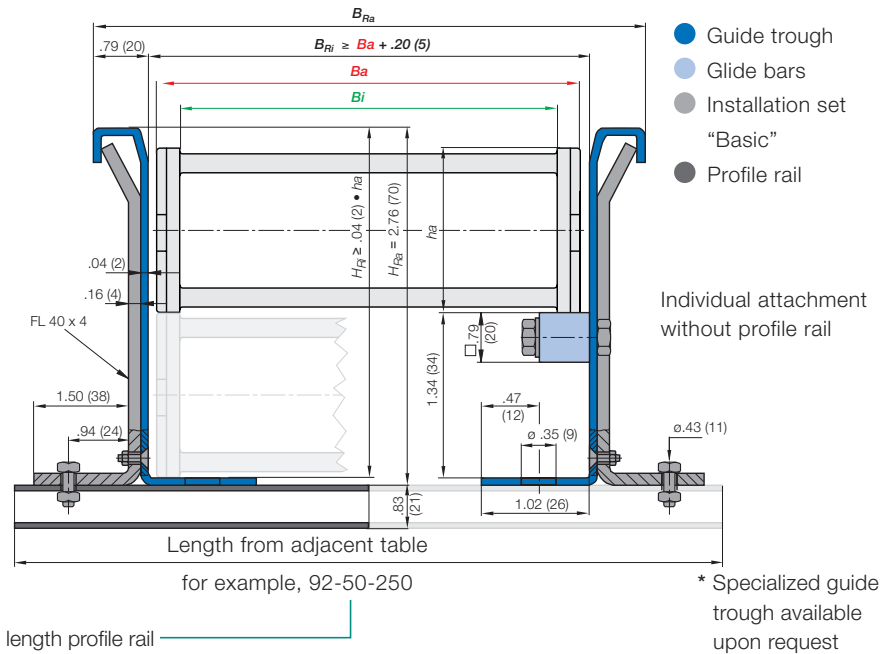
Required guide troughs:
164 ft (50 m) guide trough
82 ft (25 m) glide bar
= 25 sections of 6.56 ft
(2 m) guide trough
Part No. 92-30
= 13 sections of 6.56 ft (2 m) glide bar
Part No. 92-01

Required number of installation sets:
= Number of guide trough components + 1
= 25 + 1 = 26
Part number of the installation sets

Example: 92-50-400 for 15.75" (400 mm) long profile rail.



Crossbar Width E6-29-100-100-0	Dimension D	Installation Part No.
-030	2.01 (51)	*
-040	2.40 (61)	92-50-175
-050	2.80 (71)	92-50-200
-060	3.19 (81)	92-50-200
-070	3.58 (91)	92-50-200
-080	3.98 (101)	92-50-225
-090	4.37 (111)	92-50-225
-100	4.76 (121)	92-50-250
-110	5.16 (131)	92-50-250
-120	5.55 (141)	92-50-250



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index

Series E6-35
Special Features / Options

Extremely low noise
 Test results upon request

IPA Certificate: Class 1, according to standard DIN EN ISO 14644-1 for the E6 system (Series E6-29-060-150-0-CR, (v = 1.64 ft/s, a = 3.28 ft/s²))

LEVEL 1 absorption confirmed by IPA-Fraunhofer-Institute according to SEMI E78-0998 for the E6 standard material
Assembly Tips


To close, push and click shut

Other Installation Methods

Vertical, hanging ≤ 98.4 ft (30 m)

Vertical, standing ≤ 6.56 ft (2 m)

Side-mounted, unass. = possible to a limited extent

Unsupported length of upper run upon request

Usage Guidelines


- If a low-noise version is required
- For very high speeds and/or accelerations
- If large stresses and thrust forces are present
- For small bending radii
- If less vibration is required
- Minimal abrasion, suitable for cleanrooms

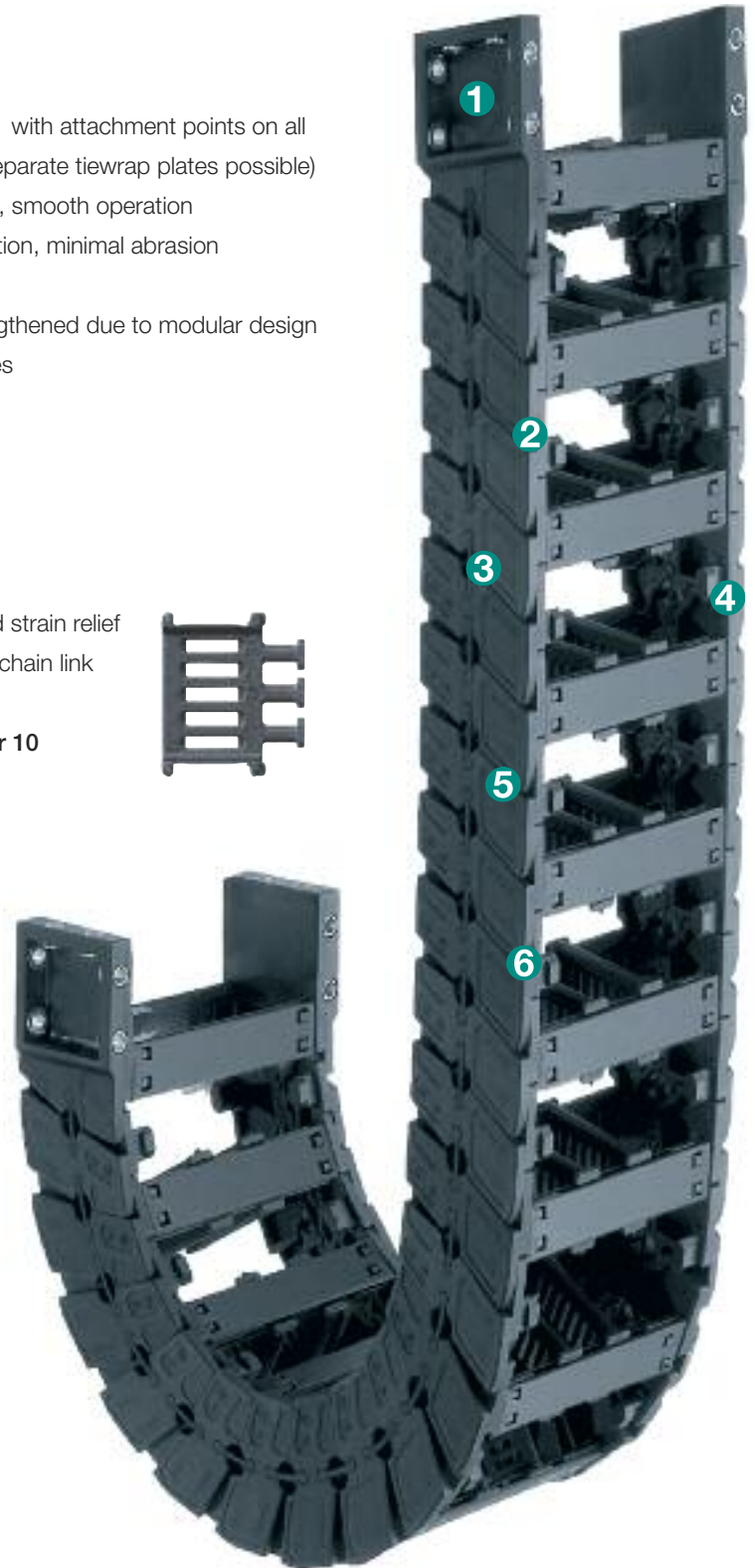


- If a fully enclosed tube is required
 ➤ **Series R58 E2 Tubes**
- For side mounted applications
 ➤ **Series 2828 E4/4**
- For RBR (Reverse Bending Radius)
 ➤ **Series 280 E4/100**
- For high additional loads
 ➤ **Series 2828 E4/4**
- For dirty environments
 ➤ **Series 2828 E4/4**

7.21
Features & Benefits

- 1 KMA mounting brackets with attachment points on all sides (strain relief with separate tie-wrap plates possible)
- 2 Small pitch for low-noise, smooth operation
- 3 No pin and bore connection, minimal abrasion
- 4 Interior stop dog
- 5 Can be shortened or lengthened due to modular design
- 6 Very large gliding surfaces

- Also available:
 Separator with integrated strain relief for use in the first or last chain link
(Part No. E6-35-02-Z)
 ➤ **Strain Relief, Chapter 10**


Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator

 6.56 ft (2 m) **E6-35-100-055-0**
Energy Chain®

 With 2 separators **E6-35-11** assembled every 2nd link

 Interior Separation

 1 Set **E6-350-100-12**
Mounting Bracket

Energy Chain System® E6 Series E6-35 Installation Dimensions

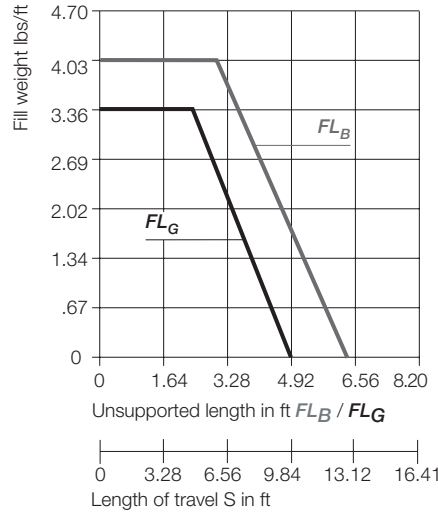
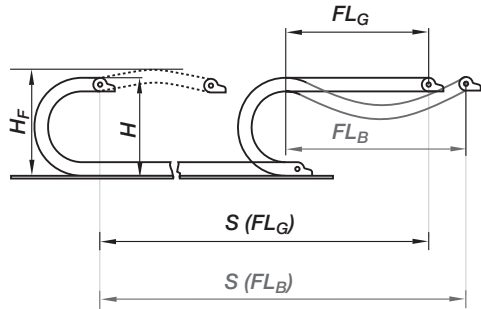
energy chain® configurator ▶



E6-35

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



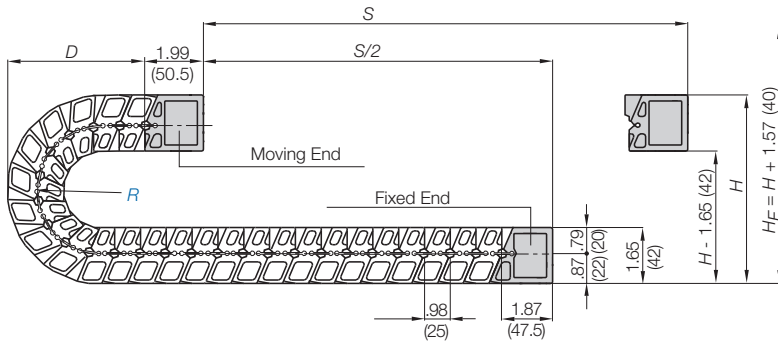
Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{"safety buffer"}$
- H_F = Required clearance height



Pitch per link = .98" (25 mm)
 Links per ft (m) = 12.19 (40)
 For center mount applications:
 Chain length = $s/2 + K$

The required clearance height: $H_F = H + 1.57$ in. (40 mm) (with 1.34 lbs/ft (2.0 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	2.17 (055)	2.95 (100)
H	7.44 (189)	10.98 (279)
D	4.01 (102)	5.79 (147)
K	8.86 (225)	14.37 (365)

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	upon request
Permitted temperature	-40°F (-40°C) up to +158°F (+70° C)
Flammability Class	VDE 0304 IIC UL94 HB

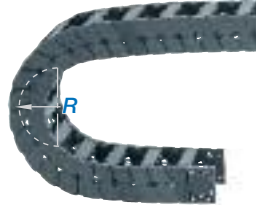
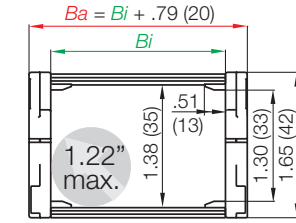
Technical Data



Details of material properties

▶ Design, Chapter 1

Series E6-35 - Energy Chain® with crossbars every other link



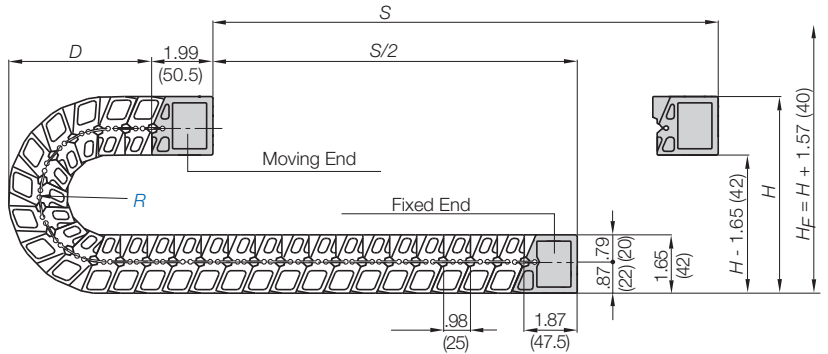
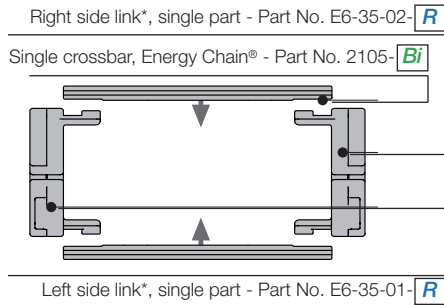
Part Number Structure

E6-35-100-055-0

- Color - Black
- Bending radius
- Width
- Series



Energy Chain® as separate parts, links and side plates



Polymer spring as single part - Part No. E6-35-150

*View from the fixed point of the Energy Chain®/Energy Tube

Supplement part number with required radius. Example: E6-35-100-055-0
Pitch: .98 in. (25 mm) per link links/ft (m) = 12.19 (40)

Part Number	Bi in. (mm)	Ba in. (mm)	Weight lbs/ft (kg/m)
E6-35-030- <input type="text"/> -0	1.18 (30)	1.97 (50)	≈ 0.59 (0.88)
E6-35-040- <input type="text"/> -0	1.57 (40)	2.36 (60)	≈ 0.54 (0.90)
E6-35-050- <input type="text"/> -0	1.97 (50)	2.76 (70)	≈ 0.90 (0.92)
E6-35-060- <input type="text"/> -0	2.36 (60)	3.15 (80)	≈ 0.63 (0.94)
E6-35-070- <input type="text"/> -0	2.76 (70)	3.54 (90)	≈ 0.65 (0.96)
E6-35-080- <input type="text"/> -0	3.15 (80)	3.94 (100)	≈ 0.66 (0.99)
E6-35-090- <input type="text"/> -0	3.54 (90)	4.33 (110)	≈ 0.68 (1.01)
E6-35-100- <input type="text"/> -0	3.94 (100)	4.72 (120)	≈ 0.69 (1.03)
E6-35-110- <input type="text"/> -0	4.33 (110)	5.12 (130)	≈ 0.76 (1.05)
E6-35-120- <input type="text"/> -0	4.72 (120)	5.51 (140)	≈ 0.72 (1.07)

Choose from the radii below for all of the above sizes

Radius (mm) Example: E6-35-100-055-0

	055	100
R	2.17 (055)	2.95 (100)
H	7.44 (189)	10.98 (279)
D	4.01 (102)	5.79 (147)
K	8.86 (225)	14.37 (365)

Energy Chain System® E6 Series E6-35 Interior Separation

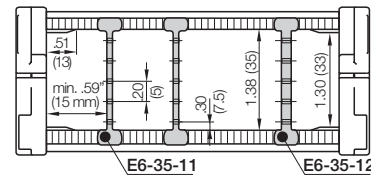
energy chain® configurator ▶



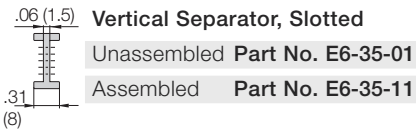
E6-35

Option 1: Vertical separators

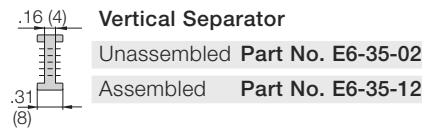
Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.



- Slotted vertical separator E6-35-01**
 This separator is used for general subdivision of Energy Chains®. Can be used in combination with full-width shelf 111-X.

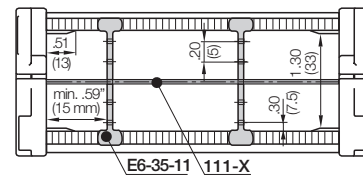


- Vertical separator E6-35-02**
 For use with side plate E6-35-13, full-width shelf 221-X and shelf 2210-X



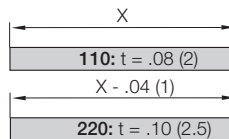
Option 2: Full-width shelf

For applications involving many thin cables with similar or identical diameters. Full-width shelf **111-X** can be used with vertical separator **E6-35-11**. Full-width shelf **221-X** can be used with vertical separator **E6-35-12**.



Shelves 110-X/220-XX

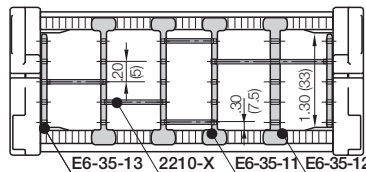
Shelves can be inserted at 5 different heights in .20" (5mm) increments



Width X in. (mm)	Part No. Unassembled		Part No. Assembled		Width X in. (mm)	Part No. Unassembled		Part No. Assembled	
	110-X	220-X	111-X	221-X		110-X	220-X	111-X	221-X
1.18 (030)	110-30	220-30	111-30	221-30	3.15 (080)	110-80	220-80	111-80	221-80
1.57 (040)	110-40	220-40	111-40	221-40	3.54 (090)	110-90	220-90	111-90	221-90
1.97 (050)	110-50	220-50	111-50	221-50	3.94 (100)	110-100	220-100	111-100	221-100
2.36 (060)	110-60	220-60	111-60	221-60	4.33 (110)	110-110	220-110	111-110	221-110
2.76 (070)	110-70	220-70	111-70	221-70	4.72 (120)	110-120	220-120	111-120	221-120

Option 3: Shelves

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 5 different heights in .20" (5mm) increments



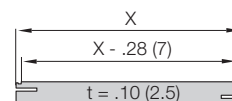
- Side plate**
 This separator is used for general subdivision of Energy Chains®.



Shelves 2200-XX

Shelf **2210-X** can be used with vertical separator **E6-35-12** and side plate **E6-35-13**

Width X in. (mm)	Part No. Unassembled		Part No. Assembled		Width X in. (mm)	Part No. Unassembled		Part No. Assembled	
	2200-XX	2210-XX	2200-XX	2210-XX		2200-XX	2210-XX	2200-XX	2210-XX
.71 (18)	2200-18	2210-18	2200-18	2210-18	1.89 (48)	2200-48	2210-48	2200-48	2210-48
.91 (23)	2200-23	2210-23	2200-23	2210-23	2.28 (58)	2200-58	2210-58	2200-58	2210-58
1.10 (28)	2200-28	2210-28	2200-28	2210-28	2.68 (68)	2200-68	2210-68	2200-68	2210-68
1.30 (33)	2200-33	2210-33	2200-33	2210-33	2.87 (73)	2200-73	2210-73	2200-73	2210-73
1.50 (38)	2200-38	2210-38	2200-38	2210-38	3.46 (88)	2200-88	2210-88	2200-88	2210-88
1.69 (43)	2200-43	2210-43	2200-43	2210-43	3.90 (99)	2200-99	2210-99	2200-99	2210-99



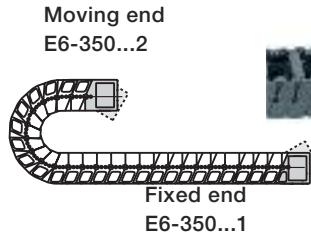
PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



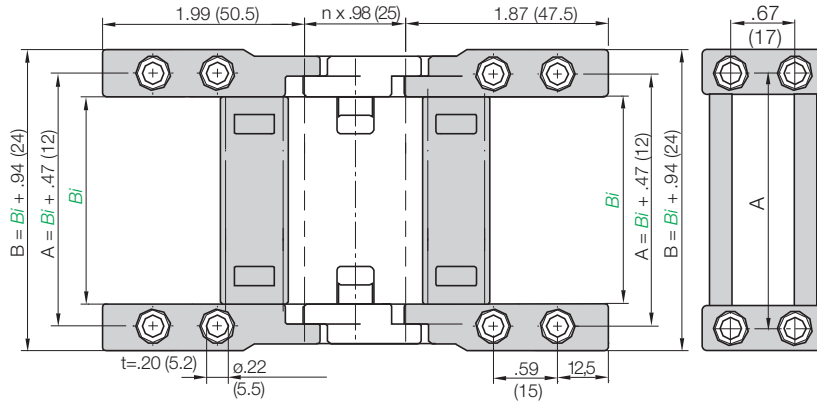


Option 1: KMA - Pivoting

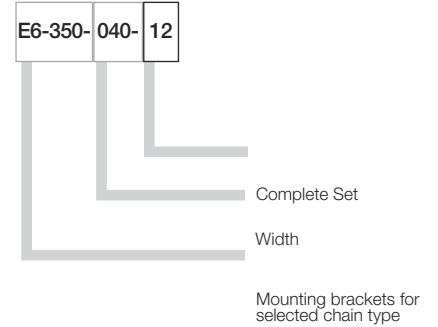
- Bolted connection outside of the chain cross-section
- Recommended for unsupported applications (for gliding applications please contact igus®)
- Confined installation conditions
- Attachment capability on all sides



Possible installation configurations -



Part Number Structure



For Series	Part No. Full Set	Dimension B in. (mm)	Dimension A in. (mm)
E6-35-030	E6-350-030-12	2.13 (54)	1.65 (42)
E6-35-040	E6-350-040-12	2.52 (64)	2.05 (52)
E6-35-050	E6-350-050-12	2.91 (74)	2.44 (62)
E6-35-060	E6-350-060-12	3.31 (84)	2.83 (72)
E6-35-070	E6-350-070-12	3.70 (94)	3.23 (82)
E6-35-080	E6-350-080-12	4.09 (104)	3.62 (92)
E6-35-090	E6-350-090-12	4.49 (114)	4.02 (102)
E6-35-100	E6-350-100-12	4.88 (124)	4.41 (112)
E6-35-110	E6-350-110-12	5.28 (134)	4.80 (122)
E6-35-120	E6-350-120-12	5.67 (144)	5.20 (132)

Full set, for both ends:

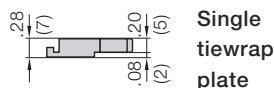
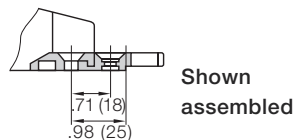
E6-350-040-12 Full set, both fixed and moving end

Single-part order:

E6-350-040-1 Mounting bracket fixed end

E6-350-040-2 Mounting bracket moving end

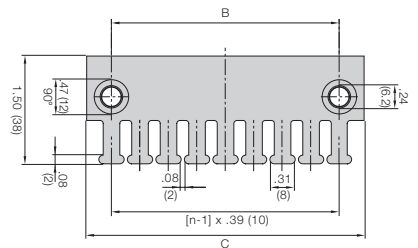
Tiewrap Plates



Option 1: Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plates	n Number of Teeth	Dimension C	Dimension B
2020-ZB	3	1.18 (30)	.59 (15)
2030-ZB	4	1.57 (40)	.79 (20)
2040-ZB	5	1.97 (50)	1.18 (30)
2050-ZB	6	2.36 (60)	1.57 (40)
2070-ZB	8	3.15 (80)	2.36 (60)
2090-ZB	9	3.54 (90)	2.76 (70)
2100-ZB	10	3.94 (100)	3.15 (80)
2120-ZB	12	4.72 (120)	3.94 (100)



If used with KMA brackets with profile rail please add "KMA" to the end of the part number.

Example: 2020-ZBKMA

Other strain relief elements
► Strain Relief, Chapter 10

Energy Chain System® E6 Series E6-35 Guide Trough

energy chain® configurator ▶



E6-35

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part No. 96-30
- 1/2 travel length of glide bars
Part No. 92-01
- Installation sets as end connectors
Part No. 95-50-XX

-XX indicates the length of the profile rail on which the guide trough is mounted. The values and part numbers are specified in the table on the left. Standard length of the trough components and glide bars is 6.56 ft (2m). The required overall length of the guide trough directly correlates to the length of travel.

Example:
Length of travel 164 ft. (50 m)
Center mounted

Required guide troughs:
164 ft (50 m) guide trough,
82 ft (25 m) glide bar
= 25 sections of 6.56 ft (2 m) guide trough

Part No. 96-30
= 13 sections of 6.56 ft. (2 m) glide bar

Part No. 92-01
Required number of installation sets
= Number of guide trough components + 1
= 25 + 1 = 26

Part number of the installation sets
95-50-XXX

Example: 95-50-400 for
15.75 (400 mm) long profile rail



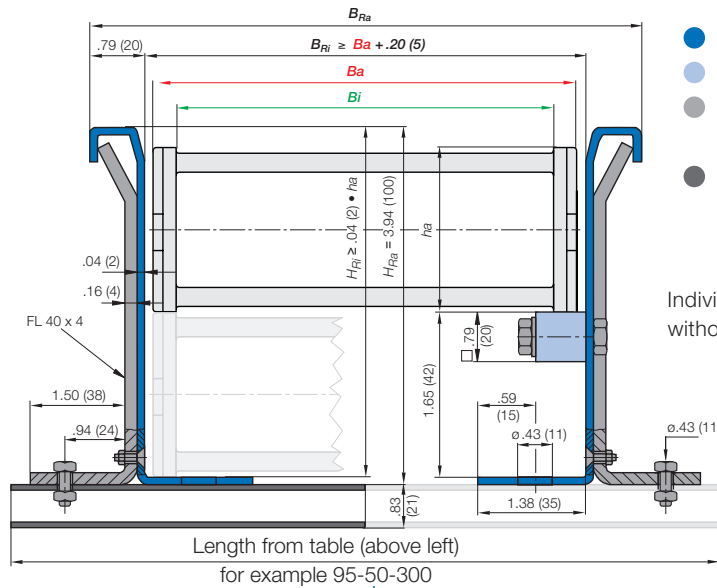
Left: Guide trough with glide bars
Right: Guide troughs without glide bars



Installation sets as section connectors

Width of Crossbar
E6-35-100-055-0

	B_{Ri}	Installation Part No.
-030	1.18 (55)	*
-040	2.56 (65)	*
-050	2.95 (75)	95-50-200
-060	3.35 (85)	95-50-200
-070	3.74 (95)	95-50-200
-080	4.13 (105)	95-50-225
-090	4.53 (115)	95-50-225
-100	4.92 (125)	95-50-250
-110	5.31 (135)	95-50-250
-120	5.71 (145)	95-50-250



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

Standard length profile rail

* Specialized guide trough available upon request

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index


Series E6-40

Special Options Available


Extremely low noise
Test results upon request



IPA Certificate: Class 1, according to standard DIN EN ISO 14644-1 for the E6 system (Series E6-29-060-150-0-CR, (v = 1.64 ft/s, a = 3.28 ft/s²))



LEVEL 1 absorption confirmed by IPA-Fraunhofer-Institute according to SEMI E78-0998 for the E6 standard material

Assembly Tips


To close, push and click shut

Other Installation Methods

Vertical, hanging ≤ 98.4 ft (30 m)

Vertical, standing ≤ 6.56 ft (2 m)

Side-mounted, un_supp. =

possible to a limited extent

Unsupported length of upper run upon request

Usage Guidelines


- If a low-noise version is required
- For very high speeds and/or accelerations
- If large stresses and thrust forces are present
- For small bending radii
- If less vibration is required
- Minimal abrasion, suitable for cleanrooms



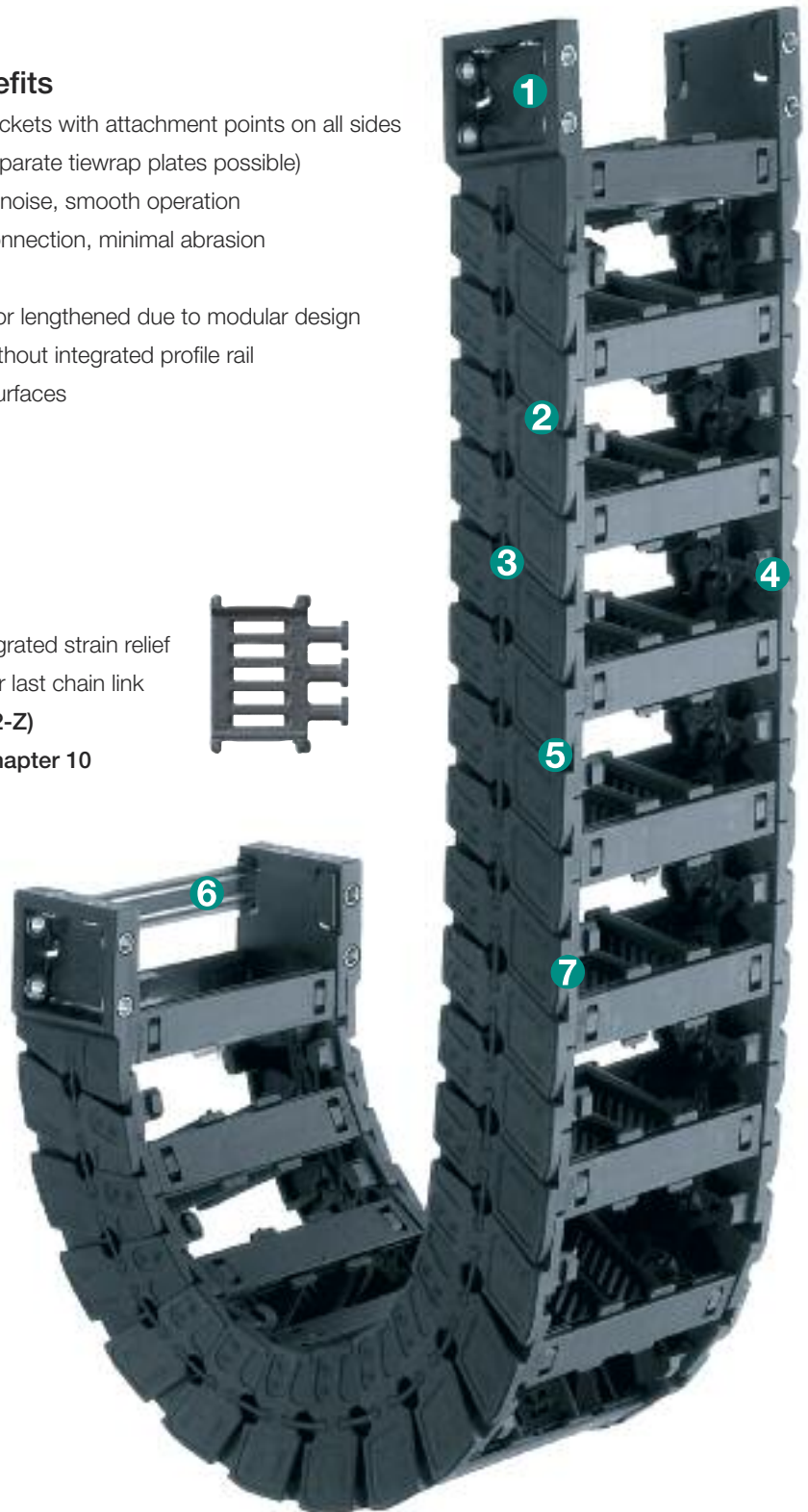
- For side mounted applications
➤ **Series 2828 E4/4**
- For RBR (Reverse Bending Radius)
➤ **Series 280 E4/100**
- For high additional loads
➤ **Series 2828 E4/4**
- For dirty environments
➤ **Series 2828 E4/4**

7.27

Features & Benefits

- 1 KMA mounting brackets with attachment points on all sides (strain relief with separate tiwrap plates possible)
- 2 Small pitch for low-noise, smooth operation
- 3 No pin and bore connection, minimal abrasion
- 4 Interior stop dog
- 5 Can be shortened or lengthened due to modular design
- 6 Available with or without integrated profile rail
- 7 Very large gliding surfaces

- Also available:
Separator with integrated strain relief for use in the first or last chain link (Part No. E6-40-02-Z)
➤ **Strain Relief, Chapter 10**


Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

6.56 ft (2 m) **E6-40-100-075-0**With 2 separators **28222** assembled every 2nd link1 Set **E6-400-100-12**

energy chain® configurator



Energy Chain®



Interior Separation



Mounting Bracket

Energy Chain System® E6 Series E6-40 Installation Dimensions

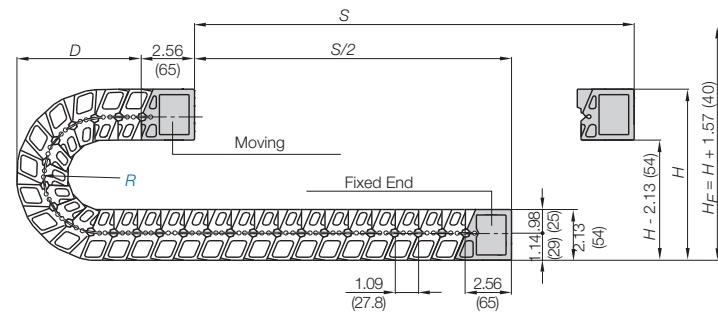
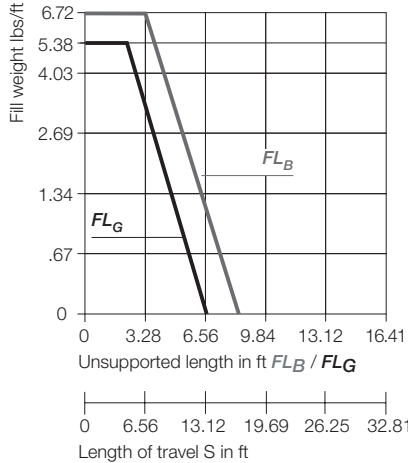
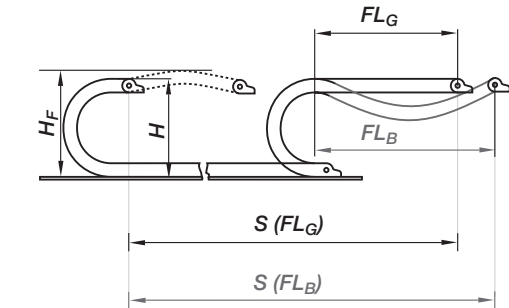
energy chain® configurator ▶



E6-40

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



Pitch per link = 1.09" (27.8 mm)
Links per ft (m) = 10.97 (36)
For center mount applications:
Chain length = $S/2 + K$

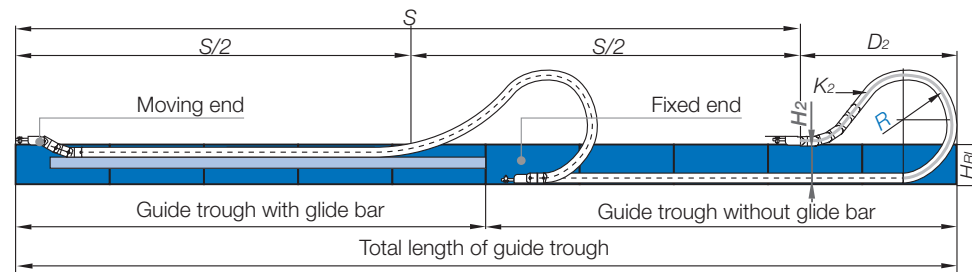
The required clearance height: $H_F = H + 1.57$ in. (40 mm) (with 1.34 lbs/ft (2.0 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	2.48 (063)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)
H	8.82 (224)	9.76 (248)	11.73 (298)	13.71 (348)	15.67 (398)	19.61 (498)
D	4.72 (120)	5.20 (132)	6.18 (157)	7.17 (182)	8.15 (207)	10.12 (257)
K	10.04 (255)	11.61 (295)	14.57 (370)	17.72 (450)	20.87 (530)	26.97 (685)

For long travels with lowered mounting height**

Long travel lengths from 19.6 ft.(6m) to max. 196.9 ft. (60m)

For center mount applications:
Chain length = $S/2 + K_2$



R	2.48 (063)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)
H_2^{+25}	5.51 (140)	5.51 (140)	5.51 (140)	5.51 (140)	5.51 (140)	5.51 (140)
D_2	8.42 (214)	10.35 (263)	15.28 (388)	22.60 (574)	29.92 (760)	54.41 (1382)
K_2	4.41 (112)	12.05 (306)	29.25 (743)	28.46 (723)	38.31 (973)	58.03 (1474)

**If you intend to use this series on long travels, we request that you consult igus®

For support of the lower run, see Chapter 9 for the Support Tray tool kit

Short Travels - Unsupported

Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to Installation dimensions for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{"safety buffer"}$
 - H_F = Required clearance height
 - H_{in} = Trough inner height
 - H_2 = *Mounting height
 - D_2 = Overlength - long travels, gliding
 - K_2 = *Add-on
- *If the mounting bracket location is set lower

Long Travels - Gliding

If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough. ▶ Design, Chapter 1

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	upon request
Permitted temperature	-40°F (-40°C) up to +158°F (+70°C)
Flammability Class	VDE 0304 IIC UL94 HB

Technical Data



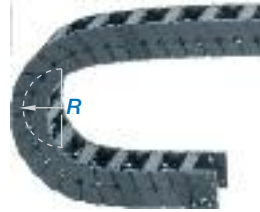
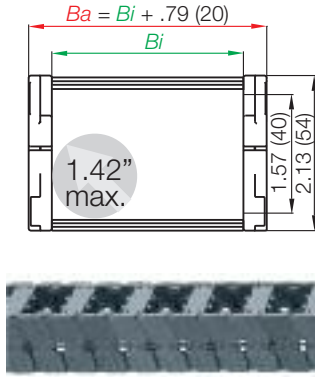
Details of material properties

▶ Design, Chapter 1

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Series E6-40 - Energy Chain® with crossbars every other link

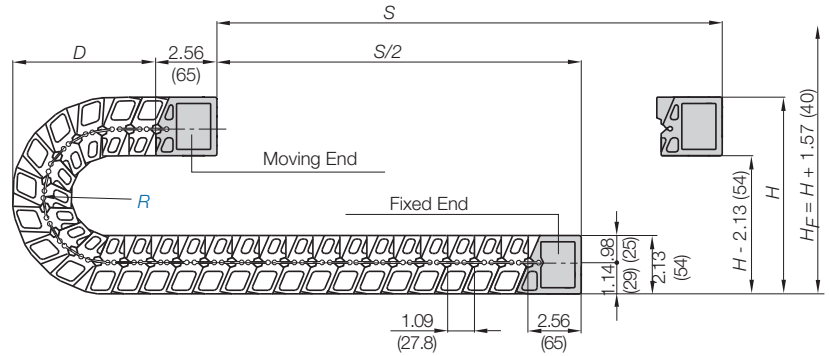
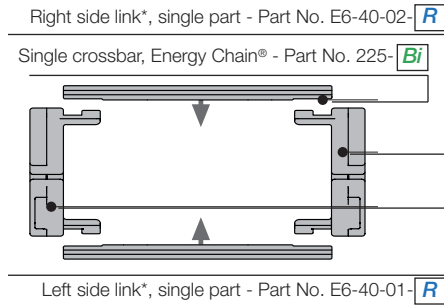


Part Number Structure



- Color - Black
- Bending radius
- Width
- Series

Energy Chain® as separate parts, links and side plates



Polymer spring as single part - Part No. E6-40-177

*View from the fixed point of the Energy Chain®/Energy Tube

Supplement part number with required radius. Example: E6-40-100--0
Pitch: 1.09 in. (27.8 mm) per link links/ft (m) = 10.97 (36)

Part Number	Bi in. (mm)	Ba in. (mm)	Weight lbs/ft (kg/m)
E6-40-040- <input type="text"/> -0	1.57 (40)	2.36 (60)	≈ 0.87 (1.29)
E6-40-050- <input type="text"/> -0	1.97 (50)	2.76 (70)	≈ 0.89 (1.33)
E6-40-062- <input type="text"/> -0	2.44 (62)	3.23 (82)	≈ 0.93 (1.38)
E6-40-070- <input type="text"/> -0	2.76 (70)	3.54 (90)	≈ 0.95 (1.41)
E6-40-075- <input type="text"/> -0	2.95 (75)	3.74 (95)	≈ 0.96 (1.43)
E6-40-087- <input type="text"/> -0	3.42 (87)	4.21 (107)	≈ 0.99 (1.48)
E6-40-100- <input type="text"/> -0	3.94 (100)	4.72 (120)	≈ 1.02 (1.53)
E6-40-125- <input type="text"/> -0	4.92 (125)	5.71 (145)	≈ 1.10 (1.63)
E6-40-150- <input type="text"/> -0	5.91 (150)	6.69 (170)	≈ 1.16 (1.73)
E6-40-175- <input type="text"/> -0	6.89 (175)	7.68 (195)	≈ 1.23 (1.83)
E6-40-200- <input type="text"/> -0	7.87 (200)	8.66 (220)	≈ 2.50 (1.93)
E6-40-225- <input type="text"/> -0	8.86 (225)	9.65 (245)	≈ 1.36 (2.02)
E6-40-250- <input type="text"/> -0	9.84 (250)	10.63 (270)	≈ 1.42 (2.12)
E6-40-275- <input type="text"/> -0	10.83 (275)	11.61 (295)	≈ 1.49 (2.22)
E6-40-300- <input type="text"/> -0	11.81 (300)	12.60 (320)	≈ 1.56 (2.32)

Choose from the radii below for all of the above sizes

Radius (mm) Example: E6-40-100--0

	063	075	100	125	150	200
R	2.48 (063)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)
H	8.82 (224)	9.76 (248)	11.73 (298)	13.71 (348)	15.67 (398)	19.61 (498)
D	4.72 (120)	5.20 (132)	6.18 (157)	7.17 (182)	8.15 (207)	10.12 (257)
K	10.04 (255)	11.61 (295)	14.57 (370)	17.72 (450)	20.87 (530)	26.97 (685)

Energy Chain System® E6 Series E6-40 Interior Separation

energy chain® configurator ▶



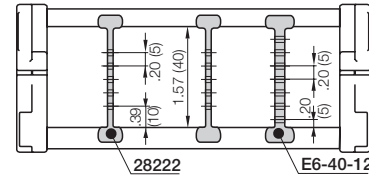
E6-40

Option 1: Vertical separators

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.

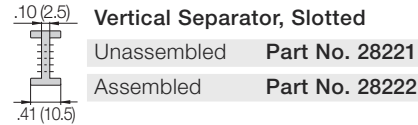


STANDARD



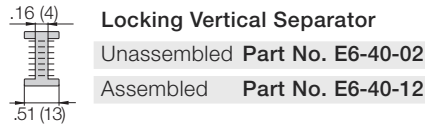
- **Slotted vertical separator**

This separator is used for general subdivision of Energy Chains®. Can be used in combination with full-width shelf 221-X.



- **Locking vertical separator**

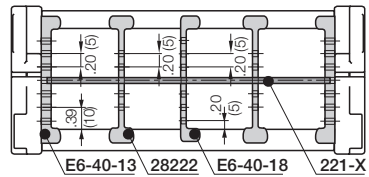
For use with shelf 2210-X



Option 2: Full-width shelf

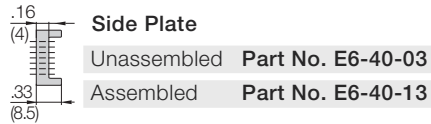
For applications involving many thin cables with similar or identical diameters.

Full-width shelf 221-X can be used with vertical separator 28222, side plate E6-40-13 and asymmetrical separator E6-40-18



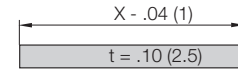
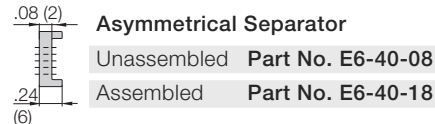
- **Side plate**

This separator is used for general subdivision of Energy Chains®.



- **Asymmetrical separator**

This separator is used for general subdivision of Energy Chains®.



Shelves 220-XX

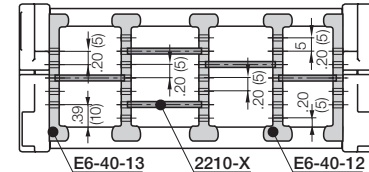
Shelves can be inserted at 5 different heights in .20" (5mm) increments

Width X in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Part No. Unassembled	Part No. Assembled
1.57 (040)	220-40	221-40	3.94 (100)	220-100	221-100
1.97 (050)	220-50	221-50	4.92 (125)	220-125	221-125
2.44 (062)	220-62	221-62	5.91 (150)	220-150	221-150
2.76 (070)	220-70	221-70	6.89 (175)	220-175	221-175
2.95 (075)	220-75	221-75	7.87 (200)	220-200	221-200
3.43 (087)	220-87	221-87			

Option 3: Shelves

These components form the basic pattern of a shelf system.

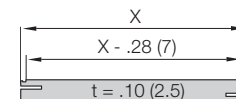
Shelves of various widths can be arranged at 7 different heights in .20" (5mm) increments



Shelves 2200-XX

Shelf 2210-X can be used with locking vertical separator E6-40-12 and side plate E6-40-13

Width X in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Part No. Unassembled	Part No. Assembled
.71 (18)	2200-18	2210-18	2.28 (58)	2200-58	2210-58
.91 (23)	2200-23	2210-23	2.28 (63)	2200-65	2210-65
1.10 (28)	2200-28	2210-28	2.68 (68)	2200-68	2210-68
1.30 (33)	2200-33	2210-33	2.87 (73)	2200-73	2210-73
1.50 (38)	2200-38	2210-38	3.46 (88)	2200-88	2210-88
1.69 (43)	2200-43	2210-43	3.90 (99)	2200-99	2210-99
1.89 (48)	2200-48	2210-48			



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS





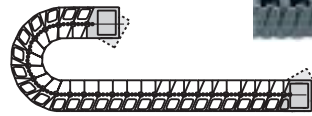
Option 1: KMA - Pivoting

- Option - profile rail with integrated strain relief chainfix clip or tiwrap plates
- Profile rail can be mounted in the inner or outer radius of the Energy Chain®
- Bolted connection outside of the chain cross-section
- Recommended for unsupported applications (for gliding applications please contact igus®)
- Confined installation conditions
- Attachment capability on all sides

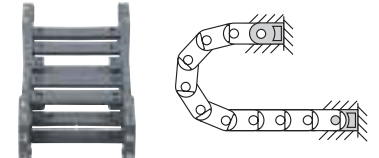
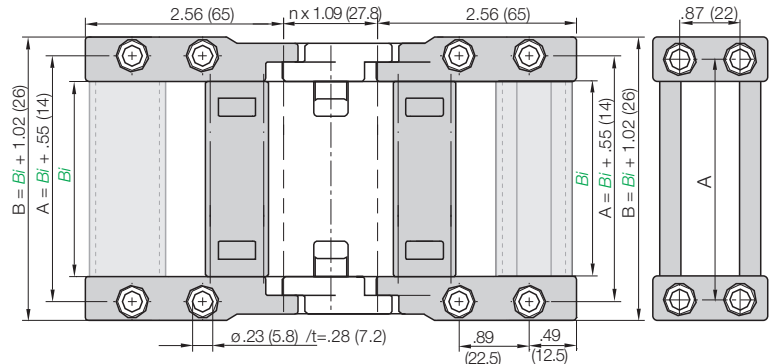


Adapters for gliding applications available upon request

Moving end
E6-400...2



Fixed end
E6-400...1

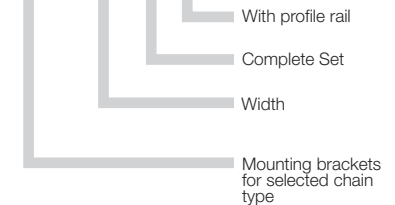


Possible installation configurations -

For Series	Part No. Full Set Without Profile Rail	Part No. Full Set With Profile Rail	Dimension A		Dimension B	
			in.	(mm)	in.	(mm)
E6-40-040	E6-400-040-12	E6-400-040-12P	2.13	(54)	2.60	(66)
E6-40-050	E6-400-050-12	E6-400-050-12P	2.52	(64)	2.99	(76)
E6-40-062	E6-400-062-12	E6-400-062-12P	2.99	(76)	3.46	(88)
E6-40-070	E6-400-070-12	E6-400-070-12P	3.31	(84)	3.78	(96)
E6-40-075	E6-400-075-12	E6-400-075-12P	3.50	(89)	3.98	(101)
E6-40-087	E6-400-087-12	E6-400-087-12P	3.98	(101)	4.45	(113)
E6-40-100	E6-400-100-12	E6-400-100-12P	4.49	(114)	4.96	(126)
E6-40-125	E6-400-125-12	E6-400-125-12P	5.47	(139)	5.94	(151)
E6-40-150	E6-400-150-12	E6-400-150-12P	6.46	(164)	6.93	(176)
E6-40-175	E6-400-175-12	E6-400-175-12P	7.44	(189)	7.91	(201)
E6-40-200	E6-400-200-12	E6-400-200-12P	8.43	(214)	8.90	(226)
E6-40-225	E6-400-225-12	E6-400-225-12P	9.41	(239)	9.88	(251)
E6-40-250	E6-400-250-12	E6-400-250-12P	10.39	(264)	10.87	(276)
E6-40-275	E6-400-275-12	E6-400-275-12P	11.38	(289)	11.85	(301)
E6-40-300	E6-400-300-12	E6-400-300-12P	12.36	(314)	12.83	(326)

Part Number Structure

E6-400-040-12 P



Full set, for both ends:

E6-400-040-12 Full set,

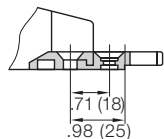
both fixed and moving end

Single-part order:

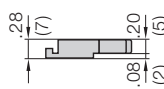
E6-400-040-1 Mounting bracket fixed end

E6-400-040-2 Mounting bracket moving end

Tiewrap Plates



Shown assembled

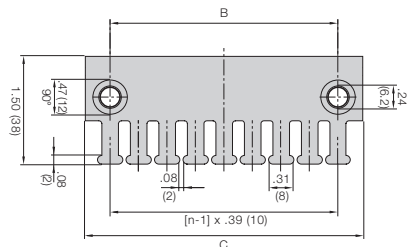


Single tiewrap plate

Option 1: Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plates	n Number of Teeth	Dimension C	Dimension B
2020-ZB	3	1.18 (30)	.59 (15)
2030-ZB	4	1.57 (40)	.79 (20)
2040-ZB	5	1.97 (50)	1.18 (30)
2050-ZB	6	2.36 (60)	1.57 (40)
2070-ZB	8	3.15 (80)	2.36 (60)
2090-ZB	9	3.54 (90)	2.76 (70)
2100-ZB	10	3.94 (100)	3.15 (80)
2120-ZB	12	4.72 (120)	3.94 (100)



If used with KMA brackets with profile rail please add "KMA" to the end of the part number.

Example: 2020-ZBKMA

Other strain relief elements

► Strain Relief, Chapter 10

Energy Chain System® E6

Series E6-40

Guide Trough

energy chain® configurator ▶



E6-40

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part Number 98-30
- 1/2 travel length of glide bars
Part Number 92-01
- Installation sets as end connectors
Part Number 93-50-XX

-XX indicates the length of the profile rail on which the guide trough is mounted. The values and part numbers are specified in the table on the left. The standard length of the trough components and glide bars is 6.56 ft (2 m.) The required overall length of the guide trough directly correlates to the length of travel.

Example:

Length of travel 164 ft (50 m)
Center mounted

Required guide troughs:

164 ft (50 m) guide trough
82 ft (25 m) glide bar

= 25 sections of 6.56 ft
(2 m) guide trough

Part No. 98-30

= 13 sections of 6.56 ft (2 m) glide bar

Part No. 92-01

Required number of installation sets:

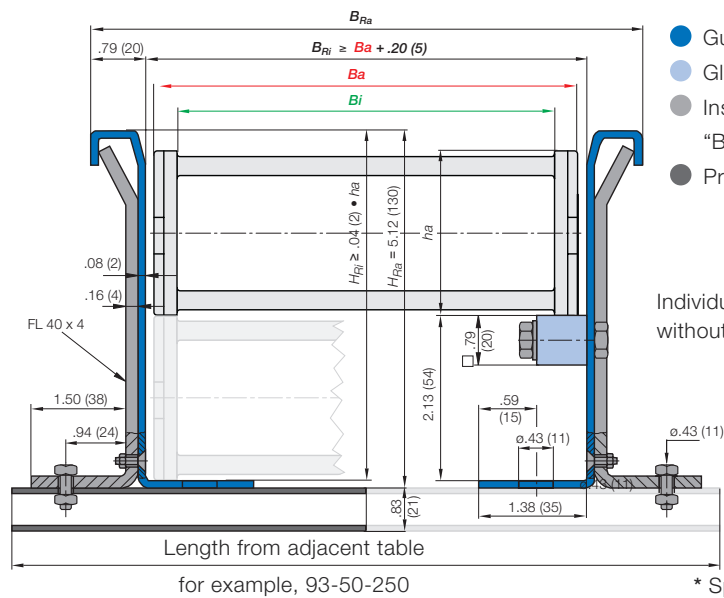
= Number of guide trough components + 1
= 25 + 1 = 26

Part number of the installation sets

Example: 93-50-400 for 15.75" (400 mm) long profile rail.



Crossbar Width E6-40-100-100-0	Dimension D	Installation Part No.
-040	2.56 (65)	*
-050	2.95 (75)	93-50-200
-062	3.43 (87)	93-50-200
-070	3.74 (95)	93-50-225
-075	3.94 (100)	93-50-225
-087	4.41 (112)	93-50-225
-100	4.92 (125)	93-50-250
-125	5.91 (150)	93-50-275
-150	6.89 (175)	93-50-300
-175	7.87 (200)	93-50-325
-200	8.86 (225)	93-50-350
-225	9.84 (250)	93-50-375
-250	10.83 (275)	93-50-400
-275	11.81 (300)	93-50-425
-300	12.80 (325)	93-50-450



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

* Specialized guide trough available upon request

Standard length profile rail

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index


Series R6-40

Special Features / Options


Extremely low noise
Test results upon request



IPA Certificate: Class 1, according to standard DIN EN ISO 14644-1 for the E6 system (Series E6-29-060-150-0-CR, (v = 1.64 ft/s, a = 3.28 ft/s²))



LEVEL 1 absorption confirmed by IPA-Fraunhofer-Institute according to SEMI E78-0998 for the E6 standard material

Assembly Tips


Lever and remove lids

Other Installation Methods

Vertical, hanging ≤ 98.4 ft (30 m)

Vertical, standing ≤ 6.56 ft (2 m)

Side-mounted, un supp. =

possible to a limited extent

Unsupported length of upper run upon

request

Usage Guidelines

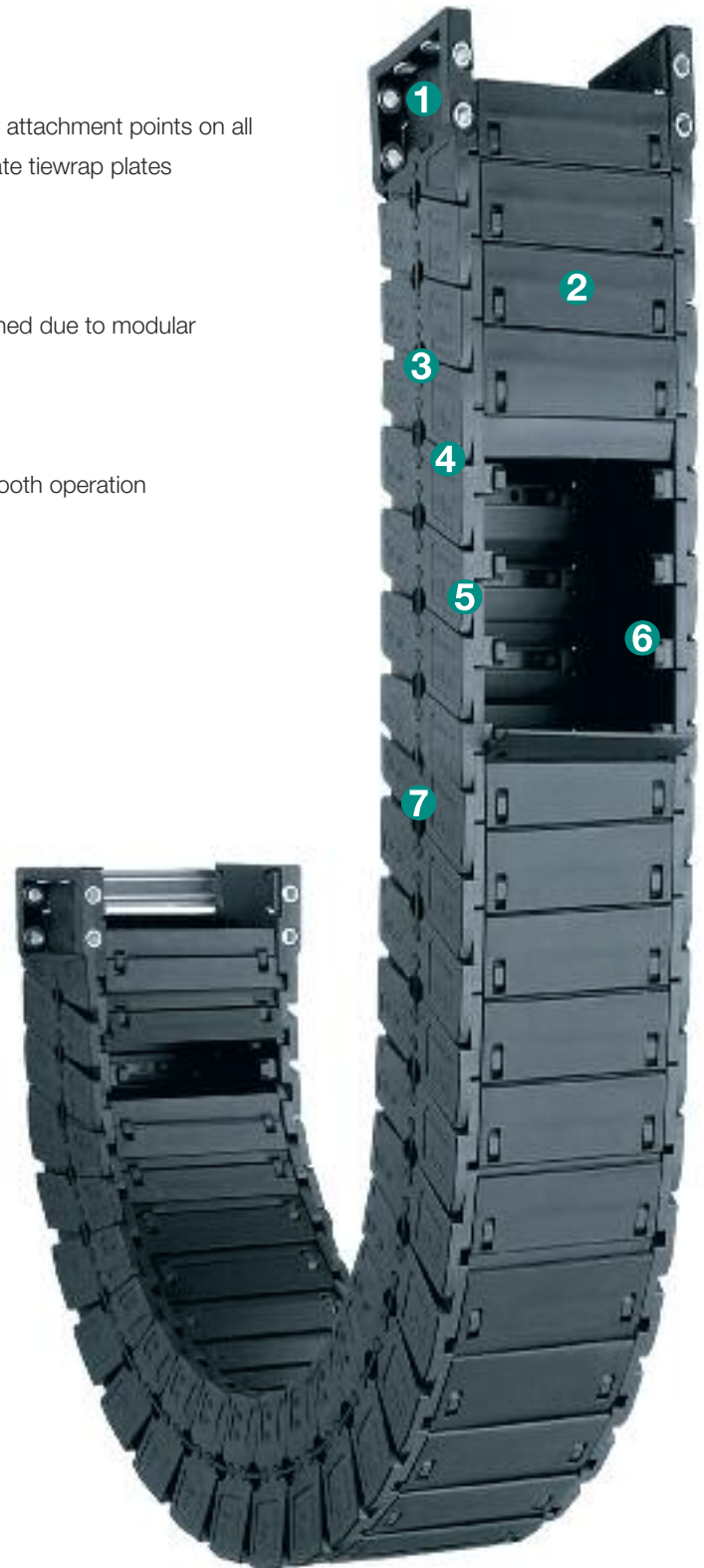

- If a low-noise version is required
- For very high speeds and/or accelerations
- If large stresses and thrust forces are present
- Protection against hot chips
- For small bending radii
- If less vibration is required
- Minimal abrasion, suitable for cleanrooms



- For side mounted applications
➤ Series R7728 E4/4

Features & Benefits

- 1 KMA mounting brackets with attachment points on all sides (strain relief with separate tie-wrap plates possible)
- 2 Fully enclosed Energy Tube
- 3 No pin and bore connection
- 4 Can be shortened or lengthened due to modular design
- 5 Very large gliding surfaces
- 6 Interior stop dog
- 7 Small pitch for low-noise, smooth operation


Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

[energy chain® configurator](#)

6.56 ft (2 m) R6-40-062-075-0



Energy Chain®

With 2 separators R6-40-11 assembled every 2nd link



Interior Separation

1 Set R6-400-062-12



Mounting Bracket

Energy Chain System® E6 Series R6-40 Installation Dimensions

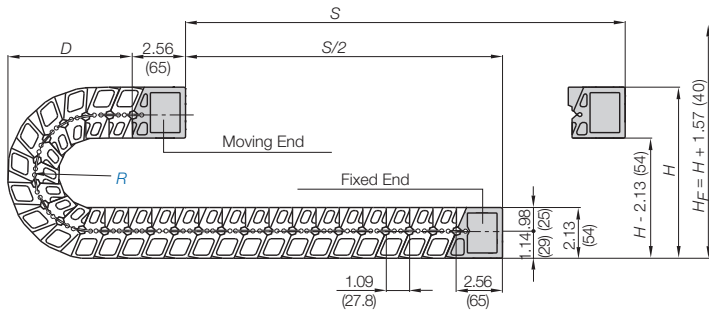
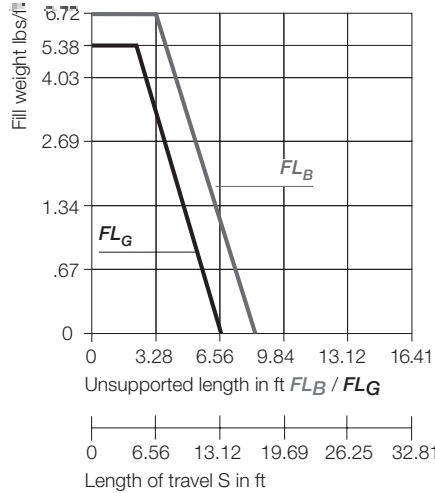
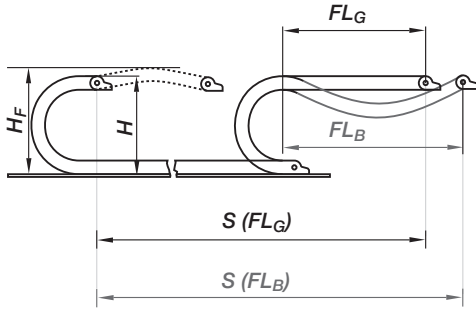
energy chain® configurator



R6-40

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1



Pitch per link = 1.09" (27.8 mm)
Links per foot (m) = 10.97 (36)
For center mount applications:
Chain length = $S/2 + K$

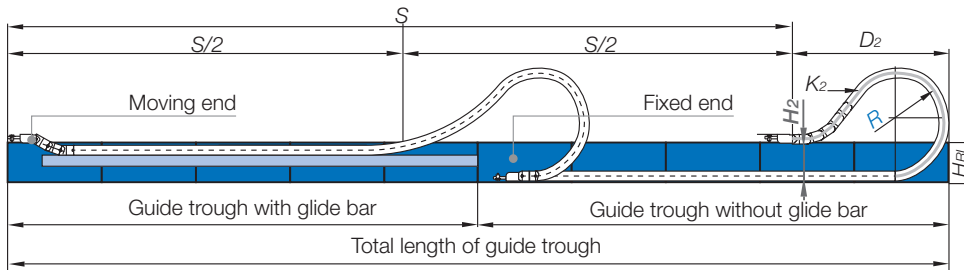
The required clearance height: $H_F = H + 1.57$ in. (40 mm) (with 1.34 lbs/ft (2.0 kg/m) fill weight). Please consult igus® if space is particularly restricted.

R	2.48 (063)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)
H	8.82 (224)	9.76 (248)	11.73 (298)	13.71 (348)	15.67 (398)	19.61 (498)
D	4.72 (120)	5.20 (132)	6.18 (157)	7.17 (182)	8.15 (207)	10.12 (257)
K	10.04 (255)	11.61 (295)	13.50 (343)	16.65 (423)	20.87 (530)	26.97 (685)

For long travels with lowered mounting height**

Long travel lengths from 19.6 ft.(6m) to max. 196.9 ft. (60m)

For center mount applications:
Chain length = $S/2 + K_2$



R	2.48 (063)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)
H_2^{+25}	5.51 (140)	5.51 (140)	5.51 (140)	5.51 (140)	5.51 (140)	5.51 (140)
D_2	8.42 (214)	10.35 (263)	15.28 (388)	22.60 (574)	29.92 (760)	54.41 (1382)
K_2	4.41 (112)	12.05 (306)	29.25 (743)	28.46 (723)	38.31 (973)	58.03 (1474)

**If you intend to use this series on long travels, we request that you consult igus®

For support of the lower run, see Chapter 9 for the Support Tray tool kit

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to Installation dimensions for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{"safety buffer"}$
- $H_F = \text{Required clearance height}$
- $H_{in} = \text{Trough inner height}$
- $H_2 = \text{*Mounting height}$
- $D_2 = \text{Overlength - long travels, gliding}$
- $K_2 = \text{*Add-on}$
- *If the mounting bracket location is set lower

1.57

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.

Design, Chapter 1

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	upon request
Permitted temperature	-40°F (-40°C) up to +158°F (+70°C)
Flammability Class	VDE 0304 IIC UL94 HB

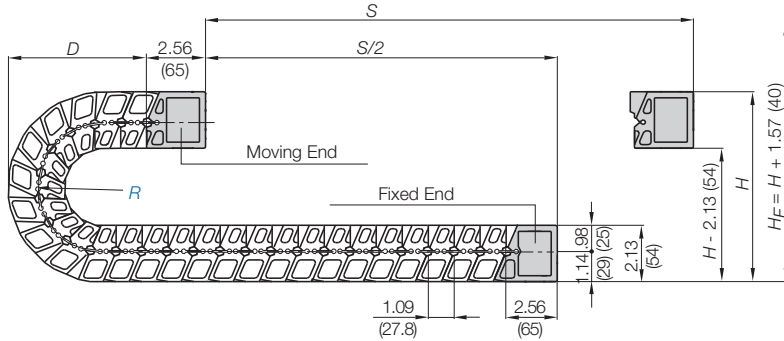
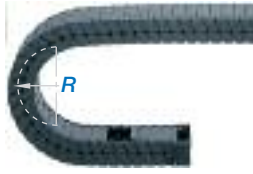
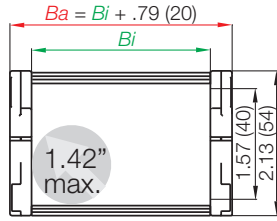
Technical Data



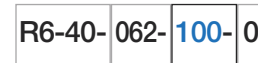
Details of material properties

Design, Chapter 1

Series R6-40 - Energy Tube, removable lids along the inner and outer radius



Part Number Structure



- Color - Black
- Bending radius
- Width
- Series

Supplement part number with required radius. Example: R6-40-062-100-0

Pitch: 1.09 in. (27.8 mm) per link links/ft (m) = 10.97 (36)

Part Number	Bi in. (mm)	Ba in. (mm)	Weight lbs/ft (kg/m)
R6-40-062- <input type="text"/> -0	2.44 (62)	3.23 (82)	≈ 0.97 (1.44)

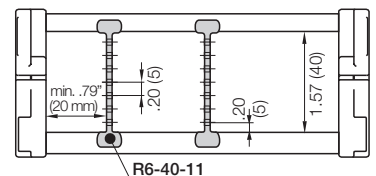
Choose from the radii below for all of the above sizes

Radius (mm) Example: R6-40-062-100-0

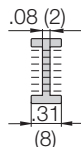
	063	075	100	125	150	200
R	2.48 (63)	2.95 (75)	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)
H	8.82 (224)	9.76 (248)	11.73 (298)	13.71 (348)	15.67 (398)	19.61 (498)
D	4.72 (120)	5.20 (132)	6.18 (157)	7.17 (182)	8.15 (207)	10.12 (257)
K	10.04 (255)	11.61 (295)	13.50 (343)	16.65 (423)	20.87 (530)	26.97 (685)

Option 1: Vertical separators

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.



Vertical separator R6-40-01



Vertical Separator

Unassembled Part No. R6-40-01

Assembled Part No. R6-40-11

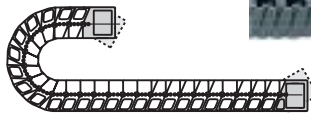
- Vertical separator R6-40-01
This separator is used for general subdivision of Energy Tubes.
- Separator snaps onto either the bottom of the carrier or the lid. Stays attached to that side. Opposite side can be removed.



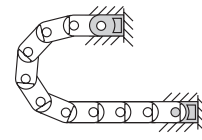
Option 1: KMA - Pivoting

- Option - profile rail with integrated strain relief chainfix clip or tiewrap plates
- Profile rail can be mounted in the inner or outer radius of the Energy Chain®
- Bolted connection outside of the chain cross-section
- Recommended for unsupported applications (for gliding applications please contact igus®)
- Confined installation conditions
- Attachment capability on all sides

Moving end
R6-400...2



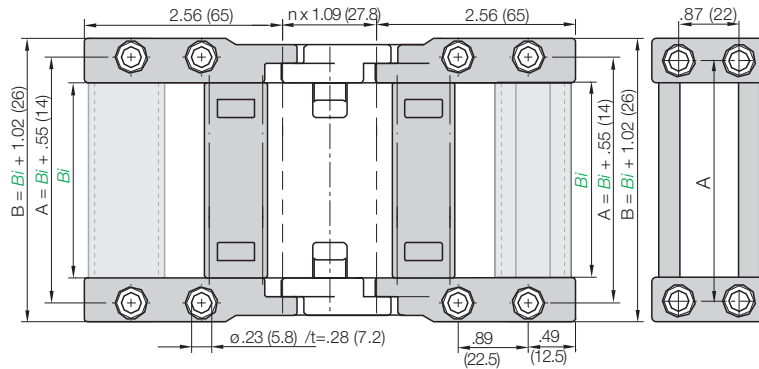
Fixed end
R6-400...1



Possible installation configurations -



Adapters for gliding applications available upon request



For Series	Part No. Full Set Without Profile Rail	Part No. Full Set With Profile Rail	Dimension A in. (mm)	Dimension B in. (mm)
R6-40-062	R6-400-062-12	R6-400-062-12P	2.99 (76)	3.46 (88)

Full set, for both ends:

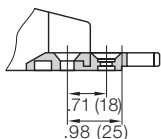
R6-400-062-12 Full set, both fixed and moving end

Single-part order:

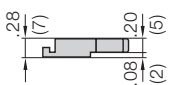
R6-400-062-1 Mounting bracket fixed end

R6-400-062-2 Mounting bracket moving end

Tiewrap Plates



Shown assembled



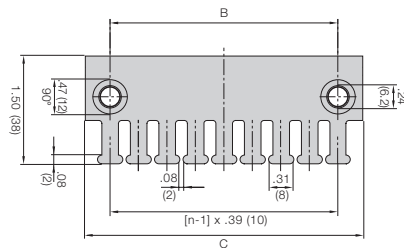
Single tie-wrap plate

Option 1:

Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plates	n Number of Teeth	Dimension C	Dimension B
2020-ZB	3	1.18 (30)	.59 (15)
2030-ZB	4	1.57 (40)	.79 (20)
2040-ZB	5	1.97 (50)	1.18 (30)
2050-ZB	6	2.36 (60)	1.57 (40)
2070-ZB	8	3.15 (80)	2.36 (60)
2090-ZB	9	3.54 (90)	2.76 (70)
2100-ZB	10	3.94 (100)	3.15 (80)
2120-ZB	12	4.72 (120)	3.94 (100)



If used with KMA brackets with profile rail please add "KMA" to the end of the part number.

Example: 2020-ZBKMA

Other strain relief elements

► Strain Relief, Chapter 10

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part Number 98-30
- 1/2 travel length of glide bars
Part Number 92-01
- Installation sets as end connectors
Part Number 93-50-XX

-XX indicates the length of the profile rail on which the guide trough is mounted. The values and part numbers are specified in the table on the left. The standard length of the trough components and glide bars is 6.56 ft (2 m.) The required overall length of the guide trough directly correlates to the length of travel.

Example:

Length of travel 164 ft (50 m)
Center mounted

Required guide troughs:

164 ft (50 m) guide trough
82 ft (25 m) glide bar
= 25 sections of 6.56 ft (2 m) guide trough
(2 m) glide bar

Part No. 98-30

= 13 sections of 6.56 ft (2 m) glide bar

Part No. 92-01

Required number of installation sets:

= Number of guide trough components + 1
= 25 + 1 = 26

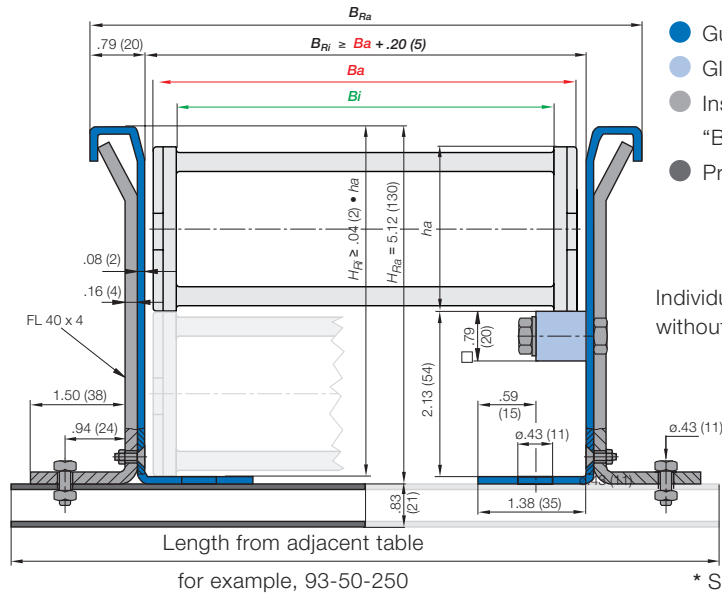
Part number of the installation sets

Example: 93-50-400 for 15.75" (400 mm) long profile rail.



Crossbar Width
E6-40-100-100-0

Dimension D	Installation Part No.
-040 2.56 (65) *	
-050 2.95 (75)	93-50-200
-062 3.43 (87)	93-50-200
-070 3.74 (95)	93-50-225
-075 3.94 (100)	93-50-225
-087 4.41 (112)	93-50-225
-100 4.92 (125)	93-50-250
-125 5.91 (150)	93-50-275
-150 6.89 (175)	93-50-300
-175 7.87 (200)	93-50-325
-200 8.86 (225)	93-50-350
-225 9.84 (250)	93-50-375
-250 10.83 (275)	93-50-400
-275 11.81 (300)	93-50-425
-300 12.80 (325)	93-50-450



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

* Specialized guide trough available upon request

Standard length profile rail

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index

Series E6-52
Special Features / Options

 Extremely low noise
 Test results upon request

 IPA Certificate: Class 1, according to standard DIN EN ISO 14644-1 for the E6 system (Series E6-29-060-150-0-CR, (v = 1.64 ft/s, a = 3.28 ft/s²))


LEVEL 1 absorption confirmed by IPA-Fraunhofer-Institute according to SEMI E78-0998 for the E6 standard material

Assembly Tips


To close, push and click shut

Other Installation Methods

Vertical, hanging ≤ 164 ft (50 m)

Vertical, standing ≤ 6.56 ft (2 m)

Side-mounted, un_supp. =

possible to a limited extent

Unsupported length of upper run upon request

Usage Guidelines

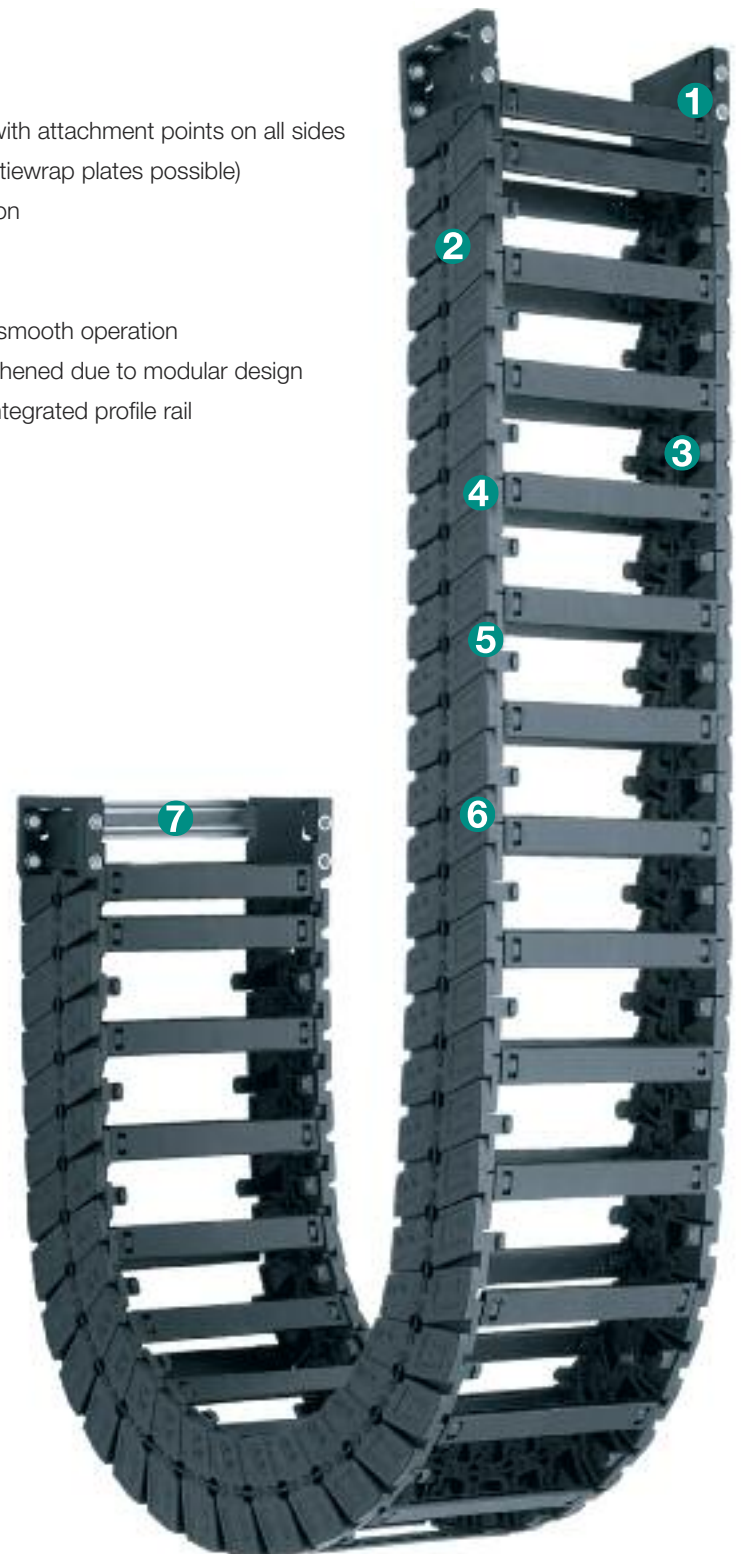

- If a low-noise version is required
- For very high speeds and/or accelerations
- If large stresses and thrust forces are present
- For small bending radii
- If less vibration is required
- Minimal abrasion, suitable for cleanrooms



- For side mounted applications
 - **Series 4040 E4/4**
- For RBR (Reverse Bending Radius)
 - **Series 400 E4/4**
- For high additional loads
 - **Series 4040 E4/100**
- For dirty environments
 - **Series 4040 E4/4**

Features & Benefits

- ➊ KMA mounting brackets with attachment points on all sides (strain relief with separate tie-wrap plates possible)
- ➋ No pin and bore connection
- ➌ Interior stop dog
- ➍ Very large gliding surfaces
- ➎ Small pitch for low-noise, smooth operation
- ➏ Can be shortened or lengthened due to modular design
- ➐ Available with or without integrated profile rail


Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

 6.56 ft (2 m) **E6-52-100-175-0**

 With 2 separators **38222** assembled every 2nd link

 1 Set **E6-520-100-12**
[energy chain® configurator](#)

Energy Chain®

Interior Separation

Mounting Bracket

Energy Chain System® E6 Series E6-52 Installation Dimensions

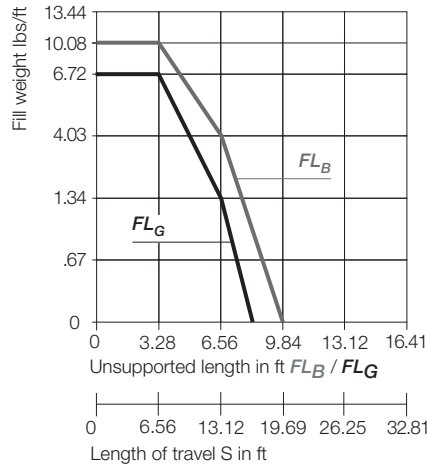
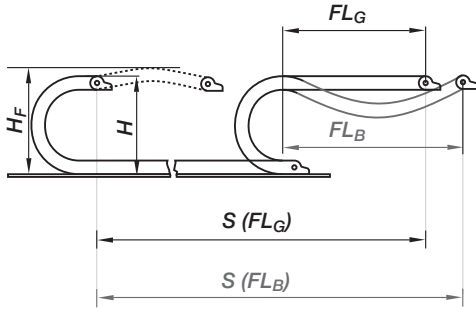
energy chain® configurator ▶



E6-52

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



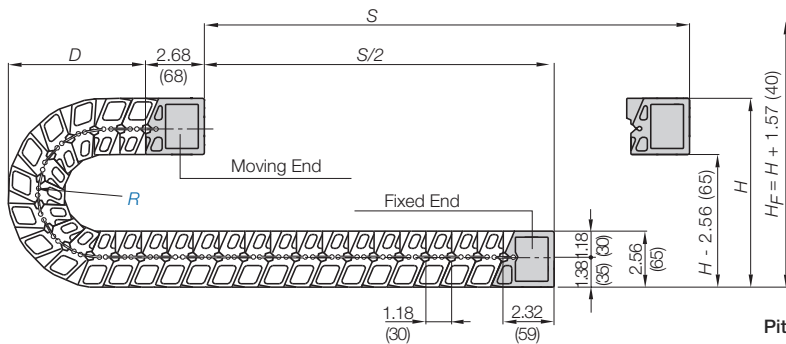
Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{"safety buffer"}$
 - H_F = Required clearance height
 - H_{in} = Trough inner height
 - H_2 = *Mounting height
 - D_2 = Overlength - long travels, gliding
 - K_2 = *Add-on
- *If the mounting bracket location is set lower



Pitch per link = 1.18" (30 mm)
Links per ft (m) = 10.17 (34)
For center mount applications:
Chain length = $\frac{S}{2} + K$

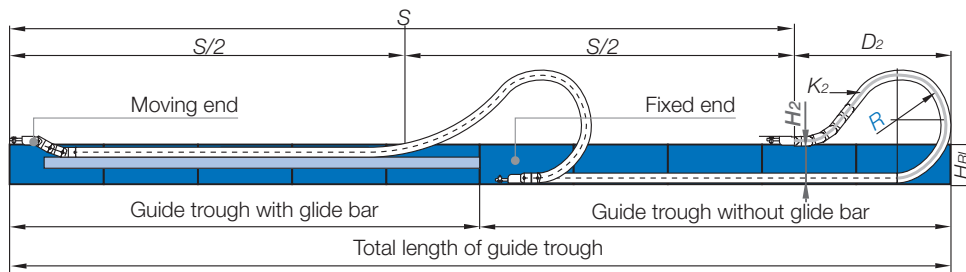
The required clearance height: $H_F = H + 1.57$ in. (40 mm) (with 1.34 lbs/ft (2.0 kg/m) fill weight. Please consult igus® if space is particularly restricted.

R	2.95 (075)	3.94 (100)	5.91 (150)	7.87 (200)	9.84 (250)
H	10.63 (270)	12.60 (320)	16.54 (420)	20.47 (520)	24.41 (620)
D	5.51 (140)	6.50 (165)	8.46 (215)	10.43 (265)	12.40 (315)
K	11.81 (300)	14.76 (375)	21.06 (535)	27.17 (690)	33.46 (850)

For long travels with lowered mounting height**

Long travel lengths from 19.6 ft.(6m) to max. 262 ft. (80m)

For center mount applications:
Chain length = $\frac{S}{2} + K_2$



Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.

▶ Design, Chapter 1

R	2.95 (075)	3.94 (100)	5.91 (150)	7.87 (200)	9.84 (250)
H_2	5.51 (140)	5.51 (140)	5.51 (140)	5.51 (140)	5.51 (140)
D_2^{+25}	10.63 (270)	15.67 (398)	30.24 (768)	44.80 (1138)	59.37 (1508)
K_2	11.81 (300)	18.90 (480)	38.98 (990)	57.87 (1470)	76.77 (1950)

**If you intend to use this series on long travels, we request that you consult igus®



For support of the lower run, see Chapter 9 for the Support Tray tool kit

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	upon request
Permitted temperature	-40°F (-40°C) up to +158°F (+70°C)
Flammability Class	VDE 0304 IIC UL94 HB

Technical Data



Details of material properties

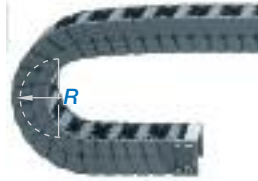
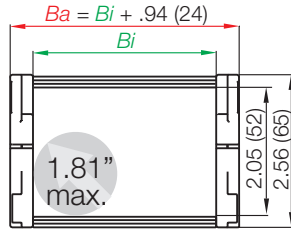
▶ Design, Chapter 1

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

2.05

7.40

Series E6-52 - Energy Chain® with crossbars every other link



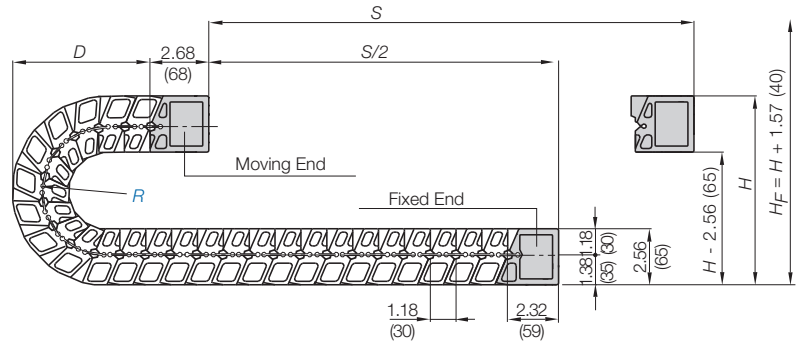
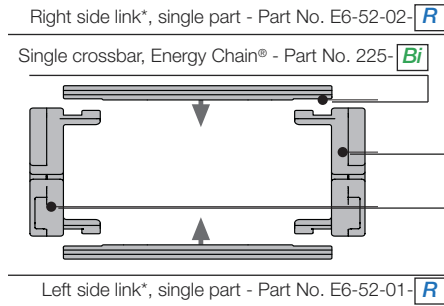
Part Number Structure

E6-52-100-075-0

- Color - Black
- Bending radius
- Width
- Series



Energy Chain® as separate parts, side links and crossbars



Polymer spring as single part - Part No. E6-52-195

*View from the fixed point of the Energy Chain®/Energy Tube

Supplement part number with required radius. Example: E6-52-100-075-0
Pitch: 1.18 in. (30 mm) per link links/ft (m) = 10.36 (34)

Part Number	Bi in. (mm)	Ba in. (mm)	Weight lbs/ft (kg/m)
E6-52-040- <input type="checkbox"/> -0	1.57 (40)	2.51 (64)	≈1.18 (1.76)
E6-52-050- <input type="checkbox"/> -0	1.97 (50)	2.91 (74)	≈1.21 (1.80)
E6-52-062- <input type="checkbox"/> -0	2.44 (62)	3.39 (86)	≈1.24 (1.84)
E6-52-070- <input type="checkbox"/> -0	2.76 (70)	3.70 (94)	≈1.26 (1.87)
E6-52-075- <input type="checkbox"/> -0	2.95 (75)	3.90 (99)	≈2.40 (1.89)
E6-52-087- <input type="checkbox"/> -0	3.42 (87)	4.37 (111)	≈1.30 (1.94)
E6-52-100- <input type="checkbox"/> -0	3.94 (100)	4.88 (124)	≈1.33 (1.98)
E6-52-125- <input type="checkbox"/> -0	4.92 (125)	5.87 (149)	≈1.39 (2.07)
E6-52-150- <input type="checkbox"/> -0	5.91 (150)	6.85 (174)	≈1.46 (2.17)
E6-52-175- <input type="checkbox"/> -0	6.89 (175)	7.83 (199)	≈1.52 (2.26)
E6-52-200- <input type="checkbox"/> -0	7.87 (200)	8.82 (224)	≈1.59 (2.36)
E6-52-225- <input type="checkbox"/> -0	8.86 (225)	9.80 (249)	≈1.65 (2.45)
E6-52-250- <input type="checkbox"/> -0	9.84 (250)	10.79 (274)	≈1.71 (2.54)
E6-52-275- <input type="checkbox"/> -0	10.83 (275)	11.77 (299)	≈1.77 (2.64)
E6-52-300- <input type="checkbox"/> -0	11.81 (300)	12.76 (324)	≈1.83 (2.73)

Choose from the radii below for all of the above sizes

Radius (mm) Example: E6-52-100-075-0

	075	100	150	200	250
R	2.95 (75)	3.94 (100)	5.91 (150)	7.87 (200)	9.84 (250)
H	10.63 (270)	12.60 (320)	16.54 (420)	20.47 (520)	24.41 (620)
D	5.51 (140)	6.50 (165)	8.46 (215)	10.43 (265)	12.40 (315)
K	11.81 (300)	14.76 (375)	21.06 (535)	27.17 (690)	33.46 (850)

Energy Chain System® E6

Series E6-52

Interior Separation

energy chain® configurator ▶



E6-52

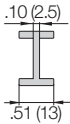
Option 1: Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.

STANDARD

Vertical separator

This separator is used for general subdivision of Energy Chains®.



Vertical Separator

Unassembled	Part No. 382212
Assembled	Part No. 382213

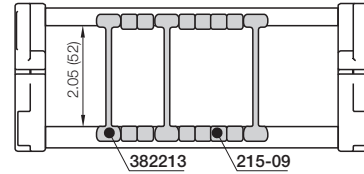
Spacer

Used when a broad distance needs to be maintained between the separators. Generally used in side-mounted applications



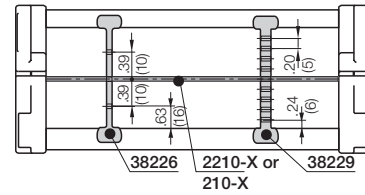
Spacer

Unassembled	Part No. 205-09
Assembled	Part No. 215-09



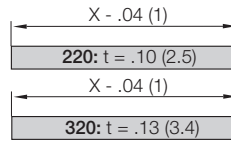
Option 2: Full-width shelf

For applications involving many thin cables with similar or identical diameters. Slotted separator **38226** and **38229** can be used in combination with full-width shelf **321-X**. Locking vertical separator **382215** can also be used with full-width shelf **221-X**.



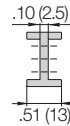
Width X in. (mm)	Part No. Unassembled		Part No. Assembled	
	220-X	320-X	221-X	321-X
1.57 (040)	220-40	320-40	221-40	321-40
1.97 (050)	220-50	320-50	221-50	321-50
2.44 (062)	220-62	320-62	221-62	321-62
2.76 (070)	220-70	320-70	221-70	321-70
2.95 (075)	220-75	320-75	221-75	321-75
3.43 (087)	220-87	320-87	221-87	321-87
3.94 (100)	220-100	320-100	221-100	321-100
4.92 (125)	220-125	320-125	221-125	321-125
5.91 (150)	220-150	320-150	221-150	321-150
6.89 (175)	220-175	320-175	221-175	321-175
7.87 (200)	220-200	320-200	221-200	321-200

Shelves 220-X/320-XX
Shelves can be inserted at 9 different heights in .20" (5mm) increments



Vertical separator, slotted

This separator is used for general subdivision of Energy Chains®. Can be used in combination with full-width shelf 321-X.

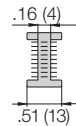


Vertical Separator, slotted

Unassembled	Part No. 38225
Assembled	Part No. 38226

Locking vertical separator

This separator is used for general subdivision of Energy Chains®.

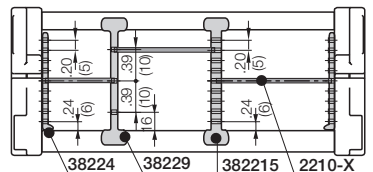


Locking Vertical Separator

Unassembled	Part No. 38228
Assembled	Part No. 38229

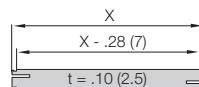
Option 3: Shelves

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 9 different heights in .20" (5mm) increments



Shelves 2200-XX

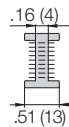
Shelf **2210-X** can be used with vertical separator **38222**, locking separator **382215** and side plate **38224**. Locking vertical separator **382215** can also be used with full-width shelf **221-X**.



Width X in. (mm)	Part No.		Width X in. (mm)	Part No.	
	Unassembled	Assembled		Unassembled	Assembled
.71 (18)	2200-18	2210-18	2.28 (58)	2200-58	2210-58
.91 (23)	2200-23	2210-23	2.28 (63)	2200-65	2210-65
1.10 (28)	2200-28	2210-28	2.68 (68)	2200-68	2210-68
1.30 (33)	2200-33	2210-33	2.87 (73)	2200-73	2210-73
1.50 (38)	2200-38	2210-38	3.46 (88)	2200-88	2210-88
1.69 (43)	2200-43	2210-43	3.90 (99)	2200-99	2210-99
1.89 (48)	2200-48	2210-48			

Locking vertical separator

This separator is used when higher retention force is needed.

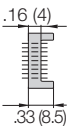


Locking Vertical Separator

Unassembled	Part No. 382214
Assembled	Part No. 382215

Side plate

This separator is used for general subdivision of Energy Chains®.

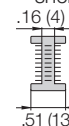


Side Plate

Unassembled	Part No. 38223
Assembled	Part No. 38224

Vertical separator, slotted

Can be used in combination with full-width shelf 321-X.



Vertical Separator, Slotted

Unassembled	Part No. 38221
Assembled	Part No. 38222

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Energy Chain System® E6 Series E6-52 Guide Trough

energy chain® configurator ▶



E6-52

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part Number 93-30
- 1/2 travel length of glide bars
Part Number 93-01
- Installation sets as end connectors
Part Number 93-50-XX

-XX indicates the length of the profile rail on which the guide trough is mounted. The values and part numbers are specified in the table on the left. The standard length of the trough components and glide bars is 6.56 ft (2 m.) The required overall length of the guide trough directly correlates to the length of travel.

Example:

Length of travel 164 ft (50 m)

Center mounted

Required guide troughs:

164 ft (50 m) guide trough

82 ft (25 m) glide bar

= 25 sections of 6.56 ft

(2 m) guide trough

Part No. 93-30

= 13 sections of 6.56 ft (2 m) glide bar

Part No. 93-01

Required number of installation sets:

= Number of guide trough components + 1

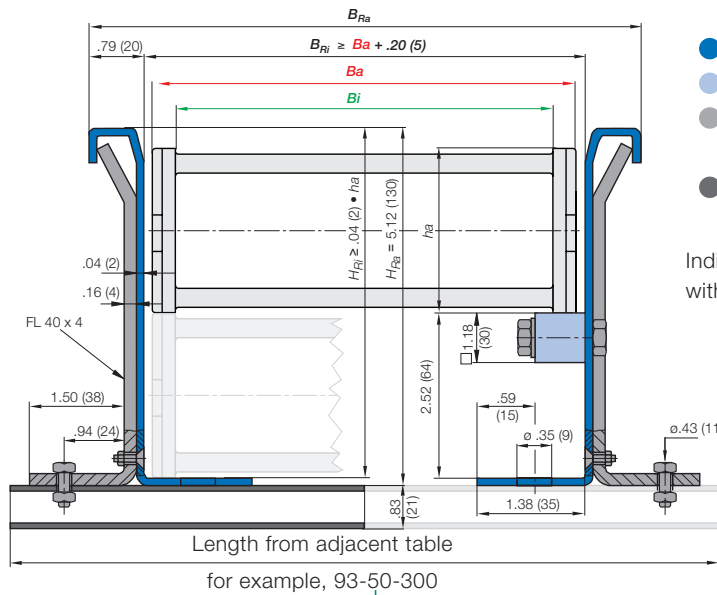
= 25 + 1 = 26

Part number of the installation sets

Example: 93-50-400 for 15.75" (400 mm) long profile rail.



Crossbar Width E6-52-100-100-0	Dimension D	Installation Part No.
-040	2.72 (69)	*
-050	3.11 (79)	93-50-200
-075	4.09 (104)	93-50-225
-100	5.08 (129)	93-50-250
-125	6.06 (154)	93-50-275
-150	7.04 (179)	93-50-300
-175	8.03 (204)	93-50-325
-200	9.01 (229)	93-50-350
-225	10.00 (254)	93-50-375
-250	10.98 (279)	93-50-400
-275	11.97 (304)	93-50-425
-300	12.95 (329)	93-50-450



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

* Specialized guide trough available upon request

Standard length profile rail

Length from adjacent table
for example, 93-50-300

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index


Series R6-52

Special Features / Options


Extremely low noise
Test results upon request



IPA Certificate: Class 1, according to standard DIN EN ISO 14644-1 for the E6 system (Series E6-29-060-150-0-CR, (v = 1.64 ft/s, a = 3.28 ft/s²))



LEVEL 1 absorption confirmed by IPA-Fraunhofer-Institute according to SEMI E78-0998 for the E6 standard material

Assembly Tips


Lever and remove lids

Other Installation Methods

Vertical, hanging ≤ 164 ft (50 m)

Vertical, standing ≤ 6.56 ft (2 m)

Side-mounted, un supp. =

possible to a limited extent

Unsupported length of upper run upon request

Usage Guidelines

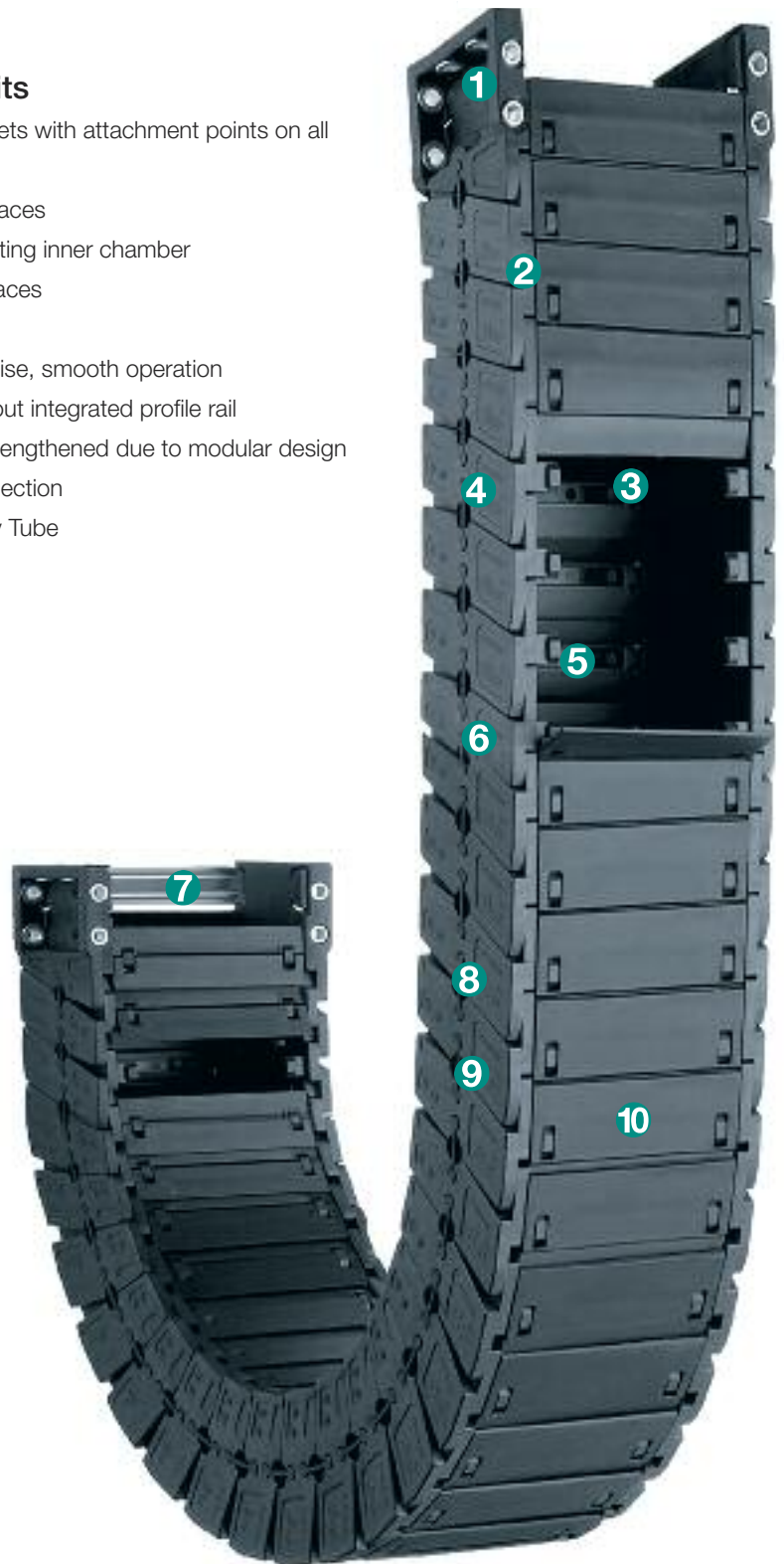

- If a low-noise version is required
- For very high speeds and/or accelerations
- If large stresses and thrust forces are present
- Protection against dirt and chips
- For small bending radii
- If less vibration is required
- Minimal abrasion, suitable for cleanrooms



- For side mounted applications
➤ Series R8840 E4/4

Features & Benefits

- 1 KMA mounting brackets with attachment points on all sides
- 2 Very large gliding surfaces
- 3 Smooth, cable protecting inner chamber
- 4 Continuous glide surfaces
- 5 Interior stop dog
- 6 Small pitch for low-noise, smooth operation
- 7 Available with or without integrated profile rail
- 8 Can be shortened or lengthened due to modular design
- 9 No pin and bore connection
- 10 Fully enclosed Energy Tube


Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

energy chain® configurator

6.56 ft (2 m) R6-52-100-075-0



Energy Chain®

With 2 separators R6-52-11 assembled every 2nd link



Interior Separation

1 Set R6-520-100-12



Mounting Bracket

Energy Chain System® E6 Series R6-52 Installation Dimensions

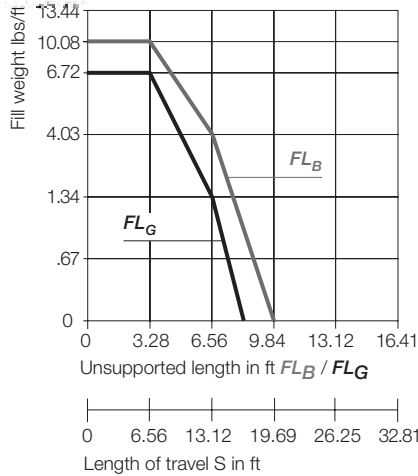
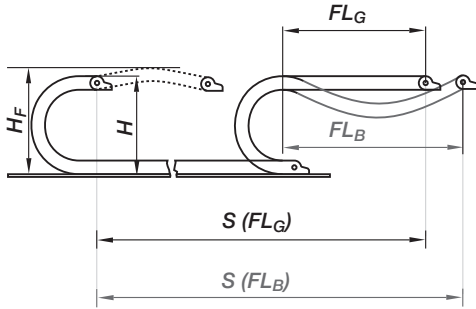
energy chain® configurator ▶



R6-52

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1

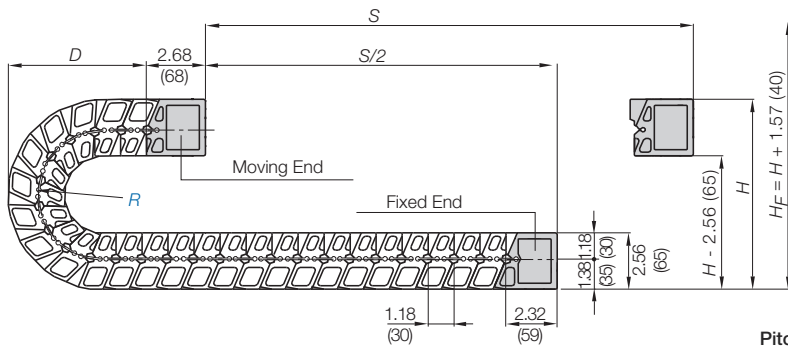


Short Travels - Unsupported

Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{"safety buffer"}$
 - H_F = Required clearance height
 - H_{in} = Trough inner height
 - H_2 = *Mounting height
 - D_2 = Overlength - long travels, gliding
 - K_2 = *Add-on
- *If the mounting bracket location is set lower



Pitch per link = 1.18" (30 mm)
 Links per ft (m) = 10.17 (34)
 For center mount applications:
 Chain length = $S/2 + K$

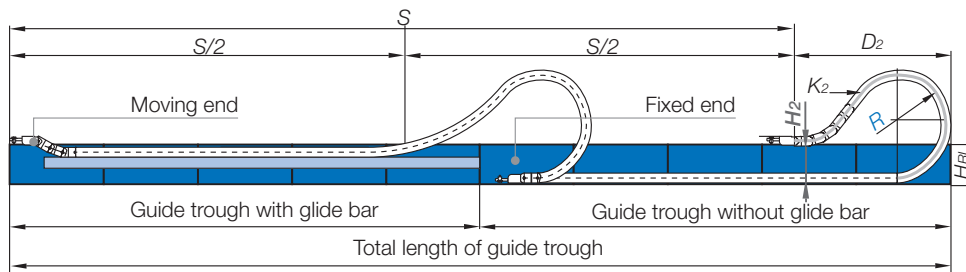
The required clearance height: $H_F = H + 1.57$ in. (40 mm) (with 1.34 lbs/ft (2.0 kg/m) fill weight. Please consult igus® if space is particularly restricted.

	2.95 (075)	3.94 (100)	5.91 (150)	7.87 (200)	9.84 (250)
R	2.95 (075)	3.94 (100)	5.91 (150)	7.87 (200)	9.84 (250)
H	10.63 (270)	12.60 (320)	16.54 (420)	20.47 (520)	24.41 (620)
D	5.51 (140)	6.50 (165)	8.46 (215)	10.43 (265)	12.40 (315)
K	11.81 (300)	14.76 (375)	21.06 (535)	27.17 (690)	33.46 (850)

For long travels with lowered mounting height**

Long travel lengths from 19.6 ft.(6m) to max. 262 ft. (80m)

For center mount applications:
 Chain length = $S/2 + K_2$



Long Travels - Gliding

If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.

▶ Design, Chapter 1

	2.95 (075)	3.94 (100)	5.91 (150)	7.87 (200)	9.84 (250)
R	2.95 (075)	3.94 (100)	5.91 (150)	7.87 (200)	9.84 (250)
H_2	5.51 (140)	5.51 (140)	5.51 (140)	5.51 (140)	5.51 (140)
D_2^{+25}	10.63 (270)	15.67 (398)	30.24 (768)	44.80 (1138)	59.37 (1508)
K_2	11.81 (300)	18.90 (480)	38.98 (990)	57.87 (1470)	76.77 (1950)

**If you intend to use this series on long travels, we request that you consult igus®

For support of the lower run, see Chapter 9 for the Support Tray tool kit

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	upon request
Permitted temperature	-40°F (-40°C) up to +158°F (+70°C)
Flammability Class	VDE 0304 IIC UL94 HB

Technical Data



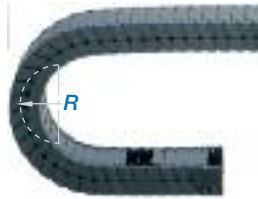
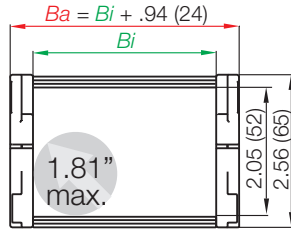
Details of material properties

▶ Design, Chapter 1

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



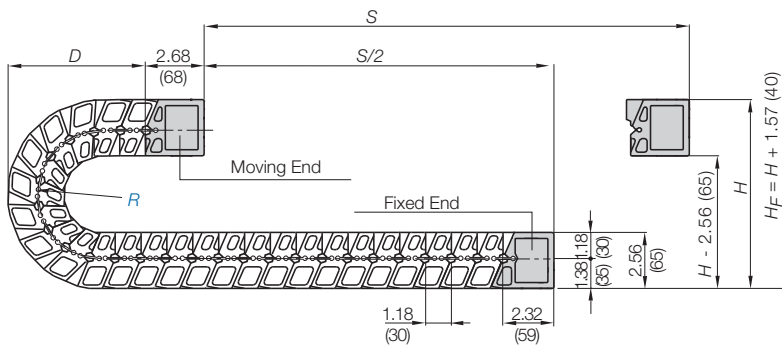
Series R6-52 - Energy Chain® with lids



Part Number Structure



- Color - Black
- Bending radius
- Width
- Series



Supplement part number with required radius. Example: R6-52-100-075-0
Pitch: 1.18 in. (30 mm) per link links/ft (m) = 10.36 (34)

Part Number	Bi in. (mm)	Ba in. (mm)	Weight lbs/ft (kg/m)
R6-52-050- <input type="checkbox"/> -0	1.97 (50)	2.91 (74)	≈1.27 (1.89)
R6-52-075- <input type="checkbox"/> -0	2.95 (75)	3.90 (99)	≈1.42 (2.12)
R6-52-100- <input type="checkbox"/> -0	3.94 (100)	4.88 (124)	≈1.58 (2.35)
R6-52-125- <input type="checkbox"/> -0	4.92 (125)	5.87 (149)	≈1.73 (2.57)
R6-52-150- <input type="checkbox"/> -0	5.91 (150)	6.85 (174)	≈1.88 (2.80)
R6-52-175- <input type="checkbox"/> -0	6.89 (175)	7.83 (199)	≈2.04 (3.03)

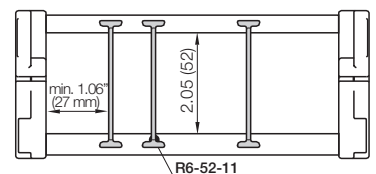
Choose from the radii below for all of the above sizes

Radius (mm) Example: R6-52-100-075-0

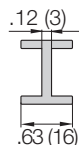
	075	100	150	200	250
R	2.95 (75)	3.94 (100)	5.91 (150)	7.87 (200)	9.84 (250)
H	10.63 (270)	12.60 (320)	16.54 (420)	20.47 (520)	24.41 (620)
D	5.51 (140)	6.50 (165)	8.46 (215)	10.43 (265)	12.40 (315)
K	11.81 (300)	14.76 (375)	21.06 (535)	27.17 (690)	33.46 (850)

Option 1: Vertical separators

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.



Vertical separator
R6-52-01



Vertical Separator

Unassembled Part No. R6-52-01

Assembled Part No. R6-52-11

- Vertical separator R6-52-01
This separator is used for general subdivision of Energy Tubes.
- Separator snaps onto either the bottom of the carrier or the lid. Stays attached to that side. Opposite side can be removed.

Energy Chain System® E6 Series R6-52 Mounting Bracket

energy chain® configurator ▶



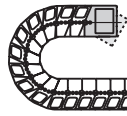
R6-52



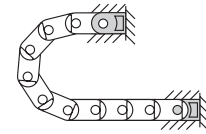
Option 1: KMA - Pivoting

- Option - profile rail with integrated strain relief chainfix clip or tiwrap plates
- Profile rail can be mounted in the inner or outer radius of the Energy Chain®
- Bolted connection outside of the chain cross-section
- Recommended for unsupported applications (for gliding applications please contact igus®)
- Confined installation conditions
- Attachment capability on all sides

Moving end
R6-520...2



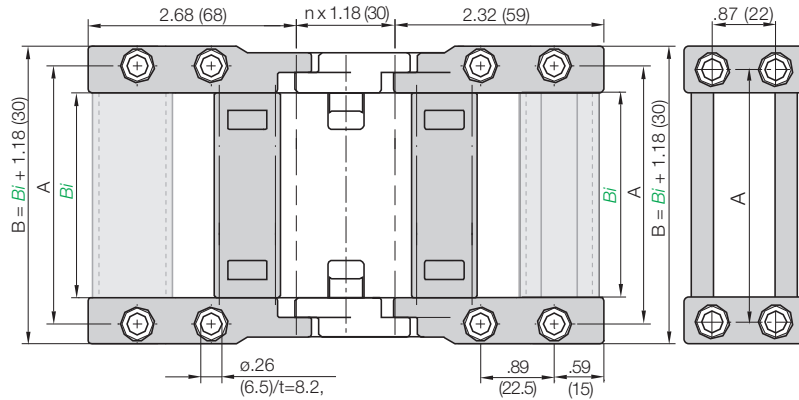
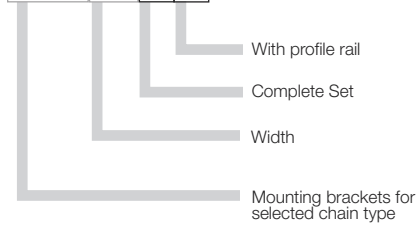
Fixed end
E6-520...1



Possible installation configurations -

Part Number Structure

R6-520-040-12 P



For Series	Part No. Full Set Without Profile Rail	Part No. Full Set With Profile Rail	Dimension A in. (mm)	Dimension B in. (mm)
R6-52-050	R6-520-050-12	R6-520-050-12P	2.60 (66)	3.15 (80)
R6-52-075	R6-520-075-12	R6-520-075-12P	3.58 (91)	4.13 (105)
R6-52-100	R6-520-100-12	R6-520-100-12P	4.57 (116)	5.12 (130)
R6-52-125	R6-520-125-12	R6-520-125-12P	5.55 (141)	6.10 (155)
R6-52-150	R6-520-150-12	R6-520-150-12P	6.54 (166)	7.09 (180)
R6-52-175	R6-520-175-12	R6-520-175-12P	7.52 (191)	8.07 (205)

Full set, for both ends:

R6-520-040-12 Full set, both fixed and moving end

Single-part order:

R6-520-040-1

Mounting bracket fixed end

R6-520-040-2

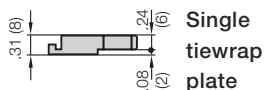
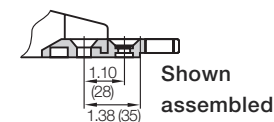
Mounting bracket moving end

Tiewrap Plates

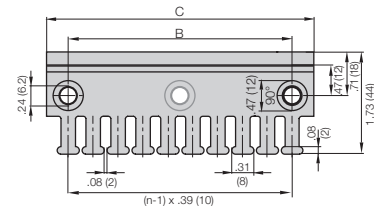


Option 1: Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.



Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



If used with KMA brackets with profile rail please add "KMA" to the end of the part number.

Example: 3050-ZBKMA

Other strain relief elements
▶ Strain Relief, Chapter 10

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



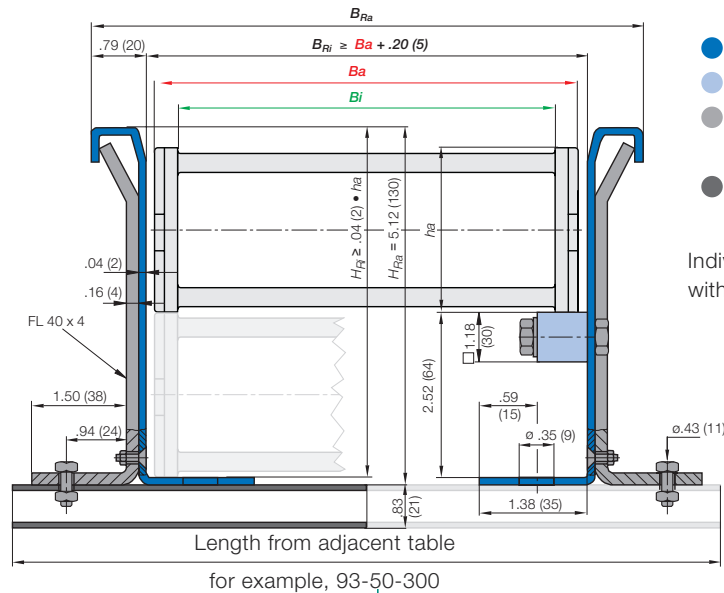
Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part Number 93-30
- 1/2 travel length of glide bars
Part Number 93-01
- Installation sets as end connectors
Part Number 93-50-XX

-XX indicates the length of the profile rail on which the guide trough is mounted. The values and part numbers are specified in the table on the left. The standard length of the trough components and glide bars is 6.56 ft (2 m.) The required overall length of the guide trough directly correlates to the length of travel.

Crossbar Width
E6-52-100-100-0

Dimension D	Installation Part No.
-040 2.72 (69) *	
-050 3.11 (79)	93-50-200
-075 4.09 (104)	93-50-225
-100 5.08 (129)	93-50-250
-125 6.06 (154)	93-50-275
-150 7.04 (179)	93-50-300
-175 8.03 (204)	93-50-325
-200 9.01 (229)	93-50-350
-225 10.00 (254)	93-50-375
-250 10.98 (279)	93-50-400
-275 11.97 (304)	93-50-425
-300 12.95 (329)	93-50-450



Example:
Length of travel 164 ft (50 m)
Center mounted

Required guide troughs:
164 ft (50 m) guide trough
82 ft (25 m) glide bar
= 25 sections of 6.56 ft (2 m) guide trough
Part No. 93-30
= 13 sections of 6.56 ft (2 m) glide bar
Part No. 93-01

Required number of installation sets:
= Number of guide trough components + 1
= 25 + 1 = 26
Part number of the installation sets

Example: 93-50-400 for 15.75" (400 mm) long profile rail.

- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

* Specialized guide trough available upon request

Standard length profile rail

Length from adjacent table
for example, 93-50-300

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index


Series E6-62

Special Features / Options


Extremely low noise
Test results upon request



IPA Certificate: Class 1, according to standard DIN EN ISO 14644-1 for the E6 system (Series E6-29-060-150-0-CR, (v = 1.64 ft/s, a = 3.28 ft/s²))



LEVEL 1 absorption confirmed by IPA-Fraunhofer-Institute according to SEMI E78-0998 for the E6 standard material

Assembly Tips


To close, push and click shut

Other Installation Methods

Vertical, hanging ≤ 196.8 ft (60 m)

Vertical, standing ≤ 9.84 ft (3 m)

Side-mounted, un supp. =

possible to a limited extent

Unsupported length of upper run upon request

Usage Guidelines


- If a low-noise version is required
- For very high speeds and/or accelerations
- If large stresses and thrust forces are present
- For small bending radii
- If less vibration is required
- Minimal abrasion, suitable for cleanrooms

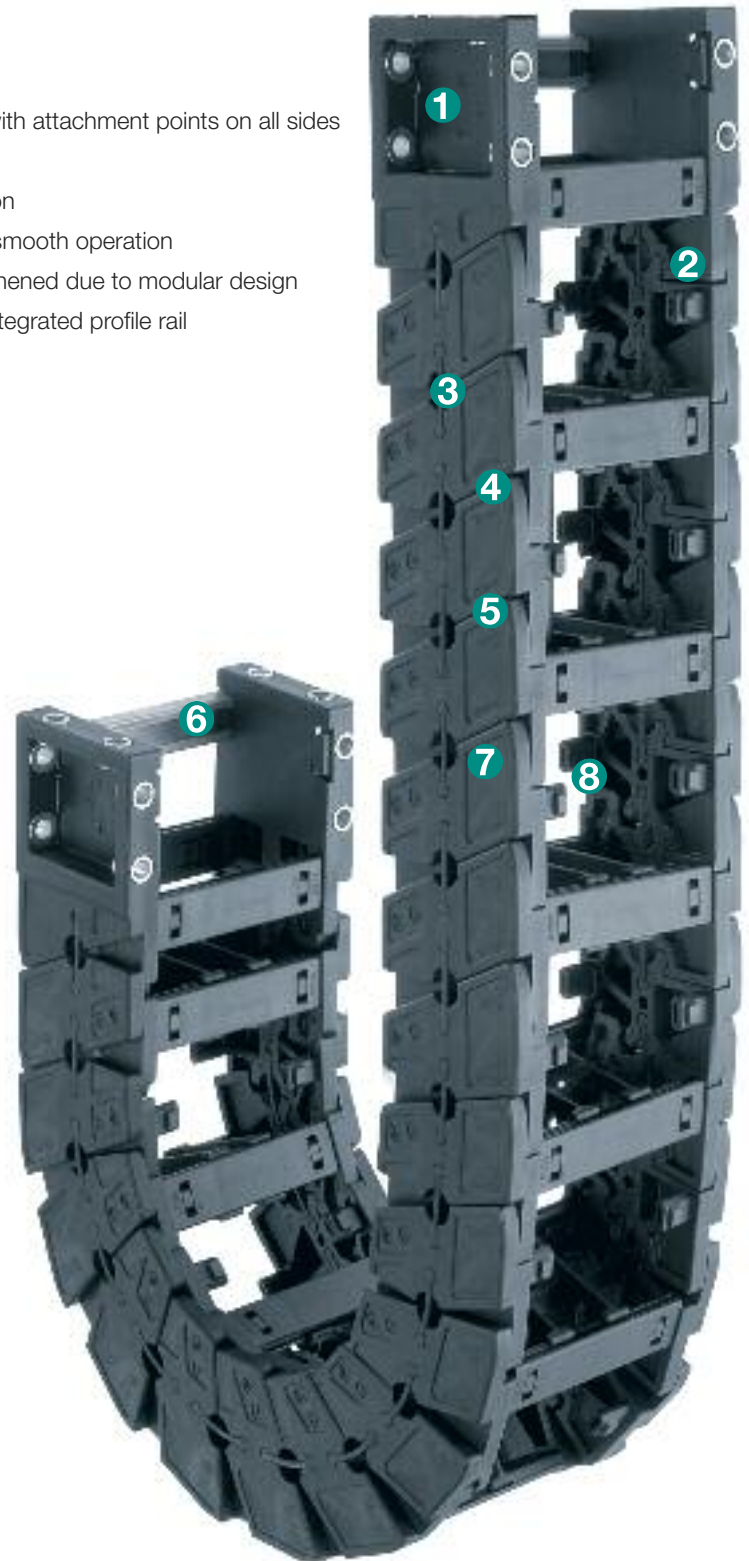


- For side mounted applications
 - **Series 4040 E4/4**
- For RBR (Reverse Bending Radius)
 - **Series 400 E4/100**
- For high additional loads
 - **Series 4040 E4/4**
- For dirty environments
 - **Series 4040 E4/4**

7.51

Features & Benefits

- 1 KMA mounting brackets with attachment points on all sides
- 2 Interior stop dog
- 3 No pin and bore connection
- 4 Small pitch for low-noise, smooth operation
- 5 Can be shortened or lengthened due to modular design
- 6 Available with or without integrated profile rail
- 7 Very large gliding surfaces
- 8 Increased inner height


Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

6.56 ft (2 m) **E6-62-10-200-0**With 2 separators **E6-62-11** assembled every 2nd link1 Set **E6-620-10-12P**

energy chain® configurator

**Energy Chain®****Interior Separation****Mounting Bracket**

Energy Chain System® E6 Series E6-62

energy chain® configurator

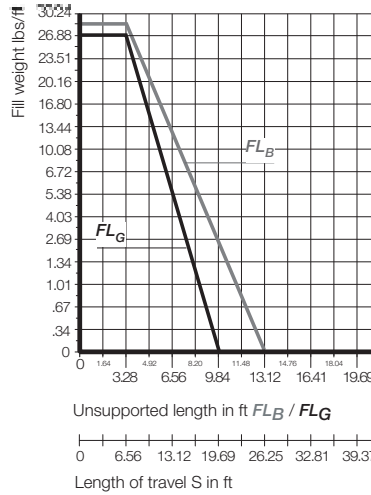
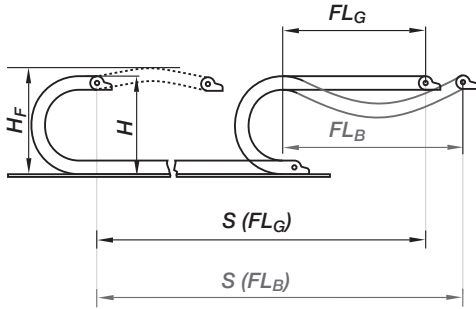


E6-62

Installation Dimensions

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1



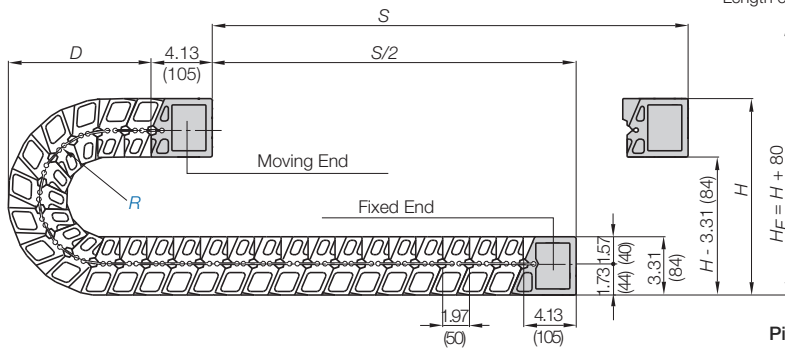
Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R + \text{"safety buffer"}$
 - H_F = Required clearance height
 - H_{in} = Trough inner height
 - H_2 = *Mounting height
 - D_2 = Overlength - long travels, gliding
 - K_2 = *Add-on
- *If the mounting bracket location is set lower



Pitch per link = 1.97" (50 mm)

Links per ft (m) = 6.1 (20)

For center mount applications:

Chain length = $S/2 + K$

The required clearance height: $H_F = H + 3.15$ in. (80 mm) (with 1.34 lbs/ft (2.0 kg/m) fill weight. Please consult igus® if space is particularly restricted.

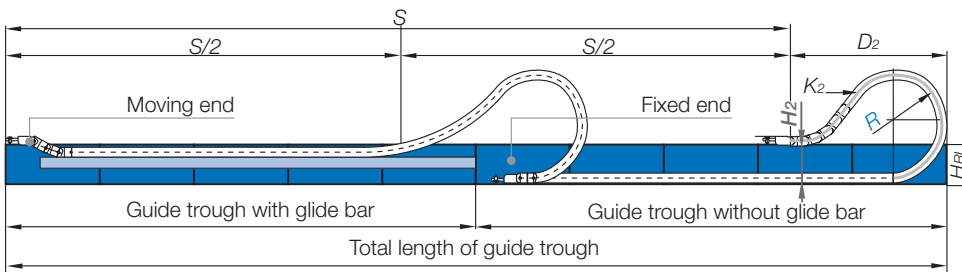
R	4.53 (115)	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)
H	15.28 (388)	18.03 (458)	21.97 (558)	25.91 (658)	29.84 (758)	33.78 (858)
D	8.22 (209)	9.61 (244)	11.57 (294)	13.54 (344)	15.51 (394)	17.48 (444)
K	18.31 (465)	22.64 (575)	28.74 (730)	35.04 (890)	41.14 (1045)	47.24 (1200)

For long travels with lowered mounting height**

Long travel lengths from 19.6 ft.(6m) to max. 262 ft. (80m)

For center mount applications:

Chain length = $S/2 + K_2$



Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.

Design, Chapter 1

R	4.53 (115)	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)
H*	5.51 (140)	5.51 (140)	5.51 (140)	5.51 (140)	5.51 (140)	5.51 (140)
D ⁺²⁵	18.23 (463)	19.61 (498)	39.84 (1012)	51.73 (1314)	63.62 (1616)	75.51 (1918)
K_2	21.65 (550)	25.59 (650)	51.18 (1300)	66.93 (1700)	84.65 (2150)	102.36 (2600)

**If you intend to use this series on long travels, we request that you consult igus®



For support of the lower run, see Chapter 9 for the Support Tray tool kit

Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	upon request
Permitted temperature	-40°F (-40°C) up to +158°F (+70° C)
Flammability Class	VDE 0304 IIC UL94 HB

Technical Data



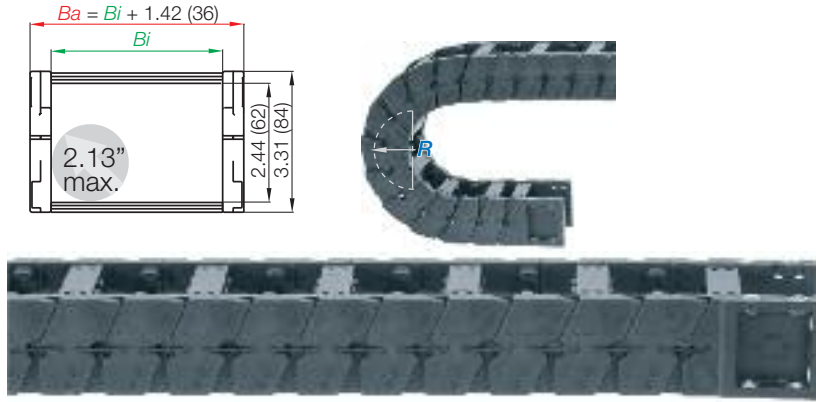
Details of material properties

Design, Chapter 1

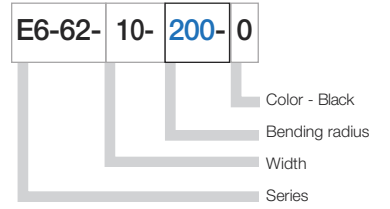
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



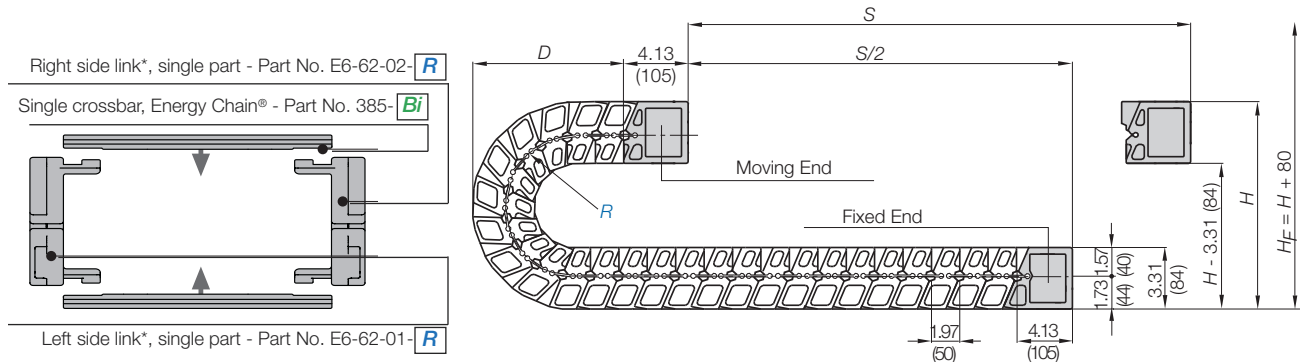
Series E6-62 - Energy Chain® with crossbars every other link



Part Number Structure



Energy Chain® as separate parts, links and side plates



Polymer spring as single part - Part No. E6-62-340

*View from the fixed point of the Energy Chain®/Energy Tube

Supplement part number with required radius. Example: E6-62-10-200-0
Pitch: 1.97 in. (50 mm) per link links/ft (m) = 6.1 (20)

Part Number	<i>Bi</i>		<i>Ba</i>		Weight lbs/ft (kg/m)
	in. (mm)		in. (mm)		
E6-62-05- <input type="checkbox"/> -0	1.97	(50)	3.39	(86)	≈ 2.16 (3.22)
E6-62-06- <input type="checkbox"/> -0	2.67	(68)	4.09	(104)	≈ 2.20 (3.28)
E6-62-07- <input type="checkbox"/> -0	2.95	(75)	4.37	(111)	≈ 2.22 (3.31)
E6-62-087- <input type="checkbox"/> -0	3.43	(87)	4.84	(123)	≈ 2.25 (3.35)
E6-62-10- <input type="checkbox"/> -0	3.94	(100)	5.35	(136)	≈ 2.28 (3.39)
E6-62-11- <input type="checkbox"/> -0	4.25	(108)	5.67	(144)	≈ 2.30 (3.42)
E6-62-112- <input type="checkbox"/> -0	4.41	(112)	5.83	(148)	≈ 2.30 (3.43)
E6-62-12- <input type="checkbox"/> -0	4.92	(125)	6.34	(161)	≈ 2.34 (3.48)
E6-62-137- <input type="checkbox"/> -0	5.39	(137)	6.81	(173)	≈ 2.37 (3.52)
E6-62-15- <input type="checkbox"/> -0	5.91	(150)	7.32	(186)	≈ 2.40 (3.57)
E6-62-162- <input type="checkbox"/> -0	6.38	(162)	7.80	(198)	≈ 2.43 (3.61)
E6-62-17- <input type="checkbox"/> -0	6.61	(168)	8.03	(204)	≈ 2.44 (3.63)
E6-62-18- <input type="checkbox"/> -0	6.89	(175)	8.31	(211)	≈ 2.45 (3.65)
E6-62-187- <input type="checkbox"/> -0	7.36	(187)	8.78	(223)	≈ 2.48 (3.69)
E6-62-20- <input type="checkbox"/> -0	7.87	(200)	9.29	(236)	≈ 2.51 (3.74)
E6-62-212- <input type="checkbox"/> -0	8.35	(212)	9.76	(248)	≈ 2.54 (3.78)
E6-62-23- <input type="checkbox"/> -0	8.86	(225)	10.28	(261)	≈ 2.57 (3.83)
E6-62-237- <input type="checkbox"/> -0	9.33	(237)	10.75	(273)	≈ 2.60 (3.87)
E6-62-25- <input type="checkbox"/> -0	9.84	(250)	11.26	(286)	≈ 2.63 (3.91)
E6-62-262- <input type="checkbox"/> -0	10.31	(262)	11.73	(298)	≈ 2.65 (3.95)
E6-62-28- <input type="checkbox"/> -0	10.83	(275)	12.24	(311)	≈ 2.69 (4.00)
E6-62-29- <input type="checkbox"/> -0	11.30	(287)	12.72	(323)	≈ 2.71 (4.04)
E6-62-30- <input type="checkbox"/> -0	11.81	(300)	13.23	(336)	≈ 2.75 (4.09)
E6-62-312- <input type="checkbox"/> -0	12.28	(312)	13.70	(348)	≈ 2.78 (4.13)
E6-62-325- <input type="checkbox"/> -0	12.80	(325)	14.21	(361)	≈ 2.80 (4.17)
E6-62-337- <input type="checkbox"/> -0	13.27	(337)	14.69	(373)	≈ 2.83 (4.21)
E6-62-350- <input type="checkbox"/> -0	13.78	(350)	15.20	(386)	≈ 2.86 (4.26)
E6-62-362- <input type="checkbox"/> -0	14.25	(362)	15.67	(398)	≈ 2.89 (4.30)
E6-62-375- <input type="checkbox"/> -0	14.76	(375)	16.18	(411)	≈ 2.92 (4.35)
E6-62-387- <input type="checkbox"/> -0	15.24	(387)	16.65	(423)	≈ 2.95 (4.39)
E6-62-400- <input type="checkbox"/> -0	15.75	(400)	17.16	(436)	≈ 2.98 (4.43)

Choose from the radii below for all of the above sizes

Radius (mm) Example: E6-62-10-200-0

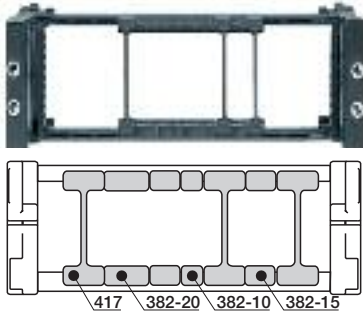
	115	150	200	250	300	350
R	4.53 (115)	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)
H	15.28 (388)	18.03 (458)	21.97 (558)	25.91 (658)	29.84 (758)	33.78 (858)
D	8.22 (209)	9.61 (244)	11.57 (294)	13.54 (344)	15.51 (394)	17.48 (444)
K	18.31 (465)	22.64 (575)	28.74 (730)	35.04 (890)	41.14 (1045)	47.24 (1200)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Option 1: Vertical separators and spacers

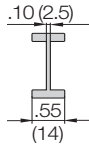
Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.



STANDARD

• **Vertical separator**

This separator is used for general subdivision of Energy Chains®.



Vertical Separator

Unassembled	Part No. 407
Assembled	Part No. 417

Spacer*

*For side-mounted applications



Unassembled **Part No. 381-XX**

Assembled **Part No. 382-XX**

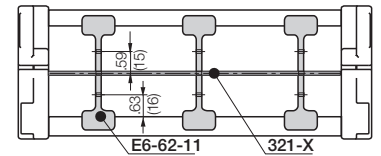
XX = width of the spacer

Spacers available in the following sizes:

Part No. Unassembled	Part No. Assembled	in. (mm)
381 -10	382 -10	.39" (10)
381 -15	382 -15	.59" (15)
381 -20	382 -20	.79" (20)

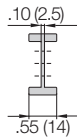
Option 2: Full-width shelf

For applications involving many thin cables with similar or identical diameters. Vertical separator **E6-62-11** can be used in combination with full-width shelf **321-X**.



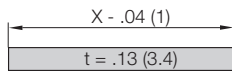
• **Vertical separator, slotted**

This separator is used for general subdivision of Energy Chains®.



Vertical Separator

Unassembled	Part No. E6-62-01
Assembled	Part No. E6-62-11

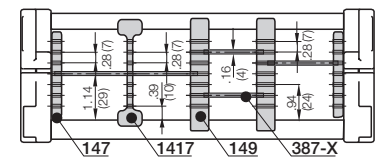


Width X in. (mm)	Part No. Unassem.	Part No. Assem.
1.97 (050)	320-50	321-50
2.68 (068)	320-68	321-68
2.95 (075)	320-75	321-75
3.43 (087)	320-87	321-87
3.94 (100)	320-100	321-100
4.25 (108)	320-108	321-108
4.41 (112)	320-112	321-112
4.92 (125)	320-125	321-125
5.39 (137)	320-137	321-137
5.91 (150)	320-150	321-150

Width X in. (mm)	Part No. Unassem.	Part No. Assem.
6.38 (162)	320-162	321-162
6.61 (168)	320-168	321-168
2.95 (175)	320-175	321-175
7.36 (187)	320-187	321-187
7.87 (200)	320-200	321-200
8.35 (212)	320-212	321-212
8.86 (225)	320-225	321-225
9.33 (237)	320-237	321-237
9.84 (250)	320-250	321-250

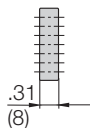
Option 3: Shelves

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 7 different heights in .28" (7mm) increments



• **Vertical separator**

This separator is used when higher retention force is needed.



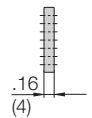
Vertical Separator

Unassembled	Part No. 148
Assembled	Part No. 149

Width X in. (mm)	Part No. Unassembled	Part No. Assembled
.71 (18)	386-18	387-18
.91 (23)	386-23	387-23
.98 (25)	386-25	387-25
1.10 (28)	386-28	387-28
1.30 (33)	386-33	387-33
1.69 (43)	386-43	387-43
1.97 (50)	386-50	387-50
2.13 (54)	386-54	387-54
2.44 (62)	386-62	387-62

• **Side plate**

This separator is used for general subdivision of Energy Chains®.



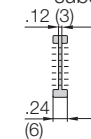
Side Plate

Unassembled	Part No. 146
Assembled	Part No. 147

Width X in. (mm)	Part No. Unassembled	Part No. Assembled
2.95 (75)	386-75	387-75
3.43 (87)	386-87	387-87
3.94 (100)	386-100	387-100
4.25 (108)	386-108	387-108
4.92 (125)	386-125	387-125
5.91 (150)	386-150	387-150
6.89 (175)	386-175	387-175
7.87 (200)	386-200	387-200
8.19 (208)	386-208	387-208

• **Vertical separator, slotted**

This separator is used for general subdivision of Energy Chains®.

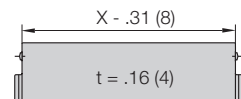


Vertical Separator, Slotted

Unassembled	Part No. 1407
Assembled	Part No. 1417

Shelves 387-XX

Shelf 387-XX can be used with vertical separator 149 and side plate 147



Energy Chain System® E6 Series E6-62 Mounting Brackets - KMA

energy chain® configurator 



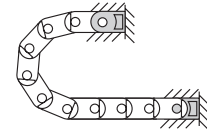
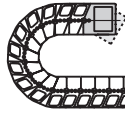
E6-62



Option 1: KMA - Pivoting

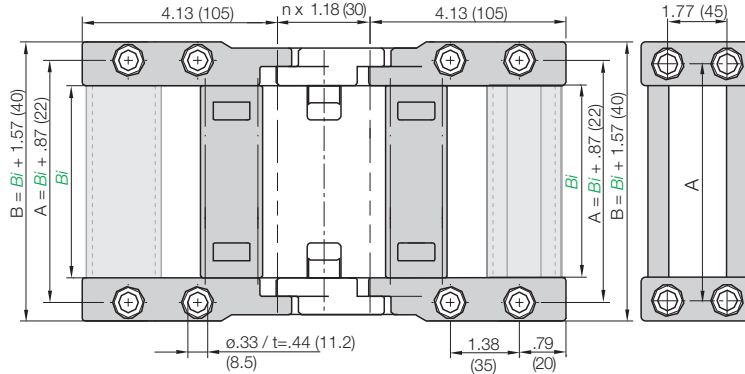
- Option - profile rail with integrated strain relief chainfix clip or tiwrap plates
- Profile rail can be mounted in the inner or outer radius of the Energy Chain®
- Bolted connection outside of the chain cross-section
- Recommended for unsupported applications (for gliding applications please contact igus®)
- Confined installation conditions
- Attachment capability on all sides

Moving end
E6-620...2



Possible installation configurations -

Fixed end
E6-620...1



For Series	Part No. Full Set Without Profile Rail	Part No. Full Set With Profile Rail	B_i	
			in.	(mm)
E6-62-05	E6-620-05-12	E6-620-05-12P	1.97	(50)
E6-62-06	E6-620-06-12	E6-620-06-12P	2.67	(68)
E6-62-07	E6-620-07-12	E6-620-07-12P	2.95	(75)
E6-62-087	E6-620-087-12	E6-620-087-12P	3.43	(87)
E6-62-10	E6-620-10-12	E6-620-10-12P	3.94	(100)
E6-62-11	E6-620-11-12	E6-620-11-12P	4.25	(108)
E6-62-112	E6-620-112-12	E6-620-112-12P	4.41	(112)
E6-62-12	E6-620-12-12	E6-620-12-12P	4.92	(125)
E6-62-137	E6-620-137-12	E6-620-137-12P	5.39	(137)
E6-62-15	E6-620-15-12	E6-620-15-12P	5.91	(150)
E6-62-162	E6-620-162-12	E6-620-162-12P	6.38	(162)
E6-62-17	E6-620-17-12	E6-620-17-12P	6.61	(168)
E6-62-18	E6-620-18-12	E6-620-18-12P	6.89	(175)
E6-62-187	E6-620-187-12	E6-620-187-12P	7.36	(187)
E6-62-20	E6-620-20-12	E6-620-20-12P	7.87	(200)
E6-62-212	E6-620-212-12	E6-620-212-12P	8.35	(212)
E6-62-23	E6-620-23-12	E6-620-23-12P	8.86	(225)
E6-62-237	E6-620-237-12	E6-620-237-12P	9.33	(237)
E6-62-25	E6-620-25-12	E6-620-25-12P	9.84	(250)
E6-62-262	E6-620-262-12	E6-620-262-12P	10.31	(262)
E6-62-28	E6-620-28-12	E6-620-28-12P	10.83	(275)
E6-62-29	E6-620-29-12	E6-620-29-12P	11.30	(287)
E6-62-30	E6-620-30-12	E6-620-30-12P	11.81	(300)
E6-62-312	E6-620-312-12	E6-620-312-12P	12.28	(312)
E6-62-325	E6-620-325-12	E6-620-325-12P	12.80	(325)
E6-62-337	E6-620-337-12	E6-620-337-12P	13.27	(337)
E6-62-350	E6-620-350-12	E6-620-350-12P	13.78	(350)
E6-62-362	E6-620-362-12	E6-620-362-12P	14.25	(362)
E6-62-375	E6-620-375-12	E6-620-375-12P	14.76	(375)
E6-62-387	E6-620-387-12	E6-620-387-12P	15.24	(387)
E6-62-400	E6-620-400-12	E6-620-400-12P	15.75	(400)

Part Number Structure



With profile rail
Complete Set
Width

Mounting brackets for selected chain type

Full set, for both ends:

E6-620-10-12 Full set, both fixed and moving end

Single-part order:

E6-620-10-1

Mounting bracket fixed end

E6-620-10-2

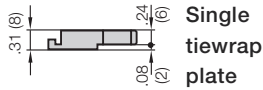
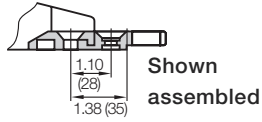
Mounting bracket moving end



Adapters for gliding applications available upon request

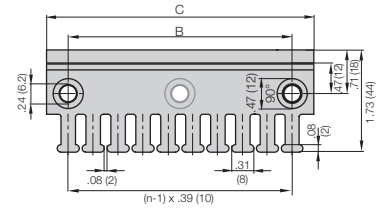
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Tiewrap Plates

Option 1:
Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



If used with KMA brackets with profile rail please add "KMA" to the end of the part number.

Example: 3050-ZBKMA

Other strain relief elements

► **Strain Relief, Chapter 10**

Energy Chain System® E6 Series E6-62 Guide Trough

energy chain® configurator



E6-62

Crossbar Width
E6-62-10-115-0

	Dimension D	Installation Part No.
-05	3.58 (91)	*
-06	4.29 (109)	94-50-225
-07	4.57 (116)	94-50-225
-087	5.04 (128)	94-50-250
-10	5.55 (141)	94-50-250
-11	5.87 (149)	94-50-275
-112	6.02 (153)	94-50-275
-12	6.54 (165)	94-50-275
-137	7.01 (178)	94-50-300
-15	7.52 (191)	94-50-300
-162	7.99 (203)	94-50-325
-17	8.23 (209)	94-50-325
-18	8.50 (216)	94-50-325
-187	8.98 (228)	94-50-350
-20	9.49 (241)	94-50-350
-212	9.96 (253)	94-50-375
-23	10.47 (266)	94-50-375
-237	10.95 (278)	94-50-400
-25	11.46 (291)	94-50-400
-262	11.93 (303)	94-50-425
-28	12.44 (316)	94-50-425
-29	12.91 (328)	94-50-450
-30	13.43 (341)	94-50-450
-312	13.90 (353)	94-50-475
-325	14.41 (366)	94-50-475
-337	14.88 (378)	94-50-500
-350	15.39 (391)	94-50-500
-362	15.87 (403)	94-50-525
-375	16.38 (416)	94-50-525
-387	16.85 (428)	94-50-550
-400	17.36 (441)	94-50-550

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part Number 94-30
- 1/2 travel length of glide bars
Part Number 93-01
- Installation sets as end connectors
Part Number 94-50-XX

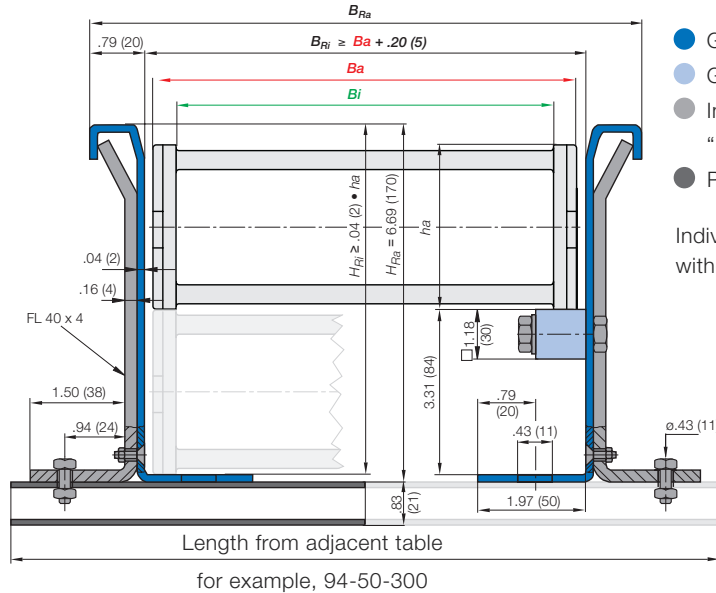
-XX indicates the length of the profile rail on which the guide trough is mounted. The values and part numbers are specified in the table on the left. The standard length of the trough components and glide bars is 6.56 ft (2 m.) The required overall length of the guide trough directly correlates to the length of travel.

Example:
Length of travel 164 ft (50 m)
Center mounted

Required guide troughs:
164 ft (50 m) guide trough
82 ft (25 m) glide bar
= 25 sections of 6.56 ft (2 m) guide trough
Part No. 94-30
= 13 sections of 6.56 ft (2 m) glide bar
Part No. 93-01

Required number of installation sets:
= Number of guide trough components + 1
= 25 + 1 = 26
Part number of the installation sets

Example: 94-50-400 for 15.75" (400 mm) long profile rail.



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

Individual attachment without profile rail

* Specialized guide trough available upon request

Standard length profile rail

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index

Series E6-80L
Special Features / Options

Extremely low noise
 Test results upon request

IPA Certificate: Class 1, according to standard DIN EN ISO 14644-1 for the E6 system (Series E6-29-060-150-0-CR, (v = 1.64 ft/s, a = 3.28 ft/s²))

LEVEL 1 absorption confirmed by IPA-Fraunhofer-Institute according to SEMI E78-0998 for the E6 standard material

Assembly Tips


To close, push and click shut

Other Installation Methods

Vertical, hanging ≤ 196.8 ft (60 m)

Vertical, standing ≤ 13.12 ft (4 m)

Side-mounted, unass. =

possible to a limited extent

Unsupported length of upper run upon request

Usage Guidelines

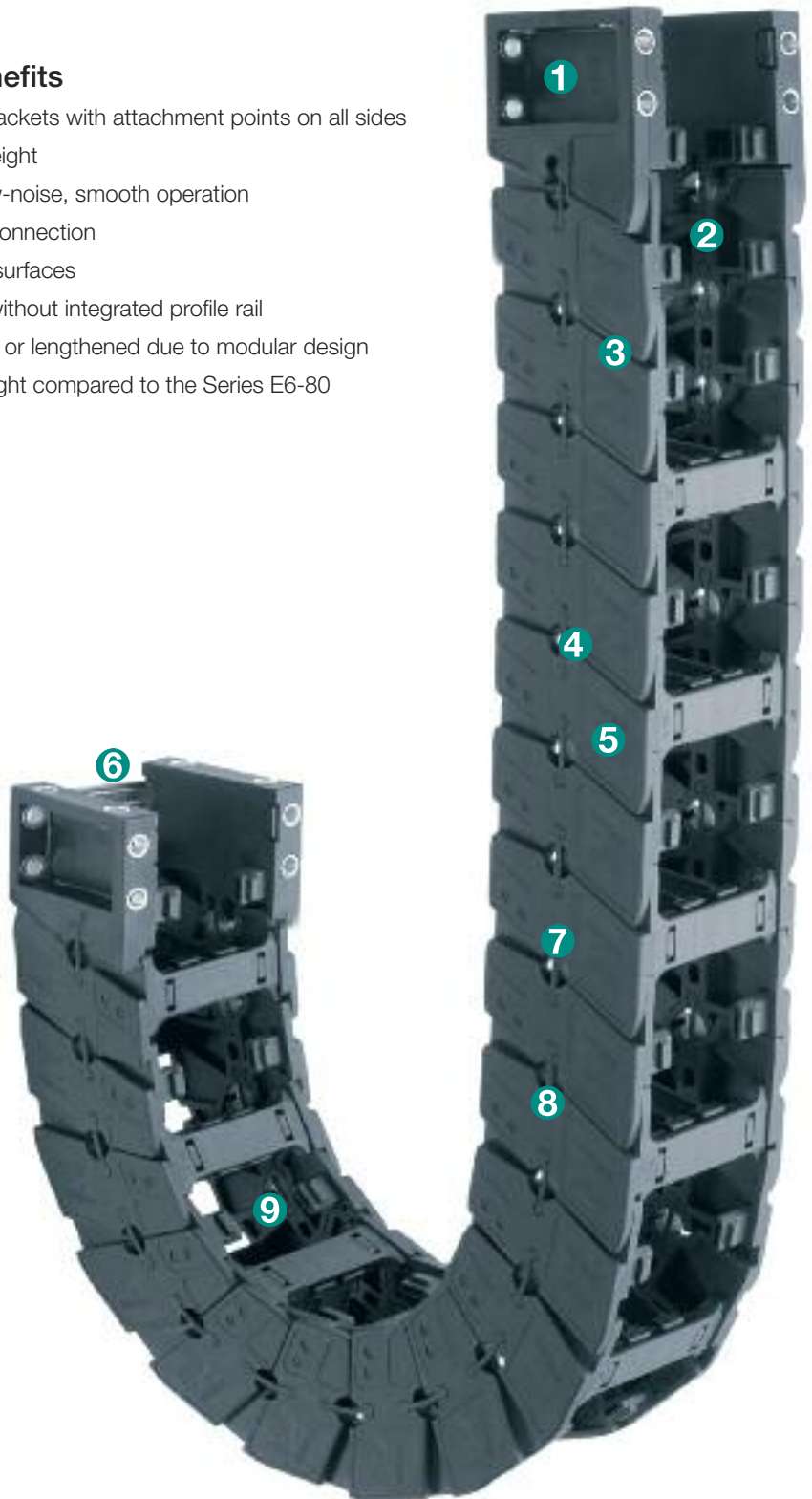

- If a low-noise version is required
- For very high speeds and/or accelerations
- If large stresses and thrust forces are present
- For small bending radii
- If less vibration is required
- Minimal abrasion, suitable for cleanrooms



- For side mounted applications
 - **Series 15050 E4/Light**
- For RBR (Reverse Bending Radius)
 - **Series 15050 E4/Light**
- For high additional loads
 - **Series 15050 E4/Light**

7.59
Features & Benefits

- ➊ KMA mounting brackets with attachment points on all sides
- ➋ Increased inner height
- ➌ Small pitch for low-noise, smooth operation
- ➍ No pin and bore connection
- ➎ Continuous glide surfaces
- ➏ Available with or without integrated profile rail
- ➐ Can be shortened or lengthened due to modular design
- ➑ 45% lighter in weight compared to the Series E6-80
- ➒ Interior stop dog


Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

[energy chain® configurator](#)

 16.4 ft (5 m) **E6-80L-15-175-0**

Energy Chain®

 With 2 separators **511** assembled every 2nd link

Interior Separation

 1 Set **E6-800L-15-12**

Mounting Bracket

Energy Chain System® E6 Series E6-80L Installation Dimensions

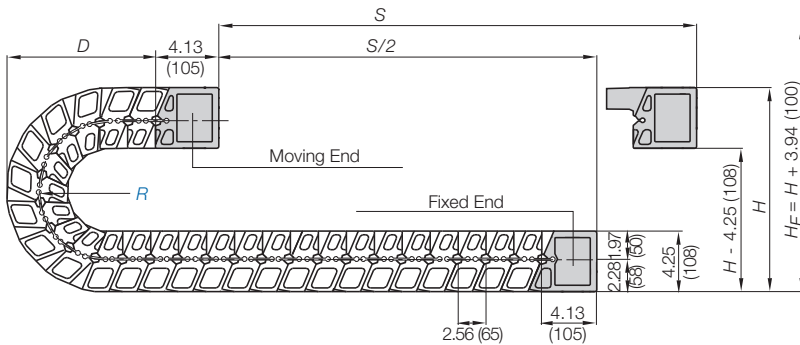
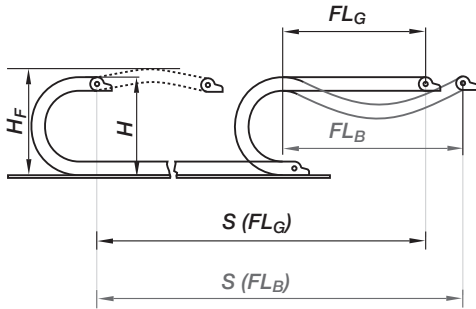
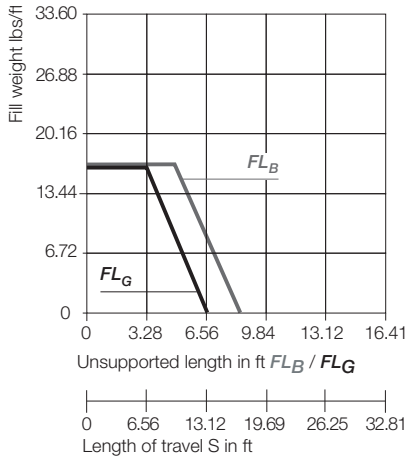
energy chain® configurator



E6-80L

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information Design, Chapter 1



The required clearance height: $H_f = H + 3.94$ in. (100 mm) (with 3.36 lbs/ft (5.0 kg/m) fill weight. Please consult igus® if space is particularly restricted.

R	6.89 (175)
H	22.28 (566)
D	11.73 (298)
K	26.77 (680)

Pitch per link = 2.56" (65 mm)
Links per ft (m) = 4.68 (16)
For center mount applications:
Chain length = $S/2 + K$

Short Travels - Unsupported

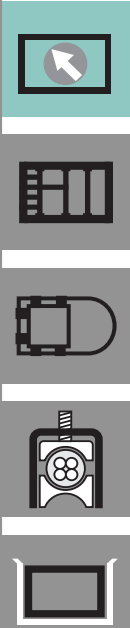
Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to **Installation dimensions** for further details.

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R +$ "safety buffer"
- H_f = Required clearance height

3.15

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	upon request
Permitted temperature	-40°F (-40°C) up to +158°F (+70° C)
Flammability Class	VDE 0304 IIC UL94 HB

Technical Data

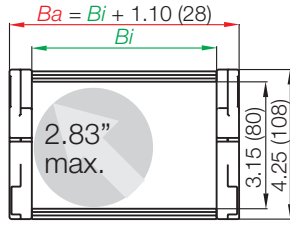


Details of material properties

Design, Chapter 1

7.60

Series E6-80L - Energy Chain® with crossbars every other link



Part Number Structure

E6-80L- 15- 175- 0

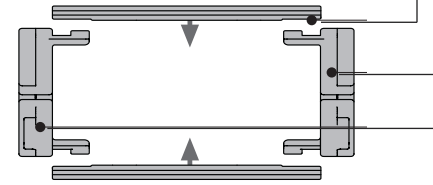
- Color - Black
- Bending radius
- Width
- Series



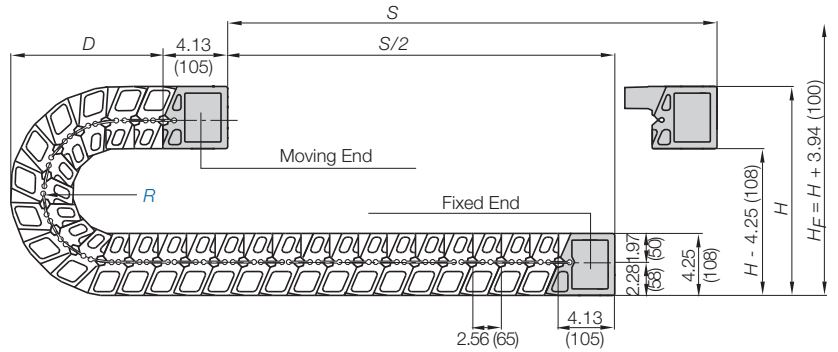
Energy Chain® as separate parts, side links and crossbars

Right side link*, single part - Part No. E6-80L-02- **R**

Single crossbar, Energy Chain® - Part No. 450- **Bi**



Left side link*, single part - Part No. E6-80L-01- **R**



*View from the fixed point of the Energy Chain®/Energy Tube



Polymer spring as single part -
Part No. E6-80-350

Energy Chain System® E6 Series E6-80L

energy chain® configurator ▶



E6-80L

Supplement part number with required radius. Example: E6-80L-15--0
Pitch: 2.56 in. (65 mm) per link links/ft (m) = 4.68 (16)

Part Number	Radius		Weight lbs/ft (kg/m)
	<i>Bi</i> in. (mm)	<i>Ba</i> in. (mm)	
E6-80L-08- <input type="text" value=""/> -0	3.43 (87)	4.53 (115)	≈ 2.20 (3.28)
E6-80L-10- <input type="text" value=""/> -0	3.94 (100)	5.04 (128)	≈ 2.24 (3.33)
E6-80L-11- <input type="text" value=""/> -0	4.41 (112)	5.51 (140)	≈ 2.26 (3.38)
E6-80L-12- <input type="text" value=""/> -0	4.92 (125)	6.02 (153)	≈ 2.30 (3.43)
E6-80L-13- <input type="text" value=""/> -0	5.39 (137)	6.50 (165)	≈ 2.35 (3.49)
E6-80L-15- <input type="text" value=""/> -0	5.91 (150)	7.01 (178)	≈ 2.39 (3.55)
E6-80L-16- <input type="text" value=""/> -0	6.38 (162)	7.48 (190)	≈ 2.43 (3.61)
E6-80L-17- <input type="text" value=""/> -0	6.89 (175)	7.99 (203)	≈ 2.47 (3.67)
E6-80L-18- <input type="text" value=""/> -0	7.36 (187)	8.46 (215)	≈ 2.51 (3.73)
E6-80L-20- <input type="text" value=""/> -0	7.87 (200)	8.98 (228)	≈ 2.55 (3.79)
E6-80L-21- <input type="text" value=""/> -0	8.35 (212)	9.45 (240)	≈ 2.59 (3.85)
E6-80L-22- <input type="text" value=""/> -0	8.86 (225)	9.96 (253)	≈ 2.63 (3.91)
E6-80L-23- <input type="text" value=""/> -0	9.33 (237)	10.43 (265)	≈ 2.67 (3.97)
E6-80L-25- <input type="text" value=""/> -0	9.84 (250)	10.94 (278)	≈ 2.70 (4.02)
E6-80L-26- <input type="text" value=""/> -0	10.31 (262)	11.42 (290)	≈ 2.75 (4.09)
E6-80L-27- <input type="text" value=""/> -0	10.83 (275)	11.93 (303)	≈ 2.78 (4.14)
E6-80L-28- <input type="text" value=""/> -0	11.30 (287)	12.40 (315)	≈ 2.82 (4.20)
E6-80L-30- <input type="text" value=""/> -0	11.81 (300)	12.91 (328)	≈ 2.86 (4.26)
E6-80L-31- <input type="text" value=""/> -0	12.28 (312)	13.39 (340)	≈ 2.90 (4.32)
E6-80L-32- <input type="text" value=""/> -0	12.80 (325)	13.90 (353)	≈ 2.94 (4.38)
E6-80L-33- <input type="text" value=""/> -0	13.27 (337)	14.37 (365)	≈ 2.98 (4.44)
E6-80L-35- <input type="text" value=""/> -0	13.78 (350)	14.88 (378)	≈ 3.02 (4.50)
E6-80L-36- <input type="text" value=""/> -0	14.25 (362)	15.35 (390)	≈ 3.06 (4.56)
E6-80L-37- <input type="text" value=""/> -0	14.76 (375)	15.87 (403)	≈ 3.10 (4.62)
E6-80L-38- <input type="text" value=""/> -0	15.24 (387)	16.34 (415)	≈ 3.14 (4.68)
E6-80L-40- <input type="text" value=""/> -0	15.75 (400)	16.85 (428)	≈ 3.19 (4.74)
E6-80L-41- <input type="text" value=""/> -0	16.22 (412)	17.32 (440)	≈ 3.23 (4.80)
E6-80L-42- <input type="text" value=""/> -0	16.73 (425)	17.83 (453)	≈ 3.26 (4.85)
E6-80L-43- <input type="text" value=""/> -0	17.20 (437)	18.31 (465)	≈ 3.31 (4.92)
E6-80L-45- <input type="text" value=""/> -0	17.72 (450)	18.82 (478)	≈ 3.38 (5.03)
E6-80L-46- <input type="text" value=""/> -0	18.19 (462)	19.29 (490)	≈ 3.42 (5.09)
E6-80L-47- <input type="text" value=""/> -0	18.70 (475)	19.80 (503)	≈ 3.46 (5.15)
E6-80L-48- <input type="text" value=""/> -0	19.17 (487)	20.28 (515)	≈ 3.50 (5.21)
E6-80L-50- <input type="text" value=""/> -0	19.69 (500)	20.79 (528)	≈ 3.54 (5.27)
E6-80L-51- <input type="text" value=""/> -0	20.16 (512)	21.26 (540)	≈ 3.58 (5.33)
E6-80L-52- <input type="text" value=""/> -0	20.67 (525)	21.77 (553)	≈ 3.62 (5.39)
E6-80L-53- <input type="text" value=""/> -0	21.14 (537)	22.24 (565)	≈ 3.66 (5.45)
E6-80L-55- <input type="text" value=""/> -0	21.65 (550)	22.76 (578)	≈ 3.70 (5.51)

Choose from the radii below for all of the above sizes
Radius (mm) Example: E6-80L-15--0

	<input type="text" value="175"/>
R	6.89 (175)
H	22.28 (566)
D	11.73 (298)
K	26.77 (680)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

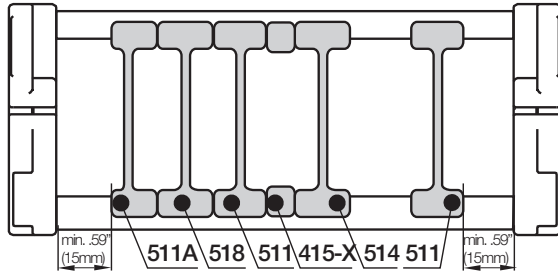




Option 1: Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.

NOTE: Observe a lateral spacing of at least 1.30 in. (33mm) for Energy Tubes and .63 in. (16mm) for Energy Chain®. There is no minimum spacing needed for side plates



STANDARD
Vertical separator
501



Vertical separator

Unassembled	Part No. 501
Assembled	Part No. 511

- **Standard separator 501 for Energy Chains®**

This separator offers safe stability due to its wide base design, also when used with thick cables or hoses.



Locking separator
504



Locking separator

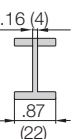
Unassembled	Part No. 504
Assembled	Part No. 514

- **Locking separator 504**

This separator features increased retention force for applications exposed to very high humidity and extreme loads. If locking separators are used, the Energy Chain® is more difficult to open.



Locking separator
508



Locking separator

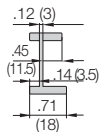
Unassembled	Part No. 508
Assembled	Part No. 518

- **Locking separator 508**

This separator is used for applications that are exposed to extremely high humidity. The clamp at the side serves to uniformly align the separators. In order to avoid destroying the separators when opening the Energy Chain®, make sure all separators are identically aligned.



Asymmetric separator
501A



Asymmetrical separator

Unassembled	Part No. 501A
Assembled	Part No. 511A

- **Asymmetrical separator 501A**

This separator features an (18mm) base. It can be used in combinations between spacers of different widths and vertical separators in side mounted applications.



Spacers
405-XX



Spacer

Unassembled	Part No. 405-XX
Assembled	Part No. 415-XX

XX = width of the spacer

- **NOTE ON SPACERS**

Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications. The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm)). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

Spacers available in the following sizes:

Part No.	Part No.	in.	(mm)
Unassembled	Assembled		
405 -10	415 -10	.39"	(10)
405 -15	415 -15	.59"	(15)
405 -20	415 -20	.79"	(20)
405 -30	415 -30	1.18"	(30)
405 -40	415 -40	1.57"	(40)



Energy Chain System® E6 Series E6-80L Interior Separation

energy chain® configurator ▶



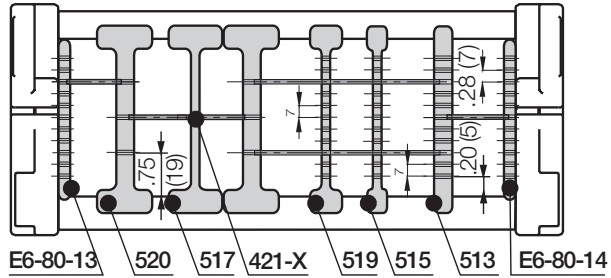
E6-80L



Option 2: Shelves

Energy Chains® and Energy Tubes can be subdivided both vertically and horizontally using the various interior separation elements.

► **Design, Chapter 1** for layout recommendations.



Side plate (left)

Unassembled Part No. E6-80-03

Assembled Part No. E6-80-13

Side plate

E6-80-03 (left)

Side plate (right)

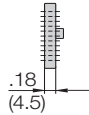
Unassembled Part No. E6-80-04

Assembled Part No. E6-80-14

E6-80-04 (right)

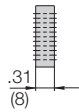
- **Side plates E6-80-03/E6-80-04**

This component is used to form the basic pattern of a shelf system.



- **Vertical separator 503**

This component is used to form the basic pattern of a shelf system.



Vertical separator

Unassembled Part No. 503

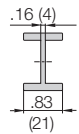
Assembled Part No. 513

Vertical separator

503

- **Locking separator, slotted 507**

This separator features increased retention force for applications exposed to very high humidity and extreme loads. The extra retention force is achieved by asymmetric claws for the crossbar. Take care to ensure proper alignment.



Locking separator, slotted

Unassembled Part No. 507

Assembled Part No. 517

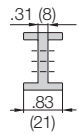
Locking separator,

slotted

507

- **Locking vertical separator 510**

This separator is slotted and able to be combined with shelves.



Locking vertical separator

Unassembled Part No. 510

Assembled Part No. 520

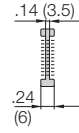
Locking vertical

separator

510

- **Slotted separators 505**

These are used for very complex subdivisions. However, they cannot be retrofitted into an existing separation system without removing the shelves first.



Slotted separators, closed

Unassembled Part No. 505

Assembled Part No. 515

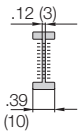
Closed slotted

separator

505

- **Slotted separator 509**

This separator can be retrofitted into an existing interior separation system without removing the shelves, as long as these shelves fit into any of the 7 middle slots



Slotted separators, open

Unassembled Part No. 509

Assembled Part No. 519

Open slotted

separator

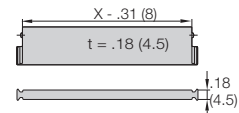
509



Shelves 420-XX

These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 11 different heights in .28" (7mm) increments

Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled
.71 (18)	.39 (10)	420-18	421-18	2.95 (75)	2.64 (67)	420-75	421-75
.91 (23)	.59 (15)	420-23	421-23	3.46 (88)	3.15 (80)	420-88	421-88
.98 (25)	.67 (17)	420-25	421-25	3.94 (100)	3.62 (92)	420-100	421-100
1.10 (28)	.79 (20)	420-28	421-28	4.92 (125)	4.61 (117)	420-125	421-125
1.30 (33)	.98 (25)	420-33	421-33	5.91 (150)	5.59 (142)	420-150	421-150
1.69 (43)	1.38 (35)	420-43	421-43	6.89 (175)	6.57 (167)	420-175	421-175
1.97 (50)	1.65 (42)	420-50	421-50	7.36 (187)	7.05 (179)	420-187	421-187
2.44 (62)	2.13 (54)	420-62	421-62	7.87 (200)	7.56 (192)	420-200	421-200



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

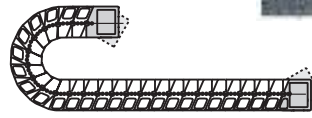




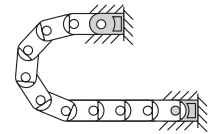
Option 1: KMA - Pivoting

- Option - profile rail with integrated strain relief chainfix clip or tiwrap plates
- Profile rail can be mounted in the inner or outer radius of the Energy Chain®
- Bolted connection outside of the chain cross-section
- Recommended for unsupported applications
- Confined installation conditions
- Attachment capability on all sides

Moving end
E6-800...2



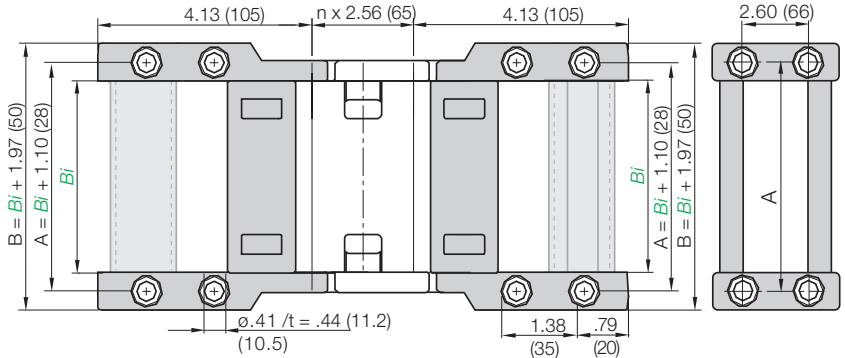
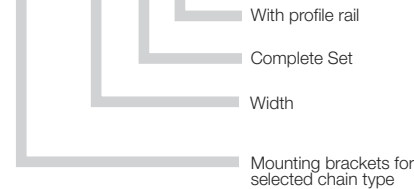
Fixed end
E6-800...1



Possible installation configurations -

Part Number Structure

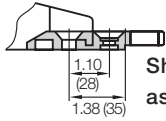
E6-800L-	10-	12	P
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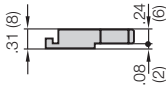
Full set, for both ends:
E6-800L- 10- 12 Full set,
both fixed and moving end
 Single-part order:
E6-800L- 10- 1
 Mounting bracket **fixed end**
E6-800L- 10- 2
 Mounting bracket **moving end**

For Series	Part No. Full Set W/O Profile Rail	Part No. Full Set With Profile Rail	<i>Bi</i> in.	(mm)	For Series	Part No. Full Set W/O Profile Rail	Part No. Full Set With Profile Rail	<i>Bi</i> in.	(mm)
E6-80L-08	E6-800L-08-12	E6-800L-08-12P	3.43	(87)	E6-80L-32	E6-800L-32-12	E6-800L-32-12P	12.80	(325)
E6-80L-10	E6-800L-10-12	E6-800L-10-12P	3.94	(100)	E6-80L-33	E6-800L-33-12	E6-800L-33-12P	13.27	(337)
E6-80L-11	E6-800L-11-12	E6-800L-11-12P	4.41	(112)	E6-80L-35	E6-800L-35-12	E6-800L-35-12P	13.78	(350)
E6-80L-12	E6-800L-12-12	E6-800L-12-12P	4.92	(125)	E6-80L-36	E6-800L-36-12	E6-800L-36-12P	14.25	(362)
E6-80L-13	E6-800L-13-12	E6-800L-13-12P	5.39	(137)	E6-80L-37	E6-800L-37-12	E6-800L-37-12P	14.76	(375)
E6-80L-15	E6-800L-15-12	E6-800L-15-12P	5.91	(150)	E6-80L-38	E6-800L-38-12	E6-800L-38-12P	15.24	(387)
E6-80L-16	E6-800L-16-12	E6-800L-16-12P	6.38	(162)	E6-80L-40	E6-800L-40-12	E6-800L-40-12P	15.75	(400)
E6-80L-17	E6-800L-18-12	E6-800L-18-12P	6.89	(175)	E6-80L-41	E6-800L-41-12	E6-800L-41-12P	16.72	(412)
E6-80L-18	E6-800L-18-12	E6-800L-18-12P	7.36	(187)	E6-80L-42	E6-800L-42-12	E6-800L-42-12P	16.73	(425)
E6-80L-20	E6-800L-20-12	E6-800L-20-12P	7.87	(200)	E6-80L-43	E6-800L-43-12	E6-800L-43-12P	17.20	(437)
E6-80L-21	E6-800L-21-12	E6-800L-21-12P	8.35	(212)	E6-80L-45	E6-800L-45-12	E6-800L-45-12P	17.72	(450)
E6-80L-22	E6-800L-23-12	E6-800L-23-12P	8.86	(225)	E6-80L-46	E6-800L-46-12	E6-800L-46-12P	18.19	(462)
E6-80L-23	E6-800L-23-12	E6-800L-23-12P	9.33	(237)	E6-80L-47	E6-800L-47-12	E6-800L-47-12P	18.70	(475)
E6-80L-25	E6-800L-25-12	E6-800L-25-12P	9.84	(250)	E6-80L-48	E6-800L-48-12	E6-800L-48-12P	19.17	(487)
E6-80L-26	E6-800L-26-12	E6-800L-26-12P	10.31	(262)	E6-80L-50	E6-800L-50-12	E6-800L-50-12P	19.69	(500)
E6-80L-27	E6-800L-28-12	E6-800L-28-12P	10.83	(275)	E6-80L-51	E6-800L-51-12	E6-800L-51-12P	20.16	(512)
E6-80L-28	E6-800L-29-12	E6-800L-29-12P	11.30	(287)	E6-80L-52	E6-800L-52-12	E6-800L-52-12P	20.67	(525)
E6-80L-30	E6-800L-30-12	E6-800L-30-12P	11.81	(300)	E6-80L-53	E6-800L-53-12	E6-800L-53-12P	21.14	(537)
E6-80L-31	E6-800L-31-12	E6-800L-31-12P	12.28	(312)	E6-80L-55	E6-800L-55-12	E6-800L-55-12P	21.65	(550)

Tiewrap Plates



Shown assembled

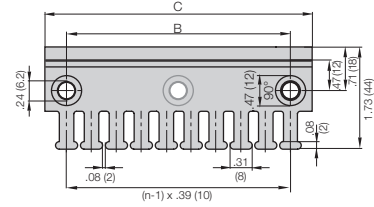


Single tiewrap plate

Option 1:
Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.

Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



If used with KMA brackets with profile rail please add "KMA" to the end of the part number.

Example: 3050-ZBKMA

Other strain relief elements

▶ Strain Relief, Chapter 10

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index


Series E6-80

Special Features / Options


Extremely low noise
Test results upon request



IPA Certificate: Class 1, according to standard DIN EN ISO 14644-1 for the E6 system
(Series E6-29-060-150-0-CR, (v = 1.64 ft/s, a = 3.28 ft/s²))



LEVEL 1 absorption confirmed by IPA-Fraunhofer-Institute according to SEMI E78-0998 for the E6 standard material

Assembly Tips


To close, push and click shut

Other Installation Methods

Vertical, hanging ≤ 196.9 ft (60 m)

Vertical, standing ≤ 13.12 ft (4 m)

Side-mounted, un_supp. = possible to a limited extent

Unsupported length of upper run upon request

Usage Guidelines


- If a low-noise version is required
- For very high speeds and/or accelerations
- If large stresses and thrust forces are present
- For small bending radii
- If less vibration is required
- Minimal abrasion, suitable for cleanrooms

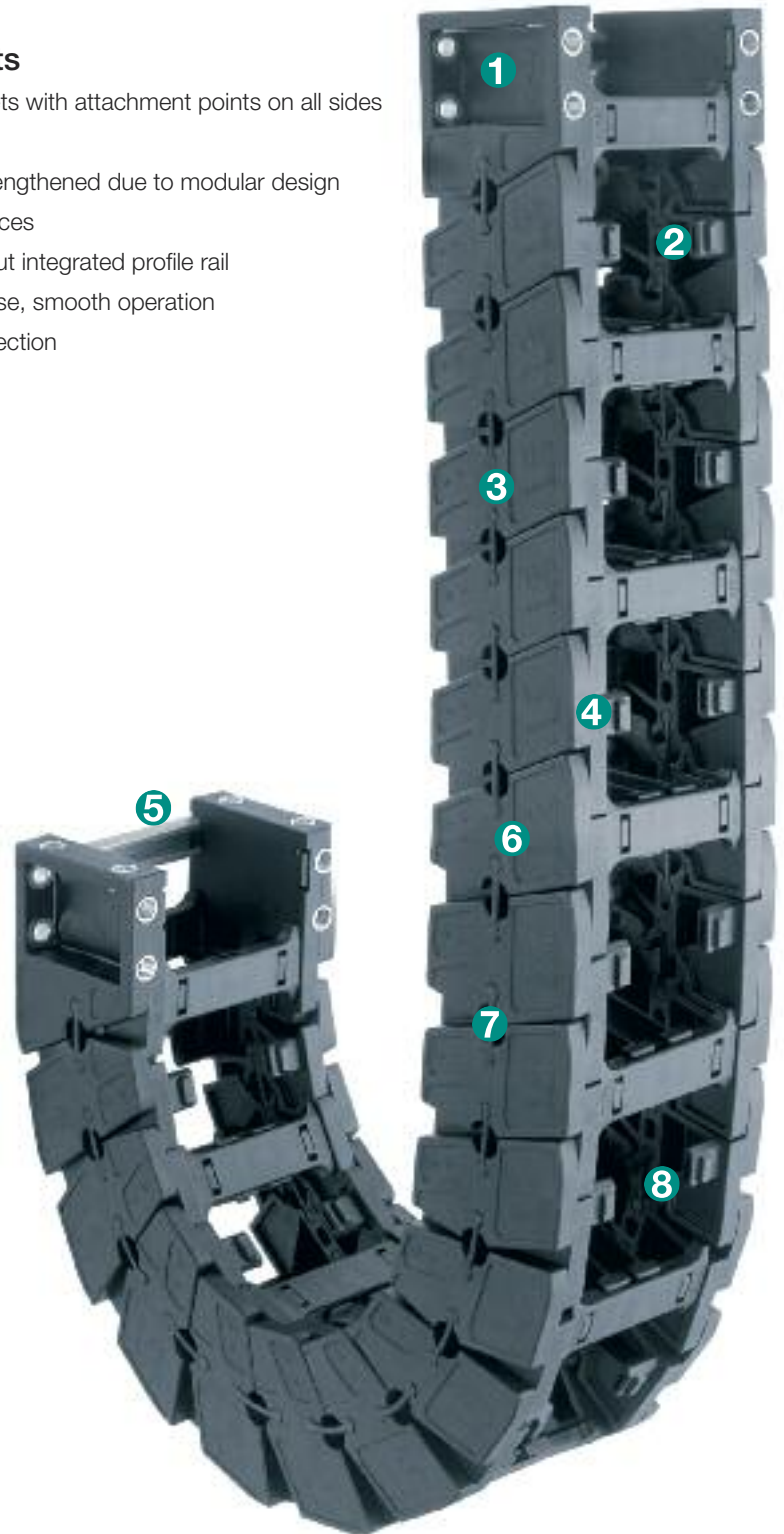


- For side mounted applications
➤ **Series 5050 E4/4**
- For RBR (Reverse Bending Radius)
➤ **Series 5050 E4/4**
- For high additional loads
➤ **Series 5050 E4/4**

7.67

Features & Benefits

- 1 KMA mounting brackets with attachment points on all sides
- 2 Increased inner height
- 3 Can be shortened or lengthened due to modular design
- 4 Very large gliding surfaces
- 5 Available with or without integrated profile rail
- 6 Small pitch for low-noise, smooth operation
- 7 No pin and bore connection
- 8 Interior stop dog


Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

[energy chain® configurator](#)
16.4 ft (5 m) **E6-80-10-200-0****Energy Chain®**With 2 separators **511** assembled every 2nd link**Interior Separation**1 Set **E6-800-10-12****Mounting Bracket**

Energy Chain System® E6 Series E6-80 Installation Dimensions

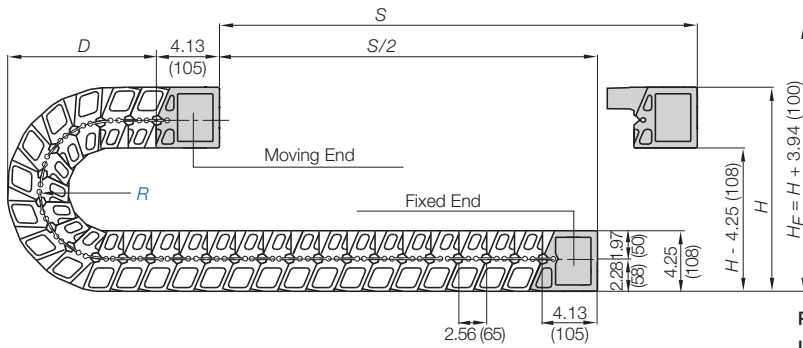
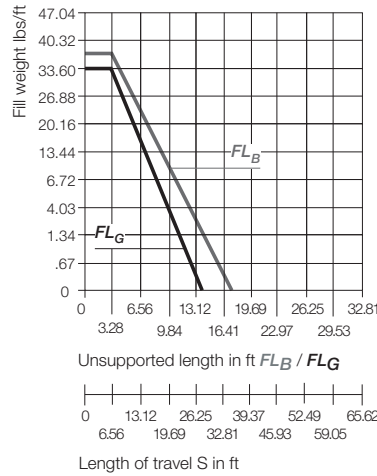
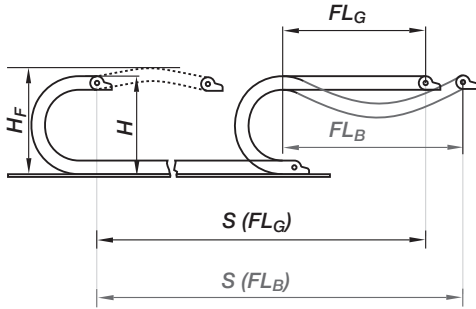
energy chain® configurator ▶



E6-80

Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1



Pitch per link: = 2.56" (65 mm)
Links per ft (m): = 4.68 (16)
Chain length: = $S/2 + K$

The required clearance height: $H_F = H + 3.94$ in. (100 mm) (with 3.36 lbs/ft (5.0 kg/m) fill weight. Please consult igus® if space is particularly restricted.

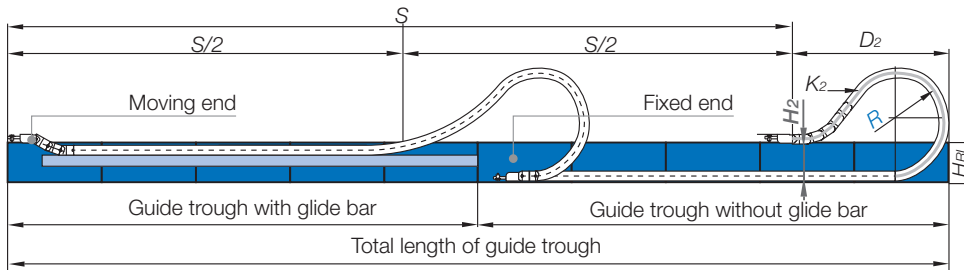
R	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.71 (450)
H^*	20.31 (516)	24.25 (616)	28.19 (716)	32.13 (816)	36.06 (916)	40.00 (1016)	43.94 (1116)
D	10.75 (273)	12.72 (323)	14.68 (373)	16.65 (423)	18.62 (473)	20.59 (523)	22.56 (573)
K	23.82 (605)	29.92 (760)	36.22 (920)	42.32 (1075)	48.43 (1230)	54.72 (1390)	60.83 (1545)

For long travels with lowered mounting height**

Long travel lengths from 32.8 ft. (10m) to max. 393.7 ft. (120m)

For center mount applications:

Chain length: = $S/2 + K_2$



R	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.71 (450)
H_2^*	9.53 (242)	9.53 (242)	9.53 (242)	9.53 (242)	9.53 (242)	9.53 (242)	9.53 (242)
D_2^{*25}	20.63 (524)	36.85 (936)	53.11 (1349)	69.37 (1762)	85.63 (2175)	101.89 (2588)	118.11 (3000)
K_2	25.59 (650)	46.06 (1170)	66.54 (1690)	89.57 (2275)	110.04 (2795)	130.51 (3315)	150.98 (3835)

For support of the lower run, see Chapter 9 for the Support Tray tool kit

Short Travels - Unsupported



Unsupported Energy Chains® feature positive camber over short travels. This must be accounted for when specifying the clearance height. Please refer to Installation dimensions for further details.

Legend

- S = Length of travel
 - R = Bending radius
 - H = Nominal clearance height
 - D = Overlength Energy Chain® radius in final position
 - $K = \pi \cdot R +$ "safety buffer"
 - H_F = Required clearance height
 - H_{in} = Trough inner height
 - H_2 = *Mounting height
 - D_2 = Overlength - long travels, gliding
 - K_2 = *Add-on
- *If the mounting bracket location is set lower

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

Long Travels - Gliding



If the unsupported length is exceeded, the Energy Chain®/Tube must glide on itself. This requires a guide trough.

▶ Design, Chapter 1

**If you intend to use this series on long travels, we request that you consult igus®

Technical Data

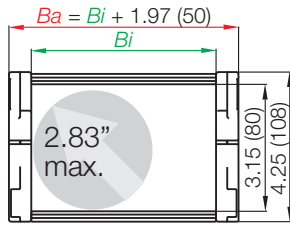
Speed / acceleration FL_G	max. 65.6 ft/s (20 m/s) / max. 656 ft/s ² (200 m/s ²)
Speed / acceleration FL_B	max. 9.84 ft/s (3 m/s) / max. 19.69 ft/s ² (6 m/s ²)
Gliding speed / acceleration (maximum)	upon request
Permitted temperature	-40°F (-40°C) up to +158°F (+70°C)
Flammability Class	VDE 0304 IIC UL94 HB



Details of material properties

▶ Design, Chapter 1

Series E6-80 - Energy Chain® with crossbars every other link



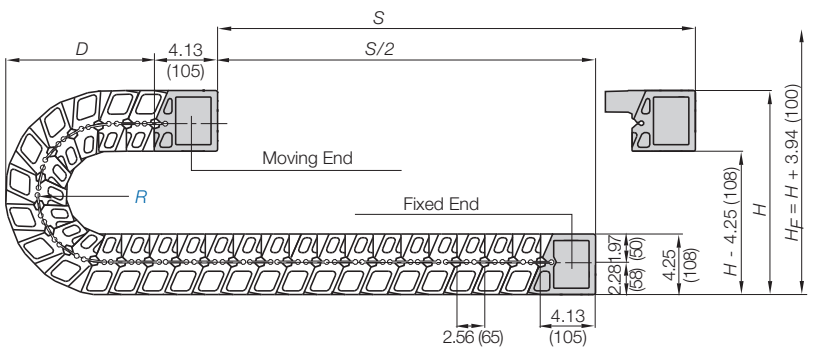
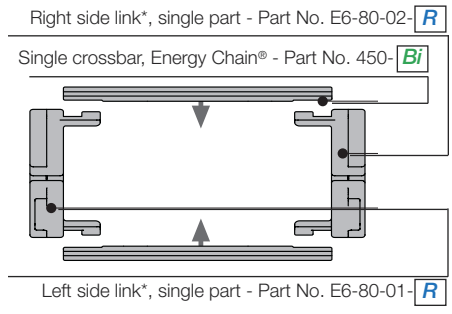
Part Number Structure

E6-80L- 15- 175- 0

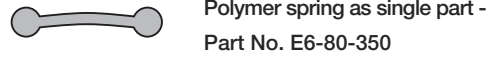
- Color - Black
- Bending radius
- Width
- Series



Energy Chain® as separate parts, side links and crossbars



*View from the fixed point of the Energy Chain®/Energy Tube



Energy Chain System® E6 Series E6-80

energy chain® configurator ▶



E6-80

Supplement part number with required radius. Example: E6-80-10--0
Pitch: 2.56 in. (65 mm) per link links/ft (m) = 4.68 (16)

Part Number	<i>Bi</i> in. (mm)	<i>Ba</i> in. (mm)	Weight lbs/ft (kg/m)
E6-80-05- <input type="text" value=""/> -0	1.97 (50)	3.94 (100)	≈3.50 (5.21)
E6-80-06- <input type="text" value=""/> -0	2.56 (65)	4.53 (115)	≈3.55 (5.28)
E6-80-07- <input type="text" value=""/> -0	2.95 (75)	4.92 (125)	≈3.58 (5.33)
E6-80-08- <input type="text" value=""/> -0	3.43 (87)	5.91 (137)	≈3.62 (5.38)
E6-80-10- <input type="text" value=""/> -0	3.94 (100)	5.91 (150)	≈3.66 (5.45)
E6-80-11- <input type="text" value=""/> -0	4.41 (112)	6.38 (162)	≈3.70 (5.50)
E6-80-12- <input type="text" value=""/> -0	4.92 (125)	6.89 (175)	≈3.74 (5.57)
E6-80-13- <input type="text" value=""/> -0	5.39 (137)	7.36 (187)	≈3.78 (5.62)
E6-80-15- <input type="text" value=""/> -0	5.91 (150)	7.87 (200)	≈3.82 (5.68)
E6-80-16- <input type="text" value=""/> -0	6.38 (162)	8.35 (212)	≈3.86 (5.74)
E6-80-17- <input type="text" value=""/> -0	6.89 (175)	8.86 (225)	≈3.90 (5.80)
E6-80-18- <input type="text" value=""/> -0	7.36 (187)	9.33 (237)	≈3.94 (5.86)
E6-80-20- <input type="text" value=""/> -0	7.87 (200)	9.84 (250)	≈3.98 (5.92)
E6-80-21- <input type="text" value=""/> -0	8.35 (212)	10.31 (262)	≈4.02 (5.98)
E6-80-22- <input type="text" value=""/> -0	8.86 (225)	10.83 (275)	≈4.06 (6.04)
E6-80-23- <input type="text" value=""/> -0	9.33 (237)	11.30 (287)	≈4.10 (6.10)
E6-80-25- <input type="text" value=""/> -0	9.84 (250)	11.81 (300)	≈4.14 (6.16)
E6-80-26- <input type="text" value=""/> -0	10.31 (262)	12.28 (312)	≈4.17 (6.21)
E6-80-27- <input type="text" value=""/> -0	10.83 (275)	12.80 (325)	≈4.22 (6.28)
E6-80-28- <input type="text" value=""/> -0	11.30 (287)	13.27 (337)	≈4.25 (6.33)
E6-80-30- <input type="text" value=""/> -0	11.81 (300)	13.78 (350)	≈4.29 (6.39)
E6-80-31- <input type="text" value=""/> -0	12.28 (312)	14.25 (362)	≈4.33 (6.45)
E6-80-32- <input type="text" value=""/> -0	12.80 (325)	14.76 (375)	≈4.37 (6.51)
E6-80-33- <input type="text" value=""/> -0	13.27 (337)	15.24 (387)	≈4.41 (6.57)
E6-80-35- <input type="text" value=""/> -0	13.78 (350)	15.75 (400)	≈4.46 (6.63)
E6-80-36- <input type="text" value=""/> -0	14.25 (362)	16.22 (412)	≈4.50 (6.69)
E6-80-37- <input type="text" value=""/> -0	14.76 (375)	16.73 (425)	≈4.54 (6.75)
E6-80-38- <input type="text" value=""/> -0	15.24 (387)	17.20 (437)	≈4.57 (6.80)
E6-80-40- <input type="text" value=""/> -0	15.75 (400)	17.72 (450)	≈4.62 (6.88)
E6-80-41- <input type="text" value=""/> -0	16.22 (412)	18.19 (462)	≈4.65 (6.92)
E6-80-42- <input type="text" value=""/> -0	16.73 (425)	18.70 (475)	≈4.70 (6.99)
E6-80-43- <input type="text" value=""/> -0	17.20 (437)	19.17 (487)	≈4.73 (7.04)
E6-80-45- <input type="text" value=""/> -0	17.72 (450)	19.69 (500)	≈4.77 (7.10)
E6-80-46- <input type="text" value=""/> -0	18.19 (462)	20.16 (512)	≈4.81 (7.16)
E6-80-47- <input type="text" value=""/> -0	18.70 (475)	20.67 (525)	≈4.85 (7.22)
E6-80-48- <input type="text" value=""/> -0	19.17 (487)	21.14 (537)	≈4.89 (7.28)
E6-80-50- <input type="text" value=""/> -0	19.69 (500)	21.65 (550)	≈4.93 (7.34)
E6-80-51- <input type="text" value=""/> -0	20.16 (512)	22.13 (562)	≈4.97 (7.40)
E6-80-52- <input type="text" value=""/> -0	20.67 (525)	22.64 (575)	≈5.01 (7.46)
E6-80-53- <input type="text" value=""/> -0	21.14 (537)	23.11 (587)	≈5.05 (7.52)
E6-80-55- <input type="text" value=""/> -0	21.65 (550)	23.62 (600)	≈5.09 (7.58)
E6-80-60- <input type="text" value=""/> -0	23.62 (600)	25.59 (650)	≈5.25 (7.81)

Choose from the radii below for all of the above sizes

Radius (mm) Example: E6-80-10--0

	150	200	250	300	350	400	450
R	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.71 (450)
H*	20.31 (516)	24.25 (616)	28.19 (716)	32.13 (816)	36.06 (916)	40.00 (1016)	43.94 (1116)
D	10.75 (273)	12.72 (323)	14.68 (373)	16.65 (423)	18.62 (473)	20.59 (523)	22.55 (573)
K	23.82 (605)	29.92 (760)	36.22 (920)	42.32 (1075)	48.43 (1230)	54.72 (1390)	60.82 (1545)

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS

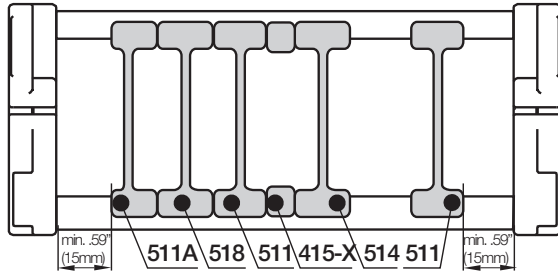




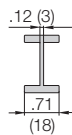
Option 1: Vertical separators and spacers

Vertical separators are used if a vertical subdivision of the Energy Chain® interior is required. By standard, vertical separators are assembled every other Energy Chain® link.

NOTE: Observe a lateral spacing of at least 1.30 in. (33mm) for Energy Tubes and .63 in. (16mm) for Energy Chain®. There is no minimum spacing needed for side plates



STANDARD
Vertical separator
501



Vertical separator

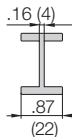
Unassembled	Part No. 501
Assembled	Part No. 511

- **Standard separator 501**

This separator offers safe stability due to its wide base design, also when used with thick cables or hoses.



Locking separator
504



Locking separator

Unassembled	Part No. 504
Assembled	Part No. 514

- **Locking separator 504**

This separator features increased retention force for applications exposed to very high humidity and extreme loads. If locking separators are used, the Energy Chain® is more difficult to open.



Locking separator
508



Locking separator

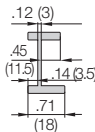
Unassembled	Part No. 508
Assembled	Part No. 518

- **Locking separator 508**

This separator is used for applications that are exposed to extremely high humidity. The clamp at the side serves to uniformly align the separators. In order to avoid destroying the separators when opening the Energy Chain®, make sure all separators are identically aligned.



Asymmetric separator
501A



Asymmetrical separator

Unassembled	Part No. 501A
Assembled	Part No. 511A

- **Asymmetrical separator 501A**

This separator features an (18mm) base. It can be used in combinations between spacers of different widths and vertical separators in side mounted applications.



Spacers
405-XX



Spacer

Unassembled	Part No. 405-XX
Assembled	Part No. 415-XX

XX = width of the spacer

- **NOTE ON SPACERS**

Vertical separators are adjustable, but can be fixed in position by means of a spacer. Spacers are most often necessary for side mounted applications. The available inner height is reduced by .08" (2mm) **per spacer** (for example if one spacer is placed on either side of the separator, the overall inner height is reduced by .16" (4mm)). To avoid this, place the spacers on the **outside** of the opening crossbar (**not for long travels**).

Spacers available in the following sizes:

Part No.	Part No.	in.	(mm)
Unassembled	Assembled		
405 -10	415 -10	.39"	(10)
405 -15	415 -15	.59"	(15)
405 -20	415 -20	.79"	(20)
405 -30	415 -30	1.18"	(30)
405 -40	415 -40	1.57"	(40)



Energy Chain System® E6 Series E6-80 Interior Separation

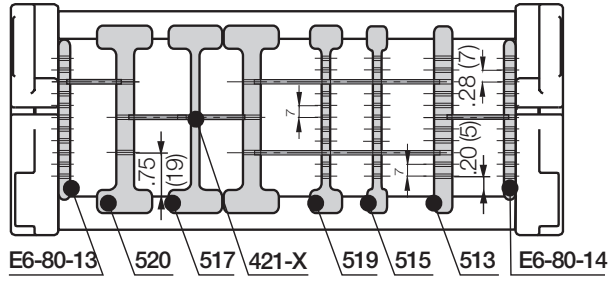
energy chain® configurator ▶



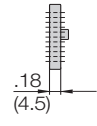
E6-80



Option 2: Shelves
Energy Chains® and Energy Tubes can be subdivided both vertically and horizontally using the various interior separation elements.
▶ **Design, Chapter 1** for layout recommendations.

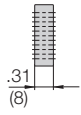


- **Side plates E6-80-03/E6-80-04**
This component is used to form the basic pattern of a shelf system.



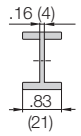
Side plate (left)		
Unassembled	Part No. E6-80-03	Side plate E6-80-03 (left) E6-80-04 (right)
Assembled	Part No. E6-80-13	
Side plate (right)		
Unassembled	Part No. E6-80-04	
Assembled	Part No. E6-80-14	

- **Vertical separator 503**
This component is used to form the basic pattern of a shelf system.



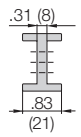
Vertical separator		
Unassembled	Part No. 503	Vertical separator 503
Assembled	Part No. 513	

- **Locking separator, slotted 507**
This separator features increased retention force for applications exposed to very high humidity and extreme loads. The extra retention force is achieved by asymmetric claws for the crossbar. Take care to ensure proper alignment.



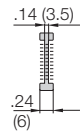
Locking separator, slotted		
Unassembled	Part No. 507	Locking separator, slotted 507
Assembled	Part No. 517	

- **Locking vertical separator 510**
This separator is slotted and able to be combined with shelves.



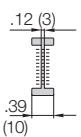
Locking vertical separator		
Unassembled	Part No. 510	Locking vertical separator 510
Assembled	Part No. 520	

- **Slotted separators 505**
These are used for very complex subdivisions. However, they cannot be retrofitted into an existing separation system without removing the shelves first.



Slotted separators, closed		
Unassembled	Part No. 505	Closed slotted separator 505
Assembled	Part No. 515	

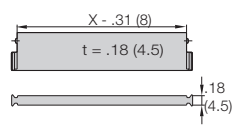
- **Slotted separator 509**
This separator can be retrofitted into an existing interior separation system without removing the shelves, as long as these shelves fit into any of the 7 middle slots



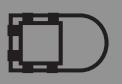
Slotted separators, open		
Unassembled	Part No. 509	Open slotted separator 509
Assembled	Part No. 519	

Shelves 420-XX
These components form the basic pattern of a shelf system. Shelves of various widths can be arranged at 11 different heights in .28" (7mm) increments

Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled	Width X in. (mm)	Usable Width in. (mm)	Part No. Unassembled	Part No. Assembled
.71 (18)	.39 (10)	420-18	421-18	2.95 (75)	2.64 (67)	420-75	421-75
.91 (23)	.59 (15)	420-23	421-23	3.46 (88)	3.15 (80)	420-88	421-88
.98 (25)	.67 (17)	420-25	421-25	3.94 (100)	3.62 (92)	420-100	421-100
1.10 (28)	.79 (20)	420-28	421-28	4.92 (125)	4.61 (117)	420-125	421-125
1.30 (33)	.98 (25)	420-33	421-33	5.91 (150)	5.59 (142)	420-150	421-150
1.69 (43)	1.38 (35)	420-43	421-43	6.89 (175)	6.57 (167)	420-175	421-175
1.97 (50)	1.65 (42)	420-50	421-50	7.36 (187)	7.05 (179)	420-187	421-187
2.44 (62)	2.13 (54)	420-62	421-62	7.87 (200)	7.56 (192)	420-200	421-200



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



igus® Energy Chain System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

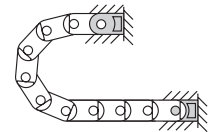
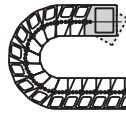
Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>



Option 1: KMA - Pivoting

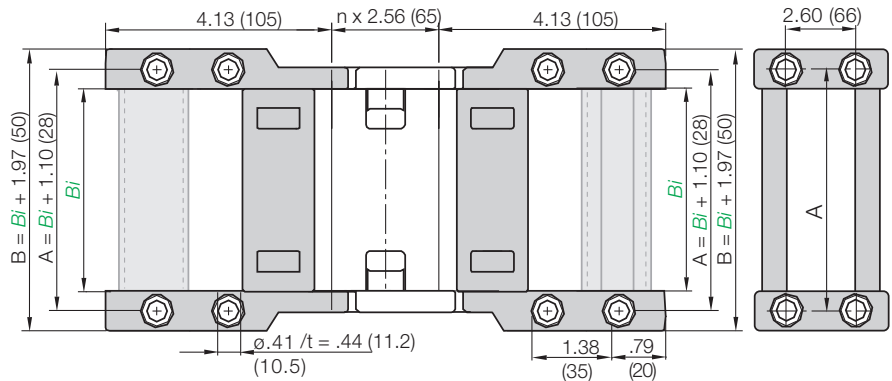
- Option - profile rail with integrated strain relief chainfix clip or tiwrap plates
- Profile rail can be mounted in the inner or outer radius of the Energy Chain®
- Bolted connection outside of the chain cross-section
- Recommended for unsupported applications
- Confined installation conditions
- Attachment capability on all sides

Moving end
E6-800...2



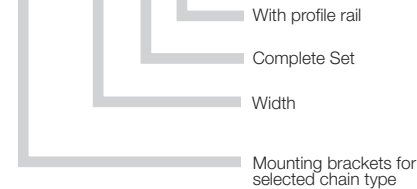
Possible installation configurations -

Fixed end
E6-800...1



Part Number Structure

E6-800-	05-	12	P
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Full set, for both ends:

E6-800- 05- 12 Full set, both fixed and moving end

Single-part order:

E6-800- 05- 1

Mounting bracket **fixed end**

E6-800- 05- 2

Mounting bracket **moving end**



Adapters for gliding applications available upon request

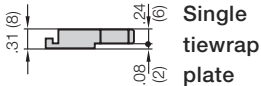
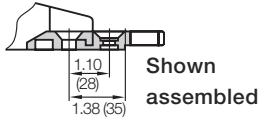
For Series	Part No. Full Set W/O Profile Rail	Part No. Full Set With Profile Rail	B_i	in.	(mm)
E6-80-05	E6-800-05-12	E6-800-05-12P	1.97	(50)	
E6-80-06	E6-800-06-12	E6-800-06-12P	2.56	(65)	
E6-80-07	E6-800-07-12	E6-800-07-12P	2.95	(75)	
E6-80-08	E6-800-08-12	E6-800-08-12P	3.43	(87)	
E6-80-10	E6-800-10-12	E6-800-10-12P	3.94	(100)	
E6-80-11	E6-800-11-12	E6-800-11-12P	4.41	(112)	
E6-80-12	E6-800-12-12	E6-800-12-12P	4.92	(125)	
E6-80-13	E6-800-13-12	E6-800-13-12P	5.39	(137)	
E6-80-15	E6-800-15-12	E6-800-15-12P	5.91	(150)	
E6-80-16	E6-800-16-12	E6-800-16-12P	6.38	(162)	
E6-80-17	E6-800-17-12	E6-800-17-12P	6.89	(175)	
E6-80-18	E6-800-18-12	E6-800-18-12P	7.36	(187)	
E6-80-20	E6-800-20-12	E6-800-20-12P	7.87	(200)	
E6-80-21	E6-800-21-12	E6-800-21-12P	8.35	(212)	
E6-80-22	E6-800-22-12	E6-800-22-12P	8.86	(225)	
E6-80-23	E6-800-23-12	E6-800-23-12P	9.33	(237)	
E6-80-25	E6-800-25-12	E6-800-25-12P	9.84	(250)	
E6-80-26	E6-800-26-12	E6-800-26-12P	10.31	(262)	
E6-80-27	E6-800-27-12	E6-800-27-12P	10.83	(275)	
E6-80-28	E6-800-28-12	E6-800-28-12P	11.30	(287)	
E6-80-30	E6-800-30-12	E6-800-30-12P	11.81	(300)	

For Series	Part No. Full Set W/O Profile Rail	Part No. Full Set With Profile Rail	B_i	in.	(mm)
E6-80-31	E6-800-31-12	E6-800-31-12P	12.28	(312)	
E6-80-32	E6-800-32-12	E6-800-32-12P	12.80	(325)	
E6-80-33	E6-800-33-12	E6-800-33-12P	13.27	(337)	
E6-80-35	E6-800-35-12	E6-800-35-12P	13.78	(350)	
E6-80-36	E6-800-36-12	E6-800-36-12P	14.25	(362)	
E6-80-37	E6-800-37-12	E6-800-37-12P	14.76	(375)	
E6-80-38	E6-800-38-12	E6-800-38-12P	15.24	(387)	
E6-80-40	E6-800-40-12	E6-800-40-12P	15.75	(400)	
E6-80-41	E6-800-41-12	E6-800-41-12P	16.72	(412)	
E6-80-42	E6-800-42-12	E6-800-42-12P	16.73	(425)	
E6-80-43	E6-800-43-12	E6-800-43-12P	17.20	(437)	
E6-80-45	E6-800-45-12	E6-800-45-12P	17.72	(450)	
E6-80-46	E6-800-46-12	E6-800-46-12P	18.19	(462)	
E6-80-47	E6-800-47-12	E6-800-47-12P	18.70	(475)	
E6-80-48	E6-800-48-12	E6-800-48-12P	19.17	(487)	
E6-80-50	E6-800-50-12	E6-800-50-12P	19.69	(500)	
E6-80-51	E6-800-51-12	E6-800-51-12P	20.16	(512)	
E6-80-52	E6-800-52-12	E6-800-52-12P	20.67	(525)	
E6-80-53	E6-800-53-12	E6-800-53-12P	21.14	(537)	
E6-80-55	E6-800-55-12	E6-800-55-12P	21.65	(550)	
E6-80-60	E6-800-60-12	E6-800-60-12P	25.59	(600)	

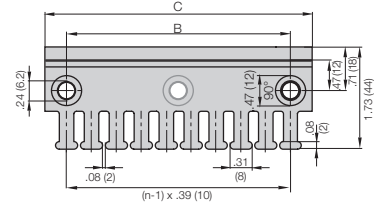
Tiewrap Plates

Option 1:
Tiewrap plates as an individual part

Available as an individual component, can be fixed onto a mounting bracket with the use of a profile rail.



Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes



If used with KMA brackets with profile rail please add "KMA" to the end of the part number.

Example: 3050-ZBKMA

Other strain relief elements

▶ Strain Relief, Chapter 10

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



igus® Energy Chain System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

Crossbar Width
E6-80L-10-115-0

	Dimension D	Installation Part No.
-05	4.13 (105)	96-50-225
-06	4.72 (120)	96-50-250
-07	5.12 (130)	96-50-250
-10	6.10 (155)	96-50-275
-11	6.57 (167)	96-50-300
-12	7.09 (180)	96-50-300
-13	7.56 (192)	96-50-325
-15	8.07 (205)	96-50-325
-16	8.54 (217)	96-50-350
-17	9.06 (230)	96-50-350
-18	9.53 (242)	96-50-375
-20	10.04 (255)	96-50-375
-21	10.51 (267)	96-50-400
-22	11.02 (280)	96-50-400
-23	11.50 (292)	96-50-425
-25	12.01 (305)	96-50-425
-26	12.48 (317)	96-50-450
-27	12.99 (330)	96-50-450
-28	13.46 (342)	96-50-475
-30	13.98 (355)	96-50-475
-31	14.45 (367)	96-50-500
-32	14.96 (380)	96-50-500
-33	15.43 (392)	96-50-525
-35	15.94 (405)	96-50-525
-36	16.42 (417)	96-50-550
-37	16.93 (430)	96-50-550
-38	17.40 (442)	96-50-575
-40	17.91 (455)	96-50-575
-41	18.39 (467)	96-50-600
-42	18.90 (480)	96-50-600
-43	19.37 (492)	96-50-625
-45	19.88 (505)	96-50-625
-46	20.35 (517)	96-50-650
-47	20.87 (530)	96-50-650
-48	21.34 (542)	96-50-675
-50	21.85 (555)	96-50-675
-51	22.32 (567)	96-50-700
-52	22.83 (580)	96-50-700
-53	23.31 (592)	96-50-725
-55	23.82 (605)	96-50-725
-60	25.79 (655)	96-50-775

Guide troughs are used with applications where the upper run of the Energy Chain® glides on the lower run. If using igus® steel guide troughs, the following components are required:

- Full travel length of guide trough
Part Number 99-30
- 1/2 travel length of glide bars
Part Number 93-01
- Installation sets as end connectors
Part Number 96-50-XX

-XX indicates the length of the profile rail on which the guide trough is mounted. The values and part numbers are specified in the table on the left. The standard length of the trough components and glide bars is 6.56 ft (2 m.) The required overall length of the guide trough directly correlates to the length of travel.

Example:

Length of travel 164 ft (50 m)
Center mounted

Required guide troughs:
164 ft (50 m) guide trough
82 ft (25 m) glide bar

= 25 sections of 6.56 ft
(2 m) guide trough

Part No. 99-30

= 13 sections of 6.56 ft (2 m) glide bar

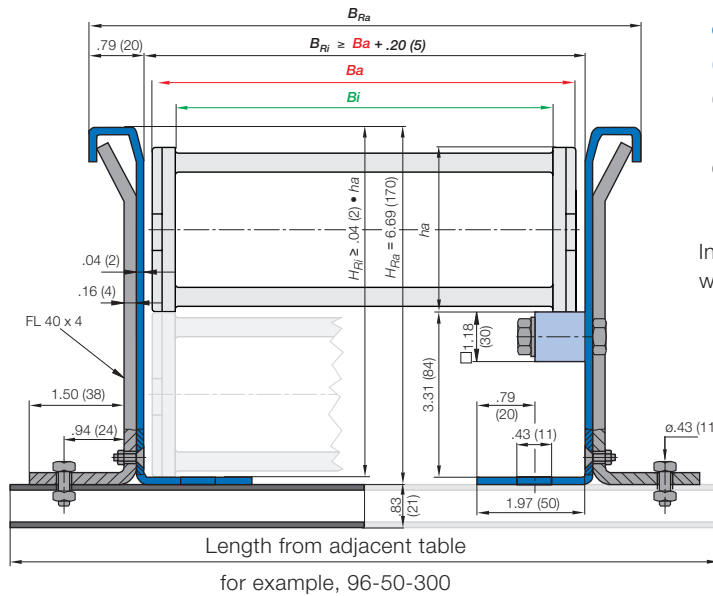
Part No. 93-01

Required number of installation sets:

= Number of guide trough components + 1
= 25 + 1 = 26

Part number of the installation sets

Example: 96-50-400 for 15.75" (400 mm) long profile rail.



- Guide trough
- Glide bars
- Installation set "Basic"
- Profile rail

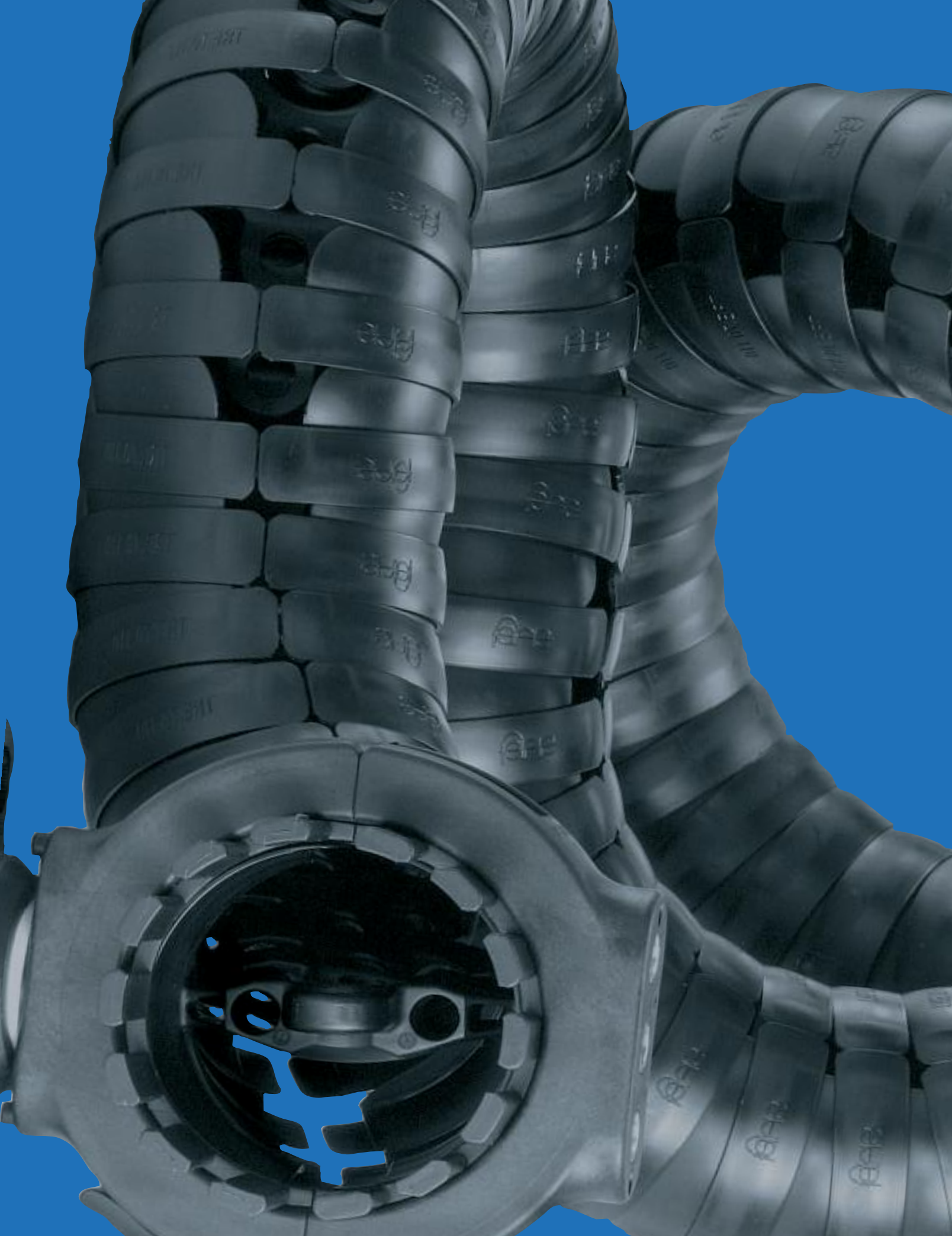
Individual attachment without profile rail

* Specialized guide trough available upon request

Standard length profile rail

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RfQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS







Triflex[®] R
E-Z Triflex[®]
Triflex[®]
TwisterChain[®]

Energy Chain System® Triflex® R Series Energy Chains® for robotics applications



The igus® Triflex® R system is the first choice for multi-axis-robots. Three versions are available: TRC: Closed design, TRE: "E-Z" design, easy to fill from outside, TRL: The "light" version of the "E-Z" design. It is universal for reliable energy supply, in general machinery with multi-axis 3D movements

TRC- closed design

- Energy supply for multi-axis 3D-movements
- High torsional stability
- Easy shortening and lengthening
- Small bend radius
- High tensile force capacity
- If a smooth and robust exterior is needed

➤ See page 8.13



TRE- "E-Z" design

- Cables are easy to install and replace
- Energy supply for multi-axis 3D-movements
- High torsional stability
- Easy shortening and lengthening
- Small bend radius
- High tensile force capacity

➤ See page 8.15



TRL- light design

- If a light weight, cost-efficient and easy to fill 3D Energy Chain® is necessary
- If a 3D Energy Chain® for easy 3D-movements is needed
- If an easy to use 3D Energy Chain® is needed
- If a 3D Energy Chain® for nonrobotic-applications is needed

➤ See page 8.17

Energy Chain System®

Triflex® Series

Energy Chains® for robotics applications



The Triflex® series was developed to realize safe energy supply in the case of multi-dimensional movements. In doing so the flexibility of a hose was combined with the stability of an Energy Chain® and its defined radii. 2 versions are available: Easy to fill **E-Z Triflex®** and the closed **Triflex®**.

Simple filling - E-Z Triflex®

- If easy filling and complex movements are necessary
- Very fast cable assembly with "E-Z" principle
- Simple filling from two sides
- For reparations or supplements of existing Triflex® Systems
- For simple 3D-applications

► See page 8.31

Closed version Triflex®

- For applications with one, two or three directions of motion (combined circle- and stroke-movements)
- Completely enclosed - protection against dirt and chips

► See page 8.43

Rotary motion with TwisterChain®

The TwisterChain® product line offers the biggest selection for rotary movements. TwisterChain® solutions are available with Guide Troughs:

TwisterChain®

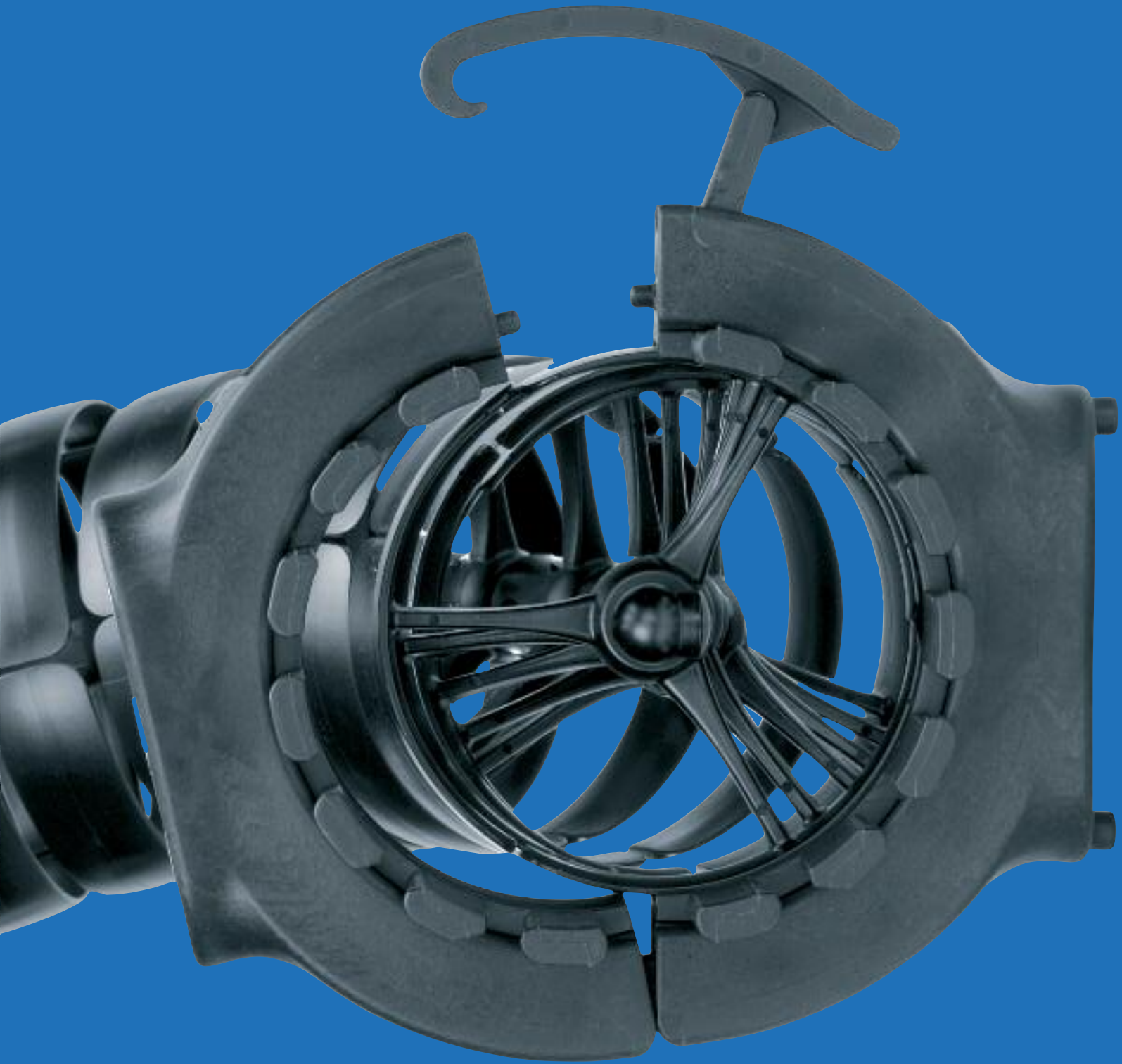
- Modular interior separation
- Crossbars can be opened on both sides
- At rotating speeds up to 90°/s
- igus® TwisterChain® for circular motions up to 540° (with special attachments)

► See page 8.57



Triflex® R





Triflex® R - 3-dimensional Energy Chains® for robots

Triflex® R is the third generation of multi-axis Energy Chains®. Design features include:

- Optional fiber rod for spring loading of the Triflex® R
- Approximately $\pm 10^\circ$ twist per chain link
- High tensile strength of the ball-and-socket joint
- Easy assembly and modification due to single molded link design. No support elements (steel cables, spring suspensions etc.) are necessary

The Triflex® R product family now comprises more than 100 components meeting all requirements ranging from those of small palleting robots to large welding robots.

Typical industries and applications

- Robotics/Automation
- Machine tools
- Handling machines - 6-axis
- Packaging machines
- General mechanical engineering, etc.



IF-Design awards for TRC and TRL-design



Series TRC - Electrically conductive ESD/ATEX version upon request



Cleanroom suitability upon request



UL94-V2 classification





Triflex® RS - universal module for all motions on a robot

Triflex® RS is a very compact universal assembly that is mounted to installation points available on the robot. Thanks to the low profile and the Triflex® R cable carrier parallel to the robotic arm, applications with extremely low installation space can be achieved.



Fiber-rod module for directed pretension and universal assembly kit for multifaceted adjustments



Triflex® R Set - Routed closely on the robotic arm for extreme flatness

Energy Chain System®

Series Triflex® R

Selection Guide



TRC Version - closed design

TRE Version - "E-Z" design- simply press cables in



TRL Version - 3-chamber system - the "light" version of the "E-Z" design simply press cables in

Select this system for:

- The first choice for multi-axis-robots
- **Three versions are available:** TRC: Closed design, TRE: "E-Z" design, easy to fill from outside, TRL: The "light" version of the "E-Z" design
- Universal for general machinery
- Multi-axis (3D) movement
- High torsional stability
- Easy shortening and lengthening
- Smooth interior and exterior edges (TRC)
- Small bend radius
- 1 Ball-and-2 socket principle
- Cables easy to assemble and to replace (TRE/TRL-version)
- Triflex® R-Set - compact module for all movements on robots, which can be fixed on existing fastening points
- TRL - one piece, very lightweight
- High tensile strengths without additional elements like steel cable and spring elements etc
- You can find more technical data about the material, chemical resistance, temperatures ► **Design, Chapter 1**

Selection table

Series	Inner height		max. cable ø		Outer width	Bending radii		Pitch	
	<i>Bi 1</i>		<i>d1</i>		<i>Ba</i>	<i>R</i>			
	in.	(mm)	in.	(mm)		in.	(mm)	in.	(mm)

"TRC" - Triflex® R closed design, dirt-resistant

TRC-30	.47 (12)	.39 (10)	.39 (10)	.31 (8)	1.36 (34.5)	1.97 (50)	.44 (11.3)
TRC-40	.59 (15)	.51 (13)	.51 (13)	.43 (11)	1.69 (43)	2.28 (58)	.55 (13.9)
TRC-60	.88 (22.5)	.77 (19.5)	.81 (20.5)	.69 (17.5)	2.56 (65)	3.43 (87)	.80 (20.4)
TRC-70	1.10 (28)	.94 (24)	1.02 (26)	.87 (22)	3.19 (81)	4.33 (110)	1.01 (25.6)
TRC-85	1.30 (33)	1.10 (28)	1.22 (31)	1.02 (26)	3.72 (94.5)	5.31 (135)	1.20 (30.6)
TRC-100	1.48 (37.5)	1.28 (32.5)	1.40 (35.5)	1.20 (30.5)	4.25 (108)	5.71 (145)	1.36 (34.5)
TRC-125**	1.70 (43.3)	1.70 (43.3)	1.61 (41)	1.61 (41)	5.31 (135)	7.17 (182)	1.76 (44.6)

"TRE" - Triflex® R "E-Z" design for fast installation of cables

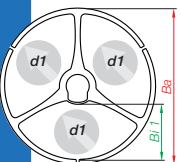
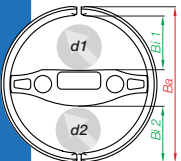
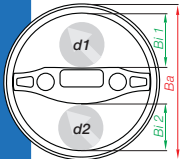
TRE-30	.47 (12)	.39 (10)	.39 (10*)	.31 (8*)	1.36 (34.5)	1.97 (50)	.44 (11.3)
TRE-40	.59 (15)	.51 (13)	.51 (13*)	.43 (11*)	1.69 (43)	2.28 (58)	.55 (13.9)
TRE-60	.88 (22.5)	.77 (19.5)	.81 (20.5*)	.69 (17.5*)	2.56 (65)	3.43 (87)	.80 (20.4)
TRE-70	1.10 (28)	.94 (24)	1.02 (26*)	.87 (22*)	3.19 (81)	4.33 (110)	1.01 (25.6)
TRE-85	1.30 (33)	1.10 (28)	1.22 (31*)	1.02 (26*)	3.72 (94.5)	5.31 (135)	1.20 (30.6)
TRE-100	1.48 (37.5)	1.28 (32.5)	1.40 (35.5*)	1.20 (30.5*)	4.25 (108)	5.71 (145)	1.36 (34.5)
TRE-125**	1.70 (43.3)	1.70 (43.3)	1.61 (41*)	1.61 (41*)	5.31 (135)	7.17 (182)	1.76 (44.6)

"TRL" - a light and economical alternative with an "E-Z" design

TRL-30	.47 (12)	.39 (10)	.39 (10*)	.31 (8*)	1.36 (34.5)	1.97 (50)	.44 (11.3)
TRL-40	.59 (15)	-	.51 (13*)	-	1.69 (43)	2.28 (58)	.55 (13.9)
TRL-60	.91 (23)	-	.81 (20.5*)	-	2.56 (65)	3.43 (87)	.80 (20.4)
TRL-70	1.10 (28)	-	1.02 (26*)	-	3.19 (81)	4.33 (110)	1.01 (25.6)
TRL-100	1.50 (38)	-	1.40 (35.5*)	-	4.25 (108)	5.31 (145)	1.36 (34.5)

* For quick and easy insertion / removal of cables using the E-Z Chain® principle, we recommend a maximum cable diameter of 70% of the specified value.

** If shortening/lengthening of a "filled" Triflex® TRC/TRE-125 is required, cable diameter changes to Ø 1.42" (36 mm).



Energy Chain System® Series Triflex® R Assembly Instructions - TRC Series

Assembly | TRC-30 · TRC-40 · TRC-60 · TRC-70 · TRC-85 · TRC-100



Hold two pieces together at inner radius and move socket up against the ball's wedged end

Separating | TRC-30 · TRC-40 · TRC-60



Bend Triflex® R into its radius and twist apart, counter-clockwise

Separating | TRC-70 · TRC-85 · TRC-100



Insert screwdriver into the opening of the socket from the top. Then twist apart, counter-clockwise

Assembly | Separating | TRC-125



Connector principle = Ball head clevis joint (similar to the proven trailer hitch design)
Improved assembly/disassembly for large sizes. Faster assembly with less effort

Energy Chain System® Series Triflex® R Assembly Instructions - TRE Series

Assembly | TRE-30 · TRE-40 · TRE-60 · TRE-70 · TRE-85 · TRE-100



Hold two pieces together at inner radius and move socket up against the ball's wedged end.
Push until a clicking sound indicates a secure fit of socket onto the ball (Energy Chain® section exposed for the purpose of demonstration)

Separating | TRE-30 · TRE-40 · TRE-60



Bend Triflex® R into its radius and twist apart, counter-clockwise

Separating | TRE-70 · TRE-85 · TRE-100



Insert screwdriver into the opening of the socket from the top. Then twist apart, counter-clockwise

Filling | TRE-30 · TRE-40 · TRE-60 · TRE-70 · TRE-85 · TRE-100



Easy to fill - simply press cables in...

...and easy to take the cables out

Energy Chain System® Series Triflex® R Assembly Instructions - TRL Series

Assembly | TRL-30 · TRL-40 · TRL-60 · TRL-70 · TRL-100



igus® Triflex® R TRL - very easy to assemble - simply press the ball into the socket, ready!

Separating | TRL-30 · TRL-40 · TRL-60 · TRL-70 · TRL-100



Just twist the ball slightly to remove it from its socket

Filling | TRL-40 · TRL-30 · TRL-60 · TRL-70 · TRL-100



Easy to fill - simply press cables in...

...and easy to take the cables out

Installation | Mounting bracket in this case, a "light" bracket with an intermediate connection



Easy assembly - open the mounting bracket, install the chain and snap the mounting bracket shut again.

To open, push a screwdriver against one side or manually pry apart

Price Index



Series Triflex® TRC

Special Options Available



Cleanroom suitability upon request



iF-Design Award Winner
Triflex® R Series

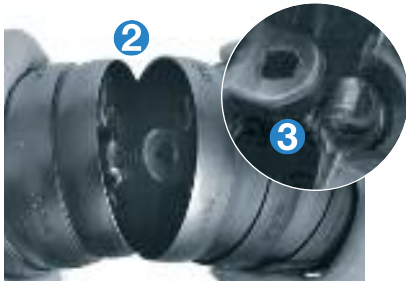


ESD classification:
Electrically conductive
ESD/ATEX version upon request



Flammability Class
VDE 0304 IIC UL94 V2

Assembly Tips



Easy assembly and quick access to cables and hoses thanks to a unique ball-and-socket design.

Usage Guidelines



- If a secure cable guide is required for multi-dimensional (3D-) movements
- If high torsional stability is required
- If the system has to be shortened or lengthened easily
- If a small bending radius is required
- If high tensile strength is important



- For circular movements with high loads
 - TwisterChain System
- If simple filling is required
 - Triflex® R, TRE
- If a simpler and cost effective solution is required
 - Triflex® R, TRL

Features & Benefits

- 1 High stability - Due to outer stop dogs, defined stops for radius and torsion
- 2 Easy installation and dismantling - An injection molded component. No other components (steel cables, spring suspensions etc.) are required
- 3 High tensile strength due to special ball-and-socket principle, enables flexible movement along all axes
- 4 Impact-resistant, dirt-repelling, rugged and abrasion-resistant, smooth, rounded exterior
- 5 Triflex® R-Set - compact module for all movements on robots, which can be fixed on existing fastening points
- 6 Able to move multi-dimensionally - High degree of flexibility, even on the 6th axis. Twist up to approx. ± 10° per link possible in longitudinal axis. This assists guiding the cables and lines around difficult configurations
- 7 Small bend radius & short pitch - Space-saving installation
- 8 Easy attachment onto the robot/machine reduces setup time



Order Example: Complete Energy Chain®

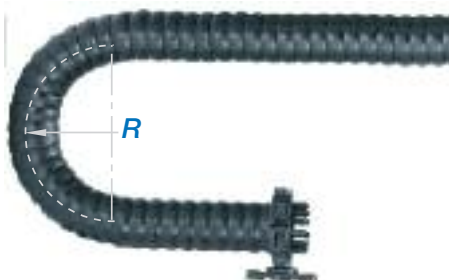
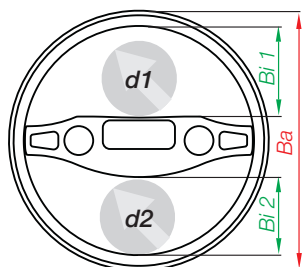
Please indicate chain length or number of links. Example: 6.56 ft (2m) or 144 links

6.56 ft (2 m) TRC-40-058-0		Energy Chain®
1 set mounting bracket with strain relief TR40-01		Mounting Bracket
2 intermediate links without strain relief TR40-02		Mounting Bracket
+23.6" (600 mm) fiber rods TRCF-40-0600-1		Fiber Rods

Energy Chain System® Series Triflex® R TRC - Fully enclosed



Triflex® R
TRC



"TRC" - Triflex® R closed design, dirt-resistant

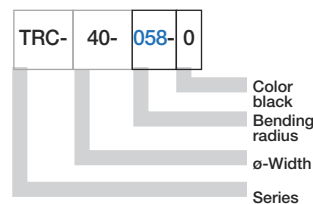
Series	Inner height				max. cable ø				Outer width		Bending radii	
	Bi 1		Bi 2		d1		d2		Ba		R	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
TRC-30-050-0	.47	(12)	.39	(10)	.39	(10)	.31	(8)	1.36	(34.5)	1.97	(50)
TRC-40-058-0	.59	(15)	.51	(13)	.51	(13)	.43	(11)	1.69	(43)	2.28	(58)
TRC-60-087-0	.88	(22.5)	.77	(19.5)	.81	(20.5)	.69	(17.5)	2.56	(65)	3.43	(87)
TRC-70-110-0	1.10	(28)	.94	(24)	1.02	(26)	.87	(22)	3.19	(81)	4.33	(110)
TRC-85-135-0	1.30	(33)	1.10	(28)	1.22	(31)	1.02	(26)	3.72	(94.5)	5.31	(135)
TRC-100-145-0	1.48	(37.5)	1.28	(32.5)	1.40	(35.5)	1.20	(30.5)	4.25	(108)	5.71	(145)
TRC-125-182-0**	1.70	(43.3)	1.70	(43.3)	1.61	(41)	1.61	(41)	5.31	(135)	7.17	(182)

* For quick and easy insertion / removal of cables using the E-Z Chain® principle, we recommend a maximum cable diameter of 70% of the specified value.

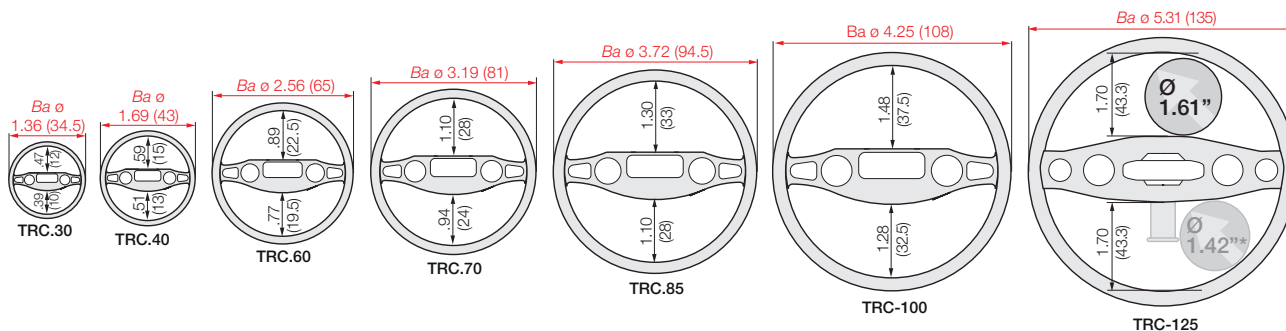
** If shortening/lengthening of a "filled" Triflex® TRC-125 is required, cable diameter changes to Ø 1.42" (36 mm).

Part No.	Pitch		Weight		Links	
	in.	(mm)	lbs/ft	(kg/m)	links/ft	links/m
TRC-30-	.44	(11.3)	≈ 0.18	≈ 0.27	27.27	(89)
TRC-40-	.55	(13.9)	≈ 0.25	≈ 0.37	21.82	(72)
TRC-60-	.80	(20.4)	≈ 0.57	≈ 0.85	15.00	(49)
TRC-70-	1.01	(25.6)	≈ 0.89	≈ 1.32	11.88	(39)
TRC-85-	1.20	(30.6)	≈ 1.18	≈ 1.75	10.00	(33)
TRC-100-	1.36	(34.5)	≈ 1.60	≈ 2.38	8.82	(29)
TRC-125-**-	1.76	(44.6)	≈ 3.16	≈ 4.70	6.82	(23)

Part No. structure



Series TRC - Dimensions



Material - permitted temperature

igumid NB / -40°F (-40°C) up to +176°F (+80° C)

Flammability Class, igumid NB

VDE 0304 IIC UL94 V2

Technical Data



Details of material properties

► Chapter 1

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Price Index



Series Triflex® TRE

Special Options Available



Cleanroom suitability upon request



Flammability Class
VDE 0304 IIC UL94 V2

Assembly Tips



Easy to fill - simply press cables in - "E-Z" Principle

Usage Guidelines



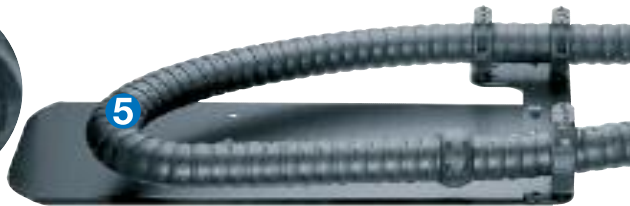
- When an easy to fill 3D Energy Chain® is needed
- If a secure cable guide is required for multi-dimensional 3D-movements
- If high torsional stability is required
- If the system has to be shortened or lengthened easily
- If a small bending radius is required
- If high tensile strength is important



- For circular movements with high loads
 - TwisterChain® System
- If a fully enclosed solution is required
 - Triflex® R, TRC
- If a more simple and cost effective solution is required
 - Triflex® R, TRL

Features & Benefits

- 1 For special cases also available: Fibre rods, universal assembly kit and FlexBar
- 2 Impact-resistant, dirt-repelling, rugged and abrasion-resistant, smooth, rounded exterior
- 3 Easy opening mechanism for easy filling with cable and hose packages
- 4 High tensile strength due to special ball-and-socket principle, enables flexible movement along all axes
- 5 Triflex® R-Set - compact module for all movements on robots, which can be fixed on existing fastening points
- 6 Easy installation and dismantling - An injection molded component. No other components (steel cables, spring suspensions etc.) are required
- 7 Able to move multi-dimensionally - High degree of flexibility, even on the 6th axis. Twist up to approx. ± 10° per link possible in longitudinal axis. This assists guiding the cables and lines around difficult configurations
- 8 Small bend radius & short pitch - Space-saving installation
- 9 High stability - Due to outer stop dogs, defined stops for radius and torsion
- 10 Easy attachment onto the robot/machine reduces setup time



Order Example: Complete Energy Chain®

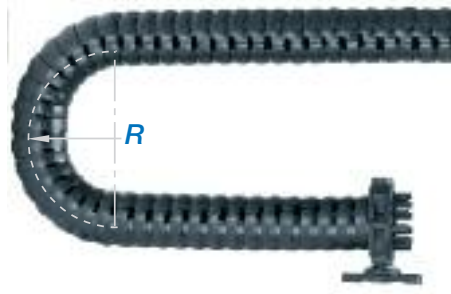
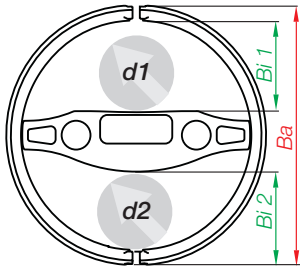
Please indicate chain length or number of links. Example: 6.56 ft (2m) or 144 links

6.56 ft (2 m) TRE-40-058-0	Energy Chain®
1 set mounting bracket with strain relief TR40-01	Mounting Bracket
2 intermediate links without strain relief TR40-02	Mounting Bracket
+23.6" (600 mm) fiber rods TREF-40-0600-1	Fiber Rods

Energy Chain System®
Series Triflex® R
TRE - Easy to fill



Triflex® R
TRE



"TRE" - Triflex® R E-Z design, dirt-resistant

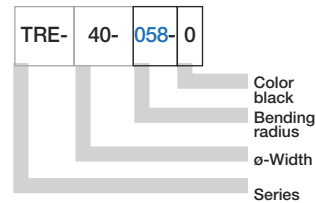
Series	Inner height				max. cable ø				Outer width		Bending radii	
	Bi 1		Bi 2		d1		d2		Ba		R	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
TRE-30-050-0	.47	(12)	.39	(10)	.39	(10*)	.31	(8*)	1.36	(34.5)	1.97	(50)
TRE-40-058-0	.59	(15)	.51	(13)	.51	(13*)	.43	(11*)	1.69	(43)	2.28	(58)
TRE-60-087-0	.88	(22.5)	.77	(19.5)	.81	(20.5*)	.69	(17.5*)	2.56	(65)	3.43	(87)
TRE-70-110-0	1.10	(28)	.94	(24)	1.02	(26*)	.87	(22*)	3.19	(81)	4.33	(110)
TRE-85-135-0	1.30	(33)	1.10	(28)	1.22	(31*)	1.02	(26*)	3.72	(94.5)	5.31	(135)
TRE-100-145-0	1.48	(37.5)	1.28	(32.5)	1.40	(35.5*)	1.20	(30.5*)	4.25	(108)	5.71	(145)
TRE-125-182-0**	1.70	(43.3)	1.70	(43.3)	1.61	(41*)	1.61	(41*)	5.31	(135)	7.17	(182)

* For quick and easy insertion / removal of cables using the E-Z Chain® principle, we recommend a maximum cable diameter of 70% of the specified value.

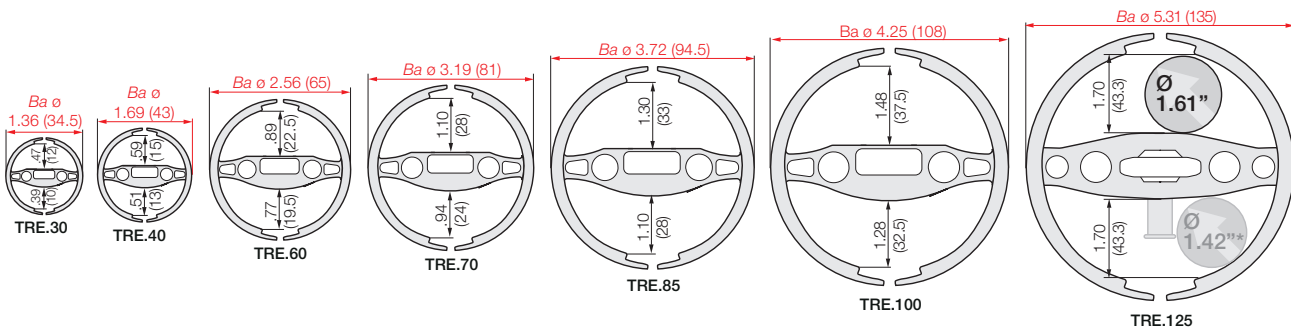
** If shortening/lengthening of a "filled" Triflex® TRE-125 is required, cable diameter changes to Ø 1.42" (36 mm).

Part No.	Pitch		Weight		Links	
	in.	(mm)	lbs/ft	(kg/m)	links/ft	links/m
TRE-30-	.44	(11.3)	≈ 0.18	≈ 0.27	27.27	(89)
TRE-40-	.55	(13.9)	≈ 0.25	≈ 0.37	21.82	(72)
TRE-60-	.80	(20.4)	≈ 0.57	≈ 0.85	15.00	(49)
TRE-70-	1.01	(25.6)	≈ 0.89	≈ 1.32	11.88	(39)
TRE-85-	1.20	(30.6)	≈ 1.18	≈ 1.75	10.00	(33)
TRE-100-	1.36	(34.5)	≈ 1.60	≈ 2.38	8.82	(29)
TRE-125-**	1.76	(44.6)	≈ 3.16	≈ 4.70	6.82	(23)

Part No. structure



Series TRE - Dimensions



Material - permitted temperature	igumid NB / -40°F (-40°C) up to +176°F (+80° C)
Flammability Class, igumid NB	VDE 0304 IIC UL94 V2

Technical Data



Details of material properties

► Chapter 1

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Price Index



Series Triflex® TRC

Special Options Available



Cleanroom suitability upon request

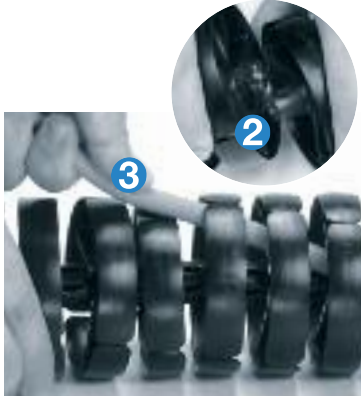


iF-Design Award Winner
Triflex® R Series



Flammability Class
VDE 0304 IIC UL94 V2

Assembly Tips



To close, push and click shut

Usage Guidelines



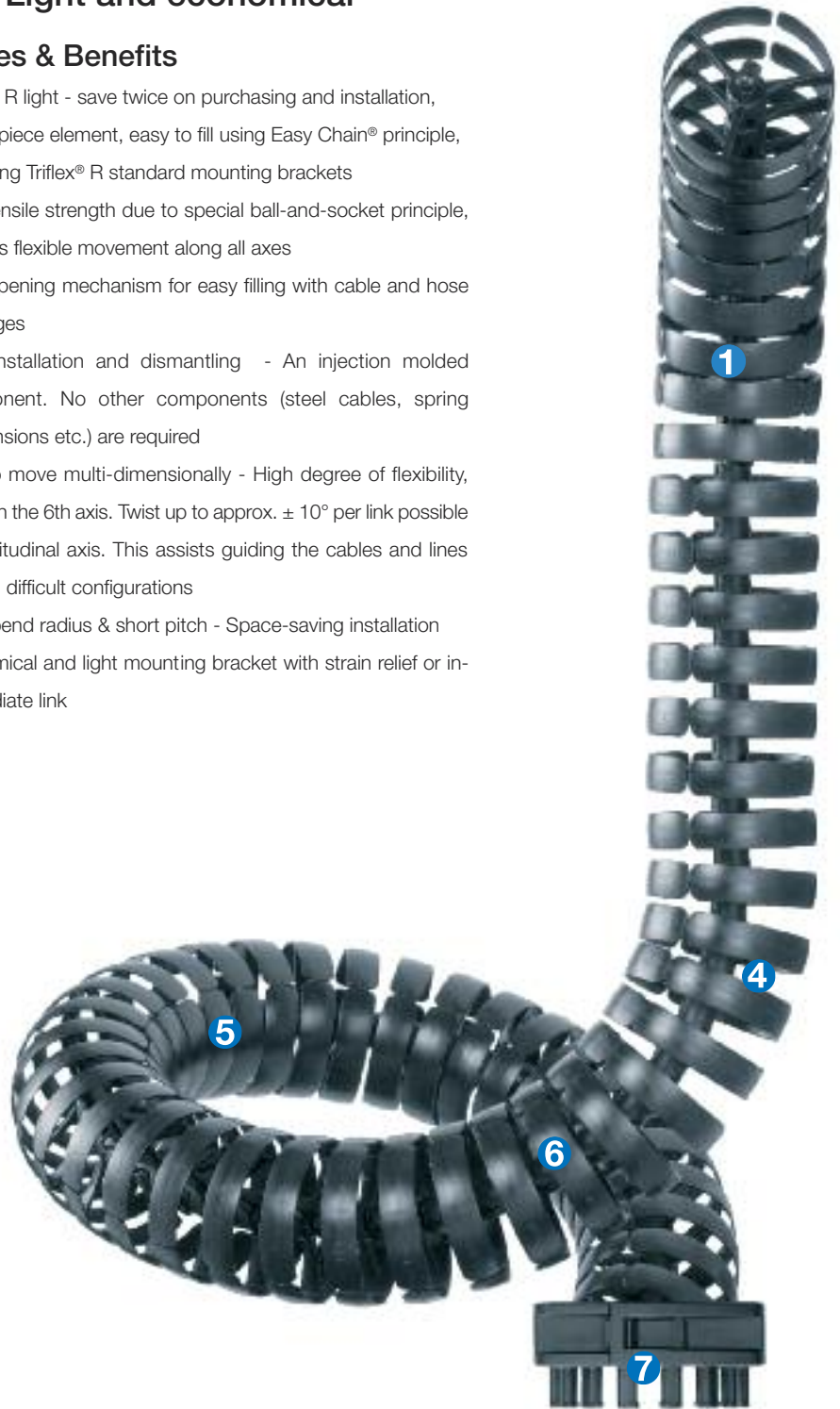
- When an easy to fill, economical 3D Energy Chain® is needed
- When 3D Energy Chain® for easily manageable operating conditions is needed
- When a very easy to use 3D Energy Chain® is needed



- For circular movements with high loads
 - System TwisterChain®
- If a fully enclosed solution is required
 - Triflex® R - TRC
- When a rugged, easy to fill variant is needed
 - Triflex® R - TRE

Features & Benefits

- 1 Triflex® R light - save twice on purchasing and installation, single-piece element, easy to fill using Easy Chain® principle, matching Triflex® R standard mounting brackets
- 2 High tensile strength due to special ball-and-socket principle, enables flexible movement along all axes
- 3 Easy opening mechanism for easy filling with cable and hose packages
- 4 Easy installation and dismantling - An injection molded component. No other components (steel cables, spring suspensions etc.) are required
- 5 Able to move multi-dimensionally - High degree of flexibility, even on the 6th axis. Twist up to approx. $\pm 10^\circ$ per link possible in longitudinal axis. This assists guiding the cables and lines around difficult configurations
- 6 Small bend radius & short pitch - Space-saving installation
- 7 Economical and light mounting bracket with strain relief or intermediate link



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example: 6.56 ft (2m) or 144 links

6.56 ft (2 m) xxx-xx-xxx

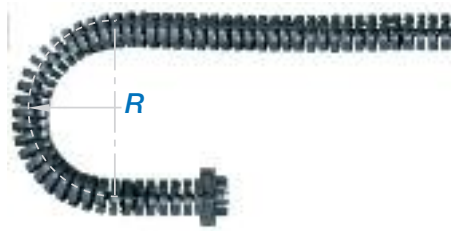
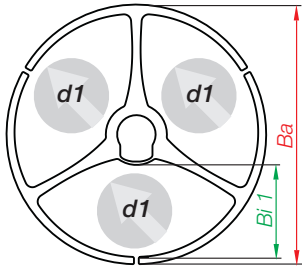


Energy Chain®

1 set mounting bracket with strain relief TR70-01-Z1



Mounting Bracket



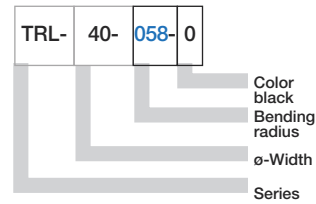
"TRL" - a light and economical alternative with an "E-Z" design

Series	Inner height				max. cable ø				Outer width		Bending radii	
	Bi 1		Bi 2		d1		d2		Ba		R	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
TRL-30-050-0	.47	(12)	.39	(10)	.39	(10*)	.31	(8*)	1.36	(34.5)	1.97	(50)
TRL-40-058-0	.59	(15)	-	-	.51	(13*)	-	-	1.69	(43)	2.28	(58)
TRL-60-087-0	.91	(23)	-	-	.81	(20.5*)	-	-	2.56	(65)	3.43	(87)
TRL-70-110-0	1.10	(28)	-	-	1.02	(26*)	-	-	3.19	(81)	4.33	(110)
TRL-100-145-0	1.50	(38)	-	-	1.40	(35.5*)	-	-	4.25	(108)	5.31	(145)

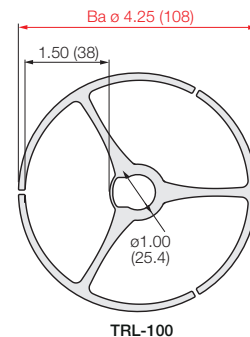
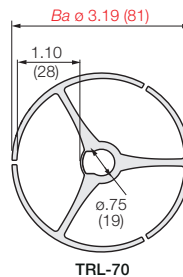
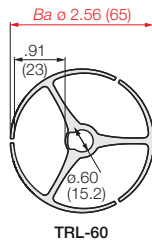
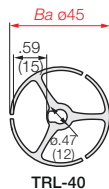
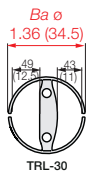
* For quick and easy insertion / removal of cables using the E-Z Chain® principle, we recommend a maximum cable diameter of 70% of the specified value.

Part No.	Pitch		Weight		Links	
	in.	(mm)	lbs/ft	(kg/m)	links/ft	links/ m
TRL-30-	.44	(11.3)	≈ 0.18	≈ 0.27	27.27	(89)
TRL-40-	.55	(13.9)	≈ 0.25	≈ 0.37	21.82	(72)
TRL-60-	.80	(20.4)	≈ 0.57	≈ 0.85	15.00	(49)
TRL-70-	1.01	(25.6)	≈ 0.89	≈ 1.32	11.88	(39)
TRL-100-	1.36	(34.5)	≈ 1.60	≈ 2.38	8.82	(29)

Part No. structure



Series TRL - Dimensions



Material - permitted temperature	igumid NB / -40°F (-40°C) up to +176°F (+80° C)
Flammability Class, igumid NB	VDE 0304 IIC UL94 V2

Technical Data



Details of material properties

► Chapter 1



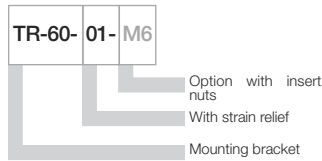


Option 1: Standard mounting brackets

- Quick and easy installation
- Short downtimes when swapping a harnessed Triflex® R system
- Mounting bracket 1 with strain relief available
- Mounting bracket also as 2 intermediate link
- Quick assembly by means of snap lock
- Bracket holes for common robot types
- Can be attached at the ends or anywhere in between

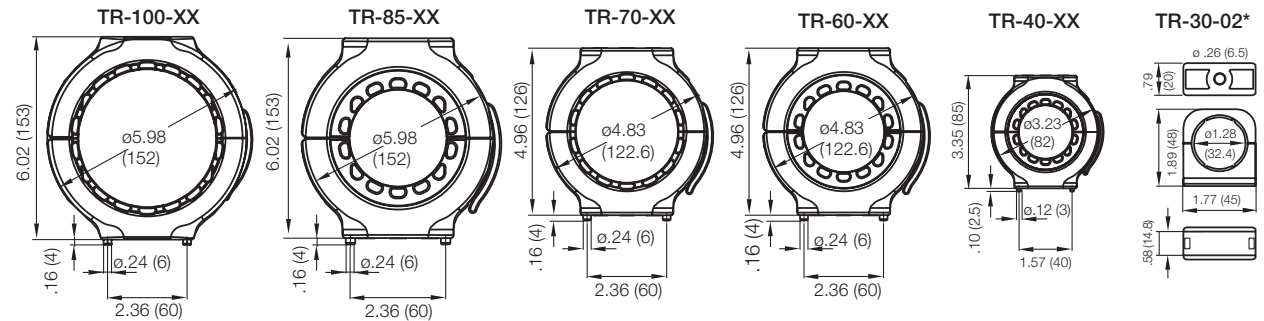
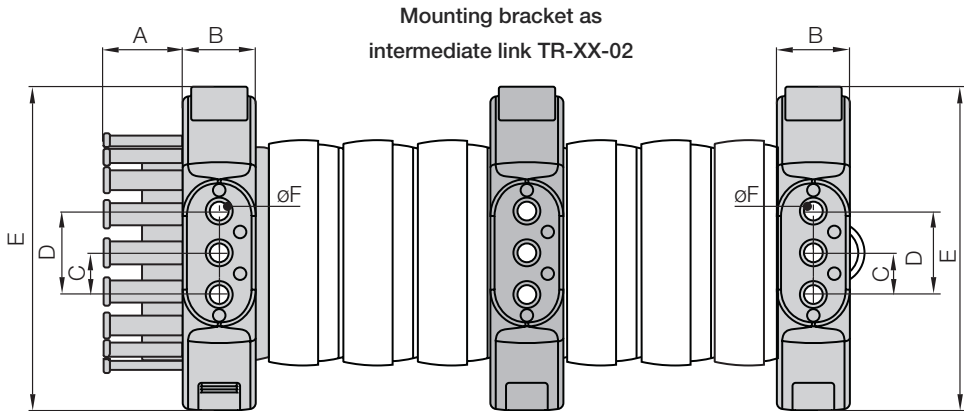


Part No. structure



Mounting bracket with strain relief TR-XX-01

Mounting bracket without strain relief TR-XX-02



For Series	Mounting bracket with strain relief	Mounting bracket as intermediate link	A in. (mm)	B in. (mm)	C in. (mm)	D in. (mm)	E in. (mm)	øF in. (mm)
TRC/TRE/TRL-30-	-	TR-30-02	*	*	*	*	*	*
TRC/TRE/TRL-40-	TR-40-01-M6	TR-40-02-M6	.70 (17.8)	.83 (21)	.53 (13.5)	1.06 (27)	3.35 (85)	.26 (6.5)
TRC/TRE/TRL-60-	TR-60-01-M8	TR-60-02-M8	.98 (25)	1.38 (35)	.79 (20)	1.57 (40)	4.96 (126)	.35 (9)
TRC/TRE/TRL-70-	TR-70-01-M8	TR-70-02-M8	.98 (25)	1.38 (35)	.79 (20)	1.57 (40)	4.96 (126)	.35 (9)
TRC/TRE-85-	TR-85-01-M8	TR-85-02-M8	1.57 (40)	1.38 (35)	.79 (20)	1.57 (40)	6.02 (153)	.35 (9)
TRC/TRE/TRL-100-	TR-100-01-M8	TR-100-02-M8	1.50 (38)	1.38 (35)	.79 (20)	1.57 (40)	6.02 (153)	.35 (9)

TRC/TRE-125 Dimensions and delivery time upon request!

* = dimensions in drawing

Strain relief is possible on the moving end and/or the fixed end.

Standard: Trough holes in ØF - Option: with insert nuts, steel, M6/M8

Energy Chain System® Series Triflex® R Light Duty Mounting Brackets



Triflex®
R



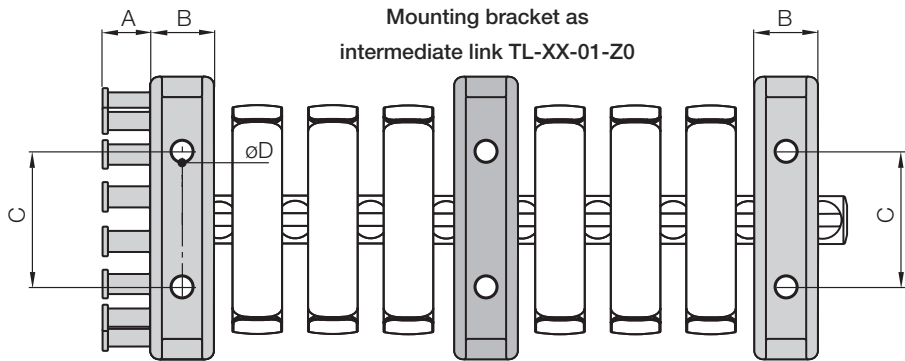
Option 2: Light mounting brackets

- Standard for TRL version, also compatible with all Triflex® R versions (TRC/TRE)
- Mounting bracket 1 with strain relief available
- Mounting bracket also as 2 intermediate link available
- Economical and light
- For simple 3D-movements and loads
- Consists of two halves - easy to assemble

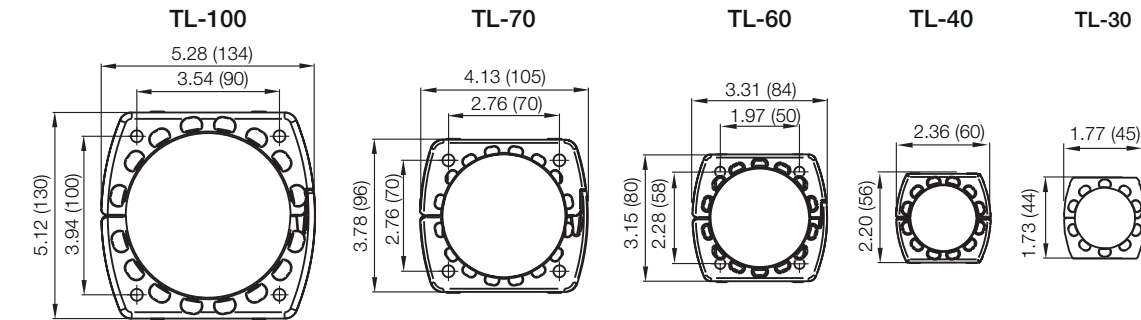
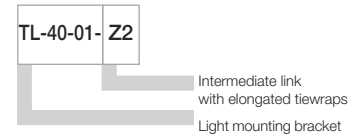


Mounting bracket with strain relief TL-XX-01-Z2

Mounting bracket without strain relief TL-XX-01-Z0



Part No. structure



For Series
Style

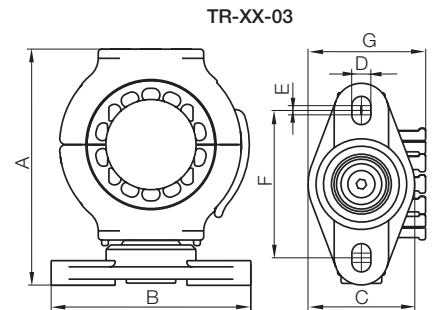
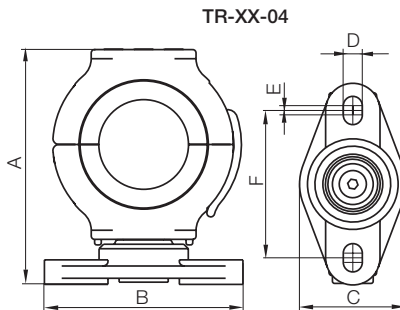
Style	Part No.	A in. (mm)	B in. (mm)	C in. (mm)	D in. (mm)
TRE/TRC/TRL-30 ▶ Without Tiewraps	TL-30-01-Z0	—	.51 (13)	.94 (24)	.18 (4.5)
▶ With Standard Tiewraps	TL-30-01-Z1	.49 (12.5)	.51 (13)	.94 (24)	.18 (4.5)
TRE/TRC/TRL-40 ▶ Without Tiewraps	TL-40-01-Z0	—	.55 (14)	1.42 (36)	.23 (5.8)
▶ With Standard Tiewraps	TL-40-01-Z1	.49 (12.5)	.55 (14)	1.42 (36)	.23 (5.8)
▶ With Elongated Tiewraps	TL-40-01-Z2	.79 (20)	.55 (14)	1.42 (36)	.23 (5.8)
TRE/TRC/TRL-60 ▶ Without Tiewraps	TL-60-01-Z0	—	.79 (20)	1.89 (48)	.23 (5.8)
▶ With Standard Tiewraps	TL-60-01-Z1	.67 (17)	.79 (20)	1.89 (48)	.23 (5.8)
▶ With Elongated Tiewraps	TL-60-01-Z2	1.06 (27)	.79 (20)	1.89 (48)	.23 (5.8)
TRE/TRC/TRL-70 ▶ Without Tiewraps	TL-70-01-Z0	—	1.06 (27)	2.52 (64)	.26 (6.5)
▶ With Standard Tiewraps	TL-70-01-Z1	.69 (17.5)	1.06 (27)	2.52 (64)	.26 (6.5)
▶ With Elongated Tiewraps	TL-70-01-Z2	1.08 (27.5)	1.06 (27)	2.52 (64)	.26 (6.5)
TRE/TRC/TRL-100 ▶ Without Tiewraps	TL-100-01-Z0	—	1.18 (30)	2.52 (64)	.26 (6.5)
▶ With Standard Tiewraps	TL-100-01-Z1	.89 (22.5)	1.18 (30)	2.52 (64)	.26 (6.5)
▶ With Elongated Tiewraps	TL-100-01-Z2	1.67 (42.5)	1.18 (30)	2.52 (64)	.26 (6.5)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Option 3: Swivel mounting brackets

- Swivel bearings are used to lessen the motion of the cables requiring guidance, while allowing for extreme twisting and bending. This relieves cables with highly sensitive bending radii (such as fiber optic cables) when following a robot's movements.
- Available in 2 designs (with or without strain relief)
- Pivoting bearing with a maintenance-free igubal® ball-and-socket joint
- Minimization of critical bending cycles
- Gentler motion

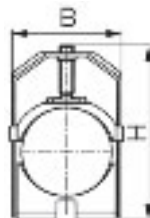
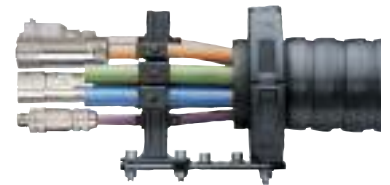


For Series	Swivel bracket with tiewrap plate	Swivel bracket as intermediate link	A in. (mm)	B in. (mm)	C in. (mm)	D in. (mm)	E in. (mm)	F in. (mm)	G* in. (mm)
TRC/TRE/TRL-40	TR-40-03	TR-40-04	4.13 (105)	3.50 (89)	1.85 (47)	.33 (8.4)	.19 (4.1)	2.56 (65)	2.03 (51.8)
TRC/TRE/TRL-60	TR-60-03	TR-60-04	5.98 (152)	4.65 (118)	2.56 (65)	.41 (10.5)	.24 (5.5)	3.44 (87.5)	2.89 (73.5)
TRC/TRE/TRL-70	TR-70-03	TR-70-04	5.98 (152)	4.65 (118)	2.56 (65)	.41 (10.5)	.24 (5.5)	3.44 (87.5)	2.89 (73.5)
TRC/TRE-85	TR-85-03	TR-85-04	7.05 (179)	4.65 (118)	2.56 (65)	.41 (10.5)	.24 (5.5)	3.44 (87.5)	3.46 (88)
TRC/TRE/TRL-100	TR-100-03	TR-100-04	7.05 (179)	4.65 (118)	2.56 (65)	.41 (10.5)	.24 (5.5)	3.44 (87.5)	3.46 (88)

*only for TR-XX-03

Strain relief systems (only for TRC/TRE) - Secure mounting of large cross sections with igus® standard Chainfix clamps

- 3 versions available for each size
- Multi-axially adjustable, for optimal positioning
- Suitable on all standard robot extensions: Ø 30 mm, Ø 32 mm, Ø 34 mm



Single clamp housing, including top/bottom saddle clamps

The dimensions given for H in the table is based on the maximum cable diameter. Cables with smaller diameters may result in lower overall clamp housing heights.

Igus® recommends strain relieving the moving end of a robotic application.

Part No. Steel	Part No. Stainless Steel	in.	(ø mm)	B	H
CFX12-1	CFX12-1E	.24 - .47	(6 - 12)	.63 (16)	1.57 (40)
CFX14-1	CFX14-1E	.47-.55	(12 - 14)	.71 (18)	1.97 (50)
CFX16-1	CFX16-1E	.55-.63	(14 - 16)	.79 (20)	2.05 (52)
CFX18-1	CFX18-1E	.63-.71	(16 - 18)	.87 (22)	2.13 (54)
CFX20-1	CFX20-1E	.71-.79	(18 - 20)	.94 (24)	2.20 (56)
CFX22-1	CFX22-1E	.79-.87	(20 - 22)	1.02 (26)	2.28 (58)
CFX26-1	CFX26-1E	.87-1.02	(22 - 26)	1.18 (30)	2.64 (67)
CFX30-1	CFX30-1E	1.02-1.18	(26 - 30)	1.34 (34)	2.80 (71)
CFX34-1	CFX34-1E	1.18-1.34	(30 - 34)	1.50 (38)	2.95 (75)
CFX38-1	CFX38-1E	1.34-1.50	(34 - 38)	1.65 (42)	3.11 (79)
CFX42-1	CFX42-1E	1.50-1.65	(38 - 42)	1.81 (46)	3.27 (83)

Energy Chain System® Series Triflex® R Strain Relief



Triflex®
R

Triflex® R Quick exchange kit

- Ideal for Triflex® R ReadyChain®
- One-time-only alignment
- No repeat alignment upon exchange of ReadyChain®
- Exchange of the Triflex® R unit including cables without any tools

For Series	Part No. Quick exchange kit
TRC/TRE-60	TR-60-22- <input type="text"/>
TRC/TRE-70	TR-70-22- <input type="text"/>
TRC/TRE-85	TR-85-22- <input type="text"/>
TRC/TRE-100	TR-100-22- <input type="text"/>



For desired pillow block opening, Ø 30, 32, or 34 mm please fill in the blank with the appropriate dimension.
For example: TR-100-21-01-

With or without strain relief

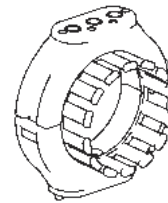


Pillow block available in 30, 32 and 34 mm opening

- 2 versions for each size available (with or without strain relief)
- Safe and simple. Affix the cables with tiewraps
- Pillow block sizes available for connections to standard extensions of many robot manufacturers: Ø 30 mm, Ø 32 mm, Ø 34 mm

For Energy Chain®	Part No. with strain relief		Part No. without strain relief	
	TRC/TRE.60	TR-60-21-01- <input type="text"/>	TR-60-21-02- <input type="text"/>	
TRC/TRE-70	TR-70-21-01- <input type="text"/>	TR-70-21-02- <input type="text"/>		
TRC/TRE-85	TR-85-21-01- <input type="text"/>	TR-85-21-02- <input type="text"/>		
TRC/TRE-100	TR-100-21-01- <input type="text"/>	TR-100-21-02- <input type="text"/>		

For desired pillow block opening, Ø 30, 32, or 34 mm please fill in the blank with the appropriate dimension.
For example: TR-100-21-01-



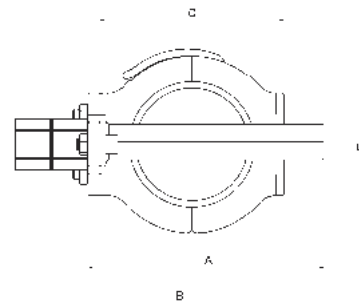
With strain relief



Without strain relief

With profile rail

- External strain relief system for large diameter cables; fits most common robots
- Double C rail for use with igus® CFX clamps
- Robust strain relief for heavy applications
- igus® clamp housings from high-grade steel or steel usable (see table below)

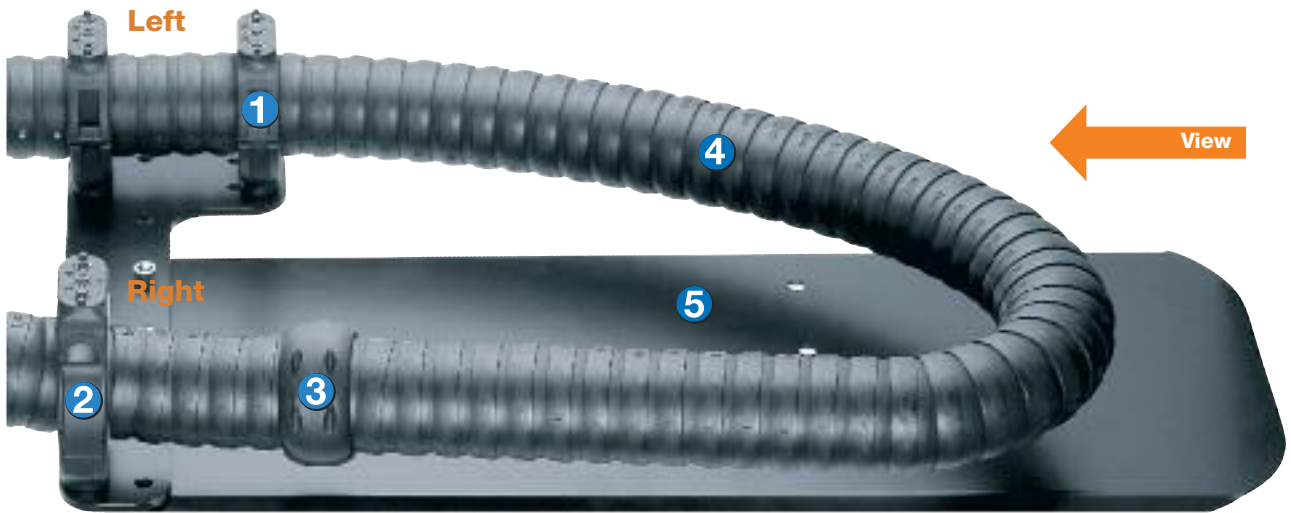


For Series	Part No.	A in. (mm)	B in. (mm)	C in. (mm)	E in. (mm)
TRC/TRE.60	TR-60-20- <input type="text"/>	—	—	—	—
TRC/TRE-70	TR-70-20- <input type="text"/>	6.34 (161)	8.35 (212)	4.96 (126)	4.96 (126)
TRC/TRE-85	TR-85-20- <input type="text"/>	6.34 (161)	8.35 (212)	6.02 (153)	6.10 (155)
TRC/TRE-100	TR-100-20- <input type="text"/>	6.34 (161)	8.35 (212)	6.02 (153)	6.10 (155)

For desired pillow block opening, Ø 30, 32, or 34 mm please fill in the blank with the appropriate dimension.
For example: TR-100-20-

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS





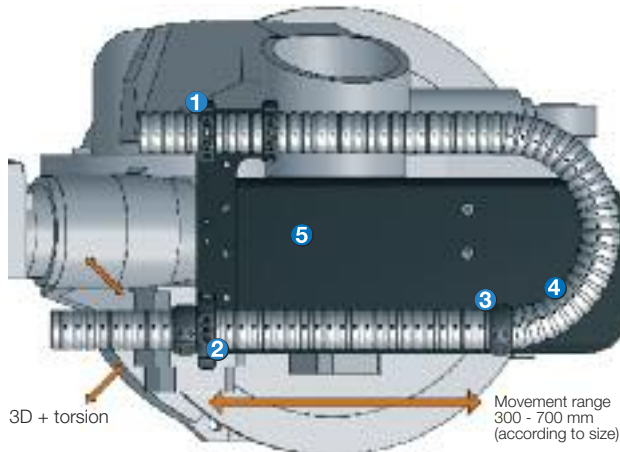
RS Assembly

Triflex® RS is a very compact universal assembly that is mounted to installation points available on the robot. Thanks to the low profile and the Triflex® R chain guide parallel to the robotic arm, applications with extremely low installation space can be achieved. Triflex® RS can be installed parallel to the robotic arm. Triflex® RS with integrated spring mechanism allows efficient energy supply to the robotic head without stress on the cables. The Triflex® R kit offers all advantages of proven Triflex® accessories, such as the FlexBar, universal assembly kit and fiber rod module in one system. All Triflex® R features are also included in the universal Triflex® RS module.

- One package for all applications, immediately installable
- Integrated fiber rods to retract cables
- First choice for robotic applications with narrow installation space
- Saves space through low installation height and close routing on the robotic arm
- Excellent service life
- Universally applicable



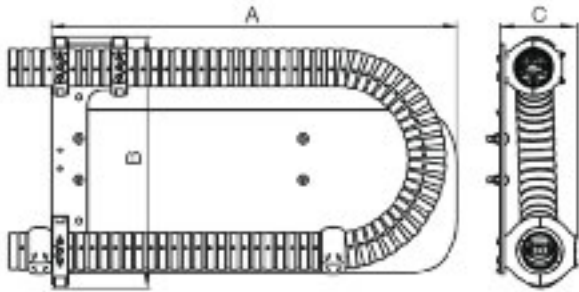
Triflex® RS - Extremely flat design, guides close to the robotic arm



- ① Mounting brackets for safe fastening
- ② Glide lead-through for a close and parallel guidance on the robotic arm
- ③ Limit stop dog for a defined free movement
- ④ Integrated recuperating spring prevents loop formations
- ⑤ Single module, space-saving and quickly mounted on robot



Integrated recuperating spring prevents loop formations



Triflex® RS - Fastening point, right

Universal module	Part No.	A	B	C
TRS for Series		in. (mm)	in. (mm)	in. (mm)
TRC-40/TRE-40	▶ TRC/TRE-RS-40-R	24.41 (620)	11.85 (301)	3.74 (95)
TRC-60/TRE-60	▶ TRC/TRE-RS-60-R	34.84 (885)	20.79 (528)	5.91 (150)
TRC-70/TRE-70	▶ TRC/TRE-RS-70-R	34.84 (885)	21.46 (545)	6.57 (167)
TRC-85/TRE-85	▶ TRC/TRE-RS-85-R	34.84 (885)	22.24 (565)	6.57 (167)
TRC-100/TRE-100	▶ TRC/TRE-RS-100-R	35.93 (912.5)	24.17 (614)	6.57 (167)

Triflex® RS - Fastening point, right, with cover

Universal module	Part No.	A	B	C
TRS for Series		in. (mm)	in. (mm)	in. (mm)
TRC-40/TRE-40	▶ TRC/TRE-RS-40-RC	24.41 (620)	11.85 (301)	3.74 (95)
TRC-60/TRE-60	▶ TRC/TRE-RS-60-RC	34.84 (885)	20.79 (528)	5.91 (150)
TRC-70/TRE-70	▶ TRC/TRE-RS-70-RC	34.84 (885)	21.46 (545)	6.57 (167)
TRC-85/TRE-85	▶ TRC/TRE-RS-85-RC	34.84 (885)	22.24 (565)	6.57 (167)
TRC-100/TRE-100	▶ TRC/TRE-RS-100-RC	35.93 (912.5)	24.17 (614)	6.57 (167)

Triflex® RS - Fastening point, left

Universal module	Part No.	A	B	C
TRS for Series		in. (mm)	in. (mm)	in. (mm)
TRC-40/TRE-40	▶ TRC/TRE-RS-40-L	24.41 (620)	11.85 (301)	3.74 (95)
TRC-60/TRE-60	▶ TRC/TRE-RS-60-L	34.84 (885)	20.79 (528)	5.91 (150)
TRC-70/TRE-70	▶ TRC/TRE-RS-70-L	34.84 (885)	21.46 (545)	6.57 (167)
TRC-85/TRE-85	▶ TRC/TRE-RS-85-L	34.84 (885)	22.24 (565)	6.57 (167)
TRC-100/TRE-100	▶ TRC/TRE-RS-100-L	35.93 (912.5)	24.17 (614)	6.57 (167)

Triflex® RS - Fastening point, left, with cover

Universal module	Part No.	A	B	C
TRS for Series		in. (mm)	in. (mm)	in. (mm)
TRC-40/TRE-40	▶ TRC/TRE-RS-40-LC	24.41 (620)	11.85 (301)	3.74 (95)
TRC-60/TRE-60	▶ TRC/TRE-RS-60-LC	34.84 (885)	20.79 (528)	5.91 (150)
TRC-70/TRE-70	▶ TRC/TRE-RS-70-LC	34.84 (885)	21.46 (545)	6.57 (167)
TRC-85/TRE-85	▶ TRC/TRE-RS-85-LC	34.84 (885)	22.24 (565)	6.57 (167)
TRC-100/TRE-100	▶ TRC/TRE-RS-100-LC	35.93 (912.5)	24.17 (614)	6.57 (167)

Fastening point,
right



Triflex® R-Set with cover for the additional support of switch cabinets or valve terminals



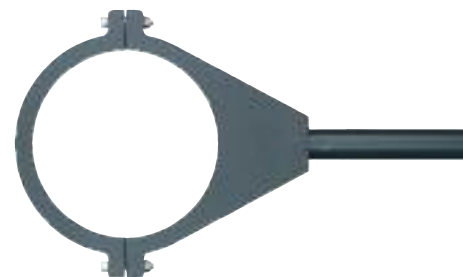
Triflex® R-Set with cover (barrier)

- Creates more mounting space on robots - e.g. for switch cabinets or valve terminals
- For upside down applications
- Enables the use of Triflex® RS in applications with extreme movements



43 Adapter brackets for robots from stock

- 43 adapter bracket types from stock for many different robots
- For all Triflex® RS modules
- For assembly to the side or on top



Triflex® R installed on axis 6
Part No. TR-907-667-Inner Ø

- One axis diameter (Ø30 mm) for all robots
- Easy and fast assembly
- For Triflex® R mounting bracket with CFX clamps (TR-XX-20-30)
- For Triflex® R mounting bracket with profile rail (TR-XX-21-30)
- For TR-XX-22-30 Quick exchange kit

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Fiber rod module:

For applications where too much flexibility is not desired.



Fiber rod modules - Intelligent
problem solution through
directed pretension (for TRC/TRE)

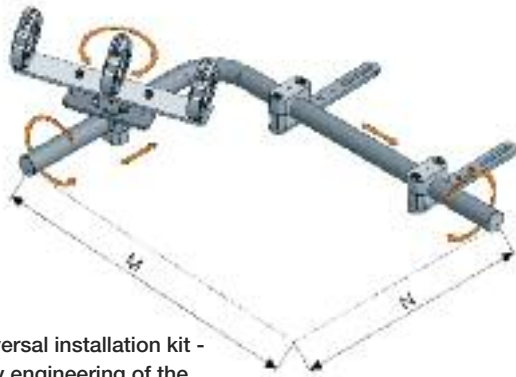


TRC/TRE with mounted fiber rods	Length		Max. Load	
	in.	(mm)	lbs/ft	(kg/m)
Triflex® R 40 Series				
TRCF/TREF-40-1000-1	39.37	(1000)	.26	(0.4)
TRCF/TREF-40-0900-1	35.43	(900)	.33	(0.5)
TRCF/TREF-40-0800-1*	31.50	(800)	.40	(0.6)
TRCF/TREF-40-0700-1	27.56	(700)	.46	(0.7)
TRCF/TREF-40-0600-1	23.62	(600)	.53	(0.8)
TRCF/TREF-40-0500-1	19.69	(500)	.60	(0.9)
TRCF/TREF-40-0400-1	15.75	(400)	.67	(1.0)
Triflex® R 60 Series				
TRCF/TREF-60-1400-1	55.12	(1400)	.67	(1.0)
TRCF/TREF-60-1200-1	47.24	(1200)	.80	(1.2)
TRCF/TREF-60-1000-1*	39.37	(1000)	.93	(1.4)
TRCF/TREF-60-0800-1	31.50	(800)	1.07	(1.6)
TRCF/TREF-60-0600-1	23.62	(600)	1.18	(1.8)
TRCF/TREF-60-0400-1	15.75	(400)	1.34	(2.0)
Triflex® R 70 Series				
TRCF/TREF-70-1800-1	70.87	(1800)	.94	(1.4)
TRCF/TREF-70-1600-1	62.99	(1600)	1.07	(1.6)
TRCF/TREF-70-1400-1	55.12	(1400)	1.18	(1.8)
TRCF/TREF-70-1200-1*	47.24	(1200)	1.34	(2.0)
TRCF/TREF-70-1000-1	39.37	(1000)	1.47	(2.2)
TRCF/TREF-70-0800-1	31.50	(800)	1.61	(2.4)
Triflex® R 85 Series				
TRCF/TREF-85-2000-1	78.74	(2000)	.94	(1.4)
TRCF/TREF-85-1800-1	70.87	(1800)	1.1	(1.7)
TRCF/TREF-85-1600-1	70.87	(1600)	1.2	(1.9)
TRCF/TREF-85-1400-1*	55.12	(1400)	1.4	(2.1)
TRCF/TREF-85-1200-1	47.24	(1200)	1.5	(2.3)
TRCF/TREF-85-1000-1	39.37	(1000)	1.7	(2.6)
TRCF/TREF-85-0800-1	31.50	(800)	2.0	(3.0)
Triflex® R 100 Series				
TRCF/TREF-100-2000-1	78.74	(2000)	1.07	(1.6)
TRCF/TREF-100-1800-1	70.87	(1800)	1.34	(2.0)
TRCF/TREF-100-1400-1*	55.12	(1400)	1.61	(2.4)
TRCF/TREF-100-1200-1	47.24	(1200)	1.74	(2.6)
TRCF/TREF-100-1000-1	39.37	(1000)	2.01	(3.0)

* recommended lengths of the fiber rods

Universal installation kit:

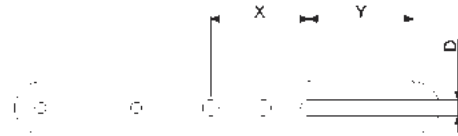
Universal installation kit allows the attachment of fiber rod modules in any given position, relative to the robotic arm.



Universal installation kit -
 Easy engineering of the
 fiber rods (for TRC/TRE)

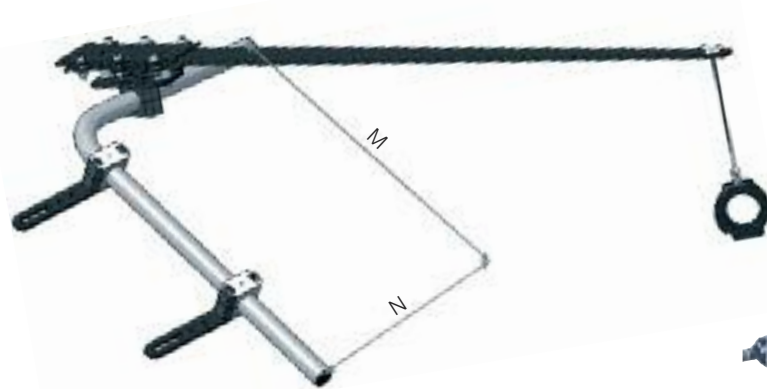
Product range - Universal Installation Kit

FlexBar	Part No.	X	Y	M	N	D
for Series		in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)
TRC/TRE-40	▶ TR-40-80	1.57 (40)	1.18 (30)	18.70 (475)	12.80 (325)	.25 (6.3)
TRC/TRE-60	▶ TR-60-80	1.57 (40)	1.18 (30)	18.70 (475)	12.80 (325)	.25 (6.3)
TRC/TRE-70	▶ TR-70-80	2.95 (75)	3.15 (80)	34.45 (875)	22.64 (575)	.49 (12.5)
TRC/TRE-85	▶ TR-85-80	2.95 (75)	3.15 (80)	34.45 (875)	22.64 (575)	.49 (12.5)
TRC/TRE-100	▶ TR.100-90	2.95 (75)	3.15 (80)	34.45 (875)	22.64 (575)	.49 (12.5)



FlexBar:

For robot-applications with extreme movements in the 4th to 6th axis and avoidance from loops

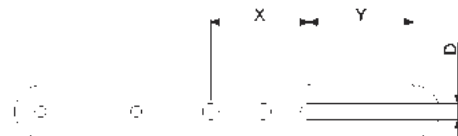


FlexBar - Universal fiber rod module
 for extreme robotic movements (for TRC/TRE)

The igus® universal module as
 standard Triflex® R-Set ▶ page 8.23

Product range - FlexBar

FlexBar	Part No.	X	Y	M	N	D
for Series		in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)
TRC/TRE-60	▶ TR-60-90	1.57 (40)	1.18 (30)	18.70 (475)	12.80 (325)	.25 (6.3)
TRC/TRE-70	▶ TR-70-90	2.95 (75)	3.15 (80)	34.45 (875)	22.64 (575)	.49 (12.5)
TRC/TRE-85	▶ TR-85-90	2.95 (75)	3.15 (80)	34.45 (875)	22.64 (575)	.49 (12.5)
TRC/TRE-100	▶ TR.100-90	2.95 (75)	3.15 (80)	34.45 (875)	22.64 (575)	.49 (12.5)



PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS

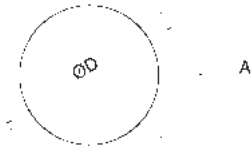


Abrasion Protectors

Protectors are available for maximum cycle life in heavy duty applications with hard impacts and rubbing of Triflex® R against the robot.

- Fast and simple installation and replacement
- Shock absorbing
- Lightweight
- Glides smoothly along robot contours
- Attaches to any link

For Series	Part No.	ØD	
		in. (mm)	in. (mm)
TRC/TRE-40	TR-40-10	2.20 (56)	1.06 (27)
TRC/TRE-60	TR-60-10	3.31 (84)	1.57 (40)
TRC/TRE-70	TR-70-10	4.13 (105)	1.97 (50)
TRC/TRE-85	TR-85-10	4.65 (118)	2.32 (59)
TRC/TRE-100	TR-100-10	5.24 (133)	2.64 (67)



Triflex® R Cover - Heat Shield

- Protects against weld and metal splatter up to 1082°F (600°C) short term
- Ends are elasticized for sealing
- Easy to replace using hook and loop tape
- Standard length from stock
- Asbestos-free
- Coating: Aramid

For Series | Part No. XX= Length of the protective cover - choose from the following standard lengths
Example: TR-40-15-0500

For Series	Part No.	Length (mm)			
		in.	(mm)	in.	(mm)
TRC/TRE-40	TR-40-15-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)
TRC/TRE-60	TR-60-15-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)
TRC/TRE-70	TR-70-15-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)
TRC/TRE-85	TR-85-15-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)
TRC/TRE-100	TR-100-15-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)



Triflex® R Cover - Protective Jacket

- Temperatures up to room temperature
- Ends are elasticized for sealing
- Easy to replace using hook and loop tape
- Standard length from stock
- Silicone-free
- Coating: none

For Series | Part No. XX= Length of the protective cover - choose from the following standard lengths
Example: TR-40-16-0500

For Series	Part No.	Length (mm)			
		in.	(mm)	in.	(mm)
TRC/TRE-40	TR-40-16-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)
TRC/TRE-60	TR-60-16-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)
TRC/TRE-70	TR-70-16-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)
TRC/TRE-85	TR-85-16-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)
TRC/TRE-100	TR-100-16-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)



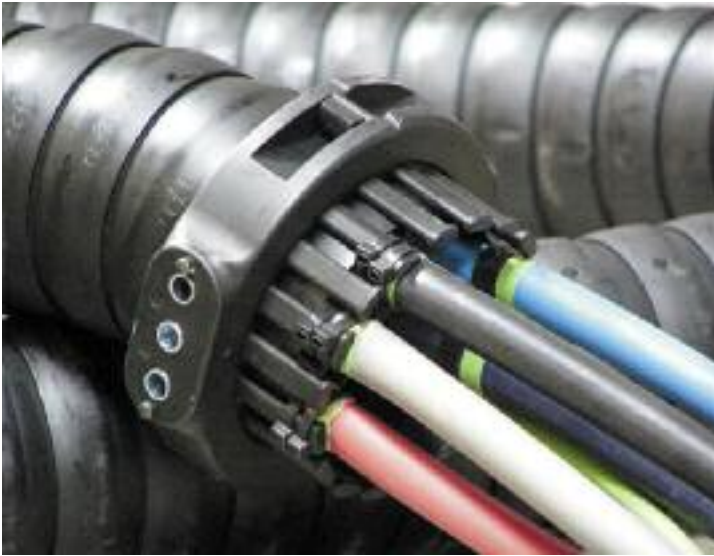
Triflex® R Cover - Light Protective Jacket

- Temperatures up to room temperature
- Ends are elasticized for sealing
- Easy to replace using hook and loop tape
- Standard length from stock
- Silicone-free
- Coating: none

For Series | Part No. XX= Length of the protective cover - choose from the following standard lengths
Example: TR-40-17-0500

For Series	Part No.	Length (mm)			
		in.	(mm)	in.	(mm)
TRC/TRE-40	TR-40-17-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)
TRC/TRE-60	TR-60-17-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)
TRC/TRE-70	TR-70-17-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)
TRC/TRE-85	TR-85-17-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)
TRC/TRE-100	TR-100-17-XX	19.68 (500)	39.37 (1000)	59.06 (1500)	78.74 (2000)





Space-saving integrated strain relief at the connection point

When filling Triflex® R, sufficient clearance needs to be provided for all electric cables, pneumatic and media hoses, in order to compensate for forces from relative motion between the cables and hoses.

As a rule of thumb, the following values apply:

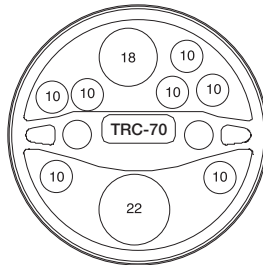
- The total of cable/hose diameters must not exceed 60% of the usable cross section of their Triflex® R component.
- A clearance of at least 10% (min. 1 mm) between any two cables/hoses
- Cables/hoses need to be able to move freely inside the Triflex® R.

Please refer to the chart on this page for an overview of available cross sections for Triflex® R.

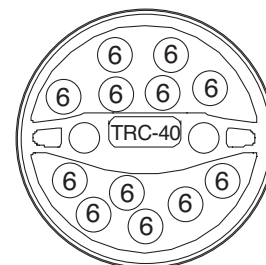
Example:
Cross Section Calculation

$A_{\text{conduit}} = \frac{d^2 \times \pi}{4}$	
Examples:	
$A_1 = 10 \text{ mm} \times 10 \text{ mm} \times \frac{\pi}{4}$	
$= 78.5 \text{ mm}^2 \times 7$ (number of conduits)	
$= 549.50 \text{ mm}^2$	
$A_2 = 18 \text{ mm} \times 18 \text{ mm} \times \frac{\pi}{4}$	
$= 254.34 \text{ mm}^2$	
$A_3 = 22 \text{ mm} \times 22 \text{ mm} \times \frac{\pi}{4}$	
$= 379.94 \text{ mm}^2$	
$A_{\text{conduit}} = A_1 + A_2 + A_3 = 1183.7 \text{ mm}^2$	

Filling Example: TRC-70



Filling Example: TRC-40



The smaller the relation between usable cross section and the total of cable/hose diameters, the less the stress of the cables.

Series	Usable Cross Section
TRC/TRE-30	.48 inch ² (313.0 mm ²)
TRC/TRE-40	.78 inch ² (508.0 mm ²)
TRC/TRE-60	1.77 inch ² (1144.6 mm ²)
TRC/TRE-70	2.77 inch ² (1788.0 mm ²)
TRC/TRE-85	3.77 inch ² (2431.0 mm ²)
TRC/TRE-100	4.92 inch ² (3177.0 mm ²)



Customer-specific special cable for robotic and torsion applications

- Control, motor, servo, bus and data cables
- Shielded and unshielded
- Outer jacket material: PVC, PUR, TPE
- Torsion area according to requirement
- Sectors: Robotic and 3D applications

The service life of cables in torsion applications depend disproportionately on the exact progression of the angle of torsion and the cable length of the exact application. As a single test facility is often insufficient, Chainflex® cables are tested on various constructional systems. Your torsion cables are tested as realistic as possible for your application. For this purpose, igus® uses up to 8 different test facilities in the in-house laboratory.

Torsionable Chainflex® robotic cables for +/-180° angle of twist per meter length



Chainflex® CFROBOT9 - PUR-Hybrid cable, torsionable



Chainflex® CFROBOT8 - PUR-Bus cable, torsionable



Chainflex® CFROBOT6 - PUR-Motor cable, torsionable



Chainflex® CFROBOT7 - PUR-Motor cable, torsionable, shielded



Chainflex® CFROBOT5 - TPE-Fiber optic cable, torsionable



Chainflex® CFROBOT - Single-core TPE robotic cable

Triflex® R - Tests in the igus® lab



Testing facility at the igus® laboratory



Torsion test of CF-ROBOT

Triflex® R - Chainflex® Robot Cable Package

Robot cables and other conduits are delivered as harnessed kits.

Triflex® R - ReadyChain® - Chainflex® cable/hose Packages

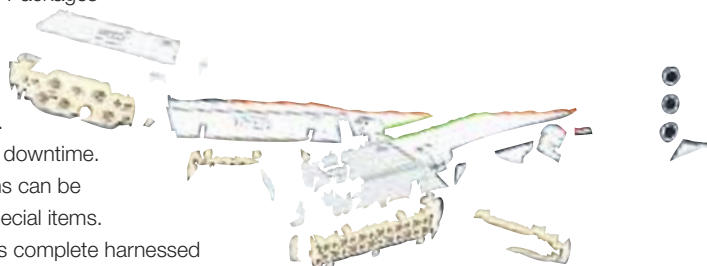
Turnkey harnessed ReadyChain® cable and hose packages, equipped with Chainflex® cables for use on robots. Delivered complete with cables, hoses, connectors and accessories.

ReadyChain® minimizes setup time and reduces downtime.

Cable and hose packages for robotic applications can be customized with Chainflex® products or other special items.

Robot cables and other conduits are delivered as complete harnessed systems.

Under the igus® CFRobot range, control, data, servo- and motor cables are available.





TRC-100-145-0 with cable handling package



Handling robot for the glass industry



Laser cutting machine



Triflex® R in the pharmaceutical industry



igus® E2 Energy Tube and Triflex® R in a processing machine



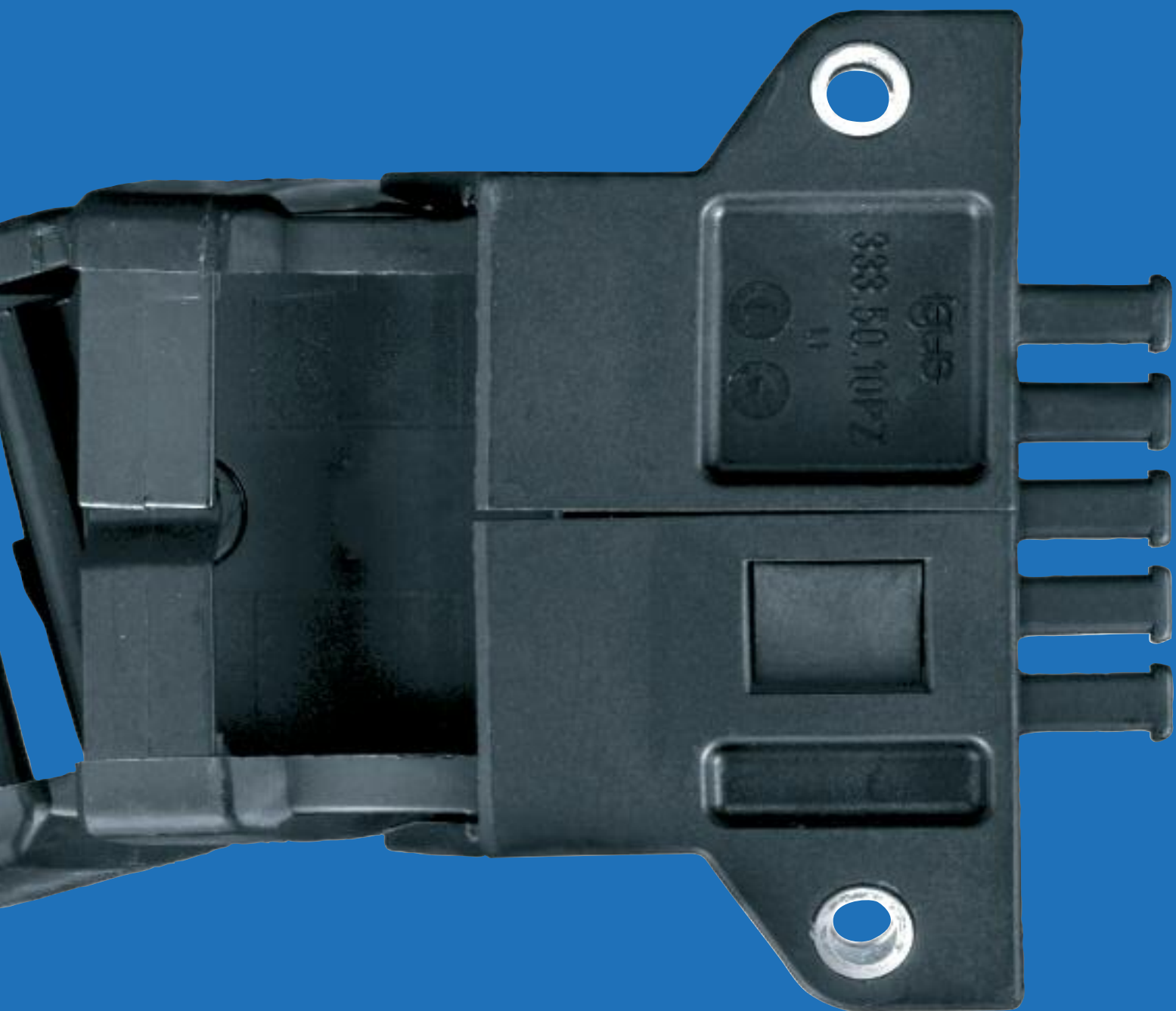
igus® System E6 and Triflex® R TRE in a Y/Z-gantry

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



E-Z Triflex®





E-Z Triflex® - for 2D and 3D movements, easy access to cable from both sides

The Triflex® series has been developed to safely guide cables through a 3D movement. With E-Z Triflex®, the installation of cables and hoses is easy. Cables can be inserted into the Energy Chain® from the top or bottom through an opening along the length of the chain. The unique modular design of Triflex® enables very complex movements through all three axes.

Typical industries and applications

- Machine Tools
- Robots
- Material handling
- Plastics machinery
- Construction machines
- Vehicles
- General machinery
- Medical equipment



iF-Design awards for
Easy Triflex®-design

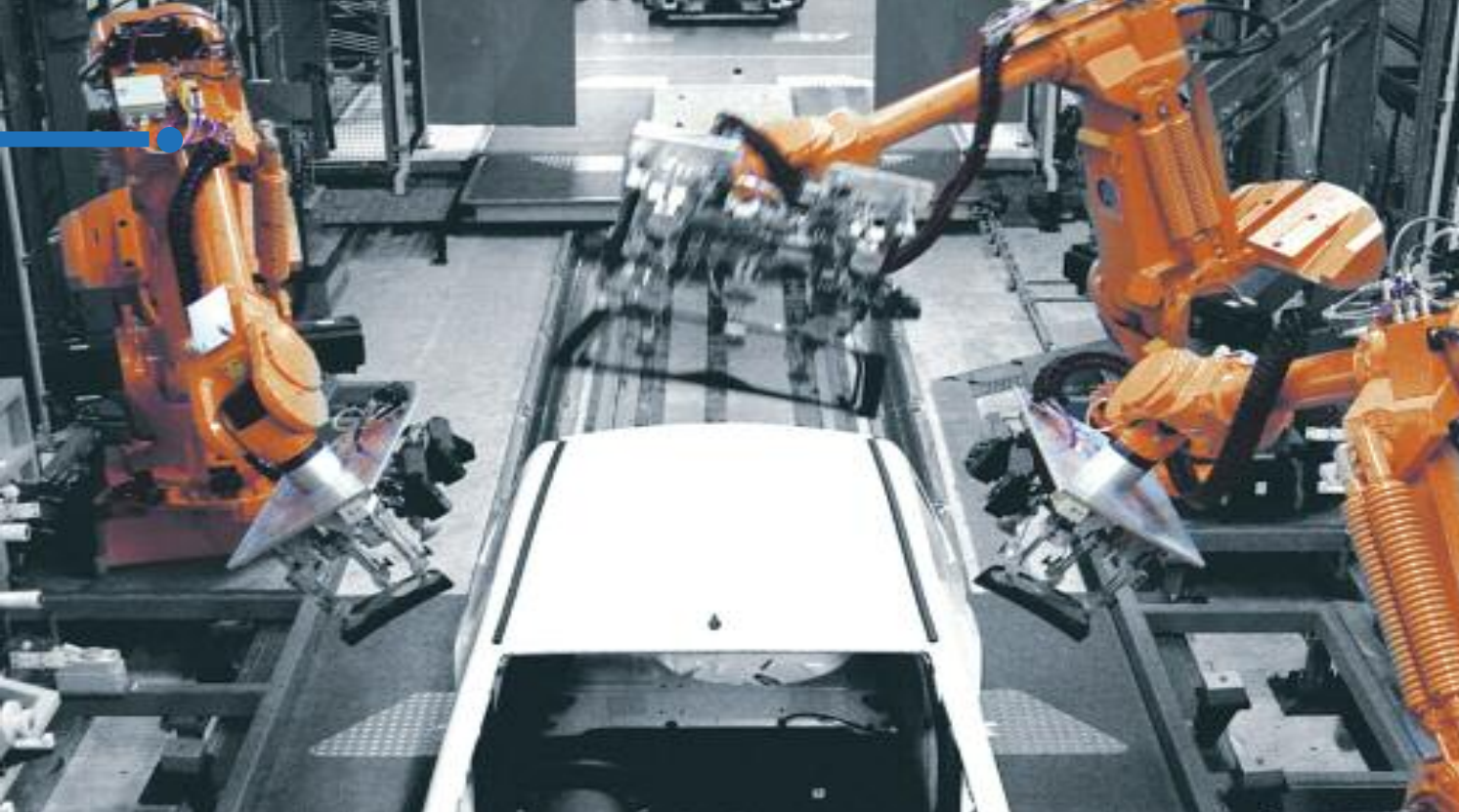


Torsional motion
possible



UL94-V2
classifications





Robots with igus® E-Z Triflex® Energy Chains® on an assembly line



E-Z Triflex® Energy Chains® for multi-dimensional movements on a production line



E-Z Triflex® Energy Chains® also for easy applications - here an aesthetic application

E-Z Triflex® - The Solution for Your Office

Dangling lines are risky and unaesthetic. The new solution: E-Z Triflex® and Triflex® Energy Chains® with special connector elements for your desk. They offer reliable, movable and elegant protection for lines, are quickly installed and are available in many variations. Naturally they can be installed at any time as retrofits. Simply press the lines from two sides. This is possible at any point desired.

Energy Chain System® E-Z Triflex® Series



E-Z Chain®
principle -
simply press
cables in

Material
igumid NB -
UL94-V2
classification

Select this modular Energy Chain System® for:

- 3-axis motions in all kinds of machinery
- Some robotics applications
- Very fast cable assembly with "E-Z" principle
- Simple filling from two sides
- Where rectangular shapes fit better
- Combination of different bending radii and movement directions
- Lengthen and shorten anywhere
- KMA mounting brackets with integrated strain relief
- You can find more technical data about the material, chemical resistance, temperatures ► **Design, Chapter 1**

Selection table

Single-axis and double-axis movement:

Series	Inner Height		Inner Width		Outer height/Outer Width		Bending Radii	
	<i>Bi 1/Bi 2</i>		<i>Bi 3</i>		<i>Ba</i>		<i>R</i>	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
E331-25	.51	(13)	.98	(25)	1.34	(34)	1.89 - 7.87	(048 - 200)
E331-32	.69	(17.5)	1.26	(32)	1.97	(50)	2.95 - 9.84	(075 - 250)
E331-50	1.02	(26)	1.97	(50)	2.68	(68)	3.94 - 9.84	(100 - 250)
E331-75	1.52	(38.5)	2.95	(75)	3.78	(96)	5.51 - 11.81	(140 - 300)

Single-axis and double-axis movement:

Series	Inner Height		Inner Width		Outer height/Outer Width		Bending Radii	
	<i>Bi 1/Bi 2</i>		<i>Bi 3</i>		<i>Ba</i>		<i>R</i>	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
E332-25	.51	(13)	.98	(25)	1.34	(34)	1.89 - 7.87	(048 - 200)
E332-32	.69	(17.5)	1.26	(32)	1.97	(50)	2.95 - 9.84	(075 - 250)
E332-50	1.02	(26)	1.97	(50)	2.68	(68)	3.94 - 9.84	(100 - 250)
E332-75	1.52	(38.5)	2.95	(75)	3.78	(96)	5.51 - 11.81	(140 - 300)

Triple-axis movement

Series	Inner Height		Inner Width		Outer height/Outer Width		Bending Radii	
	<i>Bi 1/Bi 2</i>		<i>Bi 3</i>		<i>Ba</i>		<i>R</i>	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
E333-25	.51	(13)	.98	(25)	1.34	(34)	1.89 - 7.87	(048 - 200)
E333-32	.69	(17.5)	1.26	(32)	1.97	(50)	2.95 - 9.84	(075 - 250)
E333-50	1.02	(26)	1.97	(50)	2.68	(68)	3.94 - 9.84	(100 - 250)
E333-75	1.52	(38.5)	2.95	(75)	3.78	(96)	5.51 - 11.81	(140 - 300)

Energy Chain System® E-Z Triflex® Series

E-Z Triflex® Series - Assembling



1
Twist and snap in



2
Shorten and lengthen
at any given point

E-Z Triflex® Series - Separating



1
Lever the E-Z Triflex®
side link with screwdriver



2
Twist and separate - For Series E333
you have to separate the "middle" pin

E-Z Triflex® Series - Filling



1
Easy to fill - simply press cables in...



2
...and easy to take the cables out

Price Index



Series E332/E333

Special Options Available

Flammability Class
VDE 0304 IIC UL94 V2

Torsion motion possible

iF-Design Award Winner

Assembly Tips



Easy to fill - simply press cables in

Usage Guidelines



- If simple cable installation is required with complex movements
- If simple cable installation from both sides with complex movements is required
- For repair and supplementation of existing Triflex® Systems



- For circular movements with high loads
 - TwisterChain® System, from **Chapter 8**
- If chip protection is necessary
 - Triflex® System, from **Chapter 8**

Features & Benefits

- 1 KMA split-open mounting bracket with integrated strain relief
- 2 Patented "push-button-principle"
- 3 iF-Design Award Winner
- 4 Different bending radii and directions can be combined
- 5 Robotics applications possible
- 6 Shorten and lengthen at any given point
- 7 3-Axis motions in machinery of all kinds
- 8 Simple filling from 2 sides "E-Z Chain®"-principle - simply press in cable along the inner radius or the outer radius



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

6.56 ft (2 m) **E333-50-100/100-0**

Energy Chain®

1 Set **333-50-12PZ**

Mounting Bracket

Technical Data



Details of material properties

➤ **Chapter 1**

Material - permitted temperature

igumid NB / -40°F (-40°C) up to +176°F (+80°C)

Flammability Class, igumid NB

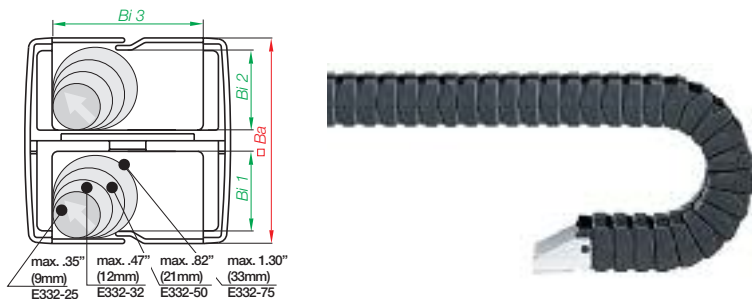
VDE 0304 IIC UL94 V2

Energy Chain System® E-Z Triflex® Series - Single Axis Movement



Series
E331

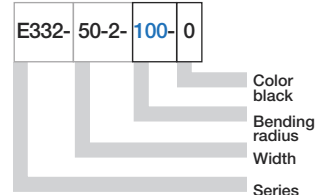
Single Axis Movement, Series E331



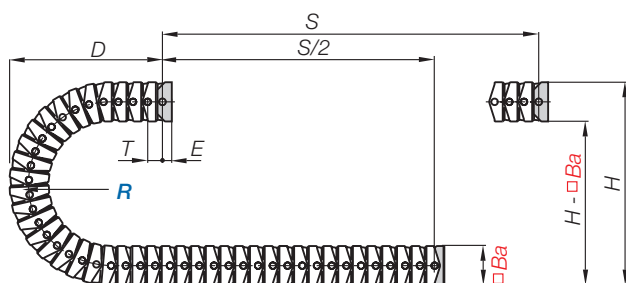
Part No.	Bi 1	Bi 2	Bi 3	Ba
E331-25-2- <input type="text"/> -0	.51 (13)	.51 (13)	.98 (25)	1.34 (34)
E331-32-2- <input type="text"/> -0	.69 (17.5)	.69 (17.5)	1.26 (32)	1.97 (50)
E331-50-2- <input type="text"/> -0	1.02 (26)	1.02 (26)	1.97 (50)	2.68 (68)
E331-75-2- <input type="text"/> -0	1.52 (38.5)	1.52 (38.5)	2.95 (75)	3.78 (96)

Supplement part number with required radius from below
for example E331-50-2-100-0

Part No. structure



Installation dimensions for single-axis movement



For center mount applications:
Chain length = $\frac{S}{2} + K$

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{"safety buffer"}$

Series E331-25-2--0

R	1.89 (048)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)
H	5.12 (130)	7.28 (185)	9.25 (235)	11.22 (285)	13.19 (335)	15.15 (385)	17.13 (435)
D	3.74 (95)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	9.84 (250)
K	7.68 (195)	11.02 (280)	14.17 (360)	17.32 (440)	20.28 (515)	23.43 (595)	26.57 (675)

Pitch = .57 (14.5 mm)
Links/ft (m) = 21.03 (69)
Dimensions E = .39 (10 mm)
Ba = 1.34 (34 mm)

Series E331-32-2--0

R	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)
H	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	17.72 (450)	21.65 (550)
D	5.12 (130)	6.10 (155)	7.09 (180)	8.07 (205)	10.04 (255)	12.01 (305)
K	12.01 (305)	15.15 (385)	18.30 (465)	21.46 (545)	27.56 (700)	34.06 (865)

Pitch = .98 (25 mm)
Links/ft (m) = 12.24 (40)
Dimensions E = .79 (20 mm)
Ba = 1.97 (50 mm)

Series E331-50-2--0

R	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)
H	10.63 (270)	12.60 (320)	14.76 (375)	18.50 (470)	22.44 (570)
D	7.68 (195)	8.66 (220)	9.65 (245)	11.61 (295)	13.58 (345)
K	17.13 (435)	20.47 (520)	23.23 (590)	29.53 (750)	35.83 (910)

Pitch = 1.18 (30 mm)
Links/ft (m) = 10.17 (34)
Dimensions E = .98 (25 mm)
Ba = 2.68 (68 mm)

Series E331-75-2--0

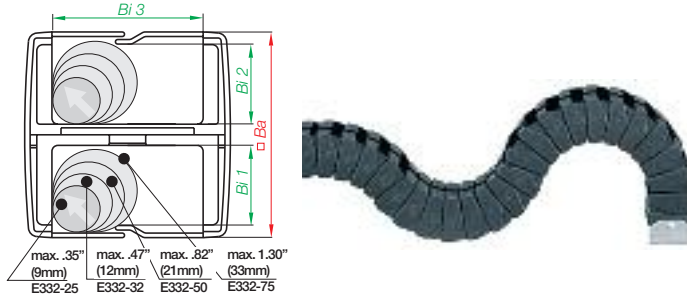
R	5.51 (140)	6.89 (175)	7.87 (200)	9.84 (250)	11.81 (300)
H	14.96 (380)	17.71 (450)	19.69 (500)	23.62 (600)	27.56 (700)
D	9.45 (240)	10.83 (275)	11.81 (300)	13.78 (350)	15.75 (400)
K	21.65 (550)	25.98 (660)	29.13 (740)	35.43 (900)	41.73 (1060)

Pitch = 1.42 (36 mm)
Links/ft (m) = 8.45 (28)
Dimensions E = .98 (25 mm)
Ba = 3.78 (96 mm)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



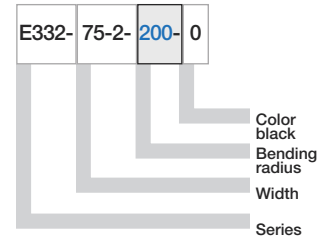
Double Axis Movement, Series E332



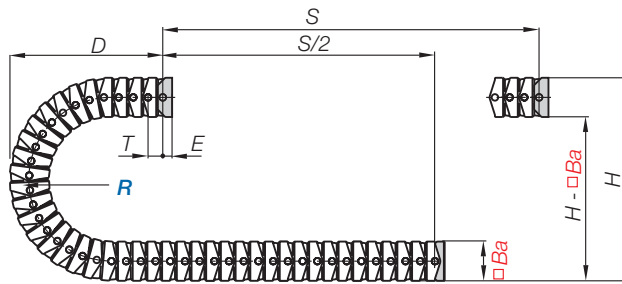
Part No.	Bi 1	Bi 2	Bi 3	Ba
E332-25-2- <input type="text"/> -0	.51 (13)	.51 (13)	.98 (25)	1.34 (34)
E332-32-2- <input type="text"/> -0	.69 (17.5)	.69 (17.5)	1.26 (32)	1.97 (50)
E332-50-2- <input type="text"/> -0	1.02 (26)	1.02 (26)	1.97 (50)	2.68 (68)
E332-75-2- <input type="text"/> -0	1.52 (38.5)	1.52 (38.5)	2.95 (75)	3.78 (96)

Supplement part number with required radius from below
for example, E332-75-2--0

Part No. structure



Installation dimensions for double-axis movement



For center mount applications:
Chain length = $S/2 + K$

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{"safety buffer"}$

Series E332-25-2--0

R	1.89 (048)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)
H	5.12 (130)	7.28 (185)	9.25 (235)	11.22 (285)	13.19 (335)	15.15 (385)	17.13 (435)
D	3.74 (95)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	9.84 (250)
K	7.68 (195)	11.02 (280)	14.17 (360)	17.32 (440)	20.28 (515)	23.43 (595)	26.57 (675)

Pitch = .57 (14.5 mm)
Links/ft (m) = 21.03 (69)
Dimensions E = .39 (10 mm)
Ba = 1.34 (34 mm)

Series E332-32-2--0

R	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)
H	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	17.72 (450)	21.65 (550)
D	5.12 (130)	6.10 (155)	7.09 (180)	8.07 (205)	10.04 (255)	12.01 (305)
K	12.01 (305)	15.15 (385)	18.30 (465)	21.46 (545)	27.56 (700)	34.06 (865)

Pitch = .98 (25 mm)
Links/ft (m) = 12.24 (40)
Dimensions E = .79 (20 mm)
Ba = 1.97 (50 mm)

Series E332-50-2--0

R	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)
H	10.63 (270)	12.60 (320)	14.76 (375)	18.50 (470)	22.44 (570)
D	7.68 (195)	8.66 (220)	9.65 (245)	11.61 (295)	13.58 (345)
K	17.13 (435)	20.47 (520)	23.23 (590)	29.53 (750)	35.83 (910)

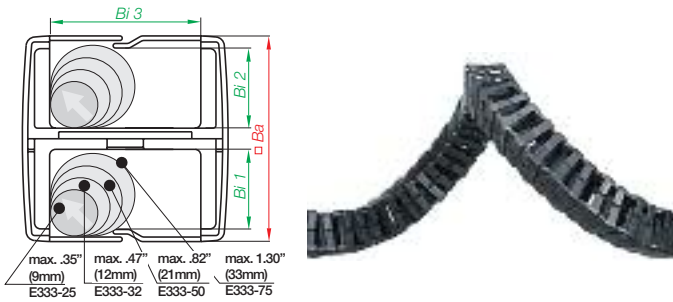
Pitch = 1.18 (30 mm)
Links/ft (m) = 10.17 (34)
Dimensions E = .98 (25 mm)
Ba = 2.68 (68 mm)

Series E332-75-2--0

R	5.51 (140)	6.89 (175)	7.87 (200)	9.84 (250)	11.81 (300)
H	14.96 (380)	17.71 (450)	19.69 (500)	23.62 (600)	27.56 (700)
D	9.45 (240)	10.83 (275)	11.81 (300)	13.78 (350)	15.75 (400)
K	21.65 (550)	25.98 (660)	29.13 (740)	35.43 (900)	41.73 (1060)

Pitch = 1.42 (36 mm)
Links/ft (m) = 8.45 (28)
Dimensions E = .98 (25 mm)
Ba = 3.78 (96 mm)

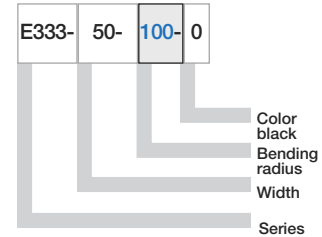
Triple Axis Movement, Series E333



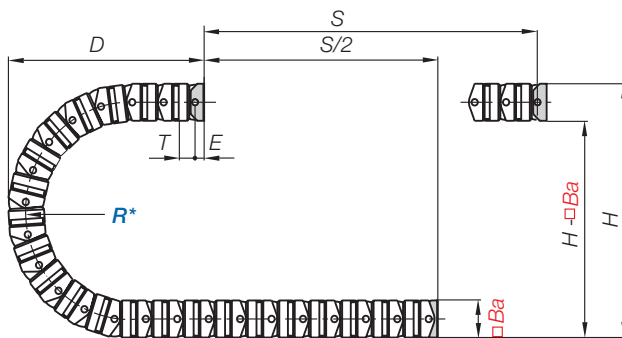
Part No.	Bi 1	Bi 2	Bi 3	Ba
E333-25-□-0	.51 (13)	.51 (13)	.98 (25)	1.34 (34)
E333-32-□-0	.69 (17.5)	.69 (17.5)	1.26 (32)	1.97 (50)
E333-50-□-0	1.02 (26)	1.02 (26)	1.97 (50)	2.68 (68)
E333-75-□-0	1.52 (38.5)	1.52 (38.5)	2.95 (75)	3.78 (96)

Supplement part number with required radius from above
for example, E333-32-**100**-0

Part No. structure



Installation dimensions for triple-axis movement



For center mount applications:
Chain length = $\frac{S}{2} + K$

* The bending radii are doubled in the case of the Series E333 Energy Chain®

Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{"safety buffer"}$

Series E333-25-**XXX**-0

R	3.78 (096)	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)
H	9.06 (230)	13.19 (335)	17.13 (435)	21.06 (535)	25.00 (635)	28.94 (735)	32.87 (835)
D	5.71 (145)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)
K	13.78 (350)	20.28 (515)	26.57 (675)	32.68 (830)	38.98 (990)	45.28 (1150)	51.18 (1300)

Pitch = .57 (14.5 mm)
Links/ft (m) = 21.03 (69)
Dimensions E = .39 (10 mm)
Ba = 1.34 (34 mm)

Series E333-32-**XXX**-0

R	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)	15.75 (400)	19.69 (500)
H	13.78 (350)	17.72 (450)	21.65 (550)	25.59 (650)	33.46 (850)	41.33 (1050)
D	8.07 (205)	10.04 (255)	12.01 (305)	13.98 (355)	17.91 (455)	21.85 (555)
K	21.46 (545)	27.56 (700)	33.86 (860)	40.16 (1020)	51.18 (1300)	63.19 (1605)

Pitch = .98 (25 mm)
Links/ft (m) = 12.24 (40)
Dimensions E = .79 (20 mm)
Ba = 1.97 (50 mm)

Series E333-50-**XXX**-0

R	7.87 (200)	9.84 (250)	11.81 (300)	15.75 (400)	19.69 (500)
H	18.50 (470)	22.44 (570)	26.38 (670)	34.25 (870)	42.13 (1070)
D	11.61 (295)	13.58 (345)	15.55 (395)	19.49 (495)	23.42 (595)
K	29.53 (750)	35.83 (910)	42.13 (1070)	54.33 (1380)	66.54 (1690)

Pitch = 1.18 (30 mm)
Links/ft (m) = 10.17 (34)
Dimensions E = .98 (25 mm)
Ba = 2.68 (68 mm)

Series E333-75-**XXX**-0

R	11.02 (280)	13.78 (350)	15.75 (400)	19.69 (500)	23.62 (600)
H	25.98 (660)	31.50 (800)	35.43 (900)	43.31 (1100)	51.18 (1300)
D	14.96 (380)	17.72 (450)	19.69 (500)	23.62 (600)	27.56 (700)
K	38.98 (990)	47.64 (1210)	55.12 (1400)	66.93 (1700)	78.74 (2000)

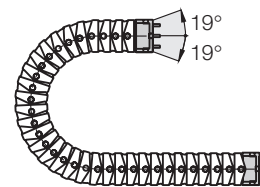
Pitch = 1.42 (36 mm)
Links/ft (m) = 8.45 (28)
Dimensions E = .98 (25 mm)
Ba = 3.78 (96 mm)



Mounting Brackets

Option 1: KMA

- Corrosion resistant
- Strain relief with tiwrap plate

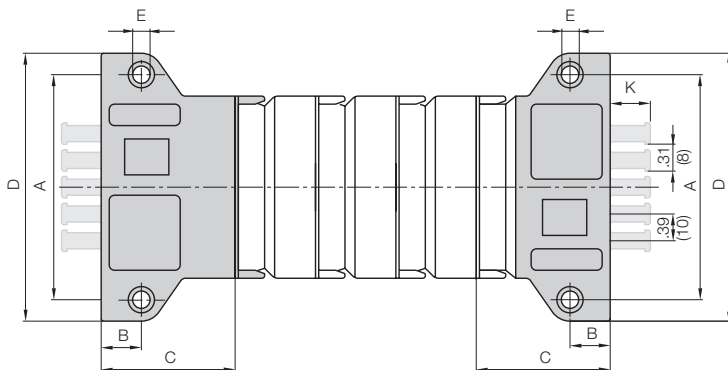


333-50-1PZ
Moving end

333-50-2PZB
Fixed end
(with tiwrap plate
333-50-ZB)

333-50-1PZ

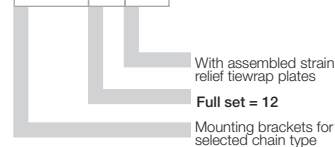
333-50-2PZB



For high loads we recommend screwing the mounting brackets to the chain. If you have any questions, please give us a call.

Part No. structure

333-32-12 PZB



Full set, for both ends:

333-32-12 PZB +tiwrap plate

Single-part order:

333-32-1 PZB +tiwrap plate

Mounting bracket with bore

333-32-2 PZB +tiwrap plate

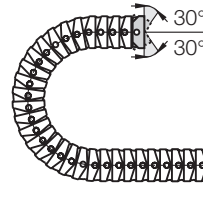
Mounting bracket with pin

Series	Part No.	A	B	C	D	E	K	N No. of Teeth
E331-25/E332-25-2/E333-25	333-25-12PZ	1.69 (43)	.28 (7)	.87 (22)	2.04 (52)	.18 (4.5)	—	—
E331-32/E332-32-2/E333-32	333-32-12PZ	2.60 (66)	.59 (15)	1.81 (46)	3.23 (82)	.26 (6.5)	.59 (15)	3
E331-50/E332-50-2/E333-50	333-50-12PZ	3.31 (84)	.59 (15)	1.97 (50)	3.94 (100)	.26 (6.5)	.59 (15)	5
E331-75/E332-75-2/E333-75	333-75-12PZ	4.29 (109)	.59 (15)	2.17 (55)	4.92 (125)	.26 (6.5)	.59 (15)	7

Mounting Brackets

Option 2: flange

- Galvanized steel
- Electrically conductive
- Flush mounting

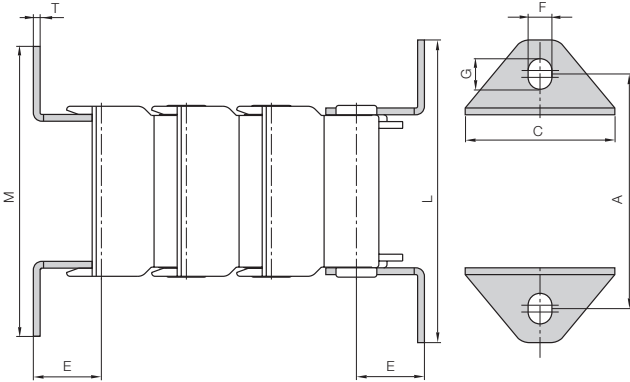


330-25-1 – 330-75-1
Moving end

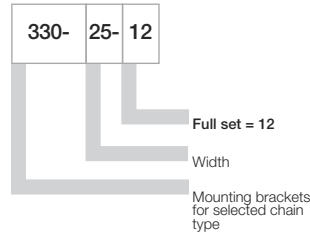
330-25-2 – 330-75-2
Fixed end

330-25-2 – 330-75-2

330-25-1 – 330-75-1



Part No. structure



Full set, 4 parts

2 with pin / 2 with bore:

330- 25- 12

Single-part order:

330- 25- 1

Mounting bracket with bore

330- 25- 2

Mounting bracket with pin

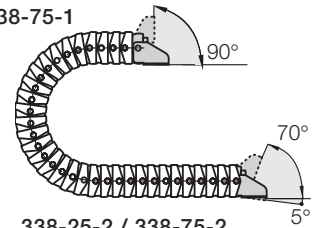
Series	Part No.	A	M	C	L	T	E	F	G
E331-25/E332-25-2/E333-25	330-25-12	1.73 (44)	2.17 (55)	1.14 (29)	2.17 (55)	.06 (1.5)	.41 (10.5)	.26 (6.5)	.35 (9)
E331-32/E332-32-2/E333-32	330-32-12	2.60 (66)	3.31 (84)	1.73 (44)	3.46 (88)	.08 (2)	.79 (20)	.28 (7)	.35 (9)
E332-50/E332-50-2/E333-50	330-50-12	3.31 (84)	4.02 (102)	2.44 (62)	4.17 (106)	.08 (2)	.98 (25)	.28 (7)	.35 (9)
E331-75/E332-75-2/E333-75	330-75-12	4.29 (109)	5.00 (127)	3.54 (90)	5.16 (131)	.08 (2)	.98 (25)	.28 (7)	.35 (9)

Option 3: angle

- Galvanized steel
- Electrically conductive
- Can be attached to top or bottom of the machine



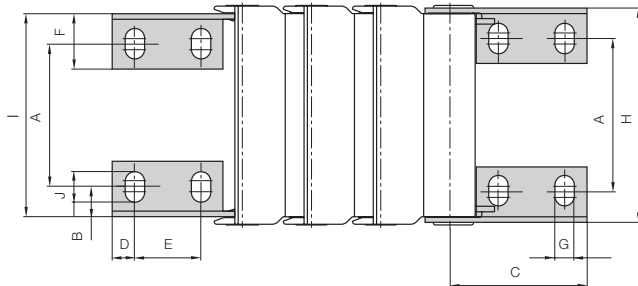
338-25-1/ 338-75-1
Moving end



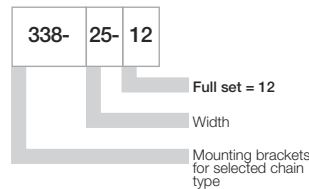
338-25-2 / 338-75-2
Fixed end

338-25-2 / 338-75-2

338-25-1 / 338-75-1



Part No. structure



Full set, 4 parts

2 with pin / 2 with bore:

338- 25- 12

Single-part order:

338- 25- 1

Mounting bracket with bore

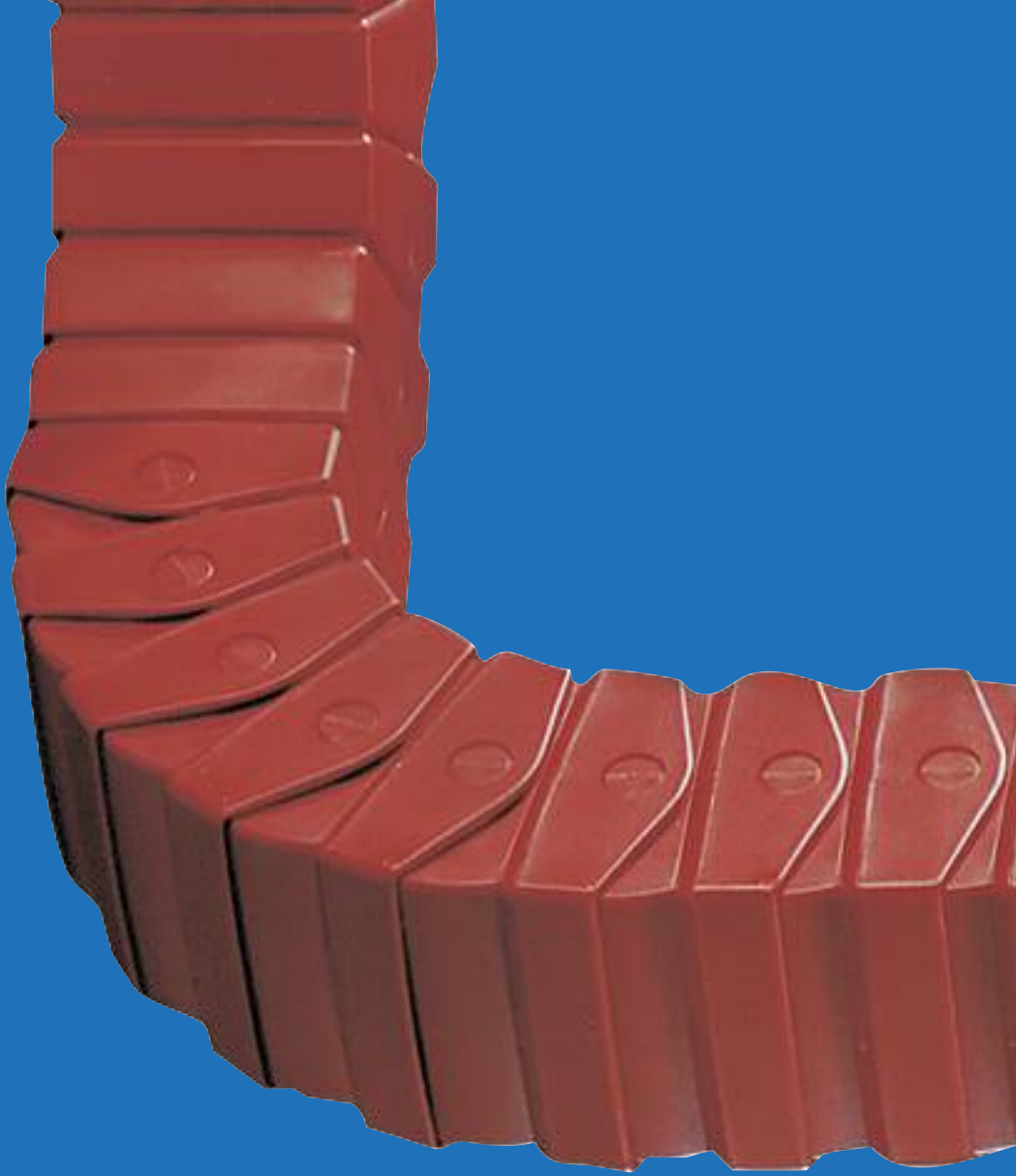
338- 25- 2

Mounting bracket with pin

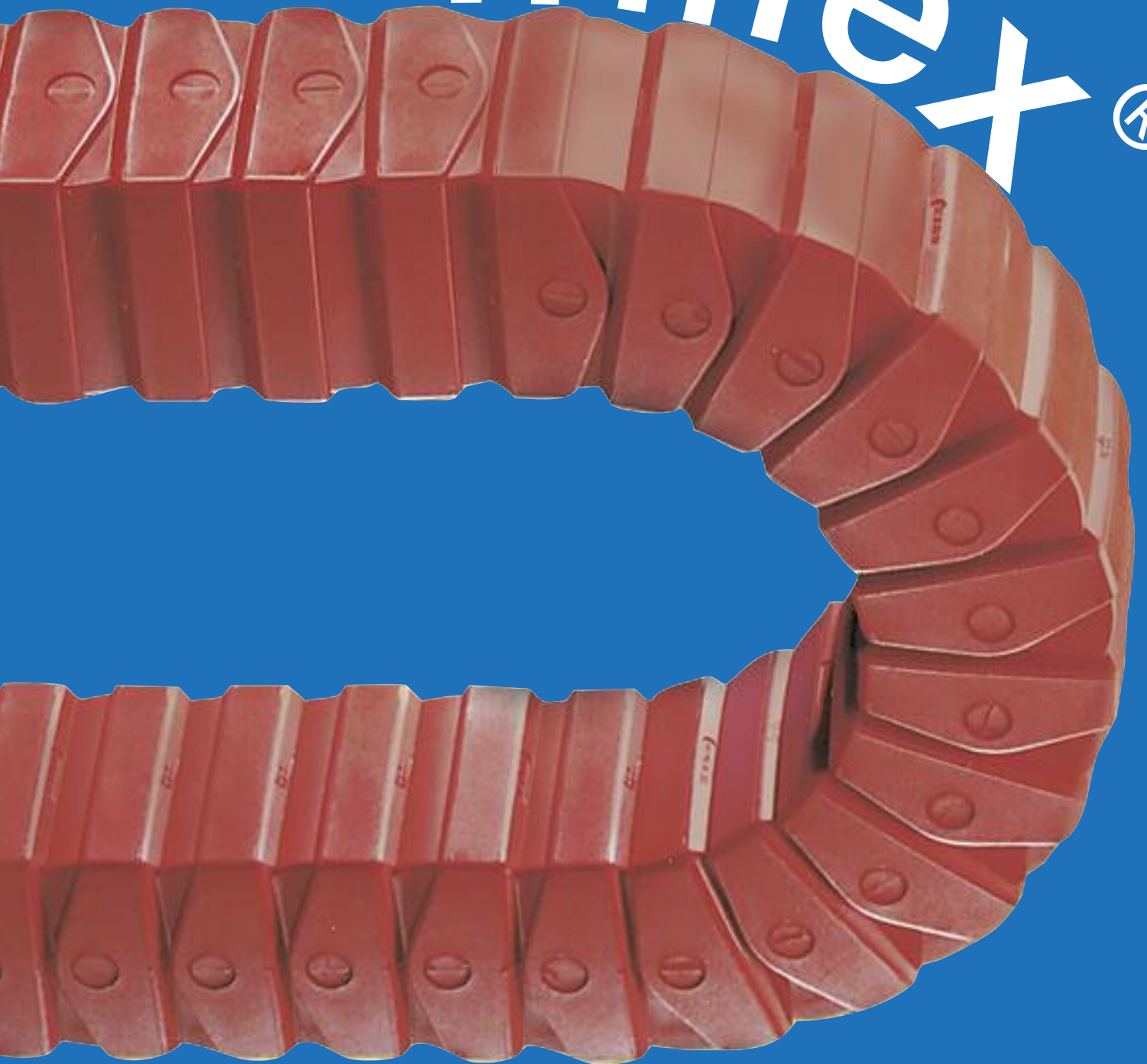
Series	Part No.	A	B	C	D	E	F	G	H	I	J
E331-25/E332-25-2/E333-25	338-25-12	.67 (17)	.25 (6.25)	1.10 (28)	.24 (6)	.63 (16)	.55 (14)	.22 (5.5)	1.33 (33.8)	1.22 (31)	.33 (8.5)
E331-25/E332-32-2/E333-32	338-32-12	.94 (24)	.22 (5.5)	1.85 (47)	.31 (8)	.94 (24)	.79 (20)	.28 (7)	1.93 (49)	1.77 (45)	.43 (11)
E331-25/E332-50-2/E333-50	338-50-12	1.65 (42)	.22 (5.5)	3.03 (77)	.47 (12)	1.38 (35)	.94 (24)	.35 (9)	2.64 (67)	2.44 (62)	.59 (15)
E331-25/E332-75-2/E333-75	338-75-12	2.56 (65)	.22 (5.5)	3.03 (77)	.47 (12)	1.38 (35)	.94 (24)	.35 (9)	3.74 (95)	3.54 (90)	.59 (15)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS





Triflex[®]



Triflex® - fully enclosed, for 2D and 3D applications

The Triflex® series has been developed to safely guide cables during a 3D movement. In this case, the flexibility of a hose is combined with the stability of an Energy Chain® with a fixed, defined radius. This unique modular range enables very complex movements. As example: Combination of chain links moving in single, double and triple axes in an Energy Chain®.

Typical industries and applications

- Machine tools
- Robots
- Handling equipment
- Material handling
- Plastics machinery
- Construction machines
- Vehicles
- Machinery of all kinds
- Medical equipment



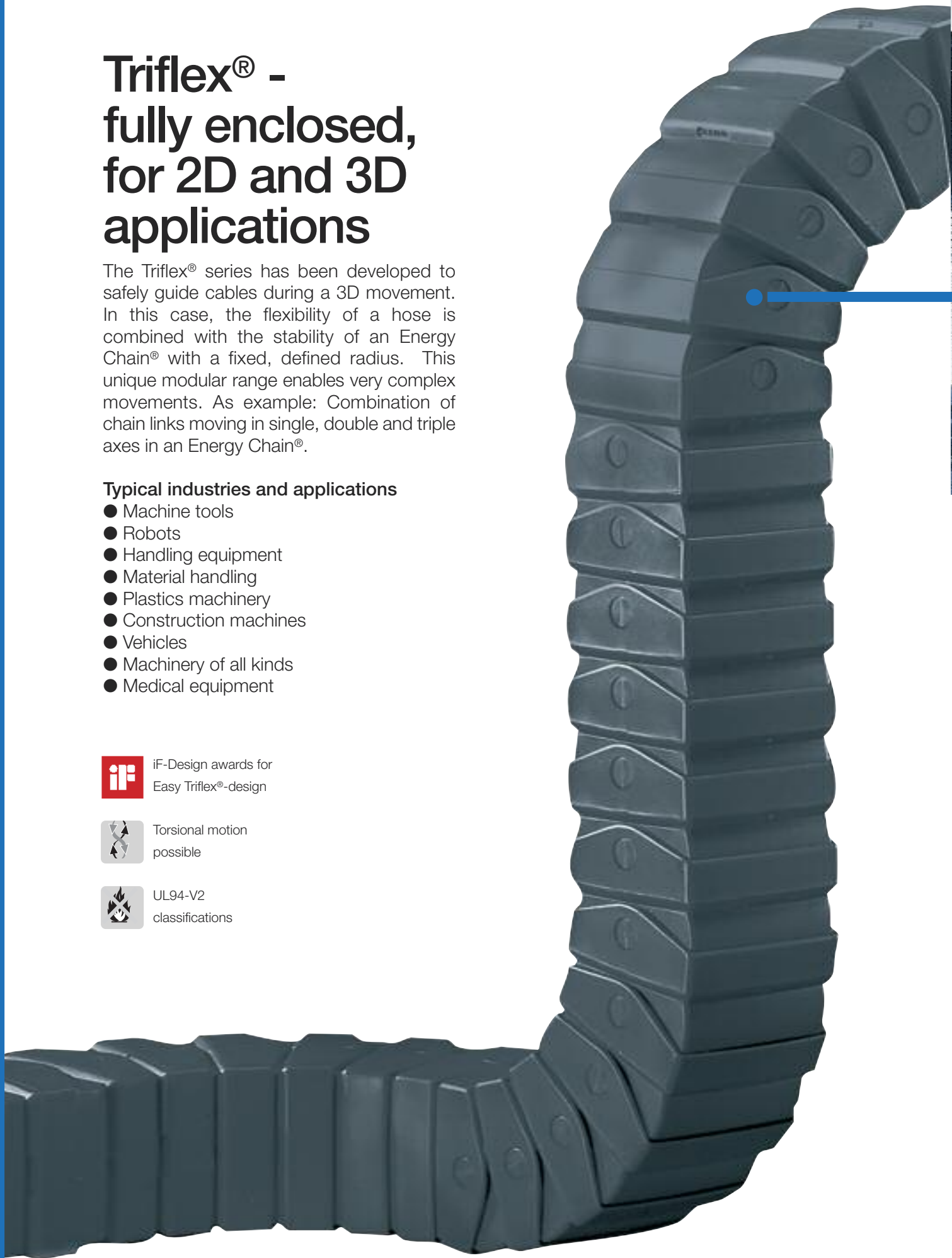
iF-Design awards for
Easy Triflex®-design

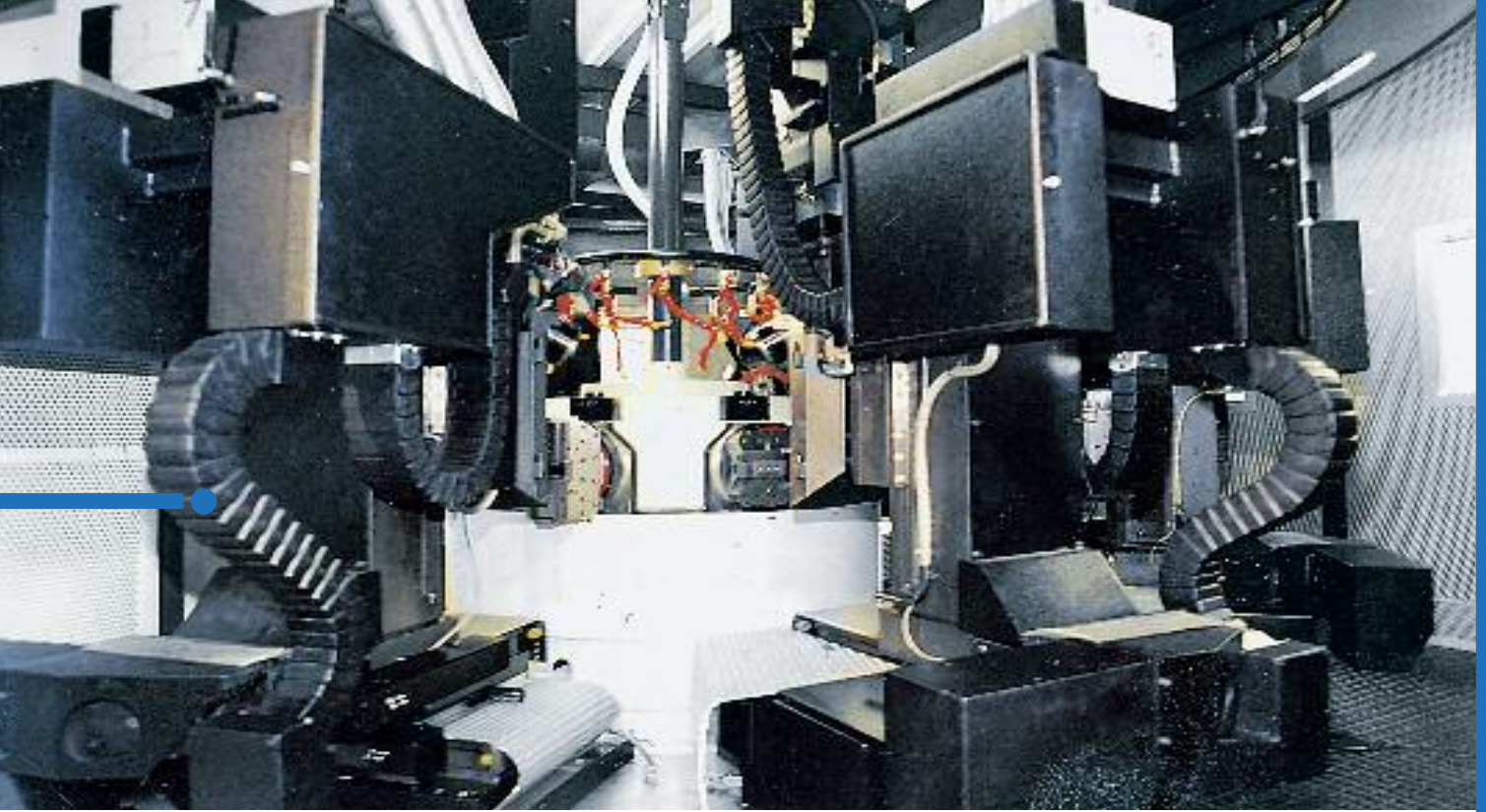


Torsional motion
possible



UL94-V2
classifications





Various Triflex® tubes on the inside of a machining center



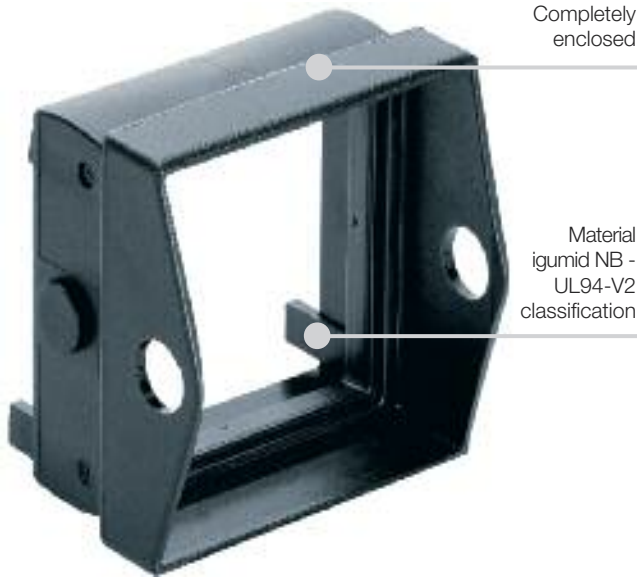
Triflex® for 3 movement directions combined with Triflex® for 1 movement direction



Triflex® 332 as unsupported link from machines to control desk

Energy Chain System® Triflex® Series Selection Guide

energy chain® configurator 



Select this modular, robust, Energy chain system® for:

- 3-axis motions in machinery of all kinds
- Dirty environments
- High tensile strength
- Where rectangular shapes fit better
- Side-mounted unsupported
- Completely enclosed - protection against dirt and chips
- Combinations of varying bending radii and moving axes
- Connecting and separating possible at every link
- Flanged mounting brackets or mounting brackets angle, galvanized steel
- Series 352 and 353 snap-open
- Combination Series 353/333 possible
- Cost-effective design for complex movements
- You can find more technical data about the material, chemical resistance, temperatures ► **Design, Chapter 1**

Selection table

Single-axis movement:

Series	Inner height/Inner width □ Bi		Outer width/Outer height □ Ba		Bending radii R	
	in.	(mm)	in.	(mm)	in.	(mm)
331-16	.63	(16)	1.02	(26)	1.50 - 3.94	(038 - 100)
331-32	1.26	(32)	1.97	(50)	2.95 - 9.84	(075 - 250)
331-50	1.97	(50)	2.68	(68)	3.94 - 9.84	(100 - 250)
331-75	2.95	(75)	3.78	(96)	5.51 - 11.81	(140 - 300)

Double-axis movement:

Series	Inner height/Inner width □ Bi		Outer width/Outer height □ Ba		Bending radii R	
	in.	(mm)	in.	(mm)	in.	(mm)
332-16	.63	(16)	1.02	(26)	1.50 - 3.94	(038 - 100)
332-32	1.26	(32)	1.97	(50)	2.95 - 9.84	(075 - 250)
332-50	1.97	(50)	2.68	(68)	3.94 - 9.84	(100 - 250)
332-75	2.95	(75)	3.78	(96)	5.51 - 11.81	(140 - 300)

Triple-axis movement:

Series	Inner height/Inner width □ Bi		Outer width/Outer height □ Ba		Bending radii R	
	in.	(mm)	in.	(mm)	in.	(mm)
333-16	.63	(16)	1.02	(26)	1.50 - 3.94	(038 - 100)
333-32	1.26	(32)	1.97	(50)	2.95 - 9.84	(075 - 250)
333-50	1.97	(50)	2.68	(68)	3.94 - 9.84	(100 - 250)
333-75	2.95	(75)	3.78	(96)	5.51 - 11.81	(140 - 300)

Snap-open Series:

Series	Inner height/Inner width □ Bi		Outer width/Outer height □ Ba		Bending radii R	
	in.	(mm)	in.	(mm)	in.	(mm)
351-50 Single	1.97	(50)	2.68	(68)	3.94 - 9.84	(100 - 250)
352-50 Double	1.97	(50)	2.68	(68)	3.94 - 9.84	(100 - 250)
353-50 Triple	1.97	(50)	2.68	(68)	3.94 - 9.84	(100 - 250)

Energy Chain System® Triflex® Series Assembly Instructions

Triflex® Series - Assembling



Twist and snap in



Snap in pin "push-button-principle"

Triflex® Series - Separating



Release side link



Twist and separate

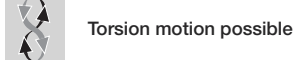
Triflex® Series 352 and 353 - Filling



To open Series 352 and Series 353 only - Insert screwdriver into slot on top of lid and push down

Price Index

Series 332/333 **Series 352/353**
Special Options Available

Flammability Class
 VDE 0304 IIC UL94 V2

Torsion motion possible

iF-Design Award Winner
Assembly Tips


Release side link, twist and separate


 To open Series 352 and Series 353 only
 - Insert screwdriver into slot on top of lid and push down

Usage Guidelines


- For applications that move within two or three axes (combined rotary and circular movements)
- If chip protection is required



- If every link must open on both sides

▶ TwisterChain® system,

Chapter 8

- For gliding applications
 - ▶ System E4, **Chapter 6**
- For rotary movements only
 - ▶ TwisterChain® system, **Chapter 8**

8.49
Features & Benefits

- 1 KMA, flanged and angled mounting brackets available
- 2 Combinations of varying bending radii and moving axes
- 3 Completely enclosed
- 4 Combination of Series 353 and Series 333 possible
- 5 Series 352 and 353 snap-open
- 6 Protection against dirt and chips
- 7 High tensile strength
- 8 Cost-effective design for complex movements
- 9 Assembling and separating at any given point


Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

[energy chain® configurator](#) ▶

 6.56 ft (2 m) **332-50-100/100-0**
Energy Chain®

 With 2 separators **351** assembled every 2nd link

 Interior Separation

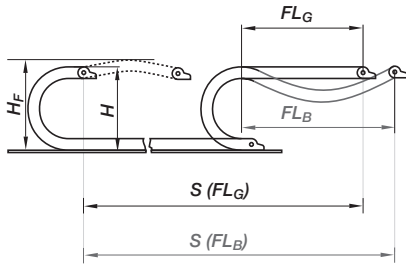
 1 Set **338-50-12**
Mounting Bracket

Energy Chain System® Triflex® Series
Series 331/332/333
Series 351/352/353 (Snap-Open)

energy chain® configurator ▶



Triflex®



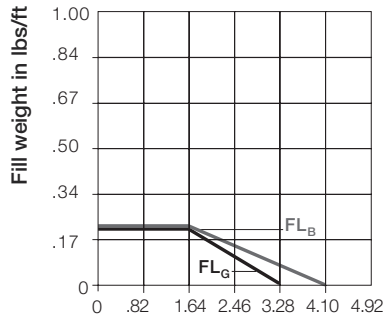
Short travel, unsupported length

- FL_B = unsupported with permitted sag
 - FL_G = unsupported with straight upper run
- Further information ▶ Design, Chapter 1

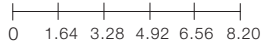
Legend

- S = Length of travel
- R = Bending radius
- H = Nominal clearance height
- D = Overlength Energy Chain® radius in final position
- $K = \pi \cdot R + \text{"safety buffer"}$
- H_F = Required clearance height

Unsupported length 331/332-16

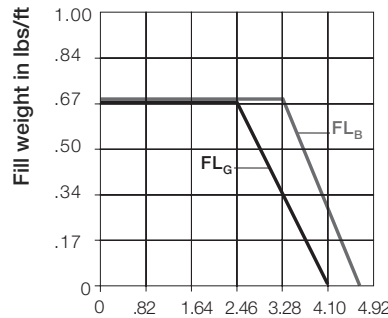


Unsupported length in ft FL_B/FL_G

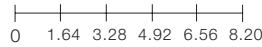


Total Length of travel S in ft

Unsupported length 331/332-32

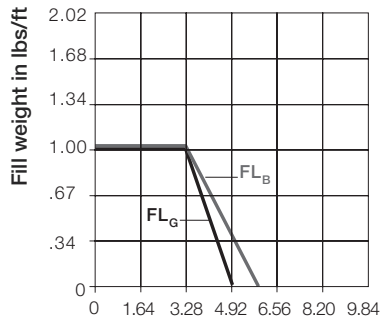


Unsupported length in ft FL_B/FL_G

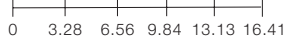


Total Length of travel S in ft

Unsupported length 331/332-50

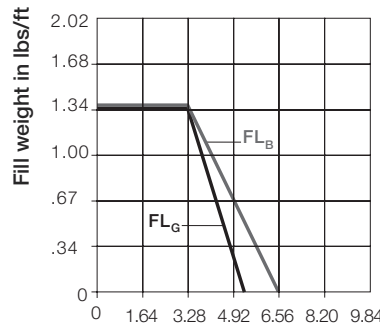


Unsupported length in ft FL_B/FL_G

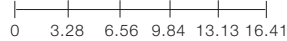


Total Length of travel S in ft

Unsupported length 331/332-75



Unsupported length in ft FL_B/FL_G



Total Length of travel S in ft

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains-pdfs
 RoHS info: www.igus.com/RoHS



Technical Data

Material - permitted temperature

igumid G / -40°F (-40°C) up to +176°F (+80°C)

Flammability Class, igumid NB

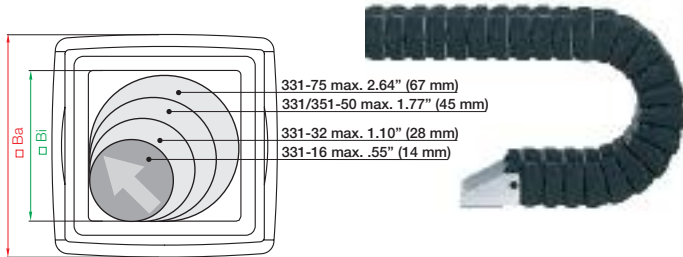
VDE 0304 IIC UL94 V2



Details of material properties

▶ Chapter 1

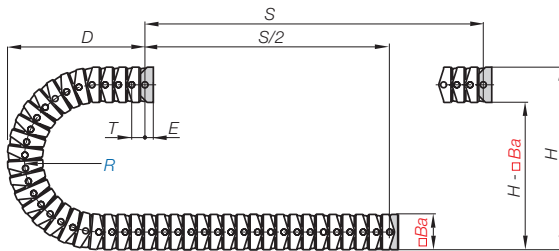
Single Axis Movement, Series 331/351



Part No.	Bi	Ba	Weight
	in. (mm)	in. (mm)	lbs/ft (kg/m)
331-16-	.63 (16)	1.02 (26)	≈ 0.22 (.33)
331-32-	1.26 (32)	1.97 (50)	≈ 0.60 (.90)
331-50-	1.97 (50)	2.68 (68)	≈ 0.94 (1.40)
331-75-	2.95 (75)	3.78 (96)	≈ 1.58 (2.35)
Snap-open			
351-50-	1.97 (50)	2.68 (68)	≈ 0.94 (1.40)

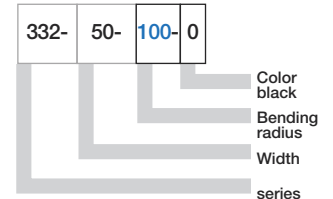
Supplement part number with required radius from below.
for example 331-50-100-0

Installation dimensions for single-axis movement



For center mount applications:
Tube length = $\frac{S}{2} + K$

Part No. structure



Series 331-16

R	1.50 (038)	1.89 (048)	2.95 (075)	3.94 (100)
H	4.13 (105)	4.92 (125)	7.09 (180)	9.06 (230)
D	2.76 (70)	3.15 (80)	4.13 (105)	5.12 (130)
K	7.87 (200)	9.06 (230)	12.40 (315)	15.75 (400)

Pitch = .52 (13.3 mm)
Links/ft (m) = 23.08 (76)
Dimensions E = .39 (10 mm)
Ba = 1.02 (26 mm)

Series 331-32

R	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)
H	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	17.72 (450)	21.65 (550)
D	5.12 (130)	6.10 (155)	7.09 (180)	8.07 (205)	10.04 (255)	12.01 (305)
K	12.01 (305)	15.15 (385)	18.30 (465)	21.46 (545)	27.56 (700)	34.06 (865)

Pitch = .98 (25 mm)
Links/ft (m) = 12.24 (40)
Dimensions E = .79 (20 mm)
Ba = 1.97 (50 mm)

Series 331-50

R	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)
H	10.63 (270)	12.60 (320)	14.76 (375)	18.50 (470)	22.44 (570)
D	7.68 (195)	8.66 (220)	9.65 (245)	11.61 (295)	13.58 (345)
K	17.13 (435)	20.47 (520)	23.23 (590)	29.53 (750)	35.83 (910)

Pitch = 1.18 (30 mm)
Links/ft (m) = 10.17 (34)
Dimensions E = .98 (25 mm)
Ba = 2.68 (68 mm)

Series 331-75

R	5.51 (140)	6.89 (175)	7.87 (200)	9.84 (250)	11.81 (300)
H	14.96 (380)	17.71 (450)	19.69 (500)	23.62 (600)	27.56 (700)
D	9.45 (240)	10.83 (275)	11.81 (300)	13.78 (350)	15.75 (400)
K	21.65 (550)	25.98 (660)	29.13 (740)	35.43 (900)	41.73 (1060)

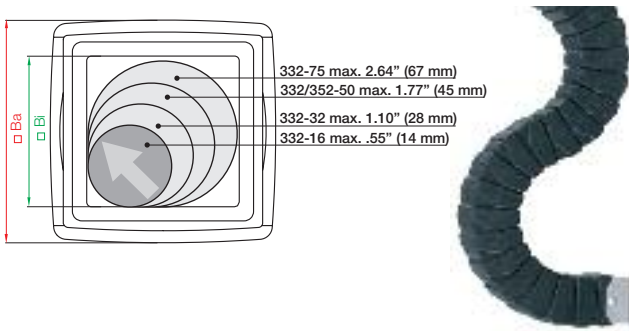
Pitch = 1.42 (36 mm)
Links/ft (m) = 8.45 (28)
Dimensions E = .98 (25 mm)
Ba = 3.78 (96 mm)

Series 351-50 (Snap-Open)

R	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)
H	10.63 (270)	12.60 (320)	14.76 (375)	18.50 (470)	22.44 (570)
D	7.68 (195)	8.66 (220)	9.65 (245)	11.61 (295)	13.58 (345)
K	17.13 (435)	20.47 (520)	23.23 (590)	29.53 (750)	35.83 (910)

Pitch = 1.18 (30 mm)
Links/ft (m) = 10.17 (34)
Dimensions E = .98 (25 mm)
Ba = 2.68 (68 mm)

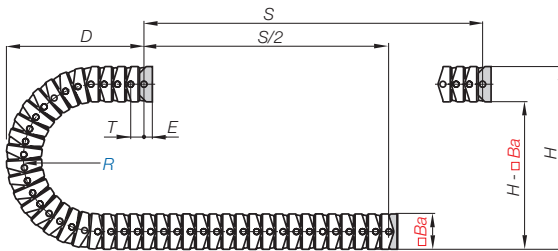
Double Axis Movement, Series 332/352



Part No.	Bi	Ba	Weight
	in. (mm)	in. (mm)	lbs/ft (kg/m)
332-16-	.63 (16)	1.02 (26)	≈ 0.22 (.33)
332-32-	1.26 (32)	1.97 (50)	≈ 0.60 (.90)
332-50-	1.97 (50)	2.68 (68)	≈ 0.94 (1.40)
332-75-	2.95 (75)	3.78 (96)	≈ 1.58 (2.35)
Snap-open			
352-50-	1.97 (50)	2.68 (68)	≈ 0.94 (1.40)

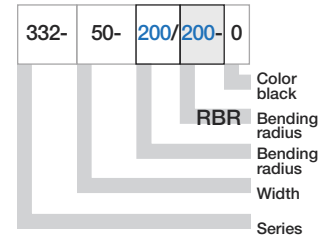
Supplement part number with required radius from below
for example, 332-75-2-200-0

Installation dimensions for double-axis movement



For center mount applications:
Tube length = $\frac{S}{2} + K$

Part No. structure



Series 332-16

R	1.50 (038)	1.89 (048)	2.95 (075)	3.94 (100)
H	4.13 (105)	4.92 (125)	7.09 (180)	9.06 (230)
D	2.76 (70)	3.15 (80)	4.13 (105)	5.12 (130)
K	7.87 (200)	9.06 (230)	12.40 (315)	15.75 (400)

Pitch = .52 (13.3 mm)
Links/ft (m) = 23.08 (76)
Dimensions E = .39 (10 mm)
Ba = 1.02 (26 mm)

Series 332-32

R	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)
H	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	17.72 (450)	21.65 (550)
D	5.12 (130)	6.10 (155)	7.09 (180)	8.07 (205)	10.04 (255)	12.01 (305)
K	12.01 (305)	15.15 (385)	18.30 (465)	21.46 (545)	27.56 (700)	34.06 (865)

Pitch = .98 (25 mm)
Links/ft (m) = 12.24 (40)
Dimensions E = .79 (20 mm)
Ba = 1.97 (50 mm)

Series 332-50

R	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)
H	10.63 (270)	12.60 (320)	14.76 (375)	18.50 (470)	22.44 (570)
D	7.68 (195)	8.66 (220)	9.65 (245)	11.61 (295)	13.58 (345)
K	17.13 (435)	20.47 (520)	23.23 (590)	29.53 (750)	35.83 (910)

Pitch = 1.18 (30 mm)
Links/ft (m) = 10.17 (34)
Dimensions E = .98 (25 mm)
Ba = 2.68 (68 mm)

Series 332-75

R	5.51 (140)	6.89 (175)	7.87 (200)	9.84 (250)	11.81 (300)
H	14.96 (380)	17.71 (450)	19.69 (500)	23.62 (600)	27.56 (700)
D	9.45 (240)	10.83 (275)	11.81 (300)	13.78 (350)	15.75 (400)
K	21.65 (550)	25.98 (660)	29.13 (740)	35.43 (900)	41.73 (1060)

Pitch = 1.42 (36 mm)
Links/ft (m) = 8.45 (28)
Dimensions E = .98 (25 mm)
Ba = 3.78 (96 mm)

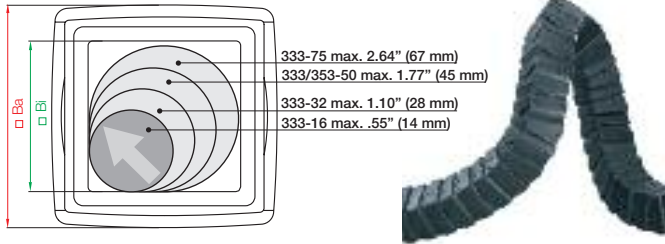
Series 352-50 (Snap-Open)

R	3.94 (100)	4.92 (125)	5.91 (150)	7.87 (200)	9.84 (250)
H	14.96 (380)	12.60 (320)	14.76 (375)	18.50 (470)	22.44 (570)
D	9.45 (240)	8.66 (220)	9.65 (245)	11.61 (295)	13.58 (345)
K	21.65 (550)	20.47 (520)	23.23 (590)	29.53 (750)	35.83 (910)

Pitch = 1.18 (30 mm)
Links/ft (m) = 10.17 (34)
Dimensions E = .98 (25 mm)
Ba = 2.68 (68 mm)



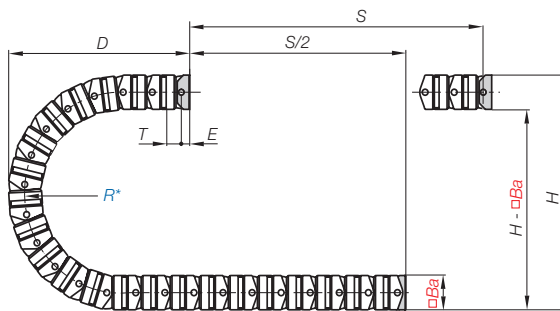
Triple Axis Movement, Series 333/353 (Snap-Open)



Part No.	Bi in. (mm)	Ba in. (mm)	Weight lbs/ft (kg/m)
333-16-	.63 (16)	1.02 (26)	≈ 0.22 (.33)
333-32-	1.26 (32)	1.97 (50)	≈ 0.60 (.90)
333-50-	1.97 (50)	2.68 (68)	≈ 0.94 (1.40)
333-75-	2.95 (75)	3.78 (96)	≈ 1.58 (2.35)
Snap-open			
353-50-	1.97 (50)	2.68 (68)	≈ 0.94 (1.40)

Supplement part number with required radius from above for example, 333-32-100-0

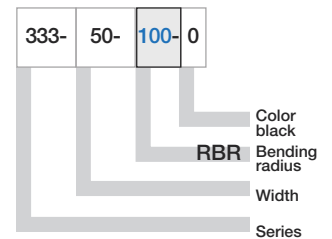
Installation dimensions for triple-axis movement



For center mount applications:
Tube length = $\frac{S}{2} + K$

* The bending radii are doubled in the case of the Series 333 Energy Chain®

Part No. structure



Series 333-16

R	(076)	3.78 (096)	5.91 (150)	7.87 (200)
H	7.09 (180)	8.66 (220)	12.99 (330)	16.93 (430)
D	4.13 (105)	4.92 (125)	7.09 (180)	9.06 (230)
K	12.60 (320)	14.96 (380)	21.65 (550)	27.95 (710)

Pitch = .52 (13.3 mm)
Links/ft (m) = 23.08 (76)
Dimensions E = .39 (10 mm)
Ba = 1.02 (26 mm)

Series 333-32

R	5.91 (150)	7.87 (200)	9.84 (250)	11.81 (300)	15.75 (400)	19.69 (500)
H	13.78 (350)	17.72 (450)	21.65 (550)	25.59 (650)	33.46 (850)	41.33 (1050)
D	8.07 (205)	10.04 (255)	12.01 (305)	13.98 (355)	17.91 (455)	21.85 (555)
K	21.46 (545)	27.56 (700)	33.86 (860)	40.16 (1020)	51.18 (1300)	63.19 (1605)

Pitch = .98 (25 mm)
Links/ft (m) = 12.24 (40)
Dimensions E = .79 (20 mm)
Ba = 1.97 (50 mm)

Series 333-50

R	7.87 (200)	9.84 (250)	11.81 (300)	15.75 (400)	19.69 (500)
H	18.50 (470)	22.44 (570)	26.38 (670)	34.25 (870)	42.13 (1070)
D	11.61 (295)	13.58 (345)	15.55 (395)	19.49 (495)	23.43 (595)
K	29.53 (750)	35.83 (910)	42.13 (1070)	54.33 (1380)	66.54 (1690)

Pitch = 1.18 (30 mm)
Links/ft (m) = 10.17 (34)
Dimensions E = .98 (25 mm)
Ba = 2.68 (68 mm)

Series 333-75

R	11.02 (280)	13.78 (350)	15.75 (400)	19.69 (500)	23.62 (600)
H	25.98 (660)	31.50 (800)	35.43 (900)	43.31 (1100)	51.18 (1300)
D	14.96 (380)	17.72 (450)	19.69 (500)	23.62 (600)	27.56 (700)
K	38.98 (990)	47.64 (1210)	55.12 (1400)	66.93 (1700)	78.74 (2000)

Pitch = 1.42 (36 mm)
Links/ft (m) = 8.45 (28)
Dimensions E = .98 (25 mm)
Ba = 3.78 (96 mm)

Series 353-50 (Snap-Open)

R	7.87 (200)	9.84 (250)	11.81 (300)	15.75 (400)	19.69 (500)
H	18.50 (470)	22.44 (570)	26.38 (670)	34.25 (870)	42.13 (1070)
D	11.61 (295)	13.58 (345)	15.55 (395)	19.49 (495)	23.43 (595)
K	29.53 (750)	35.83 (910)	42.13 (1070)	54.33 (1380)	66.54 (1690)

Pitch = 1.18 (30 mm)
Links/ft (m) = 10.17 (34)
Dimensions E = .98 (25 mm)
Ba = 2.68 (68 mm)

Interior Separation

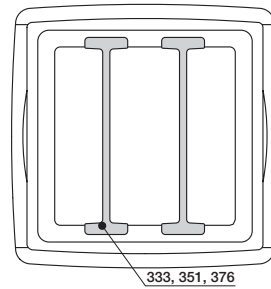
Modular separators are available as interior shelving for the igus® Triflex® System. They can be used for both vertical and horizontal sub-division. If the separators are assembled every other link and turned 90°, the tube can be sub-divided into four segments. We recommend ordering the tube pre-assembled, as subsequent assembly of separators is only possible after dismantling the tube. Please note that assembled separators have a different part number than unassembled separators.



Horizontal sub-division

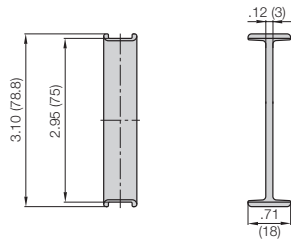


Vertical sub-division



333, 351, 376

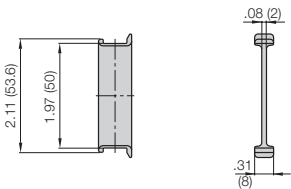
331/332/333-75



Separator

Unassembled	Part No. 375
Assembled	Part No. 376

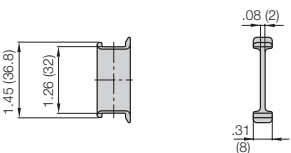
331/332/333-50 351/352/353-50



Separator

Unassembled	Part No. 350
Assembled	Part No. 351

331/332/333-32



Separator

Unassembled	Part No. 332
Assembled	Part No. 333

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains-pdfs
 RoHS info: www.igus.com/RoHS

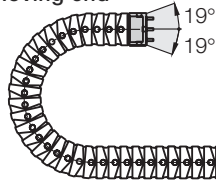




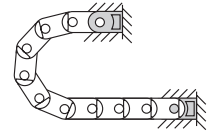
Standard

Option 1: KMA

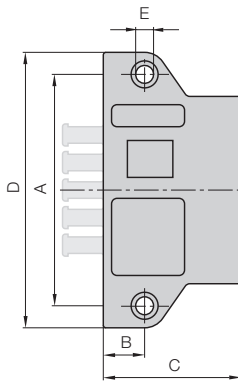
- Corrosion resistant
- Strain relief with tiwrap plate

333-50-1PZ
Moving end333-50-2PZB
Fixed end

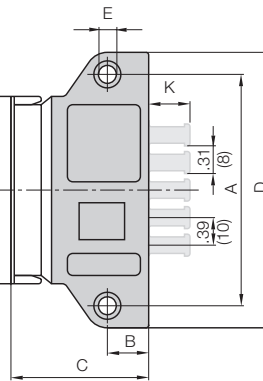
(with tiwrap plate 333-50-ZB)

Possible installation
configurations -

333...1PZ(B)



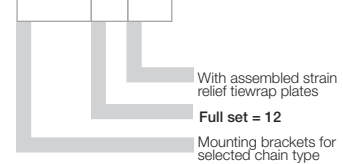
333...2PZ(B)



For high loads we recommend screwing the mounting brackets to the chain. If you have any questions, please give us a call.

Part No. structure

333-32-12-PZB



Full set, for both ends:

333- 32- 12 PZB +tiwrap plate

Single-part order:

333- 32- 1 PZB +tiwrap plate

Mounting bracket with bore

333- 32- 2 PZB +tiwrap plate

Mounting bracket with pin

Series	Part No. Full Set with tiwrap plate	Part No. Full Set without tiwrap plate	A	B	C	D	E	K	N
			in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	No. of Teeth
331/332/333-32	333-32-12PZB	333-32-12-PZ	2.60 (66)	.59 (15)	1.81 (46)	3.23 (82)	.26 (6.5)	.59 (15)	3
331/332/333-50	333-50-12PZB	333-50-12-PZ	3.31 (84)	.59 (15)	1.97 (50)	3.94 (100)	.26 (6.5)	.59 (15)	5
331/332/333-75	333-75-12PZB	333-75-12-PZ	4.29 (109)	.59 (15)	2.17 (55)	4.92 (125)	.26 (6.5)	.59 (15)	7
Snap-open series									
351/352/353-50	333-50-12PZB	333-50-12-PZ	3.31 (84)	.59 (15)	1.97 (50)	3.94 (100)	.26 (6.5)	.59 (15)	5

Tiwrap plate as individual part

Special tiwrap plates for Triflex® Energy Chains®

- Single-piece for installation inside switch cabinets or machine assembly
- Accessory for igus® Energy Chain Systems®
- Easy to assemble, no need for screws

Part No.	Width	Number	For Series
Tiwrap plate	in. (mm)	of teeth	
333-32-ZB	1.57 (40)	3	331/332/333-32
333-50-ZB	2.28 (58)	5	331/332/333-50 351/352/353-50
333-75-ZB	3.27 (83)	7	331/332/333-75

Energy Chain System® Triflex® Series Mounting Brackets

energy chain® configurator ▶



Triflex®

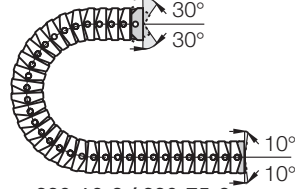


Option 2: pivoting steel flange

- Galvanized steel
- Electrically conductive
- Flush mounting

330-16-1 / 330-75-1

Moving end



330-16-2 / 330-75-2

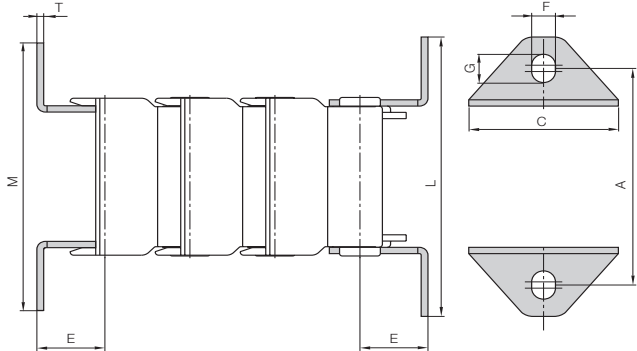
Fixed end



Possible installation configurations -

330-26-2 / 330-75-2

330-16-1 / 330-75-1



Part No. structure

330-	32-	12
------	-----	----

Full set = 12
Width
Mounting brackets for selected chain type

Full set, 4 parts

2 with pin / 2 with bore:

330- 32-12

Single-part order:

330- 32-1

Mounting bracket with bore

330- 32-2

Mounting bracket with pin

Series	Part No.	A	M	C	L	T	E	F	G
331/332/333-16	330-16-12	1.38 (35)	2.09 (53)	.83 (21)	2.24 (57)	.04 (1)	.39 (10)	.18 (4.5)	.24 (6)
331/332/333-32	330-32-12	2.60 (66)	3.31 (84)	1.73 (44)	3.46 (88)	.08 (2)	.79 (20)	.28 (7)	.35 (9)
331/332/333-50	330-50-12	3.31 (84)	4.02 (102)	2.44 (62)	4.17 (106)	.08 (2)	.98 (25)	.28 (7)	.35 (9)
331/332/333-75	330-75-12	4.29 (109)	5.00 (127)	3.54 (90)	5.16(131)	.08 (2)	.98 (25)	.28 (7)	.35 (9)

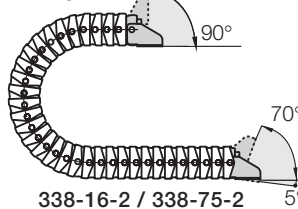


Option 3: angle

- Galvanized steel
- Electrically conductive
- Can be attached to top or bottom of the machine

338-16-1/ 338-75-1

Moving end



338-16-2 / 338-75-2

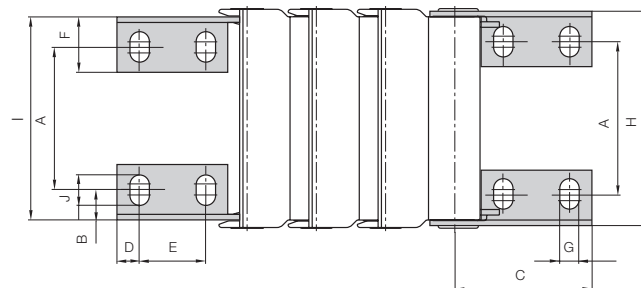
Fixed end



Possible installation configurations -

338-16-2 / 338-75-2

338-16-1 / 338-75-1



Part No. structure

338-	32-	12
------	-----	----

Full set = 12
Width
Mounting brackets for selected chain type

Full set, 4 parts

2 with pin / 2 with bore:

338- 32-12

Single-part order:

338- 32-1

Mounting bracket with bore

338- 32-2

Mounting bracket with pin

Series	Part No.	A	B	C	D	E	F	G	H	I	J
331/332/333-16	338-16-12	.47 (12)	.12 (3)	.98 (25)	.20 (5)	.39 (10)	.43 (11)	18 (4,5)	.98 (25)	.91 (23)	.24 (6)
331/332/333-32	338-32-12	.94 (24)	.22 (5.5)	1.85 (47)	.31 (8)	.94 (24)	.79 (20)	.28 (7)	1.93 (49)	1.77 (45)	.43 (11)
331/332/333-50	338-50-12	1.65 (42)	.22 (5.5)	3.03 (77)	.47 (12)	1.38 (35)	.94 (24)	.35 (9)	2.64 (67)	2.44 (62)	.59 (15)
331/332/333-75	338-75-12	2.56 (65)	.22 (5.5)	3.03 (77)	.47 (12)	1.38 (35)	.94 (24)	.35 (9)	3.74 (95)	3.54 (90)	.59 (15)
Snap-open											
351/352/353-50	338-50-12	1.65 (42)	.22 (5.5)	3.03 (77)	.47 (12)	1.38 (35)	.94 (24)	.35 (9)	2.64 (67)	2.44 (62)	.59 (15)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains-pdfs
RoHS info: www.igus.com/RoHS







TwisterChain®

TwisterChain® - Circular and spiral movements

TwisterChain® are modular and rugged Energy Chains® for circular and spiral movements. They safely supply robots on the rotary axis with energy and media.

- Circular, spiral motions up to 540°
- Fast cable replacement
- Modular, rugged design - variable widths
- Cable-friendly interior
- Crossbars snap open on both sides
- New guide troughs Type 01 and Type 02 (up to 360° motion)
- Variable interior separation
- Applicable in rotational speeds of up to 13.12 ft/s (4 m/s)
- With steel mounting brackets (electrically conductive)

Typical industries and applications

- Robots
- Handling machines
- Packaging machines
- Glass machines
- General mechanical engineering



Circular movements up to 540° possible (with special attachments)



UL94-V2 classifications upon request



Two different types of Guide Trough Systems available





Combined spiral and rotary movement - igus® Series TwisterChain®



TwisterChain® for continuous industrial operation on a buckling arm robot (for welding applications, rotary movement 420°)



The robust link design allows also safety work in a dirty environment

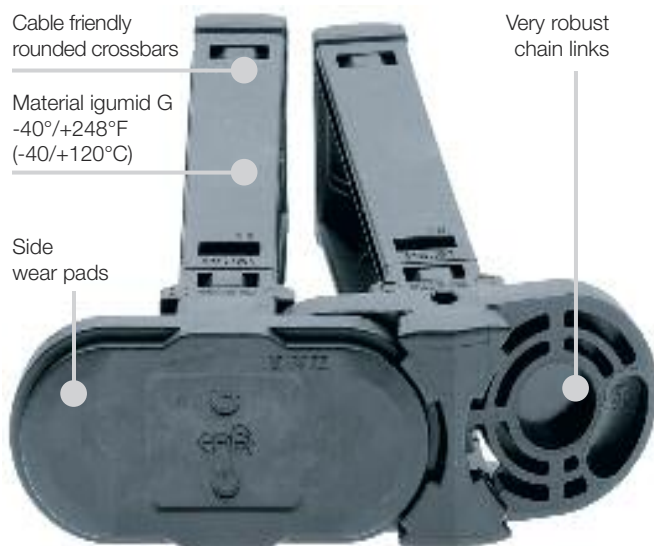
Save assembly time and costs - Better guidance for circular motion - increase cycle life!

With the new TwisterChain® trough, complex adjustment work is eliminated and assembly time is reduced from six hours to just two hours. Thanks to its almost all-plastic design, noise levels are reduced while travel speed and service life are increased. Now available for widths and radii on TwisterChain® models series 2808, 3808 and 4008. Please call igus® for more information.



New guide trough system - Type 01

Energy Chain System® TwisterChain® Series



Cable friendly rounded crossbars

Material igumid G
-40°/+248°F
(-40/+120°C)

Side wear pads

Very robust chain links

Select this modular "spiral" Energy Chain® for:

- igus® TwisterChain® for circular motions up to 540° (with special attachments)
- Fast cable change
- Modular design - variable widths
- Cable-friendly interior
- Crossbars can be opened on both sides
- New Guide Troughs Type 01 and Type 02 (circular motions up to 360°)
- Variable interior separation
- For rotational speeds of up to 13.12 ft/s (4 m/s)
- With steel (electrically conductive) mounting brackets
- You can find more technical data about the material, chemical resistance, temperatures ► **Design, chapter 1**

Selection table

Series	Inner height	Inner width	Outer width	Outer height	Bending radius	Circular Radii
	<i>hi</i> in. (mm)	<i>Bi</i> in. (mm)	<i>Ba</i> in. (mm)	<i>ha</i> in. (mm)	<i>R</i> in. (mm)	<i>AR</i> in. (mm)
2208-	1.10 (28)	2.07-4.43 (52.5-112.5)	3.15-5.51 (80-140)	1.65 (42)	2.17-5.91 (055 - 150)	11.81 (300)
2808-	1.26 (32)	1.97-5.91 (50-150)	3.19-7.13 (81-181)	2.13 (54)	3.94-9.84 (100 - 250)	15.75-23.62 (400 - 600)
3808-	1.65 (42)	1.97-7.87 (50-200)	3.35-9.25 (85-235)	2.52 (64)	3.94-9.84 (100 - 250)	15.75-23.62 (400 - 600)
4008-	2.20 (56)	1.97-7.87 (50-200)	3.66-9.57 (93-243)	3.31 (84)	5.91-15.75 (150 - 400)	25.59-33.46 (650 - 850)



Guide Trough Type 01 - Save assembly time and costs -
Better guidance for circular motion - increase cycle life! ▶ See page 8.73



Guide Trough Type 02 - continues to be available for special applications ▶ See page 8.77

2208
2808
3808
4008



Energy Chain System® TwisterChain® Series



Price Index



Special Options Available



Circular movements up to 540° possible (with special attachments)



UL94-V2 classifications upon request



Two different types of Guide Trough Systems available

Assembly Tips



Opening - push a screwdriver down vertically into the opening crossbar's groove. Using the screwdriver as a lever, loosen the opening crossbar

Usage Guidelines



- If you require variable interior separation
- If cable/hose accessibility on both sides is required
- If rotational speeds up to 90°/s are required
- For spiral motion up to 540° possible with special attachments



- If very small or large diameters are required
➤ **Design, Chapter 1**
- For applications using rotation angles over 400° please consult igus

Features & Benefits

- 1 Dirt-repellent exterior
- 2 Modular design - variable widths
- 3 Spiral chain for rotary motion up to 540° (with special attachments)
- 4 Crossbars which can be opened on both sides
- 5 Interior separation possible
- 6 Cable-friendly interior
- 7 Standard guide troughs available from stock



Order Example: Complete Energy Chain®

Please indicate chain length or number of links. Example:

6.56 ft (2 m) **2808-087-175/500-0**

With 2 separators **282** assembled every 2nd link

1 Set **28080-34**



Energy Chain®



Interior Separation



Mounting Bracket

Energy Chain System® TwisterChain® Series Selecting the correct TwisterChain®



2208
2808
3808
4008

If you would like us to design your TwisterChain® application, simply supply us with your requirements. Please use the igus® system design form at the end of this chapter. If you would like to specify the chain and the guide trough yourself, please work through the following points and enter the results on the calculation sheet at the end of the chapter.

1. Determine the series and chain width

Specify which cables you would like to use for the chain. The type of cable(s) and the largest cable diameter determine the series and chain width selection. We recommend that you allow for a cable clearance of approx 20% of the chain's inner height and width. For instance, you must choose Series 3808 for a cable diameter of 1.18 (30 mm).

2. Specify the outer and inner radius

Determine the construction space available to you (dimensions X_1 and X_2)

Example: $\alpha = 220^\circ$ /max. cable diameter .94" (24 mm) → Series 2808

$X_2 = 22.83$ (580 mm) → $AR = 19.69$ (500 mm)

$X_1 = 12.20$ (310 mm) → $IR_{min} = 15.35$ (390 mm) → selection table → 15.43 (392 mm)

3. Specify the bending radius

$H_F = 18.11$ (460 mm) → $H \leq 16.14$ (410 mm) → $R = \frac{H-ha}{2} = 7.00$ (178 mm) → R175*

*(next smallest radius)

► Result: Series 2808, Part No. 2808-087-175/500

4. Calculate the required number of links

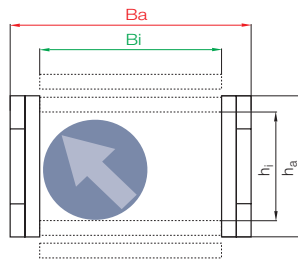
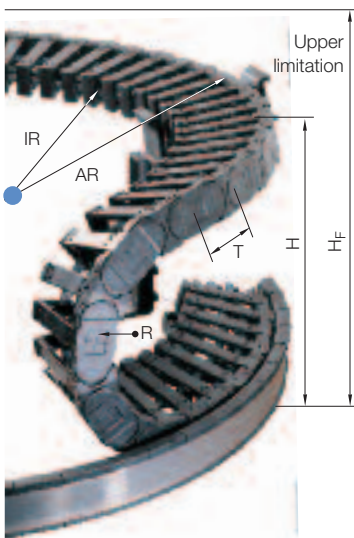
$$\text{Number of links} = \frac{\pi \times AR \times \alpha}{360^\circ \times T} + \frac{K}{T}$$

- The resulting number of links must always be rounded up!
- The mounting brackets may be attached only to the outside plates of the TwisterChain®. Consequently, the number of links **must always be rounded up to the next highest odd number!**

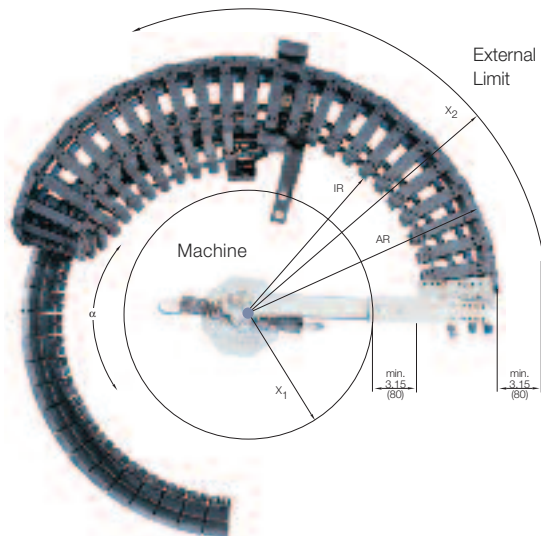
Recommendations for design without additional components

Series	$FZ_{max.}$ $\alpha 180^\circ$		$FZ_{max.}$ $\alpha 360^\circ$		v an AR permitted		a an AR max.		R max.		AR permitted	
	lbs/ft	(kg/m)	lbs/ft	(kg/m)	ft/s	(m/s)	ft/s ²	(m/s ²)	in.	(mm)	in.	(mm)
2208-	1.01	(1.5)	.67	(1)	.98-3.28	(0.3-1)	6.56	(2)	3.94	(100)	11.81	(300)
2808-	1.34	(2)	.67	(1)	.98-3.28	(0.3-1)	6.56	(2)	5.91	(150)	17.72-21.65	(450 - 550)
3808-	2.02	(3)	1.21	(1.8)	.98-3.28	(0.3-1)	6.56	(2)	7.87	(200)	17.72-21.65	(450 - 550)
4008-	2.69	(4)	1.68	(2.5)	.98-3.28	(0.3-1)	6.56	(2)	9.84	(250)	23.62-27.56	(600 - 700)

If your calculations exceed our recommendations, please contact igus® We offer special solutions and many additional components!



See Legend at upper right for drawing definitions.



Legend

- a = Acceleration
- α = Angle of rotation
- AR = Outer E-Chain radius
- Ba = Outer E-Chain width
- Bi = Inner width
- FZ_{max} = Max. additional load
- H = Nominal clearance height
- ha = Outer E-Chain height
- hi = Inner E-Chain height
- H_F = Required clearance height incl. 1.97" (50 mm) clearance
- IR = Inner radius
- K = Series-dependent add-on for bending radius
- n = Number of links
- R = E-Chain Bending radius
- T = Pitch
- v = Speed
- X_1 = Inner machine construction space
- X_2 = Outer radius, incl. clearance
- R_{LK} = Distance pivot point/ outer mounting holes

The following clearances are absolutely essential for proper design function:

$$IR_{min} = X_1 + 3.15" (80 \text{ mm})$$

$$X_2_{min} = AR + 3.15" (80 \text{ mm})$$

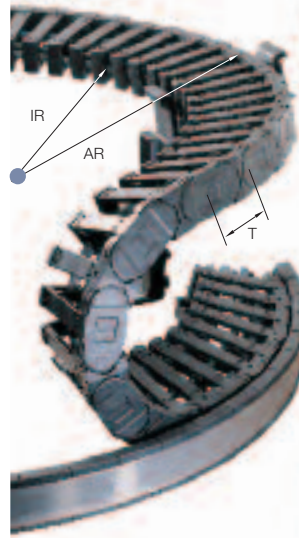
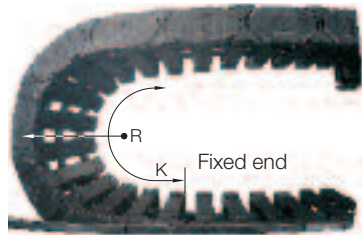
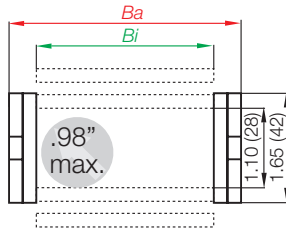
$$H_F = H + 1.97" (50 \text{ mm})$$

Chain height including clearance

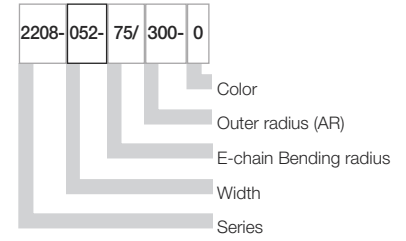
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Series 2208 (snap-open along inner and outer radius)



Part No. structure



Legend

- AR = Outer radius
- IR = Inner radius
- R = E-Chain Bending radius
- T = Pitch
- K = Series-dependent add-on for bending radius

R	2.17 (55)	2.48 (63)	2.95 (75)	3.94 (100)	4.92 (125)	5.91 (150)
K	10.43 (265)	11.42 (290)	12.99 (330)	16.14 (410)	19.09 (485)	22.24 (565)
T	1.73 (44)	1.73 (44)	1.73 (44)	1.73 (44)	1.73 (44)	1.73 (44)

Bi	Ba	AR	IR	R	R	R	R	R	R	Weight
in. (mm)	in. (mm)	in. (mm)	in. (mm)	2.16 (55) 2208-...	2.48 (63) 2208-...	2.95 (75) 2208-...	3.94 (100) 2208-...	4.92 (125) 2208-...	5.91 (150) 2208-...	lbs/ft (kg/m)
2.07 (52.5)	3.15 (80)	11.81 (300)	8.94 (227)	-052-55/300	-052-63/300	-052-75/300	-052-100/300	-052-125/300	-052-150/300	.81 (1.20)
2.46 (62.5)	3.54 (90)	11.81 (300)	8.54 (217)	—	—	-062-75/300	-062-100/300	-062-125/300	-062-150/300	.83 (1.24)
2.93 (74.5)	4.02 (102)	11.81 (300)	8.07 (205)	—	—	—	-074-100/300	-074-125/300	-074-150/300	.87 (1.29)
3.44 (87.5)	4.53 (115)	11.81 (300)	7.56 (192)	—	—	—	-087-100/300	-087-125/300	-087-150/300	.91 (1.35)
4.43 (112.5)	5.51 (140)	11.81 (300)	6.57 (167)	—	—	—	—	-112-125/300	-112-150/300	.98 (1.46)

Example Part No. 2208-112-150/300

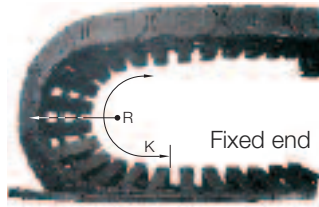
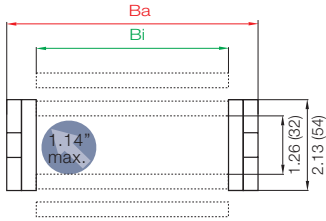
Interior Separation: Series 2208 TwisterChain



All interior elements of the E4/100 Series 220 Energy Chain® may be used with the Series 2208 TwisterChain, Chapter 6.

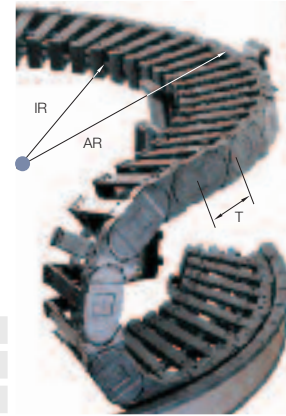


Series 2808 (can be opened along the inner and outer radius)



Legend

- AR = Outer radius
- IR = Inner radius
- R = E-Chain Bending radius
- T = Pitch
- K = Series-dependent add-on for bending radius



R	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)
K	18.30 (465)	21.65 (550)	24.40 (620)	27.56 (700)	30.71 (780)	37.01 (940)
T	2.20 (56)	2.20 (56)	2.20 (56)	2.20 (56)	2.20 (56)	2.20 (56)


Bi in. (mm)	Ba in. (mm)	AR in. (mm)	IR in. (mm)	R 3.94 (100) 2808-...	R 4.92 (125) 2808-...	R 5.91 (150) 2808-...	R 6.89 (175) 2808-...	R 7.87 (200) 2808-...	R 9.84 (250) 2808-...	Weight lbs/ft (kg/m)
1.97 (50)	3.19 (81)	15.75 (400)	12.95 (329.5)	-05-100/400	-05-125/400	-05-150/400	-05-175/400	-05-200/400	-05-250/400	1.18 (1.76)
2.68 (68)	3.90 (99)	15.75 (400)	12.36 (311.5)	-06-100/400	-06-125/400	-06-150/400	-06-175/400	-06-200/400	-06-250/400	1.26 (1.87)
2.95 (75)	4.17 (106)	15.75 (400)	11.99 (304.5)	-07-100/400	-07-125/400	-07-150/400	-07-175/400	-07-200/400	-07-250/400	1.29 (1.92)
3.44 (87.5)	4.67 (118.5)	15.75 (400)	11.50 (292)	-087-100/400	-087-125/400	-087-150/400	-087-175/400	-087-200/400	-087-250/400	1.34 (1.99)
3.94 (100)	5.16 (131)	15.75 (400)	11.00 (279.5)	—	—	-10-150/400	-10-175/400	-10-200/400	-10-250/400	1.39 (2.07)
4.25 (108)	5.47 (139)	15.75 (400)	10.69 (271.5)	—	—	—	-11-175/400	-11-200/400	-11-250/400	1.42 (2.12)
4.92 (125)	6.14 (156)	15.75 (400)	10.02 (254.5)	—	—	—	-12-175/400	-12-200/400	-12-250/400	1.49 (2.22)
5.41 (137.5)	6.63 (168.5)	15.75 (400)	9.53 (242)	—	—	—	—	—	-137-250/400	1.55 (2.30)
5.91 (150)	7.13 (181)	15.75 (400)	9.04 (229.5)	—	—	—	—	—	-15-250/400	1.60 (2.38)

1.97 (50)	3.19 (81)	19.69 (500)	16.91 (429.5)	-05-100/500	-05-125/500	-05-150/500	-05-175/500	-05-200/500	-05-250/500	1.18 (1.76)
2.68 (68)	3.90 (99)	19.69 (500)	16.20 (411.5)	-06-100/500	-06-125/500	-06-150/500	-06-175/500	-06-200/500	-06-250/500	1.26 (1.87)
2.95 (75)	4.17 (106)	19.69 (500)	15.93 (404.5)	-07-100/500	-07-125/500	-07-150/500	-07-175/500	-07-200/500	-07-250/500	1.29 (1.92)
3.44 (87.5)	4.67 (118.5)	19.69 (500)	15.43 (392)	-087-100/500	-087-125/500	-087-150/500	-087-175/500	-087-200/500	-087-250/500	1.34 (1.99)
3.94 (100)	5.16 (131)	19.69 (500)	14.94 (379.5)	-10-100/500	-10-125/500	-10-150/500	-10-175/500	-10-200/500	-10-250/500	1.39 (2.07)
4.25 (108)	5.47 (139)	19.69 (500)	14.63 (371.5)	—	-11-125/500	-11-150/500	-11-175/500	-11-200/500	-11-250/500	1.42 (2.12)
4.92 (125)	6.14 (156)	19.69 (500)	13.96 (354.5)	—	-12-125/500	-12-150/500	-12-175/500	-12-200/500	-12-250/500	1.49 (2.22)
5.41 (137.5)	6.63 (168.5)	19.69 (500)	13.46 (342)	—	—	-137-150/500	-137-175/500	-137-200/500	-137-250/500	1.55 (2.30)
5.91 (150)	7.13 (181)	19.69 (500)	12.97 (329.5)	—	—	-15-150/500	-15-175/500	-15-200/500	-15-250/500	1.60 (2.38)

1.97 (50)	3.19 (81)	23.62 (600)	20.85 (529.5)	-05-100/600	-05-125/600	-05-150/600	-05-175/600	-05-200/600	-05-250/600	1.18 (1.76)
2.68 (68)	3.90 (99)	23.62 (600)	20.13 (511.5)	-06-100/600	-06-125/600	-06-150/600	-06-175/600	-06-200/600	-06-250/600	1.26 (1.87)
2.95 (75)	4.17 (106)	23.62 (600)	19.86 (504.5)	-07-100/600	-07-125/600	-07-150/600	-07-175/600	-07-200/600	-07-250/600	1.29 (1.92)
3.44 (87.5)	4.67 (118.5)	23.62 (600)	19.37 (492)	-087-100/600	-087-125/600	-087-150/600	-087-175/600	-087-200/600	-087-250/600	1.34 (1.99)
3.94 (100)	5.16 (131)	23.62 (600)	18.88 (479.5)	-10-100/600	-10-125/600	-10-150/600	-10-175/600	-10-200/600	-10-250/600	1.39 (2.07)
4.25 (108)	5.47 (139)	23.62 (600)	18.56 (471.5)	-11-100/600	-11-125/600	-11-150/600	-11-175/600	-11-200/600	-11-250/600	1.42 (2.12)
4.92 (125)	6.14 (156)	23.62 (600)	17.89 (454.5)	—	-12-125/600	-12-150/600	-12-175/600	-12-200/600	-12-250/600	1.49 (2.22)
5.41 (137.5)	6.63 (168.5)	23.62 (600)	17.40 (442)	—	-137-125/600	-137-150/600	-137-175/600	-137-200/600	-137-250/600	1.55 (2.30)
5.91 (150)	7.13 (181)	23.62 (600)	16.91 (429.5)	—	—	-15-150/600	-15-175/600	-15-200/600	-15-250/600	1.60 (2.38)

Example: Part Number 2808-15-150/600

Interior Separation: Series 2808 TwisterChain

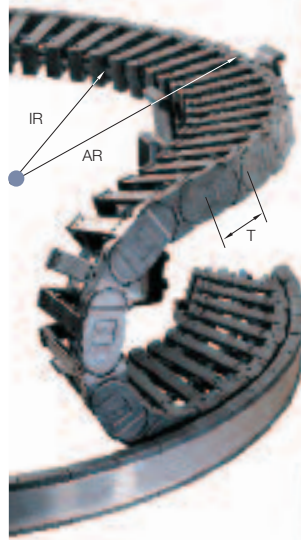
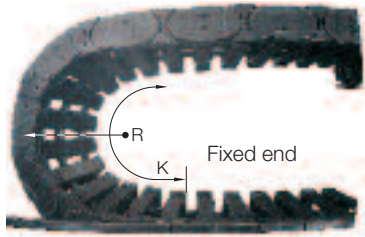
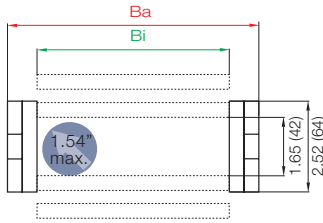
▶  All interior elements of the E4/100 Series 280 Energy Chain® may be used with the Series 2808 TwisterChain, Chapter 6.



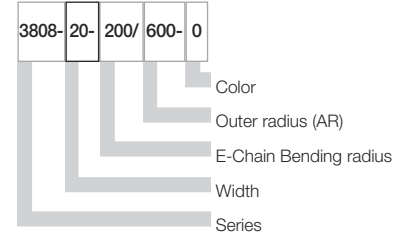
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Series 3808 (can be opened along the inner and outer radius)



Part No. structure



Legend


- AR** = Outer radius
- IR** = Inner radius
- R** = E-Chain Bending radius
- T** = Pitch
- K** = Series-dependent add-on for bending radius

R	3.94	(100)	4.92	(125)	5.91	(150)	7.87	(200)	9.84	(250)
K	19.69	(500)	25.59	(650)	28.54	(725)	34.45	(875)	41.34	(1050)
T	2.64	(67)	2.64	(67)	2.64	(67)	2.64	(67)	2.64	(67)

Bi in. (mm)	Ba in. (mm)	AR in. (mm)	IR in. (mm)	R 3.94 (100) 3808-...	R 4.92 (125) 3808-...	R 5.91 (150) 3808-...	R 7.87 (200) 3808-...	R 9.84 (250) 3808-...	Weight lbs/ft (kg/m)
1.97 (50)	3.35 (85)	15.75 (400)	12.89 (327.5)	-05-100/400	-05-125/400	-05-150/400	-05-200/400	-05-250/400	1.49 (2.21)
2.68 (68)	4.06 (103)	15.75 (400)	12.19 (309.5)	-06-100/400	-06-125/400	-06-150/400	-06-200/400	-06-250/400	1.55 (2.30)
2.95 (75)	4.33 (110)	15.75 (400)	11.91 (302.5)	-07-100/400	-07-125/400	-07-150/400	-07-200/400	-07-250/400	1.57 (2.33)
3.44 (87.5)	4.82 (122.5)	15.75 (400)	11.42 (290)	-087-100/400	-087-125/400	-087-150/400	-087-200/400	-087-250/400	1.61 (2.40)
3.94 (100)	5.31 (135)	15.75 (400)	10.93 (277.5)	-10-100/400	-10-125/400	-10-150/400	-10-200/400	-10-250/400	1.65 (2.46)
4.25 (108)	5.63 (143)	15.75 (400)	10.61 (269.5)	—	-11-125/400	-11-150/400	-11-200/400	-11-250/400	1.68 (2.50)
4.92 (125)	6.30 (160)	15.75 (400)	9.94 (252.5)	—	-12-125/400	-12-150/400	-12-200/400	-12-250/400	1.74 (2.59)
5.41 (137.5)	6.79 (172.5)	15.75 (400)	9.45 (240)	—	-137-125/400	-137-150/400	-137-200/400	-137-250/400	1.78 (2.65)
5.91 (150)	7.28 (185)	15.75 (400)	8.96 (227.5)	—	—	—	-15-200/400	-15-250/400	1.83 (2.72)
6.40 (162.5)	7.78 (197.5)	15.75 (400)	8.46 (215)	—	—	—	-162-200/400	-162-250/400	1.87 (2.78)
6.61 (168)	7.99 (203)	15.75 (400)	8.25 (209.5)	—	—	—	—	-17-250/400	1.89 (2.81)
6.89 (175)	8.27 (210)	15.75 (400)	7.97 (202.5)	—	—	—	—	-18-250/400	1.91 (2.84)
1.97 (50)	3.35 (85)	19.69 (500)	16.83 (427.5)	-05-100/500	-05-125/500	-05-150/500	-05-200/500	-05-250/500	1.49 (2.21)
2.68 (68)	4.06 (103)	19.69 (500)	16.12 (409.5)	-06-100/500	-06-125/500	-06-150/500	-06-200/500	-06-250/500	1.55 (2.30)
2.95 (75)	4.33 (110)	19.69 (500)	15.85 (402.5)	-07-100/500	-07-125/500	-07-150/500	-07-200/500	-07-250/500	1.57 (2.33)
3.44 (87.5)	4.82 (122.5)	19.69 (500)	15.35 (390)	-087-100/500	-087-125/500	-087-150/500	-087-200/500	-087-250/500	1.61 (2.40)
3.94 (100)	5.31 (135)	19.69 (500)	14.86 (377.5)	-10-100/500	-10-125/500	-10-150/500	-10-200/500	-10-250/500	1.65 (2.46)
4.25 (108)	5.62 (143)	19.69 (500)	14.55 (369.5)	—	-11-125/500	-11-150/500	-11-200/500	-11-250/500	1.68 (2.50)
4.92 (125)	6.30 (160)	19.69 (500)	13.78 (352.5)	—	-12-125/500	-12-150/500	-12-200/500	-12-250/500	1.74 (2.59)
5.41 (137.5)	6.79 (172.5)	19.69 (500)	13.38 (340)	—	—	-137-150/500	-137-200/500	-137-250/500	1.78 (2.65)
5.91 (150)	7.28 (185)	19.69 (500)	12.89 (327.5)	—	—	-15-150/500	-15-200/500	-15-250/500	1.83 (2.72)
6.40 (162.5)	7.76 (197.5)	19.69 (500)	12.40 (315)	—	—	—	-162-200/500	-162-250/500	1.87 (2.78)
6.61 (168)	7.99 (203)	19.69 (500)	12.19 (309.5)	—	—	—	-17-200/500	-17-250/500	1.89 (2.81)
6.89 (175)	8.27 (210)	19.69 (500)	11.91 (302.5)	—	—	—	-18-200/500	-18-250/500	1.91 (2.84)
7.38 (187.5)	8.76(222.5)	19.69 (500)	11.42 (290)	—	—	—	-187-200/500	-187-250/500	1.96 (2.91)
7.87 (200)	9.25 (235)	19.69 (500)	10.93 (277.5)	—	—	—	-20-200/500	-20-250/500	2.00 (2.97)
1.97 (50)	3.35 (85)	23.62 (600)	20.76 (527.5)	-05-100/600	-05-125/600	-05-150/600	-05-200/600	-05-250/600	1.49 (2.21)
2.68 (68)	4.06 (103)	23.62 (600)	20.06 (509.5)	-06-100/600	-06-125/600	-06-150/600	-06-200/600	-06-250/600	1.55 (2.30)
2.95 (75)	4.33 (110)	23.62 (600)	19.78 (502.5)	-07-100/600	-07-125/600	-07-150/600	-07-200/600	-07-250/600	1.57 (2.33)
3.44 (87.5)	4.82 (122.5)	23.62 (600)	19.29 (490)	-087-100/600	-087-125/600	-087-150/600	-087-200/600	-087-250/600	1.61 (2.40)
3.94 (100)	5.31 (135)	23.62 (600)	18.80 (477.5)	-10-100/600	-10-125/600	-10-150/600	-10-200/600	-10-250/600	1.65 (2.46)
4.25 (108)	5.63 (143)	23.62 (600)	18.48 (469.5)	-11-100/600	-11-125/600	-11-150/600	-11-200/600	-11-250/600	1.68 (2.50)
4.92 (125)	6.30 (160)	23.62 (600)	17.81 (452.5)	-12-100/600	-12-125/600	-12-150/600	-12-200/600	-12-250/600	1.74 (2.59)
5.41 (137.5)	6.79 (172.5)	23.62 (600)	17.32 (440)	-137-100/600	-137-125/600	-137-150/600	-137-200/600	-137-250/600	1.78 (2.65)
5.91 (150)	7.28 (185)	23.62 (600)	16.83 (427.5)	-15-100/600	-15-125/600	-15-150/600	-15-200/600	-15-250/600	1.83 (2.72)
6.40 (162.5)	7.76 (197.5)	23.62 (600)	16.34 (415)	—	—	—	-162-200/600	-162-250/600	1.87 (2.78)
6.61 (168)	7.99 (203)	23.62 (600)	16.12 (409.5)	—	—	—	-17-200/600	-17-250/600	1.89 (2.81)
6.89 (175)	8.27 (210)	23.62 (600)	15.85 (402.5)	—	—	—	-18-200/600	-18-250/600	1.91 (2.84)
7.38 (187.5)	8.76 (222.5)	23.62 (600)	15.35 (390)	—	—	—	-187-200/600	-187-250/600	1.96 (2.91)
7.87 (200)	9.25 (235)	23.62 (600)	14.86 (377.5)	—	—	—	-20-200/600	-20-250/600	2.00 (2.97)

Example: Part Number 3808-20-150/600

Interior Separation: Series 3808 TwisterChain

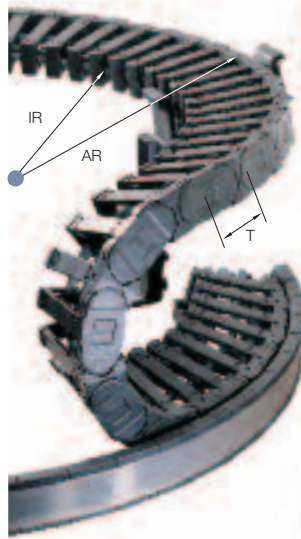
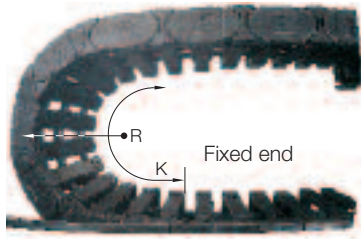
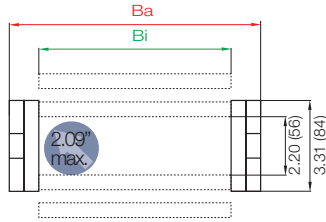
▶  All interior elements of the E4/100 Series 380 Energy Chain® may be used with the Series 3808 TwisterChain, Chapter 6.



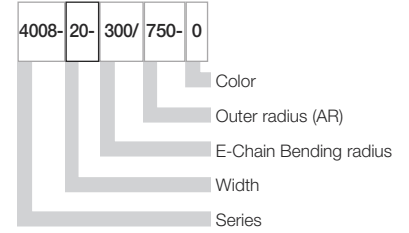
PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Series 4008 (snap-open along the inner and outer radius)



Part No. structure



Legend

- AR** = Outer radius
- IR** = Inner radius
- R** = E-Chain Bending radius
- T** = Pitch
- K** = Series-dependent add-on for bending radius

R	5.91	(150)	7.87	(200)	9.84	(250)	11.81	(300)	15.75	(400)
K	29.53	(750)	35.43	(900)	41.34	(1050)	48.23	(1225)	57.09	(1450)
T	3.58	(91)	3.58	(91)	3.58	(91)	3.58	(91)	3.58	(91)


Bi in. (mm)	Ba in. (mm)	AR in. (mm)	IR in. (mm)	R 5.91 (150) 4008-...	R 7.87 (200) 4008-...	R 9.84 (250) 4008-...	R 11.81 (300) 4008-...	R 15.75 (400) 4008-...	Weight lbs/ft (kg/m)
1.97 (50)	3.66 (93)	25.59 (650)	22.52 (572)	-05-150/650	-05-200/650	-05-250/650	-05-300/650	-05-400/650	2.20 (3.28)
2.56 (65)	4.25 (108)	25.59 (650)	21.93 (557)	-06-150/650	-06-200/650	-06-250/650	-06-300/650	-06-400/650	2.27 (3.38)
2.95 (75)	4.65 (118)	25.59 (650)	21.54 (547)	-07-150/650	-07-200/650	-07-250/650	-07-300/650	-07-400/650	2.31 (3.44)
3.94 (100)	5.63 (143)	25.59 (650)	20.55 (522)	—	-10-200/650	-10-250/650	-10-300/650	-10-400/650	2.43 (3.61)
4.41 (112)	6.10 (155)	25.59 (650)	20.08 (510)	—	-11-200/650	-11-250/650	-11-300/650	-11-400/650	2.48 (3.69)
4.92 (125)	6.61 (168)	25.59 (650)	19.57 (497)	—	-12-200/650	-12-250/650	-12-300/650	-12-400/650	2.53 (3.77)
5.41 (137.5)	7.11 (180.5)	25.59 (650)	19.07 (484.5)	—	—	-13-250/650	-13-300/650	-13-400/650	2.59 (3.86)
5.91 (150)	7.60 (193)	25.59 (650)	18.58 (472)	—	—	-15-250/650	-15-300/650	-15-400/650	2.65 (3.94)
6.40 (162.5)	8.09 (205.5)	25.59 (650)	18.09 (459.5)	—	—	-16-250/650	-16-300/650	-16-400/650	2.70 (4.02)
6.89 (175)	8.58 (218)	25.59 (650)	17.60 (447)	—	—	—	-17-300/650	-17-400/650	2.76 (4.10)
7.38 (187.5)	9.07 (230.5)	25.59 (650)	17.11 (434.5)	—	—	—	-18-300/650	-18-400/650	2.82 (4.19)

1.97 (50)	3.66 (93)	29.53 (750)	26.46 (672)	-05-150/750	-05-200/750	-05-250/750	-05-300/750	-05-400/750	2.20 (3.28)
2.56 (65)	4.25 (108)	29.53 (750)	25.87 (657)	-06-150/750	-06-200/750	-06-250/750	-06-300/750	-06-400/750	2.27 (3.38)
2.95 (75)	4.65 (118)	29.53 (750)	25.47 (647)	-07-150/750	-07-200/750	-07-250/750	-07-300/750	-07-400/750	2.31 (3.44)
3.94 (100)	5.63 (143)	29.53 (750)	24.49 (622)	-10-150/750	-10-200/750	-10-250/750	-10-300/750	-10-400/750	2.43 (3.61)
4.41 (112)	6.10 (155)	29.53 (750)	24.02 (610)	-11-150/750	-11-200/750	-11-250/750	-11-300/750	-11-400/750	2.48 (3.69)
4.92 (125)	6.61 (168)	29.53 (750)	23.50 (597)	—	-12-200/750	-12-250/750	-12-300/750	-12-400/750	2.53 (3.77)
5.41 (137.5)	7.11 (180.5)	29.53 (750)	23.01 (584.5)	—	-13-200/750	-13-250/750	-13-300/750	-13-400/750	2.59 (3.86)
5.91 (150)	7.60 (193)	29.53 (750)	22.52 (572)	—	-15-200/750	-15-250/750	-15-300/750	-15-400/750	2.65 (3.94)
6.40 (162.5)	8.09 (205.5)	29.53 (750)	22.03 (559.5)	—	-16-200/750	-16-250/750	-16-300/750	-16-400/750	2.70 (4.02)
6.89 (175)	8.58 (218)	29.53 (750)	21.54 (547)	—	—	-17-250/750	-17-300/750	-17-400/750	2.76 (4.10)
7.38 (187.5)	9.07 (230.5)	29.53 (750)	21.04 (534.5)	—	—	-18-250/750	-18-300/750	-18-400/750	2.82 (4.19)
7.87 (200)	9.57 (243)	29.53 (750)	20.55 (522)	—	—	-20-250/750	-20-300/750	-20-400/750	2.87 (4.27)

1.97 (50)	3.66 (93)	33.46 (850)	30.39 (772)	-05-150/850	-05-200/850	-05-250/850	-05-300/850	-05-400/850	2.20 (3.28)
2.56 (65)	4.25 (108)	33.46 (850)	29.80 (757)	-06-150/850	-06-200/850	-06-250/850	-06-300/850	-06-400/850	2.27 (3.38)
2.95 (75)	4.65 (118)	33.46 (850)	29.41 (747)	-07-150/850	-07-200/850	-07-250/850	-07-300/850	-07-400/850	2.31 (3.44)
3.94 (100)	5.63 (143)	33.46 (850)	28.43 (722)	-10-150/850	-10-200/850	-10-250/850	-10-300/850	-10-400/850	2.43 (3.61)
4.41 (112)	6.10 (155)	33.46 (850)	27.95 (710)	-11-150/850	-11-200/850	-11-250/850	-11-300/850	-11-400/850	2.48 (3.69)
4.92 (125)	6.61 (168)	33.46 (850)	27.44 (697)	-12-150/850	-12-200/850	-12-250/850	-12-300/850	-12-400/850	2.53 (3.77)
5.41 (137.5)	7.11 (180.5)	33.46 (850)	26.95 (684.5)	—	-13-200/850	-13-250/850	-13-300/850	-13-400/850	2.59 (3.86)
5.91 (150)	7.60 (193)	33.46 (850)	26.46 (672)	—	-15-200/850	-15-250/850	-15-300/850	-15-400/850	2.65 (3.94)
6.40 (162.5)	8.09 (205.5)	33.46 (850)	25.96 (659.5)	—	-16-200/850	-16-250/850	-16-300/850	-16-400/850	2.70 (4.02)
6.89 (175)	8.58 (218)	33.46 (850)	25.47 (647)	—	-17-200/850	-17-250/850	-17-300/850	-17-400/850	2.76 (4.10)
7.38 (187.5)	9.07 (230.5)	33.46 (850)	24.98 (634.5)	—	-18-200/850	-18-250/850	-18-300/850	-18-400/850	2.82 (4.19)
7.87 (200)	9.57 (243)	33.46 (850)	24.49 (622)	—	—	-20-250/850	-20-300/850	-20-400/850	2.87 (4.27)

Example: Part Number 4008-20-50/850

Interior Separation: Series 4008 TwisterChain

►  All interior elements of the **E4/100 Series 400 Energy Chain®** may be used with the Series 4008 TwisterChain, Chapter 6.



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



2208
2808
3808
4008



Energy Chain System® TwisterChain® Series Mounting Bracket

igus® Energy Chain System®

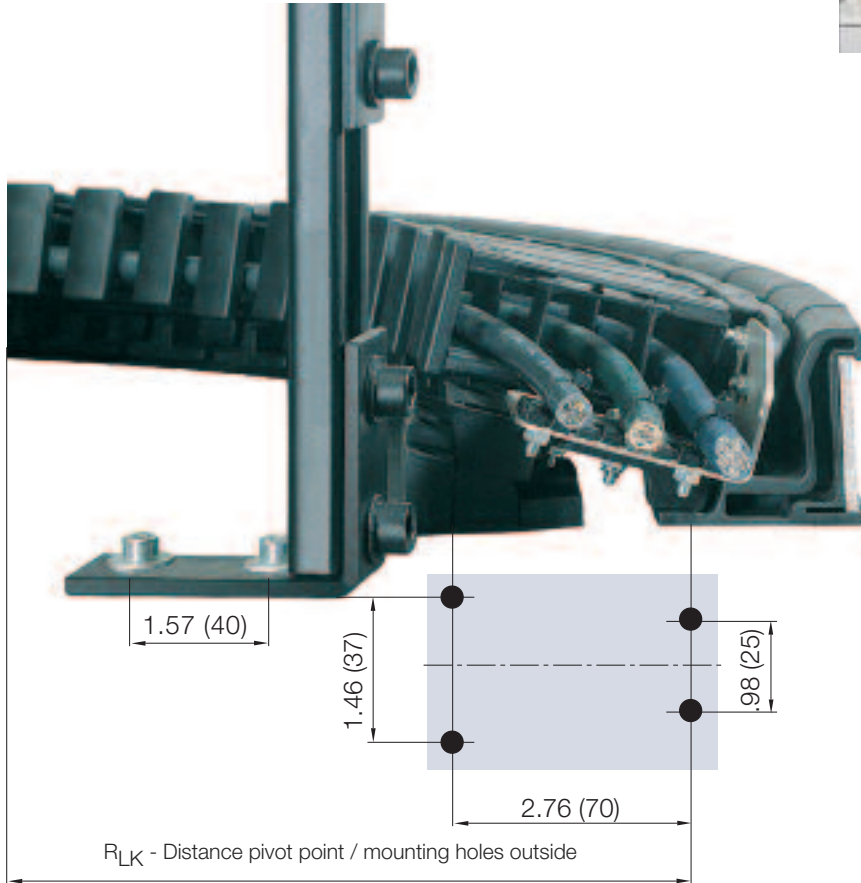
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Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec/RFQ: <http://www.igus.com/quickspec>



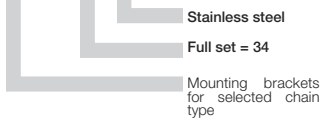
Steel mounting bracket

- Electrically conductive
- Universal use
- One component for all chain widths



Part No. structure

22080-34-E



Full set, for both ends

22080-34

Single-part order - Part 1:

22080-3

Single-part order - Part 2:

22080-4

Chain Type	Part Number Full Set	Part Number Item 1	Part Number Item 2
2208	22080-34	22080-3	22080-4
2808	28080-34	28080-3	28080-4
3808	38080-34	38080-3	38080-4
4008	40080-34	40080-3	40080-4

Other connection dimensions for mounting the guide trough, ► See Page 8.74

The guide trough must be mounted at the fixed point of the TwisterChain® as shown by the drilling template in the illustration. The following bolted connections are permitted:

- Through-hole: 4 x Ø .26 - .28" (6.6 - 7 mm)
- Mounting only with bolts: 4 x M6 bolts



TwisterChain® for continuous industrial use on a buckling arm robot (for welding applications, rotary movement 420°)



TwisterChain® in a guide trough for rotary movements on an articulated robot

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Energy Chain System®
TwisterChain® Series
Guide Trough - Type 01

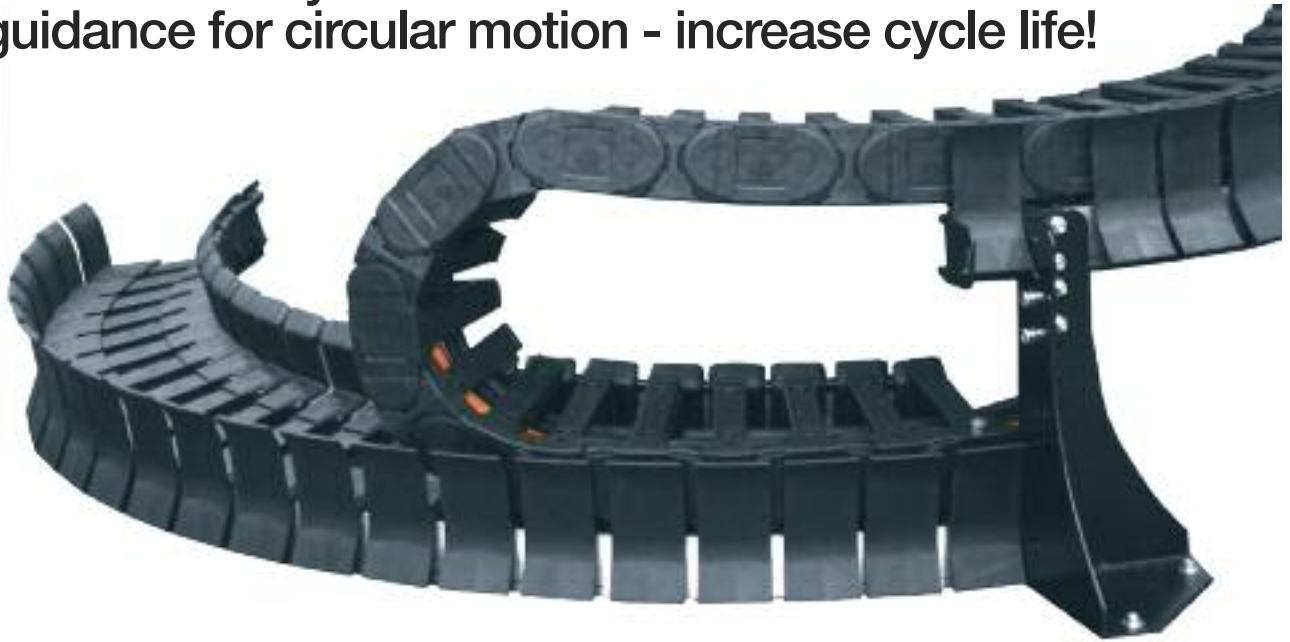
igus® Energy Chain System®

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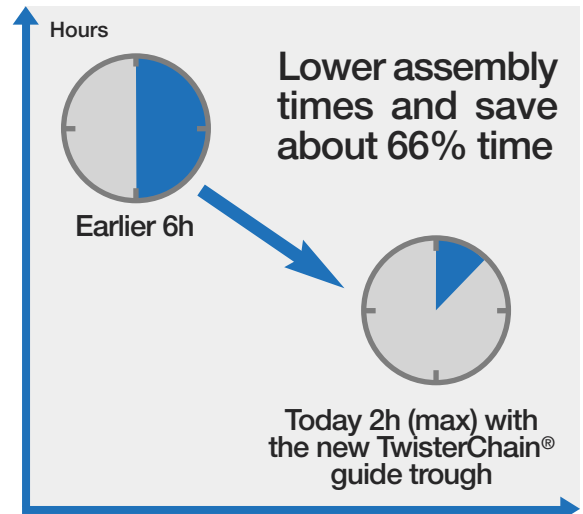
8.73

Save assembly time and costs - Better guidance for circular motion - increase cycle life!



With the new TwisterChain® trough, complex adjustment work is eliminated and assembly time is reduced from six hours to just two hours. Thanks to its almost all-plastic design, noise levels are reduced while travel speed and service life are increased. Now available for widths and radii on TwisterChain® models series 2808, 3808 and 4008. Please call igus® for more information.

- Much smoother and quieter motion of the TwisterChain® in the trough due to continuous guidance of upper run
- Preassembled delivery possible
- Easy adjustment and alignment and handling
- Assembly time reduced from 6 hours to 2 hours



With the new Twister trough, the previously complex adjustment work is clearly minimized



Easy adjustment and alignment on the robot, due to the pre-defined angles and pre-drilled mounting holes



Upper run

Lower run

Less parts, easier handling -
Illustration shows a 180° application

Energy Chain System® TwisterChain® Series Guide Trough - Type 01

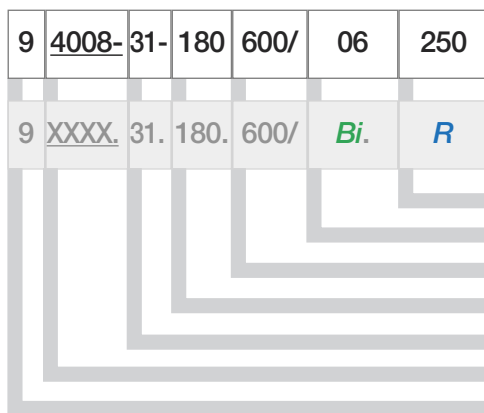


2208
2808
3808
4008

For Series	Outer radius AR [mm]	Angle of rotation α [°]	Trough Type 01 complete
2808 / 3808	15.75" (400 mm)	0 - 90°	9 [XXXX] -31-90 -400/- [Bi] [R]
		90° - 180°	9 [XXXX] -31-180-400/- [Bi] [R]
		180° - 270°	9 [XXXX] -31-270-400/- [Bi] [R]
		270° - 360°	9 [XXXX] -31-360-400/- [Bi] [R]
	19.69" (500 mm)	0 - 90°	9 [XXXX] -31-90 -500/- [Bi] [R]
		90° - 180°	9 [XXXX] -31-180-500/- [Bi] [R]
		180° - 270°	9 [XXXX] -31-270-500/- [Bi] [R]
		270° - 360°	9 [XXXX] -31-360-500/- [Bi] [R]
	23.62" (600 mm)	0 - 90°	9 [XXXX] -31-90 -600/- [Bi] [R]
		90° - 180°	9 [XXXX] -31-180-600/- [Bi] [R]
		180° - 270°	9 [XXXX] -31-270-600/- [Bi] [R]
		270° - 360°	9 [XXXX] -31-360-600/- [Bi] [R]
4008	25.59" (650 mm)	0 - 90°	9 [4008] -31-90 -650/- [Bi] [R]
		90° - 180°	9 [4008] -31-180-650/- [Bi] [R]
		180° - 270°	9 [4008] -31-270-650/- [Bi] [R]
		270° - 360°	9 [4008] -31-360-650/- [Bi] [R]
	29.53" (750 mm)	0 - 90°	9 [4008] -31-90 -750/- [Bi] [R]
		90° - 180°	9 [4008] -31-180-750/- [Bi] [R]
		180° - 270°	9 [4008] -31-270-750/- [Bi] [R]
		270° - 360°	9 [4008] -31-360-750/- [Bi] [R]
	33.46" (850 mm)	0 - 90°	9 [4008] -31-90 -850/- [Bi] [R]
		90° - 180°	9 [4008] -31-180-850/- [Bi] [R]
		180° - 270°	9 [4008] -31-270-850/- [Bi] [R]
		270° - 360°	9 [4008] -31-360-850/- [Bi] [R]

Supplement Part No. with required Series (2808, 3808 or 4008), the value *Bi*

and the corresponding value of the required Energy Chain® bending radius *R* ▶ 9 [4008] -31-180-600/ [06] - [250]



Part No. structure - guide trough
94008-31-180-600/06-250

- Energy Chain® bending radius, please add appropriate value
- Bi* - widths index, please add appropriate value
- Outer radius (AR)
- Trough angle (90°, 180°, 270°, 360°)
- Trough version - See below
- Selected Series (2808, 3808 or 4008)
- Guide trough

More order examples

- Complete system
(Energy Chain®, mounting bracket and trough)
- Complete trough
- Only lower run trough
- Upper and lower run trough without base support

= Part. No. 9 [4008] -180-600/ [06] - [250] -0

= Part. No. 9 [4008] -31-180-600/ [06] - [250] -0

= Part. No. 9 [4008] -30-180-600/ [06] - [250] -0

= Part. No. 9 [4008] -32-180-600/ [06] - [250] -0

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2208
2808
3808
4008



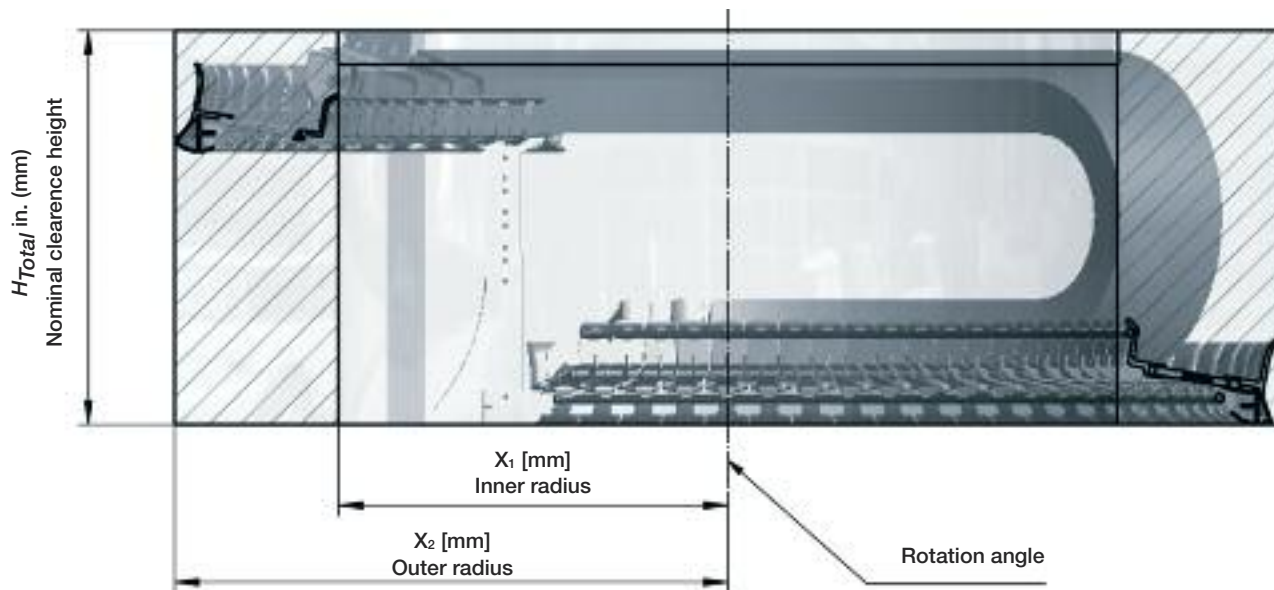
Energy Chain System®
TwisterChain® Series
Guide Trough - Type 01

igus® Energy Chain System®

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Fax 1-401-438-7270

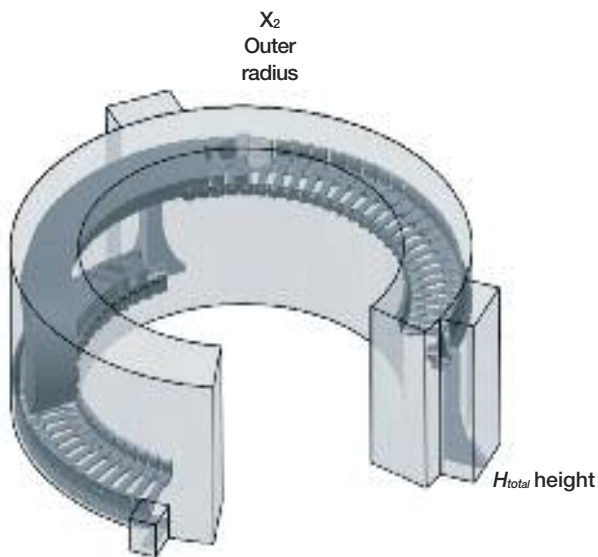
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8.75

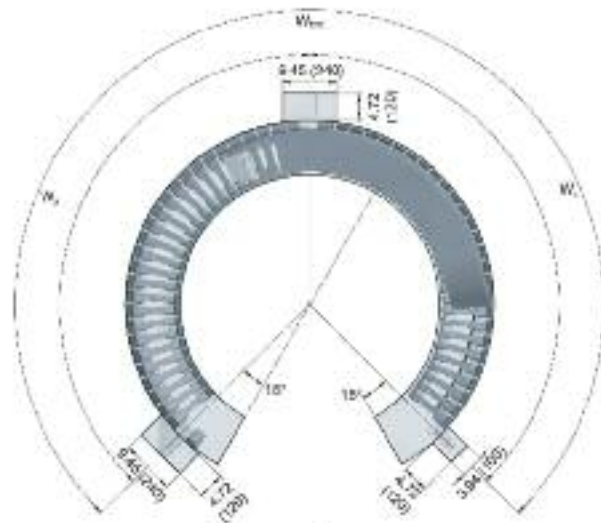


Installation Dimensions - X₁ / X₂

AR	X ₂	X ₁ Inner radius												
		Bi = 50	Bi = 65	Bi = 75	Bi = 100	Bi = 112	Bi = 125	Bi = 137	Bi = 150	Bi = 162	Bi = 175	Bi = 187	Bi = 200	
in. (mm)	Outer radius	in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)	in. (mm)
15.75 (400)	18.90 (480)	11.42 (290)	11.02 (280)	10.63 (270)	9.84 (250)	9.45 (240)	8.66 (220)	8.27 (210)	7.87 (200)	7.48 (190)	7.09 (180)	6.69 (170)	5.91 (150)	
19.69 (500)	22.83 (580)	15.35 (390)	14.96 (380)	14.57 (370)	13.78 (350)	13.39 (340)	12.60 (320)	12.20 (310)	11.81 (300)	11.42 (290)	11.02 (280)	10.63 (270)	9.84 (250)	
23.62 (600)	26.77 (680)	19.29 (490)	18.90 (480)	18.50 (470)	17.72 (450)	17.32 (440)	16.54 (420)	16.14 (410)	15.75 (400)	15.35 (390)	14.96 (380)	14.57 (370)	13.78 (350)	
25.59 (650)	28.74 (730)	21.26 (540)	20.87 (530)	20.47 (520)	19.69 (500)	19.29 (490)	18.50 (470)	18.11 (460)	17.72 (450)	17.32 (440)	16.93 (430)	16.54 (420)	15.75 (400)	
29.53 (750)	32.68 (830)	25.20 (640)	24.80 (630)	24.41 (620)	23.62 (600)	23.23 (590)	22.44 (570)	22.05 (560)	21.65 (550)	21.26 (540)	20.87 (530)	20.47 (520)	19.69 (500)	
33.46 (850)	36.61 (930)	29.13 (740)	28.74 (730)	28.35 (720)	27.56 (700)	27.16 (690)	26.38 (670)	25.98 (660)	25.59 (650)	25.20 (640)	24.80 (630)	24.41 (620)	23.62 (600)	



The required clearance height of the TwisterChain® trough system



Rotation angle - W₁ / W₂ / W_{total}

Nominal clearance height - H_{total}

For Series	R 100 [mm]	R 125 in. (mm)	R 150 in. (mm)	R 175 in. (mm)	R 200 in. (mm)	R 250 in. (mm)	R 400 in. (mm)
2808	14.57 (370)	16.54 (420)	18.50 (470)	20.47 (520)	22.44 (570)	26.38 (670)	38.19 (970)
3808	14.96 (380)	16.93 (430)	18.90 (480)	20.87 (530)	22.83 (580)	26.77 (680)	38.58 (980)
4008	15.75 (400)	17.72 (450)	19.69 (500)	21.65 (550)	23.62 (600)	27.56 (700)	39.37 (1000)

W _{total} Machine angle of rotation (°)	W ₁ angle Lower run trough (°)	W ₂ angle Upper run trough (°)
90°	45°	-
180°	90°	90°
270°	135°	135°
360°	180°	180°



TwisterChain® in the new igus® guide trough for rotary movements in a buckling arm robot -
Durable and rugged: Prototype successfully tested in over 1,000,000 cycles

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFG: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



2208
2808
3808
4008



Energy Chain System® TwisterChain® Series Guide Trough - Type 02

igus® Energy Chain
System®

The delivery of an igus® TwisterChain® includes the guide trough, which affords certain advantages:

- Guidance of the chain
- Minimized wear on the chain
- Optimal running smoothness
- Rotational angle up to 400°

The modular design of the guide trough makes it possible to connect a large number of chain, circle and bending radii by using the same trough sections. If the chain radius changes, the trough can simply be adapted without purchasing a completely new trough. The table below will assist you in selecting the right guide trough system. The specified part number includes the complete trough system. In all cases, you should state the TwisterChain® series when ordering.



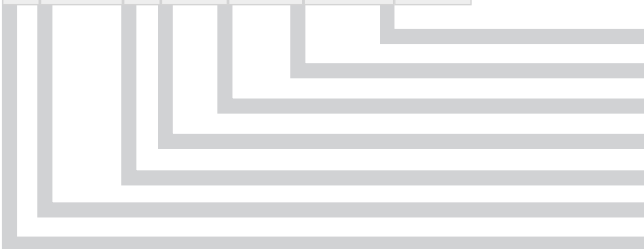
This bottom stanchion (pictured above in red) is required only if the support for the upper run (from a 180° rotation angle) cannot be mounted on the machine.

Order Example

9	4008-	5-	180-	600/	06-	250
---	-------	----	------	------	-----	-----

9	XXXX-	5-	180-	600/	Bi -	R
---	-------	----	------	------	------	---

Part No. structure - guide trough
94008-5-180-600/06-250



Energy Chain® bending radius, please add appropriate value
Bi - widths index, please add appropriate value
Outer radius (AR)
Trough angle (Standard 180°, 135°, 90°, 45°)
Trough version (-5- with and -4- without bottom support)
Selected Series (2208, 2808, 3808 or 4008)
Guide trough

Part No. Series	Outer radius AR	Rotation angle α [°]	Trough assembly		Number of support
			Standard	Trough assembly with bottom support	
2208	11.81" (300 mm)	45 - 100	9 [2208]-4-45-300/ [Bi] - [R]	Not necessary	
		>100 - 180	9 [2208]-4-90-300/ [Bi] - [R]	Not necessary	
		>180 - 270	9 [2208]-4-135-300/ [Bi] - [R] *	9 [2208]-5-135-300/ [Bi] - [R]	1
		>270 - 360	9 [2208]-4-180-300/ [Bi] - [R] **	9 [2208]-5-180-300/ [Bi] - [R]	2
2808 / 3808 / 4008	17.72" (450 mm)	45 - 100	9 [XXXX]-4-45-400/ [Bi] - [R]	Not necessary	
		>100 - 180	9 [XXXX]-4-90-400/ [Bi] - [R]	Not necessary	
		>180 - 270	9 [XXXX]-4-135-400/ [Bi] - [R] *	9 [XXXX]-5-135-400/ [Bi] - [R]	1
		>270 - 360	9 [XXXX]-4-180-400/ [Bi] - [R] **	9 [XXXX]-5-180-400/ [Bi] - [R]	2
	17.72" - 21.65" (450 - 550 mm)	45 - 100	9 [XXXX]-4-45-500/ [Bi] - [R]	Not necessary	
		>100 - 180	9 [XXXX]-4-90-500/ [Bi] - [R]	Not necessary	
		>180 - 270	9 [XXXX]-4-135-500/ [Bi] - [R] *	9 [XXXX]-5-135-500/ [Bi] - [R]	1
		>270 - 360	9 [XXXX]-4-180-500/ [Bi] - [R] **	9 [XXXX]-5-180-500/ [Bi] - [R]	2
21.65" - 23.62" (550 - 650 mm)	45 - 100	9 [XXXX]-4-45-600/ [Bi] - [R]	Not necessary		
	>100 - 180	9 [XXXX]-4-90-600/ [Bi] - [R]	Not necessary		
	>180 - 270	9 [XXXX]-4-135-600/ [Bi] - [R] *	9 [XXXX]-5-135-600/ [Bi] - [R]	1	
	>270 - 360	9 [XXXX]-4-180-600/ [Bi] - [R] **	9 [XXXX]-5-180-600/ [Bi] - [R]	2	
>23.62" (650 mm)	>360	Ask us we will be happy to assist you			

Supplement Part No. with required Series (2208, 2808, 3808 oder 4008), value Bi,

and appropriate value of the required Energy Chain® radius R ► 9 [4008]-5-180-600/ [06] - [250]

* These troughs feature **one support** for the upper run, without bottom stanchion (See red portion of above photo)

** These troughs feature **two supports** for the upper run, without bottom stanchion (See red portion of above photo)

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Fax 1-401-438-7270

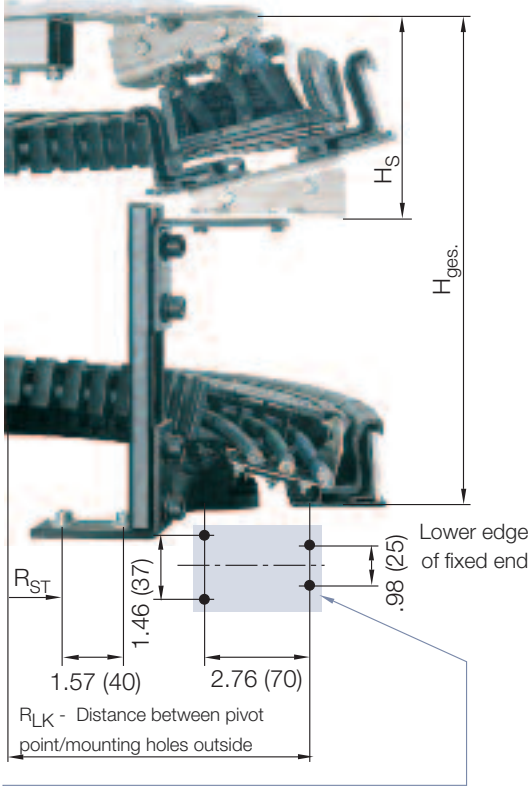
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Energy Chain System® TwisterChain® Series Guide Trough - Type 02

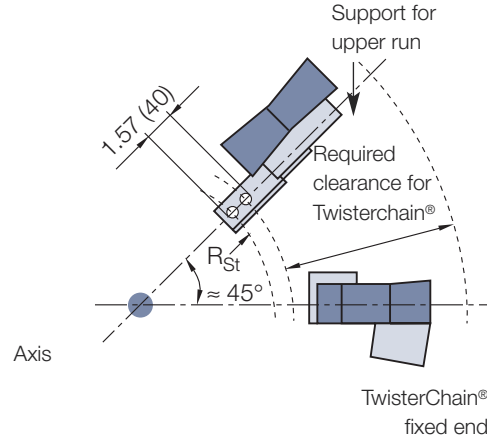


2208
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3808
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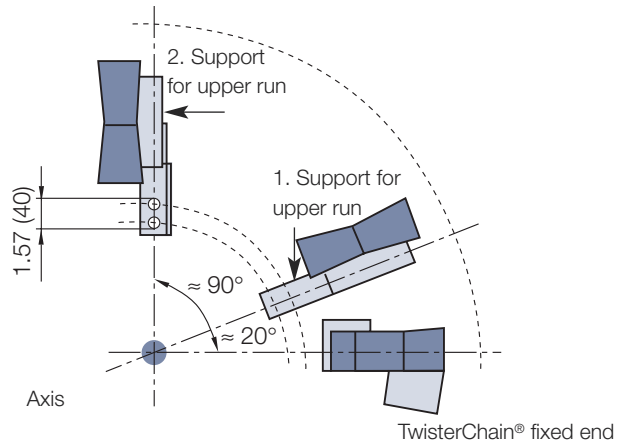
Support for the upper run (from a 180° rotational angle)
Lower edge of the carrier



Mounting position for one support



Mounting position for two supports



The guide trough must be mounted at the fixed end of the TwisterChain®, as shown by the drilling template. The following bolted connections are permitted.

- Through-hole: 4 x Ø .26" - .28" (6.6 - 7 mm)
- Mounting only with bolts: 4 x M6 bolts

Installation dimensions

Series	R _{LK}	H _S	H _{tot.} for E-Chain Bending Radius						Part No. Guide Trough	R _{ST}
			2.16 (55)	2.48 (63)	2.95 (75)	3.94 (100)	4.92 (125)	5.91 (150)		
2208...300	10.43 (265)	5.12 (130)	7.68 (195)	8.31 (211)	9.25 (235)	11.22 (285)	13.19 (335)	15.16 (385)	92208...300	in. mm 5.71 (145)

Series	R _{LK}	H _S	H _{tot.} for E-Chain Bending Radius								Part No. Guide Trough	R _{ST}	
			3.93 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	9.84 (250)	11.81 (300)			15.75 (400)
2808...400	14.17 (360)	5.75 (146)	11.42 (290)	13.39 (340)	15.85 (390)	17.32 (440)	19.29 (490)	21.26 (540)	23.23 (590)	-	-	92808...400	7.58 (192.5)
3808...400	14.17 (360)	6.14 (156)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	19.69 (500)	21.65 (550)	23.62 (600)	-	-	93808...400	7.58 (192.5)
2808...500	18.11 (460)	5.75 (146)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	19.69 (500)	21.65 (550)	23.62 (600)	-	-	92808...500	11.52 (292.5)
3808...500	18.11 (460)	6.14 (156)	12.20 (310)	14.17 (360)	16.14 (410)	18.11 (460)	20.01 (510)	22.05 (560)	24.02 (610)	-	-	93808...500	11.52 (292.5)
2808...600	22.05 (560)	5.75 (146)	12.01 (305)	13.98 (355)	15.94 (405)	17.91 (455)	19.88 (505)	21.85 (555)	23.82 (605)	-	-	92808...600	15.43 (392.5)
3808...600	22.05 (560)	6.14 (156)	12.40 (315)	14.37 (365)	16.34 (415)	18.31 (465)	20.28 (515)	22.24 (565)	24.21 (615)	-	-	93808...600	15.43 (392.5)
4008...650	24.02 (610)	6.93 (176)	-	-	17.01 (432)	-	20.94 (532)	-	24.88 (632)	28.82 (732)	36.69 (932)	94008...650	17.42 (442.5)
4008...750	27.95 (710)	6.93 (176)	-	-	17.01 (432)	-	20.94 (532)	-	24.88 (632)	28.82 (732)	36.69 (932)	94008...750	21.36 (542.5)

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



2208
2808
3808
4008



**Energy Chain System®
TwisterChain® Series
System Analysis**

igus® Energy Chain System®

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8.79

Date:	Telephone: 401-438-2200 or 800-521-2747 Fax: 401-438-7270
From:	To: igus,inc. Technical Sales Energy Chain Systems® P.O. Box 14349 East Providence, RI 02914
Telephone:	
Fax:	

Please supply us with your application data. We will then send you a full analysis with cable/layout suggestion and a quotation immediately. Please consult igus® should you have any questions.

Individual components:

- TwisterChain®
- Chainflex® high-flex cables
- Guide trough
- Pre-assembled

Cable and Hose package for igus® TwisterChain®

Number	Type	Ø	Weight (lbs/ft)	Permitted Bending Radius

Dimensions

X₁ in mm
 X₂ in mm
 H_F in mm
 Angle of rotation α* in °

* On machine elements which move to the left and to the right following a circular path, the angle of rotation can be determined by adding the two angles.

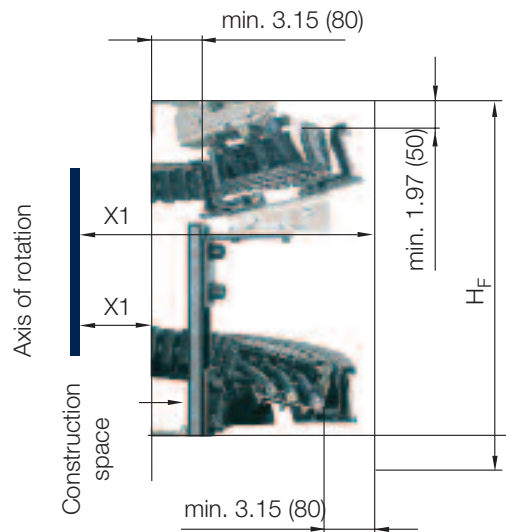
Operating data

Rotations/day
 Days/year
 Speed in ft/s
 Acceleration in ft/s²

Environment

Temperature in °F
 Moisture yes no

Remarks:



**Please copy,
fill in, and fax
this page.**

Thank you!

Calculation assistance

This calculation sheet should help you to select the right igus® TwisterChain® system for your application. Please consult igus® if you have any questions.

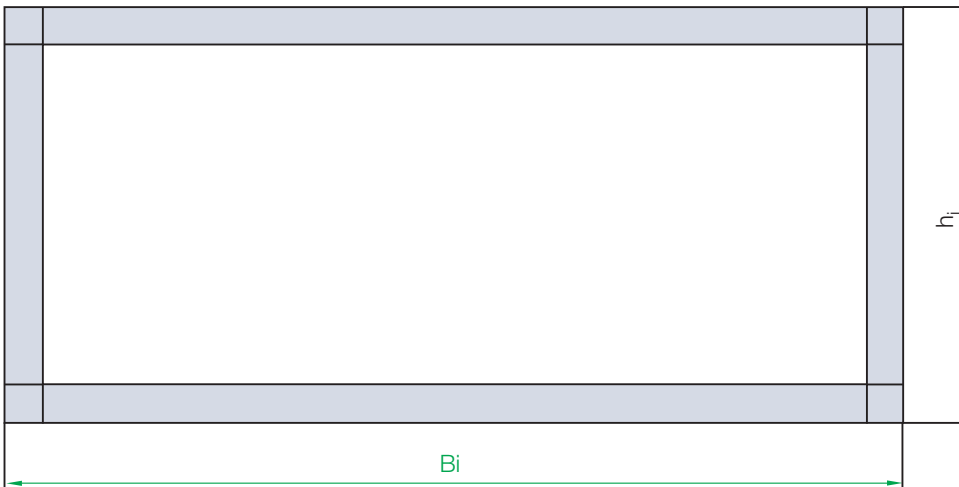
Angle of rotation in °

Cable and hose layout

Please sketch the cable and hose layout within the chain.

Note:

To find the correct series, refer to the thickest cable diameter, plus cable clearance of approx. 20% of the chain interior.



TwisterChain® Series

2208 2808 3808 4008

Existing installation space

X_1 max.:
 X_2 max.:
 H_F max.:

Chain data

Outer radius AR:
Inner radius IR:
Bending radius R:

Guide trough

yes no

Trough part number

9.....-.....-.....-.....

Supporting structure necessary

yes no

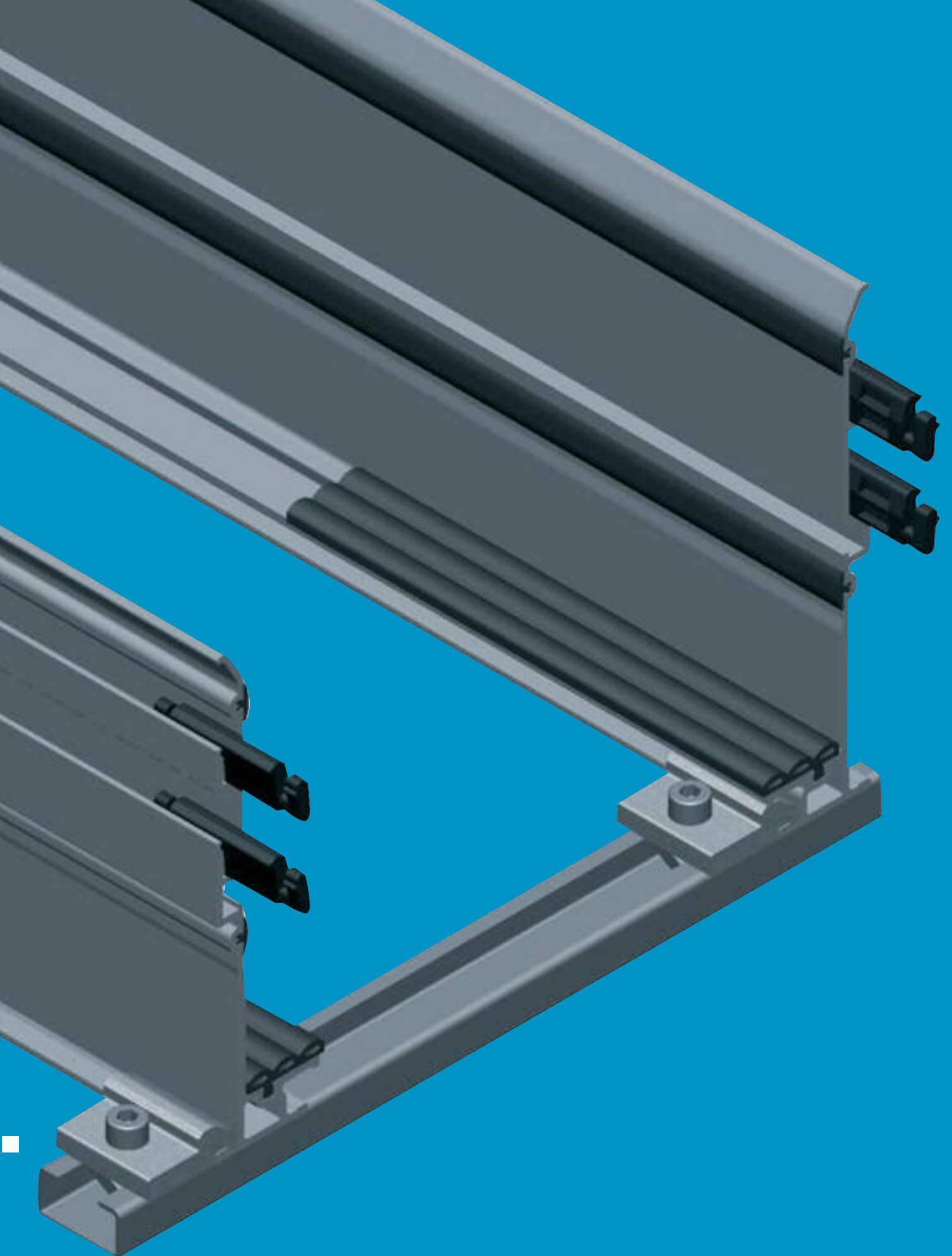
The guide trough part number includes all the necessary elements for proper operation. The angle of rotation is dependent upon support for the upper run and should be assembled on-site. If on-site assembly is not possible, we will deliver a supporting structure which can be assembled on the floor and is based on the height of the lower trough run. If necessary, we will design a supporting structure specially adapted to your application.

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFG: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

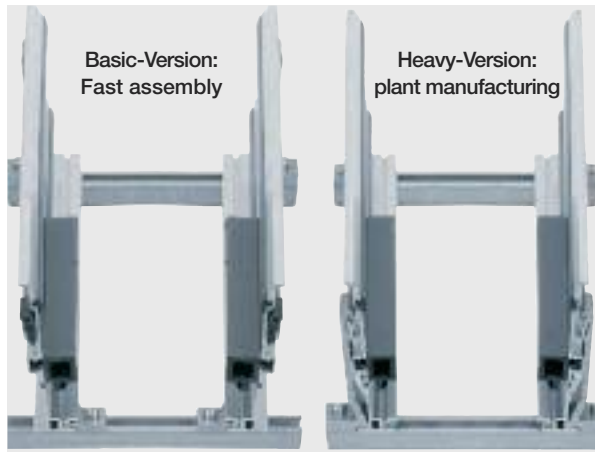




**Solutions for long
travel applications..**
with or without Guide Troughs



Long Travels **With** Guide Troughs



Aluminium "SuperTrough" - The igus® standard guide trough

- Very simple, modular assembly
- Side-mounted glide strips for wear protection in high-speed
- Corrosion resistant, seawater resistant aluminium profile
- Flexible assembly - Fastening on substructure independent of profile lengths and butt joints
- Plastic glide bar made of PE
- Bottom clamp can be mounted -inside or outside- directly on the bottom or on the profile rail
- Heavy duty brackets for safe connection also for rough applications



Steel guide trough - very stable and rugged for heavy duty applications

- Very stable and robust guide trough made of steel
- Easy assembly with installation set
- Big range, two piece design, adjustable to E-Chain® width
- Available in galvanized steel and stainless steel
- Glide bar made of PE



For support of the lower run - Support tray tool kit

- Complete system, ready to install
- No more costly self-made designs
- Easy installation onto your machine, on profiles or wall-mount brackets

Long Travels Without Guide Troughs



Rol E-Chain® - Rolling instead of gliding

Travels up to 800 m, speeds up to 6 m/s

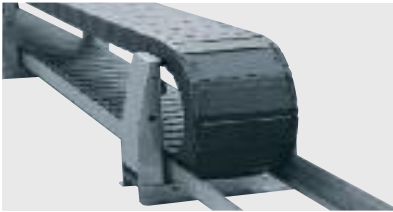
- Major reduction in drive power to less than 25 % for moving the Energy Chain®
- Rol E-Chain® is designed for applications with long travel lengths at high speed



AUTO-GLIDE - Long travels without guide troughs

Travels up to 164 ft. (50 m), speeds up to 4.92 ft/s (1.5 m/s)

- AUTO-GLIDE Energy Chain® links are moulded and no additional parts are necessary
- Very fast assembly times for long travels - No Guide Troughs required!



Guidelok horizontal - upper run guide for long travels

Travels, unsupported up to 164 ft. (50 m) possible

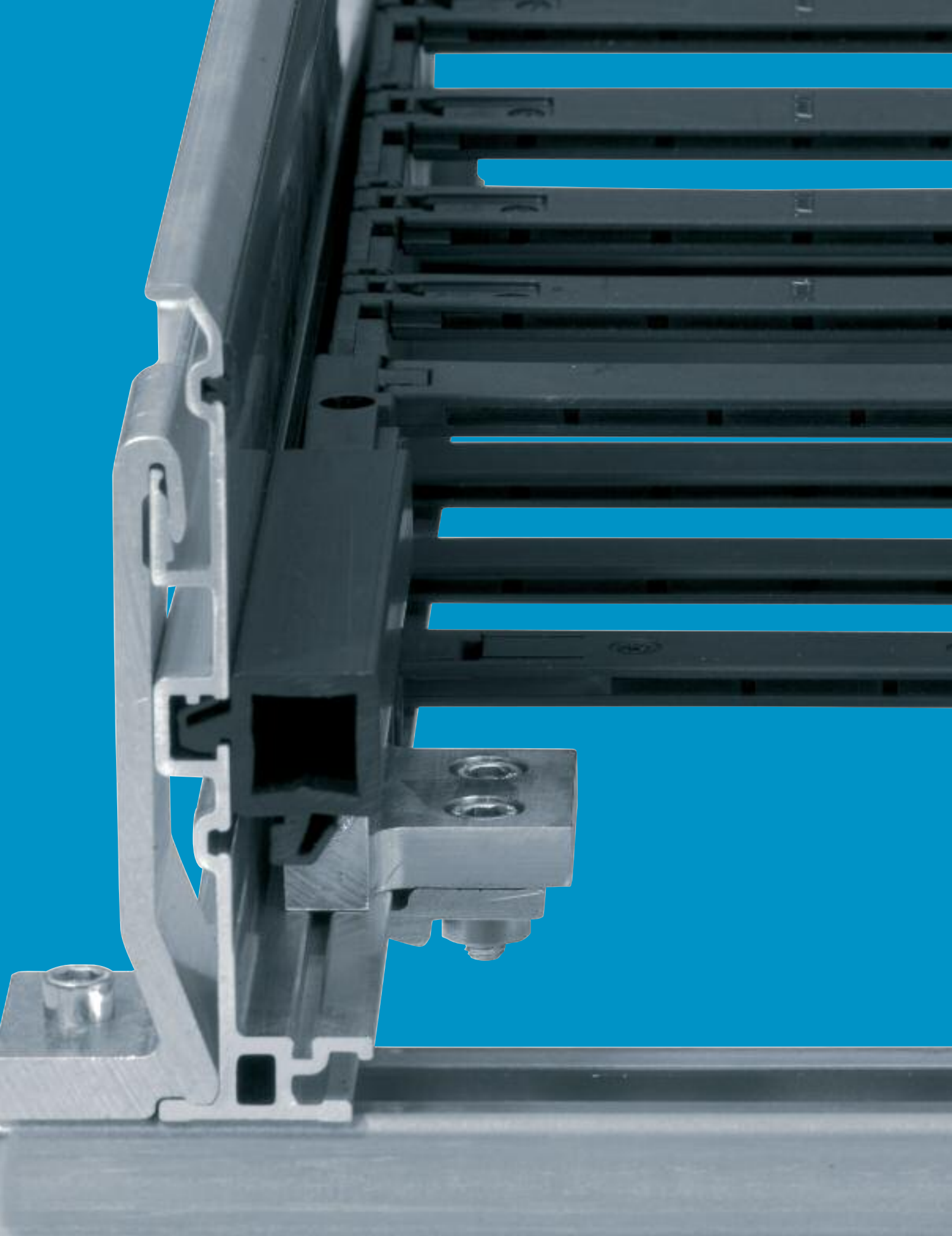
- Chips cannot get stuck between upper and lower run
- Enormous increase of „self supporting“ length of Energy Chains®



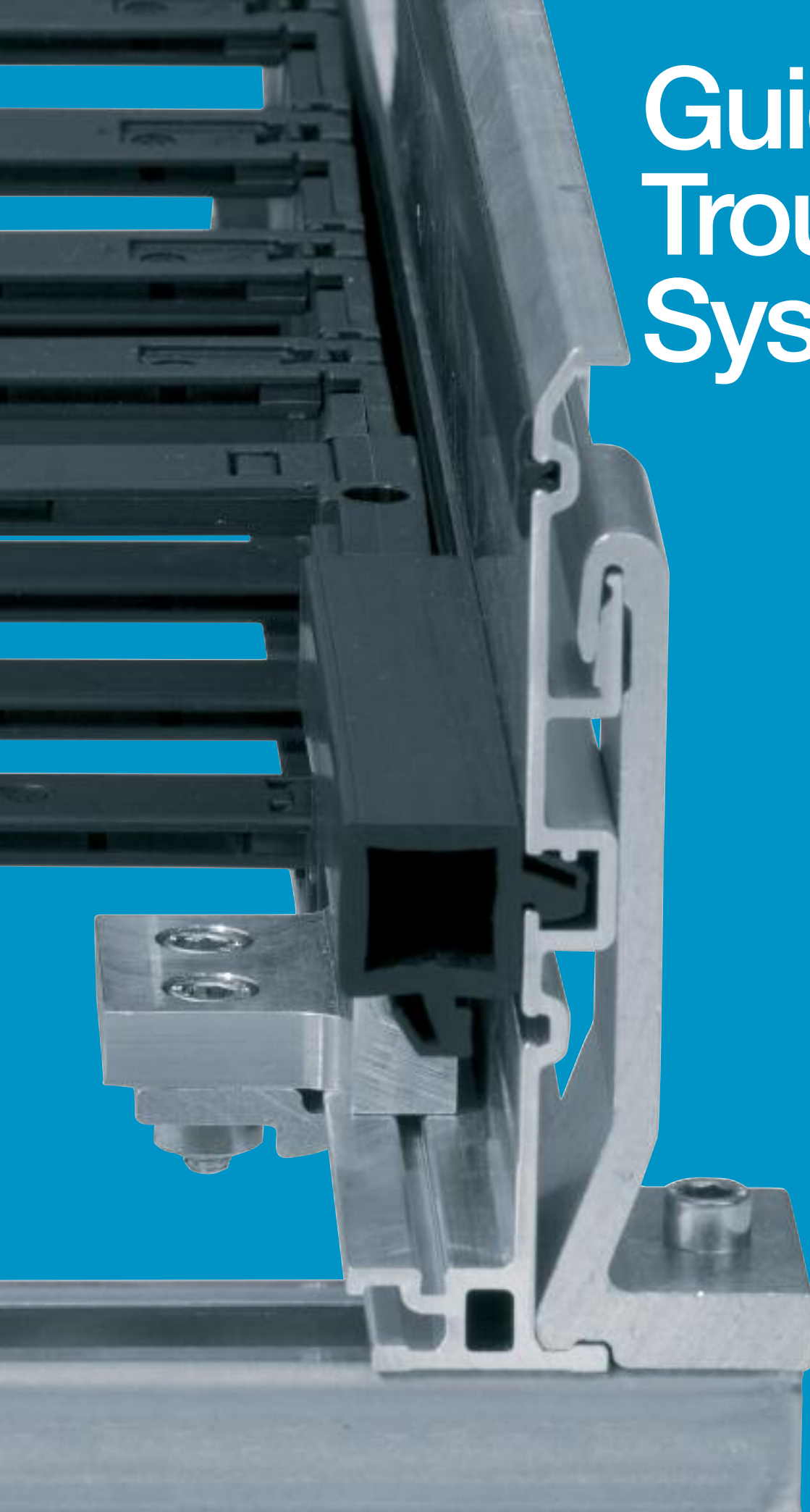
Micro Flizz® - Small Energy Chains® in aluminum profile

ONE compact system for a secure guidance of power, data and air

- Maintenance-free alternative for busbar
- Control via stationary switch cabinet possible



Guide Trough Systems





Connection of trough sections with igus® installation set



Various guide trough systems are available

Guide troughs are used for long travels from 16 - 33 ft (5-10 m) and greater, depending on the chain type. They allow igus® Energy Chain® and Energy Tubes to continue smooth, low-friction operation in these long-travel situations.

If the Energy Chains®/Tubes are installed in the center of the travel ("center-mounted"), they glide on themselves for half the travel. For the other half, we recommend glide bars, which are assembled in the trough and on which the Energy Chains®/Tubes glide. igus® guide troughs are available from stock with these highly abrasion-resistant polymer glide bars, which perform well with igus® Energy Chains® and Tubes regarding noise, abrasion and friction.

Materials

igus® offers guide troughs made of steel and aluminum. Which material to use depends on the application conditions and on the customers preference.

Delivery Options

The troughs are supplied in 6.56 ft (2 m) sections. The side parts (left and right) are installed on site at the required distance apart, depending on the width of the chain. The necessary width is shown in the table on the guide trough page of the respective chain chapter. The side parts of the trough can be bolted or welded directly to the attachment surface or connected to the base by means of screwing or welding or by using a special igus® installation set.

Guide trough systems can be ordered various ways: all the individual parts as separate components or completely assembled.

For additional overall system design information,

► **Design, Chapter 1**



Trough without glide bars:
Chain glides on chain



Guide trough with and without glide bars



Trough with glide bars:
Chain glides on glide bars

Customer-Supplied Guide Troughs

The dimensional data in this chapter consists of auxiliary dimensions for design and assembly. They apply exclusively to igus guide trough systems.

If the igus® Energy Chain® customer supplies the trough, all dimensions (including installation dimensions) must be obtained from igus. This is particularly important for one-piece guide troughs. The clearance between the guide trough and Energy Chain® is crucial and depends on the chain type, length and size, as well as the bending radius and the tolerance of the carrier and the attachment surface.

Since such guide troughs cannot be adjusted according to the application during the assembly process and cannot be readjusted in operation, careful calculation is required throughout this process.



Center mounted:
1/2 travel with glide bars
1/2 travel without glide bars



New in this catalog: igus® Support Tray - for support of the lower run

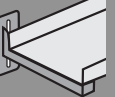
We are always happy to advise you by telephone or on site. Special solutions provided by igus® often result in significant assembly cost savings.

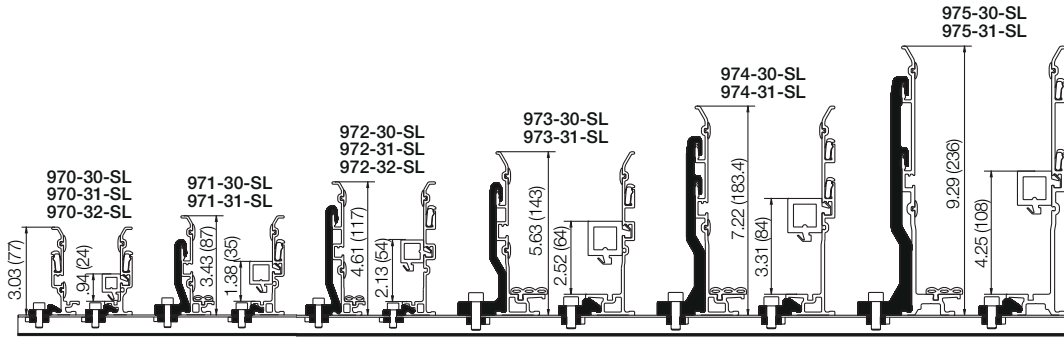
Guide Trough Systems - Selection Table



Selected Energy Chain	Chapter	Part No. Aluminum "SuperTrough"	Part No. Steel Guide Trough	Support Tray Available
10/B15-015	E2 mini	-	91-10	-
10/B15-025	E2 mini	-	91-20	-
10/B15-038	E2 mini	-	91-30	-
10/B15-050	E2 mini	-	91-40	-
10/B15-5	E2 mini	-	91-50	-
10/B15-6	E2 mini	-	91-60	-
10/B15-7	E2 mini	-	91-70	-
15-015	Zipper	-	91-10	-
15-025	Zipper	-	91-20	-
15-038	Zipper	-	91-30	-
15-050	Zipper	-	91-40	-
15-5	Zipper	-	91-50	-
15-6	Zipper	-	91-60	-
15-7	Zipper	-	91-70	-
1400/1450/1480/1500	E2/000	970-30-SL, 970-32-SL	-	✓
2480	E2/000	971-30-SL, 971-31-SL	92-30	✓
2680	E2/000	972-30-SL, 972-32-SL	95-30	✓
3480	E2/000	973-30-SL, 973-31-SL	93-30	✓
200/240/250	E2 medium	971-30-SL, 971-31-SL	92-30	✓
26/27i/27	E2 medium	972-30-SL, 972-32-SL	95-30	✓
340/350	E2 medium	973-30-SL, 973-31-SL	93-30	✓
R58 / R58	E2 Tubes	972-30-SL, 972-32-SL	95-30	-
R68 / R68	E2 Tubes	973-30-SL, 973-31-SL	93-30	-
E4-21	E4-1	970-30-SL, 970-32-SL	-	✓
E4-28/R4-28	E4-1	-	96-30	✓
E4-32/H4-32/R4-32	E4-1	972-30-SL, 972-31-SL	98-30	✓
E4-42/H4-42/R4-42	E4-1	973-30-SL, 973-31-SL	93-30	✓
E4-56/H4-56/R4-56	E4-1	974-30-SL, 974-31-SL	94-30	✓
E4-80/H4-80/R4-80	E4-1	975-30-SL, 975-31-SL	99-30	✓
840	E4-1	-	90-30	-
220/R760	E4/00	-	96-30	✓
280/290/R770	E4/00	972-30-SL, 972-31-SL	98-30	✓
380/390/R780	E4/00	973-30-SL, 973-31-SL	93-30	✓
400/410/R880	E4/00	974-30-SL, 974-31-SL	94-30	✓
600/601/R608/640	E4/00	-	97-30	-
800/840	E4/00	-	90-30	✓
2828/2928/R7728	E4/4	972-30-SL, 972-31-SL	98-30	✓
3838/3938/R7838	E4/4	973-30-SL, 973-31-SL	93-30	✓
4040/4140/R8840	E4/4	974-30-SL, 974-31-SL	94-30	✓
5050/5150/R9850	E4/4	975-30-SL, 975-31-SL	99-30	✓
14040/14140/R18840	E4/light	974-30-SL, 974-31-SL	94-30	✓
14240/14340	E4/light	974-30-SL, 974-31-SL	94-30	✓
15050/15150/R19850	E4/light	975-30-SL, 975-31-SL	99-30	✓
1640/1608	E4/light	-	97-30	✓
E6-29/R6-29	E6	971-30-SL, 971-31-SL	92-30	✓
E6-40/R6-40	E6	972-30-SL, 972-31-SL	98-30	✓
E6-52/R6-52	E6	973-30-SL, 973-31-SL	93-30	✓
E6-62	E6	974-30-SL, 974-31-SL	94-30	✓
E6-80 / E6-80L	E6	975-30-SL, 975-31-SL	96-30	✓

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS





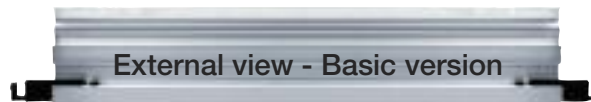
The Aluminum "SuperTrough" is a modular guide trough system for long travels. Aluminum "SuperTrough" is available in low cost "basic versions" and can be upgraded for heavy duty applications. **This universal usage makes it the igus® recommended new standard trough system.**

- Excellent wear and noise levels with igus® Energy Chains® - a 9.0 dB(A) noise reduction was achieved through Aluminum "SuperTrough" with noise reduction profile insert, in combination with optimized igus® Rol E-Chain®
- Very easy, universal assembly
- Multiple fastening options with heavy duty brackets, bottom clamps and interface connectors
- Glide strips for wear protection in high-speed
- Corrosion proof through seawater resistant aluminum
- Flexible assembly - connects to mounting surface, independent from profile length and location of trough section interfaces

Telephone 1-800-521-2747
Fax 1-401-438-7270

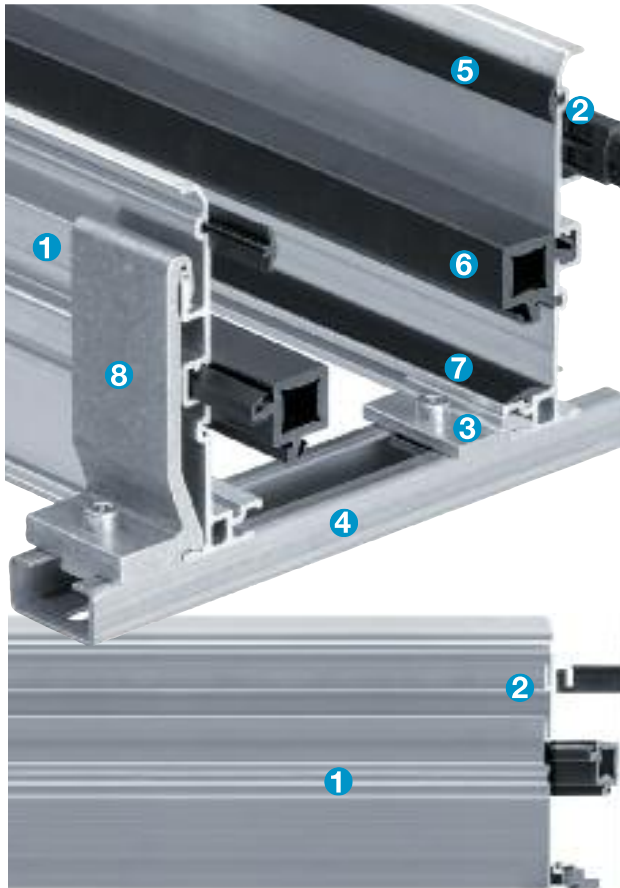
Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

Basic



Heavy





The Aluminum "SuperTrough" is a modular guide trough system for long travels. Aluminum "SuperTrough" is available in low cost "basic versions" and can be upgraded for heavy duty applications. **This universal usage makes it the igus® recommended new standard trough system.**



5 Glide strip

- Protect from wear on the sides
- Easy click-on assembly (tongue and groove), no tools needed

6 Polymer glide bar

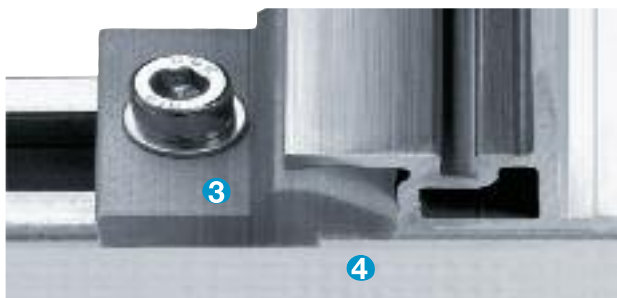
- Easy click-on assembly (tongue and groove), no tools needed

1 Aluminium profile

- Seawater resistant
- Corrosion resistant
- Standard 6.56 ft (2m) length

2 Interface connector

- Snap-on polymer connector
- Easy assembly, no tools needed



3 Bottom clamp

- Fast and easy single-bolt assembly
- Slider attached inwards or outwards, directly to the ground or onto a profile rail

4 profile rail

- Hold Bottom clamps or heavy duty brackets
- Available in zinc-plated or stainless steel



7 Silencer profile (Add-on item)

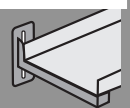
- Rubber profile insert for additional noise reduction



8 Heavy duty bracket (Add-on item)

- Safe grip for heavy duty operation
- Easy tongue and groove assembly
- Attached directly to ground or to profile rails

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



A quick fix for mounting the stationary end of an Energy Chain®

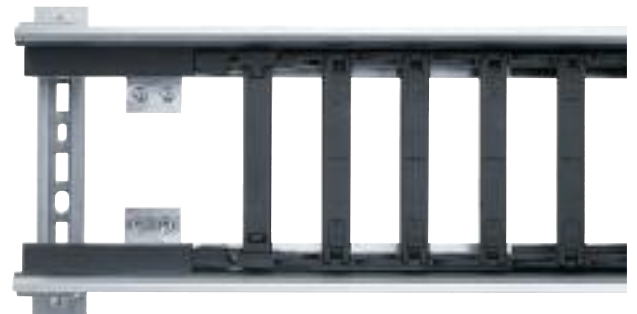
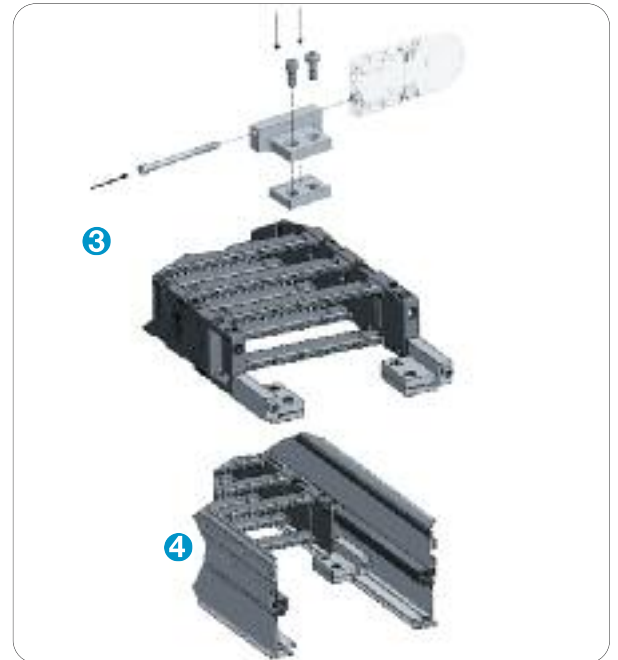
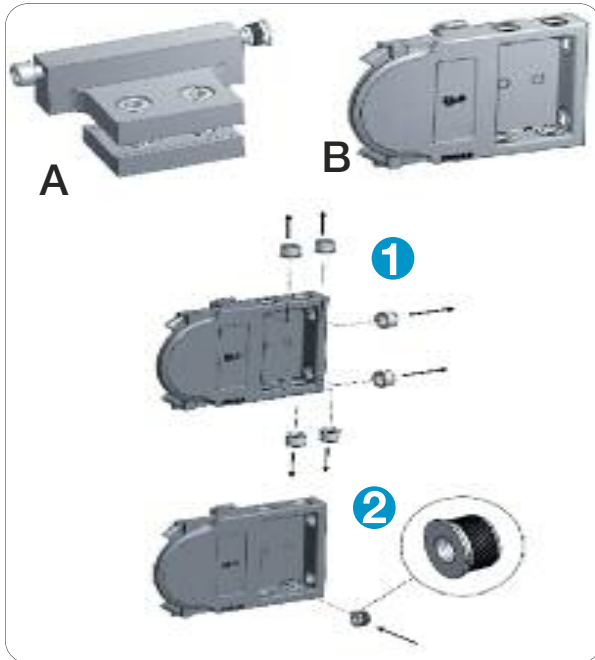


With this new module for the fixed end, fast and easy mounting onto the "SuperTrough" is now possible without any drilling.

- Fast mounting for the Energy Chain® by clamping onto the aluminum trough
- Quick relocation of the stationary end
- No drilling necessary

Installation - A) Fixed-end module, B) KMA-mounting bracket

- 1 Removing the pre-assembled metal bushings
- 2 Use of threaded bushings
- 3 Installation of fixed-end module
- 4 Mounting on aluminum "SuperTrough"



Fixed-end module - Simple fastening of the Energy Chain® without drilling

Part No.	SuperTrough	For Series
971-80	971-30-SL / 971-31-SL	2480
972-82	972-02-30-SL / 972-02-31-SL	220/R760
972-81	972-30-SL / 972-32-SL	2680
972-80	972-30-SL / 972-31-SL	280/290/R770, 2828/2928/R7728, E6-40
973-81	973-30-SL / 973-31-SL	380/390/R780, 3838/3938/R7838, E6-52/R6-52
973-80	973-30-SL / 973-31-SL	3480
974-81	974-30-SL / 974-31-SL	14040/14140/R18840, 14240/14340
974-80	974-30-SL / 974-31-SL	400/410/R880, 4040/4140/R8840, E6-62
975-80	975-30-SL / 975-31-SL	5050/5150/R9850, 15050/15150/R19850, E6-80/E6-80L



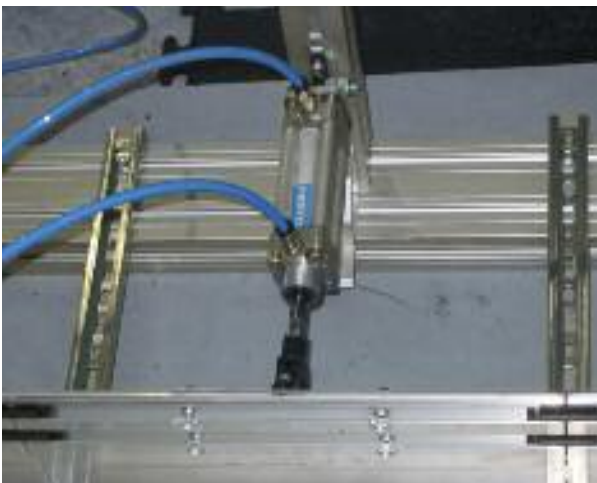
The igus® aluminum "SuperTrough" has been tested since 2005.
Test "Axis 1": Speed 4.92 ft/s (1.5 m/s), Travel: 59 ft (18m), Mileage to date: approximately 31,069 miles (50,000 km)



Test - Glide strips minimize wear after 1,653,187 cycles, 2,672 miles (4,300 km)

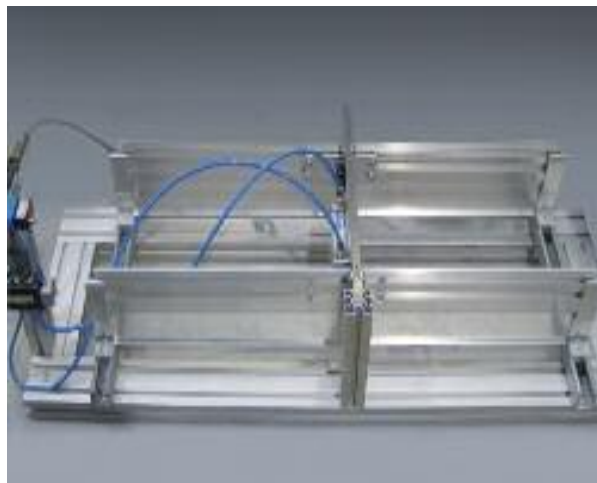


Vibration test: No shifting of trough sections after 108,000,000 rotations at 658 rpm.



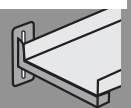
Test - Interface connector

- Push/pull force of 80 psi
- 9,890,000 cycles without shifting of the connector



Alternating push - and pull force of 90 psi is induced on 2 trough side parts, with no deformation after 1,700,000 cycles

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFG: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Installation Sets | Basic and Heavy Duty



Installation Set Basic



Installation Set Heavy Duty

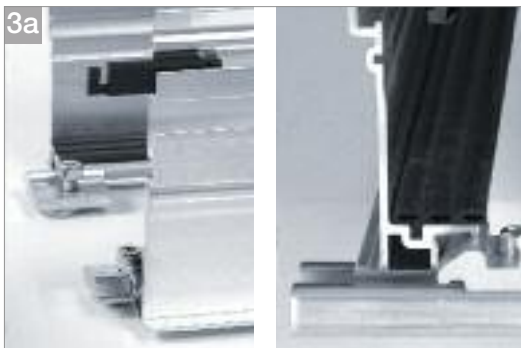
Installation Set | Basic (Standard)



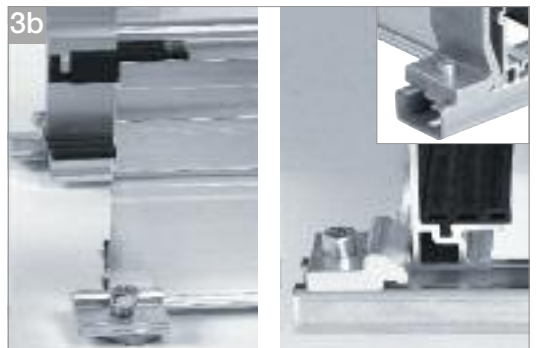
1 Pre-assemble clamp and screw



2 Clip in polymer connector on both sides of the designated support



Fasten Basic assembly set inside 3 a or outside 3 b (Please check if the stability of the attachment is adequate). Please note: half the length of the assembly set and connector must protrude out of the trough. The glide nut should be well fastened in the profile rail



Installation Set | Heavy Duty (Alternative)



1 Pre-assemble heavy duty bracket and screw set



2 Fasten Heavy Duty assembly set outside. Please note: half the length of the assembly set and connector must protrude out of the trough.

Installing the silencer profile (optional)



Cut the rubber profile in accordance to the length of the trough, standard 6.56 ft. (2 m), and press it into the designated groove. (Pictured: although this shows the left hand side, the instructions are the same for the right hand side. To be repeated for each trough section.)

Connecting the trough sections



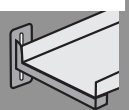
- ❶ Join the sides of the trough side parts by pushing them together (min. +.08 (2mm) gap!)
- ❷ + ❸ The pre-assembled parts join each trough section

Adjusting the tolerance and aligning trough sections



- ❶ Adjust the necessary minimum "chain/trough" tolerance of .08" (2mm) on both sides. Please note: the inner width B_{in} of the trough decreases .08" (2mm) per side with the assembled glide strip (pictured)
- ❷ Test to ensure the Energy Chain® runs problem free and with low friction in the channel
- ❸ After adjusting the minimum tolerance and alignment of all trough sections, please tighten all trough connections. Pay attention to the correct installation direction of the sliding nut (see detail)
Starting torque of the assembly set's fixing bolts: M6: 10 Nm / M8: 23 Nm.

- ⚠ Please consider health & safety regulations while handling sheet metals.
- We recommend using protective Category II gloves to protect against cuts when handling the aluminum profiles.



Part No. 970-30-SL and 970-31-SL - Trough Height: 3.03 in. (77 mm) Aluminum "SuperTrough" — Basic Version

igus® Energy Chain
System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

For the following Energy
Chains®/Energy Tubes

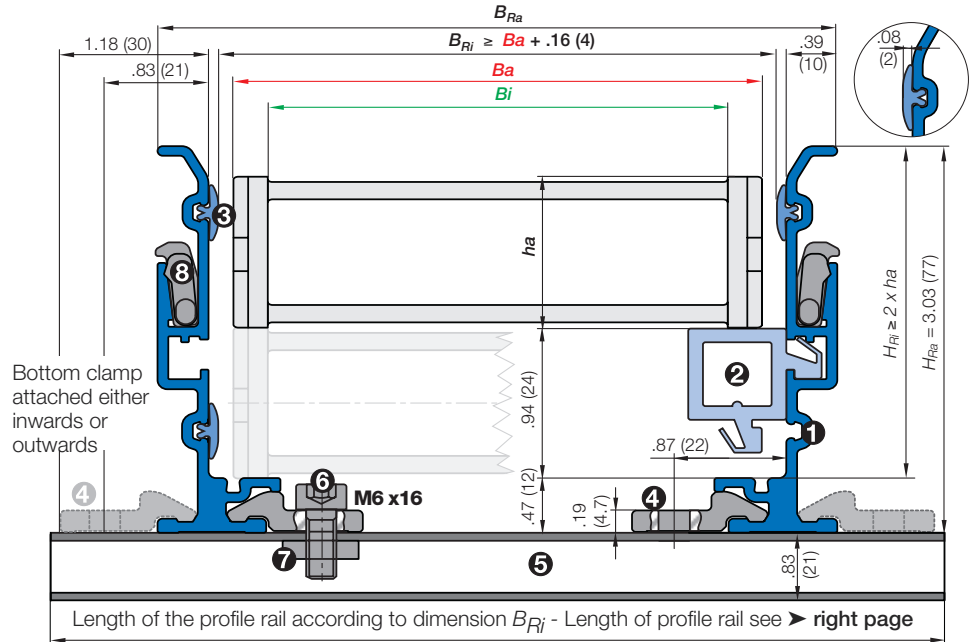
System E2 Series

- 10
- B15

Zipper Series

- 15/R15

- B_a = Outer E-Chain® width
- B_i = Inner E-Chain® width
- h_a = E-Chain® outer height
- H_{Ri} = Inner trough height
- H_{Ra} = Outer trough height
- B_{Ri} = Inner trough width ▶ depends on dim. B_a
- B_{Ra} = Outer trough width
- n_{Mon} = # of installation sets (left/right)
- n_{Ri} = # of trough set (left/right)
- ! $H_{Ri} \geq 2 \cdot h_a$
- ! $B_{Ri} \geq B_a + 4$
- = Guide trough
- = Glide bar
- = Installation set "Basic"
- = profile rail



● **Components, trough "Basic":**

- ① Trough side parts, aluminum, 6.56 ft. (2m)
- ② Glide bar, plastic, 6.56 ft. (2m)
- ③ Glide strips, plastic, 6.56 ft. (2m) (without glide strips on request)

● **Components, installation set "Basic":**

- ④ Bottom clamp, aluminum
- ⑤ profile rail, steel galvanized
- ⑥ Screw M6 x20
- ⑦ Sliding nut M6
- ⑧ Interface connector, plastic

Basic Version: Components

Complete guide trough sets - description

	Part No.	Weight
	(lbs)	
Set of 2 trough side parts, incl. glide strips, without glide bars, 6.56 ft. (2 m) sections	970-30-SL	9.26 lbs
Set of 2 trough side parts, incl. glide strips, with glide bars, 6.56 ft. (2m) sections	970-31-SL	10.8 lbs
1 Installation set "Basic" without profile rail	960-30	.13 lbs
1 Installation set "Basic" with profile rail	960-30-_____	

Single parts - description

1 Glide strip, individual, 6.56 ft. (2m) section	75-01	.13 lbs
1 Bottom clamp, individual	75-40	0.07 lbs
1 Interface connector, individual	75-60	
1 Screw M6 x 20, individual	M6X20SOCKETCAP	
1 Sliding nut M6, individual	ZBNUT-LG	
2 Glide bars, 6.56 ft. (2m) sections	81-79	
1 profile rail, individual	92-52G_____	1.23 lbs/ft

Supplement Part No. with the indicated profile rail-length-index.

Example: 960-30-125 profile rail-length-index for your chosen trough inner width B_{Ri}

▶ See table on the right or the respective page for chosen series

Lengths of profile rail - Basic Version - Bottom Clamp attached either **inwards** or **outwards**

10

10-5-038-0

	B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-015	1.18 (30)	*	960-30-125
-025	1.57 (40)	*	960-30-150
-038	2.09 (53)	*	960-30-150
-050	2.56 (65)	960-30-125	960-30-175
-5	3.15 (80)	960-30-125	960-30-175
-6	3.86 (98)	960-30-150	960-30-200
-7	4.61 (117)	960-30-175	960-30-225

B15

B15-5-038-0

	B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-015	1.18 (30)	*	960-30-125
-025	1.57 (40)	*	960-30-150
-038	2.09 (53)	*	960-30-150
-050	2.56 (65)	960-30-125	960-30-175
-5	3.15 (80)	960-30-125	960-30-175
-6	3.86 (98)	960-30-150	960-30-200
-7	4.61 (117)	960-30-175	960-30-225

15/R15

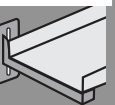
15-5-038-0

	B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-015	1.18 (30)	*	960-30-125
-025	1.57 (40)	*	960-30-150
-038	2.09 (53)	*	960-30-150
-050	2.56 (65)	960-30-125	960-30-175
-5	3.15 (80)	960-30-125	960-30-175
-6	3.86 (98)	960-30-150	960-30-200
-7	4.61 (117)	960-30-175	960-30-225



Energy Chain® on the tower of the storage and retrieval unit for high-bay warehouses rolls off from one aluminum guide trough to the opposite one

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



For the following Energy Chains®/Energy Tubes

System E2 Series

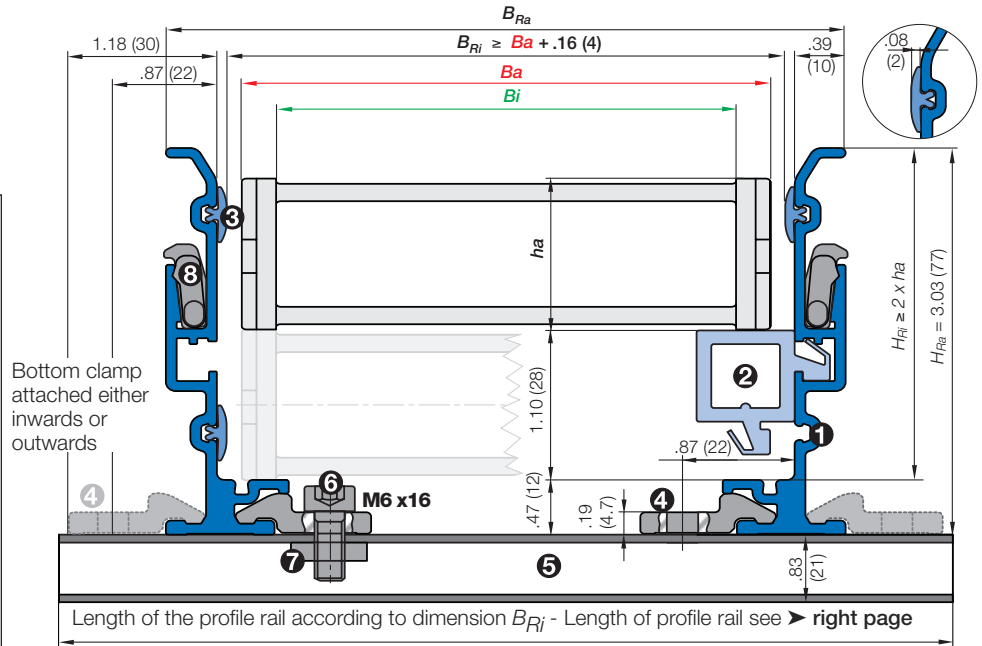
- 1400/1450/1480/1500

System E4-1 Series

- E4-21

- Ba = Outer E-Chain® width
- Bi = Inner E-Chain® width
- ha = E-Chain® outer height
- H_{Ri} = Inner trough height
- H_{Ra} = Outer trough height
- B_{Ri} = Inner trough width ▶ depends on dim. Ba
- B_{Ra} = Outer trough width
- n_{Mon} = # of installation sets (left/right)
- n_{Ri} = # of trough set (left/right)
- ! $H_{Ri} \geq 2 \cdot ha$
- ! $B_{Ri} \geq Ba + 4$
- = Guide trough
- = Glide bar
- = Installation set "Basic"
- = profile rail

Part No. 970-30-SL and 970-32-SL - Trough Height: 3.03 in. (77 mm) Aluminum "SuperTrough" — Basic Version



● **Components, trough "Basic":**

- 1 Trough side parts, aluminum, 6.56 ft. (2m)
- 2 Glide bar, plastic, 6.56 ft. (2m)
- 3 Glide strips, plastic, 6.56 ft. (2m) (without glide strips on request)

● **Components, installation set:**

- 4 Bottom clamp, aluminum
- 5 profile rail, steel galvanized
- 6 Screw M6 x20
- 7 Sliding nut M6
- 8 Interface connector, plastic



Basic Version: Components

Complete guide trough sets - description

Complete guide trough sets - description	Part No.	Weight
Set of 2 trough side parts, incl. glide strips, without glide bars, 6.56 ft (2 m) section	970-30-SL	9.26 lbs
Set of 2 trough side parts, incl. glide strips, with glide bars, 6.56 ft. (2m) section	970-32-SL	11.02 lbs
1 Installation set "Basic" without profile rail	960-30	.13 lbs
1 Installation set "Basic" with profile rail	960-30-___	

Single parts - description

1 Glide strip, individual, 6.56 ft. (2m) section	75-01	.13 lbs
1 Bottom clamp, individual	75-40	0.07 lbs
1 Interface connector, individual	75-60	
1 Screw M6 x 20, individual	M6X20SOCKETCAP	
1 Sliding nut M6, individual	ZBNUT-LG	
2 Glide bars, 6.56 ft. (2m) sections	82-79	
1 profile rail, individual	92-52G___	1.23 lbs/ft

Supplement Part No. with the indicated profile rail-length-index.

Example: 960-30-125 profile rail-length-index for your chosen trough inner width B_{Ri}

▶ See table on the right or the respective page for chosen series

Lengths of profile rail - Basic Version - Bottom Clamp attached either **inwards** or **outwards**

1400/1450/1480/1500

1500-050-035-0

	B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-015	1.30 (33)	*	960-30-125
-020	1.50 (38)	*	960-30-125
-025	1.69 (43)	*	960-30-150
-038	2.20 (56)	*	960-30-150
-050	2.68 (68)	960-30-125	960-30-175
-068	3.39 (86)	960-30-150	960-30-175
-080	3.86 (98)	960-30-150	960-30-200
-100	4.65 (118)	960-30-175	960-30-225
-125	5.63 (143)	960-30-200	960-30-250

E4-21

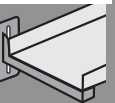
E4-21-080-100-0

	B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-030	1.89 (48)	*	960-30-150
-040	2.28 (58)	960-30-125	960-30-150
-050	2.68 (68)	960-30-125	960-30-175
-060	3.07 (78)	960-30-125	960-30-175
-070	3.46 (88)	960-30-150	960-30-175
-080	3.86 (98)	960-30-150	960-30-200
-100	4.65 (118)	960-30-175	960-30-225
-120	5.43 (138)	960-30-200	960-30-225



Seawater resistant aluminum
“SuperTrough” in a RTG-crane. Long
travel with the E4/4 Energy Chain
System®.

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Part No. 971-30-SL and 971-31-SL - Trough Height: 3.42 in. (87 mm)

Aluminum "SuperTrough" — Basic Version

For the following Series

System E2 Series:

- 2480
- 200/240/250

System E2 Tube Series:

- R48

System E6 Series:

- E6-29/R6-29

Ba = Outer E-Chain® width

Bi = Inner E-Chain® width

ha = E-Chain® outer height

H_{Ri} = Inner trough height

H_{Ra} = Outer trough height

B_{Ri} = Inner trough width
depends on dim. Ba

B_{Ra} = Outer trough width

n_{Mon} = # of installation sets
(left/right)

n_{Ri} = # of trough set
(left/right)

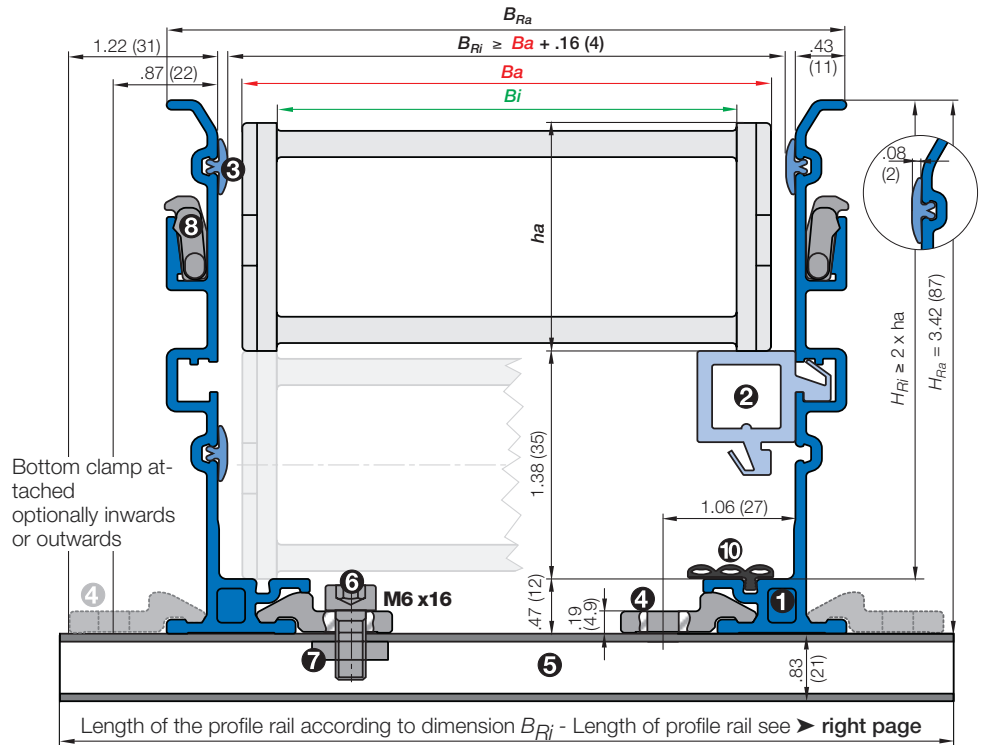
! $H_{Ri} \geq 2 \cdot ha$
■ $B_{Ri} \geq Ba + 4$

● = Guide trough

● = Glide bar

● = Installation set "Basic"

● = profile rail



● **Components, trough:**

- 1 Trough side parts, aluminum, 6.56 ft. (2m)
- 2 Glide bar, plastic, 6.56 ft. (2m)
- 3 Glide strips, plastic, 6.56 ft. (2m) (without glide strips on request)
- 10 Optional: Silencer profile, rubber

● **Components, installation set:**

- 4 Bottom clamp, aluminum
- 5 profile rail, steel galvanized
- 6 Screw M6 x20
- 7 Sliding nut M6
- 8 Interface connector, plastic



Basic version: Aluminum "SuperTrough" components

Complete guide trough sets - description

Complete guide trough sets - description	Part No.	Weight
Set of 2 trough side parts, incl. glide strips, without glide bars, 6.56 ft. (2m) section	971-30-SL	≈ 11.02 lbs
Set of 2 trough side parts, incl. glide strips, with glide bars, 6.56 ft. (2m) section	971-31-SL	≈ 14.11 lbs
1 Installation set "Basic" without profile rail	960-30	≈ .13 lbs
1 Installation set "Basic" with profile rail	960-30-___	

Single parts - description

1 Glide strip, individual, 6.56 ft. (2m) section	75-01	≈ .13 lbs
1 Bottom clamp, individual	75-40	≈ .07 lbbs
1 Interface connector, individual	75-60	
1 Screw M6 x 20, individual	M6X20SOCKETCAP	
1 Sliding nut M6, individual	ZBNUT-LG	
2 Glide bar, 6.56 ft. (2m) sections	82-79	≈
1 profile rail, individual	92-52G ___	≈ 1.23 lbs/ft
Silencer profile	75-76-H	

Supplement Part No. with the indicated profile rail-length-index.

Example: 960-30-150 profile rail-length-index for your chosen trough inner width B_{Ri}

➤ See table on the right or the respective page for chosen series

Number of installation sets which have to be installed



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QuickSpec: <http://www.igus.com/quickspec>

Lengths of profile rail - Basic Version

Bottom Clamp can be attached either **inwards** or **outwards**

240/250/2480

240-02-200-0

	B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-02	1.77 (45)	*	960-30-150
-03	2.28 (58)	*	960-30-150
-05	3.03 (77)	960-30-125	960-30-175
-07	3.82 (97)	960-30-150	960-30-200
-09	4.29 (109)	960-30-175	960-30-225
-10	4.84 (123)	960-30-175	960-30-225
-12	5.71 (145)	960-30-200	960-30-250
*Upon request			

E6-29

E6-29-030-100-0

	B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-030	1.97 (50)	*	960-30-150
-040	2.36 (60)	*	960-30-175
-050	2.76 (70)	*	960-30-175
-060	3.15 (80)	960-30-150	960-30-175
-070	3.54 (90)	960-30-150	960-30-200
-080	3.94 (100)	960-30-150	960-30-200
-090	4.33 (110)	960-30-175	960-30-225
-100	4.72 (120)	960-30-175	960-30-225
-110	5.12 (130)	960-30-200	960-30-225
-120	5.51 (140)	960-30-200	960-30-250
*Upon request			

R6-29

R6-29-030-100-0

	B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-030	1.97 (50)	*	960-30-150
-050	2.76 (70)	*	960-30-175
-060	3.15 (80)	960-30-150	960-30-175
-080	3.94 (100)	960-30-150	960-30-200
-100	4.72 (120)	960-30-175	960-30-225
-110	5.12 (130)	960-30-200	960-30-225
-120	5.51 (140)	960-30-200	960-30-250

For the "Heavy Duty" installation set:

Insert Part No. **971-50-____**

instead of **960-30-____**

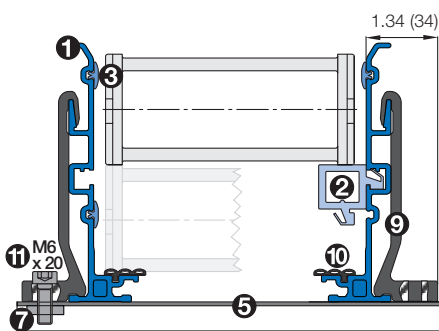
on the right column "attached outwards"

R48

48-050-100-0

	B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-025	1.57 (40)	*	960-30-150
-050	2.56 (65)	*	960-30-175
-075	3.54 (90)	960-30-150	960-30-200
-100	4.53 (115)	960-30-175	960-30-225
-130	5.71 (145)	960-30-200	960-30-250

Heavy Duty Version - Installation Set Part No. 971-50



● Components, trough "Heavy Duty":

- ❶ Trough side parts, aluminum, 6.56 ft. (2m)
- ❷ Glide bar, plastic, 6.56 ft. (2m)
- ❸ Glide strips, plastic 6.56 ft. (2m)
(without glide strips on request)
- ❿ Optional: Silencer profile, rubber

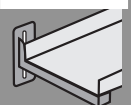
● Components, installation set "Heavy Duty":

- ❺ profile rail, steel galvanized
- ❽ Sliding nut M6
- ❾ Heavy duty bracket, aluminum
- ⓫ Screw M6 x 20



- = Guide trough
- = Glide bar
- = Installation set
"Heavy duty"
- = profile rail

Note: Dimensions similar to Basic version!
Exception: Heavy duty bracket, see drawing



Part No. 972-30-SL and 972-31-SL Trough Height: 4.61 in. (117 mm)
Aluminum "SuperTrough" — Basic Version

For the following Series

System E4 Series:

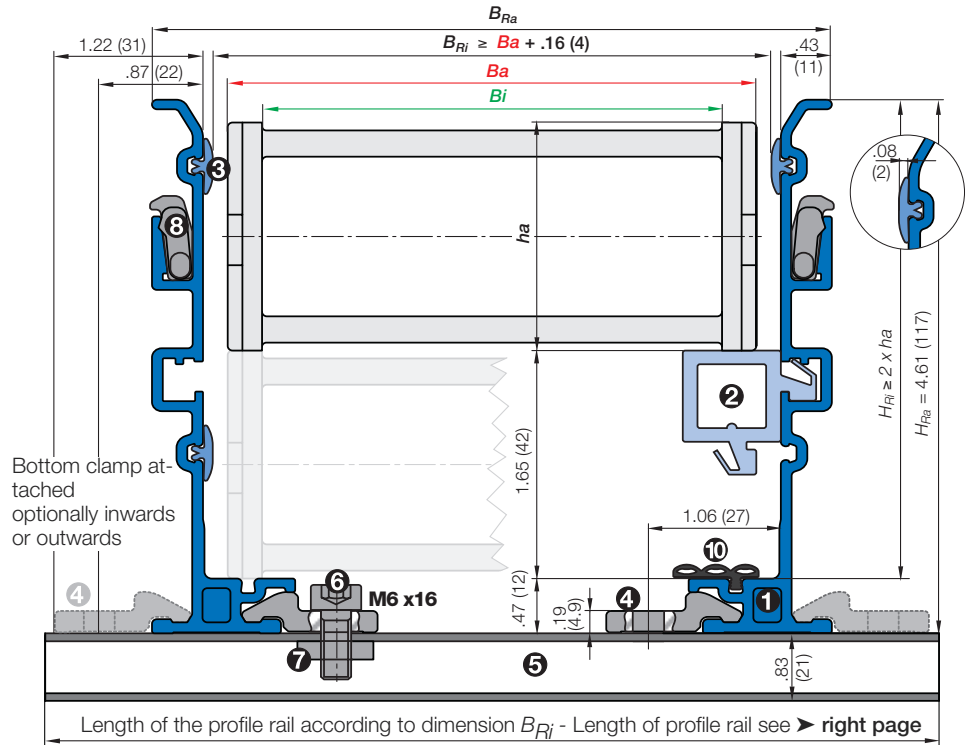
- 280/290/R770
- 2828/2928/R7728

System E6 Series:

- E6-40/R6-40

System E4-1 Series

- E4-32/H4-32/R4-32



- B_a = Outer E-Chain® width
- B_i = Inner E-Chain® width
- h_a = E-Chain® outer height
- H_{Ri} = Inner trough height
- H_{Ra} = Outer trough height
- B_{Ri} = Inner trough width \blacktriangleright depends on dim. B_a
- B_{Ra} = Outer trough width
- n_{Mon} = # of installation sets (left/right)
- n_{Ri} = # of trough set (left/right)
- $H_{Ri} \geq 2 \cdot h_a$
- $B_{Ri} \geq B_a + 4$
- = Guide trough
- = Glide bar
- = Installation set "Basic"
- = profile rail

- **Components, trough:**
- ① Trough side parts, aluminum, 6.56 ft. (2m)
- ② Glide bar, plastic, 6.56 ft. (2m)
- ③ Glide strips, plastic, 6.56 ft. (2m) (without glide strips on request)
- ⑩ Optional: Silencer profile, rubber
- **Components, installation set:**
- ④ Bottom clamp, aluminum
- ⑤ profile rail, steel galvanized
- ⑥ Screw M6 x20
- ⑦ Sliding nut M6
- ⑧ Interface connector, plastic



Basic version: Aluminum "SuperTrough" components

Complete guide trough sets - description

Complete guide trough sets - description	Part No.	Weight
Set of 2 trough side parts, incl. glide strips, without glide bars, 6.56 ft. (2m) section	972-30-SL	≈ 13.23 lbs
Set of 2 trough side parts, incl. glide strips, with glide bars, 6.56 ft. (2m) section	972-31-SL	≈ 16.31 lbs
1 Installation set "Basic" without profile rail	960-30	≈ .13 lbs
1 Installation set "Basic" with profile rail	960-30-___	

Single parts - description

1 Glide strip, individual, 6.56 ft. (2m) section	75-01	≈ .13 lbs
1 Bottom clamp, individual	75.40	≈ .07 lbs
1 Interface connector, individual	75-60	
1 Screw M6 x 20, individual	M6X20SOCKETCAP	
1 Sliding nut M6, individual	ZBNUT-LG	
2 Glide bars, 6.56 ft. (2m) sections	82-79	≈
1 profile rail, individual	92-52G___	≈ 1.23 lbs/ft.
Silencer profile	75-67H	

Supplement Part No. with the indicated profile rail-length-index.

Example: 960-30-150 profile rail-length-index for your chosen trough inner width B_{Ri}

\blacktriangleright See table on the right or the respective page for chosen series

Number of installation sets which have to be installed



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Guide Trough Systems Aluminum "SuperTrough"

Lengths of profile rail - Basic Version

Bottom Clamp can be attached either **inwards** or **outwards**



280/290/R770 E4-32/H4-32/R4-32

280-05-200-0

	B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-05	3.03 (77)	960-30-125	960-30-175
-06	3.74 (95)	960-30-150	960-30-200
-07	4.02 (102)	960-30-150	960-30-200
-087	4.49 (114)	960-30-175	960-30-225
-10	5.00 (127)	960-30-175	960-30-225
-11	5.31 (135)	960-30-200	960-30-250
-112	5.51 (140)	960-30-200	960-30-250
-12	5.98 (152)	960-30-200	960-30-250
-137	6.50 (165)	960-30-225	960-30-275
-15	6.97 (177)	960-30-225	960-30-275
-162	7.48 (190)	960-30-250	960-30-300
-17	7.68 (195)	960-30-250	960-30-300
-18	7.95 (202)	960-30-250	960-30-300
-187	8.46 (215)	960-30-275	960-30-325
-20	8.94 (227)	960-30-275	960-30-325
-212	9.45 (240)	960-30-300	960-30-350
-23	9.92 (252)	960-30-300	960-30-350
-237	10.43 (265)	960-30-325	960-30-375
-25	10.91 (277)	960-30-325	960-30-375
-262	11.42 (290)	960-30-350	960-30-400
-28	11.89 (302)	960-30-350	960-30-400
-29	12.40 (315)	960-30-375	960-30-425
-30	12.87 (327)	960-30-375	960-30-425
-312	13.39 (340)	960-30-400	960-30-450
-325	13.86 (352)	960-30-400	960-30-450
-337	14.37 (365)	960-30-425	960-30-475
-350	14.84 (377)	960-30-425	960-30-475
-362	15.35 (390)	960-30-450	960-30-500
-375	15.83 (402)	960-30-450	960-30-500
-387	16.34 (415)	960-30-475	960-30-525
-400	16.81 (427)	960-30-475	960-30-525

2828/2928/R7728

2828-05-200-0

	B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-05	3.07 (78)	960-30-125	960-30-175
-06	3.78 (96)	960-30-150	960-30-200
-07	4.06 (103)	960-30-150	960-30-200
-087	4.53 (115)	960-30-175	960-30-225
-10	5.04 (128)	960-30-175	960-30-225
-11	5.35 (136)	960-30-200	960-30-225
-112	5.55 (141)	960-30-200	960-30-250
-12	6.02 (153)	960-30-200	960-30-250
-137	6.54 (166)	960-30-225	960-30-275
-15	7.01 (178)	960-30-225	960-30-275
-162	7.52 (191)	960-30-250	960-30-300
-17	7.72 (196)	960-30-250	960-30-300
-18	7.99 (203)	960-30-250	960-30-300
-187	8.50 (216)	960-30-275	960-30-325
-20	8.98 (228)	960-30-275	960-30-325
-212	9.49 (241)	960-30-300	960-30-350
-23	9.96 (253)	960-30-300	960-30-350
-237	10.47 (266)	960-30-325	960-30-375
-25	10.94 (278)	960-30-325	960-30-375
-262	11.46 (291)	960-30-350	960-30-400
-28	11.93 (303)	960-30-350	960-30-400
-29	12.44 (316)	960-30-375	960-30-425
-30	12.91 (328)	960-30-375	960-30-425
-312	13.43 (341)	960-30-400	960-30-450
-325	13.90 (353)	960-30-400	960-30-450
-337	14.41 (366)	960-30-425	960-30-475
-350	14.88 (378)	960-30-425	960-30-475
-362	15.39 (391)	960-30-450	960-30-500
-375	15.87 (403)	960-30-450	960-30-500
-387	16.38 (416)	960-30-475	960-30-525
-400	16.85 (428)	960-30-475	960-30-525

E6-40

E6-40-040-063-0

	B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-040	2.52 (64)	*	960-30-175
-050	2.91 (74)	960-30-125	960-30-175
-062	3.39 (86)	960-30-150	960-30-200
-070	3.70 (94)	960-30-150	960-30-200
-075	3.90 (99)	960-30-150	960-30-200
-087	4.37 (111)	960-30-175	960-30-225
-100	4.88 (124)	960-30-175	960-30-225
-125	5.87 (149)	960-30-200	960-30-250
-150	6.85 (174)	960-30-225	960-30-275
-175	7.83 (199)	960-30-250	960-30-300
-200	8.82 (224)	960-30-275	960-30-325
-225	9.80 (249)	960-30-300	960-30-350
-250	10.78 (274)	960-30-325	960-30-375
-275	11.77 (299)	960-30-350	960-30-400
-300	12.76 (324)	960-30-375	960-30-425

*Upon request

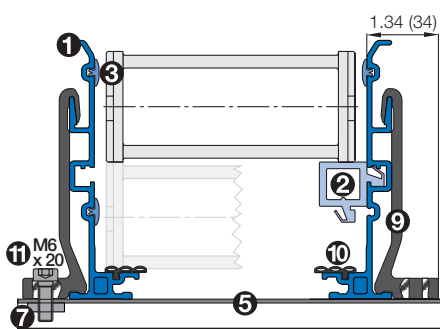
R6-40

R6-40-062-063-0

	B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-062	3.39 (86)	960-30-150	960-30-200

- For the "Heavy Duty" installation set:
Insert Part No. **972-50-_____**
instead of **960-30-_____**
on the right column "attached outwards"

Heavy Duty Version - Installation Set Part No. 972-50

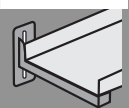


- **Components, trough "Heavy Duty":**
- ① Trough side parts, aluminum, 6.56 ft. (2m)
- ② Glide bar, plastic, 6.56 ft. (2m)
- ③ Glide strips, plastic 6.56 ft. (2m)
(without glide strips on request)
- ⑩ Optional: Silencer profile, rubber
- **Components, installation set "Heavy Duty":**
- ⑤ profile rail, steel galvanized
- ⑦ Sliding nut M6
- ⑨ Heavy duty bracket, aluminum
- ⑪ Screw M6 x 20



- = Guide trough
- = Glide bar
- = Installation set "Heavy duty"
- = profile rail

Note: Dimensions similar to Basic version!
Exception: Heavy duty bracket, see drawing



Part No. 972-30-SL and 972-32-SL Trough Height: 4.61 in. (117 mm)
Aluminum "SuperTrough" — Basic Version

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For the following Series

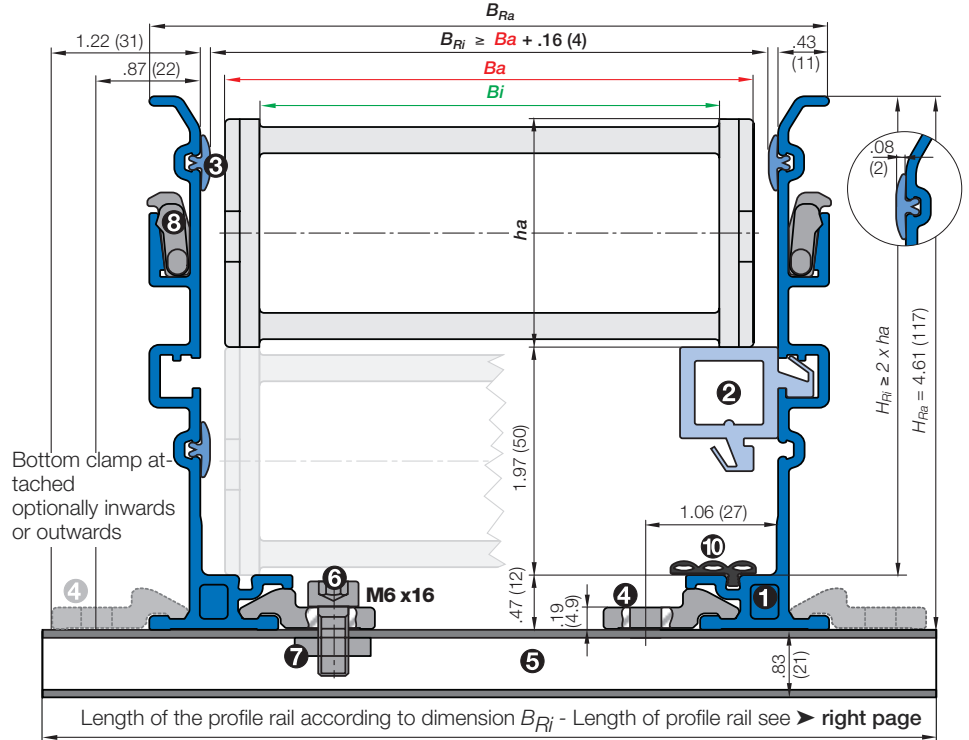
System E2 Series:

- 2680
- 26/27i/27

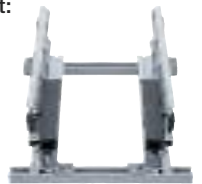
System E2 Tube Series:

- R58

- B_a = Outer E-Chain® width
- B_i = Inner E-Chain® width
- h_a = E-Chain® outer height
- H_{Ri} = Inner trough height
- H_{Ra} = Outer trough height
- B_{Ri} = Inner trough width
depends on dim. B_a
- B_{Ra} = Outer trough width
- n_{Mon} = # of installation sets
(left/right)
- n_{Ri} = # of trough set
(left/right)
- ! $H_{Ri} \geq 2 \cdot h_a$
 $B_{Ri} \geq B_a + 4$
- = Guide trough
- = Glide bar
- = Installation set "Basic"
- = profile rail



- **Components, trough:**
- 1 Trough side parts, aluminum, 6.56 ft. (2m)
- 2 Glide bar, plastic, 6.56 ft. (2m)
- 3 Glide strips, plastic, 6.56 ft. (2m) (without glide strips on request)
- 10 Optional: Silencer profile, rubber
- **Components, installation set:**
- 4 Bottom clamp, aluminum
- 5 profile rail, steel galvanized
- 6 Screw M6 x20
- 7 Sliding nut M6
- 8 Interface connector, plastic



Basic version: Aluminum "SuperTrough" components

Complete guide trough sets - description

Description	Part No.	Weight
Set of 2 trough side parts, incl. glide strips, without glide bars, 6.56 ft. (2m) section	972-30-SL	≈ 13.23 lbs
Set of 2 trough side parts, incl. glide strips, with glide bars, 6.56 ft. (2m) section	972-32-SL	≈ 16.31 lbs
1 Installation set "Basic" without profile rail	960-30	≈ .13 lbs
1 Installation set "Basic" with profile rail	960-30-___	

Single parts - description

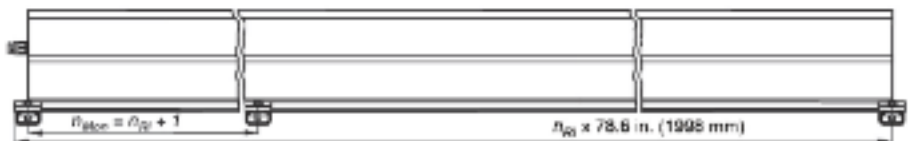
1 Glide strip, individual, 6.56 ft. (2m) section	75-01	≈ .13 lbs
1 Bottom clamp, individual	75-40	≈ .07 lbs
1 Interface connector, individual	75-60	
1 Screw M6 x 20, individual	M6X20SOCKETCAP	
1 Sliding nut M6, individual	ZBNUT-LG	
2 Glide bars, 6.56 ft. (2m) sections	82-79	≈
1 profile rail, individual	92-52G ___	≈ 1.23 lbs/ft.
Silencer profile	75-67H	

Supplement Part No. with the indicated profile rail-length-index.

Example: 960-30-150 profile rail-length-index for your chosen trough inner width B_{Ri}

➤ See table on the right or the respective page for chosen series

Number of installation sets which have to be installed



Guide Trough Systems Aluminum "SuperTrough"



Lengths of profile rail - Basic Version

Bottom Clamp can be attached either **inwards** or **outwards**

2680

2680-05-200-0

	B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-05	2.76 (70)	*	960-30-175
-06	3.35 (85)	960-30-150	960-30-200
-07	3.74 (95)	960-30-150	960-30-200
-09	4.33 (110)	960-30-175	960-30-225
-10	4.72 (120)	960-30-175	960-30-225
-12	5.71 (145)	960-30-200	960-30-250
-15	6.69 (170)	960-30-225	960-30-275
-17	7.79 (198)	960-30-250	960-30-300

R58

58-075-200-0

	B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-050	2.76 (70)	*	960-30-175
-075	3.74 (95)	960-30-150	960-30-200
-100	4.72 (120)	960-30-175	960-30-225
-125	5.71 (145)	960-30-200	960-30-250
-150	6.69 (170)	960-30-225	960-30-275
-175	7.58 (195)	960-30-250	960-30-300
-200	8.66 (220)	960-30-275	960-30-325

26/27i/27

26-05-200-0

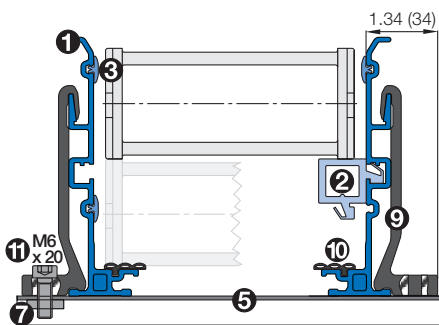
	B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-05	2.76 (70)	960-30-125	960-30-175
-07	3.74 (95)	960-30-150	960-30-200
-10	4.72 (120)	960-30-175	960-30-225
-12	5.71 (145)	960-30-200	960-30-250
-15	6.69 (170)	960-30-225	960-30-275
-17	7.79 (198)	960-30-250	960-30-300
-20	8.78 (223)	960-30-275	960-30-325



Stable guidance without oscillation. Because of the compact design of the aluminum "SuperTrough" the need for space along the travel path is small.

Travel 105 ft. (32 m) Crane operating speed 262 ft./min. (80 m/min).

Heavy Duty Version - Installation Set Part No. 972-50



● Components, trough "Heavy Duty":

- ① Trough side parts, aluminum, 6.56 ft. (2m)
- ② Glide bar, plastic, 6.56 ft. (2m)
- ③ Glide strips, plastic 6.56 ft. (2m) (without glide strips on request)
- ⑩ Optional: Silencer profile, rubber

● Components, installation set "Heavy Duty":

- ⑤ profile rail, steel galvanized
- ⑦ Sliding nut M6
- ⑨ Heavy duty bracket, aluminum
- ⑪ Screw M6 x 20

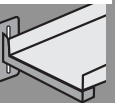


- = Guide trough
- = Glide bar
- = Installation set "Heavy duty"
- = profile rail

For the "Heavy Duty" installation set:
Insert Part No. 972-50-___ instead of 960-30-___
on the right column "attached outwards"

Note: Dimensions similar to Basic version!
Exception: Heavy duty bracket, see drawing

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Part No. 973-30-SL and 973-31-SL Trough Height: 5.67 in. (144 mm)
Aluminum "SuperTrough" — Basic Version

igus® Energy Chain System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

For the following Series

System E2 Series:

- 3480
- 340/350

System E2 Tube Series:

- R68

System E4 Series:

- 380/390/R780
- 3838/3938/R7838

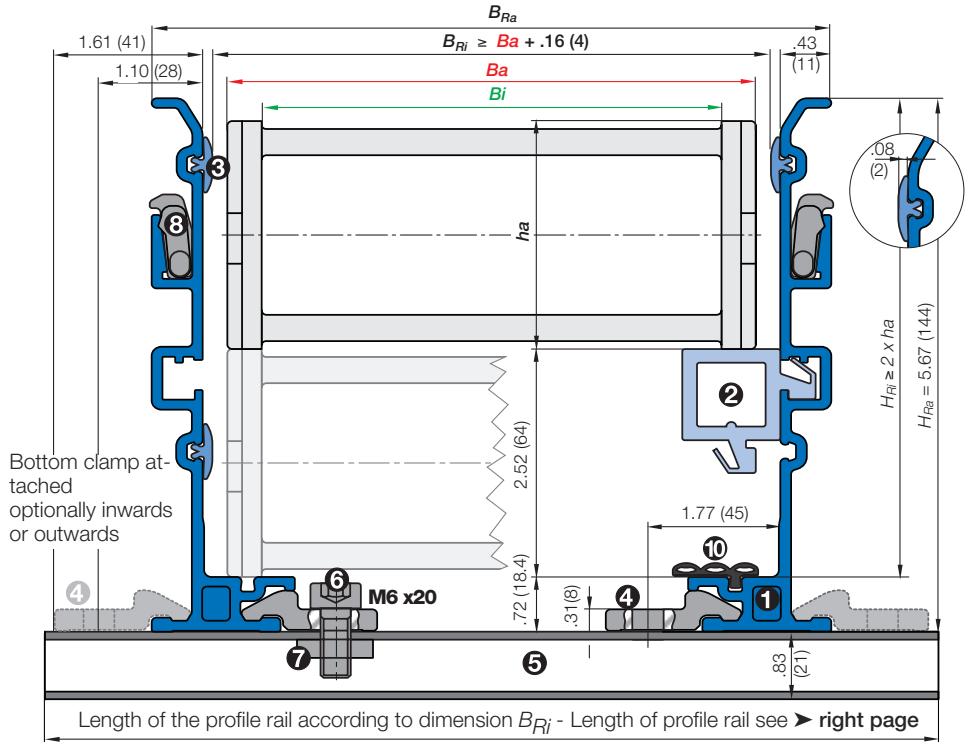
System E6 Series:

- E6-52/R6-52

System E4-1 Series

- E4-42/H4-42/R4-42

- B_a = Outer E-Chain® width
- B_i = Inner E-Chain® width
- h_a = E-Chain® outer height
- H_{Ri} = Inner trough height
- H_{Ra} = Outer trough height
- B_{Ri} = Inner trough width \blacktriangleright depends on dim. B_a
- B_{Ra} = Outer trough width
- n_{Mon} = # of installation sets (left/right)
- n_{Ri} = # of trough set (left/right)
- $H_{Ri} \geq 2 \cdot h_a$
- $B_{Ri} \geq B_a + 4$
- = Guide trough
- = Glide bar
- = Installation set "Basic"
- = profile rail



- **Components, trough:**
- 1 Trough side parts, aluminum, 6.56 ft. (2m)
- 2 Glide bar, plastic, 6.56 ft. (2m)
- 3 Glide strips, plastic, 6.56 ft. (2m) (without glide strips on request)
- 10 Optional: Silencer profile, rubber
- **Components, installation set:**
- 4 Bottom clamp, aluminum
- 5 profile rail, steel galvanized
- 6 Screw 5/16 x 1"
- 7 Sliding nut 5/16
- 8 Interface connector, plastic



Basic version: Aluminum "SuperTrough" components

Complete guide trough sets - description	Part No.	Weight
Set of 2 trough side parts, incl. glide strips, without glide bars, 6.56 ft. (2m) section	973-30-SL	≈ 17.64 lbs
Set of 2 trough side parts, incl. glide strips, with glide bars, 6.56 ft. (2m) section	973-31-SL	≈ 23.81 lbs
1 Installation set "Basic" without profile rail	960-40	≈ .18 lbs
1 Installation set "Basic" with profile rail	960-40-___	
Single parts - description		
1 Glide strip, individual, 6.56 ft. (2m) section	75-01	≈ .13 lbs
1 Bottom clamp, individual	75.50	≈ .09 lbs
1 Interface connector, individual	75-60	
1 Screw 5/16 x 1", individual	82-55	
1 Sliding nut 5/16, individual	82-56	
2 Glide bars, 6.56 ft. (2m) sections	83-79	≈
1 profile rail, individual	92-52G___	≈ 1.23 lbs/ft.
Silencer profile	75-68H	

Supplement Part No. with the indicated profile rail-length-index.
Example: 960-30-150 profile rail-length-index for your chosen trough inner width B_{Ri}
 ▶ See table on the right or the respective page for chosen series

Number of installation sets which have to be installed



Guide Trough Systems Aluminum "SuperTrough"

Lengths of profile rail - Basic Version

Bottom Clamp can be attached either **inwards** or **outwards**



340/350/3480

340-050-200-0

B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-050 2.91 (74)	*	960-40-200
-075 3.90 (99)	*	960-40-225
-100 4.88 (124)	960-40-175	960-40-250
-115 5.47 (139)	960-40-200	960-40-275
-125 5.87 (149)	960-40-200	960-40-275
-150 6.85 (174)	960-40-225	960-40-300
-175 7.83 (199)	960-40-250	960-40-325
-200 8.82 (224)	960-40-275	960-40-350
-225 9.80 (249)	960-40-300	960-40-375
-250 10.79 (274)	960-40-325	960-40-400

R68

68-050-200-0

B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-050 2.83 (72)	*	960-40-200
-075 3.82 (97)	*	960-40-225
-100 4.80 (122)	960-40-175	960-40-250
-115 5.39 (137)	960-40-200	960-40-275
-125 5.79 (147)	960-40-200	960-40-275
-150 6.77 (172)	960-40-225	960-40-300
-175 7.76 (197)	960-40-250	960-40-325
-200 8.74 (222)	960-40-275	960-40-350
-225 9.72 (247)	960-40-300	960-40-375
-250 10.71 (272)	960-40-325	960-40-400

380/390/R780

E4-42/H4-42/R4-42

380-05-200-0

B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-05 3.15 (80)	*	960-40-200
-06 3.86 (98)	*	960-40-225
-07 4.13 (105)	*	960-40-225
-087 4.65 (118)	960-40-175	960-40-250
-10 5.12 (130)	960-40-200	960-40-250
-11 5.43 (138)	960-40-200	960-40-275
-112 5.63 (143)	960-40-200	960-40-275
-12 6.10 (155)	960-40-225	960-40-275
-137 6.61 (168)	960-40-225	960-40-300
-15 7.09 (180)	960-40-250	960-40-300
-162 7.60 (193)	960-40-250	960-40-325
-17 7.80 (198)	960-40-250	960-40-325
-18 8.07 (205)	960-40-275	960-40-325
-187 8.58 (218)	960-40-275	960-40-350
-20 9.06 (230)	960-40-300	960-40-350
-212 9.57 (243)	960-40-300	960-40-375
-23 10.04 (255)	960-40-325	960-40-375
-237 10.55 (268)	960-40-325	960-40-400
-25 11.02 (280)	960-40-350	960-40-400
-262 11.54 (293)	960-40-350	960-40-425
-28 12.01 (305)	960-40-375	960-40-425
-29 12.52 (318)	960-40-375	960-40-450
-30 12.99 (330)	960-40-400	960-40-450
-312 13.50 (343)	960-40-400	960-40-475
-325 13.98 (355)	960-40-425	960-40-475
-337 14.49 (368)	960-40-425	960-40-500
-350 14.96 (380)	960-40-450	960-40-500
-362 15.47 (393)	960-40-450	960-40-525
-375 15.98 (406)	960-40-475	960-40-525
-387 16.46 (418)	960-40-475	960-40-550
-400 16.93 (430)	960-40-500	960-40-550

3838/3938/R7838

3838-05-200-0

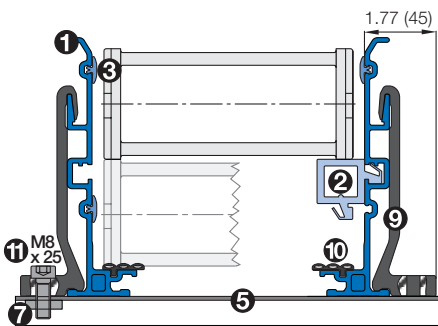
B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-05 3.19 (81)	*	960-40-200
-06 3.90 (99)	*	960-40-225
-07 4.17 (106)	*	960-40-225
-087 4.69 (119)	960-40-175	960-40-250
-10 5.16 (131)	960-40-200	960-40-250
-11 5.47 (139)	960-40-200	960-40-275
-112 5.67 (144)	960-40-200	960-40-275
-12 6.14 (156)	960-40-225	960-40-275
-137 6.65 (169)	960-40-225	960-40-300
-15 7.13 (181)	960-40-250	960-40-300
-162 7.64 (194)	960-40-250	960-40-325
-17 7.83 (199)	960-40-250	960-40-325
-18 8.11 (206)	960-40-275	960-40-325
-187 8.62 (219)	960-40-275	960-40-350
-20 9.09 (231)	960-40-300	960-40-350
-212 9.61 (244)	960-40-300	960-40-375
-23 10.08 (256)	960-40-325	960-40-375
-237 10.59 (269)	960-40-325	960-40-400
-25 11.06 (281)	960-40-350	960-40-400
-262 11.57 (294)	960-40-350	960-40-425
-28 12.05 (306)	960-40-375	960-40-425
-29 12.56 (319)	960-40-375	960-40-450
-30 13.03 (331)	960-40-400	960-40-450
-312 13.54 (344)	960-40-400	960-40-475
-325 14.02 (356)	960-40-425	960-40-475
-337 14.53 (369)	960-40-425	960-40-500
-350 15.00 (381)	960-40-450	960-40-500
-362 15.51 (394)	960-40-450	960-40-525
-375 15.98 (406)	960-40-475	960-40-525
-387 16.50 (419)	960-40-475	960-40-550
-400 16.97 (431)	960-40-500	960-40-550

E6-52/R6-52

E6-52-040-200-0

B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-040 2.68 (68)	*	960-40-200
-050 3.07 (78)	*	960-40-200
-062 3.54 (90)	*	960-40-225
-070 3.86 (98)	*	960-40-225
-075 4.06 (103)	*	960-40-225
-100 5.04 (128)	960-40-175	960-40-250
-125 6.02 (153)	960-40-200	960-40-275
-150 7.01 (178)	960-40-225	960-40-300
-175 7.99 (203)	960-40-250	960-40-325
-200 8.98 (228)	960-40-275	960-40-350
-225 9.96 (253)	960-40-300	960-40-375
-250 10.94 (278)	960-40-325	960-40-400
-275 11.92 (303)	960-40-350	960-40-425
-300 12.91 (328)	960-40-375	960-40-450

Heavy Duty Version - Installation Set Part No. 973-50



- **Components, trough "Heavy Duty":**
 - ❶ Trough side parts, aluminum, 6.56 ft. (2m)
 - ❷ Glide bar, plastic, 6.56 ft. (2m)
 - ❸ Glide strips, plastic 6.56 ft. (2m)
(without glide strips on request)
 - ❿ Optional: Silencer profile, rubber
- **Components, installation set "Heavy Duty":**
 - ❺ profile rail, steel galvanized
 - ❽ Sliding nut 5/16
 - ❾ Heavy duty bracket, aluminum
 - ❶❶ Screw 5/16 x 1-1/8"



- = Guide trough
- = Glide bar
- = Installation set
"Heavy duty"
- = profile rail

For the "Heavy Duty" installation set:
Insert Part No. 973-40-____ instead of 960-40-____
on the right column "attached outwards"

Note: Dimensions similar to Basic version!
Exception: Heavy duty bracket, see drawing

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Part No. 974-30-SL and 974-31-SL Trough Height: 7.24 in. (184 mm)
Aluminum "SuperTrough" — Basic Version

igus® Energy Chain System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

For the following Series

System E4 Series:

- 400/410/R880
- 4040/4140/R8840
- 14040/14140/R18840
- 14240/14340

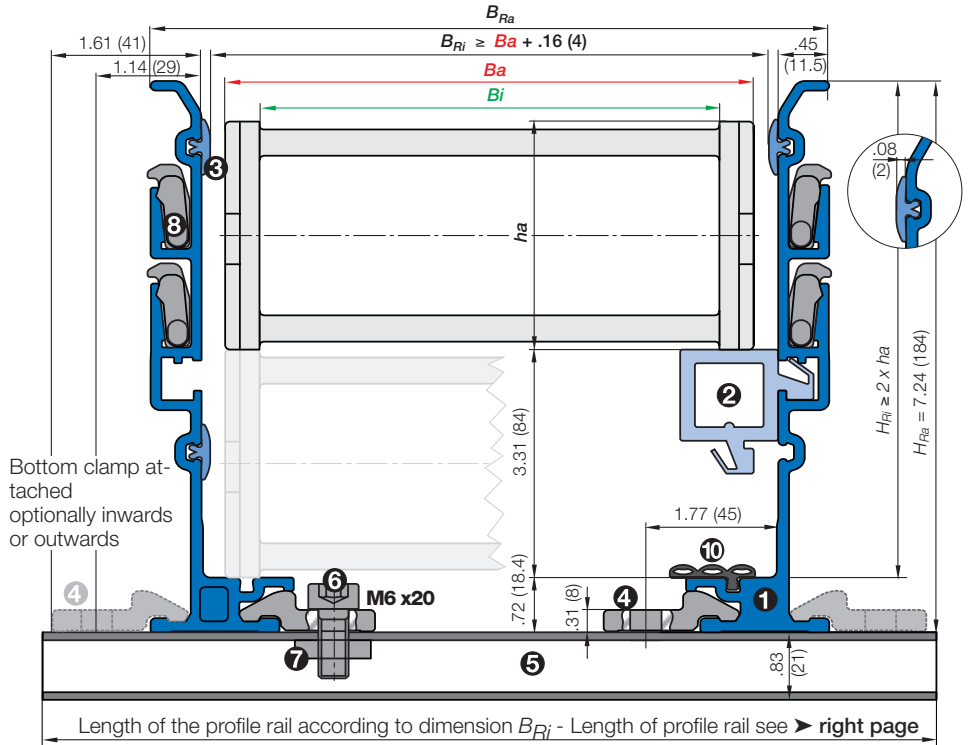
System E6 Series:

- E6-62

System E4-1 Series

- E4-56/H4-56/R4-56

- Ba = Outer E-Chain® width
- Bi = Inner E-Chain® width
- ha = E-Chain® outer height
- H_{Ri} = Inner trough height
- H_{Ra} = Outer trough height
- B_{Ri} = Inner trough width \blacktriangleright depends on dim. Ba
- B_{Ra} = Outer trough width
- n_{Mon} = # of installation sets (left/right)
- n_{Ri} = # of trough set (left/right)
- $H_{Ri} \geq 2 \cdot ha$
- $B_{Ri} \geq Ba + 4$
- = Guide trough
- = Glide bar
- = Installation set "Basic"
- = profile rail



- **Components, trough:**
 - 1 Trough side parts, aluminum, 6.56 ft. (2m)
 - 2 Glide bar, plastic, 6.56 ft. (2m)
 - 3 Glide strips, plastic, 6.56 ft. (2m) (without glide bars on request)
 - 10 Optional: Silencer profile, rubber
- **Components, installation set:**
 - 4 Bottom clamp, aluminum
 - 5 profile rail, steel galvanized
 - 6 Screw 5/16 x 1-1/8"
 - 7 Sliding nut 5/16
 - 8 Interface connector, plastic



Basic version: Aluminum "SuperTrough" components

Complete guide trough sets - description	Part No.	Weight
Set of 2 trough side parts, incl. glide strips, without glide bars, 6.56 ft. (2m) section	974-30-SL	≈ 22.05 lbs
Set of 2 trough side parts, incl. glide strips, with glide bars, 6.56 ft. (2m) section	974-31-SL	≈ 28.22 lbs
1 Installation set "Basic" without profile rail	960-50	≈ .18 lbs
1 Installation set "Basic" with profile rail	960-50-_____	
Single parts - description		
1 Glide strip, individual, 6.56 ft. (2m) section	75-01	≈ .13 lbs
1 Bottom clamp, individual	75.50	≈ .09 lbs
1 Interface connector, individual	75-60	
1 Screw 5/16 x 1-1/8", individual	82-55	
1 Sliding nut 5/16, individual	82-56	
2 Glide bars, 6.56 ft. (2m) section	83-79	≈
1 profile rail, individual	92-52G_____	≈ 1.23 lbs/ft.
Silencer profile	75-68H	

Supplement Part No. with the indicated profile rail-length-index.
Example: 960-30-150 profile rail-length-index for your chosen trough inner width B_{Ri}
 ▶ See table on the right or the respective page for chosen series

Number of installation sets which have to be installed



Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec: <http://www.igus.com/quickspec>

Guide Trough Systems Aluminum "SuperTrough"



400/410/R880 E4-56/H4-56/R4-56

400-050-200-0

	B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-05	3.46 (88)	*	960-50-225
-06	4.06 (103)	*	960-50-225
-07	4.45 (113)	*	960-50-250
-10	5.43 (138)	960-50-200	960-50-275
-11	5.94 (151)	960-50-200	960-50-275
-12	6.42 (163)	960-50-225	960-50-300
-13	6.93 (176)	960-50-225	960-50-300
-15	7.40 (188)	960-50-250	960-50-325
-16	7.91 (201)	960-50-250	960-50-325
-17	8.39 (213)	960-50-275	960-50-350
-18	8.90 (226)	960-50-275	960-50-350
-20	9.37 (238)	960-50-300	960-50-375
-21	9.88 (251)	960-50-300	960-50-375
-22	10.35 (263)	960-50-325	960-50-400
-23	10.87 (276)	960-50-325	960-50-400
-25	11.34 (288)	960-50-350	960-50-425
-26	11.85 (301)	960-50-350	960-50-425
-27	12.32 (313)	960-50-375	960-50-450
-28	12.83 (326)	960-50-375	960-50-450
-30	13.31 (338)	960-50-400	960-50-475
-31	13.82 (351)	960-50-400	960-50-475
-32	14.29 (363)	960-50-425	960-50-500
-33	14.80 (376)	960-50-425	960-50-500
-35	15.28 (388)	960-50-450	960-50-525
-36	15.79 (401)	960-50-450	960-50-525
-37	16.26 (413)	960-50-475	960-50-550
-38	16.77 (426)	960-50-475	960-50-550
-40	17.24 (438)	960-50-500	960-50-575
-41	17.76 (451)	960-50-500	960-50-575
-42	18.23 (463)	960-50-525	960-50-600
-43	18.74 (476)	960-50-525	960-50-600
-45	19.21 (488)	960-50-550	960-50-625
-46	19.72 (501)	960-50-550	960-50-625
-47	20.20 (513)	960-50-575	960-50-650
-48	20.71 (526)	960-50-575	960-50-650
-50	21.18 (538)	960-50-600	960-50-675
-51	21.69 (551)	960-50-600	960-50-675
-52	22.17 (563)	960-50-625	960-50-700
-53	22.68 (576)	960-50-625	960-50-700
-55	23.15 (588)	960-50-650	960-50-725
-60	25.12 (638)	960-50-700	960-50-775

4040/4140/R8840

4040-05-200-0

	B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-05	3.54 (90)	*	960-50-225
-06	4.13 (105)	*	960-50-225
-07	4.53 (115)	*	960-50-250
-10	5.51 (140)	960-50-200	960-50-275
-11	6.02 (153)	960-50-200	960-50-275
-12	6.50 (165)	960-50-225	960-50-300
-13	7.01 (178)	960-50-225	960-50-300
-15	7.48 (190)	960-50-250	960-50-325
-16	7.99 (203)	960-50-250	960-50-325
-17	8.46 (215)	960-50-275	960-50-350
-18	8.98 (228)	960-50-275	960-50-350
-20	9.45 (240)	960-50-300	960-50-375
-21	9.96 (253)	960-50-300	960-50-375
-22	10.43 (265)	960-50-325	960-50-400
-23	10.94 (278)	960-50-325	960-50-400
-25	11.42 (290)	960-50-350	960-50-425
-26	11.93 (303)	960-50-350	960-50-425
-27	12.40 (315)	960-50-375	960-50-450
-28	12.91 (328)	960-50-375	960-50-450
-30	13.39 (340)	960-50-400	960-50-475
-31	13.90 (353)	960-50-400	960-50-475
-32	14.37 (365)	960-50-425	960-50-500
-33	14.88 (378)	960-50-425	960-50-500
-35	15.35 (390)	960-50-450	960-50-525
-36	15.87 (403)	960-50-450	960-50-525
-37	16.34 (415)	960-50-475	960-50-550
-38	16.85 (428)	960-50-475	960-50-550
-40	17.32 (440)	960-50-500	960-50-575
-41	17.83 (453)	960-50-500	960-50-575
-42	18.31 (465)	960-50-525	960-50-600
-43	18.82 (478)	960-50-525	960-50-600
-45	19.29 (490)	960-50-550	960-50-625
-46	19.80 (503)	960-50-550	960-50-625
-47	20.28 (515)	960-50-575	960-50-650
-48	20.79 (528)	960-50-575	960-50-650
-50	21.26 (540)	960-50-600	960-50-675
-51	21.77 (553)	960-50-600	960-50-675
-52	22.24 (565)	960-50-625	960-50-700
-53	22.76 (578)	960-50-625	960-50-700
-55	23.23 (590)	960-50-650	960-50-725
-60	25.20 (640)	960-50-700	960-50-775

14040/14140/R18840

14040-05-200-0

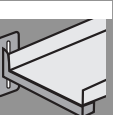
	B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-05	3.15 (80)	*	960-50-200
-06	3.74 (95)	*	960-50-225
-07	4.13 (105)	*	960-50-225
-10	5.12 (130)	960-50-200	960-50-250
-11	5.63 (143)	960-50-200	960-50-275
-12	6.10 (155)	960-50-225	960-50-275
-13	6.61 (168)	960-50-225	960-50-300
-15	7.09 (180)	960-50-250	960-50-300
-16	7.60 (193)	960-50-250	960-50-325
-17	8.07 (205)	960-50-275	960-50-325
-18	8.58 (218)	960-50-275	960-50-350
-20	9.39 (230)	960-50-300	960-50-350
-21	9.57 (243)	960-50-300	960-50-375
-22	10.04 (255)	960-50-325	960-50-375
-23	10.55 (268)	960-50-325	960-50-400
-25	11.02 (280)	960-50-350	960-50-400
-26	11.53 (293)	960-50-350	960-50-425
-27	12.01 (305)	960-50-375	960-50-425
-28	12.52 (318)	960-50-375	960-50-450
-30	12.99 (330)	960-50-400	960-50-450
-31	13.50 (343)	960-50-400	960-50-475
-32	13.98 (355)	960-50-425	960-50-475
-33	14.49 (368)	960-50-425	960-50-500
-35	14.96 (380)	960-50-450	960-50-500
-36	15.47 (393)	960-50-450	960-50-525
-37	15.94 (405)	960-50-475	960-50-525
-38	16.46 (418)	960-50-475	960-50-550
-40	16.93 (430)	960-50-500	960-50-550
-41	17.44 (443)	960-50-500	960-50-575
-42	17.91 (455)	960-50-525	960-50-575
-43	18.43 (468)	960-50-525	960-50-600
-45	18.90 (480)	960-50-550	960-50-600
-46	19.41 (493)	960-50-550	960-50-625
-47	19.88 (505)	960-50-575	960-50-625
-48	20.39 (518)	960-50-575	960-50-650
-50	20.87 (530)	960-50-600	960-50-650
-51	21.38 (543)	960-50-600	960-50-675
-52	21.85 (555)	960-50-625	960-50-675
-53	22.36 (568)	960-50-625	960-50-700
-55	22.83 (580)	960-50-650	960-50-700
-60	24.80 (630)	960-50-700	960-50-750

E6-62

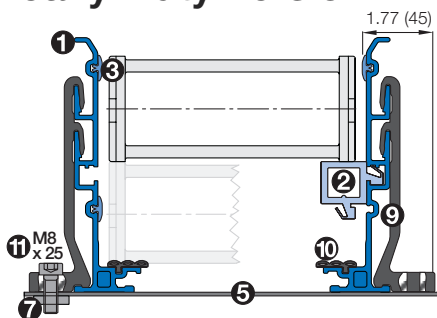
E6-62-05-200-0

	B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-05	3.54 (90)	*	960-50-225
-06	4.25 (108)	*	960-50-225
-07	4.53 (115)	*	960-50-250
-087	5.00 (127)	960-50-175	960-50-250
-10	5.51 (140)	960-50-200	960-50-275
-11	5.83 (148)	960-50-200	960-50-275
-112	5.98 (152)	960-50-200	960-50-275
-12	6.50 (165)	960-50-225	960-50-300
-137	6.97 (177)	960-50-225	960-50-300
-15	7.48 (190)	960-50-250	960-50-325
-162	7.95 (202)	960-50-250	960-50-325
-17	8.19 (208)	960-50-275	960-50-325
-18	8.46 (215)	960-50-275	960-50-350
-187	8.94 (227)	960-50-275	960-50-350
-20	9.45 (240)	960-50-300	960-50-375
-212	9.92 (252)	960-50-300	960-50-375
-23	10.43 (265)	960-50-325	960-50-400
-237	10.91 (277)	960-50-325	960-50-400
-25	11.42 (290)	960-50-350	960-50-425
-262	11.89 (302)	960-50-350	960-50-425
-28	12.40 (315)	960-50-375	960-50-450
-29	12.87 (327)	960-50-375	960-50-450
-30	13.39 (340)	960-50-400	960-50-475
-312	13.86 (352)	960-50-400	960-50-475
-325	14.37 (365)	960-50-425	960-50-500
-337	14.84 (377)	960-50-425	960-50-500
-350	15.35 (390)	960-50-450	960-50-525
-362	15.83 (402)	960-50-450	960-50-525
-375	16.34 (415)	960-50-475	960-50-550
-387	16.81 (427)	960-50-475	960-50-550
-400	17.32 (440)	960-50-500	960-50-575

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Heavy Duty Version - Installation Set Part No. 974-50



- Components, trough "Heavy Duty":
 - ① Trough side parts, aluminum, 6.56 ft. (2m)
 - ② Glide bar, plastic, 6.56 ft. (2m)
 - ③ Glide strips, plastic 6.56 ft. (2m)
(without glide strips on request)
 - ⑩ Optional: Silencer profile, rubber
 - Components, installation set "Heavy Duty":
 - ⑤ profile rail, steel galvanized
 - ⑦ Sliding nut 5/16
 - ⑨ Heavy duty bracket, aluminum
 - ⑪ Screw 5/16 x 1-1/8"
- Note: Dimensions similar to Basic version!
Exception: Heavy duty bracket, see drawing**



- = Guide trough
- = Glide bar
- = Installation set "Heavy duty"
- = profile rail

For the "Heavy Duty" installation set:
Insert Part No. 974-50-____ instead of 960-50-____
on the right column "attached outwards"

Part No. 975-30-SL and 975-31-SL Trough Height: 9.29 in. (236 mm)
Aluminum "SuperTrough" — Basic Version

igus® Energy Chain System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

For the following Series

System E4 Series:

- 5050/5150/R9850
- 15050/15150/R19850

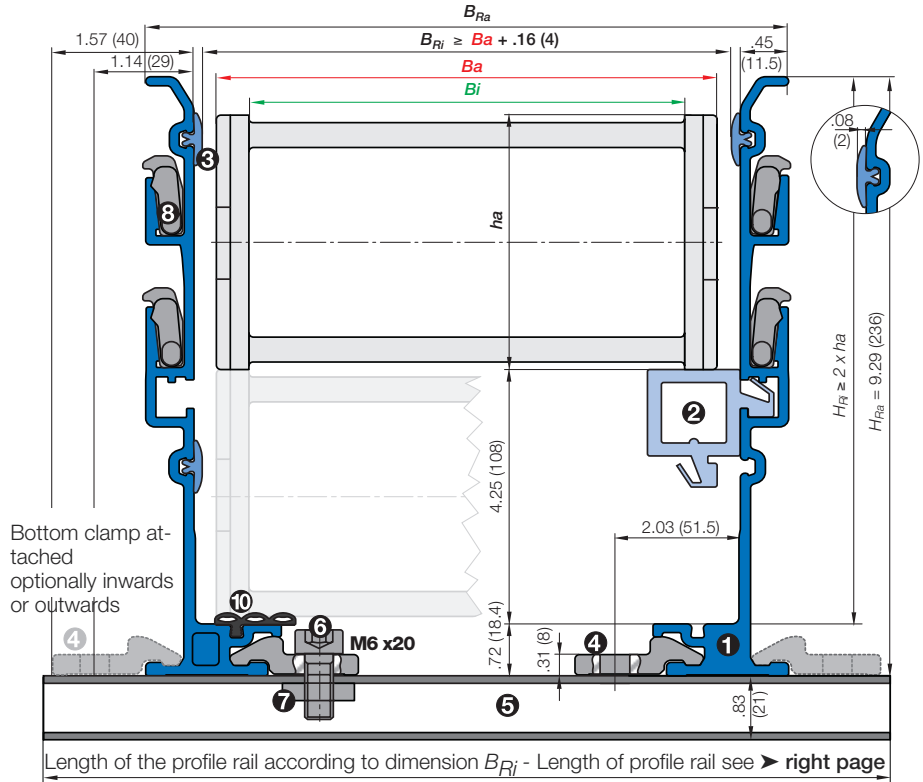
System E6 Series:

- E6-80L
- E6-80

System E4-1 Series

- E4-80/H4-80/R4-80

- B_a = Outer E-Chain® width
- B_i = Inner E-Chain® width
- h_a = E-Chain® outer height
- H_{Ri} = Inner trough height
- H_{Ra} = Outer trough height
- B_{Ri} = Inner trough width \blacktriangleright depends on dim. B_a
- B_{Ra} = Outer trough width
- n_{Mon} = # of installation sets (left/right)
- n_{Ri} = # of trough set (left/right)
- $H_{Ri} \geq 2 \cdot h_a$
- $B_{Ri} \geq B_a + 4$
- = Guide trough
- = Glide bar
- = Installation set "Basic"
- = profile rail



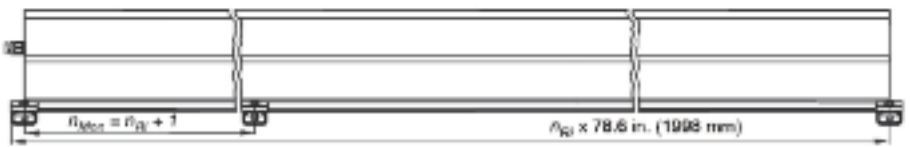
- **Components, trough:**
 - 1 Trough side parts, aluminum, 6.56 ft. (2m)
 - 2 Glide bar, plastic, 6.56 ft. (2m)
 - 3 Glide strips, plastic, 6.56 ft. (2m) (without glide strips on request)
 - 10 Optional: Silencer profile, rubber
- **Components, installation set:**
 - 4 Bottom clamp, aluminum
 - 5 profile rail, steel galvanized
 - 6 Screw M8 x20
 - 7 Sliding nut M8
 - 8 Interface connector, plastic

Basic version: Aluminum "SuperTrough" components

Complete guide trough sets - description	Part No.	Weight
Set of 2 trough side parts, incl. glide strips, without glide bars, 6.56 ft. (2m) section	975-30-SL	≈ 30.87 lbs
Set of 2 trough side parts, incl. glide strips, with glide bars, 6.56 ft. (2m) section	975-31-SL	≈ 36.60 lbs
1 Installation set "Basic" without profile rail	960-50	≈ .18 lbs
1 Installation set "Basic" with profile rail	960-50-___	
Single parts - description		
1 Glide strip, individual, 6.56 ft. (2m) section	75-01	≈ .13 lbs
1 Bottom clamp, individual	75.50	≈ .09 lbs
1 Interface connector, individual	75-60	
1 Screw 5/16 x 1-1/8" individual	82-55	
1 Sliding nut 5/16, individual	82-56	
2 Glide bars, 6.56 ft. (2m) section	83-79	≈
1 profile rail, individual	92-52-___	≈ 1.23 lbs/ft.
Silencer profile	75-68H	

Supplement Part No. with the indicated profile rail-length-index.
Example: 960-30-150 profile rail-length-index for your chosen trough inner width B_{Ri}
 \blacktriangleright See table on the right or the respective page for chosen series

Number of installation sets which have to be installed



5050/5150/R9850 E4-80/H4-80/R4-80

5050-50-200-0

B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-05	4.09 (104)	* 960-50-225
-06	4.68 (119)	* 960-50-250
-07	5.08 (129)	* 960-50-250
-10	6.06 (154)	960-50-225 960-50-275
-11	6.57 (167)	960-50-225 960-50-300
-12	7.05 (179)	960-50-250 960-50-300
-13	7.56 (192)	960-50-250 960-50-325
-15	8.03 (204)	960-50-275 960-50-325
-16	8.54 (217)	960-50-275 960-50-350
-17	9.02 (229)	960-50-300 960-50-350
-18	9.53 (242)	960-50-300 960-50-375
-20	10.00 (254)	960-50-325 960-50-375
-21	10.51 (267)	960-50-325 960-50-400
-22	10.98 (279)	960-50-350 960-50-400
-23	11.50 (292)	960-50-350 960-50-425
-25	11.97 (304)	960-50-375 960-50-425
-26	12.48 (317)	960-50-375 960-50-450
-27	12.95 (329)	960-50-400 960-50-450
-28	13.46 (342)	960-50-400 960-50-475
-30	13.94 (354)	960-50-425 960-50-475
-31	14.45 (367)	960-50-425 960-50-500
-32	14.92 (379)	960-50-450 960-50-500
-33	15.43 (392)	960-50-450 960-50-525
-35	15.91 (404)	960-50-475 960-50-525
-36	16.42 (417)	960-50-475 960-50-550
-37	16.89 (429)	960-50-500 960-50-550
-38	17.40 (442)	960-50-500 960-50-575
-40	17.87 (454)	960-50-525 960-50-575
-41	18.39 (467)	960-50-525 960-50-600
-42	18.86 (479)	960-50-550 960-50-600
-43	19.37 (492)	960-50-550 960-50-625
-45	19.84 (504)	960-50-575 960-50-625
-46	20.35 (517)	960-50-575 960-50-650
-47	20.83 (529)	960-50-600 960-50-650
-48	21.34 (542)	960-50-600 960-50-675
-50	21.81 (554)	960-50-625 960-50-675
-51	22.32 (567)	960-50-625 960-50-700
-52	22.80 (579)	960-50-650 960-50-700
-53	23.31 (592)	960-50-650 960-50-725
-55	24.17 (604)	960-50-675 960-50-725
-60	25.75 (654)	960-50-725 960-50-775

15050/15150/R19850

15050-05-200-0

B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-05	3.31 (84)	* 960-50-200
-07	4.29 (109)	* 960-50-225
-10	5.28 (134)	* 960-50-250
-11	5.75 (146)	960-50-200 960-50-275
-12	6.26 (159)	960-50-225 960-50-275
-13	6.73 (171)	960-50-225 960-50-300
-15	7.24 (184)	960-50-250 960-50-300
-16	7.72 (196)	960-50-250 960-50-325
-17	8.23 (209)	960-50-275 960-50-325
-18	8.70 (221)	960-50-275 960-50-350
-20	9.21 (234)	960-50-300 960-50-350
-21	9.69 (246)	960-50-300 960-50-375
-22	10.20 (259)	960-50-325 960-50-375
-23	10.67 (271)	960-50-325 960-50-400
-25	11.18 (284)	960-50-350 960-50-400
-26	11.65 (296)	960-50-350 960-50-425
-27	12.16 (309)	960-50-375 960-50-425
-28	12.64 (321)	960-50-375 960-50-450
-30	13.15 (334)	960-50-400 960-50-450
-31	13.62 (346)	960-50-400 960-50-475
-32	14.13 (359)	960-50-425 960-50-475
-33	14.61 (371)	960-50-425 960-50-500
-35	15.12 (384)	960-50-450 960-50-500
-36	15.59 (396)	960-50-450 960-50-525
-37	16.10 (409)	960-50-475 960-50-525
-38	16.57 (421)	960-50-475 960-50-550
-40	17.07 (434)	960-50-500 960-50-550
-41	17.56 (446)	960-50-500 960-50-575
-42	18.07 (459)	960-50-525 960-50-575
-43	18.54 (471)	960-50-525 960-50-600
-45	19.06 (484)	960-50-550 960-50-600
-46	19.53 (496)	960-50-550 960-50-625
-47	20.04 (509)	960-50-575 960-50-625
-48	20.51 (521)	960-50-575 960-50-650
-50	21.02 (534)	960-50-600 960-50-650
-51	21.50 (546)	960-50-600 960-50-675
-52	22.01 (559)	960-50-625 960-50-675
-53	22.48 (571)	960-50-625 960-50-700
-55	22.99 (584)	960-50-650 960-50-700
-60	24.96 (634)	960-50-700 960-50-750

E6-80

E6-80-30-200-0

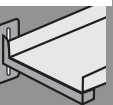
B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-05	4.09 (104)	* 960-50-225
-06	4.68 (119)	* 960-50-250
-07	5.08 (129)	* 960-50-250
-10	6.06 (154)	960-50-225 960-50-275
-11	6.57 (167)	960-50-225 960-50-300
-12	7.05 (179)	960-50-250 960-50-300
-13	7.56 (192)	960-50-250 960-50-325
-15	8.03 (204)	960-50-275 960-50-325
-16	8.54 (217)	960-50-275 960-50-350
-17	9.02 (229)	960-50-300 960-50-350
-18	9.53 (242)	960-50-300 960-50-375
-20	10.00 (254)	960-50-325 960-50-375
-21	10.51 (267)	960-50-325 960-50-400
-22	10.98 (279)	960-50-350 960-50-400
-23	11.50 (292)	960-50-350 960-50-425
-25	11.97 (304)	960-50-375 960-50-425
-26	12.48 (317)	960-50-375 960-50-450
-27	12.95 (329)	960-50-400 960-50-450
-28	13.46 (342)	960-50-400 960-50-475
-30	13.94 (354)	960-50-425 960-50-475
-31	14.45 (367)	960-50-425 960-50-500
-32	14.92 (379)	960-50-450 960-50-500
-33	15.43 (392)	960-50-450 960-50-525
-35	15.91 (404)	960-50-475 960-50-525
-36	16.42 (417)	960-50-475 960-50-550
-37	16.89 (429)	960-50-500 960-50-550
-38	17.40 (442)	960-50-500 960-50-575
-40	17.87 (454)	960-50-525 960-50-575
-41	18.39 (467)	960-50-525 960-50-600
-42	18.86 (479)	960-50-550 960-50-600
-43	19.37 (492)	960-50-550 960-50-625
-45	19.84 (504)	960-50-575 960-50-625
-46	20.35 (517)	960-50-575 960-50-650
-47	20.83 (529)	960-50-600 960-50-650
-48	21.34 (542)	960-50-600 960-50-675
-50	21.81 (554)	960-50-625 960-50-675
-51	22.32 (567)	960-50-625 960-50-700
-52	22.80 (579)	960-50-650 960-50-700
-53	23.31 (592)	960-50-650 960-50-725
-55	24.17 (604)	960-50-675 960-50-725
-60	25.75 (654)	960-50-725 960-50-775

E6-80L

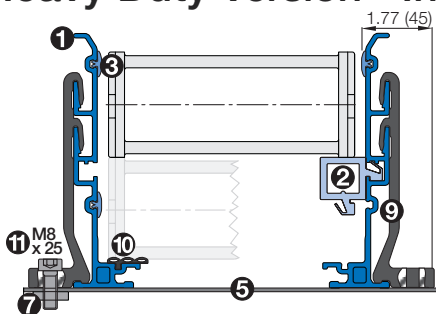
E6-80L-30-200-0

B_{Ri} in. (mm)	Part No. attached inwards	Part No. attached outwards
-05	3.23 (82)	* 960-50-200
-06	3.82 (97)	* 960-50-225
-07	4.21 (107)	* 960-50-225
-10	5.20 (132)	* 960-50-250
-11	5.67 (144)	960-50-200 960-50-275
-12	6.18 (157)	960-50-225 960-50-275
-13	6.65 (169)	960-50-225 960-50-300
-15	7.17 (182)	960-50-250 960-50-300
-16	7.64 (194)	960-50-250 960-50-325
-17	8.15 (207)	960-50-275 960-50-325
-18	8.62 (219)	960-50-275 960-50-350
-20	9.13 (232)	960-50-300 960-50-350
-21	9.61 (244)	960-50-300 960-50-375
-22	10.12 (257)	960-50-325 960-50-375
-23	10.59 (269)	960-50-325 960-50-400
-25	11.10 (282)	960-50-350 960-50-400
-26	11.57 (294)	960-50-350 960-50-425
-27	12.09 (307)	960-50-375 960-50-425
-28	12.56 (319)	960-50-375 960-50-450
-30	13.07 (332)	960-50-400 960-50-450
-31	13.54 (344)	960-50-400 960-50-475
-32	14.06 (357)	960-50-425 960-50-475
-33	14.53 (369)	960-50-425 960-50-500
-35	15.04 (382)	960-50-450 960-50-500
-36	15.51 (394)	960-50-450 960-50-525
-37	16.02 (407)	960-50-475 960-50-525
-38	16.50 (419)	960-50-475 960-50-550
-40	17.01 (432)	960-50-500 960-50-550
-41	17.48 (444)	960-50-500 960-50-575
-42	17.99 (457)	960-50-525 960-50-575
-43	18.46 (469)	960-50-525 960-50-600
-45	18.98 (482)	960-50-550 960-50-600
-46	19.45 (494)	960-50-550 960-50-625
-47	19.96 (507)	960-50-575 960-50-625
-48	20.43 (519)	960-50-575 960-50-650
-50	20.94 (532)	960-50-600 960-50-650
-51	21.42 (544)	960-50-600 960-50-675
-52	21.93 (557)	960-50-625 960-50-675
-53	22.40 (569)	960-50-625 960-50-700
-55	22.91 (582)	960-50-650 960-50-700
-60	24.88 (632)	960-50-700 960-50-750

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Heavy Duty Version - Installation Set Part No. 975-50



- Components, trough "Heavy Duty":
 - ❶ Trough side parts, aluminum, 6.56 ft. (2m)
 - ❷ Glide bar, plastic, 6.56 ft. (2m)
 - ❸ Glide strips, plastic 6.56 ft. (2m)
(without glide strips on request)
 - ❹ Optional: Silencer profile, rubber
- Components, installation set "Heavy Duty":
 - ❺ profile rail, steel galvanized
 - ❻ Sliding nut 5/16
 - ❼ Heavy duty bracket, aluminum
 - ❽ Screw 5/16 x 1-1/8"

Note: Dimensions similar to Basic version!
Exception: Heavy duty bracket, see drawing



- = Guide trough
- = Glide bar
- = Installation set "Heavy duty"
- = profile rail

For the "Heavy Duty" installation set:
Insert Part No. 975-50-____ instead of 960-50-____
on the right column "attached outwards"

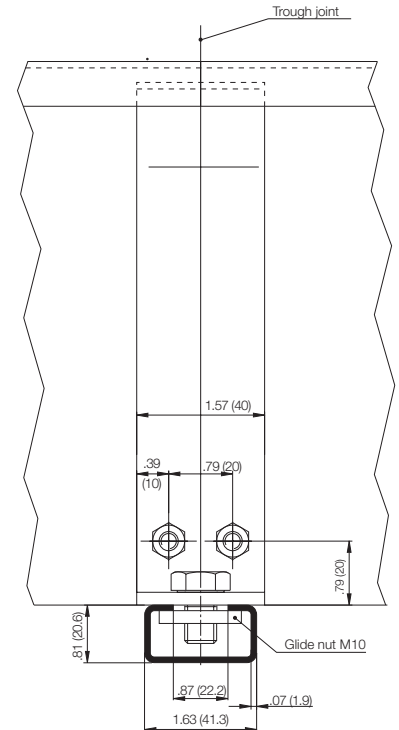
Steel Guide Troughs

If the igus® installation sets are used, the guide troughs are particularly easy to assemble. All the steel guide troughs are constructed according to the same basic principle. On the following pages, you will find information about dimensions, weights and accessories according to the trough size. In the appropriate Energy Chain® chapter, you will find all the necessary design data to stipulate the assembly width. All sizes use a common profile rail on which the guide parts are assembled. The assembly brackets used vary in height only.



Guide Trough Selection Guide

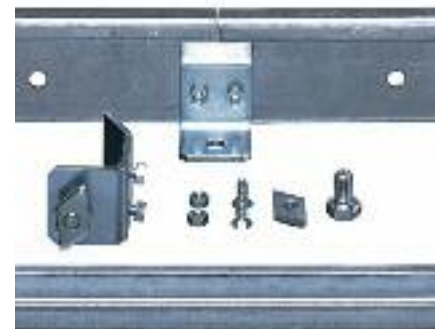
Part No. Trough	Part No. Glide Bars	System E2 Series	System E4 Series	System E6 Series
92-30	92-01	200/240/250		E6-29
		2480		R6-29
93-30	93-01	340/350	380/390/R780	E6-52
		3480	3838/3938/R7838	R6-52
		R68	E4-42/H4-42/R4-42	
94-30	93-01		400/410/R880	E6-62
			4040/4140/R8840	
			14040/14140/R18840	
			14240/14340	
95-30	92-01	26/27/27i		
		2680		
96-30	92-01		220/R760	E6-35
			E4-28/R4-28	
97-30	93-01		600/601/R608	
			640	
			1640/1608	
			28/29/R77	E6-40
98-30	92-01		280/290/R770	R6-40
			2828/2928/R7728	
			E4-32/H4-32/R4-32	
99-30	93-01		15050/15150/R19850	E6-80
			5050/5150/R9850	
			E4-80/H4-80/R4-80	



Side view of trough joint. All the dimensions, apart from the height, apply to all sizes.



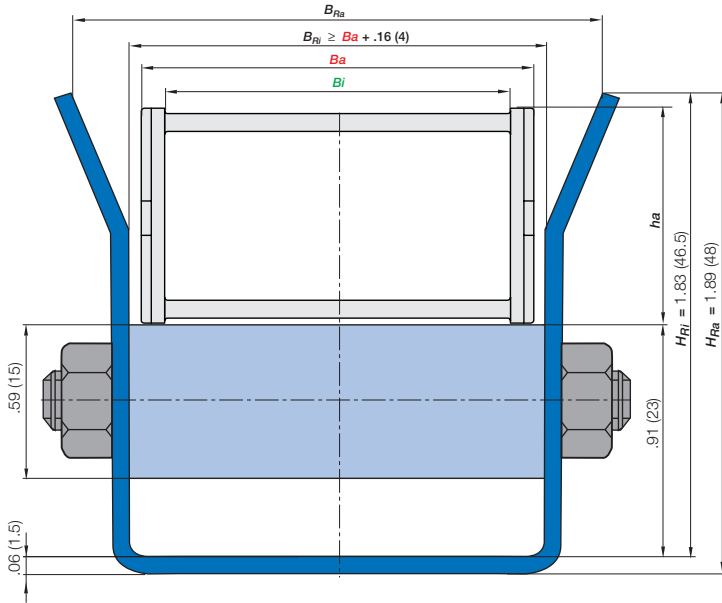
Long travel with igus® steel guide trough and harnessed igus® E-Chain® on a crane



Installation set for joint and attachment surface connections, secure connection without misalignment and without welding.

One-piece guide troughs made of steel are available for the following Energy Chains®: Series 10, 15 and B15. These guide troughs are available from stock for outer chain widths up to 2.36 in. (60 mm). For wider Energy Chains® and Tubes, special solutions are possible with short lead times.

No installation sets are required for these trough sizes since the guide troughs consist of a one-piece U-profile. The joint connection with this type of guide trough is specified individually for every application.



For the following Series

- System E2 Series:**
 - 10
 - B15
- System Zipper Series:**
 - 15

- B_a = Outer Energy Chain® width
- B_i = Inner Energy Chain® width
- h_a = Energy Chain® outer height
- H_{Ri} = Inner trough height
- H_{Ra} = Outer trough height
- B_{Ri} = Inner trough width
- B_{Ra} = Outer trough width

Dimensions Guide troughs 91-10 — 91-71

For Series	Part No.	B_{Ra} in. (mm)	B_{Ri} in. (mm)	Weight lbs/ft (kg/m)
10-015/15-015/B15-015				
Trough without glide bar 6.56 ft. (2m section)	91-10	1.59 (40.5)	1.18 (30)	1.01 (1.50)
Glide bar 6.56 ft. (2m section)	91-11	1.59 (40.5)	1.18 (30)	.30 (.45)
10-025/15-025/B15-025				
Trough without glide bar 6.56 ft. (2m section)	91-20	1.99 (50.5)	1.57 (40)	1.11 (1.65)
Glide bar 6.56 ft. (2m section)	91-21	1.99 (50.5)	1.57 (40)	.38 (.57)
10-038/15-038/B15-038				
Trough without glide bar 6.56 ft. (2m section)	91-30	2.46 (62.5)	2.05 (52)	1.21 (1.80)
Glide bar 6.56 ft. (2m section)	91-31	2.46 (62.5)	2.05 (52)	.46 (.68)
10-050/15-050/B15-050				
Trough without glide bar 6.56 ft. (2m section)	91-40	2.85 (72.5)	2.44 (62)	1.28 (1.90)
Glide bar 6.56 ft. (2m section)	91-41	2.85 (72.5)	2.44 (62)	.61 (.91)
10-5/15-5/B15-5				
Trough without glide bar 6.56 ft. (2m section)	91-50	3.60 (91.5)	3.19 (81)	1.52 (2.26)
Glide bar 6.56 ft. (2m section)	91-51	3.60 (91.5)	3.19 (81)	.84 (1.25)
10-6/15-6/B15-6				
Trough without glide bar 6.56 ft. (2m section)	91-60	4.27 (108.5)	3.86 (98)	1.83 (2.72)
Glide bar 6.56 ft. (2m section)	91-61	4.27 (108.5)	3.86 (98)	.91 (1.35)
10-7/15-7/B15-7				
Trough without glide bar 6.56 ft. (2m section)	91-70	5.06 (128.5)	4.65 (118)	2.13 (3.17)
Glide bar 6.56 ft. (2m section)	91-71	5.06 (128.5)	4.65 (118)	1.14 (1.70)

Trough material in general: St 1203 galvanized

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



For the following Series

System E2 Series:

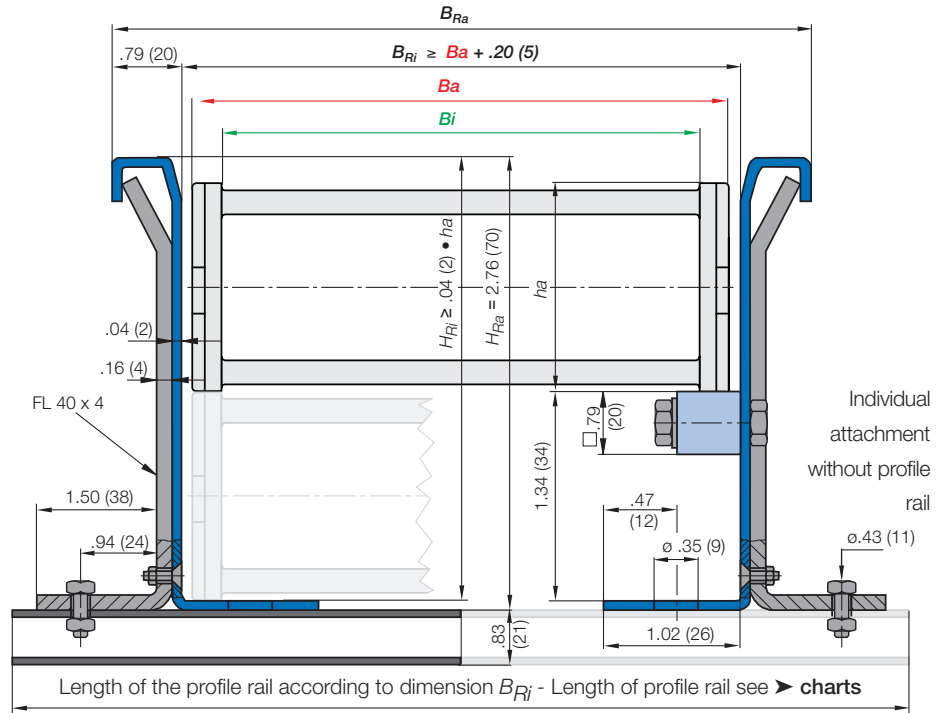
- 2480
- 200/240/250

System E6 Series:

- E6-29/R6-29

- B_a = Outer E-Chain® width
- B_i = Inner E-Chain® width
- h_a = E-Chain® outer height
- H_{Ri} = Inner trough height
- H_{Ra} = Outer trough height
- B_{Ri} = Inner trough width > depends on dim. B_a
- B_{Ra} = Outer trough width
- n_{Mon} = # of installation sets (left/right)
- n_{Ri} = # of trough set (left/right)
- ! $H_{Ri} \geq 2 \cdot h_a$
- ! $B_{Ri} \geq B_a + 5$
- = Guide trough
- = Glide bar
- = Installation set "Basic"
- = profile rail

Part No. 92-30 - Trough Height: 2.76 in. (70 mm)



Steel Guide Trough components - Sets and single parts

Complete guide trough sets - description

Complete guide trough sets - description	Part No.	Weight lbs
Set of 2 trough side parts without glide bars, each 6.56 ft. (2m)	92-30	19.85
1 Installation set "Basic" with profile rail	92-50-___	
1 Installation set "Basic" without profile rail	92-50	.84
1 Glide bar set with hardware, each 6.56 ft. (2m) + 22 bolts	92-01	4.52

Single parts - description

1 profile rail, individual	92-52-___	.60 lbs/ft.
1 Clamping brackets, 2 pcs	92-51	.31
4 Flat-head screws M6 x 20	92-53	
4 Lock nuts M6	92-55	
2 3/8 Slide nuts	92-56	
2 Hex-head bolts 3/8 x 3/4	92-57	
Glide bar hardware only, 22 pcs.	92-21	1.21

Supplement Part No. with the indicated profile rail-length-index. **Example: 92-50-175**
profile rail-length-index for your chosen trough inner width B_{Ri} > **opposite page**

Principle sketch: Number of installation sets which have to be installed



Part No. Installation set: Steel Guide Trough with profile rail
(depending on the width)

2480			200/240/250			E6-29			R6-29		
2480-03-200-0			200-03-200-0			E6-29-040-200-0			R6-29-040-200-0		
B_{Ri} in. (mm)	Part No. Installation set		B_{Ri} in. (mm)	Part No. Installation set		B_{Ri} in. (mm)	Part No. Installation set		B_{Ri} in. (mm)	Part No. Installation set	
-03	2.32 (59)	92-50-175	-02	1.81 (46)	*	-030	2.01 (51)	*	-030	2.01 (51)	*
-05	3.07 (78)	92-50-200	-03	2.32 (59)	92-50-175	-040	2.40 (61)	92-50-175	-050	2.80 (71)	92-50-200
-07	3.86 (98)	92-50-225	-05	3.07 (78)	92-50-175	-050	2.80 (71)	92-50-200	-060	3.19 (81)	92-50-200
-10	4.88 (124)	92-50-250	-07	3.86 (98)	92-50-200	-060	3.19 (81)	92-50-200	-080	3.98 (101)	92-50-225
			-09	4.37 (111)	92-50-250	-070	3.58 (91)	92-50-200	-100	4.76 (121)	92-50-250
			-10	4.88 (124)	92-50-250	-080	3.98 (101)	92-50-225	-110	5.16 (131)	92-50-250
			-12	5.75 (146)	92-50-300	-090	4.37 (111)	92-50-225	-120	5.55 (141)	92-50-250
						-100	4.76 (121)	92-50-250			
						-110	5.16 (131)	92-50-250			
						-120	5.55 (141)	92-50-250			

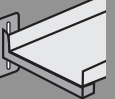
*upon request

*upon request



igus® steel guide trough used in a robotics application

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFG: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



For the following Series

System E2 Series:

● 26/27/27I

● 2680

System E2 Tube Series:

● R58

B_a = Outer E-Chain® width

B_i = Inner E-Chain® width

h_a = E-Chain® outer height

H_{Ri} = Inner trough height

H_{Ra} = Outer trough height

B_{Ri} = Inner trough width
▶ depends on dim. B_a

B_{Ra} = Outer trough width

n_{Mon} = # of installation sets
(left/right)

n_{Ri} = # of trough set
(left/right)

! $H_{Ri} \geq 2 \cdot h_a$
 $B_{Ri} \geq B_a + 5$

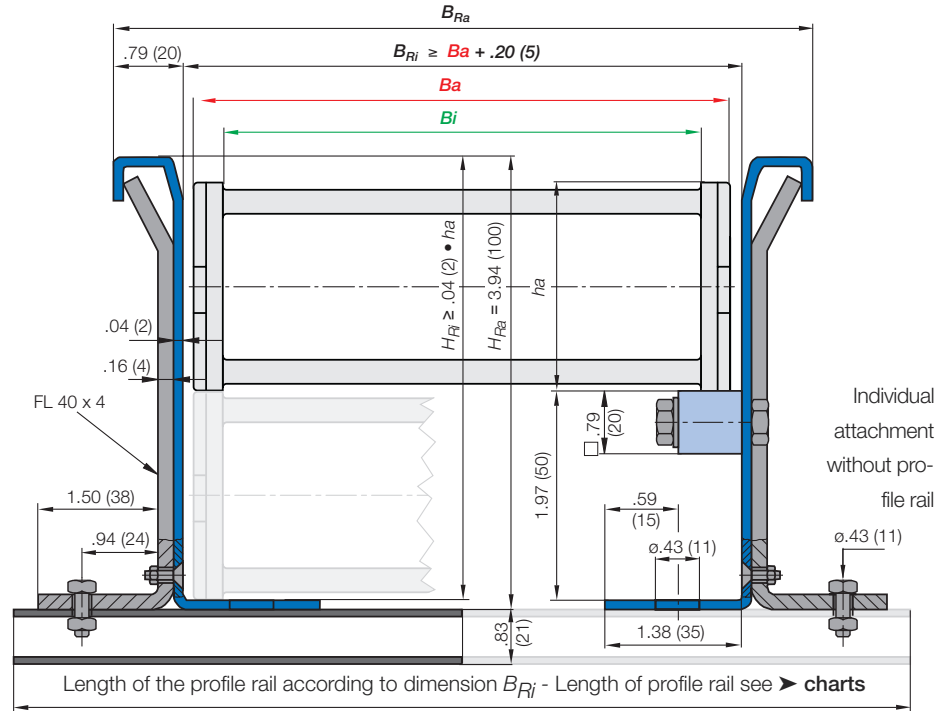
● = Guide trough

● = Glide bar

● = Installation set "Basic"

● = profile rail

Part No. 95-30 - Trough Height: 3.94 in. (100 mm)



Steel Guide Trough components - Sets and single parts

Complete guide trough sets - description	Part No.	Weight lbs
Set of 2 trough side parts without glide bars, each 6.56 ft. (2m)	95-30	23.81
1 Installation set "Basic" with profile rail	95-50-___	
1 Installation set "Basic" without profile rail	95-50	1.01
1 Glide bar set with hardware, each 6.56 ft. (2m) + 22 bolts	92-01	4.52

Single parts - description

1 profile rail, individual	92-52-___	.60 lbs/ft
1 Clamping brackets, 2 pcs	95-51	.40
4 Flat-head screws M6 x 20	92-53	
4 Lock nuts M6	92-55	
2 3/8 Slide nuts	92-56	
2 Hex-head bolts 3/8 x 3/4	92-57	
Glide bar hardware only, 22 pcs	92-21	1.21

Supplement Part No. with the indicated profile rail-length-index. **Example: 95-50-175**
profile rail-length-index for your chosen trough inner width B_{Ri} ▶ **opposite page**

Principle sketch: Number of installation sets which have to be installed



26/27/27i

27-05-200-0

	B_{Ri} in. (mm)	Part No. Installation set
-05	2.80 (71)	95-50-200
-07	3.78 (96)	95-50-200
-10	4.76 (121)	95-50-250
-12	5.75 (146)	95-50-250
-15	6.73 (171)	95-50-300
-17	7.83 (199)	95-50-300
-20	8.82 (224)	95-50-350

2680

2680-05-100-0

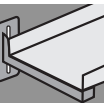
	B_{Ri} in. (mm)	Part No. Installation set
-05	2.80 (71)	95-50-200
-07	3.78 (96)	95-50-225
-10	4.76 (121)	95-50-250

R58

58-075-200-0

	B_{Ri} in. (mm)	Part No. Installation set
-050	2.80 (71)	95-50-200
-075	3.78 (96)	95-50-225
-100	4.76 (121)	95-50-250
-125	5.75 (146)	95-50-275
-150	6.73 (171)	95-50-300
-175	7.72 (196)	95-50-325
-200	8.70 (221)	95-50-350

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



For the following Series

System E4 Series:

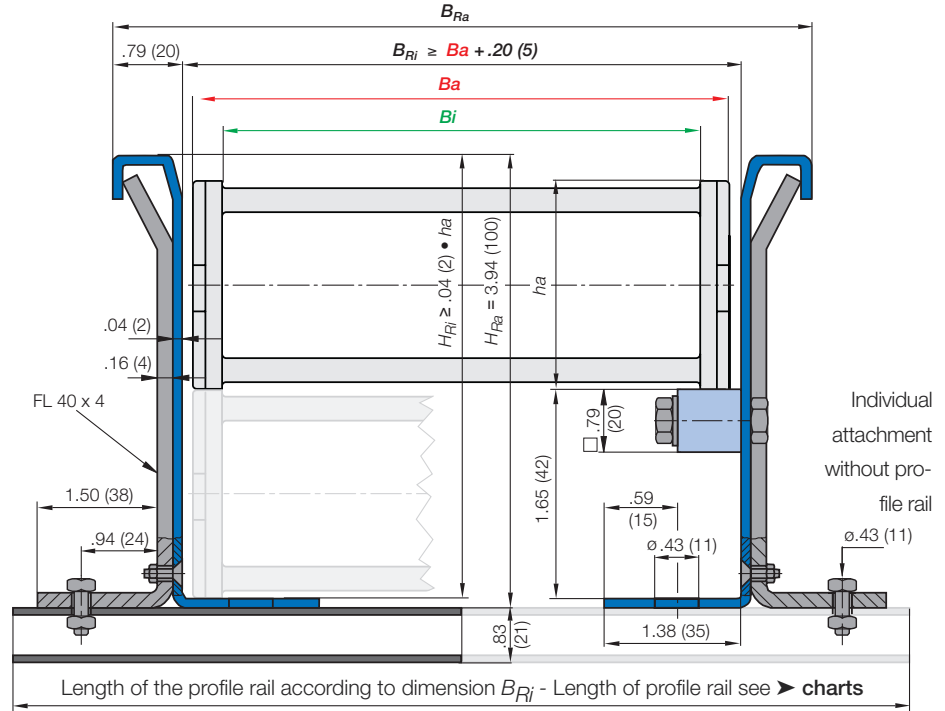
- 220/R760
- E6-35

System E4-1 Series

- E4-28/R4-28

- B_a = Outer E-Chain® width
- B_i = Inner E-Chain® width
- h_a = E-Chain® outer height
- H_{Ri} = Inner trough height
- H_{Ra} = Outer trough height
- B_{Ri} = Inner trough width \blacktriangleright depends on dim. B_a
- B_{Ra} = Outer trough width
- n_{Mon} = # of installation sets (left/right)
- n_{Ri} = # of trough set (left/right)
- !** $H_{Ri} \geq 2 \cdot h_a$
- !** $B_{Ri} \geq B_a + 5$
- = Guide trough
- = Glide bar
- = Installation set "Basic"
- = profile rail

Part No. 96-30 - Trough Height: 3.94 in. (100 mm)



Steel Guide Trough components - Sets and single parts

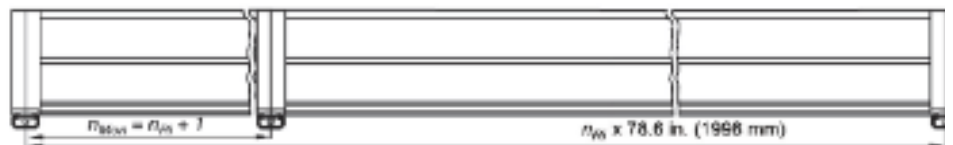
Complete guide trough sets - description	Part No.	Weight lbs
Set of 2 trough side parts without glide bars, each 6.56 ft. (2m)	96-30	23.81
1 Installation set "Basic" with profile rail	95-50-___	
1 Installation set "Basic" without profile rail	96-50	1.01
1 Glide bar set with hardware, each 6.56 ft. (2m) + 22 bolts	92-01	4.52

Single parts - description

1 profile rail, individual	92-52-___	.60 lbs/ft
1 Clamping brackets, 2 pcs	95-51	.40
4 Flat-head screws M6 x 20	92-53	
4 Lock nuts M6	92-55	
2 3/8 Slide nuts	92-56	
2 Hex-head bolts 3/8 x 3/4	92-57	
Glide bar hardware only, 22 pcs	92-21	1.21

Supplement Part No. with the indicated profile rail-length-index. **Example:** 95-50-175
profile rail-length-index for your chosen trough inner width B_{Ri} \blacktriangleright **opposite page**

Principle sketch: Number of installation sets which have to be installed



220/R760 E4-28/R4-28

220-040-200-0

	B_{Ri} in. (mm)	Part No. Installation set
-040	2.56 (65)	*
-050	2.95 (75)	95-50-200
-062	3.43 (87)	95-50-200
-070	3.74 (95)	95-50-200
-075	3.94 (100)	95-50-225
-100	4.92 (125)	95-50-250
-125	5.91 (150)	95-50-275
-150	6.89 (175)	95-50-300
-175	7.87 (200)	95-50-325
-200	8.86 (225)	95-50-350
-225	9.84 (250)	95-50-375
-250	10.83 (275)	95-50-400
-275	11.81 (300)	95-50-425
-300	12.80 (325)	95-50-450

*upon request

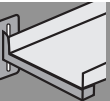
E6-35

E6-35-100-055-0

	B_{Ri} in. (mm)	Part No. Installation set
-030	2.01 (55)	*
-040	2.40 (65)	*
-050	2.80 (75)	95-50-200
-060	3.19 (85)	95-50-200
-070	3.58 (95)	95-50-200
-080	3.98 (105)	95-50-225
-090	4.37 (115)	95-50-225
-100	4.76 (125)	95-50-250
-110	5.16 (135)	95-50-250
-120	5.55 (145)	95-50-250

*upon request

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



For the following Series

System E4 Series:

- 280/290/R770
- 2828/2928/R7728

System E6 Series:

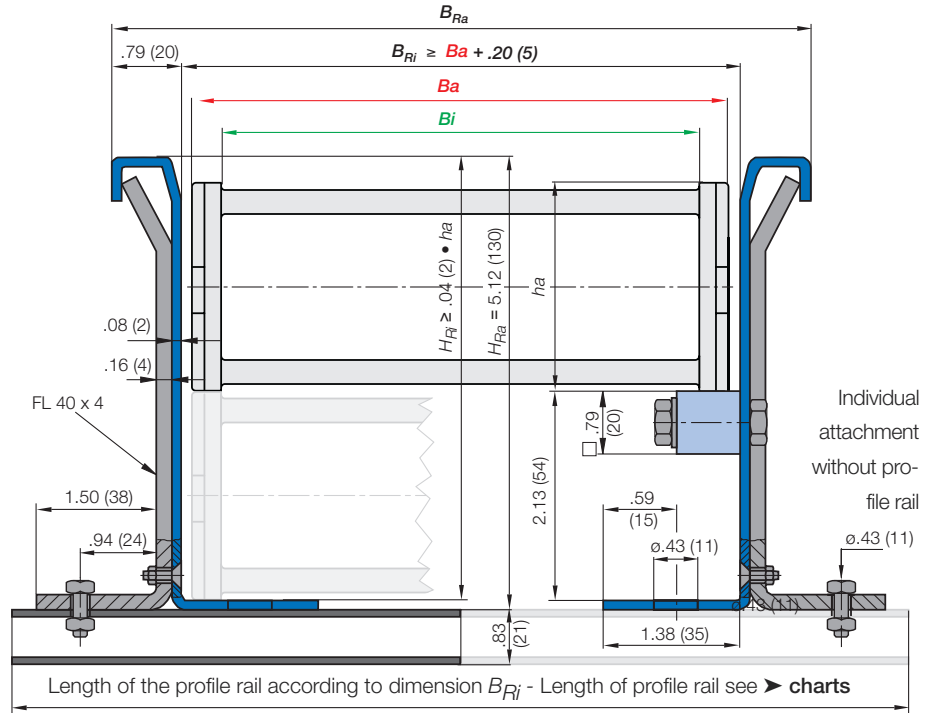
- E6-40/R6-40

System E4-1 Series

- E4-32/H4-320/R4-32

- B_a = Outer E-Chain® width
- B_i = Inner E-Chain® width
- h_a = E-Chain® outer height
- H_{Ri} = Inner trough height
- H_{Ra} = Outer trough height
- B_{Ri} = Inner trough width \blacktriangleright depends on dim. B_a
- B_{Ra} = Outer trough width
- n_{Mon} = # of installation sets (left/right)
- n_{Ri} = # of trough set (left/right)
- !** $H_{Ri} \geq 2 \cdot h_a$
- !** $B_{Ri} \geq B_a + 5$
- = Guide trough
- = Glide bar
- = Installation set "Basic"
- = profile rail

Part No. 98-30 - Trough Height: 5.12 in. (130 mm)



Steel Guide Trough components - Sets and single parts

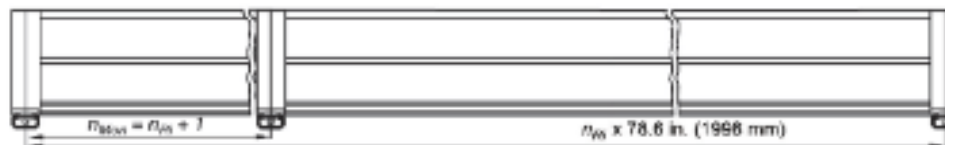
Complete guide trough sets - description	Part No.	Weight lbs
Set of 2 trough side parts without glide bars, each 6.56 ft. (2m)	98-30	28.22
1 Installation set "Basic" with profile rail	93-50-____	
1 Installation set "Basic" without profile rail	93-50	1.19
1 Glide bar set with hardware, each 6.56 ft. (2m) + 22 bolts	92-01	4.52

Single parts - description

1 profile rail, individual	92-52-____	.60 lbs/ft
1 Clamping brackets, 2 pcs	93-51	.49
4 Flat-head screws M6 x 20	92-53	
4 Lock nuts M6	92-55	
2 3/8 Slide nuts	92-56	
2 Hex-head bolts 3/8 x 3/4	92-57	
Glide bar hardware only, 22 pcs	93-21	1.21

Supplement Part No. with the indicated profile rail-length-index. **Example:** 93-50-175
profile rail-length-index for your chosen trough inner width B_{Ri} \blacktriangleright **opposite page**

Principle sketch: Number of installation sets which have to be installed



280/290/R770 E4-32/H4-32/R4-32

280-05-200-0

	B_{Ri} in. (mm)	Part No. Installation set
-05	3.15 (78)	93-50-200
-06	3.86 (96)	93-50-225
-07	4.13 (103)	93-50-225
-087	4.61 (115)	93-50-225
-10	5.12 (128)	93-50-250
-11	5.43 (136)	93-50-250
-112	5.59 (141)	93-50-250
-12	6.10 (153)	93-50-275
-137	6.57 (166)	93-50-275
-15	7.09 (178)	93-50-300
-162	7.56 (191)	93-50-300
-17	7.80 (196)	93-50-325
-18	8.07 (203)	93-50-325
-187	8.54 (216)	93-50-325
-20	9.06 (228)	93-50-350
-212	9.53 (241)	93-50-350
-23	10.04 (253)	93-50-375
-237	10.51 (266)	93-50-375
-25	11.02 (278)	93-50-400
-262	11.50 (291)	93-50-400
-28	12.01 (303)	93-50-425
-29	12.48 (316)	93-50-425
-30	12.99 (328)	93-50-450
-312	13.46 (341)	93-50-450
-325	13.98 (353)	93-50-475
-337	14.45 (366)	93-50-475
-350	14.96 (378)	93-50-500
-362	15.43 (391)	93-50-500
-375	15.94 (403)	93-50-525
-387	16.42 (416)	93-50-525
-400	16.93 (428)	93-50-550

2828/2928/R7728

2828-05-200-0

	B_{Ri} in. (mm)	Part No. Installation set
-05	3.11 (79)	93-50-200
-06	3.82 (97)	93-50-225
-07	4.09 (104)	93-50-225
-087	4.57 (116)	93-50-225
-10	5.08 (129)	93-50-250
-11	5.39 (137)	93-50-250
-112	5.59 (142)	93-50-250
-12	6.06 (154)	93-50-275
-137	6.57 (167)	93-50-275
-15	7.05 (179)	93-50-300
-162	7.56 (192)	93-50-300
-17	7.76 (197)	93-50-325
-18	8.03 (204)	93-50-325
-187	8.54 (217)	93-50-325
-20	9.02 (229)	93-50-350
-212	9.53 (242)	93-50-350
-23	10.00 (254)	93-50-375
-237	10.51 (267)	93-50-375
-25	10.98 (279)	93-50-400
-262	11.50 (292)	93-50-400
-28	11.97 (304)	93-50-425
-29	12.48 (317)	93-50-425
-30	12.95 (329)	93-50-450
-312	13.46 (342)	93-50-450
-325	13.94 (354)	93-50-475
-337	14.45 (367)	93-50-475
-350	14.92 (379)	93-50-500
-362	15.43 (392)	93-50-500
-375	15.91 (404)	93-50-525
-387	16.42 (417)	93-50-525
-400	16.89 (429)	93-50-550

E6-40

E6-40-040-200-0

	B_{Ri} in. (mm)	Part No. Installation set
-040	2.56 (65)	*
-050	2.95 (75)	93-50-200
-062	3.43 (87)	93-50-200
-070	3.74 (95)	93-50-225
-075	3.94 (100)	93-50-225
-100	4.92 (125)	93-50-250
-125	5.91 (150)	93-50-275
-150	6.89 (175)	93-50-300
-175	7.87 (200)	93-50-325
-200	8.86 (225)	93-50-350
-225	9.84 (250)	93-50-375
-250	10.83 (275)	93-50-400
-275	11.81 (300)	93-50-425
-300	12.80 (325)	93-50-450

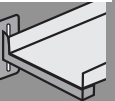
*upon request

E6-40

E6-40-040-200-0

	B_{Ri} in. (mm)	Part No. Installation set
-062	3.43 (87)	93-50-200

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



For the following Series

System E2 Series:

- 3480
- 340/350

System E2 Tube Series:

- R68

System E4 Series:

- 380/390
- 3838/3938/R7838

System E6 Series:

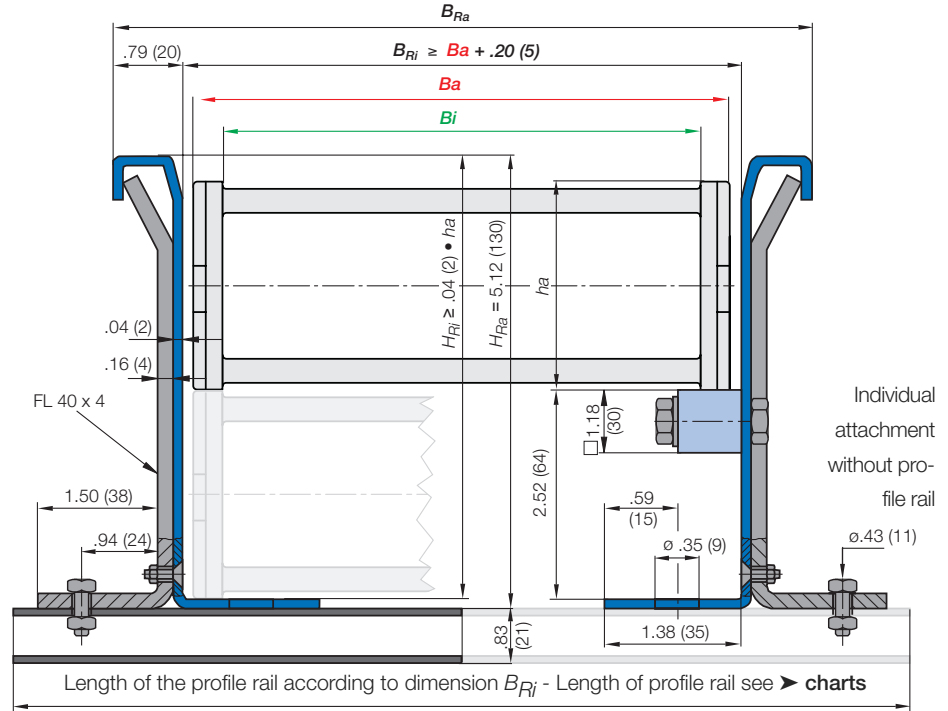
- E6-52/R6-52

System E4-1 Series:

- E4-42/H4-42/R4-42

- B_a = Outer E-Chain® width
- B_i = Inner E-Chain® width
- h_a = E-Chain® outer height
- H_{Ri} = Inner trough height
- H_{Ra} = Outer trough height
- B_{Ri} = Inner trough width
depends on dim. B_a
- B_{Ra} = Outer trough width
- n_{Mon} = # of installation sets (left/right)
- n_{Ri} = # of trough set (left/right)
- ! $H_{Ri} \geq 2 \cdot h_a$
- $B_{Ri} \geq B_a + 5$
- = Guide trough
- = Glide bar
- = Installation set "Basic"
- = profile rail

Part No. 93-30 - Trough Height: 5.12 in. (130 mm)



Steel Guide Trough components - Sets and single parts

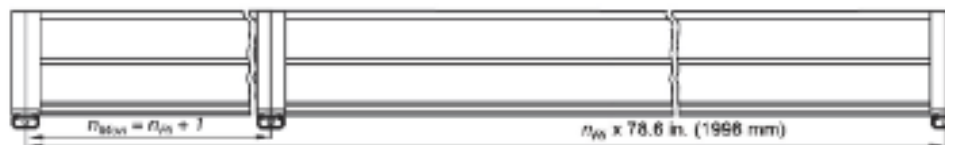
Complete guide trough sets - description	Part No.	Weight lbs
Set of 2 trough side parts without glide bars, each 6.56 ft. (2m)	93-30	28.22
1 Installation set "Basic" with profile rail	93-50-___	
1 Installation set "Basic" without profile rail	93-50	1.19
1 Glide bar set with hardware, each 6.56 ft. (2m) + 22 bolts	93-01	9.95

Single parts - description

1 profile rail, individual	92-52-___	.60 lbs/ft.
1 Clamping brackets, 2 pcs	93-51	.49
4 Flat-head screws M6 x 20	92-53	
4 Lock nuts M6	92-55	
2 3/8 Slide nuts	92-56	
2 Hex-head bolts 3/8 x 3/4	92-57	
Glide bar hardware only, 22 pcs	93-21	2.67

Supplement Part No. with the indicated profile rail-length-index. **Example: 93-50-175**
profile rail-length-index for your chosen trough inner width B_{Ri} ▶ **opposite page**

Principle sketch: Number of installation sets which have to be installed



Guide Trough Systems

Steel Guide Troughs

Part No. Installation set: Steel Guide Trough with profile rail
(depending on the width)



3480

3480-075-200-0

	B_{Ri} in. (mm)	Part No. Installation set
-075	3.94 (100)	93-50-225
-115	5.51 (140)	93-50-250
-175	7.87 (200)	93-50-300

340/350

350-075-200-0

	B_{Ri} in. (mm)	Part No. Installation set
-050	2.95 (75)	93-50-150
-075	3.94 (100)	93-50-200
-100	4.92 (125)	93-50-250
-115	5.51 (140)	93-50-250
-125	5.91 (150)	93-50-300
-150	6.89 (175)	93-50-300
-175	7.87 (200)	93-50-300
-200	8.86 (225)	93-50-350
-225	9.84 (250)	93-50-350
-250	10.83 (275)	93-50-400

R6-52

R6-52-100-100-0

	B_{Ri} in. (mm)	Part No. Installation set
-050	3.11 (79)	93-50-200
-075	4.09 (104)	93-50-225
-100	5.08 (129)	93-50-250
-125	6.06 (154)	93-50-275
-150	7.04 (179)	93-50-300
-175	8.03 (204)	93-50-325

R68

68-075-200-0

	B_{Ri} in. (mm)	Part No. Installation set
-050	2.87 (73)	93-50-200
-075	3.86 (98)	93-50-225
-100	4.84 (123)	93-50-250
-115	5.43 (138)	93-50-250
-125	5.83 (148)	93-50-275
-150	6.81 (173)	93-50-300
-175	7.80 (198)	93-50-325
-200	8.78 (223)	93-50-350
-225	9.76 (248)	93-50-375
-250	10.75 (273)	93-50-400

E6-52

E6-52-100-100-0

	B_{Ri} in. (mm)	Part No. Installation set
-040	2.72 (69)	*
-050	3.11 (79)	93-50-200
-075	4.09 (104)	93-50-225
-100	5.08 (129)	93-50-250
-125	6.06 (154)	93-50-275
-150	7.04 (179)	93-50-300
-175	8.03 (204)	93-50-325
-200	9.01 (229)	93-50-350
-225	10.00 (254)	93-50-375
-250	10.98 (279)	93-50-400
-275	11.97 (304)	93-50-425
-300	12.95 (329)	93-50-450

*upon request

380/390/R780

E4-42/H4-42/R4-42

380-05-200-0

	B_{Ri} in. (mm)	Part No. Installation set
-05	3.19 (81)	93-50-200
-06	3.90 (99)	93-50-225
-07	4.17 (106)	93-50-225
-087	4.69 (119)	93-50-250
-10	5.16 (131)	93-50-250
-11	5.47 (139)	93-50-250
-112	5.67 (144)	93-50-275
-12	6.14 (156)	93-50-275
-137	6.65 (169)	93-50-300
-15	7.12 (181)	93-50-300
-162	7.64 (194)	93-50-325
-17	7.83 (199)	93-50-325
-18	8.11 (206)	93-50-325
-187	8.62 (219)	93-50-350
-20	9.09 (231)	93-50-350
-212	9.61 (244)	93-50-375
-23	10.08 (256)	93-50-375
-237	10.59 (269)	93-50-400
-25	11.06 (281)	93-50-400
-262	11.57 (294)	93-50-425
-28	12.05 (306)	93-50-425
-29	12.56 (319)	93-50-450
-30	13.03 (331)	93-50-450
-312	13.54 (344)	93-50-475
-325	14.01 (356)	93-50-475
-337	14.52 (369)	93-50-500
-350	15.00 (381)	93-50-500
-362	15.51 (394)	93-50-525
-375	16.02 (407)	93-50-525
-387	16.50 (419)	93-50-550
-400	16.97 (431)	93-50-550

3838/3938/R7838

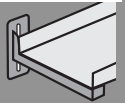
3838-05-200-0

	B_{Ri} in. (mm)	Part No. Installation set
-05	3.23 (82)	93-50-200
-06	3.94 (100)	93-50-225
-07	4.21 (107)	93-50-225
-087	4.72 (120)	93-50-250
-10	5.20 (132)	93-50-250
-11	5.51 (140)	93-50-250
-112	5.71 (145)	93-50-275
-12	6.18 (157)	93-50-275
-137	6.69 (170)	93-50-300
-15	7.16 (182)	93-50-300
-162	7.68 (195)	93-50-325
-17	7.87 (200)	93-50-325
-18	8.15 (207)	93-50-325
-187	8.66 (220)	93-50-350
-20	9.13 (232)	93-50-350
-212	9.65 (245)	93-50-375
-23	10.12 (257)	93-50-375
-237	10.63 (270)	93-50-400
-25	11.10 (282)	93-50-400
-262	11.61 (295)	93-50-425
-28	12.09 (307)	93-50-425
-29	12.60 (320)	93-50-450
-30	13.07 (332)	93-50-450
-312	13.58 (345)	93-50-475
-325	14.06 (357)	93-50-475
-337	14.57 (370)	93-50-500
-350	15.04 (382)	93-50-500
-362	15.55 (395)	93-50-525
-375	16.02 (407)	93-50-525
-387	16.53 (420)	93-50-550
-400	17.01 (432)	93-50-550

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS

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For the following Series

System E4 Series:

- 400/410/R880
- 4040/4140/R8840
- 14040/14140/R18840
- 14240/14340

System E6 Series:

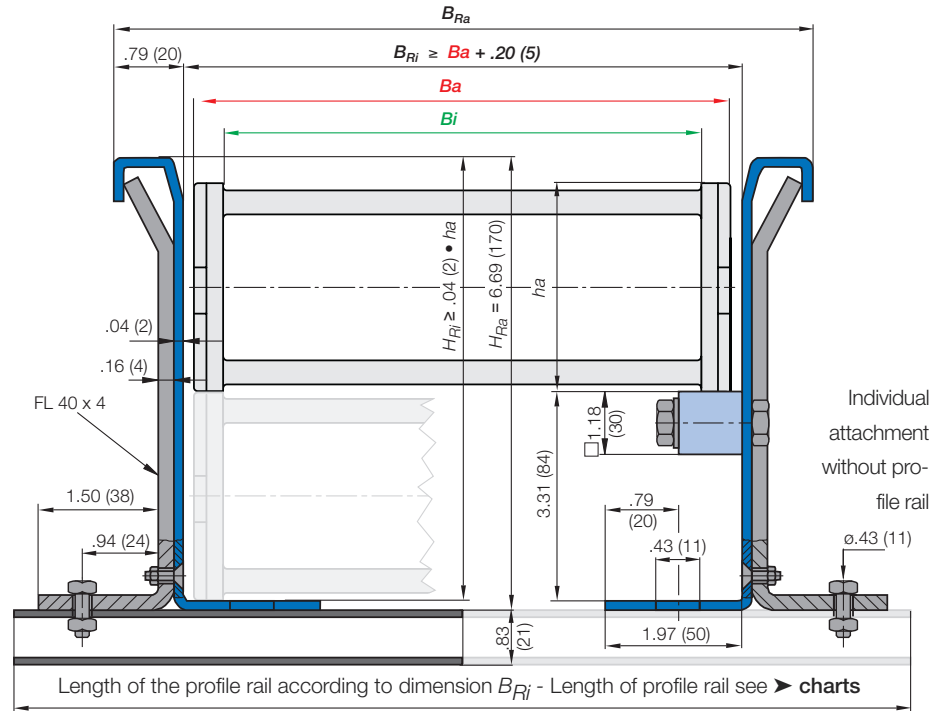
- E6-62

System E4-1 Series

- E4-56/H4-56/R4-56

- B_a = Outer E-Chain® width
- B_i = Inner E-Chain® width
- h_a = E-Chain® outer height
- H_{Ri} = Inner trough height
- H_{Ra} = Outer trough height
- B_{Ri} = Inner trough width ▶ depends on dim. B_a
- B_{Ra} = Outer trough width
- n_{Mon} = # of installation sets (left/right)
- n_{Ri} = # of trough set (left/right)
- ! $H_{Ri} \geq 2 \cdot h_a$
- ! $B_{Ri} \geq B_a + 5$
- = Guide trough
- = Glide bar
- = Installation set "Basic"
- = profile rail

Part No. 94-30 - Trough Height: 6.69 in. (170 mm)



Steel Guide Trough components - Sets and single parts

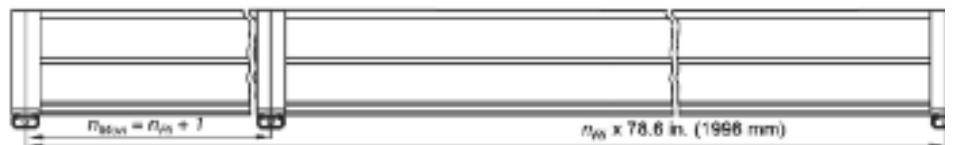
Complete guide trough sets - description	Part No.	Weight lbs
Set of 2 trough side parts without glide bars, each 6.56 ft. (2m)	94-30	37.04
1 Installation set "Basic" with profile rail	94-50-___	
1 Installation set "Basic" without profile rail	94-50	1.41
1 Glide bar set with hardware, each 6.56 ft. (2m) + 22 bolts	93-01	4.30

Single parts - description

1 profile rail, individual	92-52-___	.60 lbs/ft
1 Clamping brackets, 2 pcs	94-51	.60
4 Flat-head screws M6 x 20	92-53	
4 Lock nuts M6	92-55	
2 3/8 Slide nuts	92-56	
2 Hex-head bolts 3/8 x 3/4	92-57	
Glide bar hardware only, 22 pcs	93-21	2.65

Supplement Part No. with the indicated profile rail-length-index. **Example: 94-50-175**
profile rail-length-index for your chosen trough inner width B_{Ri} ▶ **opposite page**

Principle sketch: Number of installation sets which have to be installed



400/410/R880
4040/4140
E4-56/H4-56/R4-56

400-10-200-0

	B_{Ri} in. (mm)	Part No. Installation set
-05	3.50 (89)	*
-06	4.23 (104)	94-50-225
-07	4.49 (114)	94-50-225
-10	5.47 (139)	94-50-250
-11	5.98 (152)	94-50-275
-12	6.46 (164)	94-50-275
-13	6.97 (177)	94-50-300
-15	7.44 (189)	94-50-300
-16	7.95 (202)	94-50-325
-17	8.42 (214)	94-50-325
-18	8.94 (227)	94-50-350
-20	9.41 (239)	94-50-350
-21	9.92 (252)	94-50-375
-22	10.39 (264)	94-50-375
-23	10.91 (277)	94-50-400
-25	11.38 (289)	94-50-400
-26	11.89 (302)	94-50-425
-27	12.36 (314)	94-50-425
-28	12.87 (327)	94-50-450
-30	13.35 (339)	94-50-450
-31	13.86 (352)	94-50-475
-32	14.33 (364)	94-50-475
-33	14.84 (377)	94-50-500
-35	15.31 (389)	94-50-500
-36	15.82 (402)	94-50-525
-37	16.30 (414)	94-50-525
-38	16.81 (427)	94-50-550
-40	17.28 (439)	94-50-550
-41	17.79 (452)	94-50-575
-42	18.27 (464)	94-50-575
-43	18.78 (477)	94-50-600
-45	19.25 (489)	94-50-600
-46	19.76 (502)	94-50-625
-47	20.24 (514)	94-50-625
-48	20.75 (527)	94-50-650
-50	21.22 (539)	94-50-650
-51	21.73 (552)	94-50-675
-52	22.20 (564)	94-50-675
-53	22.72 (577)	94-50-700
-55	23.19 (589)	94-50-700
-60	25.28 (639)	94-50-750

14040/14140/R18840

14040-05-200-0

	B_{Ri} in. (mm)	Part No. Installation set
-05	3.19 (81)	*
-06	3.78 (96)	*
-07	4.17 (106)	94-50-225
-10	5.16 (131)	94-50-250
-11	5.63 (143)	94-50-275
-12	6.14 (156)	94-50-275
-13	6.61 (168)	94-50-300
-15	7.13 (181)	94-50-300
-16	7.60 (193)	94-50-325
-17	8.11 (206)	94-50-325
-18	8.58 (218)	94-50-350
-20	9.09 (231)	94-50-350
-21	9.57 (243)	94-50-375
-22	10.08 (256)	94-50-375
-23	10.55 (268)	94-50-400
-25	11.06 (281)	94-50-400
-26	11.54 (293)	94-50-425
-27	12.05 (306)	94-50-425
-28	12.52 (318)	94-50-450
-30	13.03 (331)	94-50-450
-31	13.50 (343)	94-50-475
-32	14.02 (356)	94-50-475
-33	14.49 (368)	94-50-500
-35	15.00 (381)	94-50-500
-36	15.47 (393)	94-50-525
-37	15.98 (406)	94-50-525
-38	16.46 (418)	94-50-550
-40	16.97 (431)	94-50-550
-41	17.44 (443)	94-50-575
-42	17.95 (456)	94-50-575
-43	18.43 (468)	94-50-600
-45	18.94 (481)	94-50-600
-46	19.41 (493)	94-50-625
-47	19.92 (506)	94-50-625
-48	20.59 (518)	94-50-650
-50	20.91 (531)	94-50-650
-51	21.38 (543)	94-50-675
-52	21.89 (556)	94-50-675
-53	22.36 (568)	94-50-700
-55	22.87 (581)	94-50-700
-60	24.84 (631)	94-50-750

14240/14340

14240-05-200-0

	B_{Ri} in. (mm)	Part No. Installation set
-05	3.19 (81)	*
-06	3.90 (99)	*
-07	4.17 (106)	94-50-225
-087	4.65 (118)	94-50-250
-10	5.16 (131)	94-50-250
-11	5.47 (139)	94-50-250
-112	5.63 (143)	94-50-275
-12	6.14 (156)	94-50-275
-137	6.61 (168)	94-50-300
-15	7.12 (181)	94-50-300
-162	7.60 (193)	94-50-325
-17	7.83 (199)	94-50-325
-18	8.11 (206)	94-50-325
-187	8.58 (218)	94-50-350
-20	9.09 (231)	94-50-350
-212	9.57 (243)	94-50-375
-23	10.08 (256)	94-50-375
-237	10.55 (268)	94-50-400
-25	11.06 (281)	94-50-400
-262	11.54 (293)	94-50-425
-28	12.05 (306)	94-50-425
-29	12.52 (318)	94-50-450
-30	13.03 (331)	94-50-450
-312	13.50 (343)	94-50-475
-325	14.02 (356)	94-50-475
-337	14.49 (368)	94-50-500
-350	15.00 (381)	94-50-500
-362	15.47 (393)	94-50-525
-375	15.98 (406)	94-50-525
-387	16.46 (418)	94-50-550
-400	16.97 (431)	94-50-550

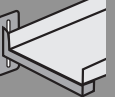
E6-62

E6-62-10-115-0

	B_{Ri} in. (mm)	Part No. Installation set
-05	3.58 (91)	*
-06	4.29 (109)	94-50-225
-07	4.57 (116)	94-50-225
-087	5.04 (128)	94-50-250
-10	5.55 (141)	94-50-250
-11	5.87 (149)	94-50-275
-112	6.02 (153)	94-50-275
-12	6.54 (165)	94-50-275
-137	7.01 (178)	94-50-300
-15	7.52 (191)	94-50-300
-162	7.99 (203)	94-50-325
-17	8.23 (209)	94-50-325
-18	8.50 (216)	94-50-325
-187	8.98 (228)	94-50-350
-20	9.49 (241)	94-50-350
-212	9.96 (253)	94-50-375
-23	10.47 (266)	94-50-375
-237	10.95 (278)	94-50-400
-25	11.46 (291)	94-50-400
-262	11.93 (303)	94-50-425
-28	12.44 (316)	94-50-425
-29	12.91 (328)	94-50-450
-30	13.43 (341)	94-50-450
-312	13.90 (353)	94-50-475
-325	14.41 (366)	94-50-475
-337	14.88 (378)	94-50-500
-350	15.39 (391)	94-50-500
-362	15.87 (403)	94-50-525
-375	16.38 (416)	94-50-525
-387	16.85 (428)	94-50-550
-400	17.36 (441)	94-50-550

*upon request

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



For the following Series

System E4 Series:

- 5050/5150/R9850
- 15050/15150/R19850

System E6 Series:

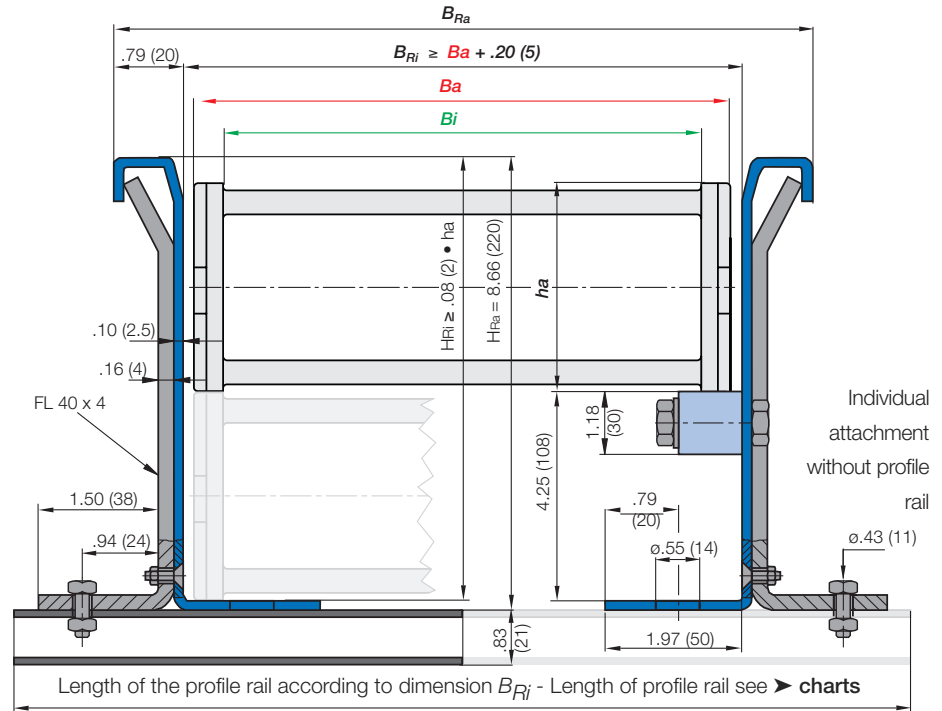
- E6-80/E6-80L

System E4-1 Series

- E4-80/H4-80/R4-80

- B_a = Outer E-Chain® width
- B_i = Inner E-Chain® width
- h_a = E-Chain® outer height
- H_{Ri} = Inner trough height
- H_{Ra} = Outer trough height
- B_{Ri} = Inner trough width ▶ depends on dim. B_a
- B_{Ra} = Outer trough width
- n_{Mon} = # of installation sets (left/right)
- n_{Ri} = # of trough set (left/right)
- ! $H_{Ri} \geq 2 \cdot h_a$
- ! $B_{Ri} \geq B_a + 5$
- = Guide trough
- = Glide bar
- = Installation set "Basic"
- = profile rail

Part No. 99-30 - Trough Height: 6.69 in. (170 mm)



Steel Guide Trough components - Sets and single parts

Complete guide trough sets - description	Part No.	Weight lbs
Set of 2 trough side parts without glide bars, each 6.56 ft. (2m)	99-30	43.66
1 Installation set "Basic" with profile rail	96-50-____	
1 Installation set "Basic" without profile rail	96-50	1.63
1 Glide bar set with hardware, each 6.56 ft. (2m) + 22 bolts	93-01	9.95

Single parts - description

1 profile rail, individual	92-52-____	.60 lbs/ft
1 Clamping brackets, 2 pcs	96-51	.71
4 Flat-head screws M6 x 20	92-53	
4 Lock nuts M6	92-55	
2 3/8 Slide nuts	92-56	
2 Hex-head bolts 3/8 x 3/4	92-57	
Glide bar hardware only, 22 pcs	93-21	2.67

Supplement Part No. with the indicated profile rail-length-index. **Example: 96-50-175**
profile rail-length-index for your chosen trough inner width B_{Ri} ▶ **opposite page**

Principle sketch: Number of installation sets which have to be installed



5050/5150/R9850 E4-80/H4-80/R4-80

5050-10-200-0

	B_{Ri} in. (mm)	Part No. Installation set
-05	4.13 (105)	96-50-225
-06	4.72 (120)	96-50-250
-07	5.12 (130)	96-50-250
-10	6.10 (155)	96-50-275
-11	6.61 (168)	96-50-300
-12	7.09 (180)	96-50-300
-13	7.60 (193)	96-50-325
-15	8.07 (205)	96-50-325
-16	8.58 (218)	96-50-350
-17	9.06 (230)	96-50-350
-18	9.57 (243)	96-50-375
-20	10.04 (255)	96-50-375
-21	10.55 (268)	96-50-400
-22	11.02 (280)	96-50-400
-23	11.54 (293)	96-50-425
-25	12.01 (305)	96-50-425
-26	12.52 (318)	96-50-450
-27	12.99 (330)	96-50-450
-28	13.50 (343)	96-50-475
-30	13.98 (355)	96-50-475
-31	14.49 (368)	96-50-500
-32	14.96 (380)	96-50-500
-33	15.47 (393)	96-50-525
-35	15.94 (405)	96-50-525
-36	16.46 (418)	96-50-550
-37	16.93 (430)	96-50-550
-38	17.44 (443)	96-50-575
-40	17.91 (455)	96-50-575
-41	18.43 (468)	96-50-600
-42	18.90 (480)	96-50-600
-43	19.41 (493)	96-50-625
-45	19.88 (505)	96-50-625
-46	20.39 (518)	96-50-650
-47	20.87 (530)	96-50-650
-48	21.38 (543)	96-50-675
-50	21.85 (555)	96-50-675
-51	22.36 (568)	96-50-700
-52	22.83 (580)	96-50-700
-53	23.35 (593)	96-50-725
-55	23.82 (605)	96-50-725
-60	25.79 (655)	96-50-775

15050/15150/R19850

15050-10-200-0

	B_{Ri} in. (mm)	Part No. Installation set
-05	3.35 (85)	*
-07	4.33 (110)	96-50-225
-10	5.31 (135)	96-50-250
-11	5.83 (148)	96-50-275
-12	6.30 (160)	96-50-275
-13	6.81 (173)	96-50-300
-15	7.28 (185)	96-50-300
-16	7.80 (198)	96-50-325
-17	8.27 (210)	96-50-325
-18	8.78 (223)	96-50-350
-20	9.25 (235)	96-50-350
-21	9.76 (248)	96-50-375
-22	10.24 (260)	96-50-375
-23	10.75 (273)	96-50-400
-25	11.22 (285)	96-50-400
-26	11.73 (298)	96-50-425
-27	12.20 (310)	96-50-425
-28	12.72 (323)	96-50-450
-30	13.19 (335)	96-50-450
-31	13.70 (348)	96-50-475
-32	14.17 (360)	96-50-475
-33	14.69 (373)	96-50-500
-35	15.16 (385)	96-50-500
-36	15.67 (398)	96-50-525
-37	16.14 (410)	96-50-525
-38	16.65 (423)	96-50-550
-40	17.13 (435)	96-50-550
-41	17.63 (448)	96-50-575
-42	18.11 (460)	96-50-575
-43	18.62 (473)	96-50-600
-45	19.09 (485)	96-50-600
-46	19.61 (498)	96-50-625
-47	20.08 (510)	96-50-625
-48	20.59 (523)	96-50-650
-50	21.06 (535)	96-50-650
-51	21.57 (548)	96-50-675
-52	22.04 (560)	96-50-675
-53	22.56 (573)	96-50-700
-55	23.03 (585)	96-50-700
-60	25.00 (635)	96-50-750

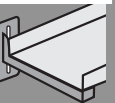
E6-80

E6-80-10-115-0

	B_{Ri} in. (mm)	Part No. Installation set
-05	4.13 (105)	96-50-225
-06	4.72 (120)	96-50-250
-07	5.12 (130)	96-50-250
-10	6.10 (155)	96-50-275
-11	6.57 (167)	96-50-300
-12	7.09 (180)	96-50-300
-13	7.56 (192)	96-50-325
-15	8.07 (205)	96-50-325
-16	8.54 (217)	96-50-350
-17	9.06 (230)	96-50-350
-18	9.53 (242)	96-50-375
-20	10.04 (255)	96-50-375
-21	10.51 (267)	96-50-400
-22	11.02 (280)	96-50-400
-23	11.50 (292)	96-50-425
-25	12.01 (305)	96-50-425
-26	12.48 (317)	96-50-450
-27	12.99 (330)	96-50-450
-28	13.46 (342)	96-50-475
-30	13.98 (355)	96-50-475
-31	14.45 (367)	96-50-500
-32	14.96 (380)	96-50-500
-33	15.43 (392)	96-50-525
-35	15.94 (405)	96-50-525
-36	16.42 (417)	96-50-550
-37	16.93 (430)	96-50-550
-38	17.40 (442)	96-50-575
-40	17.91 (455)	96-50-575
-41	18.39 (467)	96-50-600
-42	18.90 (480)	96-50-600
-43	19.37 (492)	96-50-625
-45	19.88 (505)	96-50-625
-46	20.35 (517)	96-50-650
-47	20.87 (530)	96-50-650
-48	21.34 (542)	96-50-675
-50	21.85 (555)	96-50-675
-51	22.32 (567)	96-50-700
-52	22.83 (580)	96-50-700
-53	23.31 (592)	96-50-725
-55	23.82 (605)	96-50-725
-60	25.79 (655)	96-50-775

*upon request

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



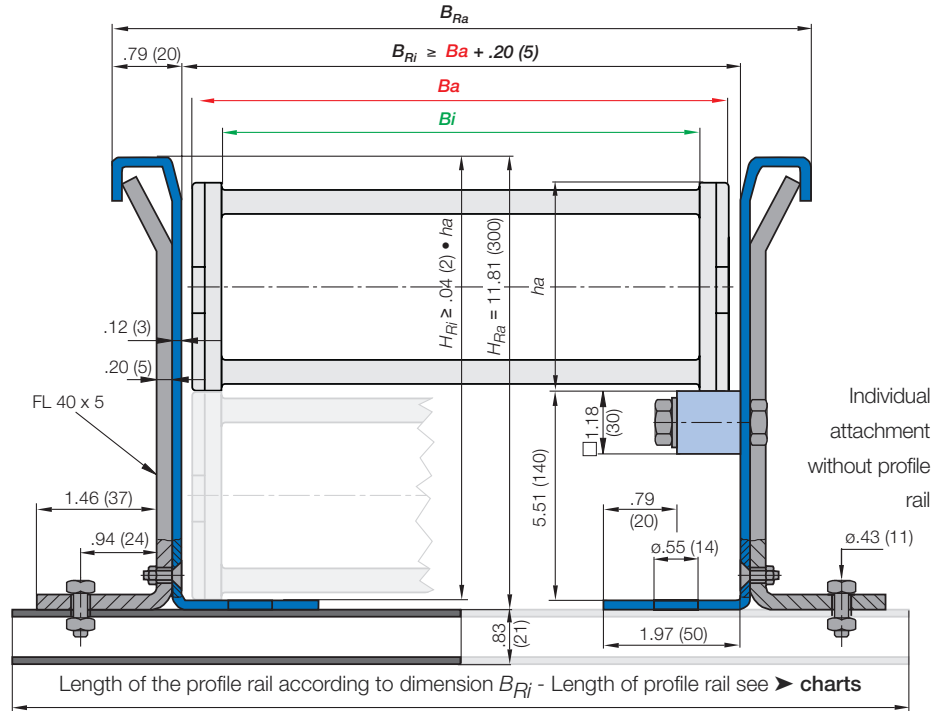
For the following Series

System E4 Series:

- 600/601/R608
- 640
- 1640/R1608

- Ba = Outer E-Chain® width
- Bi = Inner E-Chain® width
- ha = E-Chain® outer height
- H_{Ri} = Inner trough height
- H_{Ra} = Outer trough height
- B_{Ri} = Inner trough width \blacktriangleright depends on dim. Ba
- B_{Ra} = Outer trough width
- n_{Mon} = # of installation sets (left/right)
- n_{Ri} = # of trough set (left/right)
- !** $H_{Ri} \geq 2 \cdot ha$
- !** $B_{Ri} \geq Ba + 5$
- = Guide trough
- = Glide bar
- = Installation set "Basic"
- = profile rail

Part No. 97-30 - Trough Height: 11.81 in. (300 mm)



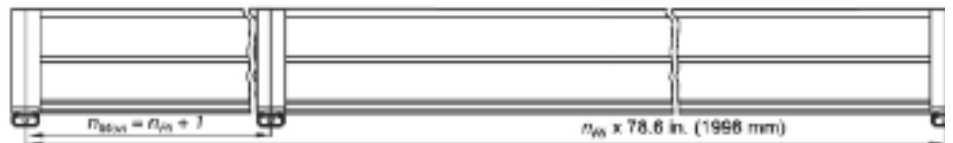
Steel Guide Trough components - Sets and single parts

Complete guide trough sets - description	Part No.	Weight lbs
Set of 2 trough side parts without glide bars, each 6.56 ft. (2m)	97-30	60.42
1 Installation set "Basic" with profile rail	97-50-____	
1 Installation set "Basic" without profile rail	97-50	2.47
1 Glide bar set with hardware, each 6.56 ft. (2m) + 22 bolts	93-01	9.95

Single parts - description	Part No.	Weight lbs
1 profile rail, individual	92-52-____	.60 lbs/ft
1 Clamping brackets, 2 pcs	97-51	1.12
4 Flat-head screws M6 x 20	98-52	
4 Lock nuts M8	98-53	
2 3/8 Slide nuts	92-56	
2 Hex-head bolts 3/8 x 3/4	92-57	
Glide bar hardware only, 22 pcs	93-21	2.67

Supplement Part No. with the indicated profile rail-length-index. Example: 94-50-175
profile rail-length-index for your chosen trough inner width B_{Ri} \blacktriangleright opposite page

Principle sketch: Number of installation sets which have to be installed



600/601/R608

600-20-200-0

	B_{Ri} in. (mm)	Part No. Installation set
-20	10.12 (257)	97-50-375
-25	12.09 (307)	97-50-425
-30	14.06 (357)	97-50-475
-32	14.84 (377)	97-50-500
-35	16.02 (407)	97-50-525
-40	17.99 (457)	97-50-575
-45	19.96 (507)	97-50-625
-50	21.93 (557)	97-50-675
-55	23.90 (607)	97-50-725
-60	25.87 (657)	97-50-775

640

640-12-200-0

	B_{Ri} in. (mm)	Part No. Installation set
-12	5.67 (144)	97-50-275
-13	6.18 (157)	97-50-275
-15	6.65 (169)	97-50-300
-16	7.16 (182)	97-50-300
-17	6.46 (164)	97-50-325
-18	8.15 (207)	97-50-325
-20	8.62 (219)	97-50-350
-21	9.13 (232)	97-50-350
-22	9.61 (244)	97-50-375
-23	10.12 (257)	97-50-375
-25	10.59 (269)	97-50-400
-26	11.10 (282)	97-50-400
-27	11.57 (294)	97-50-425
-28	12.09 (307)	97-50-425
-30	12.56 (319)	97-50-450
-31	13.07 (332)	97-50-450
-32	13.54 (344)	97-50-475
-33	14.06 (357)	97-50-475
-35	14.53 (369)	97-50-500
-36	15.04 (382)	97-50-500
-37	15.51 (394)	97-50-525
-38	16.02 (407)	97-50-525
-40	16.50 (419)	97-50-550
-41	17.01 (432)	97-50-550
-42	17.48 (444)	97-50-575
-43	17.99 (457)	97-50-575
-45	18.46 (469)	97-50-600
-46	18.98 (482)	97-50-600
-47	19.45 (494)	97-50-625
-48	19.96 (507)	97-50-625
-50	20.43 (519)	97-50-650
-51	20.94 (532)	97-50-650
-52	21.42 (544)	97-50-675
-53	21.93 (557)	97-50-675
-55	22.40 (569)	97-50-700
-60	24.37 (619)	97-50-750

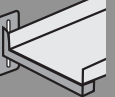
1640/1608

1640-05-200-0

	B_{Ri} in. (mm)	Part No. Installation set
-05	3.50 (89)	*
-06	4.09 (104)	97-50-225
-07	4.49 (114)	97-50-250
-10	5.47 (139)	97-50-275
-11	5.94 (151)	97-50-275
-12	6.46 (164)	97-50-300
-13	6.93 (176)	97-50-300
-15	7.44 (189)	97-50-325
-16	7.91 (201)	97-50-325
-17	8.43 (214)	97-50-350
-18	8.90 (226)	97-50-350
-20	9.41 (239)	97-50-375
-21	9.88 (251)	97-50-375
-22	10.39 (264)	97-50-400
-23	10.87 (276)	97-50-400
-25	11.38 (289)	97-50-425
-26	11.85 (301)	97-50-425
-27	12.36 (314)	97-50-450
-28	12.83 (326)	97-50-450
-30	13.35 (339)	97-50-475
-31	13.82 (351)	97-50-475
-32	14.33 (364)	97-50-500
-33	14.80 (376)	97-50-500
-35	15.31 (389)	97-50-525
-36	15.79 (401)	97-50-525
-37	16.30 (414)	97-50-550
-38	16.77 (426)	97-50-550
-40	17.28 (439)	97-50-575
-41	17.76 (451)	97-50-575
-42	18.27 (464)	97-50-600
-43	18.74 (476)	97-50-600
-45	19.25 (489)	97-50-625
-46	19.72 (501)	97-50-625
-47	20.24 (514)	97-50-650
-48	20.71 (526)	97-50-650
-50	21.22 (539)	97-50-675
-51	21.69 (551)	97-50-675
-52	22.20 (564)	97-50-700
-53	22.68 (576)	97-50-700
-55	23.19 (589)	97-50-725
-60	25.16 (639)	97-50-775

*upon request

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 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



For the following Series

System E4 Series:

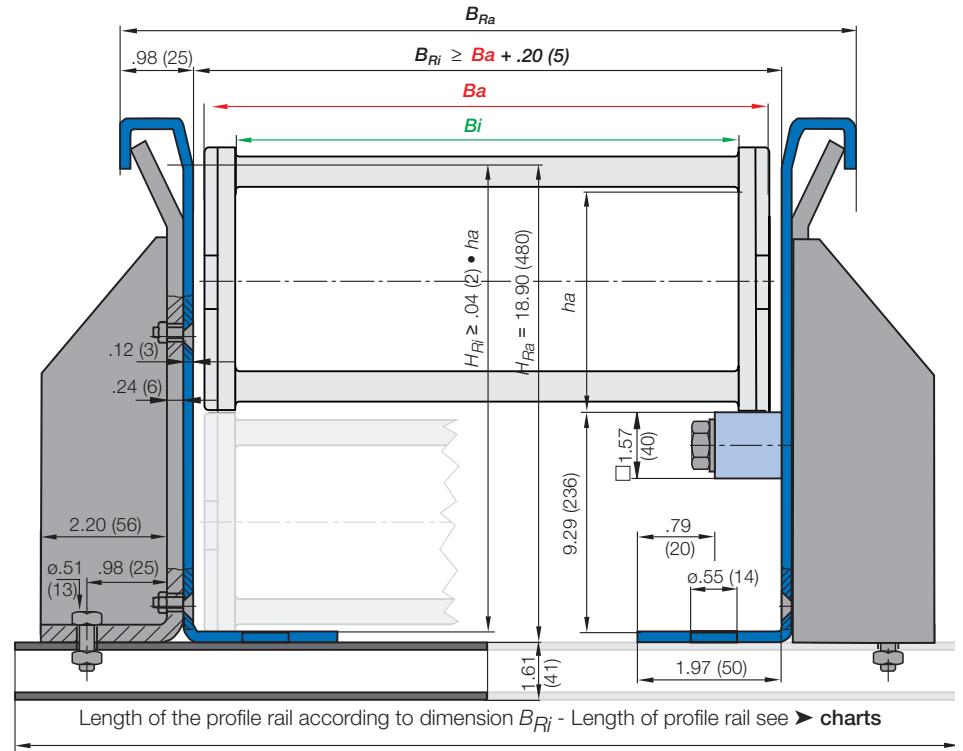
- 800

System E4-1 Series

- 840

- B_a = Outer E-Chain® width
- B_i = Inner E-Chain® width
- h_a = E-Chain® outer height
- H_{Ri} = Inner trough height
- H_{Ra} = Outer trough height
- B_{Ri} = Inner trough width \blacktriangleright depends on dim. B_a
- B_{Ra} = Outer trough width
- n_{Mon} = # of installation sets (left/right)
- n_{Ri} = # of trough set (left/right)
- ! $H_{Ri} \geq 2 \cdot h_a$
- $B_{Ri} \geq B_a + 5$
- = Guide trough
- = Glide bar
- = Installation set "Basic"
- = profile rail

Part No. 90-30 - Trough Height: 18.90 in. (480 mm)



Steel Guide Trough components - Sets and single parts

Complete guide trough sets - description	Part No.	Weight lbs
Set of 2 trough side parts without glide bars, each 6.56 ft. (2m)	90-30	
1 Installation set "Basic" with profile rail	90-50-___	
1 Installation set "Basic" without profile rail	90-50	
1 Glide bar set with hardware, each 6.56 ft. (2m) + 22 bolts	90-01	

Single parts - description

1 profile rail, individual	92-52-___
1 Clamping brackets, 2 pcs	90-51
4 Flat-head screws M8 x 25	92-53
4 Lock nuts M6	92-55
2 3/8 Slide nuts	92-56
2 Hex-head bolts 3/8 x 3/4	92-57
Glide bar hardware only, 22 pcs.	92-21

Supplement Part No. with the indicated profile rail-length-index. **Example: 90-50-200**
profile rail-length-index for your chosen trough inner width B_{Ri} \blacktriangleright **opposite page**

Principle sketch: Number of installation sets which have to be installed



Part No. Installation set: Steel Guide Trough with profile rail
(depending on the width)

800

800-20-325-0

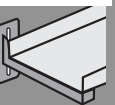
	B_{Ri} in. (mm)	Part No. Installation set
-20	10.43 (265)	90-50-450
-25	12.40 (315)	90-50-500
-30	14.37 (365)	90-50-550
-32	15.35 (390)	90-50-575
-35	16.34 (415)	90-50-600
-40	18.31 (465)	90-50-650
-45	20.27 (515)	90-50-700
-50	22.24 (565)	90-50-750
-55	24.21 (615)	90-50-800
-60	26.18 (665)	90-50-850

840

840-13-325-0

	B_{Ri} in. (mm)	Part No. Installation set
-20	10.43 (265)	90-50-450
-13	6.49 (165)	90-50-350
-15	7.01 (178)	90-50-350
-16	7.48 (190)	90-50-375
-17	7.99 (203)	90-50-375
-18	8.46 (215)	90-50-400
-20	8.98 (228)	90-50-400
-21	9.45 (240)	90-50-425
-22	9.96 (253)	90-50-425
-23	10.43 (265)	90-50-450
-25	10.94 (278)	90-50-450
-26	11.42 (290)	90-50-475
-27	11.93 (303)	90-50-475
-28	12.40 (315)	90-50-500
-30	12.91 (328)	90-50-500
-31	13.39 (340)	90-50-525
-32	13.90 (353)	90-50-525
-33	14.37 (365)	90-50-550
-35	14.88 (378)	90-50-550
-36	15.35 (390)	90-50-575
-37	15.87 (403)	90-50-575
-38	16.34 (415)	90-50-600
-40	16.85 (428)	90-50-600
-41	17.32 (440)	90-50-625
-42	17.83 (453)	90-50-625
-43	18.31 (465)	90-50-650
-45	18.82 (478)	90-50-650
-46	19.29 (490)	90-50-675
-47	19.80 (503)	90-50-675
-48	20.20 (513)	90-50-700
-50	20.79 (528)	90-50-700
-51	21.26 (540)	90-50-725
-52	21.77 (553)	90-50-725
-53	22.24 (565)	90-50-750
-55	22.76 (578)	90-50-750
-60	26.18 (665)	90-50-800

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 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS





Support Tray

Support Tray

For support of the lower run

For support of the lower run - Support tray tool kit

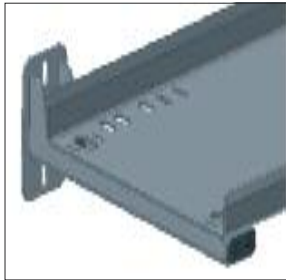
Simple one-piece support trays for the lower Energy Chain® run, according with your requirements and specification. Your width, height and color - we supply the fitting Energy Chain®, together with the support tray system. Ready to install onto your machine or application. Save on procurement and design time.

- Complete system, ready to install
- No more costly self-made designs
- Easy installation onto your machine, on profiles or wall-mount brackets

igus® support tray - in 2 types
and 4 options available



Option 01 -
with connection-rail



Option 02 -
with bracket

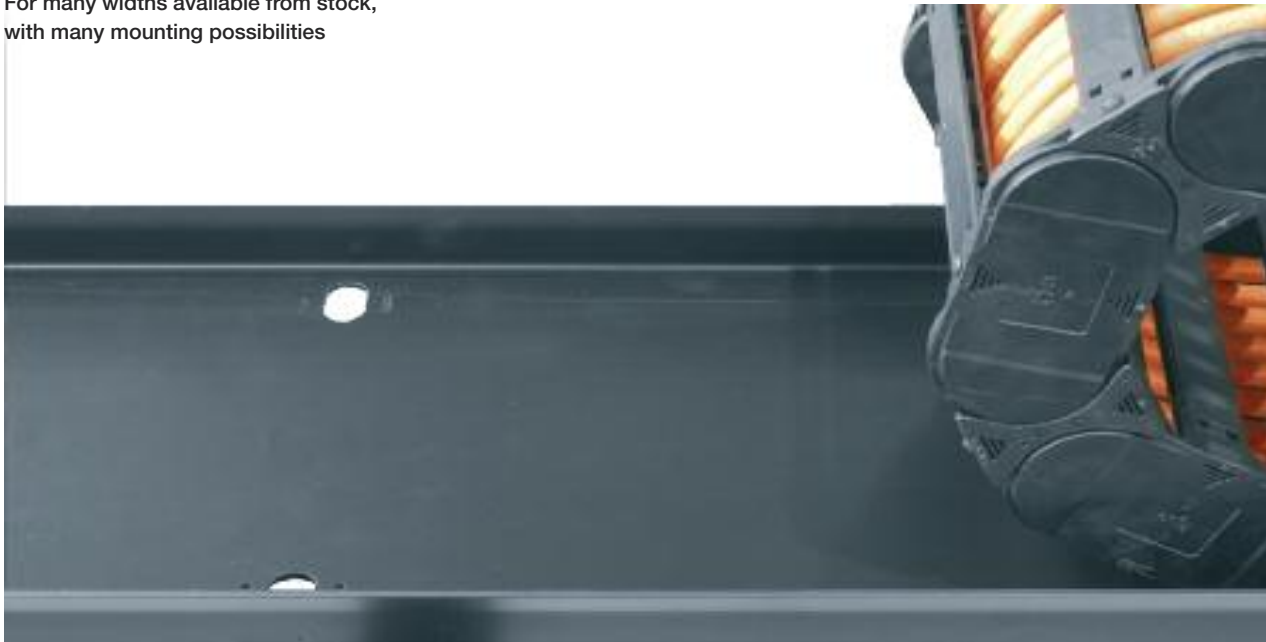


Option 03 -
without rail



Option 04 -
customized

For many widths available from stock,
with many mounting possibilities



For the following Series

System E2/000 Series:

- 2480
- 2680

System E4-1 Series:

- E4-21
- E4-28/R4-28
- E4-32/H4-32/R4-28

System E4/00 Series:

- 220/R760
- 280/290/R770

System E4/4 Series:

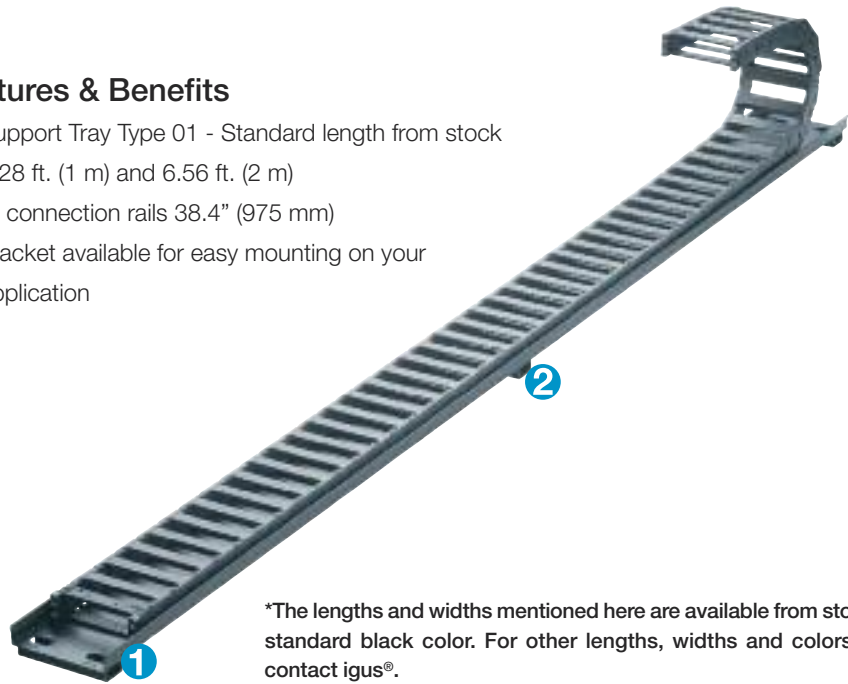
- 2828/2928/R7728

System E6 Series:

- E6-29/R6-29
- E6-35
- E6-40/R6-40

Features & Benefits

- 1 Support Tray Type 01 - Standard length from stock
3.28 ft. (1 m) and 6.56 ft. (2 m)
- 2 All connection rails 38.4" (975 mm)
- 3 Bracket available for easy mounting on your application



*The lengths and widths mentioned here are available from stock in the standard black color. For other lengths, widths and colors, please contact igus®.

Product Range*

System	Suitable for the following series ▼	Widths- index	B _{Ra} in. (mm)	B _{Ri} in. (mm)	Part No. Support-tray, single	Part No. Support-tray with bracket	Part No. single bracket
E2/000	2480	-05	3.50 (89)	3.15 (80)	S9-010-05-XXXX-0	S9-011-05-XXXX-0	907-724-05
		-07	4.49 (114)	4.13 (105)	S9-010-07-XXXX-0	S9-011-07-XXXX-0	907-724-07
		-10	5.47 (139)	5.12 (130)	S9-010-10-XXXX-0	S9-011-10-XXXX-0	907-724-10
E2/000	2680	-05	3.50 (89)	3.15 (80)	S9-010-05-XXXX-0	S9-011-05-XXXX-0	907-724-05
		-07	4.49 (114)	(105)	S9-010-07-XXXX-0	S9-011-07-XXXX-0	907-724-07
		-10	5.47 (139)	(130)	S9-010-10-XXXX-0	S9-011-10-XXXX-0	907-724-10
E4-1	E4-21	-15	7.28 (185)	6.89 (175)	S9-010-15-XXXX-0	S9-011-15-XXXX-0	907-724-15
E4-1	E4-32/H4-32/R4-32	-050	3.50 (89)	3.15 (80)	S9-010-05-XXXX-0	S9-011-05-XXXX-0	907-724-05
E4/4	2828/2928/R7728	-070	4.49 (114)	4.13 (105)	S9-010-07-XXXX-0	S9-011-07-XXXX-0	907-724-07
E4/00	280/290/R770	-100	5.47 (139)	5.12 (130)	S9-010-10-XXXX-0	S9-011-10-XXXX-0	907-724-10
E6	E6-29/R6-29	-150	7.28 (185)	6.89 (175)	S9-010-15-XXXX-0	S9-011-15-XXXX-0	907-724-15
E6	E6-35	-050	3.50 (89)	3.15 (80)	S9-010-05-XXXX-0	S9-011-05-XXXX-0	907-724-05
E4-1	E4-28/R4-28	-070	4.49 (114)	4.13 (105)	S9-010-07-XXXX-0	S9-011-07-XXXX-0	907-724-07
E4/00	220/R760	-100	5.47 (139)	5.12 (130)	S9-010-10-XXXX-0	S9-011-10-XXXX-0	907-724-10
E6	E6-40/R6-40	-150	7.28 (185)	6.89 (175)	S9-010-15-XXXX-0	S9-011-15-XXXX-0	907-724-15

Please replace XXXX by the standard lengths 1000 or 2000 mm available from stock!

Accessories - optional bracket

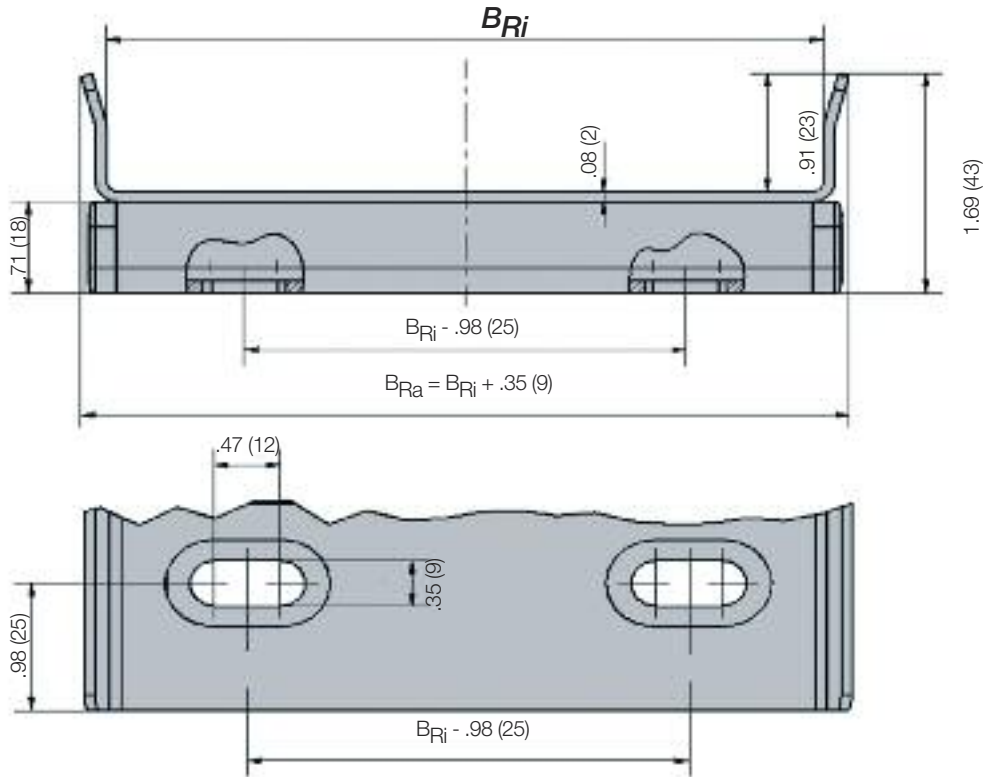


3

Bracket for easy mounting on your application (see table above for Part No.)



Mounting holes of the trough system



Standard lengths from stock 3.28 ft. and 6.56 ft. (1 m and 2 m) - All connection rails 38.4" (975 mm) 78.7 (2000)



Part No. structure without bracket 39.4" (1000 mm)

S9-	010-	07-	1000-	0
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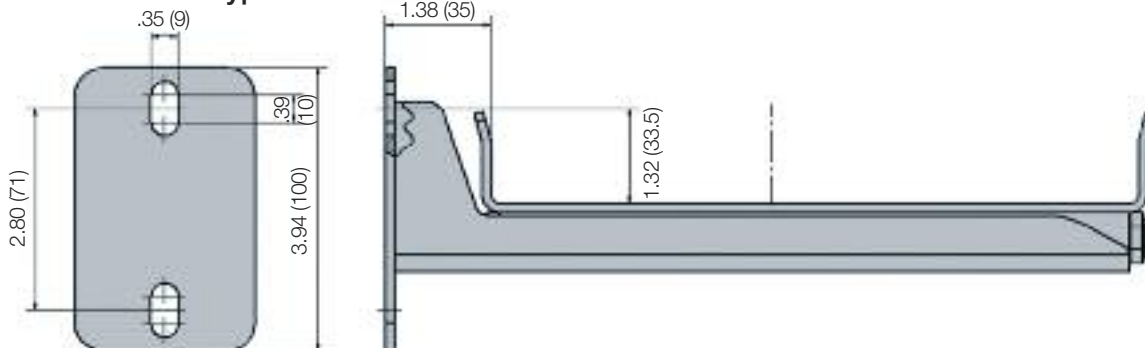
- Color, powdered black
- Length 1000 mm
- Energy Chain®- width without bracket
- Support tray

Part No. structure with bracket 78.7" (2000 mm)

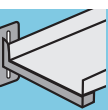
S9-	011-	07-	2000-	0
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- Color, powdered black
- Length 2000 mm
- Energy Chain®- width with bracket
- Support tray

Bracket - Type 01



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



For the following Series

System E2/000 Series:

- 3480

System E4-1 Series:

- E4-42/H4-42/R4-42
- E4-56/H4-56/R4-56
- E4-80/H4-80/R4-80

System E4/00 Series:

- 380/390/R780
- 400/410/R880

System E4/4 Series:

- 3838/3938/R7838
- 4040/4140/R8840
- 5050/5150/R9850

System E4/Light Series:

- 14040/14140/R18840
- 14240/14340
- 15050/15150/R19850

System E6 Series:

- E6-52/R6-52
- E6-62
- E6-80

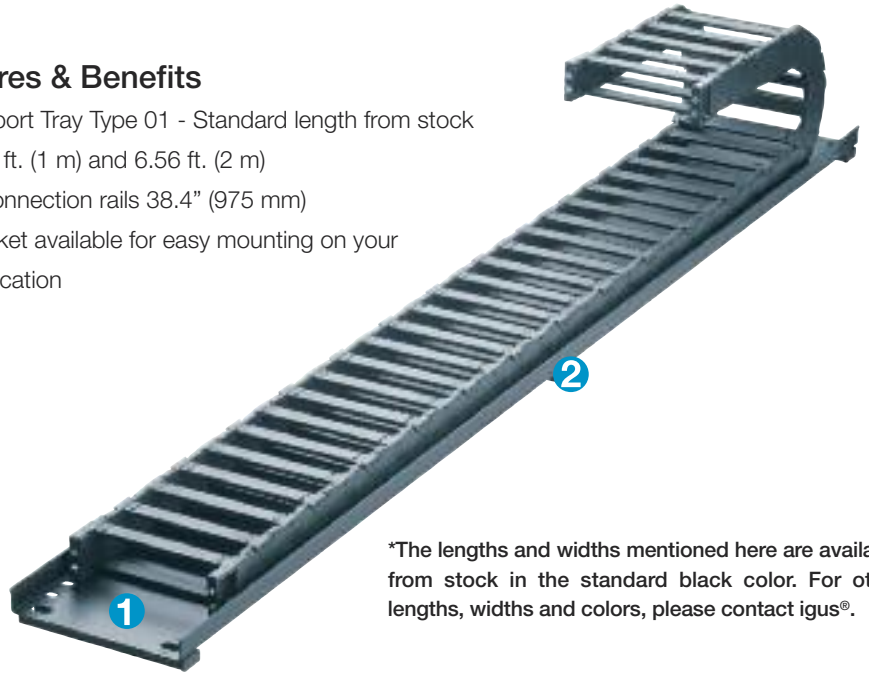
Product Range*

System	Suitable for the following series ▼	Widths-index	B _{Ra} in. (mm)	B _{Ri} in. (mm)	Part No. Support-tray, single	Part No. Support-tray with bracket	Part No. single bracket
E4-1	E4-42/H4-42/R4-42	-10	6.57 (167)	6.14 (156)	S9-020-10-XXXX-0	S9-021-10-XXXX-0	907-759-10-0
	E4-56/H4-56/R4-56	-15	8.54 (217)	8.11 (206)	S9-020-15-XXXX-0	S9-021-15-XXXX-0	907-759-15-0
	E4-80/H4-80/R4-80	-20	10.51 (267)	10.08 (256)	S9-020-20-XXXX-0	S9-021-20-XXXX-0	907-759-20-0
E4/00	380/390/R780	-25	12.48 (317)	12.05 (306)	S9-020-25-XXXX-0	S9-021-25-XXXX-0	907-759-25-0
	400/410/R880						
E4/4	3838/3938/R7838						
	4040/4140/R8840						
	5050/5150/R9850						
E4/light	14040/14140/R18840						
	14240/14340						
	15050/15150/R19850						
E6	E6-62, E6-80						
E4/00	3480	-100	6.57 (167)	6.14 (156)	S9-020-10-XXXX-0	S9-021-10-XXXX-0	907-759-10
		-150	8.54 (217)	8.11 (206)	S9-020-15-XXXX-0	S9-021-15-XXXX-0	907-759-15
E6	E6-52/R6-52	-200	10.51 (267)	10.08 (256)	S9-020-20-XXXX-0	S9-021-20-XXXX-0	907-759-20
		-250	12.48 (317)	12.05 (306)	S9-020-25-XXXX-0	S9-021-25-XXXX-0	907-759-25

Please replace XXXX by the standard lengths 1000 or 2000 mm available from stock!

Features & Benefits

- 1 Support Tray Type 01 - Standard length from stock 3.28 ft. (1 m) and 6.56 ft. (2 m)
- 2 All connection rails 38.4" (975 mm)
- 3 Bracket available for easy mounting on your application



*The lengths and widths mentioned here are available from stock in the standard black color. For other lengths, widths and colors, please contact igus®.

Accessories - optional bracket

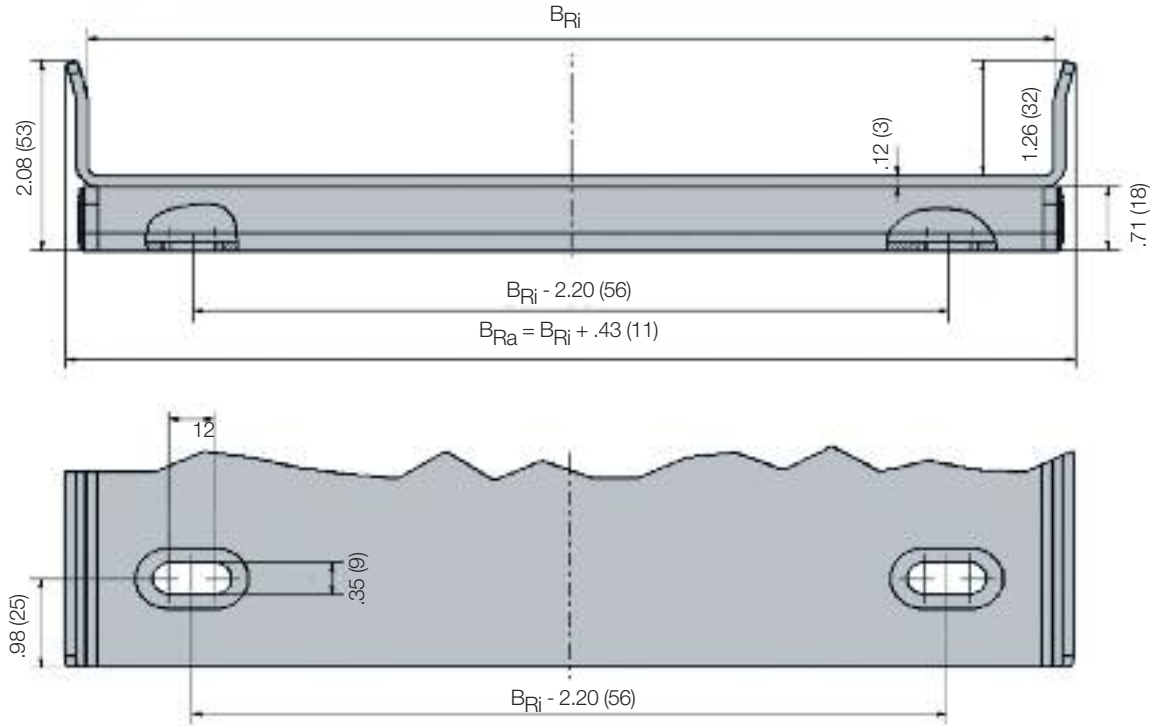


3

Bracket for easy mounting on your application (see table above for Part No.)



Mounting holes of the trough system

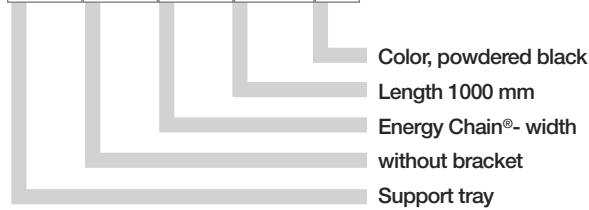


Standard lengths from stock 3.28 ft. and 6.56 ft. (1 m and 2 m) - All connection rails 38.4" (975 mm)



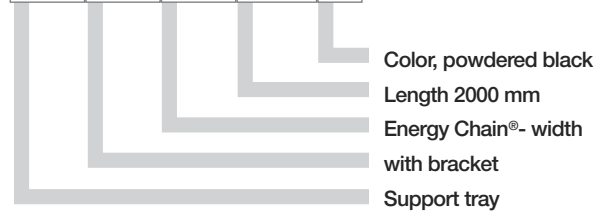
Part No. structure without bracket 39.4" (1000 mm)

S9-	020-	20-	1000-	0
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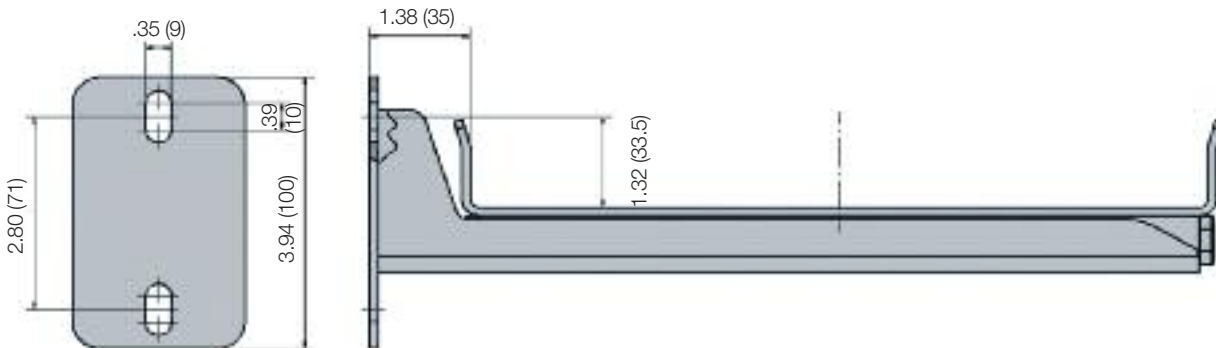


Part No. structure with bracket 78.7" (2000 mm)

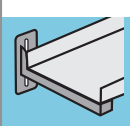
S9-	021-	20-	2000-	0
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Bracket - Type 02



PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



Special Solutions for Long Travels



Special solutions for long travels

Without guide troughs

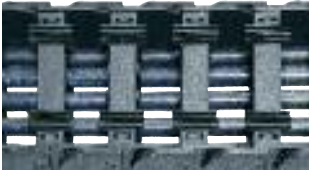
Rol E-Chain® - Rolling instead of gliding



Rol E-Chain®

Major reduction in drive power to less than 25 % for moving the Energy Chain®
Travels up to 2,624 ft. (800 m), speeds up to 19.69 ft/s (6 m/s)

System AUTO-GLIDE - Long travels without guide troughs



AUTO-GLIDE

Self-guiding Energy Chain Systems® - No Guide Troughs required!
Travels up to 164 ft. (50 m), speeds up to 4.92 ft/s(1.5 m/s)

Guidelok horizontal - Upper run guide for long travels



Guidelok horizontal

Chips cannot get stuck between upper and lower run -
Enormous increase of self supported length of Energy Chains®

Micro Flizz® - Small Energy Chains® in aluminum profile



Micro Flizz®

ONE compact system for a secure guidance of power, data and air
Maintenance-free alternative for busbar



Roll E-Chain[®]

Special solutions for long travel

Rol E-Chain®

Rol E-Chain® - Rolling instead of gliding

Over the years, Energy Chain® cable carriers have been used in increasingly longer travel distances. This drove igus® to develop Rol E-Chain®: a cable carrier specifically designed for long travel lengths with high speeds. Please contact igus® for more information. We will assist you in planning and design phase of your application.

Benefits:

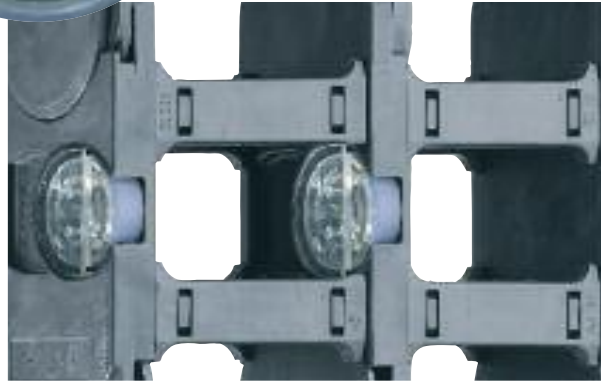
- Reduces drive power necessary for Energy Chains® to less than 25%
- Makes travel lengths up to 2,624.8 ft (800 m) and speeds up to 19.69 ft/s (6 m/s) possible
- Can be used in harsh, dirty environments
- Available as a custom-made, ready-to-install system
- Complete system guarantee for custom-made solutions

Application areas

Ideal for applications such as moving camera systems and material handling systems. Can also be used for considerable cost-savings (due to smaller drives) in slower-travel applications in the crane sector or traveling plants



Cutting the operating noise by approximately 6dB(A) through improved geometry of Energy Chain® link and roller. Stainless steel roller bearings are the igus® standard



Roller extension link for higher additional weights and widths up to 6.56 ft (2 m) and more



Travel of 1,448 ft. (441.3 m), implemented with igus® Rol E-Chain® Series 5050R

Product Range Rol E-Chain®

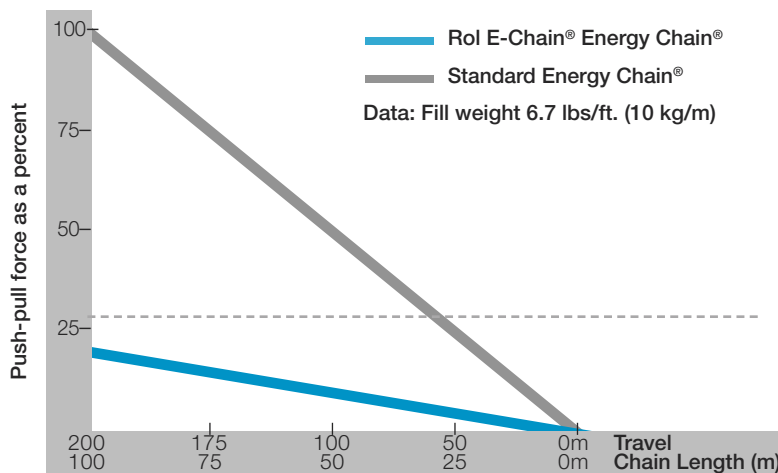
Interior heights of 1.26", 1.65", 2.20", and 3.15" (32, 42, 56, and 80 mm) can be supplied from stock. All interior separation and mounting bracket options of the igus® System E4 are available. The standard guide troughs of the various chains from stock can be used. Rol E-Chains® can be opened on both sides. The Rol E-Chain® is available as a made-to-spec Energy Chain Systems®. Chainflex® cables can be harnessed in Rol E-Chain to your specifications by igus® specialists and are packaged in an

installation-friendly manner. Depending on the Rol E-Chain length it can be delivered on a drum. If cables from the Chainflex® product line are to be used, we will also be happy to provide a guarantee for the entire system. **Systems of this type should be designed by our system design engineers. We will be more than willing to submit an offer to you. Please contact igus®.**

Selection table

Series	Inner height		Inner width		Outer width		Outer height		Bending radius	
	<i>hi</i>		<i>Bi</i>		<i>Ba</i>		<i>ha</i>		<i>R</i>	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
Rol E-Chain® - with crossbars every 2nd link										
2828R	1.26	(32)	1.97-15.75 (50-400)		2.87-16.65 (73-423)		2.13	(54)	4.92-11.81 (125-300)	
3838R	1.65	(42)	1.97-15.75 (50-400)		3.03-16.81 (77-427)		2.52	(64)	5.91-13.78 (150-350)	
4040R	2.20	(56)	1.97-23.62 (50-600)		3.39-25.04 (86-636)		3.31	(84)	7.87-19.69 (200-500)	
4040 RHD*	2.20	(56)	1.97-23.62 (50-600)		5.51-25.75 (140-654)		3.31	(84)	7.87-19.69 (200-500)	
5050R	3.15	(80)	1.97-23.62 (50-600)		3.94-25.59 (100-650)		4.25	(108)	9.84-19.69 (250-500)	
5050 RHD*	3.15	(80)	1.97-25.98 (50-660)		6.30-27.95 (160-710)		4.25	(108)	7.87-19.69 (200-500)	
Rol E-Chain® - E-Tube, fully enclosed										
R7728R	1.26	(32)	1.97-11.81 (50-300)		2.87-16.65 (73-323)		2.13	(54)	9.84-11.81 (250-300)	
R7838R	1.65	(42)	1.97-11.81 (50-300)		3.03-16.81 (77-327)		2.52	(64)	4.92-13.78 (200-350)	
R8840R	2.20	(56)	2.95-18.19 (75-462)		4.37-19.65 (111-499)		3.31	(84)	11.81-19.69 (300-500)	
R9850R	3.15	(80)	2.95-18.19 (75-462)		4.92-20.20 (125-513)		4.25	(108)	11.81-39.37 (300-1000)	

- 5050R: for Energy Chain® widths up to 9.84 ft. (3000 mm) with extension link/roller extension link
- Series 2828R, 3838R, 4040R, 5050R are also available as AUTO-GLIDE rollers
- Details on the appropriate E4/4 Series ► **Chapter 6 - System E4/4**



The Rol E-Chain® roller Energy Chain® compared with a conventional Energy Chain System®



igus® Rol E-Chain® Series 5050R in a steel plant in India with a highly corrosive atmosphere -
 Travel = 22 m, $v = 3.28 \text{ ft/s}$ (1 m/s), $a = 3.28 \text{ ft/s}^2$ (1 m/s²)



Power plant application with igus® Rol E-Chain® 4040R -
 Travel 151 ft. (46 m), Speed 4.92 ft/s (1.5 m/s), Fill weight 3.56 lbs/ft (5.3 kg/m)



Assembled system in a ship unloading crane with igus® 5050RHD - Travel 248 ft. (106 m), Speed 13.12 ft/s (4 m/s),
 Fill weight 16.8 lbs/ft (25 kg/m)



Series 4040R on a coal unloading system -
 Travel 623 ft (190 m), Speed 1.6 ft/s (0.5 m/s),
 Fill weight 5.41 lbs/ft (8.05 kg/m)

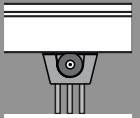
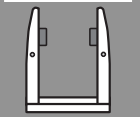
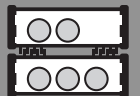
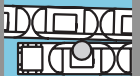


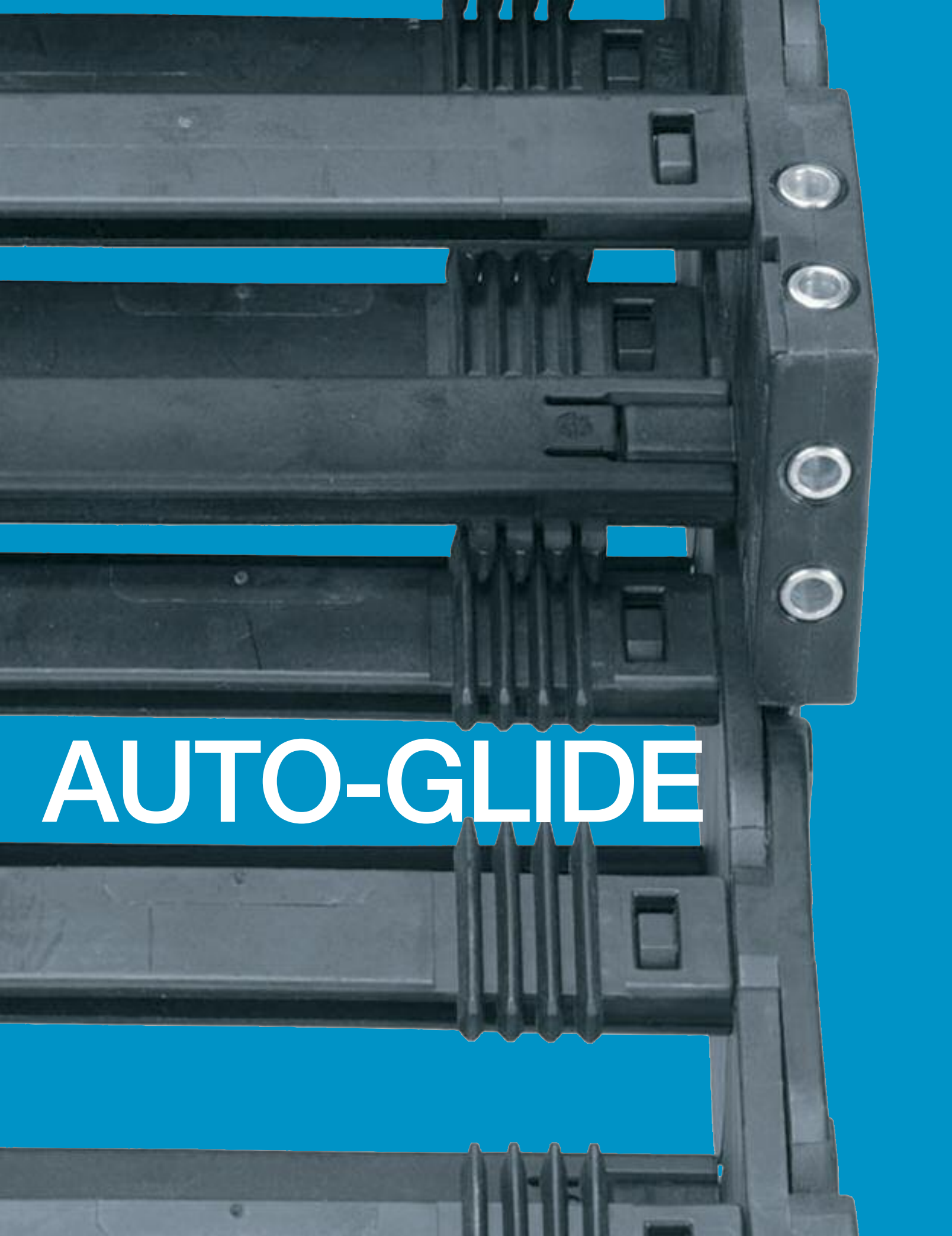
Series 4040R in steel works environment -
 Travel 34.5 ft (10.5 m), Speed 197 ft/min (60 m/min),
 Fill weight 4.09 lbs/ft (6.084 kg/m)



igus® Energy Chains® 5050RHD "Rol E-Chain®" in an igus® Aluminum SuperTrough = 75% less driving power

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS





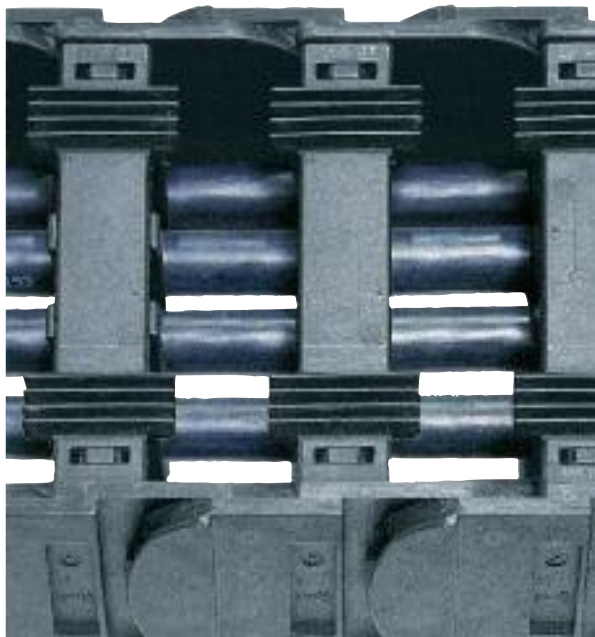
AUTO-GLIDE

Special solutions for long travel AUTO-GLIDE

AUTO-GLIDE

Long travel distances always pose special requirements on an Energy Chain System®. From a certain point, the upper run will glide on the lower run or on glide bars. Moreover, the Energy Chain System® requires additional guidance to prevent a lateral offset. In most instances a guide trough can be used, but for applications with optical or spatial limitations, there is AUTO-GLIDE: a self-aligning cable carrier that eliminates the need for a guide trough in applications with travel lengths up to 164 ft. (50 m)

- Travels up to 164 ft. (50 m)
- Travel speeds up to 4.92 ft/s (1.5 m/s)
- AUTO-GLIDE Energy Chain® requires, no additional parts
- Very quick installation times for long travels
- Guide troughs not required!
- Small installation width, silent operation
- Functional guarantee for the entire system with Chainflex® cables

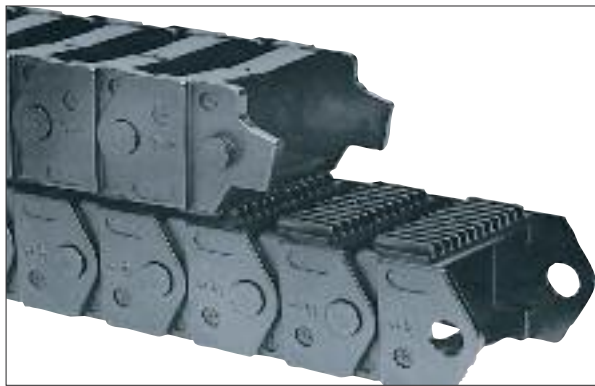


In principle every igus® Energy Chain® can be fitted with the AUTO-GLIDE system. However, we recommend its use with Energy Chain® where the interior height is less than 1.38" (35 mm), and you should also consult us, since there are restrictions regarding the bending radii to be used

There are 3 options of the igus® AUTO-GLIDE system:



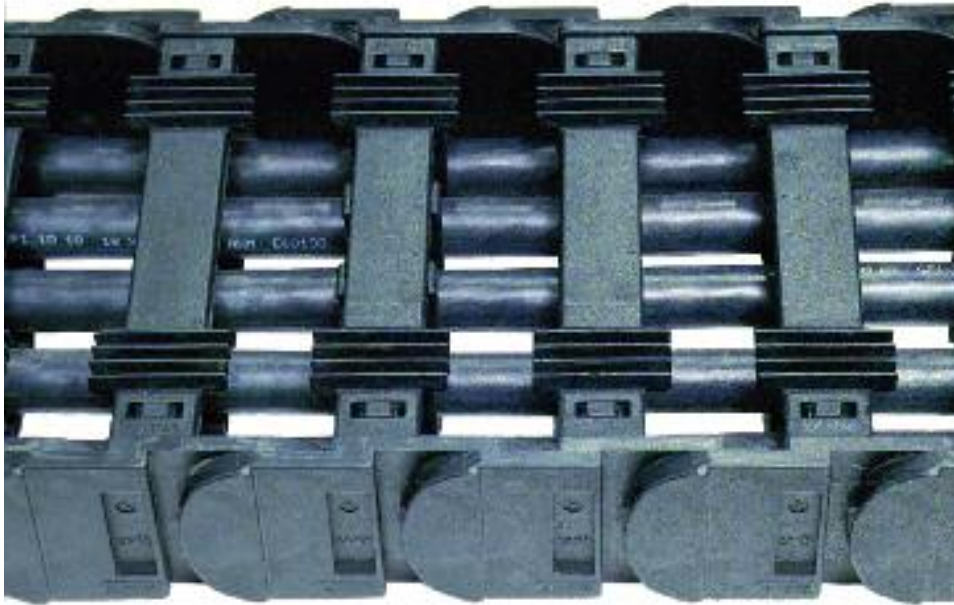
Option 1 - is available for almost all System E4 Series - here the crossbars in the interior radius of the Energy Chain® are fitted with molded-on glide shoes



Option 2 - for igus® E-Z Chain Energy Chain® combination of the easily fillable E-Z Chain and injection-molded AUTO-GLIDE grooves in the inner radius



Option 3 - for E2 Series Energy Chains®: Special plastic glide shoes hold the Energy Chain® "in the track".



AUTO-GLIDE System E4 is Available for all Chain Widths of the Following Series Upon Request



Comb-like teeth ensure a safe guide without guide trough



E4/00

Series 280 ▶ from Chapter 6

Series 380 ▶ from Chapter 6

Series 400 ▶ from Chapter 6

E4-1

Series E4-32 ▶ from Chapter 6

Series E4-42 ▶ from Chapter 6

Series E4-56 ▶ from Chapter 6

E4/4

Series 2828 ▶ from Chapter 6

Series 2822 ▶ from Chapter 6

Series 3838 ▶ from Chapter 6

Series 3822 ▶ from Chapter 6

Series 4040 ▶ from Chapter 6

Series 5050 ▶ from Chapter 6

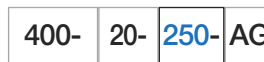
E4/Light

Series 14040 ▶ from Chapter 6

Series 14240 ▶ from Chapter 6

Series 15050 ▶ from Chapter 6

Part Number Structure



Index for AUTO-GLIDE

Bending radius

Width

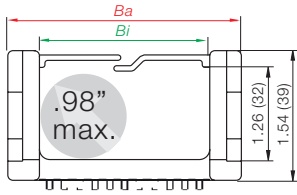
Chain type

Special solutions for long travel AUTO-GLIDE - Option 2

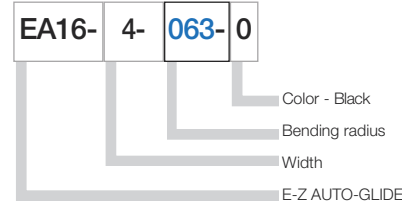


AUTO-GLIDE

Combination of AUTO-GLIDE and E-Z Chain Series EA16



Part Number Structure



Supplement part number with required radius. Example: EA16-4-060-0

Pitch: 1.20 in. (30.5 mm) per link links/ft (m) = 10.06 (33)

Part Number	<i>Bi</i> in. (mm)	<i>Ba</i> in. (mm)
EA16-4- -0	1.89 (48)	2.37 (60.2)
Choose from the radii below for the above size		
<i>Radius</i> (mm) Example: EA16-4- 060 -0		
	060	075
<i>R</i>	2.36 (060)	3.94 (100)
<i>H*</i>	6.26 (159)	9.41 (239)
<i>D</i>	4.33 (110)	6.10 (155)
<i>K</i>	10.63 (270)	15.55 (395)

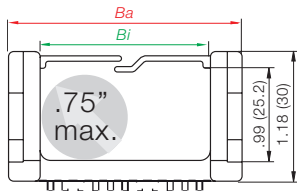
Pitch = 1.20 (30.5 mm)
Links per ft (m) = 10.06 (33)
Chain length = S + K

The required clearance height is HF=H + .98 (25 mm).
Other sizes upon request

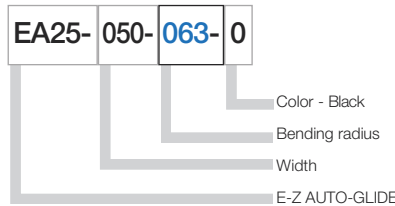
For mounting Brackets

► Chapter 2

Combination of AUTO-GLIDE and E-Z Chain Series EA25



Part Number Structure



Supplement part number with required radius. Example: EA25-050-063-0

Pitch: 1.20 in. (30.5 mm) per link links/ft (m) = 10.06 (33)

Part Number	<i>Bi</i> in. (mm)	<i>Ba</i> in. (mm)
EA25-050- -0	1.89 (48)	2.37 (60.2)
Choose from the radii below for the above size		
<i>Radius</i> (mm) Example: EA25-050- 063 -0		
	060	075
<i>R</i>	2.48 (063)	3.94 (100)
<i>H*</i>	6.14 (156)	9.06 (230)
<i>D</i>	4.92 (125)	6.30 (160)
<i>K</i>	9.84 (250)	14.76 (375)

Pitch = .98 (25 mm)
Links per ft (m) = 12.2 (40)
Chain length = S + K

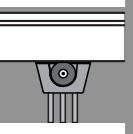
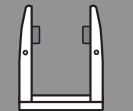
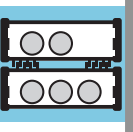
The required clearance height is HF=H + .98 (25 mm).
Other sizes upon request

For mounting Brackets

pivoting set:
EA25-050-12PZ

Locking set:
EA25-050-34PZ

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS

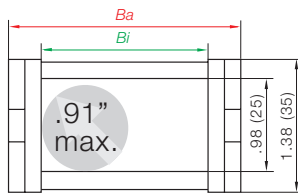


For Energy Chain Systems® up to 1.38" (35 mm) inner height

In this version, special plastic glide shoes are side-mounted on the Energy Chain® link every 39.4" to 78.7" (1,000 to 2,000 mm). The function of these gliding shoes resembles the leeboards used on sail boats. Some of these leeboards are conceived in such a way that in contact they pivot upward and enable the continuation of the travel. Similarly the glide shoes in AUTO-GLIDE go up and down, each according to its position as lower run or upper run of the E-Chain®. They provide for the precise lateral guidance and a smooth gliding of the Energy Chain®.

- The first 13.12 ft. (4 m) of the Energy Chain® seen from the moving end needs no gliding shoes. From the fixed end of the Energy Chain®, the glide shoes are **mounted on every 20th Energy Chain® link** up to 13.12 ft. (4 m) before the moving end
- Series 200/240/250 allow up to (15 m) length without further glide shoes

**AUTO-GLIDE System E2
 Series 200/240/250**



Part Number Structure



- AUTO-GLIDE
- Color - Black
- Bending radius
- Width
- Series

Chain length = $S + K_2$

Number of glide shoes = $\frac{\text{Chain length [ft]} - 13.12 \text{ ft}}{3 \text{ ft}}$

Supplement part number with required radius. Example: 250-10-**100**-0-AG
 Pitch: 1.81 in. (46 mm) per link links/ft (m) = 6.71 (22)

Part Number						<i>Bi</i>	<i>Ba</i>
Non Snap-open	Snap-open Inner Radius	Snap-open Outer Radius				in. (mm)	in. (mm)
200-02	240-02	250-02	<input type="checkbox"/>	-0-AG		.98 (25)	1.61 (41)
200-03-	240-03	250-03	<input type="checkbox"/>	-0-AG		1.50 (38)	2.13 (54)
200-05-	240-05	250-05	<input type="checkbox"/>	-0-AG		2.24 (57)	2.87 (73)
200-07-	240-07	250-07	<input type="checkbox"/>	-0-AG		3.03 (77)	3.66 (93)
200-09-	240-09	250-09	<input type="checkbox"/>	-0-AG		3.54 (90)	4.17 (106)
200-10	240-10	250-10	<input type="checkbox"/>	-0-AG		4.06 (103)	4.69 (119)
200-12	240-12	250-12	<input type="checkbox"/>	-0-AG		4.92 (125)	5.55 (141)

Choose from the radii below for all of the above sizes

Radius (mm) Example: 250-10-**100**-0-AG

	055	075	100	125	150	175	200	225	250
R	2.17 (55)	2.95 (75)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	9.84 (250)
H+4	5.71 (145)	7.28 (185)	9.25 (235)	11.22 (285)	13.19 (335)	15.16 (385)	17.13 (435)	19.09 (485)	21.06 (535)
D	4.92 (125)	5.91 (150)	6.69 (170)	7.68 (195)	8.66 (220)	9.65 (245)	10.63 (270)	11.61 (295)	12.60 (320)
K	10.87 (276)	13.62 (346)	16.30 (414)	19.53 (496)	22.76 (578)	25.98 (660)	29.21 (742)	32.05 (814)	36.22 (920)

The required clearance height: $H_f = H + .98 \text{ in. (25 mm)}$

(with 1.01 lbs/ft (1.5 kg/m) fill weight.

Please consult igus® if space is particularly restricted.

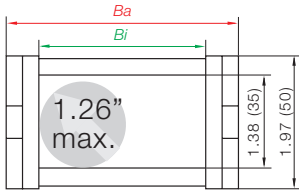
Special solutions for long travel

AUTO-GLIDE - Option 3 - Series 26/27/27i



AUTO-GLIDE

AUTO-GLIDE System E2 Series 26/27/27i



Part Number Structure

26- 10- 100- 0- AG



$$\text{Chain length} = S + K_2$$

$$\text{Number of glide shoes} = \frac{\text{Chain length [ft]} - 13.12 \text{ ft}}{3 \text{ ft}}$$

Supplement part number with required radius. Example: 26-10-100-0-AG
Pitch: 2.20 in. (56 mm) per link links/ft (m) = 5.49 (18)

Part Number		Part Number		<i>Bi</i>	<i>Ba</i>
Non Snap-open	Snap-open Outer Radius	Snap-open Inner Radius		in. (mm)	in. (mm)
26-05-	27-05-	27i-05-	<input type="checkbox"/> -0-AG	1.97 (50)	2.60 (66)
26-07-	27-07-	27i-07-	<input type="checkbox"/> -0-AG	2.95 (75)	3.58 (91)
26-10-	27-10-	27i-10-	<input type="checkbox"/> -0-AG	3.94 (100)	4.57 (116)
26-12-	27-12-	27i-12-	<input type="checkbox"/> -0-AG	4.92 (125)	5.55 (141)
26-15-	27-15-	27i-15-	<input type="checkbox"/> -0-AG	5.91 (150)	6.54 (166)
26-17-	27-17-	27i-17-	<input type="checkbox"/> -0-AG	6.89 (175)	7.64 (194)
26-20-	27-20-	27i-20-	<input type="checkbox"/> -0-AG	7.87 (200)	8.62 (219)

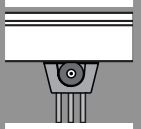
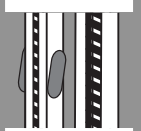
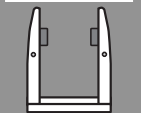
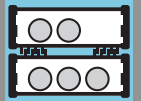
Choose from the radii below for all of the above sizes

Radius (mm) Example: 26-10-100-0-AG

	063	075	100	125	150	175	200	250
R	2.48 (063)	2.95 (075)	3.94 (100)	4.92 (125)	5.91 (150)	6.89 (175)	7.87 (200)	9.84 (250)
H ⁺	7.09 (180)	7.87 (200)	9.84 (250)	11.81 (300)	13.78 (350)	15.75 (400)	17.72 (450)	21.65 (550)
D	5.51 (140)	5.91 (150)	6.89 (175)	7.87 (200)	8.86 (225)	9.84 (250)	10.83 (275)	12.80 (325)
K	13.19 (335)	14.76 (375)	18.70 (475)	21.65 (550)	25.59 (650)	29.53 (750)	32.48 (825)	36.42 (925)

The required clearance height: $H_f = H + 1.38 \text{ in. (35 mm)}$
(with 1.34 lbs/ft (2 kg/m) fill weight).
Please consult igus® if space is particularly restricted.

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS





Guidelok horizontal

Special solutions for long travel

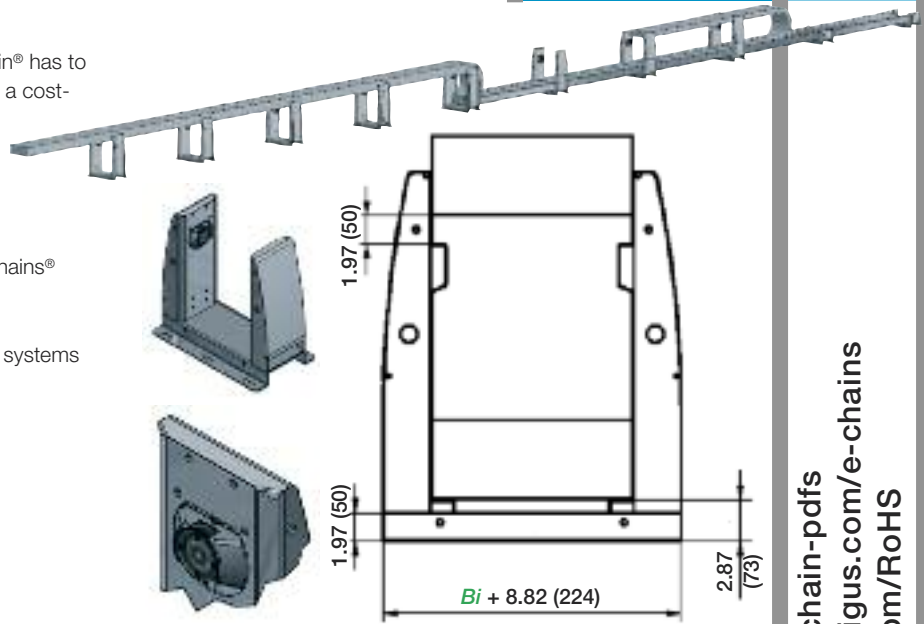
Guidelok horizontal - upper run guide for long travel



Upper run guide for long travels, self-supporting in chip areas

Especially for long travels on machine tools, if the Energy Chain® has to be gliding, metallic chips are a problem. Guidelok horizontal is a cost-effective solution

- Travels, unsupported, up to 164 ft. (50 m) possible
- Chips cannot get stuck between upper and lower run
- Modular system with few parts (also possible without sideways trough)
- Enormous increase of "self supporting" length of Energy Chains®
- Lower push-/pull forces (smaller Energy Chains®, self supporting and rollers = energy efficient)
- Lower cost than most steel chains or sophisticated gliding systems
- Open guide trough design, chips can fall through



Typical industries and applications

- Machine tools
- Applications in the chip area
- Wherever a gliding application is not recommended

Design-principle - horizontal Guidelok guides the Energy Chain® on special spring loaded roller supports that are pushed back by the Energy Chain's® radius, clearing its path



The Energy Chain® is guided in the trough channel, pushing back the spring loaded roller support with its radius...

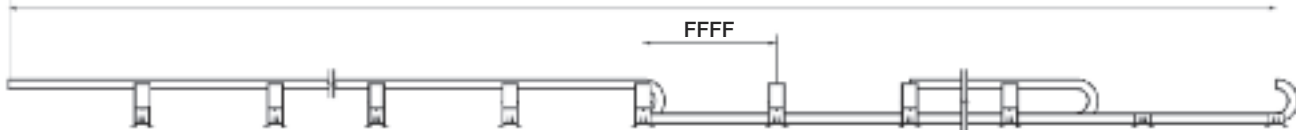


...which snaps back out after the Energy Chain® radius has passed...



...the upper run then lays on the roller support.

$$LLLL = S$$



Principle sketch - Guidelok horizontal

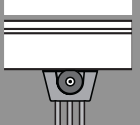
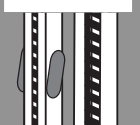
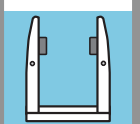
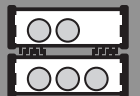
Selection table

For Series	Part Number	Bi (mm)	R (mm)
E4-56/R4-56	907-645-Bi - R - LLLL/FFFF	(50 - 600)	150, 175, 200, 250, 300
E4-80/R4-80	907-645-Bi - R - LLLL/FFFF	(50 - 600)	150, 175, 200, 250, 300
600/R608	907-645-Bi - R - LLLL/FFFF	(200 - 600)	150, 175, 200, 250, 300
E4-56/R4-56	907-837-Bi - R - LLLL/FFFF	(50 - 600)	350, 400, 450, 500
E4-80/R4-80	907-837-Bi - R - LLLL/FFFF	(50 - 600)	350, 400, 450, 500
600/R608	907-837-Bi - R - LLLL/FFFF	(200 - 600)	350, 400, 450, 500

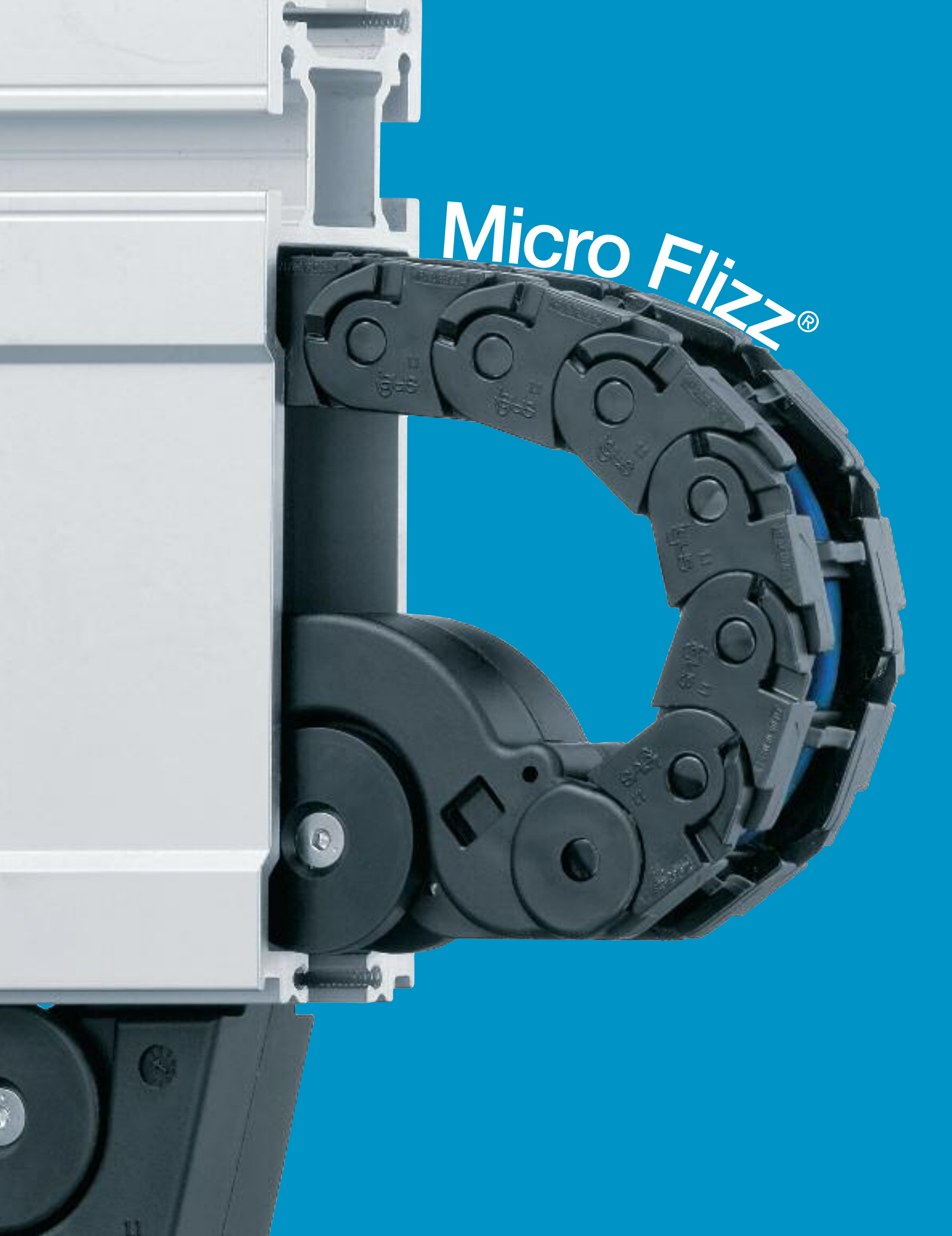
LLLL = Total Length

FFFF = Field Length

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Micro Flizz®



Energy Chain Systems®

Micro Flizz - Small Energy Chains® in aluminum profile



Master long travels with the smallest Energy Chain® without failures

- ONE compact system for a secure guidance of power, data and air
- Maintenance-free alternative for busbar
- Energy Chain® is guided in special slot, long travels with no gliding
- Control via stationary switch cabinet possible
- Accelerations up to 164 f/s² (50 m/s²) and speeds up to 19.69 f/s (6 m/s)
- Fast assembly due to pre-configured, modular system
- Less space required
- Available also as pre-assembled
- Smooth running due to ball bearings in the guide carriages
- Also with EX tested Energy Chain® available (on request)
- Rail material: anodized aluminum
- iF-Design Award



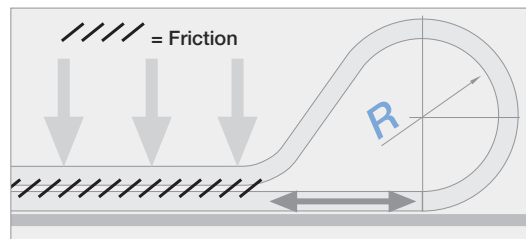
Cable diameter
 MF06: max. Ø .31" (8.0 mm)
 MF08: max. Ø .37" (9.5 mm)

Typical industries and applications

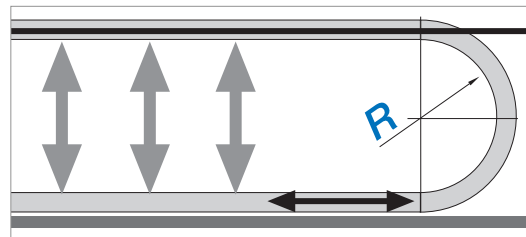
- Rack feeder • Indoor cranes • Industrial gates • Working stations
- Sewage treatment plants • Camera systems
- Sliding doors • Operator panels • Measure systems
- Studio equipment • Conveyor technique



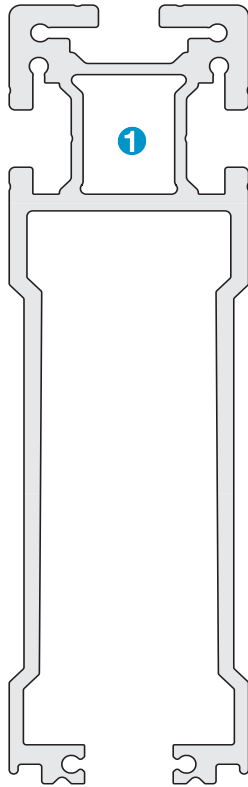
Special feature of the Micro Flizz® construction



Yesterday: Moving lower run, sliding function.
 Long travels need stable Energy Chains®.

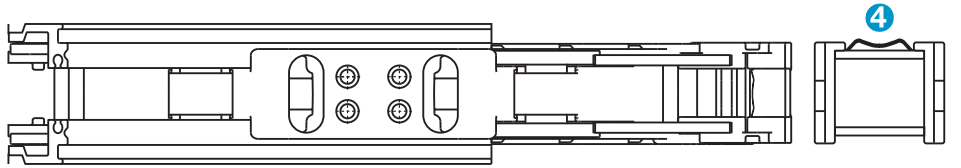
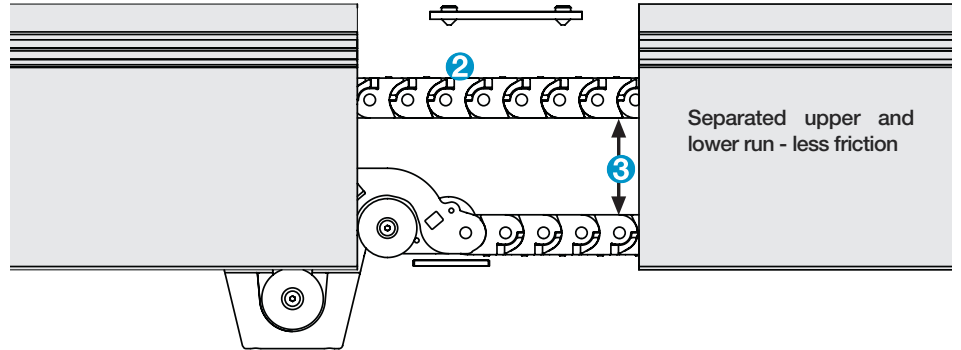


Today: Micro Flizz® - Small Energy Chains®, self-guiding in guiding channel - Friction is reduced by factor 3 over the conventional system.



Technical data Micro Flizz®

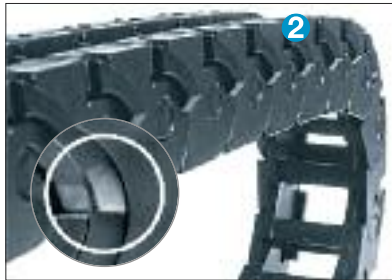
- 1 Universal attachment options due to three T-grooves
- 2 Winglets hold the E-Chain® secure in the guidance channel
- 3 Separated upper and lower run of the Flizz® E-Chain®, thus less friction and reduced push/pull forces
- 4 Polymer springs for a soft unrolling of the E-Chain® in the Flizz® channel effect a substantial noise reduction
- 5 Opposed E-Chains® can be used, that means a double filling or two independent travels are possible
- 6 Attachment of the E-Chain® by roller cart on the moving end, gliding or locking possible
- 7 Integrated strain relief in the guide carriage for the safe fixing of cables



Details Micro Flizz®



Separated upper and lower run: Running trough the radius, integrated winglets fold in



In the extended position, the winglets fold out and safely hold the upper run in the elevated position



Power, data, pneumatics in confined areas. Chainflex® cables are specifically designed for this challenge



A polymer spring element cushions the motion inside the trough and lower noise



Micro Flizz® accessory: Connection for compressed air coupling



Potential application area of the Micro Flizz® - Storage and retrieval units for high-bay warehouses, indoor cranes, etc.

Order example - End feed

MF	06-	10-	018-	L / F
MF	08-	18-	035-	L / F

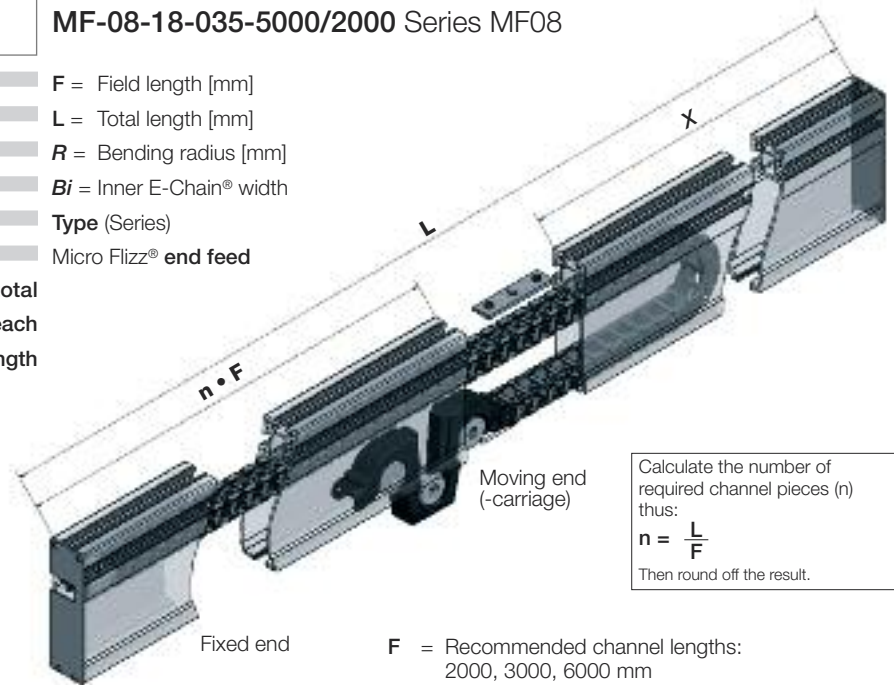
MF-06-10-018-5000/2000 Series MF06

MF-08-18-035-5000/2000 Series MF08

- F = Field length [mm]
- L = Total length [mm]
- R = Bending radius [mm]
- Bi = Inner E-Chain® width
- Type (Series)
- Micro Flizz® end feed

Micro Flizz® as end feed option with a total length of 5000 mm, split into 2 channels each 2000 mm and 1 channel with a residual length of 1000 mm

- Bi = Inner E-Chain® width [mm]
- R = Bending radius [mm]
- n = Number of channel pieces
- S = travel = L - 300 [mm]
- F = Field length [mm]
- L = Total length [mm]
- X = residual length [mm]



Calculate the number of required channel pieces (n) thus:
 $n = \frac{L}{F}$
Then round off the result.

- F = Recommended channel lengths: 2000, 3000, 6000 mm
- Bi = Series 06: 10 mm / Series 08: 18 mm
- hi = Series 06: 11 mm / Series 08: 13 mm

Order example - 2 carriages in opposite directions

MFG2	06-	10-	018-	L / F
MFG2	08-	18-	035-	L / F

MFG2-06-10-018-10000/3000 Series MF06

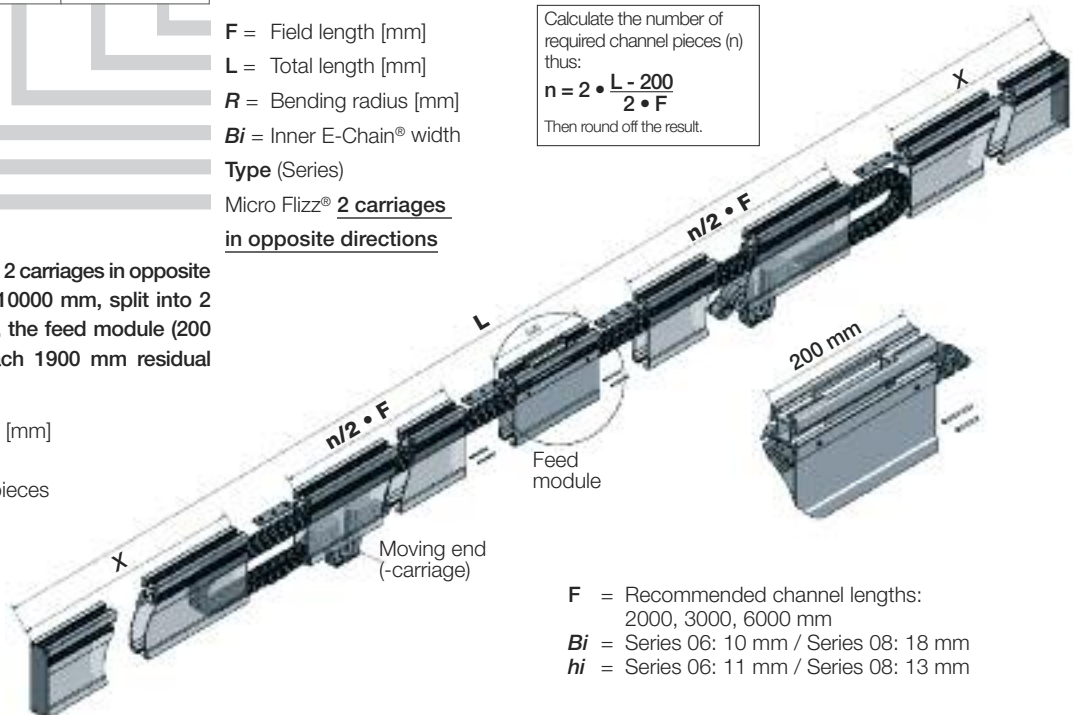
MFG2-08-18-035-10000/3000 Series MF08

- F = Field length [mm]
- L = Total length [mm]
- R = Bending radius [mm]
- Bi = Inner E-Chain® width
- Type (Series)
- Micro Flizz® **2 carriages in opposite directions**

Micro Flizz® mounted with 2 carriages in opposite directions - Total length 10000 mm, split into 2 channels each 3000 mm, the feed module (200 mm) and 2 channels each 1900 mm residual length.





- Bi = Inner E-Chain® width [mm]
- R = Bending radius [mm]
- n = Number of channel pieces
- S = travel = L - 300 [mm]
- F = Field length [mm]
- L = Total length [mm]
- X = residual length [mm]

Calculate the number of required channel pieces (n) thus:
 $n = 2 \cdot \frac{L - 200}{2 \cdot F}$
Then round off the result.



- F = Recommended channel lengths: 2000, 3000, 6000 mm
- Bi = Series 06: 10 mm / Series 08: 18 mm
- hi = Series 06: 11 mm / Series 08: 13 mm

Highly flexible Chainflex® special cables for dynamic applications

Chainflex®	Temp.	v max. unsupported		v max. gliding		a max.		Number of cores	AWG Range
		ft/s	(m/s)	ft/s	(m/s)	ft/s²	(m/s²)		
 CF9	-31°F - +212°F	32.8	(10)	19.7	(6)	328	(100)	2 - 36	24-2
 CF10	-31°F - +212°F	32.8	(10)	16.4	(5)	328	(100)	2 - 25	26-12
 CF98	-31°F - +194°F	32.8	(10)	19.7	(6)	328	(100)	2 - 8	26-22
 CF99	-31°F - +194°F	32.8	(10)	19.7	(6)	328	(100)	2 - 8	26-22

Chainflex® cables suitable for Micro Flizz® are available from stock at igus®!

MF06 - max. cable outer diameter ø 8.0 mm, MF08 - max. cable outer diameter ø 9.5 mm



Micro Flizz® in an outdoor application with 30 m travel

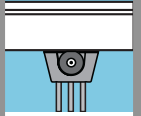
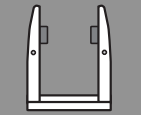
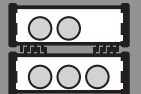


Safe energy supply under strong dust
and dirt accumulation with igus® Micro Flizz®



Micro Flizz® as "energy supplying rail guide"
for a scale to weigh chemicals, etc.

PDF: www.igus.com/e-chain-pdfs
Specs/CAD/RFQ: www.igus.com/e-chains
RoHS info: www.igus.com/RoHS



igus® Energy Chain
System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>



igus® Energy Chain
System®

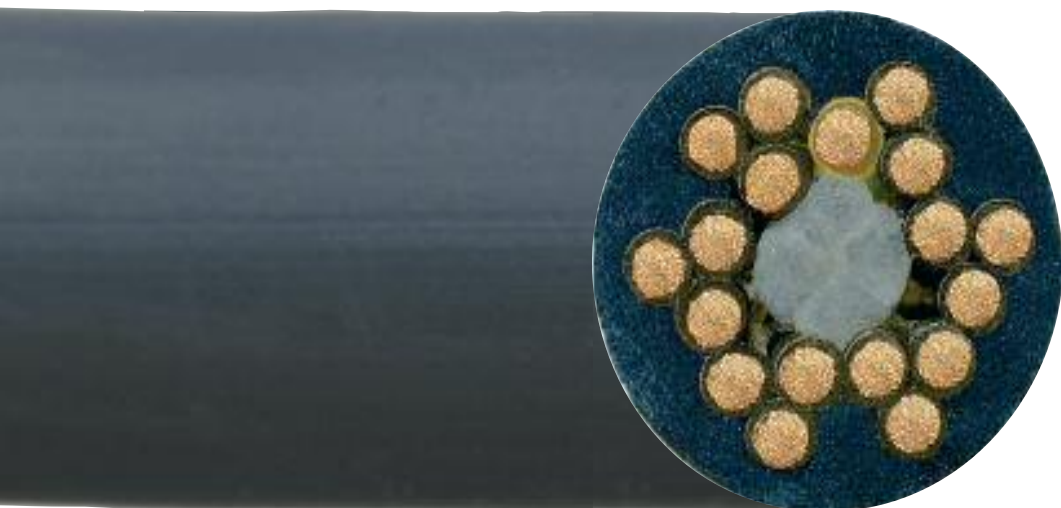
Telephone 1-800-521-2747
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Internet: <http://www.igus.com>
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igus® Energy Chain
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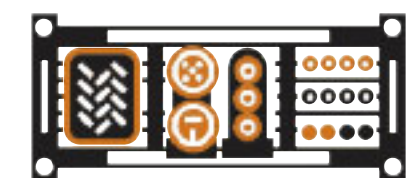
High-Flex Cables for
Energy Chains®



chordiflex®
cable works.

Chainflex® cable	Jacket	Shield	Minimum bending radius, (factor x d)		Temperature		Price index	Approvals and standards	Flame-retardant	Oil-resistant	Halogen-free	UV-resistant	Torsion resistant	v max. unsupported	v max. gliding	a max. [m/s²]	Number of conductors	AWG range	Page
			moving	fixed	moving	fixed													
CF130	PVC		7.5-10	5	+23°F to +158°F (-5°C to +70°C)	-4°F to +158°F (-20°C to +70°C)	●●●	CE UL	✓				✓	9.84 ft/s (3 m/s)	6.56 ft/s (2 m/s)	65.6 ft/s² (20 m/s²)	2 - 30	24 - 10	10.64
CF140	PVC	✓	7.5-15	5	+23°F to +158°F (-5°C to +70°C)	-4°F to +158°F (-20°C to +70°C)	●●●	CE UL	✓					9.84 ft/s (3 m/s)	6.56 ft/s (2 m/s)	65.6 ft/s² (20 m/s²)	3 - 36	24 - 14	10.66
CF130US	PVC		8	5	+23°F to +176°F (-5°C to +80°C)	-4°F to +194°F (-20°C to +90°C)	●●●	CE SF UL	✓	✓		✓	✓	9.84 ft/s (3 m/s)	6.56 ft/s (2 m/s)	65.6 ft/s² (20 m/s²)	2 - 33	20 - 10	10.68
CF140US	PVC	✓	10	7.5	+23°F to +176°F (-5°C to +80°C)	-4°F to +194°F (-20°C to +90°C)	●●●	CE SF UL	✓	✓		✓		9.84 ft/s (3 m/s)	6.56 ft/s (2 m/s)	65.6 ft/s² (20 m/s²)	2 - 33	20 - 10	10.70
CF5	PVC		6.8-7.5	4	+23°F to +158°F (-5°C to +70°C)	-4°F to +158°F (-20°C to +70°C)	●●●	CE UL	✓	✓		✓	✓	32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s² (80 m/s²)	2 - 42	24 - 14	10.72
CF6	PVC	✓	6.8-7.5	4	+23°F to +158°F (-5°C to +70°C)	-4°F to +158°F (-20°C to +70°C)	●●●	CE UL	✓	✓		✓		32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s² (80 m/s²)	2 - 36	24 - 14	10.74
CF170-D	PUR		7.5-10	5	-31°F to +176°F (-35°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	●●●	CE			✓	✓	✓	9.84 ft/s (3 m/s)	6.56 ft/s (2 m/s)	65.6 ft/s² (20 m/s²)	3 - 30	20 - 8	10.76
CF77-UL-D	PUR		6.8-7.5	4	-31°F to +176°F (-35°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	●●●	CE UL	✓	✓	✓	✓	✓	32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s² (80 m/s²)	2 - 36	24 - 12	10.78
CF78-UL	PUR	✓	6.8-7.5	4	-31°F to +176°F (-35°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	●●●	CE UL	✓	✓	✓	✓		32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s² (80 m/s²)	3 - 25	20 - 12	10.80
CF2	PUR	✓	5	4	-31°F to +176°F (-20°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	●●●	CE UL	✓	✓		✓		32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s² (80 m/s²)	3 - 48	26 - 16	10.82
CF98	TPE		4	3	-31°F to +194°F (-35°C to +90°C)	-40°F to +194°F (-40°C to +90°C)	●●●	CE UL		✓	✓	✓	✓	32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s² (100 m/s²)	2 - 8	26 - 20	10.84
CF99	TPE	✓	4	3	-31°F to +194°F (-35°C to +90°C)	-40°F to +194°F (-40°C to +90°C)	●●●	CE UL		✓	✓	✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s² (100 m/s²)	2 - 8	26 - 22	10.85
CF9	TPE		5	3	-31°F to +212°F (-35°C to +100°C)	-40°F to +212°F (-40°C to +100°C)	●●●	CE		✓	✓	✓	✓	32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s² (100 m/s²)	2 - 36	24 - 2	10.86
CF10	TPE	✓	5	3	-31°F to +212°F (-35°C to +100°C)	-40°F to +212°F (-40°C to +100°C)	●●●	CE		✓	✓	✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s² (100 m/s²)	2 - 25	26 - 12	10.88
CF9-UL	TPE		5	3	-31°F to +212°F (-35°C to +100°C)	-40°F to +212°F (-40°C to +100°C)	●●●	CE UL	✓	✓		✓	✓	32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s² (100 m/s²)	2 - 36	24 - 10	10.90
CF10-UL	TPE	✓	5	3	-31°F to +212°F (-35°C to +100°C)	-40°F to +212°F (-40°C to +100°C)	●●●	CE UL	✓	✓		✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s² (100 m/s²)	2 - 25	24 - 12	10.92

No Minimum Order!
No Cut Charges on up to 10 cuts of the same part number!


















Chain – cable – guarantee!
 Ask for fully harnessed and preassembled ReadyChains® – increase your cash-flow and profit immediately. The igus® system guarantee also covers individually delivered components.

Chainflex® cable	Jacket	Shield	Minimum bending radius, (factor x d)		Temperature		Price index	Approvals and standards	Flame-retardant	Oil-resistant	Halogen-free	UV-resistant	Torsion resistant	v max. unsupported	v max. gliding	a max. [m/s²]	Number of conductors	AWG range	Page		
			moving	fixed	moving	fixed															
Data cables																					
	CF240	PVC	✓	10-12	5	+23°F to +158°F (-5°C to +70°C)	-4°F to +158°F (-20°C to +70°C)	●●●	CE	RU		✓	✓	9.84 ft/s (3 m/s)	6.56 ft/s (2 m/s)	65.62 ft/s² (20 m/s²)	3 - 24	26 - 22	10.96		
	CF211	PVC	✓	7.5	5	+23°F to +158°F (-5°C to +70°C)	-4°F to +158°F (-20°C to +70°C)	●●●	CE	RU		✓	✓	16.41 ft/s (5 m/s)	9.84 ft/s (3 m/s)	164.0 ft/s² (50 m/s²)	2 - 28	24 - 20	10.97		
	CF112	PUR	✓	10	5	-31°F to +176°F (-35°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	●●●	CE	RU		✓	✓	✓	✓	16.41 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s² (80 m/s²)	4 - 12	24 - 20	10.98
	CF113	PUR	✓	10	5	-31°F to +176°F (-35°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	●●●	CE	RU		✓	✓	✓	✓	9.84 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s² (80 m/s²)	4 - 12	24 - 20	10.99
	CF11	TPE	✓	6.8	5	-31°F to +212°F (-35°C to +100°C)	-40°F to +212°F (-40°C to +100°C)	●●●	CE			✓	✓	✓	32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s² (100 m/s²)	4 - 36	26 - 14	10.100	
	CF12	TPE	✓	10	5	-31°F to +212°F (-35°C to +100°C)	-40°F to +212°F (-40°C to +100°C)	●●●	CE			✓	✓	✓	32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s² (100 m/s²)	4 - 28	24 - 17	10.101	
Bus cables																					
	CFBUS-PVC	PVC	✓	6.8-7.5	4	+23°F to +158°F (-5°C to +70°C)	-4°F to +158°F (-20°C to +70°C)	●●●	CE	RU		✓	✓	✓	6.56 ft/s (2 m/s)		98.43 ft/s² (30 m/s²)	2 - 8	26 - 20	10.106	
	CFBUS-PUR	PUR	✓	6.8-7.5	4	-4°F to +158°F (-20°C to +70°C)	-40°F to +158°F (-40°C to +70°C)	●●●	CE	RU		✓	✓	✓	✓	32.81 ft/s (10 m/s)		98.43 ft/s² (30 m/s²)	2 - 8	26 - 20	10.107
	CFBUS	PUR	✓	6.8-7.5	4	-31°F to +158°F (-35°C to +70°C)	-40°F to +158°F (-40°C to +70°C)	●●●	CE	RU		✓	✓	✓	32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s² (100 m/s²)	2 - 13	28 - 16	10.108	
	CF11-LC	PUR	✓	6.8 - 7.5	4	-31°F to +158°F (-35°C to +70°C)	-40°F to +158°F (-40°C to +70°C)	●●●	CE			✓	✓	✓	32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s² (100 m/s²)	2 - 9	24 - 17	10.110	
	CF11-LC-D	PUR	✓	6.8 - 7.5	4	-31°F to +158°F (-35°C to +70°C)	-40°F to +158°F (-40°C to +70°C)	●●●	CE			✓	✓	✓	32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s² (100 m/s²)	2 - 6	24 - 16	10.111	
	CF14US	PUR	✓	12.5	4	-31°F to +158°F (-35°C to +70°C)	-40°F to +158°F (-40°C to +70°C)	●●●	CE			✓	✓	✓	32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s² (100 m/s²)	8	26	10.112	
	CF14 CAT5	PUR	✓	12.5	4	-31°F to +158°F (-35°C to +70°C)	-40°F to +158°F (-40°C to +70°C)	●●●	CE			✓	✓	✓	32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s² (100 m/s²)	4 - 10	24	10.113	
Position feedback cables																					
	CF211	PVC	✓	5	3	+23°F to +158°F (-5°C to +70°C)	-4°F to +158°F (-20°C to +70°C)	●●●	CE	RU		✓	✓	16.41 ft/s (5 m/s)	9.84 ft/s (3 m/s)	164.0 ft/s² (50 m/s²)	6 - 16	26 - 17	10.114		
	CF113-D	PUR	✓	5	3	-4°F to +176°F (-20°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	●●●	CE	RU		✓	✓	✓	✓	16.41 ft/s (5 m/s)	9.84 ft/s (3 m/s)	164.0 ft/s² (50 m/s²)	4 - 17	26 - 17	10.116
	CF111-D	TPE	✓	5	3	-31°F to +212°F (-35°C to +100°C)	-40°F to +212°F (-40°C to +100°C)	●●●	CE	RU		✓	✓	✓	6.56 ft/s (2 m/s)		98.43 ft/s² (30 m/s²)	7 - 16	26 - 20	10.118	
	CF11-D	TPE	✓	5	3	-31°F to +212°F (-35°C to +100°C)	-40°F to +212°F (-40°C to +100°C)	●●●	CE			✓	✓	✓	32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s² (100 m/s²)	4 - 17	26 - 17	10.120	
Koax cables																					
	CF Koax 1	TPE		10	7.5	-31°F to +212°F (-35°C to +100°C)	-40°F to +212°F (-40°C to +100°C)	●●●	CE			✓	✓	32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	328.1 ft/s² (100 m/s²)	1 - 5	26 - 22	10.122		








Chainflex® cable	Jacket	Shield	Minimum bending radius, (factor x d)		Temperature		Price index	Approvals and standards	Flame-retardant	Oil-resistant	Halogen-free	UV-resistant	Torsion resistant	v max. unsupported	v max. gliding	a max. [m/s²]	Number of conductors	AWG range	Page
			moving	fixed	moving	fixed													
Fiber optic cables																			
	CFLG-2H	PUR	12.5	7.5	-4°F to +158°F (-20°C to +70°C)	-13°F to +158°F (-25°C to +70°C)	●●●	CE						32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	65.6 ft/s² (20 m/s²)	1	980/1000 µm	10.126
	CFLK	PUR	12.5	7.5	-4°F to +140°F (-20°C to +60°C)	-13°F to +140°F (-25°C to +60°C)	●●●	CE						32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	65.6 ft/s² (20 m/s²)	2	50 62.5/125, 200/230 µm	10.127
	CFLG-2LB	TPE	5	5	-40°F to +140°F (-40°C to +60°C)	-40°F to +140°F (-40°C to +60°C)	●●●	CE						32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	65.6 ft/s² (20 m/s²)	2	50 62.5/125	10.128
	CFLG-G	TPE	15	8.5	-40°F to +140°F (-40°C to +60°C)	-40°F to +140°F (-40°C to +60°C)	●●●	CE						32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	65.6 ft/s² (20 m/s²)	6 - 12	50 62.5/125 µm	10.129
Servo cables																			
	CF210	PVC	✓	10	5	+23°F to +158°F (-5°C to +70°C)	-4°F to +158°F (-20°C to +70°C)	●●●	CE	UL				32.81 ft/s (10 m/s)		164.0 ft/s² (50 m/s²)	4 - 8	16 - 10 Pairs 18 - 16	10.134
	CF21	PVC	✓	7.5	4	+23°F to +158°F (-5°C to +70°C)	-4°F to +158°F (-20°C to +70°C)	●●●	CE	UL				32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	65.6 ft/s² (20 m/s²)	6 - 8	18 - 2 Pairs 22 - 16	10.136
	CF270	PUR	✓	10	5	-4°F to +176°F (-20°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	●●●	CE	UL				32.81 ft/s (10 m/s)		164.0 ft/s² (50 m/s²)	4 - 8	17 - 2 Pairs 20 - 16	10.138
	CF27	PUR	✓	7.5	4	-4°F to +176°F (-20°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	●●●	CE	UL				32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s² (80 m/s²)	4 - 8	18 - 1 Pairs 22 - 16	10.140
Power cables																			
	CF30	PVC		7.5	4	+23°F to +158°F (-5°C to +70°C)	-4°F to +158°F (-20°C to +70°C)	●●●	CE	UL				32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s² (80 m/s²)	4 - 5	16 - 1	10.144
	CF31	PVC	✓	7.5	4	+23°F to +158°F (-35°C to +90°C)	-4°F to +158°F (-40°C to +70°C)	●●●	CE	UL				32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s² (80 m/s²)	4 - 5	16 - 2/0	10.145
	CF34	TPE		7.5	4	-31°F to +194°F (-35°C to +90°C)	-40°F to +194°F (-40°C to +90°C)	●●●	CE	UL				32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s² (80 m/s²)	3 - 5	16 - 1	10.146
	CF35	TPE	✓	7.5	4	-31°F to +194°F (-35°C to +90°C)	-40°F to +194°F (-40°C to +90°C)	●●●	CE	UL				32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	262.4 ft/s² (80 m/s²)	3 - 4	20 - 1	10.147
	CF300	TPE		7.5	4	-31°F to +194°F (-35°C to +90°C)	-40°F to +194°F (-40°C to +90°C)	●●●	CE	UL				32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	262.4 ft/s² (80 m/s²)	1	10 - 350	10.148
	CFPE	TPE		7.5	4	-31°F to +194°F (-35°C to +90°C)	-40°F to +194°F (-40°C to +90°C)	●●●	CE	UL				32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s² (100 m/s²)	1	16 - 2	10.149
	CF310	TPE	✓	7.5	4	-31°F to +194°F (-35°C to +90°C)	-40°F to +194°F (-40°C to +90°C)	●●●	CE	UL				32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s² (100 m/s²)	1	12 - 350	10.150
	CFCRANE	igupren		10	4	-4°F to +176°F (-20°C to +80°C)	-22°F to +176°F (-30°C to +80°C)	●●●	CE					32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	164.0 ft/s² (50 m/s²)	8	4 - 3/0	10.151

Chainflex® cable	Jacket	Shield	Minimum bending radius, (factor x d)		Temperature		Price index	Approvals and standards	Flame-retardant	Oil-resistant	Halogen-free	UV-resistant	Torsion resistant	v max. unsupported	v max. gliding	a max. [m/s ²]	Number of conductors	AWG range	Page	
			moving	fixed	moving	fixed														
Pneumatic hoses																				
	CF AIR	PU	10	8	-13°F to +176°F (-25°C to +80°C)	-40°F to +185°F (-40°C to +85°C)	●●●													
	CF CleanAIR	PE	10	8	-13°F to +140°F (-25°C to +60°C)	-22°F to +149°F (-30°C to +65°C)	●●●													
Robot cables																				
	CFROBOT9	PUR	10	4	+13°F to +176°F (-25°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	●●●	CE												
	CFROBOT8	PUR	✓	10	7.5	-4°F to +158°F (-20°C to +70°C)	-13°F to +158°F (-25°C to +70°C)	●●●	CE											
	CFROBOT4	TPE		10	4	+13°F to +176°F (-25°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	●●●	CE											
	CFROBOT5	TPE	✓	12.5	7.5	-4°F to +140°F (-20°C to +60°C)	-13°F to +140°F (-25°C to +60°C)	●●●	CE											
	CFROBOT6	PUR	✓	10	4	+13°F to +176°F (-25°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	●●●	CE											
	CFROBOT7	PUR	✓	10	4	+13°F to +176°F (-25°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	●●●	CE											
	CFROBOT	TPE		10	4	-31°F to +212°F (-35°C to +100°C)	-40°F to +212°F (-40°C to +100°C)	●●●	CE											
Special cables																				
	CFFLAT	TPE		5	4	-31°F to +194°F (-35°C to +90°C)	-40°F to +194°F (-40°C to +90°C)	●●●	CE											
	CFBRAID	TPE		7.5	4	-31°F to +158°F (-35°C to +70°C)	-40°F to +158°F (-40°C to +70°C)	●●●	CE											
	CFBRAID-C	TPE	✓	7.5	4	-31°F to +158°F (-35°C to +70°C)	-40°F to +158°F (-40°C to +70°C)	●●●	CE											
	CFTHERMO	PUR		10	7.5	-4°F to +176°F (-20°C to +80°C)	-40°F to +176°F (-40°C to +80°C)	●●●	CE											

Chainflex® ReadyCable®







	Cable type	Jacket	Page
Video- vision engineering/bus technology			
	FireWire Ready-made cable	TPE	10.174
	USB Ready-made cable	TPE	10.176
	GigE Ready-made cable	TPE	10.178
	LWL Ready-made cable	PUR	10.180
	LWL Ready-made cable (Robotics)	TPE	10.182
	Koax Ready-made cable	TPE	10.184
Network-/Ethernet-/FOC-Cables			
	CFLG.6G Gradient fibre glass cable, ready-made	TPE	10.188
	CFLG-12G Gradient fibre glass cable, ready-made	TPE	10.189
	CAT5 Ethernet cable, ready-made	TPE	10.190
	CAT5 Ethernet cable, ready-made, L-/T-angle	TPE	10.192
	CAT6 Ethernet cable, ready-made	TPE	10.195
	Profibus Field bus cable, ready-made	PVC/PUR/TPE	10.196
Industrial Automation Cordsets CF9 - CF-INI (minimum bending radius 5 x d)			
	Direct line/Connecting cable	TPE	10.204
Industrial Automation Cordsets CF10 - CF-INI (minimum bending radius 5 x d) 360° shielded			
	Direct line/Connecting cable	TPE	10.210
Industrial Automation Cordsets CF98 - CF-INI (minimum bending radius 4 x d)			
	Direct line/Connecting cable	TPE	10.212

Chainflex® ReadyCable®

	Selection table according to Motor type (Part No. and sheath materials)	Jacket	Page
Cables for Drive Technology			
	Allen Bradley	TPE	10.222
	Danaher Motion	PVC/PUR/TPE	10.224
	Fanuc	PUR/TPE	10.236
	Heidenhain	PUR/TPE	10.242
	Lenze	PVC/PUR/TPE	10.246
	Rexroth	PVC/PUR/TPE	10.260
	Siemens	PVC/PUR/TPE	10.270

"Danaher Motion" is a registered trademark of "Danaher Motion Technology LLC, Delaware" / "Fanuc" is a registered trademark of "Fanuc Ltd., Tokyo/Yamanashi" / "Heidenhain" is a registered trademark of "Dr. Johannes Heidenhain GmbH, Traunreut" / "Lenze" is a registered trademark of "Lenze GmbH & Co. KG, Ex-tertal" / "Rexroth" is a registered trademark of "Bosch Rexroth GmbH, Lohr" / "Siemens" is a registered trademark of "Siemens AG, München"

Chainflex® Strain Relief

		Page
Strain Relief		
	Chainfix steel clamps Adjustable with hexagon socket	10.290
	Tiewrap plates Bolted or clip-on	10.295
	Chainfix-tiewrap plates For Profile rail, clip-on	10.295
	Chainfix Clips Snap-on strain relief device	10.296
	Strain relief separator Separator with integrated teeth	10.297
	igus® blocks Strain relief for hoses	10.298

Chainflex® Qualification

igus® has been supplying cables for continuous movement in Energy Chains® for more than 20 years now. Chainflex® cables deliver longer service life and reliable performance.

To achieve this, all Chainflex® cables in Energy Chain® applications have to withstand demanding requirements such as small bending radii, high cycles, compact design spaces, a wide range of chemicals and dynamic parameters.

igus® carries out basic cable qualification tests according to igus® standards at its own R & D center and in its testing laboratory. These Chainflex® qualification standards include a series of tests, which determines the respective igus® "class" of the cable.

Chainflex® standard qualifications

1. Materials

Materials that are used for the production of Chainflex® cables must pass a series of endurance tests in Energy Chains®. They must also pass standard cable-specific tests such as permanent alternate bending tests, aging, abrasion, media resistance, flame resistance if appropriate etc.

These endurance tests, which can last up to three years, use Energy Chains® to house and protect the cables and include:

- **Continuous bending tests** in Energy Chains® at room temperature and with gliding and freely suspended travel distances.
- **Continuous bending tests** in Energy Chains® at low temperatures and a travel distance of 26.2 ft (8m) at temperatures as low as -40 °F depending on the material.
- **Continuous bending tests** in Energy Chains® in different liquid media with a travel distance of approximately 1.64 ft (0.5m).
- **Abrasion tests** combined with chain materials.

2. Design

These series of tests, which can last one to three years, use Energy Chains® to guide and protect the cable and include:

- **Continuous bending tests** in Energy Chains® at room temperature and with gliding and freely suspended travel distances. The radii are significantly smaller than those later defined in the catalog.
- **Continuous bending tests** in Energy Chains® with varying temperature curves between -40 °F and +140 °F – depending on design and material – with gliding travel distances and smaller radii than those defined in the catalog.
- **Continuous torsion tests** in a 3.28 ft (1m) triflex® Energy Chain® with ±180 °/m with torsion cables on the torsion test stand.
- **Continuous torsion tests** in triflex® Energy Chains® using movement programs on 6-axis robots.

3. Approvals

These series of tests are based on the standards specified by the approval authorities and are carried out according to these specifications.

4. Production optimization

Following several years of qualification for the design and materials, the production methods are broken down and defined at the machine level. This is to keep the potential production tolerance as tight as possible.

Cables are also taken systematically and continually from current production and subjected to a batch test. At igus®, the term batch test indicates the following:

- Recording and examination of the production parameters of the Chainflex® cable.
- Execution of continuous bending tests in Energy Chain® test systems over short fast travel distances.



igus® recently expanded its testing laboratory for Energy Chains® and Chainflex® cables to 11,086 square feet, with 70 different test stands.

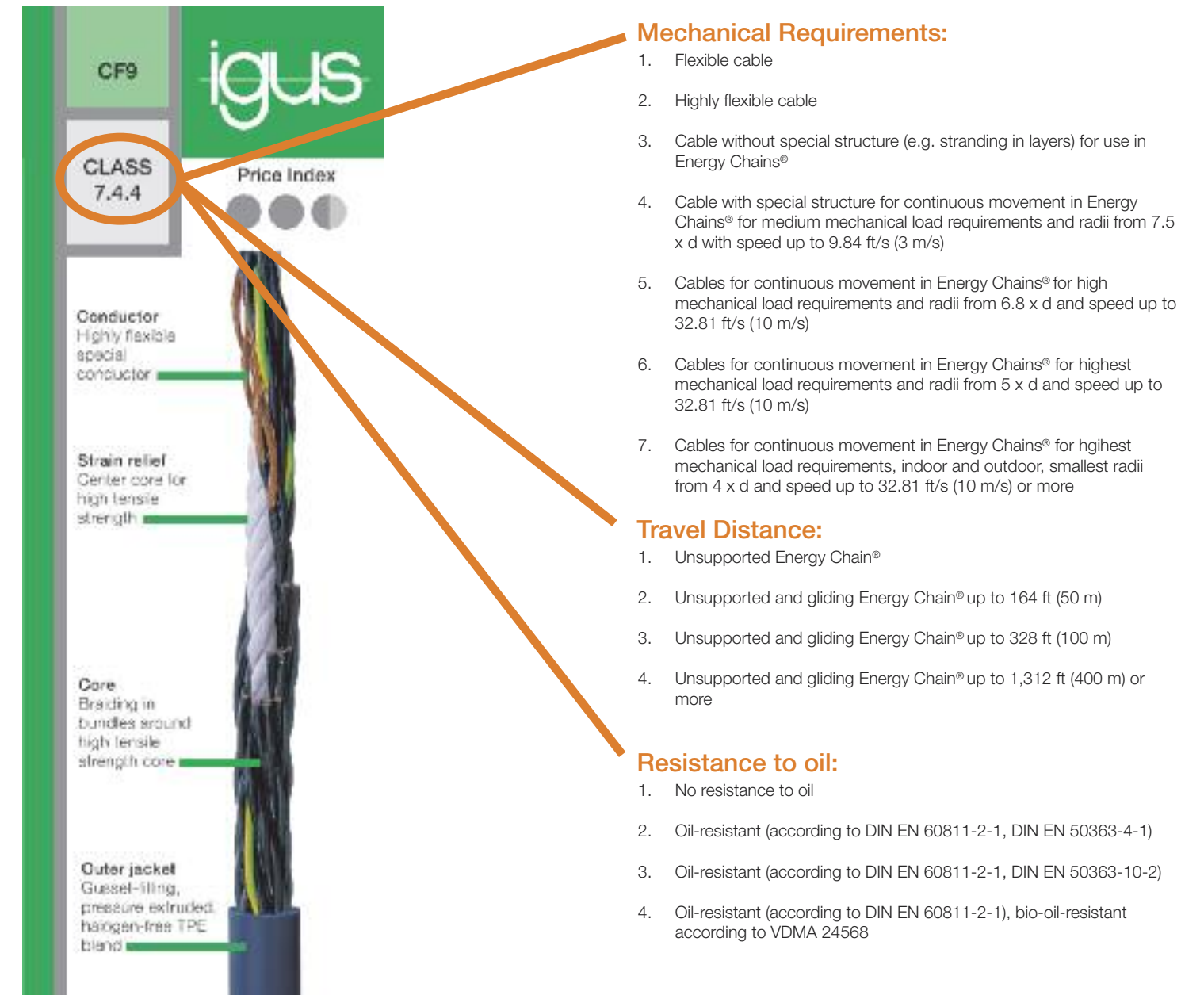
Chainflex® Classification

Based on these tests, igus® has introduced the new selection and cable qualification system "class" to make it easier for customers to select the cable they need.

This "class" system makes choosing a Chainflex® cable fast and straightforward for any application.

Cables are classified by the load they can handle, the recommended travel distance and the recommended oil/media resistance.

The higher the class, the more complex the design principles and materials used. The lower the class, the more cost-effective the cables, with the same key electric data.



The example shows a cable which is classified as 7.4.4. This means that it is a cable with the highest mechanical load requirements, is oil resistant according to VDMA 24568 and is capable of travel distance up to 1,312 ft (400 m) or more either unsupported or gliding travel.

Chainflex® Design

Page

Technical Data and Design Information

Chainflex® Design

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Chainflex® Continuous-Flex Cables Designed for Energy Chain Systems® -

Igus® has been developing Energy Chain Systems® to house and protect moving cables and hoses for more than thirty years. As an expert in the cable carrier industry, the company sought to understand why, at times, its customers flexible energy supply systems would fail or break down.

Igus® quickly realized that widespread growth of automated technology in the early 1980s had resulted in increasing loads, which guided cables couldn't support. The cables would fail and cause costly system downtime or even damage to the machine. In extreme cases, cable failure could halt production entirely.

Most standard cables aren't designed with high flexing in mind. Parameters that hold true for conductor stranding in fixed installations for example, do not apply in flexing applications. Igus® embarked on the development of its own continuous-flexing cable line, designed specifically for use in Energy Chain Systems® and has been selling Chainflex® since 1989. Chainflex® cables withstand the stress of tight bending radii in moving applications and deliver longer extended life at a lower cost. Today igus® offers an extensive line of cables, in more than 700 sizes and styles.

Igus® customers rely on their flexible energy supply systems to function properly. The company has dedicated significant resources to continuous testing and design verification of its products. More than 35 rigorous cable tests are performed in all types of conditions, including extreme temperatures, erratic and high speeds, and a multitude of debris-infested environments. The data revealed by this continuous, comprehensive testing not only provides detailed information on service life and durability, but also serves as a basis for new product development.

To ensure the installation of energy supply systems that are guaranteed to perform as expected, igus® offers customers preassembled cable carrier solutions called ReadyChain, complete with Energy Chains®, Chainflex® cables, connectors, brackets, strain relief and other accessories. Igus® provides a complete system guarantee on a ReadyChain solution after an installation review is conducted. The combination of comprehensive testing and the secure knowledge that the performance of these products is further validated by application success stories in the field, gives igus® the confidence to offer this guarantee.

proven time and time again!



Partial view of igus® experimental laboratory - testing, testing, testing of Chainflex® cables

Bundling Versus Layering: The Key to Continuous-Flexing

Cables that are constructed in layers are significantly cheaper to produce and many manufacturers offer “continuous-flexing cable” with this low-cost design. These cables are often constructed without attention to pitch length, pitch direction or center filler material and they will use fleece wraps and binders with a tube extruded jacket.

In certain short-travel applications these cables may provide sufficient support. However, in a long-travel, gliding and demanding flex application, these cables fatigue and the insulation and jacket compounds lose their tensile and elongation properties, greatly reducing lifetime. As these materials breakdown, the cable core is compromised and the torsional forces of the cabled conductors release and untwist in parts of the cable causing the corkscrew affect and cable failure. These problems are increased in cables with multiple layers (usually more than 12 conductors).

In the majority of igus Chainflex® cables the conductors are bundled rather than layered to eliminate these problems. The wires are twisted with a special pitch length and the resulting conductors are cabled into bundles. For large cross sections, this is done around a strain relief element. The conductor bundles then are cables around a tension- proof center.

The multiple bundling of the conductors, changes the inner radius and the outer radius of the bent cable several times at identical intervals. Pulling and compressing forces balance one another around the high-tensile center cord that provides the necessary inner stability. As a result, the cable core remains stable even under maximum bending stress.

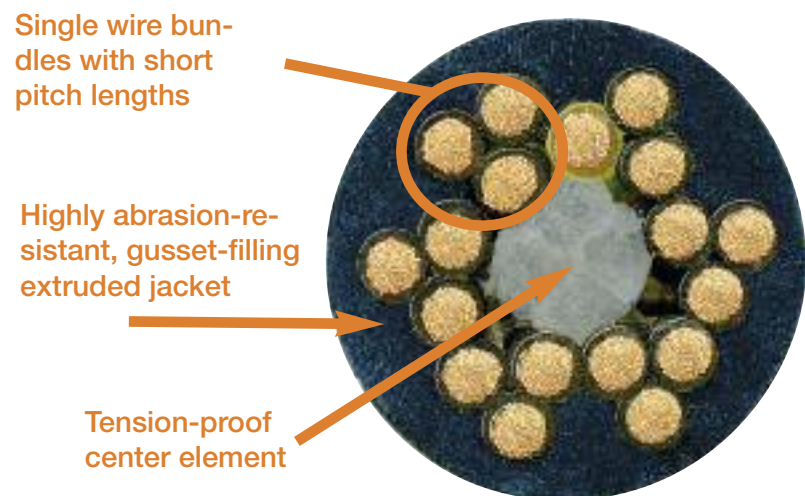


Figure 1: Wire and core structures of a Chainflex® cable

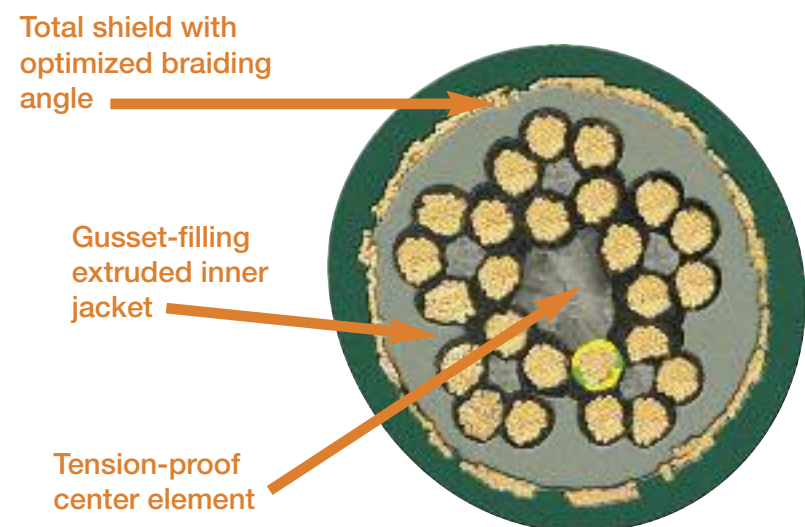


Figure 2: igus® stranding in bundles around a center cord



7 Guidelines for Continuous-Flex Cables

- 1. Strain-relieving Core**
 The center core should be filled with a high-quality, high tensile strength core to protect the twisted conductors from falling into the center.
- 2. Conductor Structure**
 The copper stranding in Chainflex® is chosen in accordance with tested and proven designs. Igus' test results indicate that a medium to fine strand diameter is preferable. Most typical flexing cable designs will employ an extra-fine conductor strand, and have a tendency to kink when subjected to high-duty cycles. As a result of long-term testing, igus® uses a combination of single-wire diameter, pitch length and pitch direction to achieve the best flex life performance in even the most demanding applications.
- 3. Core Insulation**
 Insulation materials must be adhesion-resistant to one another within the cable. The insulation must also support the stranded individual wires of the conductor. Only the highest-quality, high-pressure-extruded PVC or TPE materials should be used.
- 4. Cable Core**
 Individual conductors are bundled in groups. These bundles are cabled together in a single layer around the core. This design enables the pulling and compressing forces of the bending motion to balance and cancels torsional forces. Special attention is given to pitch length and pitch direction. Cables that are not bundled are not suitable for long-travel applications.
- 5. Inner Jacket**
 A gusset-filling extruded inner jacket should be used instead of inexpensive fleece wrap or filler to ensure that the structure is efficiently guided in longitudinal direction. The inner jacket will also maintain the integrity of the cable core and provide a continuous base for the shield.
- 6. Shield Design**
 A high-quality braided shield protects cables from external interference and shields any interference before it is transmitted to the outside environment. An optimized braid angle prevents the shield strands from breaking over the linear axis and increases torsional stability. The shield has an optical coverage of approximately 90%, providing maximum shield effectiveness.
- 7. Outer Jacket**
 The outer jacket material must be UV-resistant, abrasion-resistant and resistant to oils and chemicals, as well as cost-effective. However, it must not adhere to anything and be flexible while providing support. It should also be extruded under pressure (gusset-filled).

In order to effectively design a continuous-flexing cable, it is crucial to understand the common modes of cable failure.

Common Cable Failure Symptoms

Loss of Continuity

The copper conductors sever and break causing loss of continuity when insulated conductors are twisted with incorrect pitch length and pitch directions. The cable core cannot absorb the mechanical load caused by flexing, thereby transferring the force to the copper conductors and causing them to break under the increased tensile load.

Insulation Damage

Insulation damage occurs when the insulation integrity of the conductors is compromised. This is caused by material fatigue under constant bending stress, abrasion within the cable structure and/or conductor strand breakage which in turn perforates through the insulation.

Corkscrew

This failure is named for its highly recognizable mechanical deformation of the entire cable. The corkscrew or pigtail effect is caused when the torsional forces incurred during the cabling process are allowed to release through continuous flexing. These forces are released because the cable configuration, pitch length and pitch direction are incorrect. Cables that are constructed in layers are generally more susceptible.

Jacket Abrasion

When the outer jacket of a cable wears through to the underlying layer of conductors or shielding, it causes jacket abrasion. This mechanical failure is common when soft jacket materials are used. This problem is also caused by thin wall thickness occurring during the jacket extrusion process.

Jacket Swelling/Jacket Cracking

An outer jacket swells usually because it has been exposed to oil or a chemical that it was not designed to withstand. Jacket cracking occurs when the jacket breaks until the shield can be seen. It is an effect of excessively high or low temperatures.

Shielding Losses/EMC Problems

Increased electromagnetic interference (EMI) occurs when the shield designed to protect the cable signals from electromagnetic fields breaks and abrades due to continuous bending.

Jacket breakage of 36 conductor x 26 AWG after only 900,000 cycles with a bending factor of 7.8 x diameter

Chainflex®: proven!

igus® test database proves the superior performance of Chainflex®

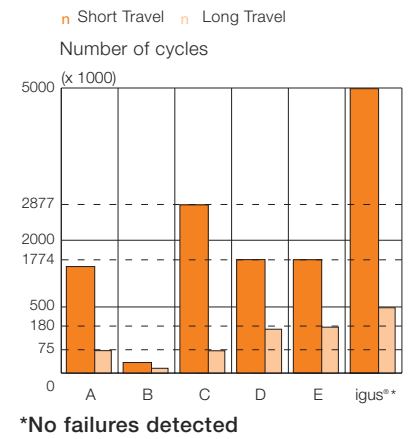
Igus® performs an array of 35 different tests to validate the design of Chainflex® cables and to ensure reliability in the field. These tests range from rolling flex and torsion tests to extreme temperature exposure and oil and fluid resistance testing. Testing laboratories in both the German and US facilities are in constant operation, creating additional information on a daily basis to add to igus' extensive flex-test database.

The majority of Chainflex® cables are tested at a bending radius 30-50% less than the bending radius listed in the catalog. Standards are set high, allowing absolutely no room for mechanical damage or loss of continuity due to broken conductors. Igus® is able to determine the electrical characteristics of a cable both before and after dynamic testing. Every type of cable is cycle tested in Energy Chains® for long and short travels before they are released. Cables are closely inspected and must pass strict requirements. Based on this testing, igus® guarantees the quality and superior performance of its Chainflex® cables.

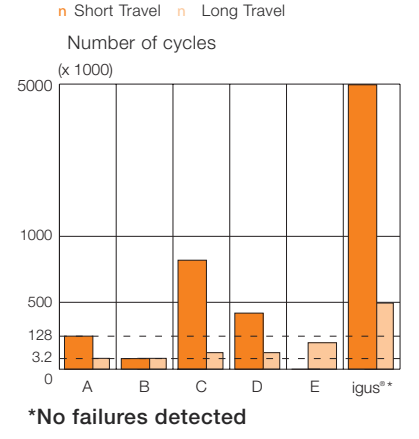
This commitment to quality is the cornerstone of igus' reputation of integrity and top-notch customer service. The igus® Chainflex® test database provides key information to assess a customer's needs. Igus® design specialists work diligently to determine the best cable, Energy Chain® or ReadyChain solution for their customers. Despite the igus® guarantee, some customers insist on performing their own tests to verify Chainflex' long flex life and performance specifications. Igus® is confident in its testing results and will furnish data upon request.

Level	Part #	Cond. # AWG	Shield	Min. Temp	Max. Temp	Tested At	Travel	Cycles
ig	CF 100 10	10	0	-40	125	100	100	100
ig	CF 100 12	12	0	-40	125	100	100	100
ig	CF 100 14	14	0	-40	125	100	100	100
ig	CF 100 16	16	0	-40	125	100	100	100
ig	CF 100 18	18	0	-40	125	100	100	100
ig	CF 100 20	20	0	-40	125	100	100	100
ig	CF 100 22	22	0	-40	125	100	100	100
ig	CF 100 24	24	0	-40	125	100	100	100
ig	CF 100 26	26	0	-40	125	100	100	100
ig	CF 100 28	28	0	-40	125	100	100	100
ig	CF 100 30	30	0	-40	125	100	100	100
ig	CF 100 32	32	0	-40	125	100	100	100
ig	CF 100 34	34	0	-40	125	100	100	100
ig	CF 100 36	36	0	-40	125	100	100	100
ig	CF 100 38	38	0	-40	125	100	100	100
ig	CF 100 40	40	0	-40	125	100	100	100
ig	CF 100 42	42	0	-40	125	100	100	100
ig	CF 100 44	44	0	-40	125	100	100	100
ig	CF 100 46	46	0	-40	125	100	100	100
ig	CF 100 48	48	0	-40	125	100	100	100
ig	CF 100 50	50	0	-40	125	100	100	100
ig	CF 100 52	52	0	-40	125	100	100	100
ig	CF 100 54	54	0	-40	125	100	100	100
ig	CF 100 56	56	0	-40	125	100	100	100
ig	CF 100 58	58	0	-40	125	100	100	100
ig	CF 100 60	60	0	-40	125	100	100	100
ig	CF 100 62	62	0	-40	125	100	100	100
ig	CF 100 64	64	0	-40	125	100	100	100
ig	CF 100 66	66	0	-40	125	100	100	100
ig	CF 100 68	68	0	-40	125	100	100	100
ig	CF 100 70	70	0	-40	125	100	100	100
ig	CF 100 72	72	0	-40	125	100	100	100
ig	CF 100 74	74	0	-40	125	100	100	100
ig	CF 100 76	76	0	-40	125	100	100	100
ig	CF 100 78	78	0	-40	125	100	100	100
ig	CF 100 80	80	0	-40	125	100	100	100
ig	CF 100 82	82	0	-40	125	100	100	100
ig	CF 100 84	84	0	-40	125	100	100	100
ig	CF 100 86	86	0	-40	125	100	100	100
ig	CF 100 88	88	0	-40	125	100	100	100
ig	CF 100 90	90	0	-40	125	100	100	100
ig	CF 100 92	92	0	-40	125	100	100	100
ig	CF 100 94	94	0	-40	125	100	100	100
ig	CF 100 96	96	0	-40	125	100	100	100
ig	CF 100 98	98	0	-40	125	100	100	100
ig	CF 100 100	100	0	-40	125	100	100	100

Testing of a Chainflex® CF5 7 x 1 mm² in "short" and "long" distances of travel compared with other cables. CF5 with 4.3 x d bending radius.

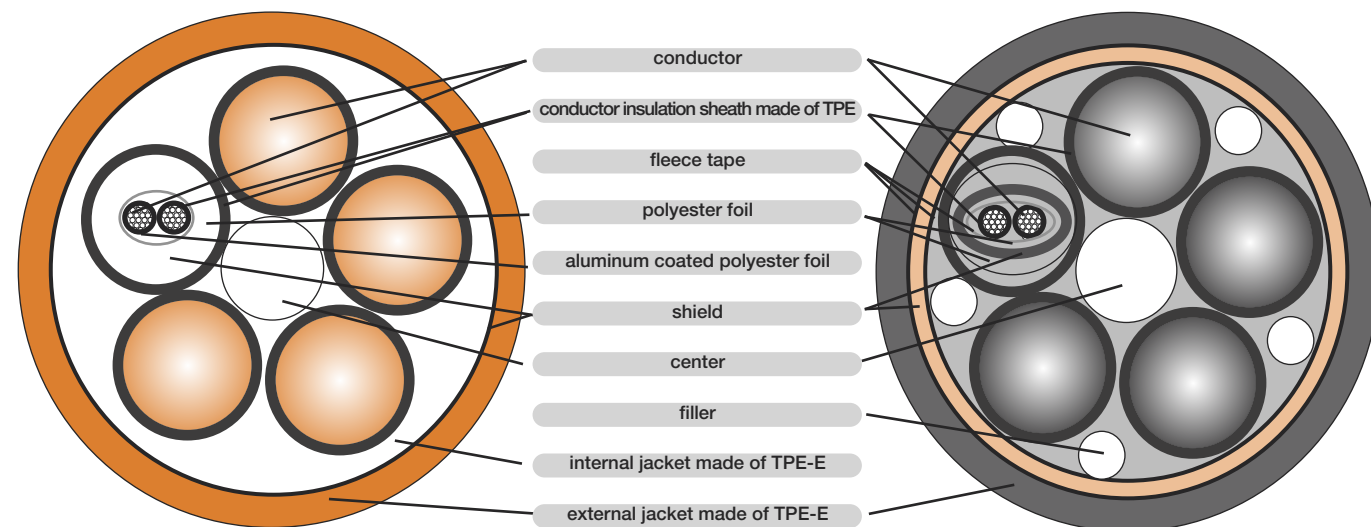


Testing of a Chainflex® CF5 25 x 1 mm² in "short" and "long" distances of travel compared with other cables. CF5 with 4.3 x d bending radius.



Test report available upon request

Servo Cable Structure: Tested!



Sample A with internal jacket
igus® Chainflex®
CF27-100-10-02-01-D

Sample B with fleece and filler
experimental production
4x10+(2x1.0) C



The purpose of the test is to determine the advantages of the more expensive internal jacket in shielded servo cables versus the less expensive fleece taping with fillers.

In the case of flexible shielded cables, the shield is usually separated from the composite core structure. On the one hand, this is done in order to achieve a rounder braid form and, on the other hand, the friction of the core insulation sheath against the braided shield structure is prevented due to the separation of the cores and the shield. This can be achieved with an internal jacket or a fleece taping which is wrapped around the composite core structure. The internal jacket is more sophisticated and is therefore more expensive to produce. Following the twisting process, the composite core structure must run through the extruder in which the external jacket is then put on. In contrast to this method, the fleece tape can be put on between the twisting point and the reeling up device during the twisting process and therefore does not require another work operation.



Comparison between the igus® solution with the gusset filling internal jacket and the fleece version with fillers

Here, the servo cables are highly flexible motor connection cables with a complete copper shield and an integrated, shielded pair of control conductors. This cable type was selected due to the fact that here the problematic case of an out-of-round braid form due to the different conductor cross sections is a significant factor and that the various bending behaviors of the production methods are therefore emphasized.

- Sample A: CF27-100-10-02-01-D (8 AWG + (18 AWG) of igus® GmbH
- Sample B: experimental production (8 AWG + (18 AWG)

Both cables are provided with identical nominal cross sections and insulation methods. Cable A is equipped with an inner jacket and cable B with a fleece taping and fillers.

The experimental production (Sample B) shows the formation of a corkscrew after only 145,000 cycles. In the case of a cable, the corkscrew refers to a wave shaped deformation like the one that can be seen in the picture of Sample B below.

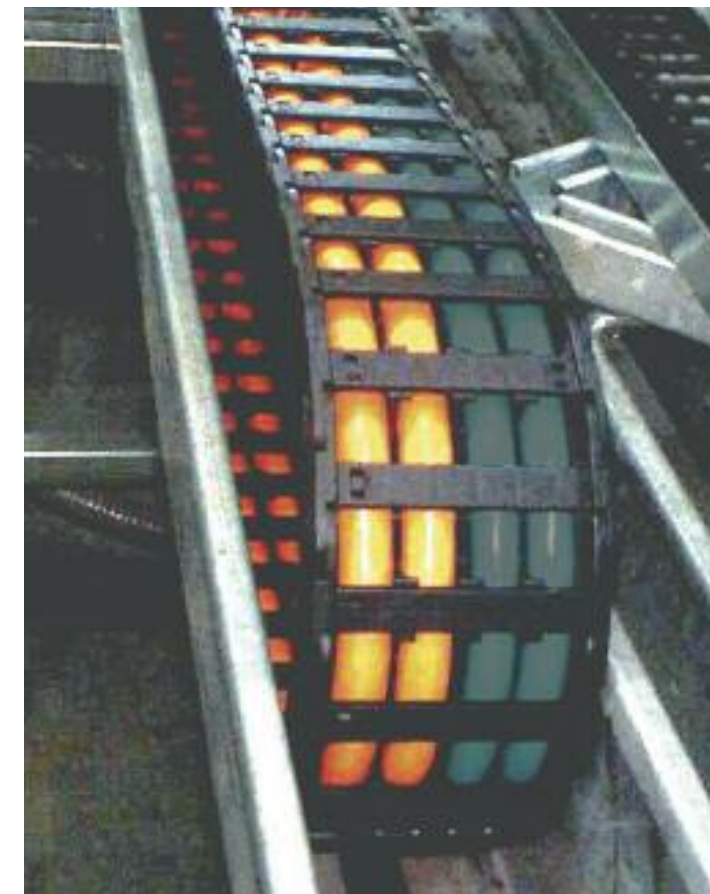
Whereas, in the case of Sample A, the internal jacket fills up the gussets and a round braid structure is created. As a result, Sample B requires fillers in the gussets. Like the core, the fillers also consist of fibrated polyethylene. They are easy to compress and are therefore hardly capable of taking over any supporting effects. Whereas the internal jacket, which is made of TPE, and the Sample A center, which consists of cordage, hold the conductors in a defined position, the conductors of Sample B are able to move about uncontrolled. During the bending process, a conductor has detached itself from the composite braid structure and has been shifted in the inner bending radius with respect to the jacket. This results in corkscrew-type deformations that repeat themselves periodically with the pitch length.



Sample A: CF27-100-10-02-01-D, 5,000,000 cycles, no failure



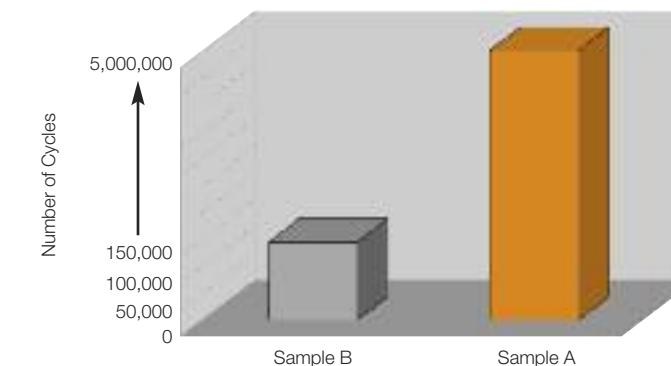
Sample B: experimental production, 145,000 cycles, failed



Assessment

Despite the extremely low bending factor of 4.76, no signs of wear can be detected in Sample A (CF27-100-10-02-01-D) even after 5 million cycles. Sample B, on the other hand, with its fillers and fleece taping succumbs to a corkscrew formation after only 145,000 cycles. Accordingly, the result therefore justifies the extra expenditure of the cable with the gusset-filling internal jacket.

For more information on CF27 see Servo Cable section



Chainflex®: proven!

Technical Data Properties

CAT5: tested!

Alteration of the electrical transmission properties of a CAT5 cable when subjected to an application of stress with the minimum bending radius

High transmission rates of up to 100 Mbit/s place high demands on the cable structure and composite materials.

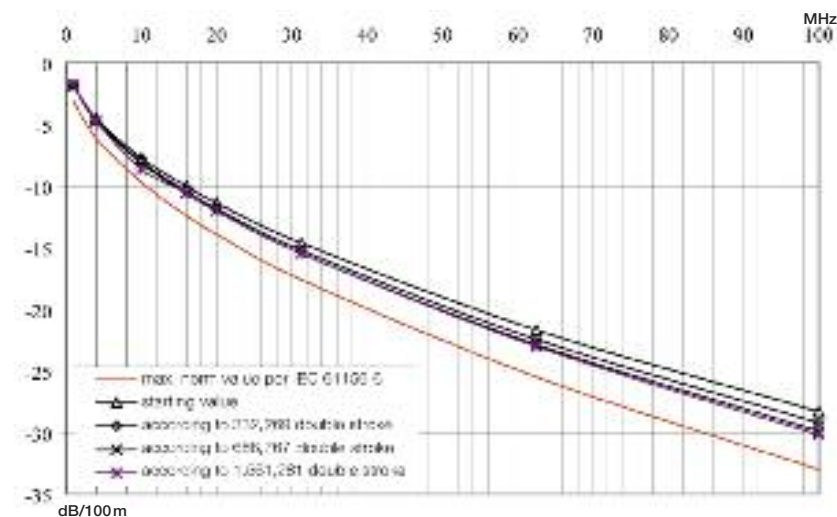
Running a cable inside a cable carrier subjects these materials to additional mechanical stress and results in long-lasting changes to the cable's electrical properties.

A test was conducted on a Chainflex® CAT5 cable to determine whether - even when subjected to high stress at its minimum bending radius - the cable continued to meet the electrical requirements of cabling standard IEC 61156-6.

A CF14-02-04-02-CAT5 cable was selected, which has four pairs of stranded cores with a nominal cross section of 0.01 mm² per pair. The conductor consists of bare copper wires and is surrounded by an insulation sheath consisting of foamed PE.

The following items were assessed:

- Characteristic wave impedance of single pairs
- Single-pair attenuation
- Return loss of single pairs
- Near-end crosstalk attenuation of single pairs versus one another



Attenuation

The maximum values of the individual attenuation for each pair of cores are specified for the corresponding nominal characteristic wave impedance in dB/100m in the DIN IEC 61156-6 standard. Accordingly, the cables are subdivided into several categories according to transmission frequency planned to be used. For the cable being inspected, transmission of up to 100 MHz are planned to be used, which corresponds to the category 5e.

Test result

The attenuation, as a measure of the reduction of the transmitted electrical energy of a signal on the cable, remains, even after more than 1.5 million cycles, below the specified limit value while being subjected to the application of stress of the minimum bending radius. The characteristic electrical transmission quantities such as characteristic wave impedance, return loss and near-end crosstalk are fulfilled so that, despite applications of high mechanical stress, the electrical values of the IEC standard are compiled with for a cable of category 5.



For more information on CF14US and CF14, see Data Cable section

Chainflex®: proven!

Dispersion and attenuation: tested!

Plastic fiber-optic cables in Energy Chains®

Plastic fiber-optic cables have been introduced for data transmission in industrial applications due to their excellent interference-proof properties against electro-magnetic fields and further advantages such as the possibility of reducing dimensions and weights. The application as flexible link lines particularly in energy supply chains place high demands on plastic fiber-optic cable are dispersion and attenuation.

Dispersion is the term used to describe the scattering of the travel time of the signal in the fiber-optic cable. In plastic fiber-optic cables this is essentially caused by the mode dispersion, which arises from the different travel times of individual light beams. Dispersion determines important transmission properties such as bandwidth, cut-off frequency or maximum bit rate. Significant changes in dispersion could not be ascertained in any of the investigations carried out.

The industrial application of igus Chainflex® lines with plastic fiber-optic cables in supply chains for example is therefore unproblematic with regard to changes in dispersion.

The second important characteristic property, attenuation, determines the maximum possible length of a transmission path.

The attenuation of a plastic fiber, like that of the glass fiber, is also strongly dependent on the wavelength of the light used. For this reason all the investigations were carried out with a wavelength of 666nm.

Depending on the output of the transmitter and the sensitivity of the receiver the operator has a certain "attenuation budget" available for the complete transmission path including all junction and transition regions. This attenuation budget (typical value approx. 20dB) must not be exceeded if a secure transmission of the data is to be guaranteed.

For this reason it is of great interest to the user to know whether and to what extent increases in attenuation are to be expected for his particular application so that these can be taken into account in the compilation of his own attenuation budget.

In addition to continuous bending stress, which is typical for operation in an Energy Chain®, further mechanical stresses that can occur during installation or operation must be taken into account. Thus, for example relatively large tensile forces can occur when integrating the line into an Energy Chain®. The fixing of the lines at the ends of the Energy Chain® using cable clamps leads to permanent transverse loads.

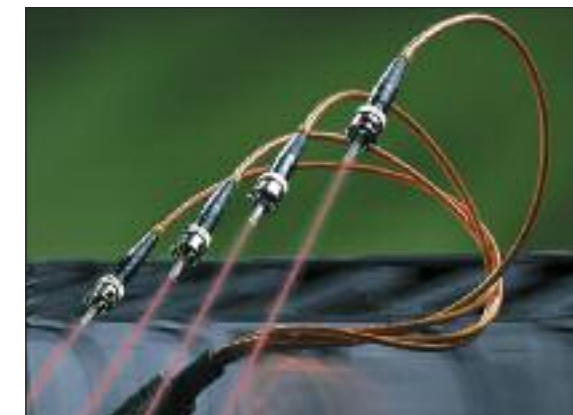
The test of the behavior under transverse load is carried out following DIN VDE 0472, Part 223. Since the cable clamps only exercise pressure in an area covering a few centimeters, increases in attenuation are relatively low.

Attenuation under tensile loads depends to a great extent of course on the composition of the line. Lines with integrated copper conductors or strain relief elements do not reveal a noticeable increase in attenuation until very much greater tensile forces are applied than is the case with pure fiber-optic cables.

Figure 1 represents test results for a Chainflex® line with 6 fiber-optic cables. The length of the test sample is 1m and the maximum tensile load is 250 N.

The tensile forces required to integrate fiber-optic cables in Energy Chains® are usually much lower than 250 N. The increase in attenuation was 0.17dB at maximum tensile force and disappeared completely after the tensile load was released. Thus no effect on attenuation should be expected.

In the case of plastic fiber-optic cables that are bent very often, as is the case in applications with Energy Chains®, then further influencing



factors such as material fatigue, dulling of the materials, micro-cracks right through to complete fiber fracture must be feared, and their influence on attenuation can only be investigated in extensive practical tests such as those carried out by igus®.

The excellent test results, shown in part here, of the Chainflex® lines must not be taken for granted, as investigations of fiber-optic cables from other manufacturers showed, some of which even failed with complete breaks in the fibers.

The investigations revealed that Chainflex® fiber-optic cables are not influenced in their function by mechanical loads such as tensile, transverse or bending stresses in Energy Chains®. Therefore they are perfectly suitable for use in the sometimes rough industrial environments for the interference-proof transfer of information between drive and control elements of machines.

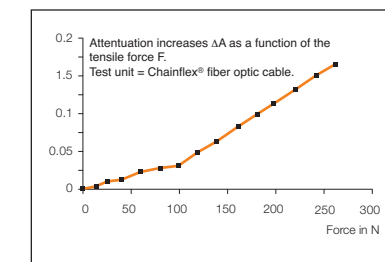


Figure 1: Course of the increase in attenuation as a function of the tensile forces

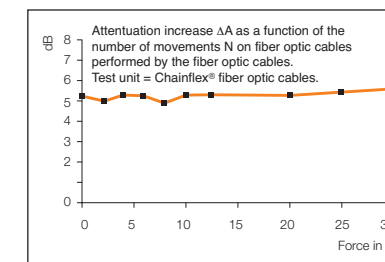


Figure 2: Course of the increase in attenuation as a function of the number of cycles

For more information on CFLK see the Fiber Optic Cable section

Millions of Cycles in an Energy Chain: tested!

Profibus cables in constantly moving industrial use

For cable users, it's difficult to gain a clear overview of the cable market. Competition between suppliers is intensifying and manufacturers are continually outdoing each other with promises such as "guaranteed service life for cables used in a cable carrier." Some suppliers even go so far as to claim in their catalogs and product literature, the ability to sustain anywhere from 10 to 50 million cycles with cables used in moving applications.

A close examination of those purported figures begs the question, how was the testing done? Or, just how true-to-life, in regards to length of travel, test radii, etc., really are these tests to be able to provide such a guarantee? Even information stating that cables are tested in accordance with VDE (Association of German electrical engineers) 0472, Part 603, test method H, is irrelevant when it comes to determining the service life of a cable in an Energy Chain®, since the roller testing stand cannot provide any conclusive results and there is no VDE test for special cables in Energy Chains®.

Differences in service life



In 2002, a test was created in igus' laboratory to determine the service life of Profibus cables in real-world applications. The aim was to examine any differences between the service life of an igus Chainflex CFBUS-001 cable and other market leading Profibus cable (test item A). The parameters of the test were selected based on data collected from the competitor's catalog.

Since Profibus cables are normally used in long lengths of travel and long transmission distances due to their data integrity, a gliding application was chosen as a suitable test structure.

Details	Test Item "A" competitor profibus	Test Item "B" Chainflex® CFBUS-001
Cross Section	(2 x AWG24)C	(2 x 0.25 mm²)C
Recommended Bend Radius	≥ 60 mm	85 mm
Cable Diameter	8.0 mm	8.5 mm

In order to carry out non-destructive testing, while at the same time achieving a large number of bending cycles in a short time, a genuine Profibus transmission path was constructed. A PC configured as a Profibus master was installed at the fixed end of the test carrier and on the moving end was a connection to a Profibus slave. With the help of diagnosis programming, the transmission rate could be determined and any data transmitted incorrectly could be indicated. The transmission was set at 12 megabits/s.

This test started in 2002 and still runs today. The results show that after a relatively low number of cycles (420,000), test item A resulted in total failure. According to competitor's catalog, however, item A should have functioned safely for at least 4.0 million cycles. The actual service life achieved compared to that indicated in the catalog deviates by a factor of ten. CFBUS-001, however, is still undergoing testing without any faulty data transmissions. So far, the cable has carried out more than 14.0 million cycles.

Structure and materials

The reason for the major differences in the service life is that the CFBUS-001 cable is constructed with special attention to key design factors and specially selected materials that are conducive to continuous flexing. In contrast, test specimen A is constructed with attention to electrical performance only, making its design easily compromised by continuous movement.

The conductor insulation of both cables is comprised of a foam material. Foam insulation is needed to achieve better transmission rates. However, the foam material is weakened under stress. The test proved, in order to alleviate the mechanical stress of the conductor insulation, the inner jacketing of the igus cable helps to absorb the forces that affect the bus pair.

Test Parameters

Distance of travel:

S = 16.41 ft (5m)

Speed, approx.:

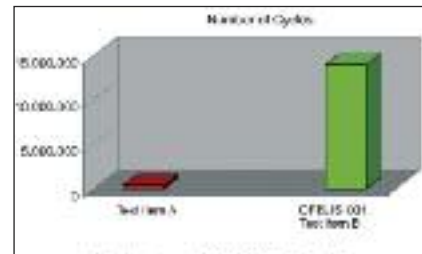
V = 11.48 ft/s (3.5 m/s)

Acceleration, approx.:

a = 24.61 ft/s (7.5 m/s)

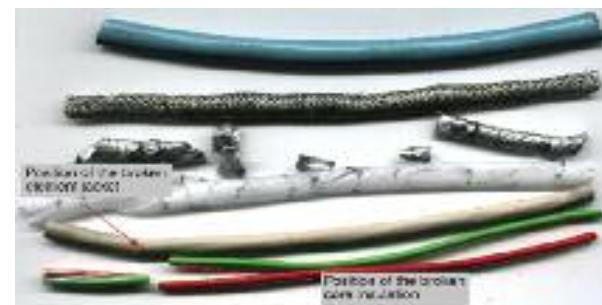
Radius, approx.:

2.16" (55 mm)



Highly elastic inner jacketing

The CFBUS-001 cable was equipped with a mechanically superior, extruded TPE inner jacket. The inner jacket protects the bus pair against mechanical influences in bending applications and controls the movement of the conductors as the cable is flexed. The inner jacket must be highly elastic in order to function properly. If it does not possess a highly elastic property or is made of inexpensive filling material, it will only succeed in making the cable round. It is not able to protect the insulated conductors from the high degree of mechanical stress present in the cable carrier. Figure 3 illustrates this affect in that the inner jacketing is cracked in the same position as the broken insulation.



For more information on CFBUS see Data Cable section

CF98 with bend radius of 4x cable diameter: tested!

Users of Energy Chains® with small bending radii are often unable to find a suitable cable for applications that demand a high number of cycles. At bending radii of less than 5x cable diameter, copper quickly reaches its physical limits. As a result, a search for alternative conductor materials was necessary.

A series of tests on a variety of conductor materials was performed in order to better understand how to manufacture a cable that can withstand flexing several times in an Energy Chain®, even at a bend radius less than 4x the cable diameter.

Test 1: Selecting the correct conductor material and conductor construction

For different cables were designed and tested. The test items vary in conductor material and/or construction. Refer to table for results:

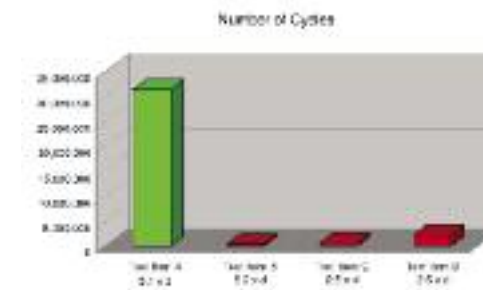
Test Item A: Alloy conductor similar to CF98

Test Item B: Copper conductor similar to CF9

Test Item C: Copper conductor with braided construction

Test Item D: Copper conductor with concentric stranding

	Number of Cycles	Cross Section	d (mm)	Test Radius
Test item A	31,000,000	7 x 0.20	5.8	3.1 x d=18
Test item B	450,000	7 x 0.20	5.6	3.2 x d=18
Test item C	638,000	7 x 0.25	7.3	2.5 x d=18
Test item D	2,350,000	7 x 0.25	7.3	2.5 x d=18



Test 2: Material comparison Copper vs. Alloy

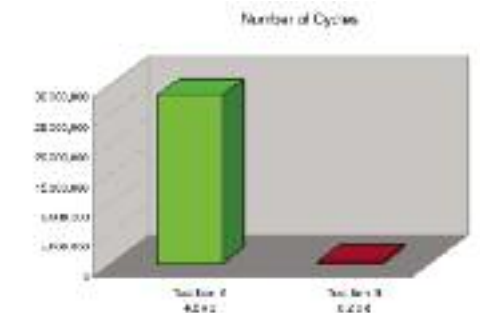
Two cable designs were tested, and varying core numbers and cross sections were selected in comparison to test 1:

Test Item A: Conductor with special conductor alloy

Test Item B: Conductor in copper

Test item A was manufactured identically to test item B, except for the conductor material. Results showed that after 28 million cycles, test item A did not experience any detectable wire breakage, while test item B only achieved approximately 1.4 million cycles before the conductor was completely destroyed. The test also demonstrated that in item A, the alloy concept surpasses the life of the copper conductor by more than 19 times and delivers a superior performance in critical area of small cross sections.

	Number of Cycles	Cross Section	d (mm)	Test Radius
Test item A	28,267,000	2 x 0.14	3.9	4.6 x d=18
Test item B	1,450,000	2 x 0.14	2.9	6.2 x d=18



For more information on CF98 see Control Cable section

Chainflex®: proven!

Fast images in industrial applications: tested!

USB and FireWire

The rising resolution and sampling rates of modern digital visual display systems are also inevitably accompanied by the rapid increase in the data quantities to be transmitted.

Fast bus systems which find applications for similar data quantities available in the consumer sector were taken from the industry particularly for this purpose. Here the typical representatives are bus systems such as FireWire (1394a and 1394b), USB (2.0), as well as Gigabit Ethernet or CameraLink.

All these bus systems need special cables, which are offered in the consumer sector by numerous manufacturers at low prices. Many of these frequently preassembled cables are developed and manufactured only for static installation or minimum mechanical stressing.

If these standard industry cables are used in dynamic applications then costly downtimes occur. Mechanical failures include wire breakage or short circuits of the conductors. More importantly is the data errors that gradually increase through alteration of the capacitive features with a reduction of the possible transmission rates and increased attenuation. A genuine troubleshooting in bus cables is possible only with very expensive equipment and lots of time. Depending on the position of the damage, the errors may also occur only sporadically during operation and cannot be found once the facility stops.

The good experiences in thousands of applications with classic field bus systems, e.g. Profibus, Interbus, DeviceNet, Ethernet etc., and the desire of many customers for comparable cables led igus® to develop cables to support the following:
CFBUS-055 for FireWire 1394a
CFBUS-065 and CFBUS-066 USB 2.0
CFLG-2HG-MF. Fiber optic cable series for bus-independent, long transmission stretches

The main focus in the development was on mechanically stable cable designs in order to grant the capacitive, inductive and optical features over a high number of cycles. Long service life of cables is a result of material selection and special manufacturing processes.

In the industrial environment, it is not only the electrical and mechanical features that play a role, but also the resistance to a great variety of media such as oils, coolants and chemicals. The Chainflex® TPE jacket material has already proved its durability in many thousands of applications in other igus® cables.

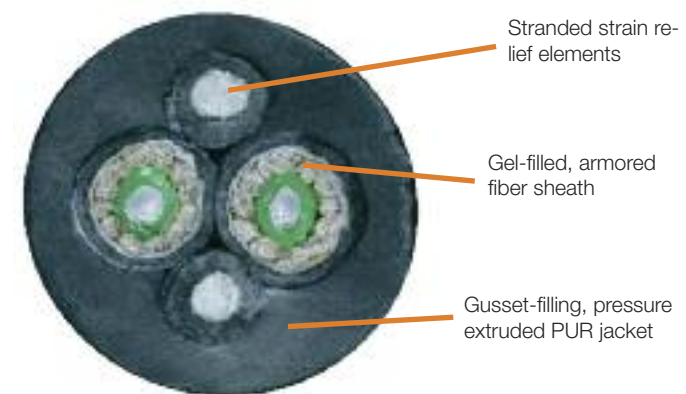
igus developed a test to provide "live" environment true to the machine vision applications

Several industrial cameras traversed on a fast linear motor at a speed of 2 m/s, an acceleration of 5 m/s² and a travel of 600 mm, while the bus cables moved continuously in the used Energy Chain® Systems.



All cables are subject to ample tests in the igus® laboratory; as there is no existing conclusive test procedure, the igus® engineers chose a very pragmatic method.

Several industrial cameras traversed on a fast linear motor at a speed of 2 m/s, an acceleration of 5 m/s² and a travel of 600 mm, while the bus cables moved continuously in the used Energy Chain® Systems.



Cross section "Chainflex" fiber optic cable from igus®.

For more information on CFBUS see Data Cable section

Test rig:
10 m CFBUS-055 FireWire (1394a)

tested in an Energy Chain® of the B10-015-125 series with over 6 million movements with a FireWire 1394a camera.
10 m CFBUS-066 (USB 2.0)

tested in an Energy Chain® of the B10-015-100 series with over 3.5 million movements with a USB 2.0 camera.
10 m CFLG-2HG-MF-50/125

tested in an Energy Chain® of the B10-015-075 series with over 3 million movements with a FireWire 1394b camera with optical output.

Despite the long cable lengths, particularly in USB and FireWire, no adverse effects on the picture quality could be determined even according to this stroke rate. This non-scientific, but practice-oriented test distinctly proves the industrial capability of these high-speed bus cables. This test is not complete and is continuing.

Chainflex®: proven!

Light in the cold: tested!



In the safe transmission of large amounts of data in bus systems at high speeds over long distances, the igus® gradient fiber glass cable of the type CFLG-G has already become a standard in numerous applications in cranes. Insensitivity to electro-magnetic load and resistance to hard environmental influences enable the application together with energy supply cables in very



What happens in crane facilities in regions with extremely low temperatures? Does the maximum possible cable length of several hundred meters reduce through increase in damping at low temperatures, or does the cable break in extreme applications, for example at -40°F (-40° C)?

The sensitive glass fibers are conducted in a gel-filled hollow space. How does the gel behave in highly dynamic conditions and what happens in restarts after long downtimes? As no precise statement about this topic could be found in relevant technical journals, and as little was known particularly about the thermal features of the gel, igus®, as part of its philosophy, undertook own tests to determine the reliable specifications for applications in Energy Chain Systems®.

For this task, the igus® test laboratory was equipped with a freezer that can generate constant temperatures of -40°F (-40° C) and a test facility was mounted for long travels up to 22.97 ft (7 m) for a speed of 5.25 ft/s (1.6 m/s) and an acceleration up to 19.69 ft/s² (6 m/s²).

The igus® gradient fiber glass cable CFLG-6G was tested. 50/125.TC. The cable was tested with a length of about 49.2 ft (15 m) as loop in an igus® Energy Chain Systems® 3500-125-200-0 with a radius of 7.87 in. (200 mm) long travels.

Varied and extreme temperature curves thereby served for the simulation of environmental influences, particularly when the temperature plunged during downtimes from plus degrees to -40°F (-40° C) in the shortest time and the motion was restarted afterward.

Under these application conditions, the dampening of the cable also should not rise above 3 dB at (850 nm) wave length. The maximum dampening occurs after a million double strokes, which correspond to an operational performance of about (7000 km), still distinctly under 3dB.

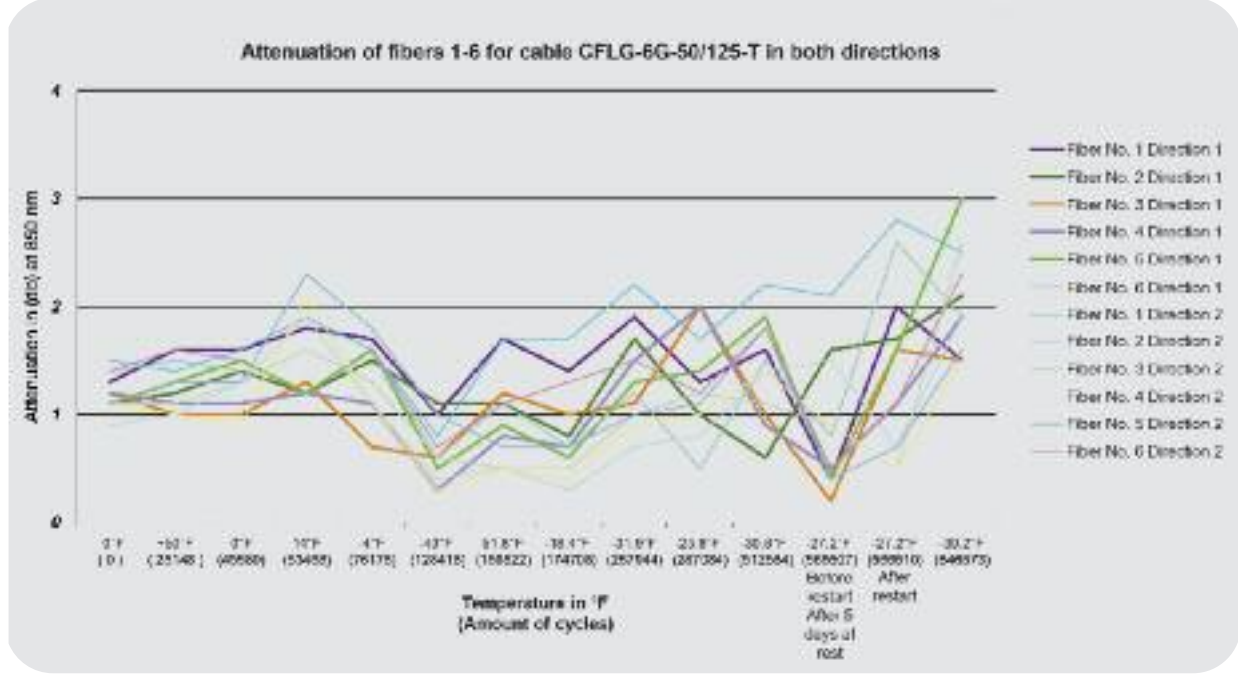
The measurements highlighted in the diagram reveal that marked variations in temperature combined with the constant movement in the Energy Chain® have only minor effects on the dampening of the CFLG-6G. The noticeable high initial dampening is attributed to the plugs used and reflects the reality here as well, as in practice 90% of cables used in automation are pluggable fiber optic cables.

The test with the igus® cable makes it quite clear that only realistic and absolutely very expensive tests can fetch clarity about the service life of cables.



The test with the igus® cable makes it quite clear that only realistic and absolutely very expensive tests can fetch clarity about the service life of cables.

For more information on CFLG-G see Fiber Optic Cable section



Chainflex®: proven!

CF ROBOT Torsion Cables: tested!

CFROBOT-Special cables deliver long life in robotic applications

Shielded cables in torsion applications often fail prematurely. igus® offers CFROBOT: a torsion-resistant, shielded, single-core cable. Tested at its lab and results yield more than 3-million torsion cycles at $\pm 270^\circ$. On request, the igus® ReadyChain® factory assembles Triflex® systems complete with CFROBOT robotic cables, hoses, plugs and couplings which are ready to install. The igus® laboratory continuously tests CFROBOT control cables and shielded data cables to guarantee high durability and safe operation.



For more information on
CFROBOT see Robot Cable
section

CF ROBOT was tested at the igus® laboratory on a specially developed torsion test stand. The torsion angle tested was $\pm 270^\circ$ for a total cable length of about (2.5 m) (tested in different versions of the Triflex® R).

Cables tested:

- 3 CF ROBOT-037 cables
- 3 lengths of cable CF310-250-01-UL
- 3 lengths of cable CF310-250-01



igus® test lab: The cables were tested in movements of $\pm 270^\circ$.



Samples of the cable were cut and analyzed at sections along the tested cables length. In the image above damage of the overall shield are noticeable.



Test samples of CFROBOT-037 were taken at 250,000, 1.5 million and 3 million movements. The CFROBOT-037 cables has no sign of damage even after 3 million torsional movements of $\pm 270^\circ$.



Detailed analysis of the tested CFROBOT cable show no damage. See picture above.

Chainflex®: proven!

Service Life Comparison: tested!

igus® performs testing at its in-house laboratory on its new and existing lines of cable. igus® performs batch testing where cable manufacturing lots are tested to reveal any defects. These tests are short term and are done at a higher frequency.

igus® also performs service-life testing. These tests are set up to run for years to help determine how long a cable will last.

The test in this example was cable CF21 and CF27. These two families are the same except for the overall jacket material. These cables were installed in a long-travel gliding Energy Chain®. The bend radius was four inches. The travel distance was 26 feet. The acceleration was 20 ft/s². We purposely installed the cables with no clearance, rubbing against other cables.



CF21.UL: overall stranding including the outer jacket without damage



CF27.D: overall stranding including the outer jacket without damage



CF21.40.10.02.01.UL: after more than five million cycles, no shield wire breakages



CF27-40-10-02-01-D: after more than five million cycles, no shield wire breakages



Actual test picture: Chainflex® cables were intentionally installed close together without adequate clearance to test their performance in a harsh application.

The test items, CF21-40-10-02-01-UL (4x4 mm² + 2x1,0 mm²), and CF27-40-10-02-01-D (4x4 mm² + 2x1,0 mm²), were tested in continuous operation in a real cable carrier system. Cables were continuously monitored during the test.

Result:

After more than five million cycles, the cables were dissected and inspected. No damage to the conductor stranding and/or insulation was found. Only typical outer jacket abrasion occurred. This type of wear is considered normal for a cable in the field for five million cycles.

Summary:

The test proved that Chainflex®, with gusset-filled extruded inner jacket and pressure-extruded outer jacket, deliver a long service life and offer advantages versus the common "flexible" cables with low quality flex performance.

For more information on CF21 and CF27 see Servo Cable section

Container crane at 164 ft travel distance: field tested!

In the crane engineering industry, it is important that an energy supply system be flexible and space-saving. It is also important that the system is equipped with the proper cables. The system must be reliable.

In the Chainflex® laboratory, igus® cables undergo constant testing which is used to gather important information about service life. However, the best measure of a cables service life is in the field. igus® has had the opportunity to inspect cables that have been in service on demanding crane applications. This type of cable analysis has enabled igus® to more accurately predict and determine the life of its cables.

Current inspection

Chainflex® cable CF9-60-05 had been used in container cranes for many years. This crane uses an Energy Chain System® with approximately 164 ft of travel. The customer requested igus® inspect their Energy Chain System® after 500,000 cycles. This was done to help determine a maintenance schedule for the customer.

The CF9-60-05 10AWG 5 conductor cables used in this system were removed and inspected. The goal of this inspection was to find any indication of potential cable failure. The inspection was performed with the following criteria:

1. Check outer jacket wear and abrasion and/or other damage
2. Check cable core and conductor insulation for damage
3. Check for any broken conductor strands



The Energy Chain System® houses and protects numerous igus® Chainflex® cables, e.g. the CF9-60-05

Inspection criteria 1: Jacket abrasion

Only trace findings of abrasion were present on the cable's TPE jacket. The test proved the cable would not fail as a result of jacket abrasion.



An igus® energy supply system with an approx. length of 82 ft in a stainless steel trough with middle band support.

Inspection criteria 2: Cable core and conductor insulation

The cable core and conductor insulation had no signs of abrasion or deformation. This is due to the high-pressure, gusset extruded overall jacket that fills all the space between the conductors. A high voltage test was also performed and found no insulation degradation.



The individual elements of the CF9 from the cable piece dissected for the test setup.

Inspection criteria 3: Conductor stranding

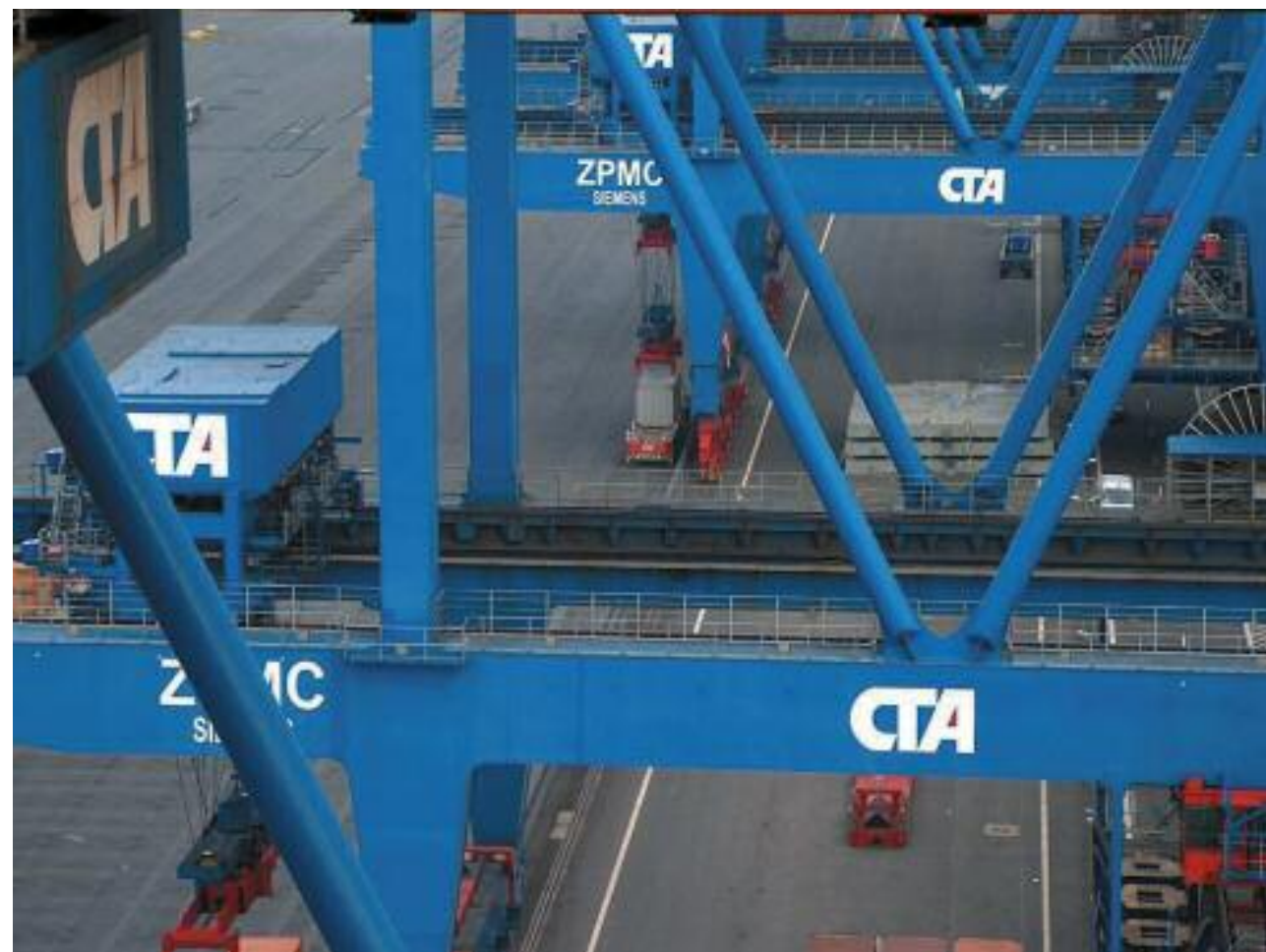
The conductor stranding was examined at the point in the cable length that is subjected to the most mechanical stress. No broken conductors were found.



A close-up of the completely intact copper conductor. The inspection performed over the entire length shows that the conductor is still completely intact and does not have any individual wire breakages.

In summary, the valuable data collected from this inspection and other similar inspections has not only proven the Chainflex® design but also enables igus® to determine reliability with confidence.

For more information on CF9 see Control Cable section



An igus® energy supply system with a total travel length of approximately 85 ft

Comparison of jacketing materials in different oils: tested!

For years, igus® has been performing specially-designed tests for its customers. This enables igus® to obtain more useful results than cannot be gathered from standard tests alone. With regards to oil resistance, igus® set out to construct a test that would best duplicate oil exposure in various applications.

Standard oil-resistance testing link DIN EN 60811-2-1 and IEC 60811-1-1, involves exposing cables to oil for a certain time, at a certain temperature. However, these tests are only acceptable for static non-moving cables. igus® set out to construct a test that test continuous-flex cables. The igus® oil-resistance test involves cables installed on an Energy Chain®. The carrier continuously moves in and out of specific types of oil. This exposes the cable to oil and air continuously, just as in a real application.

Test criteria included measuring tensile strength and elongation percentage before and after exposure. This type of testing gives igus® the ability to advise customers as to the correct cable for their application. This also provides customers with a proper estimation of cable service life.



The actual test stand located in the igus® test lab



Test samples of cable jackets cracking with exposure to oils

Torsion-resistant up to $\pm 180^\circ$, take two: tested!

The "torsion-resistant" requirement for cables are difficult to define. How does igus® make a statement like, "This cable is torsion-resistant up to $\pm 180^\circ$!" This makes it important to be able to deliver comparable and meaningful test results.

In order to satisfy this requirement, the "Torsion Test Standard" was developed by to igus®. Here, various cable types are twisted using a cable length of 3.28 ft (1m).

The igus® Torsion Test is basically ± 180 degrees of torsion for millions of twist cycles depending on the customers requirements. Then the samples are inspected to detect any wear or premature failure. The complete CFROBOT series was tested to this standard before being released to the market.

For more information on CFROBOT see Robot Cable section



The "torsion test bench" especially developed according to the igus® standard



Supply of data and energy in all forms within an Energy Chain System®

The key advantage of an iglus® Energy Chain System® is the safe accommodation of various forms of data cables and energy suppliers in one system. We recommend the optimal separation layout of the cables/hoses in the carrier, but you, the customer, are still afforded the final choice. It is possible, for instance, to maintain minimum distances between bus and motor cables and mix pneumatics, electric and hydraulics in the same compartments.

In addition to the quality of the cables used, the arrangement of each cable/hose within the chain and the space allowed, are important for the service life of the system. Various separation options enable the adaptation of the Energy Chains® to the specific requirements of each respective application. General rules of thumb, such as "maximum 80% of the cross section of an Energy Chain should be used" **are no longer viable** with today's application complexities. In this chapter, we give you detailed recommendations. Due to the variety of the application parameters, we strongly recommend you take advantage of our free consultation services. Simply give us a list of your cable requirements (or merely the required electrical or other services) and you will receive our recommendation by the end of the next business day.

Maximum cable and hose diameters

The maximum cable and/or hose diameter corresponds to the inner height of the selected Energy Chain®/Tube, with additional minimum clearance. This minimum clearance would be, for example, 10% for electrical round cables, 20% for hydraulic hoses. An Energy Chain® is ideal if a minimum lateral gap to the next cable or hose has been factored in. Depending on the nature of the cables, the dynamics, and the expected service life, more clearance must be allowed. In specific cases, clearances may be altered further. Please consult iglus®.

Distribution within the Energy Chain®:

- Cables and hoses with very different diameters should be laid separately. The separation is achieved using modular separators.
- Cables and hoses must **under no circumstances** have the opportunity to tangle. Therefore, the clearance height of a compartment with several similar cables or hoses next to one another **must not amount to more than one and a half times the cable/hose diameter**.

Distribution Rules:

Rule 1:

If $D1 + D2 > 1.2 \times \text{chain inner height}$, no separation between the two cables/hoses is necessary. Two cables or hoses should never be left unguided on top of one another or be allowed to become tangled.

Rule 2:

If $d1 + d2 \leq 1.2 \times \text{chain inner height}$, a vertical separator or a horizontal shelf must be used to reduce the inner height, thereby preventing the entanglement of d1 and d2.

The reason for these rules is as follows:

The cables and hoses must be laid so that they can move freely at all times and so that no tensile force is exerted at the radius of the Energy Chains®.

For high-speed applications and high cycles, cables or hoses must not be laid on top of each other without horizontal separation.

The standard values for this are:

Travel speed over 1.64 ft/s (0.5 m/s) and cycles over 10,000 p.a.

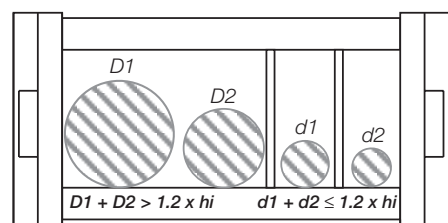
iglus® interior separation offers a safe solution for this situation.



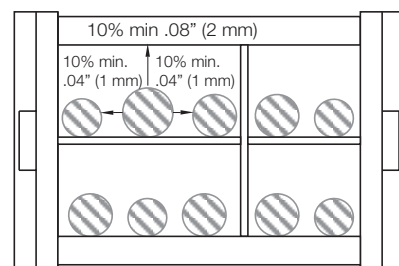
Neatly laid cables with iglus® interior separation

Clearance space in % for various cables/hoses

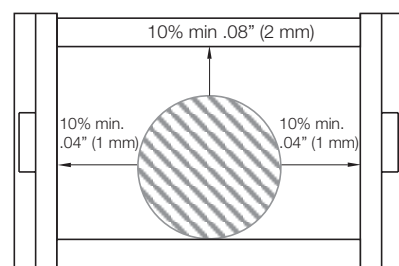
Cables and Hoses	"All-Around" Clearance
Electrical round cables	10%
Electrical flat cables	10%
Pneumatics	5-10%
Hydraulics	20%
Media hoses	15-20%



$D1 + D2 > 1.2 \times hi$ $d1 + d2 \leq 1.2 \times hi$



$d1 + d2 \leq 1.2 \times hi$



Clearance "all around" space for round electrical cables



Design Rules for Distribution of Cables/Hoses:

The cable or hose weight should be symmetrically distributed along the width of the chain

- Cables and hoses with different outer jacket materials must not be allowed to "stick" together. If necessary, they must be laid separately. All iglus® Chainflex® cables can be combined with each other and all other brands of cable or hose
- The cables and hoses should always be fixed at the moving end. The fixed end should always involve strain relief. Exceptions are made only for certain hydraulic hoses with length compensation issues or other high pressure hoses (i.e. hydraulic hoses)
- Generally, the faster and more frequently the Energy Chain® operates, the more important the exact positioning of the cables and hoses inside the chain. Due to the wide variety of the possibilities, we strongly recommend you take advantage of our free consultation services for your specific applications

Bending radius R

- The bending radius of our Energy Chain® depends on the "thickest" or "stiffest" cable or hose in your application
- The bending radii of the Energy Chains® should be adjusted to the recommendations of the cable or hose manufacturer. The selection of a larger radius than the minimum will positively affect service life
- The specification of minimum bending radii for cables and hoses refers to use at normal temperatures; other bending radii may be recommended. Please ask your cable or hose supplier for details

We recommend complete Energy Chain Systems® where bending radii for all cables and hoses, interior separation and service life are optimally matched. Please ask for the iglus® System Guarantee.

Round electrical cables

For electrical cables, the round cable is a safe, modular and cost-effective solution for Energy Chain Systems®. We recommend the following criteria for selecting the proper round electrical cables:

Selection Criteria:

- Small minimum bending radii and mounting heights
- Strain relief integrated directly into the mounting bracket
- Uncomplicated installation process - no hanging, laying out, etc. of cables
- Long service life at minimum bending radius
- Service life expectations for your application (short or long travel, hanging, etc.)
- Test data on service life from realistic tests
- Flexible shields for shielded cables
- Abrasion-resistant and non-adhesive outer jackets
- Large selection to avoid expensive custom designs

For bus cables and fiber optic cable, special attention must be paid to how effective transmission rates and shielding remain after millions of cycles at the minimum bending radius.

iglus® test laboratory

We are continuously developing and testing electrical cables in Energy Chains® and Tubes. As a result, we offer detailed reports on the service life of a cable or hose for your application. This concerns both Chainflex® cables and other brands which are important in our consultation for a safe Energy Chain System®. Statements we make including those regarding strain relief, EMC, transmission characteristics, etc. are backed by our own tests. We are always happy to provide a system analysis and quote. Provide us with your electrical performance requirements and you will receive an analysis from us within a matter of hours.



The iglus® modular Energy Chain System® solves all known requirements for interior separation



iglus Chainflex® cables permit the smallest bending radius of 5 x d for one million strokes



Example from iglus® test laboratory: continuous development and testing of Chainflex® round electrical cables

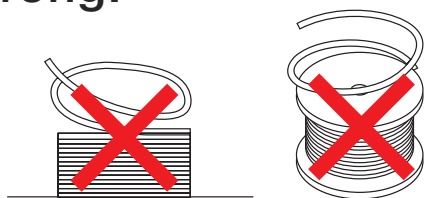


Guidelines for the installation and strain relief of round electrical cables

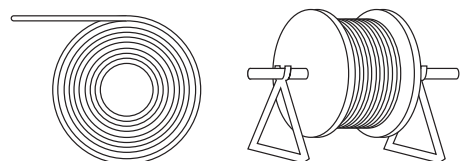
1. The cables must be laid straight, without twisting. Cables must not be uncoiled from the top of the spool. igus® Chainflex® cables are immediately ready for placement directly into the Energy Chain®. They need not be disconnected or laid out before installation.
2. The cables must be laid so that each individual cable can move freely from side to side.
3. The cables must be able to move freely along the radius. This must be double-checked if the upper run operates at the cable's maximum bending radius.
4. The division of the carrier's interior using shelves or igus® interior separators is necessary if several cables and/or hoses with varying diameters are laid out. It is important to prevent cables and hoses from tangling.
5. For cables and hoses with different jacket materials, it is important to prevent them from "sticking" to one another. If necessary, they should be separated. igus® Chainflex® cables can be combined with all others.
6. Round electrical cables must be secured with strain relief at both ends. In exceptional cases, the cables may be fixed with strain relief at the moving end of the Energy Chain® only. A gap of 10-30 x cable diameter between the end of the bending segment and the fixed point is recommended for most cables. Chainflex® cables can, on the other hand, be secured directly to the mounting bracket with strain relief (this has been confirmed with testing).

We are happy to offer a pre-assembled Energy Chain System®: the igus® "Triple Guarantee" of chain and cable, pre-assembled and fully harnessed.

Wrong!

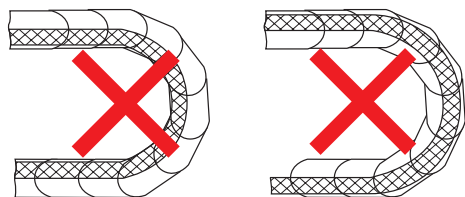


Correct!



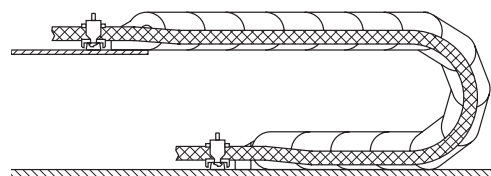
Corkscrewing: an effect of improper cable and hose placement in an Energy Chain®

Wrong!



Cables must be able to bend freely

Correct!



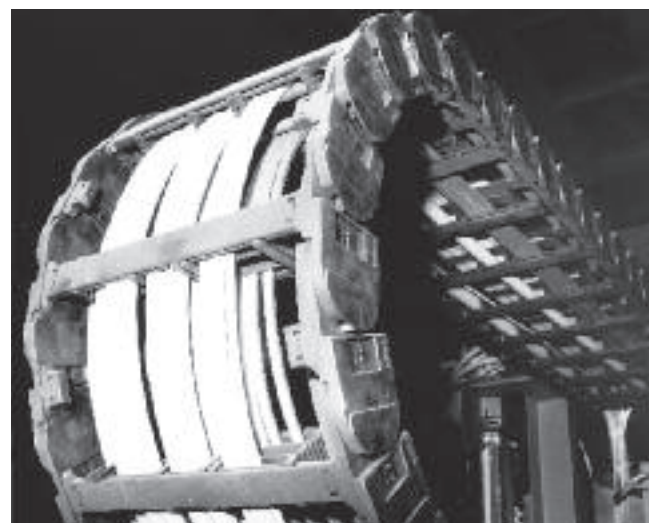
Chainflex® cables can be strain-relieved directly at the mounting bracket



Flat cables

Flat cables must be able to move freely along the bending radius. Two flat cables next to one another should be kept apart with separators. If two flat cables are laid on top of one another, we strongly recommend the use of horizontal igus® shelving. Flat and round cables should be laid separately in the Energy Chain®. Strain relief should be attached at both ends. Flat cables are only conditionally recommended for use in Energy Chains®.

Outer jackets made of rubber must be specified particularly carefully, because of potentially high static friction.



Flat cables and pneumatic hoses installed in an Energy Chain® with full interior separation of all cables.



Fully pre-assembled Energy Chain® System® with several pneumatic hoses next to and above each other

Pneumatic hoses

In principle, the same rules apply for pneumatic hoses as for round cables. In practice, it has been demonstrated that pneumatic hoses are less susceptible to wear. After consultation, they can be laid together more closely than the "10% clearance all-around" rule. A double-sided strain relief is required under these conditions. For pneumatic hoses made of rubber, we recommend strictly following the "10% clearance" rule because they tend to adhere to each other and to other cables/hoses.



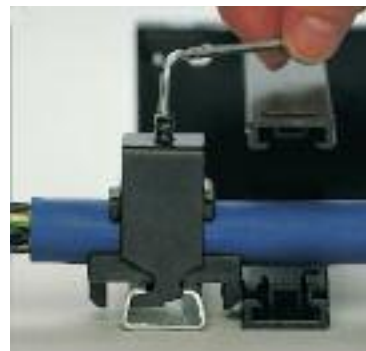
We recommend strain relief on both ends.

Strain relief for electrical cables

Strain relief can consist of standard elements or can be custom-made. For most applications, our standard program of profile rails in mounting brackets and space-saving "Chainfix" clamps can be used. We also offer simple strain relief solutions using cable tiwraps and tiwraps plates. In ideal cases, the cables should be secured at both ends of the Energy Chain® with strain relief (in a few instances, strain relief at the moving end of the Energy Chain® is sufficient - please consult igus® for these cases).



Strain relief in KMA mounting bracket with profile rail



The Chainfix clamp



igus® Chainfix strain relief with KMA brackets; used here for cables and hoses

Minimum gap of the strain relief and the beginning of the bending radius

Tests on our premises and in field applications have shown strain relief located at the last bending point of the Energy Chain® has no influence over the durability of igus® Chainflex® cables. It is possible, therefore, to integrate the strain relief with the mounting bracket. This space-saving option for strain relief is offered by igus® for almost all Energy Chains® (More details on this in the relevant chapters).

Another integrated strain relief option is the igus® tiwraps plate. The mounting bracket includes comb-like plates to which cables and hoses can be secured with the help of cable tiwraps.

The decisive features and advantages of these elements are:

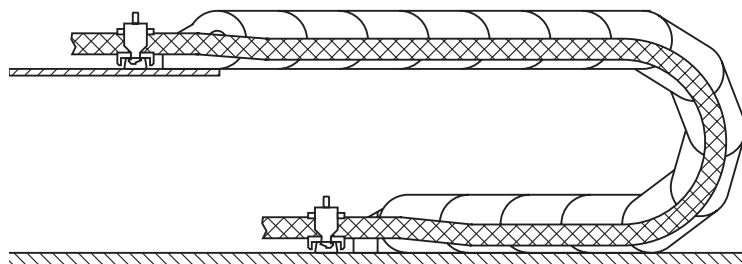
- Time saving installation: strain relief is already in place when mounting brackets are bolted in
- Longer service life for cables and hoses - when the strain relief system is implemented the cables and hoses last longer
- Space-saving design - strain relief at the mounting bracket almost always leaves room



Detachable tiwraps plate for the profile rail



Simple strain relief with cable tiwraps attached to igus® tiwraps plates and integrated into the mounting bracket



Ideal installation of cables in Energy Chains®. Chainflex® cables can be directly strain-relieved in the mounting bracket (minimum gap to the last curved chain link is not necessary)!

Design: A Guide to Regulatory Approval Codes for Chainflex®

The following describes the typical Approvals and Standards that Chainflex® cables carry. The table of contents and respective catalog page details the actual approval.



This is an Underwriters Laboratory designation that indicates compliance to the AWM (Appliance Wire Material) standard 758. This describes cables intended for internal and external wiring components. An AWM cable is useful when obtaining a UL listing on an overall product.



This mark is the same as **UL** except approved for use in Canada and the United States. In accordance with Canadian AWM Standard C22.2 No.210 and UL AWM Standard 758 respectively.



Cables that bear this mark are in compliance to a specific Article of the National Electrical Code. For example UL 1277 Tray Cable fulfills the requirements of Article 336 of the 2002 NEC. Listed products are intended for use within residential, commercial and industrial structures.



This is the mark of the Canadian Standards Association. Many Chainflex types carry CSA AWM approvals. The Canadian AWM designates compliance to CSA Standard C22.2 No. 210. These products are intended for the internal and external wiring of electronic equipment. Typical markings on cable include the following. EX "CSA AWM I/II A/B 80°C 300V FT1" Optional markings for oil resistance and wet ratings may apply.

Class I: Internal
A - Where not subject to mechanical abuse
B - Where may be subject to mechanical abuse

Class II: External
A - Where not subject to mechanical abuse
B - Where may be subject to mechanical abuse

The cable must also pass a flame test typically as described below:
FT1 - Vertical Flame Test CSA 22.2 No. 3: In general a Bunsen burner applies flame at base of 18" specimen. Cotton is placed below specimen. Flame is applied 5 times more for 15 seconds
FT4 - Vertical Flame Test CSA 22.2 No. 3: In general a propane burner (70,000 BTU/HR) applies flame at one end of 8 foot cable lengths arranged in open steel trays.



Developed by VDW - Association of German Machine Tool Manufacturers. It describes a comprehensive total concept for the standardization and decentralization of the electrical and fluid-technical installation of machines and plants.



European Conformity - The CE mark on a cable designates that the product complies with relevant European health, safety and environmental protection legislations. 2006/95/EC



Association of German Electrical Engineers - The recognized association for German standards is the German Electrotechnical Commission of DIN & VDE (DKE).



All Chainflex® cables manufactured after January 1, 2006 are RoHS Compliant according to 2002/95/EC directives.





Chainflex® AWG Charts

AWG - American Wire Gauge Chart - Solid Wire

This chart is intended for reference only. Contact igus® regarding conductor information for Chainflex® cables

AWG	Diameter		Cross-Sectional Area		DCR @ 20°C - Ohms/mft max		Wgt Lbs/Mft	Break Strength (lbs) max
	Inches	MM	CMA	Sq. MM	Bare or Silver Plated Cu.	Tinned Cu		
46	.00155	0.039370	2.391	0.0012	4932	5294	0.01451	.15491
44	.00195	0.049530	3.801	0.0019	3030	3253	0.01830	.19534
42	.00246	0.062484	6.044	0.0031	1862	1999	0.02308	.24632
40	.0031	0.078740	9.61	0.0049	1152	1236.6	.0291	.3106
39	.0035	0.088900	12.3	0.0062	897.1	963.0	.0371	.3917
38	.0040	0.101600	16.0	0.0081	681.9	732.0	.0484	.4939
37	.0045	0.114300	20.3	0.0103	535.7	575.1	.0613	.6228
36	.0050	0.127000	25.0	0.0127	431.9	463.6	.0757	.7854
35	.0056	0.142240	31.4	0.0159	342.8	368.0	.0949	.9904
34	.0063	0.160020	39.7	0.0201	269.8	289.6	.120	1.249
33	.0071	0.180340	50.4	0.0255	211.7	227.3	.153	1.575
32	.0080	0.203200	64.0	0.0324	166.2	178.4	.194	1.986
31	.0089	0.226060	79.2	0.0401	133.9	143.7	.240	2.504
30	.0100	0.254000	100	0.0506	105.8	113.6	.3042	3.157
29	.0113	0.287020	128	0.0647	82.9	88.0	.387	3.981
28	.0126	0.320040	159	0.0804	66.7	70.8	.481	5.020
27	.0142	0.360680	202	0.1021	52.5	55.8	.610	6.331
26	.0159	0.403860	253	0.1280	41.9	44.5	.765	7.983
25	.0179	0.454660	320	0.1623	33.0	35.0	.970	10.07
24	.0201	0.510540	404	0.2046	26.2	27.2	1.22	12.69
23	.0226	0.574040	511	0.2587	20.7	21.5	1.55	15.41
22	.0253	0.642620	640	0.3242	16.5	17.2	1.94	19.43
21	.0285	0.723900	812	0.4114	13.0	13.5	2.46	24.50
20	.0320	0.812800	1020	0.5186	10.3	10.7	3.10	30.89
19	.0359	0.911860	1290	0.6527	8.21	8.54	3.90	38.95
18	.0403	1.023620	1620	0.8225	6.52	6.78	4.92	49.12
17	.0453	1.150620	2050	1.0393	5.16	5.37	6.21	61.93
16	.0508	1.290320	2580	1.3070	4.10	4.26	7.81	78.10
15	.0571	1.450340	3260	1.6512	3.25	3.38	9.87	98.48
14	.0641	1.628140	4110	2.0809	2.58	2.68	12.4	124.2
13	.0720	1.828800	5180	2.6254	2.04	2.12	15.7	156.6
12	.0808	2.052320	6530	3.3064	1.62	1.68	19.8	197.5
11	.0907	2.303780	8230	4.1663	1.29	1.34	24.9	249.0
10	.1019	2.588260	10380	5.2588	1.02	1.06	31.4	314.0
9	.1144	2.905760	13090	6.6281	.809	.833	39.6	380.5
8	.1285	3.263900	16510	8.3626	.641	.660	50.0	479.8
7	.1443	3.665220	20820	10.5456	.508	.523	63.0	605.0
6	.1620	4.114800	26240	13.2913	.403	.415	79.4	762.9
5	.1819	4.620260	33090	16.7572	.320	.329	100	961.9
4	.2043	5.189220	41740	21.1385	.254	.261	126	1213
3	.2294	5.826760	52620	26.6516	.201	.206	159	1530
2	.2593	6.586220	66360	34.0520	.157	.161	201	1929
1	.2893	7.348220	83690	42.3871	.126	.129	253	2432
1/0	.3249	8.252460	105600	53.4609	.100	.102	319	2984
2/0	.3648	9.265920	133100	67.3980	.0795	.0814	403	3763
3/0	.4096	10.40384	167800	84.9683	.0631	.0646	508	4745
4/0	.4600	11.68400	211600	107.1649	.0500	.0512	641	5983

AWG - American Wire Gauge Chart - Stranded Conductors

This chart is intended for reference only. Contact igus® regarding conductor information for Chainflex® cables

AWG	Stranding	Diameter		Cross-Sectional Area		WGT/MFT	DCR @ 20°C - Ohms/mft max	
		Inches	MM	CMA	Sq. MM		Silver or Bare Cu	Tinned Cu
36	7/44	.006	0.1524	28.00	.0133	.085	446	479.0
34	7/42	.0075	0.1905	43.75	.0217	.132	274	294.0
32	7/40	.009	0.2286	67.27	.0343	.203	169.5	182.0
32	19/44	.008	0.2032	76.00	.0361	.230	165.9	178.1
30	7/38	.012	0.3048	112.00	.0567	.339	100.3	107.7
30	19/42	.013	0.3302	118.75	.0589	.359	101.9	109.4
28	7/36	.015	0.3810	175.00	.0889	.55	63.55	68.22
28	19/40	.016	0.4064	182.59	.0931	.59	63.06	67.69
27	7/35	.017	0.4318	219.52	.1113	.632	50.44	54.15
27	65/44	.018	0.4572	260.00	.1235	.70	49.41	53.05
26	7/34	.019	0.4826	277.83	.1407	.87	39.70	42.61
26	10/36	.020	0.5080	250.00	.1270	.77	44.92	48.21
26	19/38	.020	0.5080	304.00	.1539	.93	37.33	40.07
24	7/32	.024	0.6096	448.00	.2268	1.38	24.46	26.25
24	10/34	.023	0.5842	396.90	.2010	1.22	28.06	30.12
24	19/36	.025	0.6350	475.00	.2413	1.47	23.64	25.38
24	41/40	.024	0.6096	384.40	.2009	1.25	29.78	31.97
22	7/30	.030	0.7620	700.00	.3542	2.19	15.57	16.72
22	19/34	.032	0.8128	754.11	.3819	2.32	14.77	15.85
22	26/36	.029	0.7366	650.00	.3302	1.97	17.44	18.72
20	7/28	.038	0.9652	1111.00	.5628	3.49	9.81	10.42
20	10/30	.036	0.9144	1000.00	.5060	3.14	11.00	11.81
20	19/32	.038	0.9652	1216.00	.6156	3.75	9.10	9.765
20	26/34	.040	1.0160	1031.94	.5226	3.21	10.90	11.70
20	41/36	.038	0.9652	1025.00	.5207	3.17	11.17	11.99
18	7/26	.046	1.1684	1769.60	.8960	5.04	6.165	6.550
18	16/30	.046	1.1684	1600.00	.8096	5.00	6.877	7.384
18	19/30	.048	1.2192	1900.00	.9614	5.90	5.791	6.218
18	41/34	.046	1.1684	1627.29	.8241	5.06	6.975	7.487
18	65/36	.048	1.2192	1625.00	.8255	5.00	7.043	7.560
16	7/24	.060	1.5240	2828.00	1.4322	8.56	3.855	4.002
16	19/29	.054	1.3716	2426.30	1.2293	7.50	4.538	4.817
16	26/30	.058	1.4732	2600.00	1.3156	8.06	4.273	4.588
16	65/34	.059	1.4986	2579.85	1.3065	8.03	4.400	4.723
16	105/36	.059	1.4986	2625.00	1.3335	8.09	4.360	4.680
14	7/22	.073	1.8542	4480.00	2.2694	12.76	2.428	2.531
14	19/27	.068	1.7272	3830.40	1.9399	12.50	2.874	3.054
14	41/30	.070	1.7780	4100.00	2.0746	12.88	2.735	2.937
14	105/34	.086	2.1844	4167.50	2.1105	13.00	2.724	2.924
12	7/20	.096	2.4384	7168.00	3.6302	21.69	1.516	1.574
12	19/25	.090	2.2860	6087.60	3.0837	19.70	1.806	1.916
12	65/30	.102	2.5908	6500.00	3.2890	20.76	1.725	1.853
12	165/34	.095	2.4130	6548.90	3.3165	19.82	1.750	1.878
10	37/26	.110	2.7940	9353.60	4.7360	29.00	1.189	1.263
10	49/27	.116	2.9464	9878.40	5.0029	29.89	1.136	1.207
10	105/30	.120	3.0480	10530.00	5.3130	33.10	1.068	1.147
8	49/25	.147	3.7338	15699.60	7.9527	47.53	.714	.757
8	133/29	.166	4.2164	16984.10	8.6051	52.87	.661	.701
8	655/36	.147	3.7338	16625.00	8.3185	51.30	.706	.757
6	133/27	.206	5.2324	26812.80	13.5793	81.14	.418	.445
6	266/30	.210	5.3340	25900.00	13.4596	86.01	.426	.457
6	1050/36	.184	4.6736	26250.00	13.3350	79.47	.440	.472
4	7x19/25	.257	6.5278	42613.00	21.5859	133.00	.263	.279
4	259/27	.232	5.8928	52214.40	26.4439	158.02	.217	.231
4	1666/36	.232	5.8928	41650.00	21.1582	126.10	.277	.298
2	133/23	.292	7.4168	67936.40	34.4071	205.62	.164	.171
2	259/26	.292	7.4168	65475.20	33.1520	198.14	.173	.184
2	665/30	.235	5.9690	66500.00	33.1430	201.16	.170	.183
2	2646/36	.292	7.4168	66150.00	33.6042	200.28	.175	.187
1	19/0664	.328	8.3312	82983.60	42.4700	251.20	.134	.137
1	19x44/30	.377	9.5758	81700.00	43.3016	267.79	.135	.171
1	2109/34	.328	8.3312	83706.20	42.3909	253.29	.137	.147
1/0	133/21	.368	9.3472	108035.90	54.7162	327.05	.104	.108
1/0	259/24	.368	9.3472	104636.00	52.9914	316.76	.108	.112
2/0	133/20	.414	10.5156	136192.00	68.9738	412.17	.0821	.0853
2/0	259/23	.414	10.5156	132297.20	67.0033	400.41	.0855	.0888
2/0	1330/30	.406	10.3124	133300.00	67.2980	430.00	.0851	.0914
3/0	259/22	.464	11.7856	163195.00	83.9678	501.70	.0682	.0711
3/0	427/24	.464	11.7856	172508.00	87.3642	522.20	.0657	.0682
4/0	259/21	.597	15.1638	210385.70	106.5526	638.88	.0537	.0558
4/0	427/23	.598	15.1892	218111.60	110.4649	660.01	.0519	.0539
4/0	2107/30	.608	15.4432	211468.00	106.6142	653.00	.0537	.0577

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Cross Section mm ²	Strands VDE 0295 BS 6360 Class 2 (1)	Multi-wire (2)	Fine-wire Strands VDE 0295 BS 6360 Class 5 (3)	Fine-wire Strands VDE 0295 BS 6360 Class 6 (4)	Super Fine-wire Strands (5)	Super Fine-wire Strands (6)	Super Fine-wire Strands (7)
0.05							24 x 0.05
0.08							41 x 0.05
0.14				18 x 0.10	18 x 0.10	36 x 0.07	72 x 0.05
0.25			14 x 0.16	32 x 0.10	32 x 0.10	65 x 0.07	128 x 0.05
0.34		7 x 0.25	19 x 0.16	42 x 0.10	42 x 0.10	88 x 0.07	174 x 0.05
0.38		7 x 0.27	12 x 0.21	21 x 0.15	48 x 0.10	100 x 0.07	194 x 0.05
0.50	7 x 0.30	7 x 0.30	16 x 0.21	28 x 0.15	64 x 0.10	131 x 0.07	256 x 0.05
0.75	7 x 0.37	7 x 0.37	24 x 0.21	42 x 0.15	96 x 0.10	195 x 0.07	384 x 0.05
1	7 x 0.43	7 x 0.43	32 x 0.21	56 x 0.15	128 x 0.10	260 x 0.07	512 x 0.05
1.5	7 x 0.52	7 x 0.52	30 x 0.26	84 x 0.15	192 x 0.10	392 x 0.07	768 x 0.05
2.5	7 x 0.67	19 x 0.41	50 x 0.26	140 x 0.15	320 x 0.10	651 x 0.07	1280 x 0.05
4	7 x 0.85	19 x 0.52	56 x 0.31	224 x 0.15	512 x 0.10	1040 x 0.07	
6	7 x 1.05	19 x 0.64	84 x 0.31	192 x 0.20	768 x 0.10	1560 x 0.07	
10	7 x 1.35	49 x 0.51	80 x 0.41	320 x 0.20	1280 x 0.10	2600 x 0.07	
16	7 x 1.70	49 x 0.65	128 x 0.41	512 x 0.20	2048 x 0.10		
25	7 x 2.13	84 x 0.62	200 x 0.41	800 x 0.20	3200 x 0.10		
35	7 x 2.52	133 x 0.58	280 x 0.41	1120 x 0.20			
50	19 x 1.83	133 x 0.69	400 x 0.41	705 x 0.30			
70	19 x 2.17	189 x 0.69	356 x 0.51	990 x 0.30			
95	19 x 2.52	259 x 0.69	485 x 0.51	1340 x 0.30			
120	37 x 2.03	336 x 0.67	614 x 0.51	1690 x 0.30			
150	37 x 2.27	392 x 0.69	765 x 0.51	2123 x 0.30			
185	37 x 2.52	494 x 0.69	944 x 0.51	1470 x 0.40			
240	61 x 2.24	627 x 0.70	1225 x 0.51	1905 x 0.40			
300	61 x 2.50	790 x 0.70	1530 x 0.51	2385 x 0.40			
400	61 x 2.89		2035 x 0.51				
500	61 x 3.23		1768 x 0.51				

Note: Chainflex typically uses column 3 or 4 stranding

Comparison European/American Cable Stranding

mm ²	AWG/MCM	mm ²	AWG/MCM	mm ²	AWG/MCM	mm ²	AWG/MCM	mm ²	AWG/MCM	mm ²	AWG/MCM
0.08	= 28	0.50	= 20	2.50	= 14	16.00	= 6	70.00	= 2/0	185.00	= 350
0.14	= 26	0.75	= 18	4.00	= 12	25.00	= 4	95.00	= 3/0	240.00	= 450
0.25	= 24	1.00	= 17	6.00	= 10	35.00	= 2	120.00	= 4/0	300.00	= 550
0.34	= 22	1.50	= 16	10.00	= 8	50.00	= 1	150.00	= 300		



The values from Table 1 have been taken from DIN VDE 0298, Part 4. The values are simplified and are only approximates. In borderline cases, the DIN VDE specifications must be strictly followed. Selection of the cross-section only takes place with regard to the load in undisturbed operation, i.e. when used correctly with permissible operating temperature in the line.

We recommend that each user obtain and comply with a copy of the regulations valid for the individual area of application (e.g. measures for protection in the case of indirect contact in accordance with DIN VDE 0100, Part 410, overcurrent protective devices in accordance with DIN VDE 0100, Part 430 or power failure in accordance with DIN VDE 0100, Part 520), as it is not possible to print all regulations and overviews in this catalog. as a result of the standardization which has taken place, different load capacity values may be permissible for the same line under certain circumstances. The load during undisturbed operation is crucial when selecting relevant cross-sections (or AWG) - for example, use at permitted operating temperature in respect to the maximum permitted temperature on the conductor. The load-

Table 1:

The ampacity values in table 1 are recommendations for cables used in stationary and moving applications

Chainflex Type	Insulating Material	
	PVC	TPE
	CF130US, CF140US, CF5, CF6, CF2, CF211 Data	CF130, CF140, CF77-UL, CF78-UL, CF9, CF10, CF9-UL, CF10-UL, CF98, CF99, CF240, CF211, CF112, CF113, CF11, CF12, CF211 (Feedback), CF113-D, CF111-D, CF11-D, CF210-UL, CF21-UL, CF270-UL, CF27-D, CF30, CF31, CF34, CF35, CF300, CFPE, CF310, CFBRAID, CFROBOT, CFROBOT6/7, CFROBOT9

Cross-Section mm ²	AWG	Number of loaded conductors	
		2-3	2-3
		Amperes	Amperes
0.14	26	2.5	2.5
0.25	24	4	5
0.34	22	5	7
0.5	20	8	10
0.75	18	12	14
1.0	17	15	17
1.5	16	18	21
2.5	14	26	30
4	12	34	41
6	10	44	53
10	8	61	74
16	6	82	99
25	4	108	131
35	2	135	162
50	1	168	202
70	2/0	207	250
95	3/0	250	301
120	4/0	292	352
150	300		404
185	350		461

carrying capacity according to Table 1 on this page refers to the conductors carrying the operating current. This is usually 2 loaded lines for 2 or 3 wire lines and 3 loaded lines for 4 or 5 wire lines. For multi-wire lines in electrical wiring conduits or Energy Chains®, this must be observed during the design process.

The ambient temperature is the temperature of the atmospheric air = 86°F (30° C) if the line in question is not loaded. If the air temperature is increased by leakage of heat from the lines, the conversion factors listed in Table 2 on this page should be applied. For example, heat radiation from the sun must be taken into consideration.

The possible methods of laying cables in Energy Chains® lead to such a broad range of load profiles that no universal conversion factors can be given if multiple cables or conductors are involved. Table 3 lists conversion factors for multi-conductor cables, depending on the individual application.

Table 2:

Conversion factors for change in ambient temperature

Ambient Temperature °C	Conversion Factor	
	PVC Insulation	TPE Insulation
10	1.22	1.15
15	1.17	1.12
20	1.12	1.08
25	1.06	1.04
30	1.00	1.00
35	0.94	0.96
40	0.87	0.91
45	0.79	0.87
50	0.71	0.82
55	0.61	0.76
60	0.50	0.71
65	-	0.65
70	-	0.58
75	-	0.50
80	-	0.41
85	-	0.29
90	-	0.14

Table 3:

Conversion factors for multi-conductor cables with cable cross-sections up to 16 mm²

Loaded Conductors	Conversion Factors
5	0.75
7	0.65
10	0.55
14	0.50
19	0.45
24	0.40
40	0.35
61	0.30



The tables below show the electrotechnical data and measured values of the tested cables. The values are intended as guideline values only.

CONTROL CABLES

Cable Type / Characteristics

Conductor AWG Size

	26 AWG	24 AWG	22 AWG	20 AWG	18 AWG	17 AWG	16 AWG	14 AWG	12 AWG	10 AWG	8 AWG	6 AWG
CF130												
Resistance Ohms/Mft	42.7	24.1	17.4	11.9	7.9	5.9	4.1	2.4	1.5	1.0		
Capacitance pF/ft up to 7cond.- (Cond. to Cond.)			36.6	32.0	33.5	38.1	38.1	42.7				
Capacitance pF/ft from 12 cond.- (Cond. to Cond.)				19.8	19.8	27.4						
Capacitance pF/ft up to 7cond. - (One Cond. to all Others)				45.7	57.9	57.9	62.5	64.0		70.1		
Capacitance pF/ft from 12 cond.- (One Cond. to all Others)				45.7			62.5					
Inductance uH/ft			0.194	0.2	0.195	0.189	0.186	0.186		0.172		
Characteristic Impedance @ 1 kHz in Ohms			80.0	90.0	90.0	80.0	80.0	80.0		80.0		
CF140												
Resistance Ohms/Mft	42.1	24.1	17.4	11.9	7.9	5.9	4.1	2.4	1.5	1.0	0.6	
Capacitance pF/ft up to 7cond.- (Cond. to Cond.)			38.1	38.1	42.7	42.7	50.3	57.9				
Capacitance pF/ft from 12 cond.- (Cond. to Cond.)					22.9	27.4	27.4					
Capacitance pF/ft up to 7cond. - (One Cond. to all Others)			94.5	94.5	109.7	112.8	131.1	155.4				
Capacitance pF/ft from 12 cond.- (One Cond. to all Others)												
Inductance uH/ft			0.2	0.2	0.192	0.192	0.189	0.2				
Characteristic Impedance @ 1 kHz in Ohms			80.0	80.0	80.0	75.0	70.0	60.0				
CF130US												
Resistance Ohms/Mft				11.9	7.9	5.9	4.1	2.4	1.5	1.0		
Capacitance pF/ft - (Cond. to Cond.)												
Inductance uH/ft												
Characteristic Impedance @ 1 kHz in Ohms												
Capacitance pF/ft - (One Cond. to all Others)												
CF140US												
Resistance Ohms/Mft				11.9	7.9	5.9	4.1	2.4	1.5	1.0		
Capacitance pF/ft - (Cond. to Cond.)												
Inductance uH/ft												
Characteristic Impedance @ 1 kHz in Ohms												
Capacitance pF/ft - (Cond to All Others)												
CF5												
Resistance Ohms/Mft	42.1	24.1	17.4	11.9	7.9	5.9	4.1	2.4	1.5	1.0		
Capacitance pF/ft up to 7conductors - (Cond. to Cond.)				29.0	35.1	41.1	56.4	38.1				
Capacitance pF/ft from 12 conductors - (Cond. to Cond.)			18.3	27.4	32.0	32.0	41.1	45.7				
Capacitance pF/ft up to 7conductors - (Cond. to Shld.)				50.3	57.9	64.0	140.2					
Capacitance pF/ft from 12 conductors - (Cond. to Shld.)				49.5	63.1	68.6	70.1	100.6				
Inductance uH/ft			0.232	0.219	0.204	0.204	0.195	0.204				
Characteristic Impedance @ 1 kHz in Ohms			85.0	85.0	80.0	80.0	65.0					
CF6												
Resistance Ohms/Mft		24.1	17.4	11.9	7.9	5.9	4.1	2.4				
Capacitance pF/ft up to 7conductors - (Cond. to Cond.)		39.6	19.0	41.1	45.7	50.3	56.4					
Capacitance pF/ft from 12 conductors - (Cond. to Cond.)				33.5	36.6	36.6	41.1					
Capacitance pF/ft up to 7conductors - (Cond. to Shld.)		103.6	51.8	103.6	121.9	128.0	140.2					
Capacitance pF/ft from 12 conductors - (Cond. to Shld.)				83.8	83.8	88.4	100.6					
Inductance uH/ft		0.221	0.213	0.210	0.207	0.195	0.195					
Characteristic Impedance @ 1kHz in Ohms		80.0	80.0	80.0	75.0	70.0	65.0					
CF170												
Resistance Ohms/Mft	42.1	24.1	17.4	11.9	7.9	5.9	4.1	2.4	1.5	1.0	0.6	
Capacitance pF/ft - (Cond. to Cond.)				17.4	20.4	22.9	24.4	24.4	24.4	38.1		
Inductance uH/ft				0.2	0.186	0.186	0.183	0.192	0.2	0.2		
Characteristic Impedance @ 1 kHz in Ohms				150.0	275.0	225.0	200.0	150.0	200.0	150.0		
Capacitance pF/ft - (One Cond. to all Others)				45.7	45.7	45.7	45.7	45.7	36.6	61.0		
CF77												
Resistance Ohms/Mft												
Capacitance pF/ft up to 7conductors - (Cond. to Cond.)												
Capacitance pF/ft from 12 conductors - (Cond. to Cond.)												



CONTROL CABLES

Cable Type / Characteristics

Conductor AWG Size

	26 AWG	24 AWG	22 AWG	20 AWG	18 AWG	17 AWG	16 AWG	14 AWG	12 AWG	10 AWG	8 AWG	6 AWG
CF78												
Resistance Ohms/Mft												
Capacitance pF/ft up to 7conductors - (Cond. to Cond.)												
Capacitance pF/ft from 12 conductors - (Cond. to Cond.)												
CF7/7-D												
Resistance Ohms/Mft	42.1	24.1	17.4	11.9	7.9	5.9	4.1	2.4	1.5	1.0	0.6	
Capacitance pF/ft up to 7conductors - (Cond. to Cond.)					33.5	33.5	35.1	38.1				
Capacitance pF/ft from 12 conductors - (Cond. to Cond.)					32.0	32.0	33.5	33.5				
CF8												
Resistance Ohms/Mft	42.1	24.1	17.4	11.9	7.9	5.9	4.1	2.4	1.5	1.0	0.6	
Capacitance pF/ft up to 7conductors - (Cond. to Cond.)					33.5	38.1	38.1	44.2				
Capacitance pF/ft from 12 conductors - (Cond. to Cond.)					33.5	33.5						
Capacitance pF/ft up to 7conductors - (Cond. to Shld.)										70.1		
Capacitance pF/ft from 12 conductors - (Cond. to Shld.)					115.8	106.7	118.9	118.9				
Inductance uH/ft					0.219	0.204	0.201	0.201				
Characteristic Impedance @ 1kHz in Ohms					85.0	80.0	75.0	70.0				
CF2												
Resistance Ohms/Mft	42.1	24.1	17.4	11.9	7.9	5.9	4.1	2.4	1.5	1.0	0.6	
Capacitance pF/ft up to 7conductors - (Cond. to Cond.)	33.5	39.6			33.5	33.5	41.1					
Capacitance pF/ft from 12 conductors - (Cond. to Cond.)	30.5	36.6			39.6	32.0	41.1					
Capacitance pF/ft up to 7conductors - (Cond. to Shld.)	85.3	93.0			97.5	97.5	112.8			70.1		
Capacitance pF/ft from 12 conductors - (Cond. to Shld.)	70.1	82.3			91.4	79.2	118.9					
Inductance uH/ft	0.210	0.192			0.226	0.222	0.204					
Characteristic Impedance @ 1kHz in Ohms	90.0	80.0			85.0	85.0	75.0					
CF98												
Resistance Ohms/Mft	42.1	24.1										
Capacitance pF/ft @ 10MHz	18.9	22.9										
Inductance uH/ft	0.183	0.172										
Characteristic Impedance @ 1kHz in Ohms	115.0	115.0										
Capacitance pF/ft - (One Cond. to all Others)	30.5	36.6										
CF9												
Resistance Ohms/Mft	42.1	24.1	17.4	11.9	7.9	5.9	4.1	2.4	1.5	1.0	0.6	0.4
Capacitance pF/ft up to 7conductors - (Cond. to Cond.)		21.3	22.9	25.9	25.9	29.0	30.5	38.1	36.6	30.5		39.6
Capacitance pF/ft from 12 conductors - (Cond. to Cond.)		24.4		27.4	30.5	32.0	36.6	39.6				
Capacitance pF/ft up to 7conductors - (Cond. to Shld.)		35.1	41.1	41.1	44.2	44.2	51.8	57.9	45.7	56.4		61.0
Capacitance pF/ft from 12 conductors - (Cond. to Shld.)		61.0		56.4	77.7	71.6	65.5	68.6				
Inductance uH/ft		204.22	0.198	198.12	0.189	0.180	0.171	0.171	0.183	0.158	0.162	
Characteristic Impedance @ 1kHz in Ohms		100.0	100.0	90.0	85.0	80.0	75.0	70.0	70.0	70.0		65.0
CF10												
Resistance Ohms/Mft	42.1	24.1	17.4	11.9	7.9	5.9	4.1	2.4	1.5	1.0	0.6	
Capacitance pF/ft up to 7conductors - (Cond. to Cond.)		27.4	22.9	32.0	33.5	29.0	30.5	38.1	36.6	30.5		
Capacitance pF/ft from 12 conductors - (Cond. to Cond.)	24.4	29.0		29.0	32.0	32.0	36.6	39.6				
Capacitance pF/ft up to 7conductors - (Cond. to Shld.)		65.5		74.7	79.2	88.4	88.4	105.2				
Capacitance pF/ft from 12 conductors - (Cond. to Shld.)	54.9	61.0		62.5	68.6	77.7	80.8	83.8				
Inductance uH/ft	0.207	0.204		188.98	179.83	176.78	175.26	169.16				
Characteristic Impedance @ 1kHz in Ohms	100.0	90.0		85.0	80.0	75.0	75.0	65.0				



CONTROL CABLES

Table with columns: Cable Type / Characteristics, Conductor AWG Size (26 AWG to 6 AWG), and rows for CF9UL and CF10UL including Resistance, Capacitance, Inductance, and Impedance.

DATA CABLES

Table with columns: Cable Type / Characteristics, Conductor AWG Size (26 AWG to 6 AWG), and rows for CF240, CF211, CF11, CF12, CF113-D, and CF11-D including Resistance, Capacitance, and Impedance.



SERVO CABLES

Table with columns: Cable Type / Characteristics, Conductor AWG Size (18 AWG to 2 AWG), and rows for CF21 Power Conductor, CF21 Signal Pair, CF27 Power Conductor, and CF27 Signal Pair including Resistance, Capacitance, Inductance, and Impedance.



POWER CABLES

Cable Type / Characteristics

Cable Type / Characteristics	Conductor AWG Size											
	16 AWG	14 AWG	12 AWG	10 AWG	8 AWG	6 AWG	4 AWG	2 AWG				
CF30												
Resistance Ohms/Mft	4.1	2.4	1.5	1.006	0.7	0.517	0.3	0.174				
Operating Capacitance pF/ft	44.2	47.2	51.8	51.8	59.4	65.5	67.1	82.3				
Inductance uH/ft	0.101	0.101	0.098	0.098	0.094	0.091	0.090	0.088				
Characteristic Impedance @ 1kHz in Ohms	95.0	95.0	90.0	90.0	80.0	70.0	70.0	65.0				
Capacitance pF/ft - (One Cond. to all Others)	33.5	35.1	39.6	39.6	45.7	48.8	51.8	61.0				
CF31												
Resistance Ohms/Mft	4.1	2.4	1.5	1.006	0.7	0.517	0.3	0.174				
Operating Capacitance pF/ft	44.2	47.2	51.8	51.8	59.4	65.5	67.1	82.3				
Inductance uH/ft	0.101	0.101	0.098	0.098	0.094	0.091	0.090	0.088				
Characteristic Impedance @ 1kHz in Ohms	95.0	95.0	90.0	90.0	80.0	70.0	70.0	65.0				
Capacitance pF/ft - (One Cond. to all Others)	33.5	35.1	39.6	39.6	45.7	48.8	51.8	61.0				
CF34												
Resistance Ohms/Mft	4.1	2.4	1.5	1.006	0.7	0.517	0.3	0.174				
Operating Capacitance pF/ft	36.6		44.2	45.7		61.0	53.3					
Inductance uH/ft	0.104		0.098	0.098		0.094	0.094					
Characteristic Impedance @ 1kHz in Ohms	100.0		95.0	95.0		90.0	90.0					
Capacitance pF/ft - (One Cond. to all Others)	27.4		33.5	33.5		42.7	39.6					
CF35												
Resistance Ohms/Mft	4.1	2.4	1.5	1.006	0.7	0.517	0.3	0.174				
Operating Capacitance pF/ft		48.8	54.9	57.9	65.5	79.2						
Inductance uH/ft		0.101	0.098	0.098	0.094	0.088						
Characteristic Impedance @ 1kHz in Ohms		100.0	85.0	85.0	75.0	70.0						
Capacitance pF/ft - (One Cond. to all Others)		42.7	47.2	51.8	57.9	67.1						
CF300	16 AWG	14 AWG	12 AWG	10 AWG	8 AWG	6 AWG	4 AWG	2 AWG	1 AWG	2/0	3/0	4/0
Resistance Ohms/Mft	4.05	2.43	1.51	1.01	0.58	0.37	0.24	0.17	0.12	0.08	0.06	0.05
CF300 Continued	300 MCM	350 MCM										
Resistance Ohms/Mft	0.04	0.03										
CF310	16 AWG	14 AWG	12 AWG	10 AWG	8 AWG	6 AWG	4 AWG	2 AWG	1 AWG	2/0	3/0	4/0
Resistance Ohms/Mft	4.05	2.44	1.52	1.01	0.58	0.37	0.24	0.17	0.12	0.08	0.06	0.05
CF310 Continued	300 MCM	350 MCM	450 MCM									
Resistance Ohms/Mft	0.00	0.03	0.02									



The “Electromagnetic Compatability” of Chainflex® Cables

The subject of "electromagnetic compatibility (EMC)" is increasing in importance. This is due in part, to the increase in electro-magnetic interference fields, both in the environment created by modern telecommunications and the power systems used by local governments.

However, data transmission requirements are becoming more stringent. The signals are increasingly susceptible to interference and ambient electromagnetic interference is diversifying.

The coupling between cables which, as is frequently the case with Energy Chains®, are routed parallel over a certain distance may be specific problematic.

A power cable exposed to interference acts as the generator of an electromagnetic interference field which, in turn, acts on another cable (normally a signal cable) and causes conducted interference

We therefore introduced glass and polymer fiber optic cables a few years ago, which are capable of withstanding the mechanical stresses of use in Energy Chains®.

Chainflex cables using conventional copper conductors were tested for their electromagnetic compatibility in an extensive, application-oriented testing program.

For example, an asynchronous motor was connected via an unshielded power cable (Chainflex® CF30) to a frequency converter. This frequency converter with pulse width modulation generates

new spectral components not present to date either in the primary power system or in the secondary power system.

Chainflex® cables for digital signal transmission in an Energy Chain® were guided parallel to this power cable. The **Chainflex® CF 12 cable (the no interference cables)**, designed taking EMC aspects into account, is particularly efficient. This cable features twisted pair conductors with individual copper shielding, along with an overall ferrous shield. This ensures effective interference suppression over a wide frequency range.

Both capacitive and inductive coupling were tested. Under the test conditions selected, we were able to determine that, even if power and signal cables contact each other over a long distance, it is possible to achieve errorless data transmission if a shielded Chainflex® cable is used and this shield is grounded at both ends.

Tests were also carried out in accordance with applicable EMC compatibility standards. These standards are the basis for determining the operational performance of electrical equipment repeatedly exposed to electrical interference. These standards were not introduced solely for cables. Specifically, tests were carried out using a "burst generator," where rapid, transient interference is generated in pulse runs, mainly simulating switching operations. Such transient phenomena are produced, for example, by interrupting inductive loads or with relay contact bounce. As with other tests, shielded Chainflex® cables proved to be highly efficient.



Group	Chainflex® cable	Jacket material	1	2	3	4
CONTROL CABLE						
Control cable	CF130-UL	PVC	1			
Control cable	CF140-UL	PVC	1			
Control cable	CF130US	PVC		2		
Control cable	CF140US	PVC		2		
Control cable	CF5	PVC		2		
Control cable	CF6	PVC		2		
Control cable	CF77	PUR			3	
Control cable	CF78	PUR			3	
Control cable	CF2	PUR			3	
Control cable	CF9	TPE				4
Control cable	CF10	TPE				4
Control cable	CF9UL	TPE				4
Control cable	CF10UL	TPE				4
Control cable	CF98	TPE				4
Control cable	CF99	TPE				4
DATA CABLE						
Data cable	CF240	PVC		2		
Data cable	CF211	PVC		2		
Data cable	CF112	PUR			3	
Data cable	CF113	PUR			3	
Data cable	CF11	TPE				4
Data cable	CF12	TPE				4
BUS CABLE						
Bus cable	CFBUS	TPE				4
Bus cable	CF11-LC	TPE				4
Bus cable	CF11-LC-D	TPE				4
Bus cable	CF14	TPE				4
MEASURING SYSTEM CABLE						
Measuring system cable	CF211	PVC		2		
Measuring system cable	CF113-D	PUR			3	
Measuring system cable	CF111-D	TPE				4
Measuring system cable	CF11-D	TPE				4
KOAX CABLE						
Koax cable	CFKoax1	TPE				4
FIBRE OPTIC CABLE						
Fibre optic cable	CFLG-2H	PUR			3	
Fibre optic cable	CFLK	PUR			3	
Fibre optic cable	CFLG-2LB	TPE				4
Fibre optic cable	CFLG-G	TPE				4
SERVO CABLE						
Servo cable	CF210	PVC		2		
Servo cable	CF21	PVC		2		
Servo cable	CF27	PUR			3	
Servo cable	CF270	PUR			3	
POWER CABLE						
Power cable	CF30	PVC		2		
Power cable	CF31	PVC		2		
Power cable	CF34	TPE				4
Power cable	CF35	TPE				4
Power cable	CF300	TPE				4
Power cable	CFPE	TPE				4
Power cable	CF310	TPE				4
Power cable	CF BRAID	TPE				4

Chainflex® Cables: Chemical Resistance

Cable Type	1	2	3	4	
Inorganic chemicals					
Aqueous solutions, neutral					
Water	+	+	+	+	
Sodium chloride (10%)	+	+	+	+	
Glauber salt (10%)	+	+	+	+	
Aqueous solutions, alkaline					
Soda (10%)	0	+	0	+	
Aqueous solution, acidic					
Sodium bisulfate(10%)	0	+	0	+	+ no/few negative effects
Aqueous solutions, oxidizing					
Hydrogen peroxide (10%)	+	+	+	+	
Potassium permanganate (2%)	+	+	+	+	- unstable, partial destruction of material
Inorganic acids					
Concentrated hydrochloric acid	-	-	-	-	
Hydrochloric acid (10%)	0	0	0	+	0 average interaction, short-term exposure permissible
Concentrated sulfuric acid	-	-	-	-	
Sulfuric acid (10%)	0	0	0	+	
Concentrated nitric acid	-	-	-	-	
Nitric acid (10%)	0	0	0	+	
Inorganic bases					
Concentrated sodium hydroxide solution	-	-	-	0	
Sodium hydroxide solution (10%)	0	0	0	+	
Concentrated potassium hydroxide solution	-	-	-	0	
Potassium hydroxide solution (10%)	0	0	0	+	
Concentrated ammonia	0	0	0	+	
Ammonia (10%)	+	+	+	+	
Organic chemicals					
Organic acids					
Concentrated acetic acid (glacial acetic acid)	-	-	-	0	
Acetic acid (10% in H2O)	0	+	0	+	
Tartaric acid (10% in H2O)	0	+	+	+	
Citric acid (10% in H2O)	0	+	+	+	
Ketones					
Acetone	-	-	-	0	
Methyl ethyl ketone (MEK)	-	-	-	0	
Alcohols					
Ethanol (spirits)	-	0	0	+	
Isopropanol	-	0	0	+	
Diethylene glycol	0	0	+	+	
Aromatic hydrocarbons					
Toluene	-	-	0	-	
Xylene	-	-	0	-	
Fuels					
Benzine	-	0	+	+	
Diesel fuel	-	0	+	+	
Synthetic oils					
Lubricants					
ASTM Oil #2	0	+	+	+	
Hydraulic oil					
Mineral oil base	-	0	+	+	
Glycol base	0	0	+	+	
Synthetic ester base	-	0	+	+	
Vegetable oils					
Rape-seed oil	0	+	+	+	
Olive oil	0	+	+	+	
Soybean oil	0	+	+	+	
Cold cleaning agent					
Cold cleaning agent	-	0	+	0	



Color Code Information



DIN47100 Numbering/Color Code System

(without repetition of the color after the 44th conductor, unlike DIN)*

The first color indicates the basic color of the conductor insulation and the second color indicates the color of the printed rings. If three colors are specified, the second and third colors are printed in the basic color.

1 white	17 white-grey	33 green-red	49 white-green-black
2 brown	18 grey-brown	34 yellow-red	50 brown-green-black
3 green	19 white-pink	35 green-black	51 white-yellow-black
4 yellow	20 pink-brown	36 yellow-black	52 yellow-brown-black
5 grey	21 white-blue	37 grey-blue	53 white-grey-black
6 pink	22 brown-blue	38 pink-blue	54 grey-brown-black
7 blue	23 white-red	39 grey-red	55 white-pink-black
8 red	24 brown-red	40 pink-red	56 pink-brown-black
9 black	25 white-black	41 grey-black	57 white-blue-black
10 violet	26 brown-black	42 pink-black	58 brown-blue-black
11 grey-pink	27 grey-green	43 blue-black	59 white-pink-black
12 red-blue	28 yellow-grey	44 red-black	60 brown-red-black
13 white-green	29 pink-green	45 white-brown-black	61 black-white
14 brown-green	30 yellow-pink	46 yellow-green-black	
15 white-yellow	31 green-blue	47 grey-pink-black	
16 yellow-brown	32 yellow-blue	48 red-blue-black	

* Exception: 4-conductor cables are stranded in the color sequence white, yellow, brown, green.

Color Code Table for CF211 Position Feedback Cables

New Part No.	Old Part No.	Number of Conductors and Nominal Cross Section (mm ²)	Single Conductor	Color of Conductor
CF211-001	CF211-01-03-02-04-05-02	(3 x (2 x 0.14) C+ (4 x 0.14) + (2 x 0.5)) C	(3 x (2 x 0.14) C 4 x 0.14 2 x 0.5	yellow/green, black/brown, red/orange gray, blue, white-yellow, white-black brown-red, brown-blue
CF211-002	CF211-01-03-02-05-02	(3 x (2 x 0.14) C+ (2 x 0.5C)) C	3 x (2 x 0.14) C 2 x 0.5 C	green/yellow, black/brown, red/orange black, red
CF211-006	CF211-01-10-02-04-05-02	(3 x (2 x 0.14) C+ (2 x 0.5 + 2 x 0.14)+ (4 x 0.23 + 2 x 0.14)) C	3 x (2 x 0.14) C 4 x 0.14 4 x 0.23 2 x 0.5	green/yellow, black/brown, red/orange gray, blue, white-yellow, white-black, brown-yellow, brown-gray, green-black, green-red brown-red, brown-blue
CF211-009	—	(4 x (2 x 0.25) + 2 x 0.5) C	4 x (2 x 0.25) 2 x 0.5	brown/green, blue/violet, gray/pink, red/black white, brown
CF211-010	CF211-02-04-02-10-02	(4 x (2 x 0.25) + 2 x 1.0) C	4 x (2 x 0.25) 2 x 1.0	brown/green, blue/violet, gray/pink, red/black white, brown
CF211-011	CF211-03-04-02-05-04	(4 x (2 x 0.34) + 4 x 0.5) C	4 x (2 x 0.34) 4 x 0.5	black/brown, red/orange, yellow/green, blue/violet blue-white, black-white, red-white, yellow-white
CF211-014	CF211-02-04-02-C-05-02	(4 x (2 x 0.25) C + 1 x 2 x 0.5) C	4 x (2 x 0.25) C 2 x 0.5	white/brown, yellow/green, gray/pink, blue/red black (Numeral printing 1-2)
CF211-016	CF211-02-C-03-02	(3 x (2 x 0.25) C) C	3 x (2 x 0.25) C	white/brown, yellow/green, gray/pink
CF211-017	CF211-01-04-02-10-04-01-04	(4 x (2 x 0.14) + 4 x 1.0 + (4 x 0.14) C) C	(4 x 0.14) C 4 x (2 x 0.14) 4 x 1.0	blue-black, red-black, yellow-black, green-black red/black, green/brown, yellow/violet, pink/gray white-green, brown-green, blue, white
CF211-018	CF211-02-02-02-05-02	(2 x (2 x 0.25) + 2 x 0.5) C	2 x (2 x 0.25) 2 x 0.5	red/black, gray/pink white, brown
CF211-019	CF211-02-02-03-02-03-10-02-D	(3 x 0.25) + 3 x (2 x 0.25) C + 2 x 1.0) C	3 x (2 x 0.25) C 3 x 0.25 2 x 1.0	brown/green, pink/gray, red/black blue, yellow, violet white, brown
CF211-027		(5 x (2 x 0.14) + (2 x 0.5)) C	5 x (2 x 0.14) (2 x 0.5)	green/brown, gray/yellow, white/violet, black/red, blue/pink white-green, white-red

Color Code Table for CF11-D/CF113-D

CF11-D Part No.	CF113-D Part No.	Number of Conductors and Nominal Cross Section (mm ²)	Single Conductor	Color of Conductor
CF11-001-D	CF113-001-D	(3 x (2 x 0.14) C+ (4 x 0.14) + (2 x 0.5)) C	(3 x (2 x 0.14) C 4 x 0.14 2 x 0.5	yellow/green, black/brown, red/orange gray, blue, white-yellow, white-black brown-red, brown-blue
CF11-002-D	CF113-002-D	(3 x (2 x 0.14) C+ (2 x 0.5C)) C	3 x (2 x 0.14) C 2 x 0.5 C	green/yellow, black/brown, red/orange black, red
CF11-003-D	CF113-003-D	(3 x (2 x 0.14) + 2 x 1.0) C	3 x (2 x 0.14) 2 x 1.0	white/brown, yellow/green, gray/pink blue, red
CF11-004-D	CF113-004-D	(4 x (2 x 0.14) + (4 x 0.14) C + 4 x 0.5) C	4 x (2 x 0.14) (4 x 0.14) C 4 x 0.5	brown/green, violet/yellow, gray/pink, red/black yellow-black, red-black, green-black, blue-black brown-green, white-green, blue, white
CF11-005-D	CF113-005-D	(4 x (2 x 0.14) + 4 x 0.5) C	4 x (2 x 0.14) 4 x 0.5	white/brown, yellow/green, gray/pink, blue/red black, violet, gray-pink, red-blue
CF11-006-D	CF113-006-D	(3 x (2 x 0.14) C + (2 x 0.5 + 2 x 0.14) + (4 x 0.23 + 2 x 0.14)) C	3 x (2 x 0.14) C 4 x 0.14 4 x 0.23 2 x 0.5	green/yellow, black/brown, red/orange gray, blue, white-yellow, white-black brown-yellow, brown-gray, green-black, green-red brown-red, brown-blue
CF11-007-D	CF113-007-D	(2 x (2 x 0.34)) C	4 x 0.34	white, brown, green, yellow
CF11-008-D	CF113-008-D	(3 x (2 x 0.25)) C	3 x (2 x 0.25)	white/brown, yellow/green, gray/pink
CF11-009-D	CF113-009-D	(4 x (2 x 0.25) + 2 x 0.5) C	4 x (2 x 0.25) 2 x 0.5	brown/green, blue/violet, gray/pink, red/black white, brown
CF11-010-D	CF113-010-D	(4 x (2 x 0.25) + 2 x 1.0) C 3 x (2 x 0.25) C + 2 x 1.0) C	4 x (2 x 0.25) 2 x 1.0	brown/green, blue/violet, gray/pink, red/black white, brown
CF11-011-D	CF113-011-D	(4 x (2 x 0.34) + 4 x 0.5) C	4 x (2 x 0.34) 4 x 0.5	black/brown, red/orange, yellow/green, blue/violet blue-white, black-white, red-white, yellow-white
CF11-012-D	CF113-012-D	(3 x (2 x 0.14) C (2 x 0.5 + 6 x 0.14) + (1 x (3 x 0.14) C) C	3 x (2 x 0.14) C (3 x 0.14) C 6 x 0.14 2 x 0.5	green/yellow, white/gray, blue/red red, green, brown blue, gray, gray, yellow, pink, violet brown-red, brown-blue
CF11-013-D	CF113-013-D	(3 x (2 x 0.14) C + 2 x 0.5) C	3 x (2 x 0.14) C 2 x 0.5	white/brown, yellow/green, gray/pink red, blue
CF11-015-D	CF113-015-D	(4 x (2 x 0.14) + 4 x 0.5) C	4 x (2 x 0.14) 4 x 0.5	brown/green, violet/yellow, gray/pink, red/black blue, white, brown-green, white-green
CF11-017-D	CF113-017-D	(4 x (2 x 0.14) + 4 x 1.0 + (4 x 0.14) C) C	(4 x 0.14) C 4 x (2 x 0.14) 4 x 1.0	blue-black, red-black, yellow-black, green-black red/black, green/brown, yellow/violet, pink/gray white-green, brown-green, blue, white
CF11-018-D	CF113-018-D	(2 x (2 x 0.25) + 2 x 0.5) C	2 x (2 x 0.25) 2 x 0.5	red/black, gray/pink white, brown
CF11-019-D	CF113-019-D	(3 x 0.25) + 3 x (2 x 0.25) C + 2 x 1.0) C	3 x (2 x 0.25) C 3 x 0.25 2 x 1.0	brown/green, pink/gray, red/black blue, yellow, violet white, brown
CF11-021-D	CF113-021-D	(6 x 0.5 + 5 x 2 x 0.25) C	(3 x 0.5) (3 x 0.5) (5 x 2 x 0.25)	black (numeral printing 1-3) red (numeral printing 1-3) yellow/white, gray/white, black/orange, white/brown, black/gray
CF11-022-D	CF113-022-D	(5 x 0.5 + 1 x 2 x 0.25) C	(5 x 0.5) (2 x 0.25)	blue, green, yellow, gray, pink white, brown
CF11-025-D	CF113-025-D	(3 x (2 x 0.14) C	3 x (2 x 0.14) (2 x 0.5)	green/yellow, blue/red, gray/pink white, brown
CF11-027-D	CF113-027-D	(5 x (2 x 0.14) + (2 x 0.5)) C	5 x (2 x 0.14) (2 x 0.5)	green/brown, gray/yellow, white/violet, black/red, blue/pink white-green, white-red



Color Code Table for CF111-D Cables

New Part No.	Number of Conductors and Nominal Cross Section (mm ²)	Single Conductor	Color of Conductor
CF111-001-D	(3 x (2 x 0.14) C +	(3 x (2 x 0.14) C	yellow/green, black/brown, red/orange
	(4 x 0.14) + (2 x 0.5) C	4 x 0.14	gray, blue, white-yellow, white-black
		2 x 0.5	brown-red, brown-blue
CF111-004-D	(4 x (2 x 0.14) +	4 x (2 x 0.14)	brown/green, violet/yellow, gray/pink, red/black
	(4 x 0.14) C + 4 x 0.5) C	(4 x 0.14) C	yellow-black, red-black, green-black, blue-black
		4 x 0.5	brown-green, white-green, blue, white
CF111-006-D	(3 x (2 x 0.14) C +	3 x (2 x 0.14) C	green/yellow, black/brown, red/orange
	(2 x 0.5 + 2 x 0.14) +	4 x 0.14	gray, blue, white-yellow, white-black
	(4 x 0.23 + 2 x 0.14) C	4 x 0.23	brown-yellow, brown-gray, green-black, green-red
		2 x 0.5	brown-red, brown-blue
CF111-011-D	(4 x (2 x 0.34) + 4 x 0.5) C	4 x (2 x 0.34)	black/brown, red/orange, yellow/green, blue/violet
		4 x 0.5	blue-white, black-white, red-white, yellow-white
CF111-015-D	(4 x (2 x 0.14) + 4 x 0.5) C	4 x (2 x 0.14)	brown/green, violet/yellow, gray/pink, red/black
		4 x 0.5	blue, white, brown-green, white-green
CF111-021-D	(6 x 0.5 + 5 x 2 x 0.25) C	(3 x 0.5)	black (numeral printing 1-3)
		(3 x 0.5)	red (numeral printing 1-3)
		(5 x 2 x 0.25)	yellow/white, gray/white, black/orange, white/brown, black/gray
CF111-022-D	(5 x 0.5 + 1 x 2 x 0.25) C	(5 x 0.5)	blue, green, yellow, gray, pink
		(2 x 0.25)	white, brown
CF111-027-D	(5 x (2 x 0.14) +	5 x (2 x 0.14)	green/brown, gray/yellow, white/violet, black/red,
	(2 x 0.5) C	(2 x 0.5)	blue/pink
	(4 x (2 x 0.25) C +	4 x (2 x 0.25) C	white-green, white-red
CF111-035-D	2 x (2 x 0.5) C	2 c	white/brown, green/yellow, gray/pink, blue/red

Color Code Table for CFBUS Cables

New Part No.	Characteristic Wave Impedance in Ω approx.	Number of Conductors and Nominal Cross Section (mm ²)	Color of Conductor
PROFIBUS			
CFBUS-001	150	(2 x 0.25) C	red, green
CFBUS-002	150	4 x 1.5+ (2 x 0.25) C	black with white numbers red, green
CFBUS-003	150	3 x 0.75+ (2 x 0.25) C	black, blue, green-yellow red, green
INTERBUS			
CFBUS-010	100	(3 x 2 x 0.25) C	white, brown, green, yellow, gray, pink
CFBUS-011	100	(3 x 1.0 + 3 x 2 x 0.25) C	red, blue, green-yellow white, brown, green, yellow, gray, pink
FIELD BUS (CAN)			
CFBUS-020	120	(2 x 2 x 0.25) C	white, brown, green, yellow (star-quad stranding)
CFBUS-021	120	(1 x 2 x 0.5) C	white/brown
CFBUS-022	120	(2 x 2 x 0.5) C	white, brown, green, yellow (star-quad stranding)
CC LINK			
CFBUS-035	110	(3 x 20 AWG) C	white, yellow, blue
DEVICENET			
CFBUS-030	120	(1 x 2 x AWG 24) + (1 x 2 x AWG 22) C	white, blue red, black
CFBUS-031	120	(1 x 2 x AWG 18) + (1 x 2 x AWG 15) C	white, blue red, black
ETHERNET/CAT5			
CFBUS-040	100	(2 x 2 x 0.25) C	white, green, brown, yellow (star-quad stranding)
CFBUS-041	100	(4 x 2 x 0.25) C	white, brown, green, yellow, gray, pink, blue, red
CFBUS-042	100	(5 x 2 x 0.25) C	white, brown, green, yellow, gray, pink, blue, red, black, violet
CFBUS-044	100	(4 x 2 x 0.15) C	white, brown, green, yellow, gray, pink, blue, red
CFBUS-045	100	(4 x (2 x 0.15)) C	white-blue/blue, white-orange/orange, white-green/green, whitebrown/brown
ETHERNET/CAT5			
CFBUS-050	100	(4 x (2 x 0.14) C) C	white, blue, white, orange, white, green, white, brown
FIREWIRE			
CFBUS-055	100	(2 x 2 x 0.15) C +	orange/blue, green/red
USB			
		2 x (0.34) C	black, white
CFBUS-065	90	2 x 0.5 2 x 0.08	red, black white, green
CFBUS-066	90	2 x 0.5 2 x 0.24	red, black white, green
DVI			
CFBUS-070	100	(4 x (2 x 0.08 + 2 x 0.08 + 3 x 0.08))C	4x white/yellow with individual jacket in blue, black, white, red white/brown, green, yellow, gray

Custom Chainflex® Cables

The need for continuous-flex cables is on the rise. As the number of demanding flex applications increases, igus' design specialists encounter more and more varied and unique cable specifications. Through a combination of testing and customer feedback, we are constantly developing new types of Chainflex® cables to meet your evolving needs. However, if your cable requirements are outside our standard product line, igus® offers custom cable solutions.

We will meet the requirements of your continuous-flexing application by employing the same design techniques used for Chainflex® cables. Our proven designs are continuously tested to ensure the reliability of our products. We will analyze your specifications and recommend a cable construction customized for your application.



Partial view of igus® experimental laboratory - testing, testing, testing of Chainflex® cables

As part of our custom cable capabilities, igus® delivers:

- Cable design consultation for any application
- Flex lab available to validate designs
- Composite constructions
- Full selection of common UL, CSA and CE approvals
- Full selection of thermoplastic materials
- Short lead times, typically from 4 to 6 weeks
- Low minimum order requirements, typically 2500'

Please contact igus® for a free custom cable design for your application. See the Custom Cable Analysis Sheet on the opposite page.

igus® Offers Custom Cable Designs

Chainflex® Cables: Custom Cable and Application Analysis

Date: _____ Phone: _____
 Name: _____ Fax: _____
 Company: _____ E-Mail: _____

Application (Brief Description)

Initial Footage Requirement: _____ Annual Usage: _____

Motion

Continuous Flex (Check One): Rolling Torsion Multi-Axis
 Energy Chain® Number: _____ Max Speed (ft/sec): _____
 Bend Radius: _____ Max Acceleration (ft/sec²): _____
 Number of Cycles/Day: _____ Max Travel: _____
 Operational Days/Year: _____ Max Travel Distance: _____

Cable Performance Criteria

Voltage: _____ Temperature Range: _____
 Flame Retardant _____ Abrasion Resistant _____
 Oil Resistant _____ Indoor Outdoor _____
 Halogen-Free _____ UL _____
 UV Resistant _____ CSA _____
 Exposure to Chemicals/Oils/Solvents: _____ Other Approvals: _____

Electrical Characteristics: (Impedance, Capacitance, Attenuation, other)

Cable Construction:

Primary	Component 1	Component 2	Component 3
Number of Conductors/Pairs			
AWG/Stranding/Type (Ex: 65/34 Tinned Copper)			
Insulation Type			
Individually Shielded	Y/N	Y/N	Y/N
Color Code			
Overall Shielding <input type="checkbox"/> Yes <input type="checkbox"/> No			
Jacket Material (Ex: PVC, Polyurethane, TPE, etc.)			
Maximum Diameter Needed			

Notes: _____

Please Fax to: **1-401-438-7270**



Control Cables



Control Cable Selection

Chainflex® cable	Jacket	Shield	Class	Bending radius moving (factor x d)	Temperature moving from/to °F (°C)	Oil-resistant	Torsion resistant	V max. ft/s (m/s) unsupported	V max. ft/s (m/s) gliding	a max. ft/s² (m/s²)	Approvals and standards
Control cables											
CF130	PVC		4.2.1	7.5-10	+23/+158°F (-5/+70°C)	✓		9.84 ft/s (3 m/s)	6.56 ft/s (2 m/s)	65.6 ft/s² (20 m/s²)	CE, UL, C7, US
CF140	PVC	✓	4.2.1	7.5-10	+23/+158°F (-5/+70°C)			9.84 ft/s (3 m/s)	6.56 ft/s (2 m/s)	65.6 ft/s² (20 m/s²)	CE, UL, C7, US
CF130US	PVC		4.2.1	8	+23/+176°F (-5/+80°C)	✓	✓	9.84 ft/s (3 m/s)	6.56 ft/s (2 m/s)	65.6 ft/s² (20 m/s²)	CE, IEC, UL, C7, US
CF140US	PVC	✓	4.2.1	10	+23/+176°F (-5/+80°C)	✓		9.84 ft/s (3 m/s)	6.56 ft/s (2 m/s)	65.6 ft/s² (20 m/s²)	CE, IEC, UL, C7, US
CF5	PVC		5.3.2	6.8-7.5	+23/+158°F (-5/+70°C)	✓	✓	32.8 ft/s (10 m/s)	16.4 ft/s (5 m/s)	262.4 ft/s² (80 m/s²)	CE, UL, C7, US, GreenMark
CF6	PVC	✓	5.3.2	6.8-7.5	+23/+158°F (-5/+70°C)	✓		32.8 ft/s (10 m/s)	16.4 ft/s (5 m/s)	262.4 ft/s² (80 m/s²)	CE, UL, C7, US, GreenMark
CF170-D	PUR		4.1.3	7.5-10	-31/+176°F (-35/+80°C)	✓	✓	9.84 ft/s (3 m/s)	6.56 ft/s (2 m/s)	65.6 ft/s² (20 m/s²)	CE, BlueMark
CF77-UL-D	PUR		5.2.3	6.8-7.5	-31/+176°F (-35/+80°C)	✓	✓	32.8 ft/s (10 m/s)	16.4 ft/s (5 m/s)	262.4 ft/s² (80 m/s²)	CE, UL, C7, US, BlueMark
CF78-UL	PUR	✓	5.2.3	6.8-7.5	-31/+176°F (-35/+80°C)	✓		32.8 ft/s (10 m/s)	16.4 ft/s (5 m/s)	262.4 ft/s² (80 m/s²)	CE, UL, C7, US
CF7	PUR		5.3.3	6.8-7.5	-4/+176°F (-20/+80°C)	✓	✓	32.8 ft/s (10 m/s)	16.4 ft/s (5 m/s)	262.4 ft/s² (80 m/s²)	CE, UL, C7, US
CF8	PUR	✓	5.3.3	6.8-7.5	-4/+176°F (-20/+80°C)	✓		32.8 ft/s (10 m/s)	16.4 ft/s (5 m/s)	262.4 ft/s² (80 m/s²)	CE, UL, C7, US
CF2	PUR	✓	6.3.3	5	-4/+176°F (-20/+80°C)	✓		32.8 ft/s (10 m/s)	16.4 ft/s (5 m/s)	262.4 ft/s² (80 m/s²)	CE, UL, C7, US
CF98	TPE		7.4.4	4	-31/+194°F (-35/+90°C)	✓	✓	32.8 ft/s (10 m/s)	19.6 ft/s (6 m/s)	328.1 ft/s² (100 m/s²)	CE, GreenMark
CF99	TPE	✓	7.4.4	4	-31/+194°F (-35/+90°C)	✓		32.8 ft/s (10 m/s)	19.6 ft/s (6 m/s)	328.1 ft/s² (100 m/s²)	CE, GreenMark
CF9	TPE		7.4.4	5	-31/+212°F (-35/+100°C)	✓	✓	32.8 ft/s (10 m/s)	19.6 ft/s (6 m/s)	328.1 ft/s² (100 m/s²)	CE, GreenMark
CF10	TPE	✓	7.4.4	5	-31/+212°F (-35/+100°C)	✓		32.8 ft/s (10 m/s)	19.6 ft/s (6 m/s)	328.1 ft/s² (100 m/s²)	CE, GreenMark
CF9-UL	TPE		6.4.4	5	-31/+212°F (-35/+100°C)	✓	✓	32.8 ft/s (10 m/s)	19.6 ft/s (6 m/s)	328.1 ft/s² (100 m/s²)	CE, UL, C7, US, GreenMark
CF10-UL	TPE	✓	6.4.4	5	-31/+212°F (-35/+100°C)	✓		32.8 ft/s (10 m/s)	19.6 ft/s (6 m/s)	328.1 ft/s² (100 m/s²)	CE, UL, C7, US, GreenMark

CF130



PVC Control Cable

Chainflex® CF130

PVC Energy Chain® cable, flame-retardant

CLASS
4.2.1

Price Index


Conductor
Fine-wire stranded
conductor

Strain relief
Center core for
high tensile
strength

Core
Braiding in bundles
around high tensile
strength core

Outer jacket
Gusset-filling
pressure
extruded

Construction

Conductors: Finely stranded bare copper wires. According to EN 60228.

Conductor insulation: TPE insulation

Conductor twisting: Number of conductors < 12, Conductors concentrically layered with short pitch. Number of conductors ≥ 12, Conductors layered in braids around a, high tensile-strength core; short pitches matched in the direction of the pitch for extremely low torsion.

Conductor colors: Black with white numbers, one conductor green-yellow ≥ 20 AWG; 22 & 24 AWG color-coded in accordance with DIN 47100.

Outer jacket: PVC-based, low-adhesion blend, adapted to the requirements of the Energy Chain®. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** grey (RAL 7001).

Technical Data

Minimum bending radius, moving: <10m travel = 7.5 x o.d.; ≥ 10m travel = 10 x o.d.

Minimum bending radius, fixed: 5 x outer cable diameter

Permissible temperature, moving: +23°F to +158°F (-5°C to +70°C)

Permissible temperature, fixed: -4°F to +158°F (-20°C to +70°C)

Voltage: 300V

Testing Voltage: 2000 V

Regulations: cRUus AWM: UL AWM style for USA and Canada: 20200 60°C 300V

Flame resistance: FT1, IEC 332-1, CE: 73/23/EWG, 93/68/EWG, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Typical Applications

- for medium mechanical load requirements
- without influence of oil
- preferably indoor applications
- torsion +/-90° with 3 ft. of cable length
- especially for unsupported travel distances and for gliding applications up to 164 ft (50m).
- wood/stone processing, packaging industry, supply system, handling, adjusting equipment



10.64

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

PVC Control Cable

Chainflex® CF130

PVC Energy Chain® cable, flame-retardant



CF130

CLASS
4.2.1

Price Index

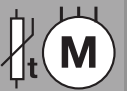
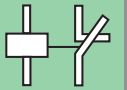


Part No.	AWG	No. of Conductors and Rated Cross- Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF130-02-03	24	3 x 0.24	.18	(4.5)	5.4	(8)	16.0	(24)
CF130-02-04	24	4 x 0.25	.22	(5.5)	6.7	(10)	24.8	(37)
CF130-02-06	24	6 x 0.24	.24	(6.0)	10.1	(15)	30.2	(45)
CF130-02-07	24	7 x 0.24	.26	(6.5)	12.1	(18)	31.5	(47)
CF130-02-12	24	12 x 0.24	.34	(8.5)	21.0	(31)	63.0	(94)
CF130-02-20	24	20 x 0.24	.41	(10.5)	32.9	(49)	96.0	(143)
CF130-02-25	24	25 x 0.24	.45	(11.5)	42.3	(63)	101.3	(151)
CF130-03-05	22	5 x 0.34	.22	(5.5)	11.56	(17)	32.6	(48)
CF130-05-02	20	2 x 0.5	.22	(5.5)	6.8	(10)	27.2	(40)
CF130-05-03	20	3 x 0.5	.24	(6)	9.5	(14)	37.4	(55)
CF130-05-04	20	4 x 0.5	.26	(6.5)	12.9	(19)	40.8	(60)
CF130-05-05	20	5 x 0.5	.28	(7.0)	16.3	(24)	44.2	(65)
CF130-05-07	20	7 x 0.5	.31	(8)	23.1	(34)	68.0	(100)
CF130-05-12	20	12 x 0.5	.37	(9.5)	37.4	(55)	78.9	(116)
CF130-05-18	20	18 x 0.5	.47	(12.0)	61.2	(90)	107.5	(158)
CF130-05-25	20	25 x 0.5	.53	(13.5)	85.7	(126)	151.0	(222)
CF130-07-02	18	2 x 0.75	.24	(6.0)	10.0	(15)	33.5	(50)
CF130-07-03	18	3 x 0.75	.26	(6.5)	14.8	(22)	40.3	(60)
CF130-07-04	18	4 x 0.75	.28	(7)	19.7	(29)	54.4	(80)
CF130-07-05	18	5 x 0.75	.30	(7.5)	24.5	(36)	61.2	(90)
CF130-07-07	18	7 x 0.75	.33	(8.5)	34.0	(50)	88.4	(130)
CF130-07-12	18	12 x 0.75	.41	(10.5)	55.1	(81)	101.4	(149)
CF130-07-18	18	18 x 0.75	.51	(13.0)	82.3	(121)	145.6	(214)
CF130-07-25	18	25 x 0.75	.61	(15.5)	113.6	(167)	206.1	(303)
CF130-10-02	17	2 x 1.0	.24	(6.0)	12.8	(19)	33.6	(50)
CF130-10-03	17	3 x 1.0	.28	(7)	19.7	(29)	51.0	(75)
CF130-10-04	17	4 x 1.0	.30	(7.5)	26.5	(39)	61.2	(90)
CF130-10-05	17	5 x 1.0	.31	(8)	32.6	(48)	74.8	(110)
CF130-10-07	17	7 x 1.0	.37	(9.5)	46.2	(68)	115.6	(170)
CF130-10-12	17	12 x 1.0	.45	(11.5)	73.5	(108)	125.9	(185)
CF130-10-18	17	18 x 1.0	.55	(14)	110.0	(161)	178.9	(263)
CF130-10-25	17	25 x 1.0	.67	(17)	152.4	(224)	252.4	(371)
CF130-15-02	16	2 x 1.5	.30	(7.5)	20.0	(29)	47.0	(70)
CF130-15-03	16	3 x 1.5	.30	(7.0)	29.9	(44)	61.2	(90)
CF130-15-04	16	4 x 1.5	.31	(8)	39.4	(58)	81.6	(120)
CF130-15-05	16	5 x 1.5	.37	(9.5)	49.0	(72)	95.2	(140)
CF130-15-07	16	7 x 1.5	.41	(10.5)	68.7	(101)	142.8	(210)
CF130-15-12	16	12 x 1.5	.51	(13)	109.5	(161)	178.9	(263)
CF130-15-18	16	18 x 1.5	.59	(15)	164.6	(242)	262.6	(386)
CF130-15-25	16	25 x 1.5	.75	(19)	238.1	(350)	368.0	(541)
CF130-25-03	14	3 x 2.5	.34	(8.5)	48.3	(72)	77.9	(116)
CF130-25-04	14	4 x 2.5	.39	(10)	65.3	(96)	122.4	(180)
CF130-25-07	14	7 x 2.5	.51	(13)	114.2	(168)	238	(350)
CF130-25-12	14	12 x 2.5	.63	(16)	180.3	(265)	267.2	(406)
CF130-40-03	12	3 x 4.0	.43	(11.0)	77.3	(115)	134.4	(200)
CF130-60-04	10	4 x 6.0	.53	(13.5)	156.4	(230)	265.2	(360)
CF130-60-05	10	5 x 6.0	.59	(15)	195.8	(288)	284.2	(418)

NOTE: The mentioned external diameters are maximum values.

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



10.65

CF140



PVC Control Cable

Chainflex® CF140

PVC Energy Chain® cable, shielded, flame-retardant

CLASS
4.2.1

Price Index



Conductor
Fine wire stranded
conductor

Strain relief
Center core for
high tensile
stress

Core
Braiding in
bundles around
high tensile
strength core

Inner jacket
Gusset-filling
pressure
extruded

Overall shield
Bend-resistant
braided tinned
copper shield

Outer jacket
pressure
extruded

Construction

Conductors: Finely stranded bare copper wires. According to EN 60228.

Conductor insulation: TPE insulation

Conductor twisting: Number of conductors < 12, Conductors concentrically layered with short pitch. Number of conductors ≥ 12, Conductors layered in braids around a, high tensile-strength core; short pitches matched in the direction of the pitch for extremely low torsion.

Conductor colors: ≥ 20 AWG Black with white numbers, one conductor green-yellow; 22 & 24 AWG color-coded in accordance with DIN 47100

Inner jacket: Low-adhesion PVC blend, adapted to the requirements of the Energy Chain®.

Shield: Tinned copper braid 80% optical coverage

Outer jacket: PVC-based, low-adhesion blend, adapted to the requirements of the Energy Chain®. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** grey (RAL 7001).

Technical Data

Minimum bending radius, moving: <10m travel = 7.5 x outer diameter; ≥10m travel = 15 x outer diameter

Minimum bending radius, fixed: 7.5 x outer cable diameter

Permissible temperature, moving: +23°F to +158°F (-5°C to +70°C)

Permissible temperature, fixed: -4°F to +158°F (-20°C to +70°C)

Flame resistance: FT1

Nominal voltage: 300V

Testing Voltage: 2000 V

Regulations: cRUus AWM: UL AWM style for USA and Canada: 20200 60°C 300V CE: 73/23/EWG, 93/68/EWG, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Typical Applications

- for medium mechanical load requirements
- preferably indoor applications
- especially for unsupported and gliding travel up to 164 ft (50m).
- storage and retrieval units for high-bay warehouse, machining units/package machines, handling, indoor cranes



10.66

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

PVC Control Cable

Chainflex® CF140

PVC Energy Chain® cable, shielded, flame-retardant



CF140

CLASS
4.2.1

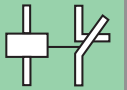
Price Index



Part No.	AWG	No. of Conductors and Rated Cross- Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF140-02-12	24	12 x 0.25	.39	(10)	47.0	(69)	75.5	(111)
CF140-03-05	22	5 x 0.34	.31	(8)	28.6	(42)	54.4	(80)
CF140-05-03	20	3 x 0.5	.32	(8)	21.5	(32)	58.5	(87)
CF140-05-05	20	5 x 0.5	.35	(9)	31.9	(47)	88.4	(130)
CF140-05-18	20	18 x 0.5	.53	(13.5)	82.9	(122)	183.6	(270)
CF140-05-36	20	36 x 0.5	.79	(20)	186.3	(274)	306	(450)
CF140-07-03	18	3 x 0.75	.33	(8.5)	27.9	(41)	61.2	(90)
CF140-07-04	18	4 x 0.75	.35	(9)	35.4	(52)	88.4	(130)
CF140-07-05	18	5 x 0.75	.35	(9)	40.1	(59)	102	(150)
CF140-07-07	18	7 x 0.75	.41	(10.5)	53	(78)	115.6	(170)
CF140-07-12	18	12 x 0.75	.51	(13)	76	(112)	150	(220)
CF140-07-18	18	18 x 0.75	.59	(15)	121	(178)	197	(289)
CF140-07-25	18	25 x 0.75	.69	(17.5)	174	(256)	232	(414)
CF140-10-02	17	2 x 1	.30	(7.5)	22.5	(33)	57.1	(84)
CF140-10-03	17	3 x 1	.33	(8.5)	35.4	(52)	88.4	(130)
CF140-10-04	17	4 x 1	.37	(9.5)	41.5	(61)	102	(150)
CF140-10-05	17	5 x 1	.39	(10)	51	(75)	115.6	(170)
CF140-10-07	17	7 x 1	.45	(11.5)	67.3	(99)	136	(200)
CF140-10-12	17	12 x 1	.53	(13.5)	108	(159)	165	(243)
CF140-10-18	17	18 x 1	.65	(16.5)	154	(227)	277	(407)
CF140-10-25	17	25 x 1	.73	(18.5)	219	(322)	327	(481)
CF140-15-03	16	3 x 1.5	.37	(9.5)	44.9	(66)	102	(150)
CF140-15-04	16	4 x 1.5	.39	(10)	57.8	(85)	122.4	(180)
CF140-15-05	16	5 x 1.5	.43	(11)	70.7	(104)	149.6	(220)
CF140-15-07	16	7 x 1.5	.49	(12.5)	93.2	(137)	176.8	(260)
CF140-15-12	16	12 x 1.5	.57	(14.5)	151	(222)	277	(407)
CF140-15-18	16	18 x 1.5	.73	(18.5)	231	(339)	318	(467)
CF140-15-25	16	25 x 1.5	.87	(22)	327	(480)	478	(703)
CF140-25-03	14	3 x 2.5	.41	(10.5)	66.7	(98)	116.3	(171)
CF140-25-04	14	4 x 2.5	.47	(12)	87	(128)	170	(250)

NOTE: The mentioned external diameters are maximum values.

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No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

CF130US



PVC Control Cable

Chainflex® CF130US

PVC Energy Chain® cable, oil-resistant, flame-retardant
UL Tray cable for exposed run (TC-ER)

CLASS
3.1.2

Price Index



Conductor
Fine wire stranded
conductor

Core
Cabled in layers
around strength
core

Outer jacket
Gusset-filling
pressure
extruded

Description

In general these cables will offer continuous-flex performance in specific "Tray Cable" and "Machine Tool Wire" NEC compliant installations. The CF130US line is designed for use in 600V control and power applications. The oil-resistant jacket also passes the stringent 70,000 BTU UL and CSA Vertical Flame Tests. Not recommended for long travel / gliding applications.

Construction

Conductors: Finely stranded bundled bare copper wires. Designed in accordance with ASTM B174-95

Conductor insulation: Mechanically high-quality, PVC/Nylon

Conductor twisting: Conductors concentrically layered with short pitch.

Conductor colors: **Black with white numbers, one green-yellow.

Outer jacket: Oil-resistant UV-resistant PVC, low-adhesion blend, adapted to the requirements of the Energy Chain®. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** Grey (RAL 7001)

Technical Data

Minimum bending radius, moving: 8 x outer cable diameter

Minimum bending radius, fixed: 5 x outer cable diameter

Permissible temperature, moving: +23°F to +176°F (-5°C to +80°C)

Permissible temperature, fixed: -4°F to +194°F (-20°C to +90°C)

UV Resistance: Medium

Voltage: 600 V

Test Voltage: 3300V

UL Listings: For installation in accordance with all applicable sections of the National Electric Code.

22 AWG - 10 AWG UL Type MTW (Machine Tool Wire), 18 AWG - 10 AWG UL Type TC (Tray Cable) includes ER-exposed run

UL AWM: 2587 90°C 600V; **CSA AWM:** I/II A/B 90°C 600V FT4; **CE:** In accordance with European Council Directive 73/23/EEC, **RoHS: 2002/95/EC;** Please reference the Design Section (Chapter 1) for more information.

Typical Applications

- for medium load requirements
- suitable for indoor/outdoor applications
- especially for unsupported travel distances and for low-duty gliding applications up to 30 ft (9m)
- UL Tray cable for exposed run (TC-ER)
- wood/stone processing, packaging industry, supply system, handling, adjusting equipment, machine tools



10.68

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

PVC Control Cable

Chainflex® CF130US

PVC Energy Chain® cable, oil-resistant, flame-retardant
UL Tray cable for exposed run (TC-ER)



CF130US

CLASS
3.1.2

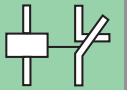
Price Index



Part No.	Number of Conductors	AWG	Strand/ AWG	Outer Diameter (approx)		Copper Index		Weight	
				in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF130US-05-02	2	20	26/34	.27	(6.7)	6.4	(10)	22.0	(33)
CF130US-05-03	3	20	26/34	.28	(7.1)	10.0	(15)	35.0	(52)
CF130US-05-04	4	20	26/34	.31	(7.9)	13.0	(19)	49.3	(73)
CF130US-05-05	5	20	26/34	.33	(8.4)	16.0	(24)	56.7	(84)
CF130US-05-07	7	20	26/34	.38	(9.7)	22.5	(33)	72.9	(108)
CF130US-05-12	12	20	26/34	.47	(11.9)	38.5	(57)	115.8	(172)
CF130US-05-18	18	20	26/34	.55	(14.0)	57.8	(86)	161.9	(241)
CF130US-05-25	25	20	26/34	.66	(16.6)	80.3	(119)	215.7	(321)
CF130US-07-04	4	18	41/34	.33	(8.3)	20.2	(30)	59.0	(88)
CF130US-07-05	5	18	41/34	.35	(8.9)	25.3	(38)	68.7	(102)
CF130US-07-07	7	18	41/34	.40	(10.2)	35.4	(53)	88.5	(132)
CF130US-07-12	12	18	41/34	.50	(12.7)	60.7	(90)	143.2	(213)
CF130US-07-18	18	18	41/34	.58	(14.7)	91.1	(136)	203.2	(302)
CF130US-07-25	25	18	41/34	.69	(17.5)	126.5	(188)	270.7	(403)
CF130US-15-03	3	16	65/34	.33	(8.4)	24.1	(36)	59.5	(89)
CF130US-15-04	4	16	65/34	.36	(9.0)	32.1	(48)	76.3	(114)
CF130US-15-05	5	16	65/34	.39	(9.8)	40.2	(60)	88.9	(132)
CF130US-15-07	7	16	65/34	.45	(11.3)	56.2	(84)	129.3	(192)
CF130US-15-10	10	16	65/34	.56	(14.2)	80.3	(120)	184.7	(274)
CF130US-15-12	12	16	65/34	.56	(14.2)	96.4	(143)	196.5	(292)
CF130US-15-18	18	16	65/34	.65	(16.4)	144.5	(215)	283.1	(421)
CF130US-15-22	22	16	65/34	.71	(18.0)	176.7	(263)	339.3	(505)
CF130US-15-25	25	16	65/34	.77	(19.4)	200.0	(298)	389.5	(580)
CF130US-15-33	33	16	65/34	.85	(21.6)	265.0	(394)	556.5	(828)
CF130US-25-04	4	14	105/34	.39	(9.8)	52.0	(77)	101.6	(151)
CF130US-25-07	7	14	105/34	.51	(13.0)	91.0	(135)	170.9	(254)
CF130US-25-10	10	14	105/34	.63	(16.0)	130.0	(190)	225.0	(333)
CF130US-25-12	12	14	105/34	.62	(15.6)	156.0	(232)	269.7	(401)
CF130US-40-04	4	12	165/34	.49	(12.4)	79.3	(118)	149.3	(222)
CF130US-60-04	4	10	259/34	.56	(14.2)	130.0	(193)	220.0	(327)
CF130US-60-05	5	10	259/34	.61	(15.5)	162.5	(242)	261.5	(389)

** Custom color codes are available upon request. Minimum order may apply

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

CF140US

igus[®]

PVC Control Cable

Chainflex[®] CF140US**PVC Energy Chain[®] cable, shielded, oil-resistant, flame-retardant, UL Tray cable for exposed run (TC-ER)**CLASS
3.1.2

Price Index

**Conductor**

Fine wire stranded conductor

Core

Cabled in layers around strength core

Inner jacket

Gusset-filling pressure extruded

Overall shield

Bend-resistant braided tinned copper shield

Outer jacket

pressure extruded

**Description**

In general these cables will offer continuous-flex performance in specific "Tray Cable" and "Machine Tool Wire" NEC compliant installations. The CF140US line is designed for use in 600V control and power applications. The oil-resistant jacket also passes the stringent 70,000 BTU UL and CSA Vertical Flame Tests. Not recommended for long travel/gliding applications.

Construction**Conductors:** Finely stranded bundled bare copper wires. Designed in accordance with ASTM B174-95**Conductor insulation:** Mechanically high-quality, PVC/Nylon**Conductor twisting:** Conductors concentrically layered with short pitch.**Conductor colors:** **Black with white numbers, one green-yellow.**Inner jacket:** Low-adhesion PVC**Shield:** tinned copper; 85% optical coverage**Outer jacket:** Oil-resistant UV-resistant PVC, low-adhesion blend, adapted to the requirements of the Energy Chain[®]. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** Grey (RAL 7001)**Technical Data****Minimum bending radius, moving:** 10 x outer cable diameter**Minimum bending radius, fixed:** 7.5 x outer cable diameter**Permissible temperature, moving:** +23°F to +176°F (-5°C to +80°C)**Permissible temperature, fixed:** -4°F to + 194°F (-20°C to +90°C)**UV Resistance:** Medium**Voltage:** 600 V**Test voltage:** 3300 V**Regulations: UL Listings:** For installation in accordance with all applicable sections of the National Electric Code. 22 AWG - 10 AWG UL Type MTW (Machine Tool Wire), 18 AWG - 10 AWG UL Type TC (Tray Cable) includes ER-exposed run**UL AWM:** 2587 90°C 600V, **CSA AWM:** I/II A/B 90°C 600V FT4, **CE:** In accordance with European Council Directive 73/23/EEC, **RoHS: 2002/95/EC;** Please reference the Design Section (Chapter 1) for more information.**Typical Applications**

- for medium load requirements
- suitable for indoor/outdoor applications applications
- especially for unsupported travel distances and for low-duty gliding applications up to 30 ft (9m)
- UL Tray cable for exposed run (TC-ER)
- wood/stone processing, packaging industry, supply system, handling, adjusting equipment, machine tools



10.70

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

PVC Control Cable



CF140US

Chainflex® CF140US

PVC Energy Chain® cable, shielded, oil-resistant, flame-retardant, UL Tray cable for exposed run (TC-ER)

Price Index

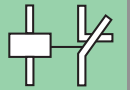


CLASS
3.1.2

Part No.	Number of Conductors	AWG	Strand/ AWG	Outer Diameter (approx)		Copper Index		Weight	
				in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF140US-05-02	2	20	26/34	.35	(8.8)	14.8	(22)	55.1	(82)
CF140US-05-03	3	20	26/34	.36	(9.1)	21	(31)	66.3	(99)
CF140US-05-04	4	20	26/34	.39	(9.9)	24.6	(37)	74.8	(111)
CF140US-05-05	5	20	26/34	.41	(10.4)	28.5	(42)	87.6	(130)
CF140US-05-07	7	20	26/34	.46	(11.7)	37.3	(56)	108.2	(161)
CF140US-05-12	12	20	26/34	.55	(14.0)	61.2	(91)	165	(246)
CF140US-05-18	18	20	26/34	.64	(16.1)	84.3	(125)	219.3	(326)
CF140US-05-25	25	20	26/34	.78	(19.7)	115.3	(172)	291	(433)
CF140US-07-04	4	18	41/34	.40	(10.2)	32.2	(48)	89	(132)
CF140US-07-05	5	18	41/34	.43	(10.8)	28.7	(43)	101.2	(151)
CF140US-07-07	7	18	41/34	.48	(12.2)	51.1	(76)	126.8	(189)
CF140US-07-12	12	18	41/34	.58	(14.6)	86	(128)	196.8	(293)
CF140US-07-18	18	18	41/34	.66	(16.8)	123.2	(183)	267.8	(398)
CF140US-07-25	25	18	41/34	.78	(19.7)	161.4	(240)	283.5	(422)
CF140US-15-03	3	16	65/34	.41	(10.3)	36.7	(55)	92.6	(138)
CF140US-15-04	4	16	65/34	.43	(10.9)	46.6	(69)	108.6	(162)
CF140US-15-05	5	16	65/34	.46	(11.7)	63	(94)	125.3	(186)
CF140US-15-07	7	16	65/34	.53	(13.3)	79.5	(118)	154.5	(230)
CF140US-15-12	12	16	65/34	.64	(16.3)	118.9	(177)	250.3	(372)
CF140US-15-18	18	16	65/34	.73	(18.4)	169.5	(252)	334.6	(498)
CF140US-15-22	22	16	65/34	.76	(19.2)	203.7	(303)	385.5	(574)
CF140US-15-25	25	16	65/34	.85	(21.6)	241	(359)	455.3	(677)
CF140US-15-33	33	16	65/34	.93	(23.5)	307	(457)	578.9	(861)
CF140US-25-04	4	14	105/34	.47	(11.8)	67	(100)	137.4	(204)
CF140US-25-07	7	14	105/34	.59	(14.9)	111	(165)	217.7	(324)
CF140US-25-12	12	14	105/34	.69	(17.5)	180	(268)	326.9	(486)
CF140US-40-04	4	12	165/34	.57	(14.5)	99.3	(148)	195.8	(291)
CF140US-60-04	4	10	259/34	.64	(16.3)	155.5	(231)	270.3	(402)
CF140US-60-05	5	10	259/34	.69	(17.5)	186.5	(278)	318.5	(474)

** Custom color codes are available upon request. Minimum order may apply

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

CF5

PVC Control Cable

Chainflex® CF5

PVC Energy Chain® cable, oil-resistant, flame-retardant

CLASS
5.3.2

Price Index


Conductor

Especially bend-resistant fine wire stranded conductor

Strain relief

Center core for high tensile strength

Core

Braiding in bundles around high tensile strength core

Outer jacket

Gusset-filling, pressure extruded, oil-proof PVC blend



Construction

Conductors: Finely stranded bundled bare copper wires. According to EN 60228.

Conductor insulation: Mechanically high-quality, PVC-insulating compound.

Conductor twisting: Number of conductors < 12, Conductors concentrically layered with short pitch. Number of conductors ≥12, Conductors layered in braids around a, high tensile-strength core; short pitches matched in the direction of the pitch for extremely low torsion.

Conductor colors: 20-10AWG Conductors black with white numbers, one green-yellow: 22-24 AWG DIN 47100

Outer jacket: PVC-based, low-adhesion blend, adapted to the requirements of the Energy Chain®. Oil resistant in accordance with VDE. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** green (RAL 6005).

Technical Data

Minimum bending radius, moving: <10m travel = 6.8 x outer diameter; ≥10m travel = 7.5 x outer diameter

Minimum bending radius, fixed: 4 x outer cable diameter

Permissible temperature, moving: +23°F to +158°F (-5°C to +70°C)

Permissible temperature, fixed: -4°F to +158°F (-20°C to +70°C)

Oil-resistance: medium

UV Resistance: Medium

UL/GSA voltage: 600V

Testing voltage: 2000 V (according to DIN VDE 0281-2)

Flame resistance: FT1

Regulations: cRUus AWM: **UL AWM:** For USA & Canada styles; 2570 80°C 600V, **CE:** CEI 20-20, **VDE:** 0245,

RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 2, material/cable tested by IPA according to ISO standard 14644-1

Typical Applications

- for high mechanical load requirements
- light oil influence
- preferably indoor applications, can be used in outdoor applications with temperatures > 23°F
- especially for unsupported travel distances and for gliding applications up to 328 ft (100m)
- torsion +/-90° with 3 ft. cable length
- storage and retrieval units for high-bay warehouses, machining units/packaging machines, quick handling, indoor cranes


Clean-Room

10.72

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

PVC Control Cable

Chainflex® CF5

PVC Energy Chain® cable, oil-resistant, flame-retardant



CF5

CLASS
5.3.2

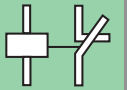
Price Index



Part No.	AWG	No. of Conductors and Rated Cross- Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF5-02-36	24	36 x 0.24	.59	(15)	58.5	(87)	187	(275)
CF5-03-15	22	15 x 0.34	.41	(10.5)	33.3	(49)	90.4	(133)
CF5-03-18	22	18 x 0.34	.45	(11.5)	40.1	(59)	117	(172)
CF5-03-25	22	25 x 0.34	.53	(13.5)	55.8	(82)	159.1	(234)
CF5-05-02	20	2 x 0.5	.24	(6)	6.5	(9.6)	23.1	(34)
CF5-05-03	20	3 x 0.5	.24	(6)	9.8	(14.4)	28.6	(42)
CF5-05-07	20	7 x 0.5	.31	(8)	23.1	(34)	52.4	(77)
CF5-05-12	20	12 x 0.5	.43	(11)	39.4	(58)	107.4	(158)
CF5-05-18	20	18 x 0.5	.49	(12.5)	58.5	(86)	156.4	(230)
CF5-05-25	20	25 x 0.5	.65	(16.5)	82.3	(121)	210.8	(310)
CF5-05-30	20	30 x 0.5	.69	(17.5)	97.9	(144)	273.3	(402)
CF5-07-03	18	3 x 0.75	.26	(6.5)	15	(22)	42.8	(63)
CF5-07-04	18	4 x 0.75	.28	(7)	19.7	(29)	49	(72)
CF5-07-05	18	5 x 0.75	.30	(7.5)	24.5	(36)	57.8	(85)
CF5-07-07	18	7 x 0.75	.35	(9)	34	(50)	73.4	(108)
CF5-07-12	18	12 x 0.75	.49	(12.5)	58.5	(86)	163.2	(240)
CF5-07-18	18	18 x 0.75	.59	(15)	88.4	(130)	219	(322)
CF5-07-25	18	25 x 0.75	.69	(17.5)	123.1	(181)	293.8	(432)
CF5-07-36	18	36 x 0.75	.87	(22)	176.1	(259)	383.5	(564)
CF5-07-42	18	42 x 0.75	.91	(23.5)	205.4	(302)	372.6	(610)
CF5-10-03	17	3 x 1	.26	(6.5)	19.7	(29)	42.2	(62)
CF5-10-04	17	4 x 1	.28	(7)	26.5	(39)	57.8	(85)
CF5-10-05	17	5 x 1	.35	(9)	32.6	(48)	68	(100)
CF5-10-07	17	7 x 1	.37	(9.5)	46.2	(68)	98.6	(145)
CF5-10-12	17	12 x 1	.53	(13.5)	78.9	(116)	176.8	(260)
CF5-10-18	17	18 x 1	.65	(16.5)	117.6	(173)	306	(450)
CF5-10-25	17	25 x 1	.77	(19.5)	163.9	(241)	401.2	(590)
CF5-15-03	16	3 x 1.5	.30	(7.5)	29.9	(44)	64.6	(95)
CF5-15-04	16	4 x 1.5	.30	(7.5)	39.4	(58)	81.6	(120)
CF5-15-05	16	5 x 1.5	.34	(8.5)	49	(72)	115.6	(170)
CF5-15-07	16	7 x 1.5	.41	(10.5)	68.7	(101)	149.6	(220)
CF5-15-12	16	12 x 1.5	.59	(15)	117.6	(173)	217.6	(320)
CF5-15-18	16	18 x 1.5	.75	(19)	176.8	(260)	374	(550)
CF5-15-25	16	25 x 1.5	.85	(21.5)	245.5	(361)	550.8	(810)
CF5-15-36	16	36 x 1.5	1.02	(26)	352.2	(518)	666.4	(980)
CF5-25-04	14	4 x 2.5	.45	(11.5)	65.3	(96)	136	(200)
CF5-25-05	14	5 x 2.5	.47	(12)	81.6	(120)	170	(250)
CF5-25-07	14	7 x 2.5	.57	(14.5)	114.2	(168)	231.2	(340)
CF5-25-12	14	12 x 2.5	.93	(23.5)	196.0	(288)	453.7	(667)
CF5-25-18	14	18 x 2.5	1.08	(27.5)	293.8	(432)	659.6	(970)
CF5-25-25	14	25 x 2.5	1.35	(34.5)	408	(600)	928.9	(1366)

NOTE: The mentioned external diameters are maximum values.

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

CF6

iglus®

PVC Control Cable

Chainflex® CF6

PVC Energy Chain® cable, shielded, oil-resistant, flame-resistant

CLASS
5.3.2

Price Index



Conductor
Especially bend-resistant fine wire stranded conductor

Strain relief
Center core for high tensile strength

Core
Braiding in bundles around high tensile strength core

Inner jacket
gusset filled pressure extruded

Overall shield
Highly flexible braided copper shield

Outer jacket
Pressure extruded, oil-proof PVC blend

Construction

Conductors: Finely stranded bundled bare copper wires. According to EN60228.

Conductor insulation: Mechanically high-quality, PVC-insulating compound.

Conductor twisting: Number of conductors < 12 Conductors concentrically layered with short pitch. Number of conductors ≥ 12 Conductors layered in braids around a, high-tensile-strength core; short pitches matched in the direction of the pitch for extremely low torsion.

Conductor colors: 20-16 AWG Black with white numbers, one conductor green-yellow; 24 AWG DIN 47100

Intermediate jacket: PVC-based, low-adhesion blend, adapted to the requirements of the Energy Chain®.

Shield: Tinned copper braid. Coverage: approx. 90% optical

Outer jacket: PVC-based, low-adhesion blend, adapted to the requirements of the Energy Chain®. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** green (RAL 6005).

Technical Data

Minimum bending radius, moving: <10m travel = 6.8 x outer diameter; ≥10m travel = 7.5 x outer diameter

Minimum bending radius, fixed: 4 x outer cable diameter

Permissible temperature, moving: +23°F to +158°F (-5°C to +70°C)

Permissible temperature, fixed: -4°F to 158°F (-20°C to +70°C)

Oil-resistance: Medium

UV Resistance: Medium

Voltage: 600V

Testing voltage: 2000 V

Flame resistance: FT1

Regulations: cRUus AWM: UL AWM: For USA & Canada styles; 2570 80°C 600V, CE: CEI 20-20, VDE: 0245, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 2, material/cable tested by IPA according to ISO standard 14644-1

Typical Applications

- for high mechanical load requirements
- preferably indoor applications, can be used in outdoor applications with temperatures > 23°F
- especially for unsupported travel distances and for gliding applications up to 328 ft (100m).
- storage and retrieval units for high-bay warehouses, machining units/packaging machines, quick handling, indoor cranes



Clean-Room

10.74

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

PVC Control Cable



CF6

Chainflex® CF6

PVC Energy Chain® cable, shielded, oil-resistant, flame-resistant

Price Index



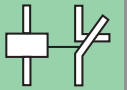
CLASS
5.3.2

Part No.	AWG	No. of Conductors and Rated Cross- Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF6-02-04	24	4 x 0.25	.30	(7.5)	19.0	(28)	37.4	(55)
CF6-02-24**	24	24 x 0.25	.57	(14.5)	68.0	(100)	170.0	(250)
CF6-03-05	22	5 x 0.34	.32	(8)	23.0	(34)	64.6	(95)
CF6-05-05	20	5 x 0.5	.34	(8.5)	32.6	(48)	77.5	(114)
CF6-05-07	20	7 x 0.5	.39	(10)	42.8	(63)	96.6	(142)
CF6-05-09	20	9 x 0.5	.45	(11.5)	52.4	(77)	123.8	(182)
CF6-05-12	20	12 x 0.5	.51	(13)	63.2	(93)	160.5	(206)
CF6-05-18	20	18 x 0.5	.59	(15)	81.6	(120)	163.2	(276)
CF6-05-24**	20	24 x 0.5	.69	(17.5)	129.2	(190)	275.4	(405)
CF6-07-03	18	3 x 0.75	.32	(8)	35.4	(52)	74.8	(110)
CF6-07-04	18	4 x 0.75	.34	(8.5)	36.7	(54)	81.6	(120)
CF6-07-05	18	5 x 0.75	.35	(9)	49.6	(73)	102.0	(150)
CF6-07-07	18	7 x 0.75	.41	(10.5)	63.2	(93)	129.2	(190)
CF6-07-12	18	12 x 0.75	.55	(14)	93.8	(138)	179.5	(264)
CF6-07-18	18	18 x 0.75	.69	(17.5)	138.7	(204)	278.8	(410)
CF6-07-24**	18	24 x 0.75	.77	(19.5)	170.0	(250)	316.9	(466)
CF6-10-03	17	3 x 1	.33	(8.5)	41.5	(61)	70.0	(103)
CF6-10-04	17	4 x 1	.35	(9)	51.0	(75)	78.2	(115)
CF6-10-05	17	5 x 1	.37	(9.5)	59.2	(87)	115.6	(170)
CF6-10-07	17	7 x 1	.47	(12)	76.8	(113)	147.6	(217)
CF6-10-12	17	12 x 1	.59	(15)	116.3	(171)	212.8	(313)
CF6-10-18	17	18 x 1	.75	(19)	177.5	(261)	319.6	(470)
CF6-10-24**	17	24 x 1	.83	(21)	208.8	(307)	399.8	(588)
CF6-15-03	16	3 x 1.5	.35	(9)	55.1	(81)	105.4	(155)
CF6-15-04	16	4 x 1.5	.39	(10)	57.8	(85)	115.6	(170)
CF6-15-05	16	5 x 1.5	.39	(10)	72.1	(106)	129.2	(190)
CF6-15-07	16	7 x 1.5	.47	(12)	104.0	(153)	183.6	(270)
CF6-15-12	16	12 x 1.5	.67	(17)	157.8	(232)	279.5	(411)
CF6-15-18	16	18 x 1.5	.85	(21.5)	249.6	(367)	433.2	(637)
CF6-15-25	16	25 x 1.5	.93	(23.5)	334.6	(492)	556.9	(819)
CF6-25-04	14	4 x 2.5	.51	(13)	91.8	(135)	187.0	(275)

The Chainflex® types marked with ** are cables based on 4-conductor bundles. Due to their excellent electrical properties (star-quad with particularly low crosstalk), these cables can be used in virtually all applications normally requiring twisted-pair cables.

NOTE: The mentioned external diameters are maximum values.

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 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

10.75

CF170-D



PUR Control Cable

Chainflex® CF170-D*

PUR-Energy Chain® cable, oil & coolant resistant,
PVC-free, halogen-free

CLASS
4.1.3

Price Index



Conductor
Fine wire stranded
conductor

Strain relief
Center core for
high tensile
strength

Core
Cabled in layers
with extremely
short pitch

Outer jacket
gusset filled
pressure
extruded



Construction

Conductors: Finely stranded bare copper wires. According to EN 60228.

Conductor insulation: Mechanically high-quality, TPE-insulating compound.

Conductor twisting: Conductors concentrically layered with short pitch. Not recommended for long travel/guiding applications.

Conductor colors: Conductors black with white numbers, one green-yellow.

Outer jacket: PUR-based, low-adhesion blend, adapted to the requirements of the Energy Chain®. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** grey (RAL 7040).

Technical Data

Minimum bending radius, moving: <10m travel = 7.5 x outer diameter; ≥10m travel = 10 x outer diameter

Minimum bending radius, fixed: 5 x out cable diameter

Permissible temperature, moving: -31°F to +176°F (-35°C to +80°C)

Permissible temperature, fixed: -40°F to +176°F (-40°C to +80°C)

Oil-resistance: High

UV-resistant: Medium

Voltage: 300V

Testing voltage: 2000 V (according to DIN VDE 0281-2)

Regulations: DESINA, CE, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Typical Applications

- for medium mechanical load requirements
- indoor and outdoor applications without direct sun radiation
- especially for unsupported travel distances
- machining units/machine tools, low temperature applications



10.76

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

PUR Control Cable

Chainflex® CF170-D*

PUR-Energy Chain® cable, oil & coolant resistant, PVC-free, halogen-free, low temperature flexible



CF170-D

Price Index



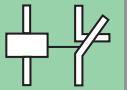
CLASS
4.1.3

Part No.	AWG	No. of Conductors and Rated Cross- Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
*CF170-05-18-D	20	18 x 0.5	.45	(11,5)	58.5	(86)	122.4	(180)
*CF170-07-12-D	18	12 x 0.75	.41	(10.5)	58.4	(86)	108.8	(160)
*CF170-07-18-D	18	18 x 0.75	.49	(12,5)	88.4	(130)	156.4	(230)
*CF170-07-20-D	18	20 x 0.75	.53	(13.5)	97.9	(144)	195.8	(288)
*CF170-10-03-D	17	3 x 1	.28	(7)	19.7	(29)	37.4	(55)
*CF170-10-25-D	17	25 x 1	.63	(16)	163.2	(240)	265.2	(390)
*CF170-15-04-D	16	4 x 1.5	.31	(8)	39.4	(58)	61.2	(90)
*CF170-15-18-D	16	18 x 1.5	.59	(15.0)	176.1	(259)	265.2	(390)
*CF170-15-25-D	16	25 x 1.5	.75	(19)	244.8	(360)	367.2	(540)
*CF170-25-07-D	14	7 x 2.5	.51	(13.0)	114.2	(168)	190.4	(280)
*CF170-40-04-D	12	4 x 4	.47	(12)	104.7	(154)	149.6	(220)

NOTE: The mentioned external diameters are maximum values.

*Call for availability

Internet: <http://www.igus.com>
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No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

10.77

CF77-
UL-D



PUR Control Cables

Chainflex® CF77-UL-D

PUR Energy Chain® cable, oil-resistant, coolant-resistant, notch-proof, flame-retardant, PVC-free, halogen-free

CLASS
5.2.3

Price Index



Conductor
Fine wire stranded
conductor

Strain relief
Center core for
high tensile
strength

Core
Braiding in
bundles around
high tensile
strength core

Outer jacket
Gusset-filling,
pressure ex-
truded PUR
Blend



Construction

Conductors: Finely stranded bare copper wires. According to EN 60228.

Conductor insulation: Mechanically high-quality, TPE-insulating compound.

Conductor twisting: Number of conductors < 12 Conductors concentrically layered with short pitch. Number of conductors ≥ 12 Conductors layered in braids around a, high-tensile-strength core; short pitches matched in the direction of the pitch for extremely low torsion.

Conductor colors: 20-12 AWG Conductors black with white numbers, one green-yellow 24 AWG DIN 47100.

Outer jacket: Low-adhesion PUR blend, adapted to the requirements of the Energy Chain®. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** grey (RAL 7040).

Technical Data

Minimum bending, moving: <10m travel = 6.8 x outer diameter; ≥10m travel = 7.5 x outer diameter

Minimum bending, fixed: 4 x outer cable diameter

Permissible temperature, moving: -31°F to +176°F (-35°C to +80°C)

Permissible temperature, fixed: -40°F to +176°F (-40°C to +80°C)

Oil-resistance: High

UV-resistance: Medium

Voltage: 300V

Testing voltage: 2000 V (according to DIN VDE 0281-2)

Regulations: cRUus; UL AWM: for USA & Canada styles 20233 80°C 300V

Flame resistance: FT1 **CE, RoHS: 2002/95/EC;** Please reference the Design Section (Chapter 1) for more information.

Typical Applications

- for high mechanical load requirements
- indoor and outdoor applications with average sun exposure
- especially for unsupported and gliding travel distances up to 328 ft (100m).
- torsion +/-180° with 3 ft. cable length
- machining units/machine tools, storage and retrieval units for high-bay warehouses, packaging industry, quick handling, refrigerating sector



10.78

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

PUR Control Cables



CF77-
UL-D

Chainflex® CF77-UL-D

PUR Energy Chain® cable, oil-resistant, coolant-resistant, notch-proof, flame-retardant, PVC-free, halogen-free

Price Index

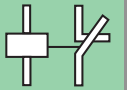


CLASS
5.2.3

Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF77-UL-02-04-D	24	4 x 0.25	.22	(5.5)	6.8	(10)	23.1	(134)
CF77-UL-05-04-D	20	4 x 0.5	.24	(6)	12.8	(19)	32.3	(48)
CF77-UL-05-05-D	20	5 x 0.5	.26	(6.5)	16.1	(24)	37.0	(55)
CF77-UL-05-12-D	20	12 x 0.5	.39	(10)	38.3	(57)	86.0	(128)
CF77-UL-05-18-D	20	18 x 0.5	.47	(12)	57.8	(86)	126.3	(188)
CF77-UL-05-25-D	20	25 x 0.5	.53	(13.5)	80.0	(119)	164.0	(244)
CF77-UL-05-30-D	20	30 x 0.5	.57	(14.5)	96.1	(143)	199.6	(297)
CF77-UL-07-03-D	18	3 x 0.75	.24	(6)	14.1	(21)	34.9	(52)
CF77-UL-07-04-D	18	4 x 0.75	.26	(6.5)	18.8	(28)	41.0	(61)
CF77-UL-07-05-D	18	5 x 0.75	.28	(7)	23.5	(35)	47.7	(71)
CF77-UL-07-07-D	18	7 x 0.75	.31	(8)	32.9	(49)	67.2	(100)
CF77-UL-07-12-D	18	12 x 0.75	.45	(11.5)	56.5	(84)	123.0	(183)
CF77-UL-07-18-D	18	18 x 0.75	.53	(13.5)	84.7	(126)	166.0	(247)
CF77-UL-07-20-D	18	20 x 0.75	.55	(14)	94.1	(140)	186.2	(277)
CF77-UL-07-36-D	18	36 x 0.75	.73	(18.5)	169.0	(252)	336.0	(500)
CF77-UL-10-02-D	17	2 x 1	.24	(6)	13.4	(20)	34.9	(52)
CF77-UL-10-03-D	17	3 x 1	.26	(6.5)	19.5	(29)	41.0	(61)
CF77-UL-10-04-D	17	4 x 1	.28	(7)	26.2	(39)	50.4	(75)
CF77-UL-10-05-D	17	5 x 1	.29	(7.5)	32.9	(49)	61.2	(91)
CF77-UL-10-07-D	17	7 x 1	.33	(8.5)	45.7	(68)	75.3	(112)
CF77-UL-10-12-D	17	12 x 1	.45	(11.5)	78.0	(116)	149.2	(222)
CF77-UL-10-18-D	17	18 x 1	.57	(14.5)	116.9	(174)	215.7	(321)
CF77-UL-10-25-D	17	25 x 1.0	.67	(17.0)	163.0	(240)	276.0	(406)
CF77-UL-15-03-D	16	3 x 1.5	.28	(7)	28.2	(42)	54.4	(81)
CF77-UL-15-04-D	16	4 x 1.5	.29	(7.5)	37.0	(55)	66.5	(99)
CF77-UL-15-05-D	16	5 x 1.5	.31	(8)	46.4	(69)	78.6	(117)
CF77-UL-15-07-D	16	7 x 1.5	.39	(10)	64.5	(96)	110.2	(164)
CF77-UL-15-12-D	16	12 x 1.5	.55	(14)	110.9	(165)	194.9	(290)
CF77-UL-15-18-D	16	18 x 1.5	.67	(17.0)	163.0	(240)	276.0	(406)
CF77-UL-15-25-D	16	25 x 1.5	.77	(19.5)	245.0	(360)	376.0	(555)
CF77-UL-25-04-D	14	4 x 2.5	.35	(9)	61.2	(91)	97.4	(145)
CF77-UL-25-05-D	14	5 x 2.5	.41	(10.5)	80.6	(120)	120.3	(179)
CF77-UL-25-07-D	14	7 x 2.5	.49	(12.5)	112.9	(168)	170.0	(253)

NOTE: The mentioned external diameters are maximum values.

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No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

10.79

CF78-UL



PUR Control Cables

CLASS
5.2.3

Price Index



Chainflex® CF78-UL

PUR Energy Chain® cable, shielded, oil-resistant, coolant-resistant, notch-proof, flame-retardant, PVC-free, halogen-free

Conductor
Fine wire stranded
conductor

Strain relief
Center core for
high tensile
strength

Core
Braiding in
bundles around
high tensile
strength core

Inner Jacket
Gusset-filling
pressure
extruded

Overall Shield
Highly flexible
braided copper
shield

Outer jacket
Gusset-filling,
pressure extruded
PUR Blend

Construction

Conductors: Finely stranded bare copper wires. According to EN 60228.

Conductor insulation: Mechanically high-quality, TPE-insulating compound.

Conductor twisting: Number of conductors < 12 Conductors concentrically layered with short pitch. Number of conductors ≥ 12 Conductors layered in braids around a, high-tensile-strength core; short pitches matched in the direction of the pitch for extremely low torsion.

Conductor colors: Conductors black with white numbers, one green-yellow.

Intermediate jacket: PUR mixture, adapted to the requirements of the Energy Chain®.

Shield: Tinned copper braid, coverage approx. 80% optical.

Outer jacket: Low-adhesion PUR blend, adapted to the requirements of the Energy Chain. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** grey (RAL 7040).

Technical Data

Minimum bending radius, moving: <10m travel = 6.8 x outer diameter; ≥10m travel = 7.5 x outer diameter

Minimum bending radius, fixed: 4 x outer cable diameter

Permissible temperature, moving: -31°F to +176°F (-35°C to +80°C)

Permissible temperature, fixed: -40°F to +176°F (-40°C to +80°C)

Oil-resistance: High

UV-resistant: Medium

Voltage: 300V

Testing voltage: 2000 V (according to DIN VDE 0281-2)

Regulations: cRUus; **UL AWM:** for USA & Canada styles 20233 80°C 300V

Flame resistance: FT1

CE, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Typical Applications

- for high mechanical load requirements
- indoor and outdoor applications with average sun exposure
- especially for unsupported and gliding travel distances up to 328 ft (100m).
- storage and retrieval units for high-bay warehouses, machining units/packaging machines, quick handling, indoor cranes, refrigerating sector



10.80

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

PUR Control Cables

Chainflex® CF78-UL

PUR Energy Chain® cable, shielded, oil-resistant, coolant-resistant, notch-proof, flame-retardant, PVC-free, halogen-free



CF78-UL

Price Index

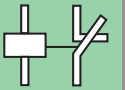


CLASS
5.2.3

Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF78-UL-05-04	20	4 x 0.5	.31	(8)	21.5	(32)	51.7	(77)
CF78-UL-05-05	20	5 x 0.5	.33	(8.5)	25.5	(38)	59.1	(88)
CF78-UL-05-07	20	7 x 0.5	.37	(9.5)	37.6	(56)	78.5	(117)
CF78-UL-05-09	20	9 x 0.5	.41	(10.5)	45.6	(68)	96.6	(144)
CF78-UL-05-12	20	12 x 0.5	.49	(12.5)	59.1	(88)	132.9	(198)
CF78-UL-05-18	20	18 x 0.5	.55	(14)	83.9	(125)	179.9	(268)
CF78-UL-05-25	20	25 x 0.5	.63	(16)	109.4	(163)	234.2	(349)
CF78-UL-07-03	18	3 x 0.75	.31	(8)	23.5	(35)	55.0	(82)
CF78-UL-07-05	18	5 x 0.75	.37	(9.5)	38.3	(57)	79.9	(119)
CF78-UL-07-07	18	7 x 0.75	.41	(10.5)	51.7	(77)	102.7	(153)
CF78-UL-07-12	18	12 x 0.75	.53	(13.5)	83.9	(125)	169.1	(252)
CF78-UL-07-18	18	18 x 0.75	.61	(15.5)	117.4	(175)	226.2	(337)
CF78-UL-10-03	17	3 x 1	.33	(8.5)	32.2	(48)	67.8	(101)
CF78-UL-10-05	17	5 x 1	.37	(9.5)	47.7	(71)	92.0	(137)
CF78-UL-10-07	17	7 x 1	.43	(11)	63.1	(94)	120.1	(179)
CF78-UL-10-12	17	12 x 1	.55	(14)	104.0	(155)	200.7	(299)
CF78-UL-10-18	17	24 x 1	.66	(17)	147.7	(220)	276.5	(412)
CF78-UL-10-25	17	25 x 1.0	.77	(19.5)	214.0	(315)	364	(535)
CF78-UL-15-03	16	3 x 1.5	.37	(9.5)	43.6	(65)	84.6	(126)
CF78-UL-15-04	16	4 x 1.5	.39	(10)	53.7	(80)	97.3	(145)
CF78-UL-15-05	16	5 x 1.5	.41	(10.5)	65.8	(98)	115.4	(172)
CF78-UL-15-07	16	7 x 1.5	.49	(12.5)	87.9	(131)	151.0	(225)
CF78-UL-15-12	16	12 x 1.5	.61	(15.5)	144.3	(215)	248.3	(370)
CF78-UL-25-04	14	4 x 2.5	.45	(11.5)	82.6	(123)	137.6	(205)
CF78-UL-25-05	14	5 x 2.5	.49	(12.5)	100.7	(150)	164.4	(245)
CF78-UL-25-07	14	7 x 2.5	.57	(14.5)	138.9	(207)	221.5	(330)

NOTE: The mentioned external diameters are maximum values.

Internet: <http://www.igus.com>
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No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

CF2



PUR Control Cables

Chainflex® CF2

PUR Energy Chain® cable, shielded, notch-proof, oil/coolant-resistant, hydrolysis/microbe-resistant, flame-retardant

CLASS
6.3.3

Price Index



Conductor
Highly flexible special conductor

Strain relief
Center element for high tensile stresses

Core
Braiding in bundles around high-tensile center cord

Inner jacket
Gusset-filling, pressure extruded

Overall shield
Highly flexible braided copper shield

Outer jacket
Pressure extruded PUR blend

Construction

Conductors: Bare copper conductors with very fine stranding. According to EN 60228

Conductor insulation: Mechanically high-quality, PVC-insulating compound.

Conductor twisting: Number of conductors < 12 Conductors concentrically layered with short pitch. Number of conductors \geq 12 Conductors layered in braids around a, high-tensile-strength core; short pitches matched in the direction of the pitch for extremely low torsion.

Conductor colors: 26 AWG and 24 AWG DIN 47100. 20 AWG - 16 AWG conductors are black with white numbers, one conductor is green-yellow.

Intermediate jacket: PVC-based, low-adhesion blend, adapted to the requirements of the Energy Chain®.

Shield: Tinned copper braid, coverage approx. 90% optical.

Outer jacket: PUR-based, low-adhesion blend, adapted to the requirements of the Energy Chain®. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** gray (RAL 7016).

Technical Data

Minimum bending radius, moving: 5 x outer cable diameter

Minimum bending radius, fixed: 4 x outer cable diameter

Permissible temperature, moving: -4°F to +176°F (-20°C to +80°C)

Permissible temperature, fixed: -40°F to +176°F (-40°C to +80°C)

UV-resistance: High

Oil-resistance: High

Voltage: 300V

Testing voltage: 2000 V (according to DIN VDE 0281-2)

Regulations: cRUus; UL AWM: for USA & Canada styles 20200 60°C 300V, CE, RoHS: 2002/95/EC;

Please reference the Design Section (Chapter 1) for more information.

Flame resistance: FT1

Typical Applications

- for maximum mechanical load requirements
- indoor and outdoor applications
- especially for unsupported and gliding travel distances up to 328 ft (100m)
- storage and retrieval units for high-bay warehouses, machining units/packaging machines, quick handling, indoor cranes, refrigerating sector



10.82

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

PUR Control Cables



CF2

Chainflex® CF2

PUR Energy Chain® cable, shielded, notch-proof, oil/coolant-resistant, hydrolysis/microbe-resistant, flame-retardant

Price Index



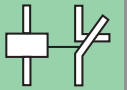
CLASS
6.3.3

Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF2-01-04	26	4 x 0.14	.24	(6)	11.6	(17)	27.2	(40)
CF2-01-08	26	8 x 0.14	.31	(8)	19.7	(29)	44.2	(65)
CF2-01-12	26	12 x 0.14	.35	(9)	33.3	(49)	68.7	(101)
CF2-01-18	26	18 x 0.14	.40	(10)	45.6	(67)	85.0	(125)
CF2-01-24**	26	24 x 0.14	.47	(12)	56.4	(83)	91.8	(135)
CF2-01-36	26	36 x 0.14	.51	(13)	52.8	(88)	136.0	(200)
CF2-01-48	26	48 x 0.14	.67	(17)	91.8	(135)	210.8	(310)
CF2-02-04	24	4 x 0.25	.28	(7)	16.3	(24)	36.0	(53)
CF2-02-08	24	8 x 0.25	.31	(8)	28.9	(41)	56.4	(83)
CF2-02-18	24	18 x 0.25	.51	(13)	65.3	(96)	129.2	(190)
CF2-02-24**	24	24 x 0.25	.55	(14)	81.6	(120)	149.6	(220)
CF2-02-48	24	48 x 0.25	.79	(20)	156.4	(230)	306.0	(450)
CF2-05-07	20	7 x 0.5	.51	(13)	55.8	(82)	142.8	(210)
CF2-05-12	20	12 x 0.5	.71	(18)	98.6	(145)	265.2	(390)
CF2-05-18	20	18 x 0.5	.87	(22)	130.6	(192)	353.6	(520)
CF2-07-04	18	4 x 0.75	.39	(10)	38.8	(57)	108.8	(160)
CF2-07-12	18	12 x 0.75	.75	(19)	124.4	(183)	299.2	(440)
CF2-07-24**	18	24 x 0.75	.98	(25)	205.4	(302)	489.6	(720)
CF2-10-12	17	12 x 1	.79	(20)	144.8	(213)	326.4	(480)
CF2-15-03	16	3 x 1.5	.44	(11)	57.8	(85)	129.2	(190)
CF2-15-07	16	7 x 1.5	.63	(16)	110.8	(163)	231.2	(340)
CF2-15-12	16	12 x 1.5	.91	(23)	196.5	(289)	442.0	(650)

** Cables based on 4-conductor bundles. Due to their excellent electrical properties (star-quad with particularly low crosstalk), these cables can be used in virtually all applications normally requiring twisted-pair cables.

NOTE: The mentioned external diameters are maximum values.

Internet: <http://www.igus.com>
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No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

10.83

CF98

igus®

TPE Control Cables

CLASS
7.4.4

Price Index



Chainflex® CF98

TPE Energy Chain® Cable, control cable for reduced bend radius, oil-resistant, bio-oil-resistant, PVC-free/halogen-free, UV-resistant, abrasion and tear resistant, low temperature flexibility

Conductor

Extremely highly flexible special alloy

Strain relief

Center core for high tensile stresses

Core

Braiding in layers with extremely short pitch

Outer jacket

Gusset-filling, pressure extruded, halogen-free TPE blend



Construction

Conductors: Special stranded alloy conductors

Conductor insulation: TPE, thin-walled version

Conductor twisting: Conductors stranded in one layer with especially short pitch length.

Conductor colors: In accordance with DIN 47100.

Outer jacket: TPE: particularly abrasion-resistant, high-flex blend, oil-resistant, coolant-resistant. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** dark blue (RAL 5011).

Technical Data:

Minimum bending radius, moving: 4 x outer cable diameter

Minimum bending radius, fixed: 3 x outer cable diameter

Permissible temperature, moving: -31°F to +194°F (-35°C to +90°C)

Permissible temperature, fixed: -40°F to +194°F (-40°C to +90°C)

UV-resistance: High

Oil-resistance: High

Voltage: 300V

Testing voltage: 1500 V

Regulations: CE, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1 Outer jacket material complies with CF9-05-07, tested by IPA according to standard 14644-1.

Typical Applications

- for maximum load requirements at 4 x d
- indoor and outdoor applications
- especially for short, very fast applications with small radii and tight design space
- torsion +/-90° with 3 ft. cable length
- automatic insertion machines, automatic doors, cleanroom, very quick handling, low temperature locations

Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF98-01-02	26	2 x 0.14	.16	(4)	2.7	(4)	7.4	(11)
CF98-01-04	26	4 x 0.14	.20	(5)	5.7	(8.5)	10.8	(16)
CF98-01-08	26	8 x 0.14	.26	(6.5)	10.8	(16)	16.1	(24)
CF98-02-04	24	4 x 0.25	.22	(5.5)	10.8	(16)	20.2	(30)
CF98-02-07	24	7 x 0.25	.26	(6.5)	17.5	(26)	35.6	(53)
CF98-02-08	24	8 x 0.25	.28	(7)	20.2	(30)	40.3	(60)
CF98-03-04	22	4 x 0.34	.22	(5.5)	12.9	(19.0)	23.8	(35.0)
CF98-03-07	22	7 x 0.34	.28	(7)	21.5	(32)	37.0	(55)
CF98-05-04	20	4 x 0.50	.24	(6)	21.0	(31)	27.2	(40)

NOTE: The mentioned external diameters are maximum values.



Clean-Room

10.84

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

TPE Control Cables

Chainflex® CF99

TPE Energy Chain® Cable, shielded control cable for reduced bend radius, oil-resistant, bio-oil-resistant, PVC-free, halogen-free, UV-resistant, abrasion and tear resistant, low temperature flexibility



CF99

CLASS
7.4.4

Price Index



Construction

Conductors: Conductor consisting of a highly flexible special alloy

Conductor insulation: Mechanically high-quality TPE mixture

Conductor twisting: Conductors stranded in one layer with especially short pitch length.

Conductor colors: In accordance with DIN 47100.

Inner Jacket: TPE

Shield: Alloy strand braid, coverage approx. 90% optical

Outer jacket: Low-adhesion mixture on the basis of TPE. Especially abrasion-resistant and highly flexible. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** dark blue (RAL 5011).

Technical Data:

Minimum bending radius, moving: 4 x outer cable diameter

Minimum bending radius, fixed: 3 x outer cable diameter

Permissible temperature, moving: -31°F to +194°F (-35°C to +90°C)

Permissible temperature, fixed: -40°F to +194°F (-40°C to +90°C)

UV-resistance: High

Oil-resistance: High

Voltage: 300V

Testing voltage: 1500 V

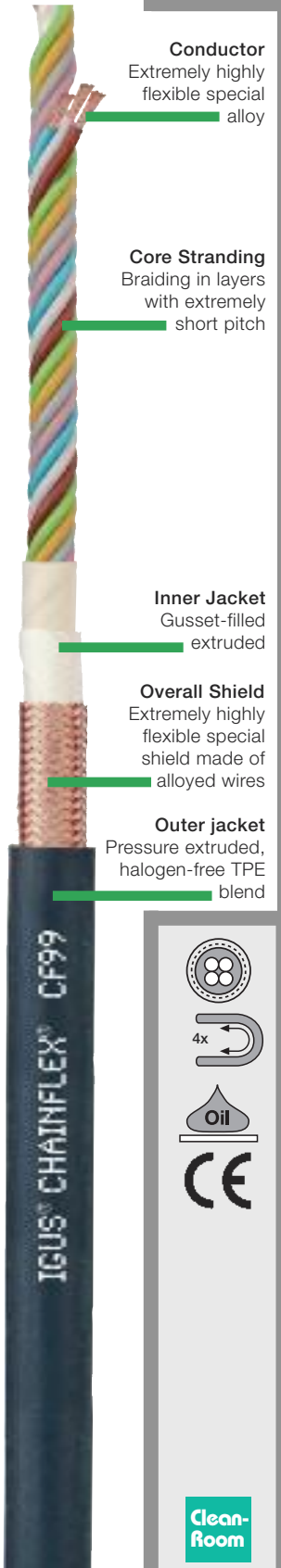
Regulations: CE, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1 Outer jacket material complies with CF9-05-07, tested by IPA according to standard 14644-1.

Typical Applications

- for maximum load requirements at 4 x d
- indoor and outdoor applications
- especially for short, very fast applications with small radii and tight design space
- automatic insertion machines, automatic doors, cleanroom, very quick handling, low temperature locations

Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF99-01-02	26	2 x 0.14	.22	(5.5)	9.07	(13.5)	22.18	(33)
CF99-01-04	26	4 x 0.14	.24	(6.0)	14.11	(21.0)	28.90	(43)
CF99-01-08	26	8 x 0.14	.31	(8.0)	24.19	(36.0)	46.37	(69)
CF99-02-04	24	4 x 0.25	.26	(6.5)	20.16	(30.0)	37.63	(56)
CF99-02-07	24	7 x 0.25	.31	(8.0)	32.26	(48.0)	57.12	(85)



4x



Clean-room

10.85

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

CF9

TPE Control Cables

CLASS
7.4.4

Price Index



Chainflex® CF9

TPE Energy Chain® Cable, oil-resistant, bio-oil-resistant, PVC-free, halogen-free, UV-resistant, low temperature flexibility

Conductor
Highly flexible special conductor

Strain relief
Center core for high tensile strength

Core
Braiding in bundles around high tensile strength core

Outer jacket
Gusset-filling, pressure extruded, halogen-free TPE blend



Construction

Conductors: Bare copper conductors with very fine stranding

Conductor insulation: TPE, thin-walled version

Conductor twisting: Number of conductors < 12 Conductors concentrically layered with short pitch.

Number of conductors ≥ 12 Conductors layered in braids around a, high-tensile-strength core; short pitches matched in the direction of the pitch for extremely low torsion.

Conductor colors: Black with white numbers, one conductor green/yellow with cross-sections up to 18-2 AWG 20-24 AWG DIN 47100.

CF9-02-03-INI: brown, blue, black

CF9-03-04-INI: brown, blue, black, white

CF9-03-05-INI: brown, blue, black, white, green-yellow

CF9-03-16-07-03-INI: (18 AWG) blue, green-yellow, brown

(22 AWG) violet, red, gray, red-blue, green, gray-pink, white-green, white-yellow, white-gray, black, yellow-brown, brown-green, white, yellow, pink, gray-brown

Outer jacket: TPE: particularly abrasion-resistant, high-flex blend, oil-resistant, coolant-resistant. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** dark blue (RAL 5011).

Technical Data:

Minimum bending radius, moving: 5 x outer cable diameter

Minimum bending radius, fixed: 3 x outer cable diameter

Permissible temperature, moving: -31°F to +212°F (-35°C to +100°C)

Permissible temperature, fixed: -40°F to +212°F (-40°C to +100°C)

UV-resistance: High

Oil-resistance: High

Voltage: 300V

Testing voltage: 2000 V (according to DIN VDE 0281-2)

Regulations: CE, **RoHS: 2002/95/EC;** Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1

Typical Applications

- for maximum mechanical load requirements
- indoor and outdoor applications
- torsion +/-90° with 3 ft. cable length
- especially for unsupported and gliding travel distances up to 1312 ft (400m) and more
- storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semi-conductor insertion, ship-to-shore, outdoor cranes, low temperature

Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF9-02-02	24	2 x 0.25	.18	(4.5)	3.4	(5)	12.2	(18)
CF9-02-03-INI	24	3 x 0.25	.18	(4.5)	4.9	(7.2)	13.6	(20)
CF9-02-06	24	6 x 0.25	.22	(5.5)	10.2	(15)	23.8	(35)
CF9-02-07	24	7 x 0.25	.24	(6)	11.6	(17)	28.6	(42)
CF9-02-08	24	8 x 0.25	.26	(6.5)	13.6	(20)	31.3	(46)
CF9-02-12	24	12 x 0.25	.31	(8)	19.7	(29)	42.0	(70)
CF9-02-18	24	18 x 0.25	.37	(9.5)	30	(44)	66.7	(98)
CF9-03-04-INI	22	4 x 0.34	.20	(5)	8.8	(13)	21.1	(31)
CF9-03-05-INI	22	5 x 0.34	.22	(5.5)	11.6	(17)	25.2	(37)
CF9-03-06	22	6 x 0.34	.24	(6)	13.6	(20)	25.2	(37)
CF9-03-08	22	8 x 0.34	.28	(7.0)	17.7	(26)	37.4	(55)
CF9-03-16-07-03-INI	16 x 22	4 x 4 x 0.34						
	3 x 18	3 x 0.75	.43	(11)	50.3	(74)	108.1	(159)



Clean-Room

10.86

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

TPE Control Cables



CF9

Chainflex® CF9

TPE Energy Chain® Cable, oil-resistant, bio-oil-resistant, PVC-free, halogen-free, UV-resistant, low temperature flexibility

Price Index



CLASS
7.4.4

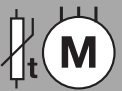
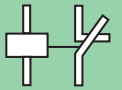
Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF9-05-02	20	2 x 0.5	.20	(5)	6.9	(10.3)	14.5	(21.6)
CF9-05-03	20	3 x 0.5	.22	(5.5)	10.2	(15)	21.8	(32)
CF9-05-04	20	4 x 0.5	.22	(5.5)	13.1	(19.2)	24.5	(36)
CF9-05-05	20	5 x 0.5	.24	(6)	16.3	(24)	31.3	(46)
CF9-05-07	20	7 x 0.5	.28	(7)	23.1	(34)	53.0	(78)
CF9-05-12	20	12 x 0.5	.37	(9.5)	39.4	(58)	71.4	(105)
CF9-05-18	20	18 x 0.5	.49	(12.5)	59.1	(88.0)	106.5	(158.5)
CF9-05-25	20	25 x 0.5	.53	(13.5)	81.6	(120)	136.7	(201)
CF9-05-36	20	36 x 0.5	.69	(17.5)	117.6	(173)	250.2	(368)
CF9-07-05	18	5 x 0.75	.26	(6.5)	24.4	(36)	39.4	(58)
CF9-07-07	18	7 x 0.75	.32	(8)	34.0	(50)	51.7	(76)
CF9-07-12	18	12 x 0.75	.43	(11)	58.4	(86)	96.6	(142)
CF9-07-20	18	20 x 0.75	.53	(13.5)	97.9	(144)	157.1	(231)
CF9-07-25	18	25 x 0.75	.69	(17.5)	122.4	(180)	217.6	(320)
CF9-10-03	17	3 x 1	.24	(6)	19.7	(29)	33.3	(49)
CF9-10-04	17	4 x 1	.25	(6.5)	25.8	(38)	38.1	(56)
CF9-10-05	17	5 x 1	.27	(7)	32.6	(48)	42.0	(70)
CF9-10-12	17	12 x 1	.45	(11.5)	78.2	(115)	123.1	(181)
CF9-10-18	17	18 x 1	.55	(14)	117.6	(173)	181.6	(267)
CF9-10-25	17	25 x 1	.67	(17)	163.9	(241)	223.7	(329)
CF9-15-02	16	2 x 1.5	.26	(6.5)	20	(29)	37	(54)
CF9-15-04	16	4 x 1.5	.30	(7.5)	39.4	(58)	58.4	(86)
CF9-15-05	16	5 x 1.5	.31	(8)	49.0	(72)	74.8	(110)
CF9-15-07	16	7 x 1.5	.37	(9.5)	68.7	(101)	95.2	(140)
CF9-15-12	16	12 x 1.5	.55	(14)	117.6	(173)	180.2	(265)
CF9-15-18	16	18 x 1.5	.67	(17)	176.8	(260)	272.0	(400)
CF9-15-25	16	25 x 1.5	.79	(20)	244.8	(360)	409.4	(602)
CF9-15-36	16	36 x 1.5	.91	(23.0)	353.0	(519)	571.0	(840)
CF9-25-04	14	4 x 2.5	.35	(9)	65.3	(96)	87.0	(128)
CF9-25-05	14	5 x 2.5	.39	(10)	81.6	(120)	118.3	(174)
CF9-25-07	14	7 x 2.5	.47	(12)	114.2	(168)	204.7	(301)
CF9-25-12	14	12 x 2.5	.67	(17)	195.8	(288)	411.4	(605)
CF9-25-16	14	16 x 2.5	.83	(21)	261.1	(384)	408.0	(600)
CF9-25-18* ²	14	18 x 2.5	.89	(22.5)	293.8	(432)	562.4	(827)
CF9-25-25	14	25 x 2.5	.96	(24.5)	408.0	(600)	673.2	(990)
CF9-40-04	12	4 x 4	.39	(10)	104.7	(154)	132.6	(195)
CF9-60-04	10	4 x 6	.49	(12.5)	156.4	(230)	210.8	(310)
CF9-60-05	10	5 x 6	.55	(14)	195.8	(288)	272.0	(400)
CF9-100-04* ¹	8	4 x 10	.65	(16.5)	261.1	(384)	350.2	(515)
CF9-160-04* ¹	6	4 x 16	.79	(20)	349.5	(514)	530.4	(780)
CF9-350-04* ¹	2	4 x 35	1.02	(26)	913.9	(1344)	1156.0	(1700)

*1nominal voltage 450/750V

*2nominal voltage 600/1000V

NOTE: The mentioned external diameters are maximum

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 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

CF10



TPE Control Cables

CLASS
7.4.4

Price Index



Chainflex® CF10

TPE Energy Chain® cable, shielded, oil-resistant, bio-oil-resistant, PVC-free, halogen-free, UV-resistant, low temperature flexibility

Conductor
Highly flexible special conductor

Strain relief
Center core for high tensile strength

Core
Braiding in bundles around high tensile strength core

Inner jacket
Gusset filled pressure extruded

Overall shield
Highly flexible braided copper shield

Outer jacket
Pressure extruded, halogen-free TPE blend

Construction

Conductors: Bare copper conductors with very fine stranding. According to EN 60228

Conductor insulation: TPE, thin-walled version

Conductor twisting: Number of conductors < 12 Conductors concentrically layered with short pitch. Number of conductors ≥ 12 Conductors layered in braids around a, high-tensile-strength core; short pitches matched in the direction of the pitch for extremely low torsion.

Conductor colors: Black with white numbers, one conductor green/yellow with cross-sections 18-12 AWG; 20-26 AWG DIN 47100.

Intermediate jacket: TPE

Shield: Tinned copper shield, coverage approx. 90% optical.

Outer jacket: TPE: particularly abrasion-resistant, high-flex blend, oil-resistant, coolant-resistant. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** dark blue (RAL 5011).

Technical Data:

Minimum bending radius, moving: 5 x outer cable diameter

Minimum bending radius, fixed: 3 x outer cable diameter

Permissible temperature, moving: -31°F to +212°F (-35°C to +100°C)

Permissible temperature, fixed: -40°F to +212°F (-40°C to +100°C)

UV-resistance: High

Oil-resistance: High

Voltage: 300V

Testing voltage: 2000 V (according to DIN VDE 0281-2)

Regulations: CE, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1.

Test cable : CF9-15-07

Typical Applications

- for maximum mechanical load requirements
- indoor and outdoor applications
- especially for unsupported and gliding travel distances up to 1312 ft (400m) and more.
- storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, ship-to-shore, outdoor cranes, low temperature applications



Clean-Room

10.88

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

TPE Control Cables



CF10

Chainflex® CF10

TPE Energy Chain® cable, shielded, oil-resistant, bio-oil-resistant, PVC-free, halogen-free, UV-resistant, low temperature flexibility

Price Index

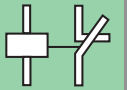


CLASS
7.4.4

Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF10-01-12	26	12 x 0.14	.30	(7.5)	24.4	(36)	54.4	(80)
CF10-01-18	26	18 x 0.14	.39	(10)	45.5	(67)	74.8	(110)
CF10-02-04	24	4 x 0.25	.25	(6.5)	17.0	(25)	27.2	(40)
CF10-02-08	24	8 x 0.25	.30	(7.5)	27.2	(40)	46.9	(69)
CF10-02-12	24	12 x 0.25	.37	(9.5)	38.1	(56)	68.0	(100)
CF10-02-24	24	24 x 0.25	.51	(13.0)	74.2	(109)	144.2	(212)
CF10-05-04	20	4 x 0.5	.28	(7)	25.8	(38)	42.1	(62)
CF10-05-05	20	5 x 0.5	.30	(7.5)	28.6	(42)	47.6	(70)
CF10-05-07	20	7 x 0.5	.34	(8.5)	35.0	(52)	59.0	(88)
CF10-05-12	20	12 x 0.5	.45	(11.5)	62.6	(92)	105.4	(155)
CF10-05-18	20	18 x 0.5	.53	(13.5)	87.0	(128)	146.2	(215)
CF10-05-25	20	25 x 0.5	.57	(14.5)	113.6	(167)	190.4	(280)
CF10-07-04	18	4 x 0.75	.30	(7.5)	32.0	(47)	49.6	(73)
CF10-07-05	18	5 x 0.75	.30	(7.5)	38.8	(57)	57.1	(84)
CF10-07-07	18	7 x 0.75	.33	(9)	51.0	(75)	74.8	(110)
CF10-07-12	18	12 x 0.75	.49	(12.5)	93.8	(138)	123.8	(182)
CF10-07-20	18	20 x 0.75	.59	(15)	139.4	(205)	235.3	(346)
CF10-07-24	18	24 x 0.75	.65	(16.5)	150.2	(221)	224.4	(330)
CF10-10-02	17	2 x 1	.28	(7)	25.8	(38)	47.6	(70)
CF10-10-03	17	3 x 1	.30	(7.5)	32.0	(47)	49.6	(73)
CF10-10-04	17	4 x 1	.31	(8)	40.1	(59)	59.1	(87)
CF10-10-05	17	5 x 1	.34	(8.5)	48.3	(71)	68.9	(101)
CF10-10-07	17	7 x 1.0	.39	(10)	48.3	(71)	68.9	(101)
CF10-10-12	17	12 x 1	.53	(13.5)	106.1	(156)	157.8	(232)
CF10-10-18	17	18 x 1	.65	(16.5)	150.2	(221)	219.0	(322)
CF10-10-24	17	24 x 1.0	.71	(18)	207.4	(305)	344.1	(506)
CF10-15-04	16	4 x 1.5	.35	(9.0)	65.3	(96)	89.8	(132)
CF10-15-05	16	5 x 1.5	.37	(9.5)	73.5	(108)	110.9	(163)
CF10-15-07	16	7 x 1.5	.45	(11.5)	105.4	(155)	136.0	(200)
CF10-15-12	16	12 x 1.5	.61	(15.5)	150.2	(221)	226.4	(333)
CF10-15-18	16	18 x 1.5	.79	(20)	245.5	(361)	397.8	(585)
CF10-25-04	14	4 x 2.5	.43	(11)	85.7	(126)	122.4	(180)
CF10-25-07	14	7 x 2.5	.53	(13.5)	139.4	(205)	204.0	(300)
CF10-25-12	14	12 x 2.5	.75	(19)	253.6	(373)	359.0	(528)
CF10-40-04	12	4 x 4	.45	(11.5)	127.8	(188)	173.4	(255)
CF10-40-05	12	4 x 4.0	.53	(13.5)	167.3	(246)	240.0	(353)

NOTE: The mentioned external diameters are maximum values.

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No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

10.89

CF9-UL

igus®

TPE Control Cable

CLASS
6.4.4

Price Index



Chainflex® CF9-UL

TPE Energy Chain® Cable, oil-resistant, bio-oil-resistant, UV-resistant, flame-retardant, low temperature flexibility

Conductor
Highly flexible special conductor

Strain relief
Center core for high tensile strength

Core
Braiding in bundles around high tensile strength core

Outer jacket
Gusset-filling, pressure extruded, halogen-free TPE blend



Construction

Conductors: Bare copper conductors with very fine stranding. According to EN 60228

Conductor insulation: TPE, thin-walled version

Conductor twisting: Number of conductors < 12 Conductors concentrically layered with short pitch.

Number of conductors \geq 12 Conductors layered in braids around a, high-tensile-strength core; short pitches matched in the direction of the pitch for extremely low torsion.

Conductor colors: 18-10 AWG Black with white numbers, one conductor green/yellow with cross-sections up to; 20-24 AWG DIN 47100.

CF9-02-03-INI: brown, blue, black

CF9-03-04-INI: brown, blue, black, white

CF9-03-05-INI: brown, blue, black, white, green-yellow

CF9-03-16-07-03-INI: (18 AWG) blue, green-yellow, brown

(22 AWG) violet, red, gray, red-blue, green, gray-pink, white-green, white-yellow, white-gray, black, yellow-brown, brown-green, white, yellow, pink, gray-brown

Outer jacket: TPE: particularly abrasion-resistant, high-flex blend, oil-resistant, coolant-resistant. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** dark blue (RAL 5011).

Technical Data:

Minimum bending radius, moving: 5 x outer cable diameter

Minimum bending radius, fixed: 3 x outer cable diameter

Permissible temperature, moving: -31°F to +212°F (-35°C to +100°C)

Permissible temperature, fixed: -40°F to + 212°F (-40°C to +100°C)

UV-resistance: High

Oil-resistance: High

Flame-resistance: FT1

Voltage: 300V 22-24 AWG; 600V 20-10 AWG

Regulations: cRUus: UL AWM for USA & Canada styles 21539 90°C 300V 22-24 AWG; 21530 90°C 600V 20-10 AWG, **CE, RoHS: 2002/95/EC**; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1.

Test cable : CF34-25-04

Typical Applications

- for maximum mechanical load requirements
- indoor and outdoor applications
- especially for unsupported and gliding travel distances up to 1312 ft (400m) and more
- storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semi-conductor insertion, ship-to-shore, outdoor cranes, low temperature applications



Clean-Room

10.90

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

TPE Control Cable



CF9-UL

Chainflex® CF9-UL

TPE Energy Chain® Cable, oil-resistant, bio-oil-resistant, UV-resistant, flame-retardant, low temperature flexibility

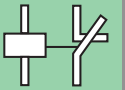
Price Index



CLASS
6.4.4

Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF9-UL-02-02	24	2 x 0.25	.20	(5.0)	3.4	(5)	18.8	(28)
CF9-UL-02-03-INI	24	3 x 0.25	.22	(5.5)	5.4	(8)	21.4	(32)
CF9-UL-02-04	24	4 x 0.25	.22	(5.5)	6.7	(10)	25.5	(38)
CF9-UL-02-06	24	6 x 0.25	.24	(6)	10.1	(15)	33.5	(50)
CF9-UL-02-07	24	7 x 0.25	.26	(6.5)	11.4	(17)	38.1	(57)
CF9-UL-02-08	24	8 x 0.25	.28	(7)	13.4	(20)	42.2	(63)
CF9-UL-02-12	24	12 x 0.25	.33	(8.5)	19.5	(29)	63.7	(95)
CF9-UL-03-04-INI	22	4 x 0.34	.24	(6)	8.7	(13)	28.8	(43)
CF9-UL-03-05-INI	22	5 x 0.34	.24	(6)	10.8	(16)	34.2	(51)
CF9-UL-03-06	22	6 x 0.34	.26	(6.5)	13.4	(20)	38.9	(58)
CF9-UL-05-02	20	2 x 0.5	.24	(6)	6.7	(10)	29.5	(44)
CF9-UL-05-03	20	3 x 0.5	.26	(6.5)	10.1	(15)	34.8	(52)
CF9-UL-05-04	20	4 x 0.5	.28	(7)	13.4	(20)	41.5	(62)
CF9-UL-05-05	20	5 x 0.5	.28	(7)	16.1	(24)	48.2	(72)
CF9-UL-05-07	20	7 x 0.5	.33	(8.5)	22.8	(34)	65.0	(97)
CF9-UL-05-12	20	12 x 0.5	.43	(11)	39.0	(58)	131.3	(196)
CF9-UL-05-18	20	18 x 0.5	.53	(13.5)	58.4	(87)	162.1	(242)
CF9-UL-05-25	20	25 x 0.5	.57	(14.5)	80.6	(120)	204.4	(305)
CF9-UL-07-05	18	5 x 0.75	.32	(8)	24.2	(36)	63.0	(94)
CF9-UL-07-07	18	7 x 0.75	.37	(9.5)	34.3	(51)	85.8	(128)
CF9-UL-07-12	18	12 x 0.75	.49	(12.5)	58.4	(87)	160.8	(240)
CF9-UL-07-25	18	25 x 0.75	.65	(16.5)	121.0	(180)	276.0	(412)
CF9-UL-10-03	17	3 x 1	.30	(7.5)	19.5	(29)	52.3	(78)
CF9-UL-10-04	17	4 x 1	.31	(8)	26.2	(39)	65.7	(98)
CF9-UL-10-05	17	5 x 1	.27	(8.5)	32.3	(48)	75.0	(112)
CF9-UL-10-12	17	12 x 1	.53	(13.5)	78.0	(116)	192.3	(287)
CF9-UL-10-18	17	18 x 1	.65	(16.5)	116.3	(173)	264.0	(394)
CF9-UL-10-25	17	25 x 1	.73	(18.5)	161.3	(240)	348.4	(520)
CF9-UL-15-04	16	4 x 1.5	.35	(9)	39.0	(58)	85.1	(127)
CF9-UL-15-05	16	5 x 1.5	.37	(9.5)	48.4	(72)	101.8	(152)
CF9-UL-15-07	16	7 x 1.5	.43	(11)	67.9	(101)	132.7	(198)
CF9-UL-15-12	16	12 x 1.5	.61	(15.5)	116.3	(173)	258.0	(385)
CF9-UL-15-18	16	18 x 1.5	.75	(19)	174.7	(260)	358.5	(535)
CF9-UL-15-25	16	25 x 1.5	.77	(19.5)	241.9	(360)	459.0	(685)
CF9-UL-25-04	14	4 x 2.5	.39	(10)	64.5	(96)	126.6	(189)
CF9-UL-25-05	14	5 x 2.5	.43	(11)	80.6	(120)	147.4	(220)
CF9-UL-25-12	14	12 x 2.5	.75	(19)	193.6	(288)	410.7	(613)
CF9-UL-25-18	14	18 x 2.5	.93	(23.5)	290.3	(432)	570.8	(852)
CF9-UL-25-25	14	25 x 2.5	1.04	(26.5)	403.2	(600)	779.2	(1163)
CF9-UL-40-04	12	4 x 4	.47	(12)	103.5	(154)	186.3	(278)
CF9-UL-60-04	10	4 x 6	.53	(13.5)	154.6	(230)	255.9	(382)

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No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

10.91

CF10-UL



TPE Control Cables

Chainflex® CF10-UL

TPE Energy Chain® cable, shielded, oil-resistant, bio-oil-resistant, flame retardant, UV-resistant, low temperature flexibility

CLASS
6.4.4

Price Index



Conductor
Highly flexible special conductor

Strain relief
Center core for high tensile strength

Core
Braiding in bundles around high tensile strength core

Inner jacket
Gusset filled pressure extruded

Overall shield
Highly flexible braided copper shield

Outer jacket
Pressure extruded, halogen-free TPE blend



Construction

Conductors: Bare copper conductors with very fine stranding. According to EN 60228

Conductor insulation: TPE, thin-walled version

Conductor twisting: Number of conductors < 12 Conductors concentrically layered with short pitch. Number of conductors ≥ 12 Conductors layered in braids around a, high-tensile-strength core; short pitches matched in the direction of the pitch for extremely low torsion.

Conductor colors: Black with white numbers, one conductor green/yellow with cross-sections 18-12 AWG; 20-24 AWG DIN 47100.

Intermediate jacket: TPE

Shield: Tinned copper shield, coverage approx. 90% optical.

Outer jacket: TPE: particularly abrasion-resistant, high-flex blend, oil-resistant, coolant-resistant. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** dark blue (RAL 5011).

Technical Data

Minimum bending radius, moving: 5 x outer cable diameter

Minimum bending radius, fixed: 3 x outer cable diameter

Permissible temperature, moving: -31°F to +212°F (-35°C to +100°C)

Permissible temperature, fixed: -40°F to +212°F (-40°C to +100°C)

UV resistance: High

Oil resistance: High

Flame resistance: FT1

Voltage: 300V 24 AWG; 600V 20-12 AWG

Regulations: cRUus: UL AWM USA & Canada styles 21539 90°C 300V 20-24 AWG; 21530 90°C 600V 18-12 AWG, CE, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1.

Test cable : CF34-25-04

Typical Applications

- for maximum mechanical load requirements
- indoor and outdoor applications
- especially for unsupported and gliding travel distances up to 1312 ft (400m) and more.
- storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semi-conductor insertion, ship-to-shore, outdoor cranes, low temperature applications



Clean-Room

10.92

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

TPE Control Cables



CF10-UL

Chainflex® CF10-UL

TPE Energy Chain® cable, shielded, oil-resistant, bio-oil-resistant, flame retardant, UV-resistant, low temperature flexibility

Price Index

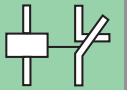


CLASS
6.4.4

Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF10-UL-02-04	24	4 x 0.25	.28	(7)	16.8	(25)	47.6	(71)
CF10-UL-02-08	24	8 x 0.25	.33	(8.5)	24.8	(37)	67.7	(101)
CF10-UL-02-12	24	12 x 0.25	.39	(10)	42.2	(63)	102.5	(153)
CF10-UL-05-04	20	4 x 0.5	.33	(8.5)	24.8	(37)	67.7	(101)
CF10-UL-05-05	20	5 x 0.5	.33	(8.5)	28.8	(43)	74.4	(111)
CF10-UL-05-12	20	12 x 0.5	.51	(13)	71.0	(106)	172.9	(258)
CF10-UL-05-18	20	18 x 0.5	.59	(15)	97.8	(146)	222.4	(332)
CF10-UL-05-25	20	25 x 0.5	.63	(16)	124.0	(185)	275.4	(411)
CF10-UL-07-04	18	4 x 0.75	.35	(9)	32.8	(49)	82.4	(123)
CF10-UL-07-05	18	5 x 0.75	.37	(9.5)	45.6	(68)	100.5	(150)
CF10-UL-07-07	18	7 x 0.75	.43	(11)	60.3	(90)	130.0	(194)
CF10-UL-07-12	18	12 x 0.75	.57	(14.5)	95.8	(143)	225.1	(336)
CF10-UL-07-24	18	24 x 0.75	.75	(19)	184.9	(276)	387.3	(578)
CF10-UL-10-03	17	3 x 1	.35	(9)	32.2	(48)	80.4	(120)
CF10-UL-10-04	17	4 x 1	.37	(9.5)	47.6	(71)	103.9	(155)
CF10-UL-10-05	17	5 x 1	.41	(10.5)	55.6	(83)	116.6	(174)
CF10-UL-10-07	17	7 x 1.0	.47	(12)	74.4	(111)	154.1	(230)
CF10-UL-10-12	17	12 x 1	.57	(14.5)	114.6	(171)	247.9	(370)
CF10-UL-10-18	17	18 x 1	.75	(19)	183.6	(274)	322.0	(473)
CF10-UL-10-24	17	24 x 1.0	.85	(21.5)	231.8	(346)	475.0	(709)
CF10-UL-15-04	16	4 x 1.5	.41	(10.5)	63.0	(94)	128.6	(192)
CF10-UL-15-05	16	5 x 1.5	.43	(11)	144.1	(215)	75.0	(112)
CF10-UL-15-07	16	7 x 1.5	.51	(13)	99.8	(149)	186.9	(279)
CF10-UL-15-12	16	12 x 1.5	.69	(17.5)	162.8	(243)	340.4	(508)
CF10-UL-15-18	16	18 x 1.5	.85	(21.5)	251.3	(375)	485.1	(724)
CF10-UL-25-04	14	4 x 2.5	.47	(12)	93.8	(140)	179.6	(268)
CF10-UL-25-07	14	7 x 2.5	.59	(15)	152.1	(227)	270.7	(404)
CF10-UL-25-12	14	12 x 2.5	.85	(21.5)	270.7	(404)	538.7	(804)
CF10-UL-40-04	12	4 x 4	.53	(13.5)	138.0	(206)	247.2	(369)

NOTE: The mentioned external diameters are maximum values.

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





















No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

Data Cables



Data Cable Selection

Chainflex® cable	Jacket	Shield	Class	Bending radius moving (factor x d)	Temperature moving from/to °F (°C)	Oil-resistant	Torsion resistant	V max. ft/s (m/s) unsupported	V max. ft/s (m/s) gliding	a max. ft/s ² (m/s ²)	Approvals and standards		
Data cables													
CF240	PVC	✓	4.2.2	10-12	+23/+158°F (-5/+70°C)	✓		9.84 ft/s (3 m/s)	6.56 ft/s (2 m/s)	65.6 ft/s ² (20 m/s ²)	CE	RU US	
CF211	PVC	✓	5.3.2	10	+23/+158°F (-5/+70°C)	✓		16.40 ft/s (5 m/s)	9.84 ft/s (3 m/s)	164 ft/s ² (50 m/s ²)	CE	RU US	
CF112	PUR	✓	6.3.3	10	-31/+176°F (-35/+80°C)	✓		32.81 ft/s (10 m/s)	16.40 ft/s (5 m/s)	262.4 ft/s ² (80 m/s ²)	CE	RU US	
CF113	PUR	✓	6.3.3	10	-31/+176°F (-35/+80°C)	✓		32.81 ft/s (10 m/s)	16.40 ft/s (5 m/s)	262.4 ft/s ² (80 m/s ²)	CE	RU US	
CF11	TPE	✓	6.4.4	10	-31/+212°F (-35/+100°C)	✓		32.81 ft/s (10 m/s)	19.68 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	CE		
CF12	TPE	✓	6.4.4	10	-31/+212°F (-35/+100°C)	✓		32.81 ft/s (10 m/s)	19.68 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	CE		
Bus cables													
CFBUS	TPE	✓	6.4.4	10-12.5	-31/+158°F (-35/+70°C)	✓		32.81 ft/s (10 m/s)	19.68 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	CE	RU US	 
CF11-LC	TPE	✓	6.4.4	10	-31/+158°F (-35/+70°C)	✓		32.81 ft/s (10 m/s)	19.68 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	CE		
CF11-LC-D	TPE	✓	6.4.4	10	-31/+158°F (-35/+70°C)	✓		32.81 ft/s (10 m/s)	19.68 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	CE		 
CF14US	PUR	✓	6.3.4	12.5	-4/+176°F (-20/+80°C)	✓		32.81 ft/s (10 m/s)	19.68 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	CE	SF UL	 
CF14 CAT5	TPE	✓	6.3.4	12.5	-31/+158°F (-35/+70°C)	✓		32.81 ft/s (10 m/s)	19.68 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	CE		 
Measuring system cables													
CF211	PVC	✓	5.3.2	10	+23/+158°F (-5/+70°C)	✓		16.40 ft/s (5 m/s)	9.84 ft/s (3 m/s)	164 ft/s ² (50 m/s ²)	CE	RU US	
CF113-D	PUR	✓	6.3.3	10	-4/+176°F (-20/+80°C)	✓		16.40 ft/s (5 m/s)	9.84 ft/s (3 m/s)	164 ft/s ² (50 m/s ²)	CE	RU US	 
CF111-D	TPE	✓	4.1.4	12	-31/+212°F (-35/+100°C)	✓		9.84 ft/s (2 m/s)		98.4 ft/s ² (30 m/s ²)	CE	RU US	 
CF11-D	TPE	✓	6.4.4	10	-31/+212°F (-35/+100°C)	✓		32.81 ft/s (10 m/s)	19.68 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	CE		 
Koax cables													
CF KOAX 1	TPE		6.4.4	10	-31/+212°F (-35/+100°C)	✓		32.81 ft/s (10 m/s)	16.40 ft/s (5 m/s)	328.1 ft/s ² (100 m/s ²)	CE		



Chainflex® CF240

PVC Energy Chain® cable, shielded, oil-resistant, flame-retardant

Conductor
Fine wire
conductor

Core
Cabled in layers
with extremely
short pitch

Overall shield
Highly flexible
braided copper
shield

Outer jacket
Pressure ex-
truded



Construction

Conductors: Finely stranded bare copper conductor with extreme flexibility.

Conductor insulation: Mechanically tough PVC

Conductor twisting: Conductors twisted with short pitch, layered around high tensile strength core.

Conductor colors: Color code DIN 47100

Shield: Tinned copper braid, coverage approx. 90% optical.

Outer jacket: PVC-based, low-adhesion blend, adapted to the requirements of the Energy Chain®, oil-resistant. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** grey (RAL 7001)

Technical Data

Minimum bending radius, moving: <10m travel = 10 x outer diameter; ≥10m travel = 12 x outer diameter,

Minimum bending radius, fixed: 5 x outer cable diameter

Permissible temperature, moving: +23°F to +158°F (-5°C to +70°C)

Permissible temperature, fixed: -4°F to +158°F (-20°C to +70°C)

Flame resistance: FT1

Oil-resistance: Medium

Voltage: 300V

Test Voltage: 1500V

Regulations: cRUus AWM: UL AWM for USA and Canada style 2464 80°C 300V, **CE, VDE, RoHS: 2002/95/EC;** Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 2, material/cable tested by IPA according to ISO standard 14644-1. Test cable CF5-10-07

Typical Applications

- for high mechanical load requirements
- preferably indoor applications, outdoor is acceptable for temperatures greater than +41°F (+5°C)
- especially for unsupported travel and gliding travel up to 164 ft (50m)
- storage and retrieval units for high-bay warehouses, machining units/packaging machines, handling, indoor cranes

Part No.	AWG	No. of Conductors and Rated Cross- Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF240-01-03	26	3 x 0.14	.18	(4.5)	11	(16)	24	(35)
CF240-01-04	26	4 x 0.14	.20	(5)	12	(18)	26	(38)
CF240-01-05	26	5 x 0.14	.22	(5.5)	14	(20)	29	(42)
CF240-01-07	26	7 x 0.14	.24	(6)	17	(25)	35	(51)
CF240-01-14	26	14 x 0.14	.28	(7)	29	(42)	52	(76)
CF240-01-18	26	18 x 0.14	.31	(8)	33	(48)	61	(90)
CF240-01-24	26	24 x 0.14	.37	(9.5)	41	(60)	77	(113)
CF240-02-03	24	3 x 0.25	.22	(5.5)	14	(21)	27	(40)
CF240-02-04	24	4 x 0.25	.22	(5.5)	16	(24)	33	(48)
CF240-02-05	24	5 x 0.25	.24	(6)	18	(27)	35	(52)
CF240-02-07	24	7 x 0.25	.28	(7)	24	(35)	45	(66)
CF240-02-08	24	8 x 0.25	.30	(7.5)	27.2	(40)	50.3	(74)
CF240-02-14	24	14 x 0.25	.31	(8)	39	(57)	68	(100)
CF240-02-18	24	18 x 0.25	.35	(9)	48	(71)	83	(122)
CF240-02-24	24	24 x 0.25	.43	(11)	63	(92)	118	(174)
CF240-03-03	22	3 x 0.34	.22	(5.5)	16	(24)	31	(45)
CF240-03-04	22	4 x 0.34	.24	(6)	19	(28)	35	(51)
CF240-03-05	22	5 x 0.34	.26	(6.5)	22	(32)	39	(58)
CF240-03-07	22	7 x 0.34	.28	(7)	29	(43)	51	(75)
CF240-03-10	22	10 x 0.34	.33	(8.5)	37.4	(55)	74.8	(110)
CF240-03-14	22	14 x 0.34	.33	(8.5)	48	(71)	79	(116)
CF240-03-18	22	18 x 0.34	.39	(10)	59	(87)	95	(140)
CF240-03-24	22	24 x 0.34	.47	(12)	78	(115)	138	(203)



PVC Data Cable

Chainflex® CF211

PVC Energy Chain® cable, shielded, twisted pair, oil-resistant, flame-retardant



CF211

CLASS 5.3.2

Price Index



Construction

Conductors: Finely stranded bare copper conductor.

Conductor insulation: Mechanically tough PVC

Conductor twisting: Twisted pairs are cabled together with a short pitch around a high tensile strength core.

Conductor colors: Color code DIN 47100

Shield: Tinned copper braid, coverage approx. 90% optical.

Outer jacket: PVC-based, low-adhesion blend, adapted to the requirements of the Energy Chain®, oil-resistant in accordance with VDE. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** grey (RAL 7001)

Technical Data

Minimum bending radius, moving: 7.5 x outer cable diameter

Minimum bending radius, fixed: 5 x outer cable diameter

Permissible temperature, moving: +23°F to +158°F (-5°C to +70°C)

Permissible temperature, fixed: -4°F to +158°F (-20°C to +70°C)

Oil-resistance: Medium

Flame-resistance: FT1

Voltage: 300V

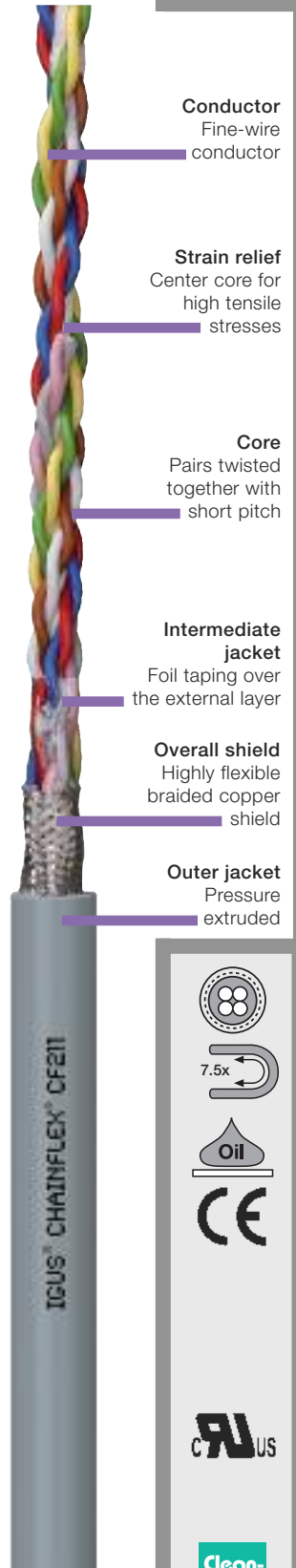
Test voltage: 1500V

Regulations: cRUus UL AWM for USA & Canada style 2464 80°C 300V, CE, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 2, material/cable tested by IPA according to ISO standard 14644-1. Test cable CF5-10-07

Typical Applications

- for high mechanical load requirements
- preferably indoor applications, outdoor is acceptable for temperatures greater than +41°F (+5°C)
- especially for unsupported and gliding travel up to 328 ft (100m)
- storage and retrieval units for high-bay warehouses, machining units/packaging machines, handling, indoor cranes



Part No.	AWG	No. of Pairs and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF211-02-01-02	24	1 PR x 0.25	.20	(5)	10.9	(16)	23.8	(35)
CF211-02-02-02	24	2 PR x 0.25	.22	(5.5)	19.0	(28)	40.8	(60)
CF211-02-03-02	24	3 PR x 0.25	.28	(7)	25.2	(37)	49.6	(73)
CF211-02-04-02	24	4 PR x 0.25	.31	(8)	29.9	(44)	57.8	(85)
CF211-02-05-02	24	5 PR x 0.25	.33	(8.5)	34.7	(51)	66.0	(97)
CF211-02-06-02	24	6 PR x 0.25	.37	(9.5)	39.4	(58)	74.8	(110)
CF211-02-08-02	24	8 PR x 0.25	.45	(11.5)	51.0	(75)	108.8	(160)
CF211-02-10-02	24	10 PR x 0.25	.51	(13)	63.2	(93)	132.6	(195)
CF211-02-14-02	24	14 PR x 0.25	.53	(13.5)	74.1	(109)	139.4	(205)
CF211-03-03-02	22	3 PR x 0.34	.31	(8)	25.2	(37)	53.7	(79)
CF211-03-08-02	22	8 PR x 0.34	.47	(12)	66.7	(98)	137.4	(202)
CF211-05-01-02	20	1 PR x 0.5	.22	(5.5)	15.6	(23)	34.0	(50)
CF211-05-02-02	20	2 PR x 0.5	.33	(8.5)	29.9	(44)	54.4	(80)
CF211-05-03-02	20	3 PR x 0.5	.35	(9)	38.8	(57)	68.0	(100)
CF211-05-04-02	20	4 PR x 0.5	.37	(9.5)	46.2	(68)	81.6	(120)
CF211-05-05-02	20	5 PR x 0.5	.43	(11)	54.4	(80)	98.6	(145)
CF211-05-06-02	20	6 PR x 0.5	.49	(12.5)	67.3	(99)	125.8	(185)
CF211-05-08-02	20	8 PR x 0.5	.55	(14)	84.3	(124)	156.4	(230)
CF211-05-10-02	20	10 PR x 0.5	.63	(16)	119.0	(175)	217.6	(320)
CF211-05-14-02	20	14 PR x 0.5	.67	(17)	127.1	(187)	227.8	(335)

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number



10.97

CF112

iglus®

PUR Data Cables

CLASS
6.3.3

Price Index



Chainflex® CF112

PUR Energy Chain® cable, double-shielded, twisted pair oil-resistant, coolant-resistant, PVC-free/halogen-free, cut-resistant, hydrolysis resistant and microbe resistant, flame-retardant

Conductor
Fine stranded conductor

Pair shield
Highly flexible braided copper shield

Strain relief
high tensile strength core

Core
Pairs twisted together with short pitch

Inner jacket
gusset filled, pressure extruded

Overall shield
Highly flexible braided copper shield

Outer jacket
Pressure extruded, halogen-free PUR blend

Construction

Conductors: Finely stranded bare copper conductor with extreme flexibility. According to EN60228

Conductor insulation: Mechanically high quality TPE mixture

Pair shielding: Tinned braided copper shield

Conductor colors: Color code in accordance with DIN 47100

Conductor twisting: Twisted pairs are cabled together with a short pitch around a high tensile strength core

Intermediate jacket: PUR blend, adapted to the requirements of the Energy Chain®.

Shield: Tinned copper braid. 90% optical coverage.

Outer jacket: PUR-based, highly abrasion-resistant, adapted to the requirements of the Energy Chain®, **Color:** grey (RAL 7016)

Silicon-free: in compliance with PV 3.10.7 - status 1992.

Technical Data

Minimum bending radius, moving: 10 x outer cable diameter

Minimum bending radius, fixed: 5 x outer cable diameter

Permissible temperature, moving: -31°F to +176°F (-35°C to +80°C)

Permissible temperature, fixed: -40°F to +176°F (-40°C to +80°C)

Flame resistance: FT1

Oil resistance: High

Voltage: 300V

Test voltage: 1500V

Regulations: cRUus AWM: UL AWM for USA and Canada style 20233 80°C 300V, CE, RoHS:

Please reference the Design Section (Chapter 1) for more information.

Typical Applications

- for high mechanical load requirements
- indoor and outdoor applications with average sun radiation
- especially for unsupported and gliding travel up to 328 ft (100m)
- machining units/machine tools, storage and retrieval units for high-bay warehouses, packaging industry, quick handling, refrigerating sector, high EMI resistance needed

Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF112-02-02-02	24	2 PR x 0.25	.37	(9.5)	36.2	(54)	83.9	(125)
CF112-02-04-02	24	4 PR x 0.25	.43	(11.0)	52.4	(78)	90.7	(135)
CF112-05-02-02	20	2 PR x 0.5	.45	(11.5)	48.3	(72)	112.8	(168)
CF112-05-04-02	20	4 PR x 0.5	.49	(12.5)	75.9	(113)	171.4	(255)
CF112-05-06-02	20	6 PR x 0.5	.57	(14.5)	104.1	(155)	206.2	(307)

PR = Twisted Pair

NOTE: The mentioned external diameters are maximum values.



10.98

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

PUR Data Cables



CF113

Chainflex® CF113

PUR Energy Chain cable, shielded, oil-resistant, coolant-resistant, PVC-free, halogen-free, cut-resistant, flame-retardant, hydrolysis resistant and microbe resistant

CLASS
6.3.3

Price Index



Construction

Conductors: Finely stranded bare copper conductor with extreme flexibility. According to EN 60228

Conductor insulation: TPE thin-wall version

Conductor twisting: Twisted pairs are cabled together with a short pitch around a high tensile strength core

Conductor colors: 24 AWG DIN 47100, 20AWG Black with printed white numbers

Intermediate jacket: PUR adapted to the requirements of the Energy Chain®.

Shield: Tinned copper braid. 90% optical coverage.

Outer jacket: Low-adhesion PUR blend, adapted to the requirements of an Energy Chain®. Silicone-free in compliance with PV 3.10.7 - status 1992

Technical Data

Minimum bending radius, moving: 10 x outer cable diameter

Minimum bending radius, fixed: 5 x outer cable diameter

Permissible temperature, moving: -31°F to +212°F (-35°C to +100°C)

Permissible temperature, fixed: -31°F to +212°F (-35°C to +100°C)

Flame resistance: FT1

UV resistance: High

Oil resistance: High

Voltage: 300V

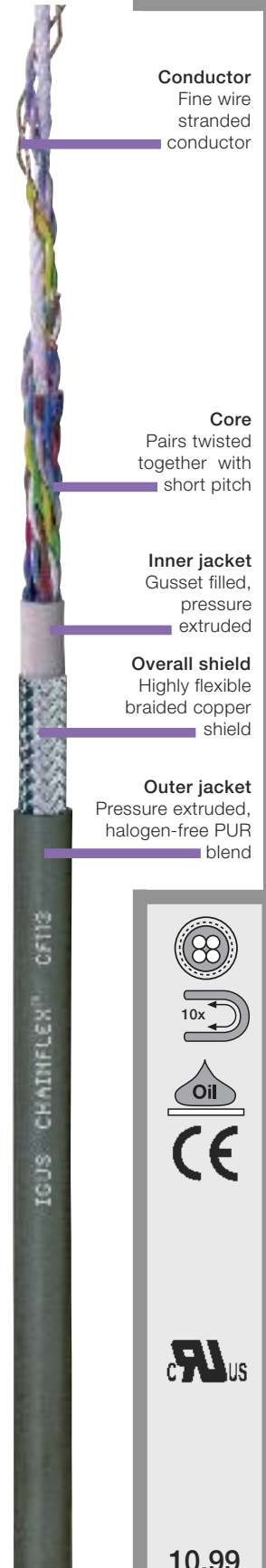
Test voltage: 1500V

Regulations: cRUus AWM: UL AWM for USA and Canada style 20233 80°C 300V, CE, RoHS: 2002/95/EC;

Please reference the Design Section (Chapter 1) for more information.

Typical Applications

- for maximum mechanical load requirements
- indoor and outdoor applications, UV-resistant
- especially for unsupported and gliding travel up to 1312 ft (400m)
- storage and retrieval units for high-bay warehouses, machine tools, quick handling, cleanroom, semiconductor insertion, outdoor cranes, low temperature applications



Part No.	AWG	No. of Pairs and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF113-02-02-02	24	2 PR x 0.25	.31	(8)	20.8	(31)	57.7	(86)
CF113-02-03-02	24	3 PR x 0.25	.33	(8.5)	16.6	(40)	64.5	(96)
CF113-02-04-02	24	4 PR x 0.25	.35	(9)	30.2	(45)	71.9	(107)
CF113-02-05-02	24	5 PR x 0.25	.37	(9.5)	37.6	(56)	83.9	(125)
CF113-02-06-02	24	6 PR x 0.25	.39	(10)	41.6	(62)	92.0	(137)
CF113-05-02-02	20	2 PR x 0.5	.39	(10)	33.5	(50)	85.3	(127)
CF113-05-04-02	20	4 PR x 0.5	.43	(11)	47.0	(70)	108.9	(162)
CF113-05-06-02	20	6 PR x 0.5	.49	(12.5)	63.8	(95)	139.0	(207)

PR = Twisted Pair

NOTE: The mentioned external diameters are maximum values.



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

10.99

CF11

TPE Data Cable

CLASS
6.4.4

Price Index



Chainflex® CF11

TPE Energy Chain cable, shielded, oil-resistant, bio-oil-resistant, PVC-free, halogen-free, UV-resistant, hydrolysis resistant and microbe resistant

Conductor
Fine wire stranded
conductor

Core
Pairs twisted
together with
short pitch

Inner jacket
Gusset filled,
pressure
extruded

Overall shield
Highly flexible
braided copper
shield

Outer jacket
Pressure extruded,
halogen-free TPE
blend

Construction

Conductors: Finely stranded bare copper conductor with extreme flexibility. According to EN 60228

Conductor insulation: TPE, thin-walled version

Conductor twisting: Twisted pairs are cabled together with a short pitch around a high tensile strength core

Conductor colors: Color code DIN 47100 up to 18 AWG, 17-14 AWG are black with white printed numbers.

Intermediate jacket: TPE blend, adapted to the requirements of the Energy Chain®.

Shield: Tinned copper braid, 90% optical coverage

Outer jacket: TPE: particularly abrasion-resistant, high-flex blend, oil-resistant, coolant-resistant. Color: dark blue (RAL 5011).

Technical Data

Minimum bending radius, moving: 6.8 x outer cable diameter

Minimum bending radius, fixed: 5 x outer cable diameter

Permissible temperature, moving: -31°F to +212°F (-35°C to +100°C)

Permissible temperature, fixed: -40°F to + 212°F (-40°C to +100°C)

UV-resistance: High

Oil-resistance: High

Voltage: 300V

Test voltage: 1500V

Regulations: CE, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1. Test cable CF9-15-07

Typical Applications

- for maximum mechanical load requirements
- indoor and outdoor applications, UV-resistant
- especially for unsupported and gliding travel up to 1312 ft (400m) or more
- storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, ship to shore, outdoor cranes, low temperature applications

Part No.	AWG	No. of Pairs and Rated Cross- Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF11-01-04-02	26	4 PR x 0.14	.28	(7)	18.8	(28)	43	(64)
CF11-01-18-02	26	18 PR x 0.14	.55	(14)	58.5	(86)	111.5	(164)
CF11-02-01-02	24	1 PR x 0.25	.26	(6)	11.4	(17)	25.5	(38)
CF11-02-02-02	24	2 PR x 0.25	.26	(6.5)	20.4	(30)	34.0	(50)
CF11-02-03-02	24	3 PR x 0.25	.32	(8)	23.1	(34)	40.8	(60)
CF11-02-04-02	24	4 PR x 0.25	.35	(9)	29.9	(44)	54.4	(80)
CF11-02-05-02	24	5 PR x 0.25	.35	(9)	37.4	(55)	68.0	(100)
CF11-02-06-02	24	6 PR x 0.25	.39	(10)	44.9	(66)	86.4	(122)
CF11-02-09-02	24	9 PR x 0.25	.49	(12.5)	62	(92)	133	(198)
CF11-02-10-02	24	10 PR x 0.25	.51	(13)	67.3	(99)	136	(200)
CF11-02-14-02	24	14 PR x 0.25	.53	(13.5)	81.6	(120)	162	(238)
CF11-03-08-02	22	8 PR x 0.34	.49	(12.5)	61.2	(90)	104.7	(154)
CF11-05-04-02	20	4 PR x 0.5	.39	(10)	61.9	(91)	73.4	(108)
CF11-05-06-02	20	6 PR x 0.5	.45	(11.5)	64.6	(95)	129.2	(190)
CF11-05-08-02	20	8 PR x 0.5	.55	(14)	88	(131)	167	(250)
CF11-07-03-02	18	3 PR x 0.75	.43	(11)	52.4	(77)	89.1	(131)
CF11-10-04-02	17	4 PR x 1.0	.47	(12)	82.3	(121)	122.4	(180)
CF11-15-06-02	16	6 PR x 1.5	.67	(17)	164.6	(242)	284.9	(419)
CF11-25-03-02	14	3 PR x 2.5	.65	(16.5)	142.8	(210)	278.8	(410)

PR = Twisted Pair

NOTE: The mentioned external diameters are maximum values.

Clean-
Room

10.100

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

TPE Data Cable



CF12

Chainflex® CF12

TPE Energy Chain® cable, double-shielded, oil-resistant, bio-oil-resistant, PVC-free/halogen-free, UV-resistant, hydrolysis resistant and microbe resistant

CLASS
6.4.4

Price Index



Construction

Conductors: Finely stranded bare copper conductor with extreme flexibility. According to EN 60228

Conductor insulation: TPE thin-wall version

Conductor twisting: Twisted pairs are cabled together with a short pitch around a high tensile strength core

Pair shielding: Tinned copper braid

Pair insulation: Each conductor pair covered individually with TPE over the pair shielding.

Conductor colors: Color code DIN 47100 for 24 AWG. 20AWG and 17AWG Black with printed white numbers

Intermediate jacket: TPE blend, adapted to the requirements of the Energy Chain®.

Shield: Galvanized steel wire braid. 90% optical coverage.

Outer jacket: TPE: particularly abrasion-resistant, high-flex blend, oil-resistant, coolant-resistant. Color: dark blue (RAL 5011).

Technical Data

Minimum bending radius, moving: 10 x outer cable diameter

Minimum bending radius, fixed: 5 x outer cable diameter

Permissible temperature, moving: -31°F to +212°F (-35°C to +100°C)

Permissible temperature, fixed: -40°F to +212°F (-40°C to +100°C)

UV resistance: High

Oil resistance: High

Voltage: 300V

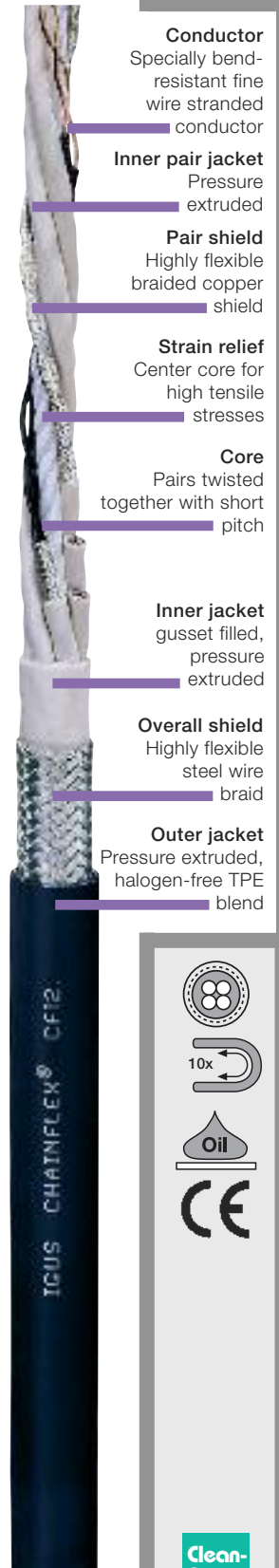
Test voltage: 1500V

Regulations: CE, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1. Test cable CF9-15-07

Typical Applications

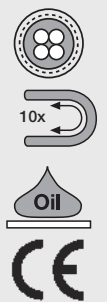
- for maximum mechanical load requirements
- indoor and outdoor applications, UV-resistant
- especially for unsupported and gliding travel up to 1312 ft (400m)
- storage and retrieval units for high-bay warehouses, machine tools, quick handling, cleanroom, semiconductor insertion, outdoor cranes, low temperature applications, high EMI resistance needed



Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF12-02-02-02	24	2PR x 0.25	.43	(11)	18.4	(22)	103.4	(152)
CF12-02-04-02	24	4 PR x 0.25	.45	(11.5)	50.3	(74)	91.8	(135)
CF12-02-05-02	24	5PR x 0.25	.51	(13)	63.3	(93)	150.0	(228)
CF12-05-03-02	20	3 PR x 0.5	.51	(13)	44.9	(66)	142.8	(210)
CF12-05-04-02	20	4 PR x 0.5	.55	(14)	59.8	(88)	173.4	(255)
CF12-05-05-02	20	5 PR x 0.5	.61	(15.5)	74.8	(110)	202.0	(297)
CF12-05-06-02	20	6 PR x 0.5	.67	(17)	89.8	(132)	244.8	(360)
CF12-05-08-02	20	8 PR x 0.5	.79	(20)	120.4	(177)	324.4	(477)
CF12-05-10-02	20	10 PR x 0.5	.91	(23)	150.3	(221)	372.6	(548)
CF12-05-14-02	20	14 PR x 0.5	.91	(23)	210.1	(309)	491.6	(723)
CF12-10-06-02	17	6 PR x 1.0	.79	(20)	134.6	(198)	368.6	(542)

PR = Twisted Pair

NOTE: The mentioned external diameters are maximum values.



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

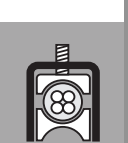
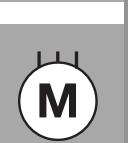
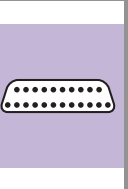
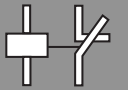
Clean-room

10.101

Chainflex® cable	Profibus	Interbus	CAN Bus	DeviceNet	CC-Link
CFBUS-PVC					
CFBUS-PVC-001	✓				
CFBUS-PVC-021			✓		
CFBUS-PVC-022			✓		
CFBUS-PUR					
CFBUS-PUR-001	✓				
CFBUS-PUR-021			✓		
CFBUS-PUR-022			✓		
CFBUS					
CFBUS-001	✓				
CFBUS-002	✓				
CFBUS-003	✓				
CFBUS-010		✓			
CFBUS-011		✓			
CFBUS-020			✓		
CFBUS-021			✓		
CFBUS-022			✓		
CFBUS-030				✓	
CFBUS-031				✓	
CFBUS-035					✓
CF11-LC					
CF11-05-01-02-LC			✓		
CF11-05-02-02-PBA-LC			✓		
CF11-02-03-02-IB-S		✓			
CF11-02-03-02-10-03-IB-S		✓			
CF11-LC-D					
CF11-02-02-02-LC-D			✓		
CF11-05-01-02-LC-D			✓		
CF11-02-01-02-PBA-LC-D	✓				

Characteristic wave impedance [Ω]	flame retardant	CE	UL	RoHS	Halogen-free
150	✓	✓	✓		
120	✓	✓	✓		
120	✓	✓	✓		
150	✓	✓	✓	✓	✓
120	✓	✓	✓	✓	✓
120	✓	✓	✓	✓	✓
150	✓	✓	✓	✓	
150	✓	✓	✓	✓	
150	✓	✓	✓	✓	
100	✓	✓	✓	✓	
100	✓	✓	✓	✓	
120	✓	✓	✓	✓	
120	✓	✓	✓	✓	
120	✓	✓	✓	✓	
120	✓	✓	✓	✓	
110	✓	✓	✓	✓	
120		✓			✓
120		✓			✓
100		✓			✓
100		✓			✓
120		✓		✓	✓
120		✓		✓	✓
150		✓		✓	✓

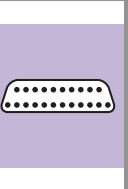
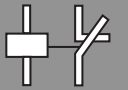
Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



Chainflex® cable	Ethernet/ CAT5	Ethernet/ CAT6	GigE	Profinet	FireWire	USB
CFBUS-PVC						
CFBUS-PVC-045	✓		✓			
CFBUS-PUR						
CFBUS-PUR-045	✓		✓			
CFBUS						
CFBUS-040	✓					
CFBUS-041	✓					
CFBUS-042	✓					
CFBUS-044	✓		✓			
CFBUS-045	✓		✓			
CFBUS-050		✓				
CFBUS-055					✓	
CFBUS-060				✓		
CFBUS-065						✓
CFBUS-066						✓
CFBUS-070						
CF14 CAT5						
CF14-02-02-02-CAT5	✓					
CF14-02-04-02-CAT5	✓					
CF14-02-06-02-CAT5	✓					

DVI	Characteristic wave impedance [Ω]	flame retardant	CE	RoHS	UL	Halogen-free
	100	✓	✓	✓		
	100	✓	✓	✓	✓	✓
	100	✓	✓	✓	✓	
	100	✓	✓	✓	✓	
	100	✓	✓	✓	✓	
	100	✓	✓	✓	✓	
	100	✓	✓	✓	✓	
	100	✓	✓	✓	✓	
	100	✓	✓	✓	✓	
	100	✓	✓	✓	✓	
	90	✓	✓	✓	✓	
	90	✓	✓	✓	✓	
✓	110	✓	✓	✓	✓	
	100		✓		✓	✓
	100		✓		✓	✓
	100		✓		✓	✓

Internet: <http://www.igus.com>
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 QuickSpec/RFQ: <http://www.igus.com/quickspec>





Conductor
Fine wire stranded
conductor

Core
Pair(s) twisted
together with
short pitch

Overall shield
Highly flexible
braided copper
shield

Outer jacket
Pressure extruded,
flame retardant
PVC blend



Construction

Conductors: Finely stranded bare copper conductors with extreme flexibility

Conductor insulation: According to Bus specifications

Conductor twisting: Twisted pairs are cabled together with a short pitch

Conductor colors: Please refer to Color Code Chart in the Design Section

Shield: Tinned copper braid, 80% optical coverage

Outer jacket: PVC blend, oil-resistant, adapted to the requirements in Energy Chains®. Color Purple (RAL 4001)

Technical Data

Minimum bending radius, moving: 10 - 12.5 x outer cable diameter

Minimum bending radius, fixed: 7.5 x outer cable diameter

Permissible temperature, moving: +41°F to +158°F (+5°C to +70°C)

Permissible temperature, fixed: -4°F to +158°F (-20°C to +70°C)

UV resistance: Medium

Oil resistance: Medium

Nominal voltage: 30V

Test voltage: 500V

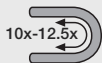
Regulations: cRUus: **UL AWM style for USA and Canada 2571 80°C 30V Flame Resistance: FT1, CE, DESINA, RoHS: 2002/95/EC;** Please reference the Design Section (Chapter 1) for more information.

Typical Applications

- for medium load requirements
- indoor applications, outdoor applications are possible at temperatures above 41°F
- especially for unsupported travels
- bus connection cable for storage and retrieval units for high-bay warehouses, machining units/machine tools, handling, indoor cranes

Part No.	AWG	No. of Conductors and Rated Cross- Section in mm ²	Outer Diameter (approx)		Copper Index		Weight		Characteristic Impedance ohms
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)	
Profibus (Bending radius 10 x D)									
CFBUS-PVC-001	24	1 PR x 0.25	.31	(8.0)	15.0	(22)	47.7	(71)	150
CAN-BUS/Fieldbus (Bending radius 10 x D)									
CFBUS-PVC-021	20	1 PR x 0.5	.33	(8.5)	18.4	(27)	54.4	(81)	120
CFBUS-PVC-022	20	2 PR x 0.5	.33	(8.5)	25.9	(38)	63.1	(94)	120
Ethernet/CAT5/GigE (Bending radius 12.5 x D)									
CFBUS-PVC-045	26	4 PR x 0.15	.28	(7.0)	23.2	(34)	41.6	(62)	100
Profinet									
CFBUS-PVC-060	22	4 PR x 0.38	.28	(7.0)	25.5	(38)	45.0	(67)	100

Part No.	Characteristics Impedance Ohms	Color Code
Profibus		
CFBUS-PVC-001	150	red, green
CAN-BUS		
CFBUS-PVC-021	120	white, brown
CFBUS-PVC-022	120	white, green, brown, yellow (star-quad arrangement)
Ethernet/CAT5/GigE		
CFBUS-PVC-045	100	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
Profinet		
CFBUS-PVC-060	100	white, yellow, blue, orange (star-quad arrangement)



PUR Bus Cable

Chainflex® CFBUS-PUR

PUR Energy Chain® Cable, shielded, oil resistant, coolant-resistant, notch resistant, PVC-free/Halogen-free, flame retardant, hydrolysis-resistant and microbe-resistant



CFBUS-PUR

Price Index



CLASS 4.1.3

Construction

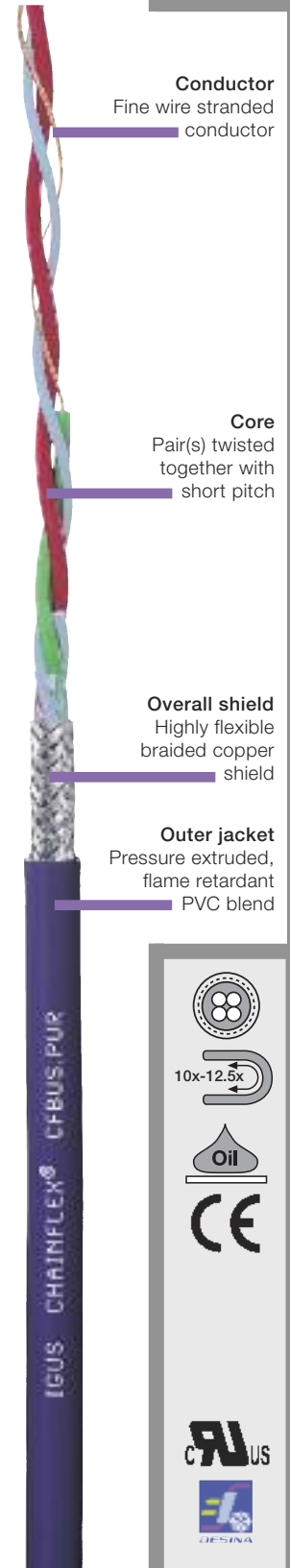
- Conductors:** Finely stranded bare copper conductors with extreme flexibility
- Conductor insulation:** According to Bus specifications
- Conductor twisting:** Twisted pairs are cabled together with a short pitch
- Conductor colors:** Please refer to Color Code Chart in the Design Section
- Shield:** Tinned copper braid, 80% optical coverage
- Outer jacket:** PUR blend, oil-resistant, adapted to the requirements in Energy Chains®. Color Purple (RAL 4001) Silicon-free in compliance with PV 3.10.7 - status 1992.

Technical Data

- Minimum bending radius, moving:** 10 - 12.5 x outer cable diameter
- Minimum bending radius, fixed:** 5 x outer cable diameter
- Permissible temperature, moving:** -31°F to +158°F (-35°C to +70°C)
- Permissible temperature, fixed:** -40°F to +158°F (-40°C to +70°C)
- UV resistance:** Medium
- Oil resistance:** Medium
- Nominal voltage:** 30V
- Test voltage:** 500V
- Regulations:** cRUus: UL AWM style for US & Canada: 20236 80°C 30V **Flame Resistance:** FT1, CE, DESINA, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Typical Applications

- for medium load requirements
- indoor and outdoor applications without direct sun radiation
- especially for unsupported travels
- bus connection cable for machining units/machine tools, low temperature applications



Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight		Characteristic Impedance ohms
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)	
Profibus (Bending radius 10 x D)									
CFBUS-PUR-001	24	1 PR x 0.25	.31	(8.0)	15.0	(22)	45.0	(67)	150
CAN-BUS/Fieldbus (Bending radius 10 x D)									
CFBUS-PUR-021	20	1 PR x 0.5	.33	(8.5)	18.4	(27)	51.0	(76)	120
CFBUS-PUR-022	20	2 PR x 0.5	.33	(8.5)	25.9	(38)	59.8	(89)	120
Ethernet/CAT5/GigE (Bending radius 12.5 x D)									
CFBUS-PUR-045	26	4 PR x 0.15	.28	(7.0)	23.2	(34)	41.6	(62)	100
Profinet									
CFBUS-PUR-060	22	4 PR x 0.38	.28	(7.0)	25.5	(38)	45.0	(67)	100

Profibus

Impedance Ohms

Profibus	Impedance Ohms	Color Code
CFBUS-PUR-001	150	red, green
CAN-BUS		
CFBUS-PUR-021	120	white, brown
CFBUS-PUR-022	120	white, green, brown, yellow (star-quad arrangement)
Ethernet/CAT5/GigE		
CFBUS-PUR-045	100	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown
Profinet		
CFBUS-PUR-060	100	white, yellow, blue, orange (star-quad arrangement)



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

CFBUS



TPE Bus Cables

CLASS
6.4.4

Price Index



Chainflex® CFBUS

TPE Energy Chain® cable, shielded, flame retardant, oil-resistant, bio-oil-resistant, hydrolysis resistant and microbe resistant

Conductor

Fine wire stranded conductor

Construction

Conductors: Finely stranded bare copper conductors with extreme flexibility

Conductor insulation: According to Bus specifications

Conductor twisting: Twisted pairs are cabled together with a short pitch.

Conductor colors: Please refer to Color Code Chart in the Design Section

Shield: Tinned copper braid, 90% optical coverage

Outer jacket: TPE blend, abrasion resistant, adapted to the requirements in Energy Chains®. Color Purple (RAL 4001)

Technical Data

Minimum bending radius, moving: 10 - 12.5 x outer cable diameter

Minimum bending radius, fixed: 5 x outer cable diameter

Permissible temperature, moving: -31°F to +158°F (-35°C to +70°C)

Permissible temperature, fixed: -40°F to +158°F (-40°C to +70°C)

UV resistance: Medium

Oil resistance: High

Nominal voltage: 30V

Test voltage: 500V

Regulations: cRUus: UL AWM style for US & Canada: 21371 80°C 30V Flame Resistance: FT1, CE, DESINA, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1. Test cable CF34-25-04

Typical Applications

- for maximum mechanical load requirements
- indoor and outdoor applications, UV-resistant
- especially for unsupported and gliding travel up to 1312 ft (400m)
- storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semi-conductor insertion, ship to shore, outdoor cranes, low temperature applications

Core

Pair(s) twisted together with short pitch

Inner jacket

gusset filled, pressure extruded

Overall shield

Highly flexible braided copper shield

Outer jacket

Pressure extruded, flame retardant TPE blend



10x-12.5x



10.108

IGUS CHAINFLEX® CFBUS 001

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

TPE Bus Cables



CFBUS

Chainflex® CFBUS

TPE Energy Chain® cable, shielded, flame retardant, oil-resistant, bio-oil-resistant, hydrolysis resistant and microbe resistant

Price Index



CLASS
6.4.4

Part No.	AWG	No. of Conductors and Rated Cross- Section in mm ²	Outer Diameter (approx)		Copper Index		Weight		Characteristic Impedance ohms
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)	
Profibus (Bending radius 10 x D)									
CFBUS-001	24	1 PR x 0.25	.33	(8.5)	15.6	(23)	47.6	(70)	150
CFBUS-002	16	4 C x 1.5							
	24	1 PR x 0.25	.49	(12.5)	65.3	(96)	119.0	(175)	150
CFBUS-003	18	3 C x 0.75							
	24	1 PR x 0.25	.43	(11)	39.4	(58)	82.3	(121)	150
Interbus (Bending radius 10 x D)									
CFBUS-010	24	3 PR x 0.25	.33	(8.5)	28.6	(42)	56.4	(83)	100
CFBUS-011	24	3 PR x 0.25							
	17	3 C x 1.0	.39	(10)	50.3	(74)	91.8	(135)	100
CAN-BUS/Fieldbus (Bending radius 10 x D)									
CFBUS-020	24	2 PR x 0.25	.26	(6.5)	22.4	(33)	44.9	(66)	120
CFBUS-021	20	1 PR x 0.5	.33	(8.5)	24.5	(36)	52.4	(77)	120
CFBUS-022	20	2 PR x 0.5	.33	(8.5)	30.6	(45)	56.4	(83)	120
Devicenet (Bending radius 10 x D)									
CFBUS-030	24	1 PR 24 AWG							
	22	1 PR 22 AWG	.30	(7.5)	22.4	(33)	43.6	(65)	120
CFBUS-031	18	1 PR 18 AWG							
	15	1 PR 15 AWG	.45	(11.5)	65.3	(96)	74.8	(110)	120
CCLink (Bending radius 10 x D)									
CFBUS-035	20	3 C x 20 AWG	.34	(8.5)	30.0	(44)	132.3	(90)	110
Ethernet/CAT5 (Bending radius 12.5 x D)									
CFBUS-040	24	2 PR x 0.25	.28	(7.0)	22.4	(33)	29.2	(43)	100
CFBUS-041	24	4 PR x 0.25	.39	(10)	31.3	(46)	68.7	(101)	100
CFBUS-044	26	4 PR x 0.15	.32	(8.0)	24.0	(35)	53.7	(79)	100
CFBUS-045	26	4 PR x 0.15	.32	(8.0)	24.0	(35)	53.7	(79)	100
Ethernet/CAT6 (Bending radius 12.5 x D)									
CFBUS-050	26	4 STP x 0.14	.39	(10)	52.4	(77)	89.1	(131)	100
Firewire (Bending radius 12.5 x D)									
CFBUS-055	26	2 STP x 0.15							
	22	2 C x 0.34	.30	(7.5)	28.6	(42)	54.4	(81)	100
Profinet (Bending radius 12.5 x D)									
CFBUS-060	21	4 C x 0.38	.30	(7.5)	25.0	(37)	48.3	(71)	100
USB (Bending radius 12.5 x D)									
CFBUS-065	20	2 C x 0.5							
	28	1 PR x 0.08	.20	(5.0)	17.5	(26)	30.2	(45)	90
CFBUS-066	20	2 C x 0.5							
	24	1 PR x 0.24	.24	(6.0)	21.5	(32)	37.6	(56)	90
DVI									
CFBUS-070	28	4 PR x 0.08							
	28	2 C x 0.08							
	28	3 C x 0.08	.35	(9.0)	22.4	(33)	61.8	(92)	100

STP = Individually shielded Pair
PR = Twisted Pair
C = Single Conductor

SC = Individually shielded conductor
SHLD = Shielded over Precable

NOTE: The mentioned external diameters are maximum values.

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email: sales@igus.com
QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

10.109

CF11-LC

igus®

TPE Bus Cables

CLASS
6.4.4

Price Index



Chainflex® CF11-Low Capacitance

TPE Energy Chain® cable, shielded, oil-resistant, bio-oil-resistant, PVC-free, halogen-free, UV-resistant, hydrolysis resistant and microbe resistant

Conductor

Especially bend-resistant fine wire stranded conductor

Core

Pairs twisted together with short pitch

Inner jacket

Gusset filled, pressure extruded

Overall shield

Highly flexible braided copper shield

Outer jacket

Pressure extruded halogen-free TPE blend

Construction

Conductors: Finely stranded bare copper conductor with extreme flexibility. According to EN 60228

Conductor insulation: Foamed polymer

Conductor colors: Color code DIN 47100

Intermediate jacket: TPE blend, adapted to the requirements of the Energy Chain®.

Shield: Tinned copper braid, coverage approx., 90% optical.

Outer jacket: TPE: particularly abrasion-resistant, high-flex blend, oil-resistant, coolant-resistant. Color: dark blue (RAL 5011).

Technical Data

Minimum bending radius, moving: 10 x outer cable diameter

Minimum bending radius, fixed: 5 x outer cable diameter

Permissible temperature, moving: -31°F to +158°F (-35°C to +70°C)

Permissible temperature, fixed: -40°F to +158°F (-40°C to +70°C)

UV resistance: Medium

Oil resistance: High

Voltage: 30V

Test voltage: 500V

Regulations: CE, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1. Test cable CF9-15-07

Typical Applications

- for maximum mechanical load requirements
- indoor and outdoor applications, UV-resistant
- especially for unsupported and gliding travel up to 1312 ft (400m)
- storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, indoor cranes, low temperature applications

CAN-BUS Part No.	AWG	No. of Conductors and Rated Cross- Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF11-05-01-02 LC	20	1 x 2 x 0.5	.33	(8.5)	24.5	(36)	39.4	(58)
CF11-05-02-02 LC	20	2 x 2 x 0.5	.33	(8.5)	30.3	(44.5)	40.8	(60)

Characteristic Impedance: 120 Ohms

Interbus Part No.	AWG	No. of Conductors and Rated Cross- Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF11-02-03-02-IB-S	24	3 x 2 x 0.25	.33	(8.5)	28.6	(42)	56.4	(83)
CF11-02-03-02-10-03-IB-S	24	3 x 2 x 0.25						
	17	3 x 1	.39	(10)	50.3	(74)	91.8	(135)

Characteristic Impedance: 100 Ohms

Please refer to the Design Section for Electrical Characteristics

NOTE: The mentioned external diameters are maximum values.



Clean-Room

10.110

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

TPE Bus Cables



CF11-
LC-D

Chainflex® CF11-LC-D

TPE Energy Chain® cable, shielded, PVC-free and halogen-free, oil-resistant, bio-oil-resistant, hydrolysis resistant and microbe resistant

CLASS
6.4.4

Price Index



Construction

Conductors: Finely stranded bare copper conductor with extreme flexibility.

Conductor insulation: Foamed polymer

Conductor colors: Color code DIN 47100

Intermediate jacket: TPE blend, adapted to the requirements of the Energy Chain®.

Shield: High flexural strength copper shield, coverage approx., 90% optical.

Outer jacket: TPE: particularly abrasion-resistant, high-flex blend, oil-resistant, coolant-resistant. Color: violet (RAL 4001).

Technical Data

Minimum bending radius, moving: 10 x outer cable diameter

Minimum bending radius, fixed: 5 x outer cable diameter

Permissible temperature, moving: -31°F to +158°F (-35°C to +70°C)

Permissible temperature, fixed: -40°F to +158°F (-40°C to +70°C)

UV resistance: Medium

Oil resistance: High

Voltage: 30V

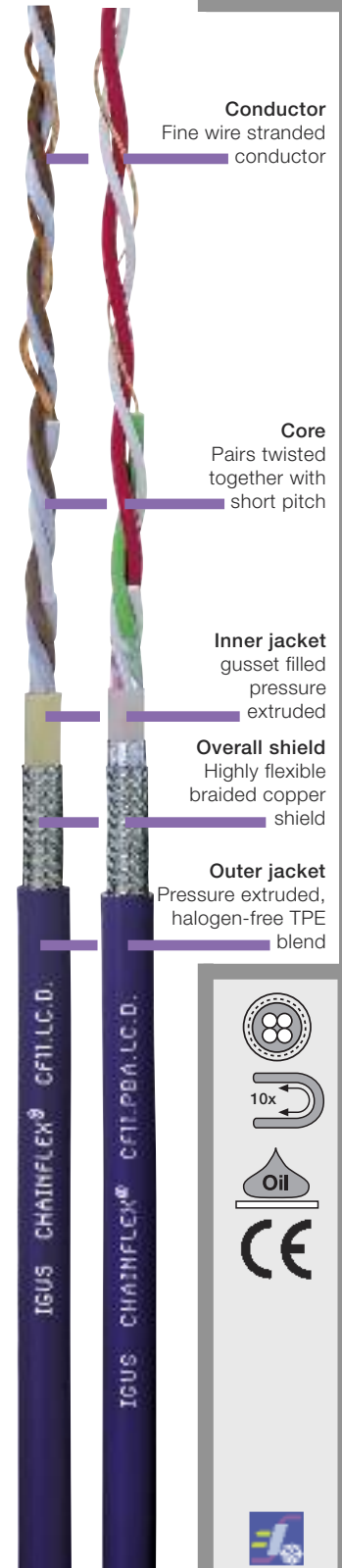
Test voltage: 500V

Regulations: CE, DESINA, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1. Test cable CF9-15-07

Typical Applications

- for maximum mechanical load requirements
- indoor and outdoor applications, UV-resistant
- especially for unsupported and gliding travel up to 1312 ft (400m)
- storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, cleanroom, semiconductor insertion, indoor cranes, low temperature applications



Field Bus, (CAN-BUS) Part No.	AWG	No. of Conductors and Rated Cross- Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF11-02-02-02-LC-D**	24	2 x 2 x 0.25	.30	(7.5)	22.4	(33)	46.9	(69)
CF11-05-01-02-LC-D	20	1 x 2 x 0.5	.33	(8.5)	24.4	(36)	39.4	(58)

Characteristic Impedance: 120 Ohms

**Star Quad Design

Profibus Cable Part No.	AWG	No. of Conductors and Rated Cross- Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF11-02-01-02-PBA-LC-D	24	1 x 2 x 0.25	.33	(8.5)	22.4	(33)	46.9	(69)

Characteristic Impedance: 150 Ohms

NOTE: The mentioned external diameters are maximum values.

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number



10.111

CF14US

PUR Ethernet Cables

CLASS
6.3.4

Price Index



Chainflex® CF14US

PUR Energy Chain® cable, shielded, oil-resistant, UV-resistant, flame retardant, abrasion and tear resistant, hydrolysis resistant and microbe resistant

Conductor
Fine wire stranded
conductor

Core
Pairs twisted
together with
short pitch

Inner jacket
gusset filled,
pressure extruded

Overall shield
Highly flexible
braided copper
shield

Outer jacket
Pressure extruded,
halogen-free PUR
blend

Construction

Conductors: 26 AWG finely stranded tinned copper wires

Conductor insulation: Foam polyethylene

Conductor twisting: 4 pairs twisted together

Conductor colors: Blue & white/blue, orange & white/orange, green & white/green, brown & white/brown

Inner jacket: TPE

Shield: Tinned copper braid, 80% optical coverage

Outer jacket: Low adhesion PUR blend adapted to the requirements of the Energy Chain®

Color: Violet

Technical Data

Minimum bending radius, moving: 12.5 x outer cable diameter

Minimum bending radius, fixed: 7.5 x outer cable diameter

Permissible temperature, moving: -4°F to +176°F (-20°C to +80°C)

Permissible temperature, fixed: -40°F to +176°F (-40°C to +80°C)

UV resistance: Medium

Oil resistance: High

Voltage: 300V

Test voltage: 2500V

Insertion Loss: meets EIA/TIA 568-B.2 for CAT5e stranded conductors

Characteristic Impedance: 100Ω

Capacitance (Conductor to Conductor): 19pF/ft

Regulations: **UL AWM:** 80°C 300V, **CSA AWM:** I/II A/B 80°C 300V, **Flame resistance:** FT1, **CE:** In accordance with European Council Directive 73/23/EEC, **RoHS: 2002/95/EC;** Please reference the Design Section (Chapter 1) for more information.

Typical Applications

- for maximum mechanical load requirements
- indoor and outdoor applications without direct sunlight
- especially for unsupported and gliding travel up to 164 ft (50m)
- For application lengths > 164 ft (50m) us igus® P/N CFBUS-044 or CF14-02-04-02-CAT5
- storage and retrieval units for high-bay warehouses, machine tools, quick handling, cleanroom, semiconductor insertion, indoor cranes, low temperature applications



IGUS® CHAINFLEX® CF14US.CAT5

Part No.	AWG	Strand/ AWG	No. of Pairs x Cross Section (mm ²)	Outer Diameter (approx)		Copper Index		Weight	
				in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF14US-02-04-02	26	19/38	4 PR x .14	.30	(7.6)	7.4	(11)	60	(89)

10.112

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

TPE Ethernet Cables



CF14

Chainflex® CF14

TPE Energy Chain® cable, shielded, oil-resistant, bio-oil-resistant, PVC-free, halogen-free, UV-resistant, hydrolysis resistant and microbe resistant

CLASS
6.3.4

Price Index



Construction

Conductors: Finely stranded bare copper conductors with extreme flexibility

Conductor insulation: Foamed polymer

Conductor twisting: Twisted pairs are cabled together with a short pitch

Conductor colors: Color code DIN 47100

Intermediate jacket: TPE blend, adapted to the requirements of the Energy Chain®.

Shield: Tinned copper braid, 80% optical coverage

Outer jacket: TPE: particularly abrasion-resistant, high-flex blend, oil-resistant, coolant-resistant. Color: violet (RAL 4011).

Technical Data

Minimum bending radius, moving: 12.5 x outer cable diameter

Minimum bending radius, fixed: 7.5 x outer cable diameter

Permissible temperature, moving: -31°F to +158°F (-35°C to +70°C)

Permissible temperature, fixed: -40°F to +158°F (-40°C to +70°C)

UV resistance: Medium

Oil resistance: High

Voltage: 30V

Test voltage: 500V

Characteristic impedance: 100 Ohms

Operating capacitance: approx. 12pF/ft

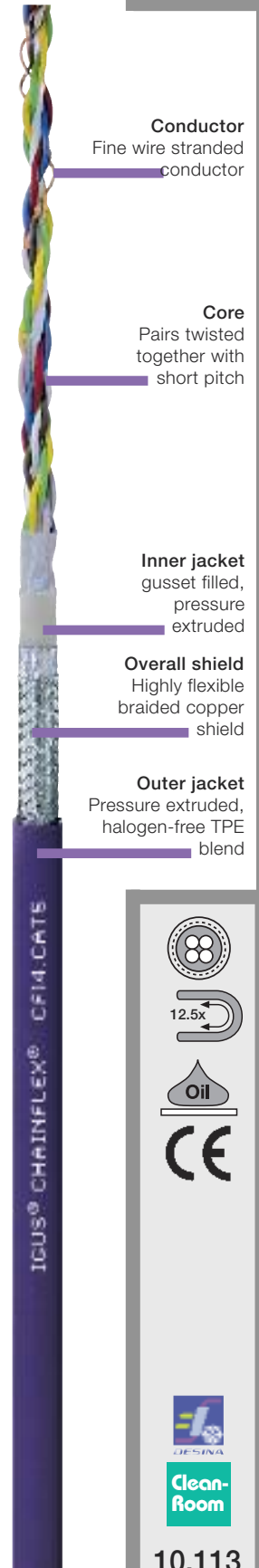
Transmission rates: up to 100 Mbit/s

Regulations: RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1. Test cable CF9-15-07

Typical Applications

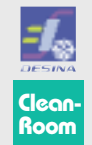
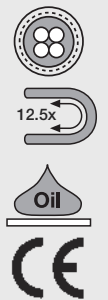
- for maximum mechanical load requirements
- indoor and outdoor applications without direct sunlight
- especially for unsupported and gliding travel up to 328 ft (100m)
- storage and retrieval units for high-bay warehouses, machine tools, quick handling, cleanroom, semiconductor insertion, indoor cranes, low temperature applications



Part No.	AWG	Strand AWG	No. of Conductors and Rated Cross-Section in mm²	Outer Diameter (approx)		Copper Index		Weight	
				in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
**CF14-02-02-02-CAT5	24	19/36	2 x 2 x 0.25	.28	(7)	22	(33)	29	(43)
CF14-02-04-02-CAT5	24	19/36	4 x 2 x 0.25	.39	(10)	31	(46)	69	(101)
CF14-02-05-02-CAT5	24	19/36	5 x 2 x 0.25	.41	(10.5)	36	(53)	71	(106)

**Star Quad Design

NOTE: The mentioned external diameters are maximum values.



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

10.113

CF211



PVC Measuring System Cable

Chainflex® CF211

PVC Energy Chain® cable, shielded, twisted pair, oil-resistant, flame-retardant

CLASS
5.3.2

Price Index



Conductor

Fine wire conductor

Strain relief

Center core for high tensile strength

Core

Pairs twisted together with short pitch

Overall shield

Highly flexible braided copper shield

Outer jacket

Pressure extruded

Construction

Conductors: Finely stranded bare copper conductor with extreme flexibility.

Conductor insulation: Mechanically tough PVC

Conductor twisting: Conductors are combined in accordance to motor manufacturers specifications

Conductor colors: Please refer to Color Code Chart in the Design Section

Shield: Foil tape over cable core; tinned copper braid, coverage approx., 90% optical.

Outer jacket: PVC-based, low-adhesion blend, adapted to the requirements of the Energy Chain®, oil-resistant. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** grey (RAL 7001)

Technical Data

Minimum bending radius, moving: 10 x outer cable diameter

Minimum bending radius, fixed: 5 x outer cable diameter

Permissible temperature, moving: +23°F to +158°F (-5°C to +70°C)

Permissible temperature, fixed: -4°F to +158°F (-20°C to +70°C)

Oil-resistance: Medium

Voltage: 30V

Test voltage: 500V

Regulations: cRUus AWM: UL AWM for USA & Canada style 2502 80°C 30V, **Flame Resistance:** FT1, CE, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 2, material/cable tested by IPA according to ISO standard 14644-1. Test cable CF5-10-07

Typical Applications

- for medium mechanical load requirements
- preferably indoor applications, outdoor is acceptable for temperatures greater than +41°F (+5°C)
- especially for unsupported travel and gliding travel up to 328 ft (100m)
- storage and retrieval units for high-bay warehouses, machining units/packages machines, handling, indoor cranes



10.114



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

PVC Measuring System Cable



CF211

Chainflex® CF211

PVC Energy Chain® cable, shielded, twisted pair, oil-resistant, flame-retardant

Price Index

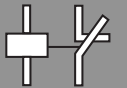


CLASS
5.3.2

Part No	AWG	No. of Pairs & Conductors and Rated Cross- Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF211-001	26	3 STP x 0.14						
	26	4 C x 0.14						
	20	2 C x 0.50	.35	(9)	41.0	(61)	67.2	(100)
CF211-002	26	3 STP x 0.14						
	20	2 SC x 0.50	.35	(9)	42.3	(63)	73.9	(110)
CF211-006	26	3 STP x 0.14						
	26	4 C x 0.14						
	24	4 C x 0.23	.37	(9.5)	49.0	(72)	80.6	(120)
	20	2 C x 0.50						
CF211-009	24	4 PR x 0.25						
	20	2 C x 0.50	.35	(9)	34.7	(51)	75.5	(111)
CF211-010	24	4 PR x 0.25						
	17	2 C x 1.0	.37	(9.5)	50.3	(74)	95.9	(141)
CF211-011	22	4 PR x 0.34						
	20	4 C x 0.50	.35	(9)	51.0	(75)	91.8	(135)
CF211-014	24	4 STP x 0.25						
	20	4 C x 0.50	.51	(13)	57.1	(84)	143.5	(211)
CF211-016	24	3 STP x 0.25	.43	(11)	58.0	(85)	116	(170)
CF211-017	26	4 PR x 0.14						
	17	4 C x 1.0						
	26	(4 C x 0.14) SHLD	.35	(9)	57.0	(85)	83.3	(124)
CF211-018	24	2 PR x 0.25						
	20	2 C x 0.50	.28	(7)	27.6	(41)	41.7	(62)
CF211-019	24	3 C x 0.25						
	24	3 STP x 0.25						
	17	2C x 1.0	.35	(9)	55.2	(82)	77.3	(115)
CF211-027	26	5 PR x 0.14						
	20	2C x 0.50	.35	(9)	30.6	(45)	69.4	(102)

STP = Individually shielded Pair
 PR = Twisted Pair
 C = Single Conductor
 SC = Individually shielded conductor
 SHLD = Shielded over Precable

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 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

10.115

CF113-D

PUR Measuring System Cable

CLASS
6.3.3

Price Index



Chainflex® CF113-D

PUR Energy Chain® cable, shielded, oil-resistant, coolant resistant, flame retardant, notch resistant, PVC-free/halogen-free, hydrolysis resistant and microbe resistant

Conductor
Especially bend-resistant, fine wire stranded conductor

Pair shield*
Highly flexible braided copper shield

Strain relief
Center core for high tensile stresses

Inner jacket
Gusset-filling, pressure extruded

Overall shield
Highly flexible braided copper shield

Outer jacket
Pressure extruded, PUR blend



Construction

Conductors: Finely stranded bare copper conductor. According to EN 60228

Conductor insulation: Mechanically high-quality PP mixture

Conductor twisting: Conductors are combined in accordance to motor manufacturers specifications

Conductor colors: Please refer to Color Code Chart in the Design Section

Intermediate jacket: TPE blend, adapted to the requirements in the Energy Chain®.

Shield: Tinned braided copper shield, 90% optical coverage

Outer jacket: PUR: low-adhesion, highly abrasion-resistant, adapted to the requirements in the Energy Chain®. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** green (RAL 6018).

Technical Data

Minimum bending radius, moving: 10 x outer cable diameter

Minimum bending radius, fixed: 5 x outer cable diameter

Permissible temperature, moving: -4°F to +176°F (-20°C to +80°C)

Permissible temperature, fixed: -40°F to +176°F (-40°C to +80°C)

Flame resistance: FT1

UV resistance: Medium

Oil resistance: High

Voltage: 30V

Test voltage: 500V

Regulations: cRUus AWM: UL AWM for USA & Canada style 20236 80°C 30V, CE, DESINA, RoHS:

2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1. Outer jacket material complies with CF27-07-05-02-01-D

Part No.	AWG	No. of Pairs & Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF113-001-D	26	3 STP x 0.14						
	26	4 C x 0.14						
CF113-002-D	20	2 C x 0.50	.41	(10.5)	48.3	(72)	115.5	(172)
	26	3 STP x 0.14						
CF113-003-D	20	2 SC x 0.50	.41	(10.5)	49.7	(74)	124.3	(185)
	26	3 PR x 0.14						
CF113-004-D	17	2 C x 1.0	.33	(8.5)	36.9	(55)	83.3	(124)
	26	4 PR x 0.14						
CF113-005-D	26	(4 C x 0.14)SHLD						
	20	4 C x 0.50	.45	(11.5)	55.1	(82)	131.0	(195)
CF113-006-D	26	4 PR x 0.14						
	20	4 C x 0.50	.37	(9.5)	40.9	(61)	96.7	(144)
CF113-007-D	26	3 STP x 0.14						
	26	4 C x 0.14						
CF113-008-D	24	4 C x 0.23						
	20	2 C x 0.50	.43	(11)	56.4	(84)	132.3	(197)
CF113-007-D	22	2 PR x 0.34	.24	(6)	19.4	(29)	43.0	(64)
CF113-008-D	24	3 PR x 0.25	.31	(8)	22.1	(33)	54.4	(81)



10.116

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

PUR Measuring System Cable



CF113-D

Chainflex® CF113-D

PUR Energy Chain® cable, shielded, oil-resistant, coolant resistant, flame retardant, notch resistant, PVC-free/halogen-free, hydrolysis resistant and microbe resistant

Price Index

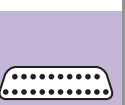
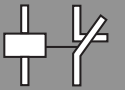


CLASS
6.3.3

Part No.	AWG	No. of Pairs & Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF113-009-D	24	4 PR x 0.25						
	20	2 C x 0.50	.37	(9.5)	40.3	(60)	92.0	(137)
CF113-012-D	26	3 STP x 0.14						
	26	(3 C x 0.14)SHLD						
	26	6 C x 0.14						
	20	2 C x 0.50	.45	(11.5)	60.4	(90)	147.8	(220)
CF113-014-D	26	4 STP x 0.14						
	20	4 C x 0.50	.45	(11.5)	57.7	(86)	141.1	(210)
CF113-015-D	26	4 PR x 0.14						
	20	4 C x 0.50	.37	(9.5)	40.9	(61)	94.0	(140)
CF113-016-D	24	3 STP x 0.25	.37	(9.5)	39.6	(59)	94.7	(141)
CF113-017-D	26	4 PR x 0.14						
	26	(4 C x 0.14)SHLD						
	17	4 C x 1.0	.45	(11.5)	70.5	(105)	161.9	(241)
CF113-019-D	24	3 STP x 0.25						
	24	3 C x 0.25						
	17	2 C x 1.0	.45	(11.5)	64.5	(96)	151.1	(225)
CF113-025-D	26	3 STP x 0.14						
	20	1 STP x 0.50	.43	(11)	49.0	(73)		(180)
CF113-028-D	26	2 PR x 0.15						
	22	2 C x 0.38	.29	(7.5)	31.5	(47)	48.3	(72)
CF113-032-D	26	3 STP x 0.14						
	26	3 C x 0.14	.37	(9.5)	40.9	(61)	99.4	(148)
CF113-033-D	26	4 STP x 0.14						
	17	2 C x 1.0	.45	(11.5)	65.1	(97)	159.2	(237)
CF113-034-D	26	3 STP x 0.14						
	26	4 C x 0.14						
	20	2 PR x 0.50	.49	(12.5)	70.5	(105)	133.7	(199)

STP = Individually shielded Pair
 PR = Twisted Pair
 C = Single Conductor
 SC = Individually shielded conductor
 SHLD = Shielded over Precable

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 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

10.117

CF111-D



TPE Measuring System Cable

Chainflex® CF111-D

TPE Energy Chain® cable, shielded, oil-resistant, bio-oil-resistant, flame-retardant, hydrolysis resistant and microbe resistant

CLASS
4.1.4

Price Index



Strain relief
Center core for high tensile stresses

Conductor
Fine wire stranded conductor

Core
conductors stranded with short pitch

Overall shield
Highly flexible braided copper shield

Outer jacket
Pressure extruded, halogen-free TPE blend



Construction

Conductors: Finely stranded bare copper conductor with extreme flexibility

Conductor insulation: Mechanically high-quality PP mixture

Conductor twisting: Conductors are combined in accordance to motor manufacturers specifications

Conductor colors: Please refer to Color Code Chart in the Design Section

Shield: Tinned copper braid, 80% optical coverage

Outer jacket: TPE: low-adhesion, particularly abrasion-resistant, high-flex blend, oil resistant, coolant resistant
Color: green (RAL 6018).

Technical Data

Minimum bending radius, moving: 12 x outer cable diameter

Minimum bending radius, fixed: 6 x outer cable diameter

Permissible temperature, moving: -31°F to +212°F (-35°C to +100°C)

Permissible temperature, fixed: -40°F to +212°F (-40°C to +100°C)

UV resistance: Medium

Oil resistance: High

Voltage: 30V

Test voltage: 500V

Regulations: cRUus AWM: UL AWM for USA & Canada style 21371 80°C 30V, **Flame Resistance:** FT1, CE, DESINA, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1. Test cable CF34-25-04

Typical Applications

- for medium load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications without direct sun radiation
- especially for unsupported travel
- machining units/machine tools, low temperature applications



10.118

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

TPE Measuring System Cable



CF111-D

Chainflex® CF111-D

TPE Energy Chain® cable, shielded, oil-resistant, bio-oil-resistant, flame-retardant, hydrolysis resistant and microbe resistant

Price Index

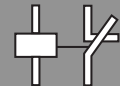


CLASS
4.1.4

Part No.	AWG	No. of Pairs & Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF111-001-D	26	3 STP x 0.14						
	26	4 C x 0.14						
	20	2 C x 0.50	.33	(8.5)	37.6	(56)	58.4	(87)
CF111-004-D	26	4 PR x 0.14						
	26	4 C x 0.14 SHLD						
	20	4 C x 0.50	.41	(10.5)	48.3	(72)	75.9	(113)
CF111-006-D	26	3 STP x 0.14						
	20	2 C x 0.50						
	26	4 C x 0.14						
	24	4 C x 0.23	.39	(10)	46.3	(69)	75.2	(112)
CF111-011-D	22	4 PR x 0.34						
	20	4 C x 0.50	.37	(9.5)	46.3	(69)	71.2	(106)
CF111-015-D	26	4 PR x 0.14						
	20	4 C x 0.50	.31	(8.0)	32.9	(49)	51.0	(76)
CF111-021-D	20	6 C x 0.50						
	24	5 PR x 0.25	.39	(10)	53.0	(79)	83.9	(125)
CF111-022-D	20	5 C x 0.50						
	24	1 PR x 0.25	.31	(8)	32.9	(49)	52.4	(78)
CF111-027-D	26	5 PR x 0.14						
	20	2 C x 0.50	.35	(9)	36.2	(54)	73.2	(109)
CF111-035-D	24	4 STP x 0.25						
	20	2 PR x 0.50	.49	(12.5)	79.2	(118)	135.7	(202)

STP = Individually shielded Pair
 PR = Twisted Pair
 C = Single Conductor
 SC = Individually shielded conductor
 SHLD = Shielded over Precable

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

10.119

CF11-D

CLASS
6.4.4

Price Index



TPE Measuring System Cable

Chainflex® CF11-D

TPE Energy Chain® cable, shielded, twisted-pair, oil-resistant, bio-oil-resistant, PVC free, halogen-free, hydrolysis resistant and microbe resistant

Conductor
Fine wire stranded conductor

Pair shield*
Highly flexible braided copper shield

Strain relief
Center core for high tensile stresses

Core
conductors stranded with short pitch

Inner jacket
Gusset-filling, pressure extruded

Overall shield
Highly flexible braided copper shield

Outer jacket
Pressure extruded, halogen-free TPE blend



Construction

Conductors: Finely stranded bare copper conductor. According to EN 60228

Conductor insulation: Mechanically high quality PP mixture

Conductor twisting: Conductors are combined in accordance to motor manufacturers specifications

Conductor colors: Please refer to Color Code Chart in the Design Section

Intermediate jacket: TPE blend, adapted to the requirements in the Energy Chain®.

Shield: Tinned copper braid, 90% optical coverage

Outer jacket: TPE: particularly abrasion-resistant, high-flex blend, oil-resistant, coolant-resistant. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** green (RAL 6018).

Technical Data

Minimum bending radius, moving: 10 x outer cable diameter

Minimum bending radius, fixed: 5 x outer cable diameter

Permissible temperature, moving: -31°F to +212°F (-35°C to +100°C)

Permissible temperature, fixed: -40°F to +212°F (-40°C to +100°C)

UV resistance: High

Oil resistance: High

Voltage: 30V

Test voltage: 500V

Regulations: CE, DESINA, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1. Test cable CF34-25-04

Part No.	AWG	No. of Pairs & Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF11-001-D	26	3 STP x 0.14						
	26	4 C x 0.14						
	20	2 C x 0.50	.41	(10.5)	52.4	(78)	87.4	(130)
CF11-002-D	26	3 STP x 0.14						
	20	2 SC x 0.50	.41	(10.5)	44.4	(66)	80.6	(120)
CF11-003-D	26	3 PR x 0.14						
	17	2 C x 1.0	.31	(8)	34.0	(50)	61.2	(90)
CF11-004-D	26	4 PR x 0.14						
	26	4 C x 0.14 SHLD						
	20	4 C x 0.50	.47	(12)	62.5	(93)	123.6	(184)
CF11-005-D	26	4 PR x 0.14						
	20	4 C x 0.50	.35	(9)	43	(64)	70.6	(105)
CF11-006-D	26	3 STP x 0.14						
	26	4 C x 0.14						
	24	4 C x 0.23						
	20	2 C x 0.50	.45	(11.5)	55.1	(81)	83.9	(125)
CF11-007-D	22	2 PR x 0.34	.30	(7.5)	20.8	(31)	47	(70)
CF11-008-D	24	3 PR x 0.25	.33	(8.5)	23.5	(35)	57	(85)
CF11-009-D	24	4 PR x 0.25						
	20	2 C x 0.50	.37	(9.5)	42.8	(63)	78.2	(115)
CF11-010-D	24	4 PR x 0.25						
	17	2 C x 1.0	.37	(9.5)	51.0	(75)	88.4	(130)
CF11-011-D	22	4 PR x 0.34						
	20	4 C x 0.50	.41	(10.5)	51.7	(77)	87.4	(130)



10.120

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

TPE Measuring System Cable



CF11-D

Chainflex® CF11-D

TPE Energy Chain® cable, shielded, twisted-pair, oil-resistant, bio-oil-resistant, PVC free, halogen-free, hydrolysis resistant and microbe resistant

Price Index



CLASS
6.4.4

Typical Applications

- for maximum mechanical load requirements
- indoor and outdoor applications without direct sunlight
- especially for unsupported and gliding travel up to 1312 ft (400m)
- storage and retrieval units for high-bay warehouses, machine tools, quick handling, cleanroom, semiconductor insertion, outdoor cranes, low temperature applications

Part No.	AWG	No. of Pairs & Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF11-012-D	26	3 STP x 0.14						
	26	6 C x 0.14						
	26	(3 C x 0.14) SHLD						
	20	2 C x 0.50	.47	(12)	63.9	(94)	110.8	(163)
CF11-013-D	26	3 STP x 0.14						
	20	2 C x 0.50	.37	(9.5)	52.4	(78)	77.3	(115)
CF11-015-D	26	4 PR x 0.14						
	20	4 C x 0.50	.35	(9)	43.5	(64)	71.4	(105)
CF11-017-D	26	4 PR x 0.14						
	26	(4 C x 0.14) SHLD						
	17	4 C x 1.0	.35	(9)	57.1	(85)	107.5	(160)
CF11-018-D	24	2 PR x 0.25						
	20	2 C x 0.50	.28	(7)	27.6	(41)	38.3	(57)
CF11-019-D	24	3 STP x 0.25						
	24	3 C x 0.25						
	17	2 C x 1.0	.45	(11.5)	55.1	(82)	75.3	(112)
CF11-021-D	20	3 C x 0.5						
	20	3 C x 0.5						
	24	5 PR x 0.25	.49	(12.5)	71.4	(105)	116.3	(171)
CF11-022-D	20	5 C x 0.5						
	24	1 PR x 0.25	.33	(8.5)	40.8	(60)	61.2	(90)
CF11-025-D	26	3 STP x 0.14						
	20	1 STP x 0.50	.49	(12.5)	81.6	(120)	115.6	(170)
CF11-027-D	26	5 PR x 0.14						
	20	1 PR x 0.50	.37	(9.5)	40.1	(59)	76.8	(113)

NOTE: The mentioned external diameters are maximum values.

STP = Individually shielded Pair

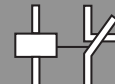
PR = Twisted Pair

C = Single Conductor

SC = Individually shielded conductor

SHLD = Shielded over Precable

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

10.121



Conductor
Fine wire stranded
conductor

Conductor shield
Highly flexible
braided copper
shield

Core
Coaxes
twisted with
short pitch

Outer jacket
gusset filled, pres-
sure extruded,
halogen-free TPE
blend

Construction

Conductors: Finely stranded tinned copper conductor

Conductor insulation: FEP

Coax shield: Tinned copper braid, 90% optical coverage

Coax jacket/color: TPE, red, green, blue, white, black

Cable core for 5 coax cable: 5 coax combined with short pitch

Outer jacket: TPE abrasion-resistant, high-flex blend, oil-resistant, coolant-resistant. **Color:** dark blue (RAL 5011).

Technical Data

Minimum bending radius, moving: 10 outer cable diameter

Minimum bending radius, fixed: 7.5 x outer cable diameter

Permissible temperature, moving: -31°F to +212°F (-35°C to +100°C)

Permissible temperature, fixed: -40°F to +212°F (-40°C to +100°C)

UV resistance: High

Oil resistance: High

Nominal voltage: 300V

Test voltage: 1500V

Operating capacitance: approx. 19.5pF/ft

Characteristic impedance: 75 Ω

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1. Test cable CF9-15-07

Coax is compatible with RG179 type connectors

Typical Applications

- for maximum mechanical load requirements
- indoor and outdoor applications, UV resistant
- for unsupported and gliding travel up to 1312 ft (400m)
- storage and retrieval units for high bay warehouses, machine tools, quick handling, cleanroom, semiconductor insertion, outdoor cranes, low temperature applications

Part No.	AWG	Strand/ AWG	No. of Coax and color code
CF Koax 1-01	30	7/38	1 black
CF Koax 1-05	30	7/38	5 red, green, blue, white, black

Part No.	Outer Diameter (approx)		Copper Index		Weight	
	in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF Koax 1-01	.18	(4.5)	6.1	(9)	17.0	(25)
CF Koax 1-05	.39	(10)	32.0	(47)	91.8	(135)

NOTE: The mentioned external diameters are maximum values.





Fiber Optic Cables



Fiber Optic Cable Selection

Chainflex® cable	Jacket	Shield	Class	Bending radius moving (factor x d)	Temperature moving from/to °F (°C)	Oil-resistant	Torsion resistant	V max. ft/s (m/s) unsupported	V max. ft/s (m/s) gliding	a max. ft/s² (m/s²)	Approvals and standards
Fiber Optic cables (FOC)											
CFLG-2H	PUR		4.2.2	12.5	-4/+140°F (-20/+60°C)	✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	65.62 ft/s² (20 m/s²)	CE
CFLK	PUR		5.3.2	12.5	-4/+158°F (-20/+70°C)	✓		32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	65.62 ft/s² (20 m/s²)	CE
CFLG-2LB	TPE		6.3.3	5	-40/+140°F (-40/+60°C)	✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	65.62 ft/s² (20 m/s²)	CE
CFLG-G	TPE		6.3.3	15	-40/+140°F (-40/+60°C)	✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	65.62 ft/s² (20 m/s²)	CE

Seamless communication between machines is becoming more and more complex every day. Finding the right cables for these types of applications is very important.

Many plant manufacturers and operators have EMC problem that occur sporadically or over time.

These problems are often based on conventional bus cables that either have insufficient or unreliable shielding.

Chainflex® bus cables are designed to prevent these problems and now Chainflex® Fiber Optic cables provide further advantages and safety benefits

Important fiber types:

● Multi-mode fibers

50/125 µm

62,5/125 µm

The ideal fiber for large data volumes and longer transmission lengths in the field of automation. On account of the very low output attenuation (0.8-3 db/km per fiber and light wave length) of these fiber types, transmission lengths of several hundred meters can be realized quite easily.

● POF (Plastic fibers)

980/1000 µm

The ideal and low-cost fiber for short transmission paths. On account of the high output attenuation of the fiber type of 160-230 dB/km, lengths over 15 mm must be avoided in permanent-motion energy chains®.

● PCF (Polymer Cladded fiber)

200/230 µm

The ideal compromise for POF fiber. This plastic-coated quartz glass fiber is a viable alternative for many terminal devices that have been designed for POF. This means greater transmission lengths (100 m and more) are possible without the original POF terminal devices having to be replaced.

Chainflex® FOC cables offer the following advantages:

1. Greater data security thanks to:

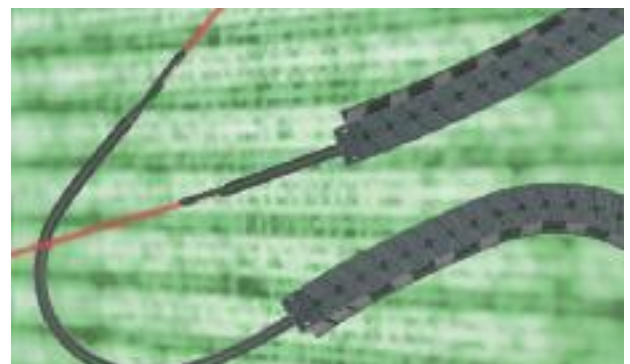
- FOC-typical better transmission characteristics
- Greater possible transmission lengths of several 100 m
- Greater possible data volumes thanks to lower attenuation values
- Maximum EMC protection for the data transmitted
- Future-proof installation (no cable replacement with new bus systems)

2. Greater mechanical protection through:

- The FOC designed for permanent mechanical movement
- The igus®-typical highly abrasion-proof and chemical resistant sheathing materials
- The special Chainflex® design concept (tested at 30 million cycles without a significant increase in attenuation)

3. Future-oriented cost reduction through:

- Bus-independent bus cable wiring
- Longer service life in E-Chains®
- Extendable without transmission limits



For further information see the test data on page 10.27

CFLG-2H

PUR Fiber Optic Cables

CLASS
6.3.3

Price Index



Chainflex® CFLG-2H

PUR Energy Chain® gradient glass fiber optic cable, UV-resistant, halogen-free, oil-resistant, metal-free

FOC

Fiber optic with jacket

Fiber coating

Strain relief with individual cover

Core

Jacketed FOC cores twisted with optimized pitch length stranded around a strain relief element

Outer jacket

Gusset-filled pressure extruded PUR Blend



Construction

Fiber: 50/125 µm; 62.5/125 µm fibers in gel filled hollow cores

Core stranding: Tubes with one fiber in each are twisted with strain relief elements

Color code: Black fiber jackets with white printed numbers

Outer jacket: PUR-based blend, adapted to the requirements of an Energy Chain®. Silicone-free in compliance with PV 3.10.7 - status 1992 **Color:** Black

Technical Data

Minimum bending radius, moving: 12.5 outer cable diameter

Minimum bending radius, fixed: 7.5 x outer cable diameter

Permissible temperature, moving: -4°F to +140°F (-20°C to +60°C)

Permissible temperature, fixed: -13°F to +140°F (-25°C to +60°C)

UV Resistance: High

Oil Resistance: High

Typical Applications

- for high mechanical load requirements
- maximum EMI protection
- indoor and outdoor applications
- for unsupported and gliding travel up to 328 ft (100m) and more
- storage and retrieval units, machine tools, packaging machines, quick handling, cranes, refrigerating sector

Part No.	Fiber Count	Fiber Diameter	Outer Diameter		Weight (approx.)	
			µm (approx)	in. (mm)	lbs/mft	(kg/km)
CFLG-2HG-MF-50/125	2	50/125	.35	(9)	56	(85)
CFLG-2HG-MF-62.5/125	2	62.5/125	.35	(9)	56	(85)
CFLG-2HS-MF-200/230	2	200/230	.35	(9)	56	(85)

NOTE: Other fiber counts available upon request

NOTE: The mentioned external diameters are maximum values.

Part No.	Bandwidth with 850 nm (Mhz x km)	Attenuation with 850 nm (dB/km)	Bandwidth with 1300 nm (Mhz x km)	Attenuation with 1300 nm (dB/km)
	CFLG-2HG-MF-50/125	200 - 600	2.5 - 3.5	600 - 1200
CFLG-2HG-MF-62.5/125	160 - 200	3.2	200 - 500	0.9
CFLG-2HS-MF-200/230	20	6.0	—	—



IGUS® CHAINFLEX® CFLG-2HG-MF

10.126

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

PUR Fiber Optic Cable

Chainflex® CFLK

PUR Energy Chain® polymer optic cable, oil-resistant



CFLK

CLASS
5.1.3

Price Index



Construction

Polymer fiber: Fiber diameter: 980/1000 µm; Numerical aperture, NA = 0.47

Core: PE insulation with stranded reinforcement

Color: Black

Outer jacket: PUR-based blend, adapted to the requirements of the Energy Chain®. Silicone-free in compliance with PV 3.10.7 - status 1992 **Color:** violet

Technical Data

Minimum bending radius, moving: 12.5 outer cable diameter

Minimum bending radius, fixed: 7.5 x outer cable diameter

Permissible temperature, moving: -4°F to +158°F (-20°C to +70°C)

Permissible temperature, fixed: -13°F to +158°F (-25°C to +70°C)

UV resistance: Medium

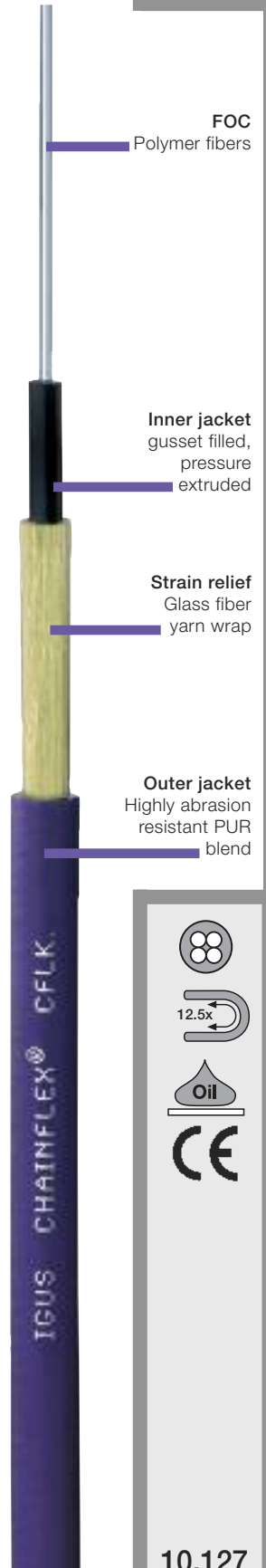
Oil resistance: High

Typical Applications

- for high mechanical load requirements
- maximum EMI protection
- preferably indoor applications
- for unsupported and gliding travel up to 49 ft (15m) and more
- wood/stone processing, packaging industry, supply system, handling, adjusting equipment

Part No.	Numbers of Fibers KWL	Fiber Diameter µm (approx)	Outer Diameter (approx.)		Weight	
			in.	(mm)	lbs/mft	(kg/km)
CFLK-L1-01	1	980/1000	.24	(6)	17.0	(25)

Part No.	Bandwidth with 650 nm (Mhz x km)	Attenuation with 650 nm (dB/km)
CFLK-L1-01	40	200



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

10.127

TPE Fiber Optic Cable (FOC)

Chainflex® CFLG-2LB

TPE Energy Chain® gradient glass fiber optic cable,
UV-resistant, oil-resistant, metal-free,
low temperature (-40°F)

CLASS
7.3.4

Price Index



FOC

Fiber optic
with jacket

Center element

Reinforced
optical fibers
twisted with an
optimized pitch

Strain relief

Aramid braid for
torsion
protection

Outer jacket

Pressure extruded
halogen-free TPE
blend



Construction

Fiber: 50/125 μm; 62.5/125 μm special fixed wire elements with aramide strain relief

Core stranding: FOC wires stranded with high tensile aramide dampers with especially short pitch length

Color code: Fibers blue with white numbers

Outer jacket: TPE particularly abrasion-resistant, high-flex blend, oil-resistant, coolant resistant, adapted to suit the requirements of an Energy Chain®. Silicone-free in compliance with PV 3.10.7 - status 1992.

Color: Black (RAL 9005)

Technical Data

Minimum bending radius, moving: 5 x outer cable diameter

Minimum bending radius, fixed: 5 x outer cable diameter

Permissible temperature, moving: -40°F to +140°F (-40°C to +60°C)

Permissible temperature, fixed: -40°F to +140°F (-40°C to +60°C)

UV Resistance: High

Oil Resistance: High

Typical Applications

- for maximum load requirements
- maximum EMC protection
- indoor and outdoor applications
- for unsupported and gliding travel up to 328 ft (100m) and more
- storage and retrieval units for high-bay warehouses, machining units/packaging machines, quick handling, semi-conductor insertion, refrigerating sector

Part No.	Fiber Count	Fiber Diameter	Outer Diameter		Weight	
			μm (approx)	in. (mm)	lbs/mft	(kg/km)
CFLG-2LB-62.5/125	2	62.5/125	.33	(8.5)	31.5	(47)
CFLG-2LB-50/125	2	50/125	.33	(8.5)	31.5	(47)

Note: The mentioned external diameters are maximum values and may tend toward lower tolerance limits.

Part No.	Bandwidth with 850 nm	Attenuation with 850 nm	Bandwidth with 1300 nm	Attenuation with 1300 nm
	(Mhz x km)	(dB/km)	(Mhz x km)	(dB/km)
CFLG-2LB-62.5/125-TC	160 - 200	3.2	200 - 500	0.9
CFLG-2LB-50/125	200-600	2.5 - 3.5	600 - 1200	0.7 - 1.5



IGUS CHAINFLEX CFLG-2LB

TPE Fiber Optic Cable



CFLG-G

Chainflex® CFLG-G

TPE Energy Chain® gradient glass fiber optic cable, UV-resistant, halogen-free, oil-resistant, metal-free, low temperature (-40°C), hydrolysis resistant and microbe resistant

CLASS
7.4.4

Price Index



Construction

Fiber: 50/125 µm; 62.5/125 µm fibers in gel filled hollow cores

Core stranding: Strength rods with integrated torsion protection braid over gel-filled fiber sheath

Color code: 6 fiber — natural, yellow, green, red, violet, blue

12 fiber — above colors and light blue, gray, brown, black, orange, pink

Outer jacket: TPE particularly abrasion-resistant, high-flex blend, oil-resistant, coolant resistant, adapted to suit the requirements of an Energy Chain®. Silicone-free in compliance with PV 3.10.7 - status 1992.

Color: Black (RAL 9005)

Technical Data

Minimum bending radius, moving: 15 x outer cable diameter

Minimum bending radius, fixed: 8.5 x outer cable diameter

Permissible temperature, moving: -40°F to +140°F (-40°C to +60°C)

Permissible temperature, fixed: -40°F to +140°F (-40°C to +60°C)

UV Resistance: High

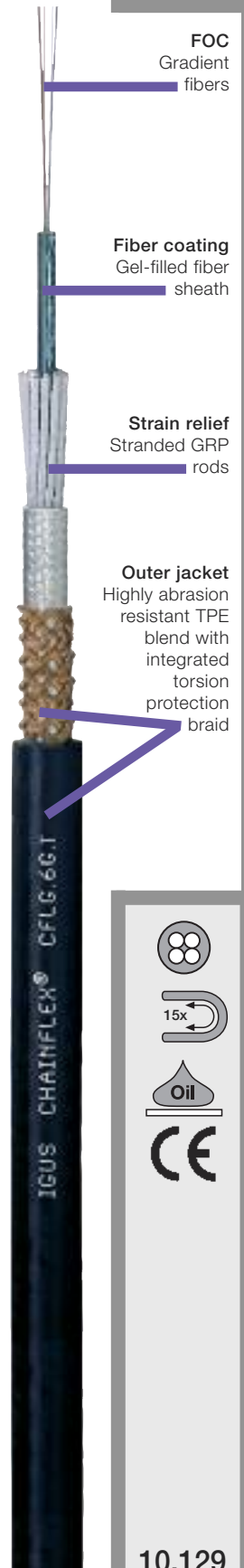
Typical Applications

- for high mechanical load requirements
- maximum EMI protection
- indoor and outdoor applications
- for unsupported and gliding travel up to 1641 ft (500m) and more
- outdoor ship-to-shore, crane applications, conveyor technology

Part No.	Fiber Count	Fiber Diameter	Outer Diameter		Weight (approx.)	
			µm (approx)	in. (mm)	lbs/mft	(kg/km)
CFLG-6G-62.5/125-TC	6	62.5/125	.45	(11.5)	75	(110)
CFLG-12G-62.5/125-TC	12	62.5/125	.45	(11.5)	75	(110)
CFLG-6G-50/125-TC	6	50/125	.45	(11.5)	75	(110)
CFLG-12G-50/125-TC	12	50/125	.45	(11.5)	75	(110)

Part No.	Bandwidth with 850 nm	Attenuation with 850 nm	Bandwidth with 1300 nm	Attenuation with 1300 nm
	(Mhz x km)	(dB/km)	(Mhz x km)	(dB/km)
CFLG-6G-62.5/125-TC	160 - 200	3.2	200 - 500	0.9
CFLG-12G-62.5/125-TC	160 - 200	3.2	200 - 500	0.9
CFLG-6G-50/125-TC	200 - 600	2.5 - 3.5	600 - 1200	0.7 - 1.5
CFLG-12G-50/125-TC	200 - 600	2.5 - 3.5	600 - 1200	0.7 - 1.5

NOTE: The mentioned external diameters are maximum values.



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

10.129

Fiber
Optic
Cables



igus® Energy Chain
System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

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email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

10.130



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Servo Cables



Servo Cable Selection

Chainflex® cable	Jacket	Shield	Class	Bending radius moving (factor x d)	Temperature moving from/to °F (°C)	Oil-resistant	V max. ft/s (m/s) unsupported	V max. ft/s (m/s) gliding	a max. ft/s ² (m/s ²)	Approvals and standards
Servo cables										
CF210	PVC	✓	4.1.2	10	+23/+158°F (-5/+70°C)	✓	32.81 ft/s (10 m/s)		164.0 ft/s ² (50 m/s ²)	CE UL
CF21	PVC	✓	5.3.2	7.5	+23/+158°F (-5/+70°C)	✓	32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s ² (80 m/s ²)	CE UL
CF270	PUR	✓	4.1.3	10	-4/+176°F (-20/+80°C)	✓	32.81 ft/s (10 m/s)		164.0 ft/s ² (50 m/s ²)	CE UL
CF27	PUR	✓	6.3.3	7.5	-4/+176°F (-20/+80°C)	✓	32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s ² (80 m/s ²)	CE UL

CF210



PVC Servo Cable

Chainflex® CF210

PVC Energy Chain® cable, shielded, oil-resistant, flame-resistant

CLASS
4.1.2

Price Index



Conductor
Highly flexible
special
conductor

Pair shield
Extremely highly
flexible braided
copper shield

Core
Power conductors
with signal pair
elements
stranded around
high tensile center
core

Overall shield
Highly flexible
braided copper
shield

Outer jacket
Pressure extruded,
oil-proof PVC
blend



Construction

Power conductor: Finely stranded bare copper wires according to EN 60228

Conductor insulation: Mechanically high quality PE blend

Signal pair insulation: Mechanically high quality PE

Conductor twisting: Power conductors with signal pairs twisted with short pitch around high tensile center core

Power conductor color/numbering: Black with white numbers, one conductor green-yellow.

1. U / L1 / C / L+
2. V / L2
3. W / L3 / D / L-
4. green / yellow

Conductor identification 1 signal pair: black with white numerals

1. #4
2. #5

Conductor identification 2 signal pairs: black with white numerals

1. #5
2. #6
3. #7
4. #8

Signal pair shield: Tinned copper braid, 80% optical coverage, over aluminum/polyester film.

Outer shielding: Tinned copper braid, 80% optical coverage

Outer jacket: PVC-based, low-adhesion blend, adapted to the requirements of the Energy Chain®. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** Orange (RAL 2003).

Technical Data

Minimum bending radius, moving: 10 x outer cable diameter

Minimum bending radius, fixed: 5 x outer cable diameter

Permissible temperature, moving: +23°F to +158°F (-5°C to +70°C)

Permissible temperature, fixed: -4°F to +158°F (-20°C to +70°C)

Voltage: 1000V

Testing Voltage: 4000V

Oil resistance: Medium

UV resistance: Medium

Regulations: RU AWM style 2570 80°C 1000V, CE: CEI 20-20, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO class 2. Tested by IPA according to standard 14644-1. Test cable Cf5-10-07

Typical Applications

- for medium mechanical load requirements
- preferably indoor applications, outdoor is acceptable for temperatures greater than +41°F (+5°C)
- especially for unsupported travel distances
- Wood/stone processing, packaging industry, supply system, handling, adjusting equipment

Clean-
Room

10.134

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

PVC Servo Cable



CF210

Chainflex® CF210

PVC Energy Chain® cable, shielded, oil-resistant, flame-resistant

Price Index



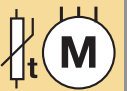
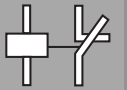
CLASS
4.1.2

Part No.	Power AWG	Signal AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx.) in. (mm)	Copper Index		Weight	
					lbs/mft	(kg/km)	lbs/mft	(kg/km)
1 Control Pair Shielded								
CF210-UL-15-15-02-01	16		4 C x 1.5					
		16	1 STP x 1.5	.47 (12)	101.4	(149)	170.1	(250)
CF210-UL-25-15-02-01	14		4 C x 2.5					
		16	1 STP x 1.5	.53 (13.5)	138.1	(203)	217.7	(320)
CF210-UL-40-15-02-01	12		4 C X 4.0					
		16	1 STP X 1.5	.59 (15)	185.0	(272)	280.2	(412)

2 Control Pairs Shielded								
CF210-UL-15-07-02-02	16		4C x 1.5					
		18	2 STP x 0.75	.53 (13.5)	115.0	(169)	197.3	(290)
CF210-UL-25-15-02-02	14		4 C x 2.5					
		16	2 STP x 1.5	.61 (15.5)	176.9	(260)	228.0	(408)
CF210-UL-40-15-02-02	12		4 C x 4.0					
		16	2 STP x 1.5	.67 (17.0)	224.5	(330)	344.2	(506)

STP = Individually shielded pair
 C = Single Conductor
 NOTE: The mentioned external diameters are maximum values.

Internet: <http://www.igus.com>
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 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

CF21

PVC Servo Cable

Chainflex® CF21

PVC Energy Chain® cable, shielded, oil-resistant, flame-resistant

CLASS
5.3.2

Price Index



Conductor
Highly flexible special conductor

Core
Power conductors with signal pair elements stranded around high tensile center core

Pair shield
Extremely highly flexible braided copper shield

Inner jacket
gusset filled, pressure extruded

Overall shield
Highly flexible braided copper shield

Outer jacket
Pressure extruded, oil-proof PVC blend



Construction

Power conductor: Finely stranded bare copper wires according to EN 60228

Conductor insulation: Mechanically high quality TPE blend

Signal pair insulation: TPE, thin-walled version

Conductor twisting: Power conductors with signal pairs twisted with short pitch around high tensile center core

Power conductor color/numbering: Black with white numbers, one conductor green-yellow.

1. U / L1 / C / L+
2. V / L2
3. W / L3 / D / L-
4. green / yellow

Conductor identification 1 signal pair: black with white numerals

1. #4
2. #5

Conductor identification 2 signal pairs: black with white numerals

1. #5
2. #6
3. #7
4. #8

Signal pair shield: Tinned copper braid, 90% optical coverage, over aluminum/polyester film.

Intermediate jacket: PVC-based blend, adapted to the requirements of the Energy Chain®.

Outer shielding: Tinned copper braid, 90% optical coverage

Outer jacket: PVC-based, low-adhesion blend, adapted to the requirements of the Energy Chain®. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** green (RAL 6005).

Technical Data

Minimum bending radius, moving: 7.5 x outer cable diameter

Minimum bending radius, fixed: 4 x outer cable diameter

Permissible temperature, moving: +23°F to +158°F (-5°C to +70°C)

Permissible temperature, fixed: -4°F to +158°F (-20°C to +70°C)

Voltage: 1000V

Testing Voltage: 4000V

Oil resistance: Medium

UV resistance: Medium

Regulations: cRUus: **UL AWM** style for USA & Canada: 2570 80°C 1000V, **Flame Resistance:** FT1, **CE:** CEI 20-20, **RoHS:** 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO class 2. Tested by IPA according to standard 14644-1. Test cable Cf5-10-07

Typical Applications

- for high mechanical load requirements
- preferably indoor applications, outdoor is acceptable for temperatures greater than +41°F (+5°C)
- designed for AC motors with variable frequency drive (VFD)
- especially for unsupported travel distances and gliding travel up to 328 ft (100m)
- storage and retrieval units for high-bay warehouses, machining tools, packaging machines, quick handling, indoor cranes



10.136

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

PVC Servo Cable



CF21

Chainflex® CF21

PVC Energy Chain® cable, shielded, oil-resistant, flame-resistant

Price Index

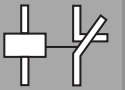


CLASS
5.3.2

Part No.	Power AWG	Signal AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx.)		Copper Index		Weight	
				in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
1 Control Pair Shielded									
CF21-07-05-02-01-UL	18		4 C x 0.75						
		20	1 STP x 0.5	.43	(11)	64.6	(95)	117.0	(172)
CF21-15-15-02-01-UL	16		4 C x 1.5						
		16	1 STP x 1.5	.51	(13)	95.0	(140)	190.5	(280)
CF21-25-15-02-01-UL	14		4 C x 2.5						
		16	1 STP x 1.5	.55	(14)	123.8	(182)	212.2	(312)
CF21-40-15-02-01-UL	12		4 C x 4.0						
		17	1 STP x 1.5	.63	(16)	164.0	(241)	265.3	(390)
CF21-100-15-02-01-UL	8		4 C x 10.0						
		16	1 STP x 1.5	.89	(22.5)	367.4	(540)	629.3	(925)
CF21-160-10-02-01-UL	6		4 C X 16.0						
		17	1 STP X 1.0	.96	(24.5)	476.0	(700)	714.0	(1050)
2 Control Pairs Shielded									
CF21-07-03-02-02-UL	18		4 C x 0.75						
		22	2 STP x 0.3	.49	(12.5)	76.8	(113)	142.8	(210)
CF21-10-07-02-02-UL	17		4 C x 1.0						
		18	2 STP x 0.75	.53	(13.5)	99.3	(146)	180.9	(266)
CF21-15-07-02-02-UL	16		4 C x 1.5						
		18	2 STP x 0.75	.57	(14.5)	119.0	(175)	210.8	(310)
CF21-25-15-02-02-UL	14		4 C x 2.5						
		16	2 STP x 1.5	.67	(17)	180.2	(265)	251.6	(370)
CF21-40-15-02-02-UL	12		4 C x 4.0						
		16	2 STP x 1.5	.73	(18.5)	206.7	(304)	295.8	(435)
CF21-60-15-02-02-UL	10		4 C x 6.0						
		16	2 STP x 1.5	.81	(20.5)	270	(397)	474	(697)
CF21-100-15-02-02-UL	8		4 C x 10.0						
		16	2 STP x 1.5	.95	(24)	381	(560)	697	(1025)
CF21-160-15-02-02-UL	6		4 C x 16.0						
		16	2 STP x 1.5	1.06	(27)	537.2	(790)	863.6	(1270)
CF21-250-15-02-02-UL	4		4 C x 25.0						
		16	2 STP x 1.5	1.22	(31)	776	(1140)	1299	(1910)

STP = Individually shielded pair
 C = Single Conductor
 NOTE: The mentioned external diameters are maximum values.

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

CF270



PUR Servo Cable

Chainflex® CF270

PUR Energy Chain® cable, shielded, oil and coolant-resistant, cut-resistant, flame-retardant, hydrolysis-resistant, microbe-resistant, PVC-free/halogen-free

CLASS
4.1.3

Price Index



Conductor
Highly flexible special conductor

Pair shield
Extremely highly flexible braided pair copper shield

Core
Power conductors with signal pair elements stranded around high-tensile strength core

Overall shield
Highly flexible braided copper shield

Outer jacket
Pressure extruded, halogen-free PUR blend



10.138

Construction

Power conductor: Finely stranded bare copper wires according to EN 60228

Conductor insulation: Mechanically high quality PE blend

Conductor twisting: Power conductors with signal pairs twisted with short pitch around a high-tensile-strength center core.

Power conductor color/numbering: Black with white numbers, one conductor green-yellow.

1. U / L1 / C / L+
2. V / L2
3. W / L3 / D / L-
4. green / yellow

Conductor identification 1 signal pair: black with white numerals

1. #4
2. #5

Conductor identification 2 signal pairs: black with white numerals

1. #5
2. #6
3. #7
4. #8

Signal pair shield: Tinned copper braid, 80% optical coverage, over aluminum/polyester film.

Overall shielding: Tinned copper braid, 80% optical coverage. Aluminum/polyester film located under braided shield

Outer jacket Low-adhesion PUR blend, adapted to the requirements of the Energy Chain®. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** orange (RAL 2003).

Technical Data

Minimum bending radius, moving: 10 x outer cable diameter

Minimum bending radius, fixed: 5 x outer cable diameter

Permissible temperature, moving: -4°F to +176°F (-20°C to +80°C)

Permissible temperature, fixed: -40°F to +176°F (-40°C to +80°C)

Voltage: 1000V

Testing voltage: 4000V

Oil resistance: High

UV resistance: Medium

Regulations: cRUus: UL AWM style for USA & Canada: 21223 80°C 1000V **Flame Resistance:** FT1, DESINA, CE, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO class 1. Tested by IPA according to standard 14644-1.

Typical Applications

- for medium mechanical load requirements
- indoor and outdoor applications, no direct sunlight
- especially for unsupported travel distances
- machine tools, quick handling, cleanroom, low temperature applications

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

PUR Servo Cable



CF270

Chainflex® CF270

PUR Energy Chain® cable, shielded, oil and coolant-resistant, cut-resistant, flame-retardant, hydrolysis-resistant, microbe-resistant, PVC-free/halogen-free

Price Index



CLASS
4.1.3

Part No.	Power AWG	Signal AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx.)		Copper Index		Weight	
				in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
1 Control Pair Shielded									
CF270-UL-15-15-02-01-D	16		4 C x 1.5						
		16	1 STP x 1.5	.47	(12.0)	101.4	(149)	167.3	(246)
CF270-UL-25-15-02-01-D	14		4 C x 2.5						
		16	1 STP x 1.5	.53	(13.5)	138.1	(203)	215.6	(317)
CF270-UL-40-15-02-01-D	12		4 C x 4.0						
		16	1 STP x 1.5	.59	(15.0)	185.0	(272)	277.6	(408)
CF270-UL-100-15-02-01-D	8		4 C x 10.0						
		16	1 STP x 1.5	.81	(20.5)	396.0	(582)	572.1	(841)
CF270-UL-160-15-02-01-D	6		4 C x 16.0						
		16	1 STP x 1.5	.94	(24.0)	581.6	(855)	833.3	(1225)

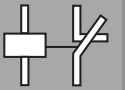
2 Control Pairs Shielded									
CF270-UL-10-07-02-02-D	17		4 C x 1.0						
		18	2 STP x 0.75	.51	(13.0)	97.3	(143)	170.8	(251)
CF270-UL-15-07-02-02-D	16		4 C x 1.5						
		18	2 STP x 0.75	.53	(13.5)	115.0	(169)	197.3	(290)
CF270-UL-25-15-02-02-D	14		4 C x 2.5						
		16	2 STP x 1.5	.61	(15.5)	176.9	(260)	277.6	(408)
CF270-UL-40-15-02-02-D	12		4 C x 4.0						
		16	2 STP x 1.5	.73	(18.5)	224.5	(330)	344.2	(506)
CF270-UL-100-15-02-02-D	8		4 C x 10.0						
		16	2 STP x 1.5	.87	(22.0)	429.9	(632)	639.5	(940)
CF270-UL-250-15-02-02-D	4		4C x 25.0						
		16	2 STP x 1.5	1.10	(28)	928.6	(1365)	1256.5	(1847)

No Signal Pair									
CF270-UL-15-04-D	16		4 C x 1.5	.35	(9.0)	55.8	(82)	100	(147)
CF270-UL-25-04-D	14		4 C x 2.5	.43	(11.0)	95.9	(141)	152.4	(224)
CF270-UL-40-04-D	12		4 C x 4.0	.49	(12.5)	143.5	(211)	210.2	(309)
CF270-UL-60-04-D	10		4 C x 6.0	.57	(14.5)	208.2	(306)	295.2	(434)
CF270-UL-100-04-D	8		4 C x 10.0	.71	(18.0)	337.4	(496)	474.8	(698)
CF270-UL-160-04-D	6		4 C x 16.0	.85	(21.5)	532.0	(782)	715.6	(1052)
CF270-UL-350-04-D	2		4 C x 35.0	1.30	(33.0)	1153.1	(1695)	15.0	(2312)

STP = Individually shielded pair
C = Single Conductor

NOTE: The mentioned external diameters are maximum values.

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email: sales@igus.com
QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

10.139

CF27

iglus®

PUR Servo Cable

CLASS
6.3.3

Price Index



Chainflex® CF27

PUR Energy Chain® cable, shielded, oil and coolant-resistant, cut-resistant, flame-retardant, hydrolysis-resistant, microbe-resistant, PVC-free/halogen-free

Conductor
Highly flexible special conductor

Core
Power conductors with signal pair elements stranded around high-tensile strength core

Pair shield
Extremely highly flexible braided pair copper shield

Inner jacket
gusset filled, pressure extruded

Overall shield
Highly flexible braided copper shield

Outer jacket
Pressure extruded, halogen-free PUR blend



Construction

Power conductor: Finely stranded bare copper wires according to EN 60228

Conductor insulation: Mechanically high quality TPE blend

Conductor twisting: Power conductors with signal pairs twisted with short pitch around a high-tensile-strength center core.

Power conductor color/numbering: Black with white numbers, one conductor green-yellow.

1. U / L1 / C / L+ 2. V / L2 3. W / L3 / D / L- 4. green / yellow

Conductor identification 1 signal pair: black with white numerals

1. #4 2. #5

Conductor identification 2 signal pairs: black with white numerals

1. #5 2. #6 3. #7 4. #8

Signal pair shield: Tinned copper braid, 90% optical coverage, over aluminum/polyester film.

Intermediate jacket: TPE-based blend, adapted to the requirements of the Energy Chain®.

Overall shielding: Tinned copper braid, 90% optical coverage,

Outer jacket Low-adhesion PUR blend, adapted to the requirements of the Energy Chain®. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** orange (RAL 2003).

Technical Data

Minimum bending radius, moving: 7.5 x outer cable diameter

Minimum bending radius, fixed: 4 x outer cable diameter

Permissible temperature, moving: -4°F to +176°F (-20°C to +80°C)

Permissible temperature, fixed: -40°F to +176°F (-40°C to +80°C)

Voltage: 1000V

Testing voltage: 4000V

Oil resistance: High

UV resistance: Medium

Regulations: cRUus: UL AWM style for USA & Canada: 20234 80°C 1000V **Flame Resistance:** FT1, **DESINA, CE, RoHS: 2002/95/EC;** Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO class 1. Tested by IPA according to standard 14644-1.

Typical Applications

- for maximum mechanical load requirements
- indoor and outdoor applications, UV-resistant
- designed for AC motors with variable frequency drive (VFD)
- especially for unsupported travel distances and gliding travel up to 328 ft (100m)
- storage and retrieval units for high-bay warehouses, machine tools, quick handling, cleanroom, semiconductor insertion, outdoor cranes, low temperature applications

Part No.	Power AWG	Signal AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx.)		Copper Index		Weight	
				in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
1 Control Pair Shielded									
CF27-07-05-02-01-D	18		4 C x 0.75						
		20	1 STP x 0.5	.45	(11.5)	64.6	(95)	116.3	(171)
CF27-15-10-02-01-D	16		4 C x 1.5						
		17	1 STP x 1.0	.49	(12.5)	92.5	(136)	149.6	(220)
CF27-15-15-02-01-D	16		4C x .5						
		16	1 STP x 1.5	.49	(12.5)	95.2	(140)	176.9	(260)
CF27-25-10-02-01-D	14		4 C x 2.5						
		17	1 STP x 1.0	.53	(13.5)	120.0	(177)	195.0	(286)
CF27-25-15-02-01-D	14		4C x 2.5						
		16	1 STP x 1.5	.55	(14.0)	123.8	(182)	204.1	(300)
CF27-40-10-02-01-D	12		4 C x 4.0						
		17	1 STP x 1.0	.63	(16.0)	158.0	(232)	242.0	(356)



10.140

PUR Servo Cable



CF27

Chainflex® CF27

PUR Energy Chain® cable, shielded, oil and coolant-resistant, cut-resistant, flame-retardant, hydrolysis-resistant, microbe-resistant, PVC-free/halogen-free

Price Index



CLASS
6.3.3

Part No.	Power AWG	Signal AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx.)		Copper Index		Weight	
				in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
1 Control Pair Shielded									
CF27-40-15-02-01-D	12		4 C x 4.0						
		16	1 STP x 1.5	.63	(16.0)	164.0	(241)	255.1	(375)
CF27-60-10-02-01-D	10		4 C x 6.0						
		17	1 STP x 1.0	.69	(17.5)	223.0	(327)	327.0	(481)
CF27-60-15-02-01-D	10		4 C x 6.0						
		16	1 STP x 1.5	.69	(17.5)	242.9	(357)	395.0	(580)
CF27-100-10-02-01-D	8		4 C x 10.0						
		17	1 STP x 1.0	.81	(20.5)	361.0	(530)	503.0	(740)
CF27-100-15-02-01-D	8		4 C x 10.0						
		16	1 STP x 1.5	.85	(21.5)	367.4	(540)	612.2	(900)
CF27-160-10-02-01-D	6		4 C x 16.0						
		17	1 STP x 1.0	.91	(23.0)	476.0	(700)	696.0	(1023)
CF27-160-15-02-01-D	4		4 C x 16.0						
		16	1 STP x 1.5	.97	(24.5)	487.1	(716)	782.3	(1150)
CF27-250-15-02-01-D	4		4 C x 25.0						
		16	1 STP x 1.5	1.12	(28.5)	718.0	(1056)	976.0	(1435)
CF27-350-15-02-01-D	2		4 C x 35.0						
		16	1 STP x 1.5	1.28	(32.5)	1057.0	(1553)	1414.0	(2079)

2 Control Pairs Shielded

CF27-07-03-02-02-D	18		4 C x 0.75						
		22	2 STP x 0.34	.49	(12.5)	69.4	(102)	132.7	(195)
CF27-10-07-02-02-D	17		4 C x 1.0						
		18	2 STP x 0.75	.53	(13.5)	97.2	(143)	170.7	(251)
CF27-15-07-02-02-D	16		4 C x 1.5						
		18	2 STP x 0.75	.57	(14.5)	119.0	(175)	200.6	(295)
CF27-25-15-02-02-D	14		4 C x 2.5						
		16	2 STP x 1.5	.65	(16.5)	180.2	(265)	237.3	(349)
CF27-40-15-02-02-D	12		4 C x 4.0						
		16	2 STP x 1.5	.71	(18)	206.0	(303)	275.4	(405)
CF27-60-15-02-02-D	10		4 C x 6.0						
		16	2 STP x 1.5	.77	(19.5)	270.0	(397)	437.2	(643)
CF27-100-15-02-02-D	8		4 C x 1.0						
		16	2 STP x 1.5	.92	(23.5)	380.8	(560)	680.0	(1000)
CF27-160-15-02-02-D	6		4 C x 16.0						
		16	2 STP x 1.5	1.02	(26)	537.2	(790)	850.0	(1250)
CF27-250-15-02-02-D	4		4 C x 25.0						
		16	2 STP x 1.5	1.18	(30.0)	775.2	(1140)	1285.2	(1890)

1 Star Quad Shielded

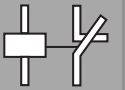
CF27-15-05-04-D	16		4 C x 1.5						
		20	(4 x 0.5)SHLD	.57	(14.5)	95.6	(142)	210.9	(310)
CF27-25-05-04-D	14		4 C x 2.5						
		20	(4 x 0.5)SHLD	.59	(15.0)	135.4	(199)	221.1	(325)
CF27-40-05-04-D	12		4 C x 4.0						
		20	(4 x 0.5)SHLD	.67	(17.0)	174.2	(256)	326.5	(480)

Without Control Pair

CF27-15-04-D	16		4 C x 1.5	.41	(10.5)	59	(86)	109	(160)
CF27-25-04-D	14		4 C x 2.5	.47	(12.0)	95	(140)	177	(260)
CF27-500-04-D	1		4 C x 50.0	1.48	(37.5)	1517	(2230)	2177	(3200)

NOTE: The mentioned external diameters are maximum values.



















Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



Power Cables



Power Cable Selection

Chainflex® cable	Jacket	Shield	Class	Bending radius moving (factor x d)	Temperature moving from/to °F (°C)	Oil-resistant	Torsion resistant	V max. ft/s (m/s) unsupported	V max. ft/s (m/s) gliding	a max. ft/s ² (m/s ²)	Approvals and standards
Power cables											
CF30	PVC		5.3.2	7.5	+23/+158°F (-5/+70°C)	✓	✓	32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s ² (80 m/s ²)	CE   
CF31	PVC	✓	5.3.2	7.5	+23/+158°F (-5/+70°C)	✓		32.81 ft/s (10 m/s)	16.41 ft/s (5 m/s)	262.4 ft/s ² (80 m/s ²)	CE  
CF34	TPE		6.4.4	7.5	-31/+194°F (-35/+90°C)	✓	✓	32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	262.4 ft/s ² (80 m/s ²)	CE   
CF35	TPE	✓	6.4.4	7.5	-31/+194°F (-35/+90°C)	✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	262.4 ft/s ² (80 m/s ²)	CE  
CF300	TPE	✓	6.4.4	7.5	-31/+194°F (-35/+90°C)	✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	CE   
CFPE	TPE		6.4.4	7.5	-31/+194°F (-35/+90°C)	✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	CE  
CF310	TPE	✓	6.4.4	7.5	-31/+194°F (-35/+90°C)	✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s ² (100 m/s ²)	CE  
CFCRANE	igupren		6.4.3	7.5	-31/+194°F (-35/+90°C)	✓		32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	164.0 ft/s ² (50 m/s ²)	CE
Pneumatic Hose											
CF AIR	PU			10	-13/+176°F (-25/+80°C)	✓		9.84 ft/s (3 m/s)	9.84 ft/s (3 m/s)	65.62 ft/s ² (20 m/s ²)	
CF CleanAIR	PU			10	-13/+176°F (-25/+80°C)	✓		9.84 ft/s (3 m/s)	9.84 ft/s (3 m/s)	65.62 ft/s ² (20 m/s ²)	

CF30

igus®

PVC Power Cable

CLASS
5.3.2

Price Index



Chainflex® CF30

PVC Standard Energy Chain® cable, oil-resistant, flame-retardant

Conductor
Highly flexible special conductor

Core
Conductors stranded around high-tensile center core

Outer jacket
gusset filled, pressure extruded, oil-proof PVC blend



Construction

Conductor: Finely stranded bare copper wires, according to EN 60228

Conductor insulation: Mechanically high quality TPE blend

Conductor twisting: Conductors cabled with short pitch over a high-tensile-strength center core.

Conductor colors: Black with white numbers, one conductor green-yellow.

1. U / L1 / C / L+
2. V / L2
3. W / L3 / D / L-
4. 4 / N
5. green / yellow

Outer jacket: PVC-based, low-adhesion blend, adapted to the requirements of the Energy Chain®. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** black (RAL 9005).

Technical Data

Minimum bending radius, moving: 7.5 x outer cable diameter

Minimum bending radius, fixed: 4 x outer cable diameter

Permissible temperature, moving: +23°F to +158°F (-5°C to +70°C)

Permissible temperature, fixed: -4°F to +158°F (-20°C to +70°C)

Voltage: 1000V

Testing voltage: 4000V

Oil resistance: Medium

UV resistance: Medium

Regulations: cRUus: UL AWM style for USA & Canada: 2570 80°C 1000V **Flame Resistance:** FT1, **CE:** CEI 20-20, **DESINA, RoHS: 2002/95/EC;** Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 2, material/cable tested by IPA according to standard 14644-1. Test cable CF5-10-07

Typical Applications

- for high mechanical load requirements
- preferably indoor applications, outdoor is acceptable for temperatures greater than +41°F (+5°C)
- for unsupported and gliding travel up to 328 ft (100m)
- torsion +/-90° with 3 ft cable length
- storage and retrieval units for high-bay warehouses, machine tools, quick handling, indoor cranes

Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF30-15-04	16	4 x 1.5	.34	(8.5)	37	(55)	69	(102)
CF30-25-04	14	4 x 2.5	.41	(10.5)	65	(95)	112	(164)
CF30-40-04	12	4 x 4	.47	(12.0)	103	(152)	160	(235)
CF30-40-05	12	5 x 4	.51	(13.0)	130	(191)	195	(286)
CF30-60-04	10	4 x 6	.55	(14.0)	159.9	(235)	234	(344)
CF30-60-05	10	5 x 6	.59	(15.0)	199.3	(293)	283.7	(417)
CF30-100-04	8	4 x 10	.69	(17.5)	266	(391)	378	(555)
CF30-100-05	8	5 x 10	.77	(19.5)	332.7	(489)	474.8	(698)
CF30-160-04	6	4 x 16	.81	(20.5)	415	(610)	567.4	(834)
CF30-160-05	6	5 x 16	.93	(23.5)	519	(763)	722.5	(1062)
CF30-250-04	4	4 x 25	1.00	(25.5)	642.2	(944)	915	(1345)
CF30-350-04	2	4 x 35	1.12	(28.5)	910.9	(1339)	1177.6	(1731)
CF30-500-04	1	4 x 50	1.34	(34.0)	1291.2	(1898)	1766	(2596)

NOTE: The mentioned external diameters are maximum values.

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number



10.144

PVC Power Cable

Chainflex® CF31

PVC Standard Energy Chain® cable, shielded, oil-resistant, flame-retardant



CF31

Price Index



CLASS
5.3.2

Construction

Conductor: Finely stranded bare copper wires, according to EN 60228

Conductor insulation: Mechanically high quality TPE blend

Conductor twisting: Conductors cabled with short pitch over a high-tensile-strength center core.

Conductor colors: Black with white numbers, one conductor green-yellow.

1. U / L1 / C / L+
2. V / L2
3. W / L3 / D / L-
4. 4 / N
5. green / yellow

Intermediate jacket: PVC-based blend, adapted to the requirements of the Energy Chain®.

Total shielding: Tinned copper braid, 90% optical coverage

Outer jacket: PVC-based, low-adhesion blend, adapted to the requirements of the Energy Chain®. Silicone-free in compliance with PV 3.10.7 - status 1992. **Color:** black (RAL 9005).

Technical Data

Minimum bending radius, moving: 7.5 x outer cable diameter

Minimum bending radius, fixed: 4 x outer cable diameter

Permissible temperature, moving: +23°F to +158°F (-5°C to +70°C)

Permissible temperature, fixed: -4°F to +158°F (-20°C to +70°C)

Voltage: 1000V

Testing voltage: 4000V

Oil resistance: Medium

UV resistance: Medium

Regulations: cRUus: UL AWM style for USA & Canada: 2570 80°C 1000V **Flame Resistance:** FT1, **CE:** CEI 20-20, **RoHS:** 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 2, material/cable tested by IPA according to standard 14644-1. Test cable CF5-10-07

Typical Applications

- for high mechanical load requirements
- preferably indoor applications, outdoor is acceptable for temperatures greater than +41°F (+5°C)
- for unsupported and gliding travel up to 328 ft (100m)
- storage and retrieval units for high-bay warehouses, machine tools, quick handling, indoor cranes
- designed for AC motors with variable frequency drive (VFD)

Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF31-15-04	16	4 x 1.5	.43	(11.0)	56	(82)	115	(169)
CF31-25-04	14	4 x 2.5	.49	(12.5)	87	(128)	161	(237)
CF31-25-05	14	5 x 2.5	.53	(13.5)	106	(156)	189	(278)
CF31-40-04	12	4 x 4	.55	(14.0)	131	(192)	217	(319)
CF31-40-05	12	5 x 4	.59	(15.0)	167	(246)	264	(388)
CF31-60-04	10	4 x 6	.63	(16.0)	202.0	(297)	320.0	(470)
CF31-60-05	10	5 x 6	.73	(18.5)	243.5	(358)	384.4	(565)
CF31-100-04	8	4 x 10	.81	(20.5)	329.3	(484)	513.0	(754)
CF31-100-05	8	5 x 10	.87	(22.0)	406.8	(598)	614.3	(903)
CF31-160-04	6	4 x 16	.91	(23.0)	501.4	(737)	711.6	(1046)
CF31-250-04	4	4 x 25	1.12	(28.5)	735.4	(1081)	1092	(1605)
CF31-350-04	2	4 x 35	1.25	(32.0)	1015.7	(1493)	1420.4	(2088)
CF31-500-04	1	4 x 50	1.48	(37.5)	1415.7	(2081)	2048.3	(3011)
CF31-700-04	2/0	4 x 70	1.85	(47.0)	2014	(2961)	3163	(4650)

NOTE: The mentioned external diameters are maximum values.

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number



10.145

CF34

TPE Power Cable

CLASS
6.4.4

Price Index



Chainflex® CF34

TPE Energy Chain® cable, oil-resistant, bio-oil-resistant,
UV-resistant, flame-retardant

Conductor
Highly flexible
special
conductor

Core
Conductors
stranded around
high tensile
center core

Outer jacket
gusset filled,
pressure
extruded,
TPE blend



Construction

Conductors: Finely stranded bare copper wires, according to EN 60228.

Conductor insulation: Mechanically high quality TPE blend

Conductor twisting: Conductors cabled with short pitch over a high-tensile-strength center core.

Conductor colors: Black with white numbers, one conductor green-yellow.

1. U / L1 / C / L+
2. V / L2
3. W / L3 / D / L-
4. 4 / N
5. green / yellow

Outer jacket: TPE particularly abrasion-resistant, high-flex blend, oil-resistant, coolant-resistant. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** black

Technical Data

Minimum bending radius, moving: 7.5 x outer cable diameter

Minimum bending radius, fixed: 4 x outer cable diameter

Permissible temperature, moving: -31°F to +194°F (-35°C to +90°C)

Permissible temperature, fixed: -40°F to +194°F (-40°C to +90°C)

Voltage: 1000V

Testing voltage: 4000V

Oil resistance: High

UV resistance: High

Regulations: cRUUs: UL AWM style for USA & Canada: 21184 80°C 1000V **Flame Resistance:** FT1, CE, DESINA, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to standard 14644-1.

Typical Applications

- for maximum mechanical load requirements
- indoor and outdoor applications, UV-resistant
- for unsupported and gliding travel up to 1312 ft (400m)
- torsion +/-90° with 3 ft cable length
- storage and retrieval units for high-bay warehouses, machine tools, quick handling, cleanroom, semiconductor insertion, ship-to-shore, outdoor cranes, low temperature applications

Part No.	AWG	No. of Conductors and Rated Cross- Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF34-15-04	16	4 x 1.5	.34	(8.5)	37	(55)	71	(105)
CF34-25-04	14	4 x 2.5	.39	(10.0)	62	(91)	106	(156)
CF34-40-04	12	4 x 4	.47	(12.0)	103	(152)	159	(234)
CF34-60-04	10	4 x 6	.55	(14.0)	160	(235)	232	(341)
CF34-60-05	10	5 x 6	.59	(15.0)	193	(283)	282	(414)
CF34-100-04	8	4 x 10	.67	(17.0)	266	(391)	361	(531)
CF34-100-05	8	5 x 10	.73	(18.5)	333	(489)	446	(655)
CF34-160-04	6	4 x 16	.77	(19.5)	415	(610)	536	(788)
CF34-160-05	6	5 x 16	.93	(23.5)	519	(763)	729	(1072)
CF34-250-04	4	4 x 25	.96	(24.5)	642	(944)	847	(1245)
CF34-100-04-O-PE ^{††}	8	4 x 10	.67	(17.0)	266	(391)	361	(531)
CF34-500-03-O-PE ^{††}	1	3 x 50	1.18	(30.0)	968	(1423)	1323	(1947)

NOTE: The mentioned external diameters are maximum values.

^{††}O-PE = no ground (green/yellow wire)



10.146

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

TPE Power Cable



CF35

Chainflex® CF35

TPE Energy Chain® Cable, shielded, oil-resistant, bio-oil-resistant, UV-resistant, flame-retardant

CLASS 6.4.4

Price Index



Construction

Conductors: Finely stranded bare copper wires, according to EN 60228

Conductor insulation: Mechanically high quality TPE blend

Conductor twisting: Conductors cabled with short pitch over a high-tensile-strength center core.

Conductor colors: Black with white numbers, one conductor green-yellow.

1. U / L1 / C / L+
2. V / L2
3. W / L3 / D / L-
4. green / yellow

Inner Jacket: TPE

Shielding: Tinned copper braid, 90% optical coverage

Outer jacket: TPE particularly abrasion-resistant, high-flex blend, oil-resistant, coolant-resistant, Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** black (RAL 9005)

Technical Data

Minimum bending radius, moving: 7.5 x outer cable diameter

Minimum bending radius, fixed: 4 x outer cable diameter

Permissible temperature, moving: -31°F to +194°F (-35°C to +90°C)

Permissible temperature, fixed: -40°F to +194°F (-40°C to +90°C)

Voltage: 1000V

Testing voltage: 4000V

Oil resistance: High

UV resistance: High

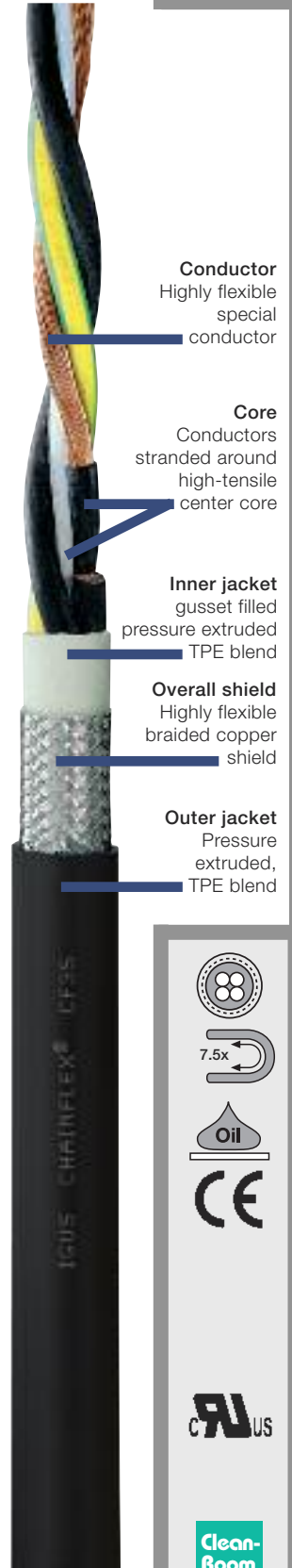
Regulations: cRUUs: UL AWM style for USA & Canada: 21184 80°C 1000V **Flame Resistance:** FT1, CE, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to standard 14644-1.

Test cable CF34-25-04

Typical Applications

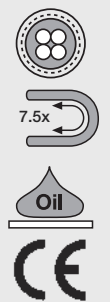
- for maximum mechanical load requirements
- indoor and outdoor applications, UV-resistant
- designed for AC motors with variable frequency drive (VFD)
- for unsupported and gliding travel up to 1312 ft (400m)
- storage and retrieval units for high-bay warehouses, machine tools, quick handling, cleanroom, semiconductor insertion, ship-to-shore, outdoor cranes, low temperature applications



Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF35-05-04	20	4 x 0.5	.32	(8.0)	26.5	(39)	55.1	(81)
CF35-07-04	18	4 x 0.75	.34	(8.5)	35.3	(52)	67.3	(99)
CF35-15-04	16	4 x 1.5	.37	(9.5)	56	(82)	99.0	(146)
CF35-25-04	14	4 x 2.5	.43	(11.0)	84	(123)	139.5	(205)
CF35-40-04	12	4 x 4	.55	(14.0)	137	(201)	218.0	(321)
CF35-60-04	10	4 x 6	.61	(15.5)	198	(291)	291.0	(428)
CF35-100-04	8	4 x 10	.77	(19.5)	305	(449)	457.0	(672)
CF35-160-04	6	4 x 16	.87	(22.0)	473.5	(696)	657.0	(965)
CF35-250-04	4	4 x 25	1.06	(27.0)	736	(1082)	1013.0	(1489)

NOTE: The mentioned external diameters are maximum values.

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number



10.147

CF300

TPE Power Cable

CLASS
6.4.4

Price Index



Chainflex® CF300

TPE Energy Chain® cable, oil-resistant, bio-oil-resistant,
UV-resistant, flame-retardant

Conductor
Highly flexible
special
conductor

Conductor insulation
Pressure
extruded
TPE blend

Outer jacket
Pressure
extruded, TPE
blend



Clean-Room

10.148

Construction

Conductors: Finely stranded bare copper wires, according to EN60882

Conductor insulation: Mechanically high quality TPE blend.

Outer jacket: TPE - Particularly abrasion-resistant, high-flex blend, oil-resistant, coolant-resistant and UV-resistant. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** black.

Technical Data

Minimum bending radius, moving: 7.5 x outer cable diameter

Minimum bending radius, fixed: 4 x outer cable diameter

Permissible temperature, moving: -31°F to +194°F (-35°C to +90°C)

Permissible temperature, fixed: -40°F to +194°F (-40°C to +90°C)

Nominal voltage: 1000 V

Testing voltage: 4000V

Oil resistance: High

UV resistance: High

Regulations: cRUus: UL AWM style for USA & Canada: 21184 80°C 1000V **Flame Resistance:** FT1, CE, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to standard 14644-1.

Test cable CF34-25-04

Typical Applications

- for maximum mechanical load requirements
- indoor and outdoor applications, UV-resistant
- for unsupported and gliding travel up to 1312 ft (400m) or more
- storage and retrieval units for high-bay warehouses, machine tools, quick handling, cleanroom, semiconductor insertion, ship-to-shore, outdoor cranes, low temperature applications

Part No.	AWG	No. of Conductors and Rated Cross- Section in mm ²	Outer Diameter		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF300-40-01	12	1 x 4.0	.26	(6.5)	25.5	(38)	41.0	(61)
CF300-60-01	10	1 x 6.0	.28	(7)	39.4	(58)	57.8	(85)
CF300-100-01	8	1 x 10.0	.31	(8)	65.3	(96)	88.4	(130)
CF300-160-01	6	1 x 16.0	.37	(9.5)	104.7	(154)	129.2	(190)
CF300-250-01	4	1 x 25.0	.45	(11.5)	163.2	(240)	190.4	(280)
CF300-350-01	2	1 x 35.0	.49	(12.5)	228.5	(336)	272.0	(400)
CF300-500-01	1	1 x 50.0	.57	(14.5)	326.4	(480)	353.6	(520)
CF300-700-01	2/0	1 x 70.0	.63	(16)	424.0	(623)	460.0	(676)
CF300-950-01	3/0	1 x 95.0	.75	(19.0)	577.0	(848)	631.0	(927)
CF300-1200-01	4/0	1 x 120.0	.85	(21.5)	720.0	(1059)	779.0	(1145)
CF300-1500-01	300 MCM	1 x 150.0	.91	(23)	897.0	(1318)	960.0	(1411)
CF300-1850-01	350 MCM	1 x 185.0	1.06	(27.0)	1285.7	(1890)	1370.1	(2014)



Chainflex® Shrink Sleeve

Technical Data (Heat-shrink sleeving only)

Material: Polyolefin particularly abrasion-resistant, high-flex blend, oil-resistant, coolant-resistant **Color:** green/yellow

Permissible temperature range for continuous flexing: -40°F to +275°F (-40°C to +135°C)

Shrink temperature: +248°F (+120 °C) min.

Part No.	Maximum Diameter Before Shrinking		Minimum Diameter After Shrinking	
	in.	(mm)	in.	(mm)
CGPT 9-5/4-8	.37	(9.5)	.19	(4.8)
CGPT 12-7/6-4	.50	(12.7)	.25	(6.4)
CGPT 19-0/9-5	.75	(19.0)	.37	(9.5)
CGPT 25-4/12-7	1.00	(25.4)	.50	(12.7)
CGPT 38-0/19-0	1.50	(38.0)	.75	(19.0)

NOTE: The mentioned external diameters are maximum values.

TPE Power Cable



CFPE

Chainflex® CFPE

TPE Energy Chain® cable, oil-resistant, bio-oil-resistant, UV-resistant, flame retardant

CLASS
6.4.4

Price Index



Construction

Conductors: Finely stranded bare copper wires, according to EN60882

Conductor insulation: Mechanically high quality TPE blend **Color:** green/yellow

Overall jacket: TPE Especially abrasion resistant, highly flexible mixture, oil resistant coolant resistant and UV resistant Silicone-free in compliance with PV 3.10.7 - status 1992. Color: Black

Conductor
Highly flexible
special
conductor

Technical Data

Minimum bending radius, moving: 7.5 x outer cable diameter

Minimum bending radius, fixed: 4 x outer cable diameter

Permissible temperature, moving: -31°F to +194°F (-35°C to +90°C)

Permissible temperature, fixed: -40°F to +194°F (-40°C to +90°C)

Voltage: 1000V

Testing voltage: 4000V

Oil resistance: High

UV resistance: High

Regulations: cRUus: UL AWM style for USA & Canada: 21184 80°C 1000V **Flame Resistance:** FT1, CE, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to standard 14644-1. Test cable

Conductor insulation
Pressure
extruded TPE
blend

Typical Applications

- for maximum mechanical load requirements
- indoor and outdoor applications, UV-resistant
- for unsupported and gliding travel up to 1312 ft (400m) or more
- storage and retrieval units for high-bay warehouses, machine tools, quick handling, cleanroom, semiconductor insertion, ship-to-shore, outdoor cranes, low temperature applications

Outer jacket
Pressure
extruded,
flame-retardant
TPE blend

Part No.	AWG	No. of Conductors and Rated Cross- Section in mm ²	Outer Diameter		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CFPE-15-01	16	1 x 1.5	.20	(5.0)	10.2	(15)	24.0	(35)
CFPE-25-01	14	1 x 2.5	.22	(5.5)	17.0	(25)	31.0	(46)
CFPE-40-01	12	1 x 4.0	.24	(6.0)	25.5	(38)	41.0	(61)
CFPE-60-01	10	1 x 6.0	.30	(7.5)	37.6	(56)	54.4	(81)
CFPE-100-01	8	1 x 10.0	.32	(8.0)	64.5	(96)	83.0	(123)
CFPE-160-01	6	1 x 16.0	.37	(9.5)	101.5	(151)	128.3	(191)
CFPE-250-01	4	1 x 25.0	.45	(11.5)	161.0	(239)	195.5	(291)
CFPE-350-01	2	1 x 35.0	.51	(13.0)	227	(333)	263	(387)



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

10.149

CF310

TPE Power Cable

CLASS
6.4.4

Price Index



Chainflex® CF310

TPE Energy Chain® cable, shielded, oil-resistant, bio-oil-resistant, UV-resistant, flame-retardant

Conductor
Highly flexible
special
conductor

**Conductor
insulation**
Pressure
extruded
TPE blend

Overall Shield
Highly flexible
braided copper
shield

Outer jacket
Pressure
extruded,
TPE blend



Construction

Conductors: Finely stranded bare copper wires, according to EN60882

Conductor insulation: Mechanically high quality TPE blend.

Total shielding: Tinned copper braid, 90% optical coverage

Outer jacket: TPE: particularly abrasion-resistant, high-flex blend, oil-resistant, coolant-resistant and UV-resistant. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** black.

Technical Data

Minimum bending radius, moving: 7.5 x outer cable diameter

Minimum bending radius, fixed: 4 x outer cable diameter

Permissible temperature, moving: -31°F to +194°F (-35°C to +90°C)

Permissible temperature, fixed: -40°F to +194°F (-40°C to +90°C)

Voltage: 1000 V

Testing voltage: 4000V

Oil resistance: High

UV resistance: High

Regulations: cRUUs: UL AWM style for USA & Canada: 21184 80°C 1000V **Flame Resistance:** FT1, CE, RoHS:

2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to standard 14644-1.

Test cable CF34-25-04

Typical Applications

- for maximum mechanical load requirements
- indoor and outdoor applications, UV-resistant
- for unsupported and gliding travel up to 1312 ft (400m) or more
- storage and retrieval units for high-bay warehouses, machine tools, quick handling, cleanroom, semiconductor insertion, ship-to-shore, outdoor cranes, low temperature applications

Part No.	AWG	No. of Conductors and Rated Cross- Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CF310-25-01	14	1 x 2.5	.26	(6.5)	26.2	(39)	41	(61)
CF310-40-01	12	1 x 4.0	.26	(6.5)	37	(55)	50	(74)
CF310-60-01	10	1 x 6.0	.30	(7.5)	51	(75)	66	(97)
CF310-100-01	8	1 x 10.0	.34	(8.5)	82	(120)	98	(144)
CF310-160-01	6	1 x 16.0	.39	(10.0)	121	(178)	143	(210)
CF310-250-01	4	1 x 25.0	.45	(11.5)	185	(272)	214	(314)
CF310-350-01	2	1 x 35.0	.53	(13.5)	259	(380)	288	(423)
CF310-500-01	1	1 x 50.0	.59	(15)	357	(524)	386	(568)
CF310-700-01	2/0	1 x 70.0	.69	(17.5)	469	(689)	509	(748)
CF310-950-01	3/0	1 x 95.0	.81	(20.5)	626	(920)	678	(997)
CF310-1200-01	4/0	1 x 120.0	.87	(22)	776	(1140)	839	(1233)
CF310-1500-01	300 MCM	1 x 150.0	.94	(24)	977	(1436)	1054	(1549)
CF310-1850-01	350 MCM	1 x 185.0	1.04	(26.5)	1244	(1829)	1297	(1906)

NOTE: The mentioned external diameters are maximum values.



10.150

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

igupren Power Cable

Chainflex® CFCRANE

For maximum voltages and output, oil-resistant, UV-resistant, flame-retardant



CFCRANE

CLASS
6.4.3

Price Index



Construction

Conductors: Highly flexible cable consisting of tinned copper wires

Conductor insulation: Inner secondary layer made of conductive rubber. Insulating sheath made of high-quality, heat-resistant and ozone-proof (free) ethylene propylene rubber (EPR). External semi-conducting layer made of conductive rubber

Outer jacket: Flame-retardant, oil-resistant rubber jacket made of iguprene for maximum mechanical stress.

Technical Data

Minimum bending radius, moving: 10 x outer cable diameter

Minimum bending radius, fixed: 7.5 x outer cable diameter

Permissible temperature, moving: -4°F to +176°F (-20°C to +80°C)

Permissible temperature, fixed: -22°F to +176°F (-30°C to +80°C)

Nominal voltage: 6/10KV (other voltage upon inquiry)

Oil resistance: High

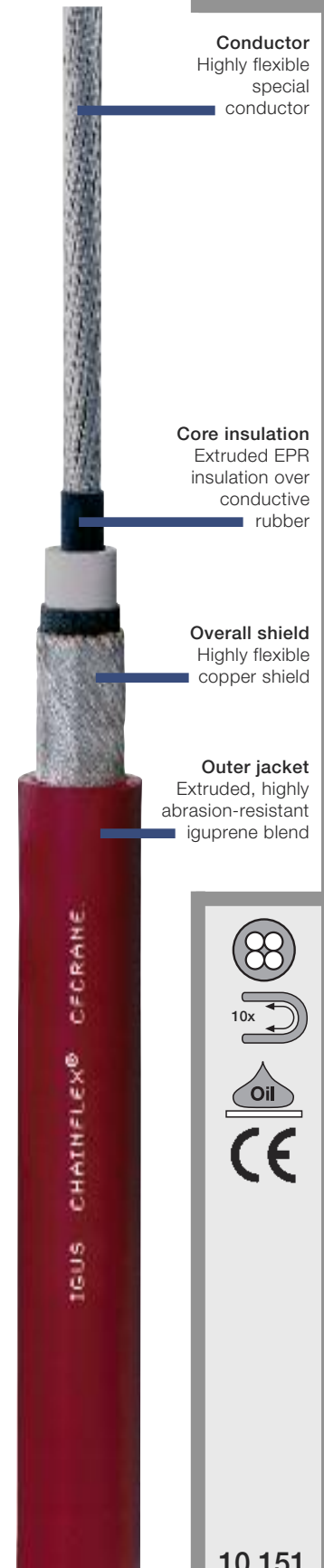
UV resistance: High

Typical Applications

- for maximum mechanical load requirements
- indoor and outdoor applications, UV-resistant
- for freely suspended and gliding travel up to 1640 ft (500m) or more

Part No.	Center AWG/ Serve AWG	No. of Conductors and Rated Cross Section in mm ²
CFCRANE 1x25/16	4 / 6	1 x 25/16
CFCRANE 1x35/16	2 / 6	1 x 35/16
CFCRANE 1x50/16	1 / 6	1 x 50/16
CFCRANE 1x70/16	2/0 / 6	1 x 70/16
CFCRANE 1x95/16	3/0 / 6	1 x 95/16

Part No.	Outer Diameter (approx)		Copper Index		Weight	
	in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CFCRANE 1x25/16	1.06	(27)	318.2	(468)	639.2	(940)
CFCRANE 1x35/16	1.14	(29)	391.7	(576)	754.8	(1110)
CFCRANE 1x50/16	1.18	(30)	484.2	(712)	918.0	(1350)
CFCRANE 1x70/16	1.26	(32)	620.2	(912)	1054.0	(1550)
CFCRANE 1x95/16	1.34	(34)	778.6	(1145)	1237.6	(1820)



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

10.151

Price Index



Pneumatic Hose

Chainflex® CF AIR

PUR Energy Chain® air hose, oil-resistant, coolant-resistant, abrasion-resistant, outside toleranced*

Description

igus® Chainflex® Air pneumatic hoses have been tested successfully in cable carriers through more than 10 million bending cycles, at bend radii below the recommended minimum. They are optimized for excellent flexibility and wear resistance in continuous-flex cable carrier applications. They are also very resistant to oils and coolants.

Technical Data

Material: Polyurethane, optimized for the requirements of continuous flexing inside a cable carrier

Color: blue

Operating pressure at +68°F (+20°C): 150 psi (10 bar)

Vacuum: at +68°F (20°C) 28" Hg

Minimum bending radius for flexible use: 10 x outer hose diameter

Temperature range, moving: -13°F to +158°F (-25°C to +70°C)

Temperature range, fixed: -40°F to +158°F (-40°C to +70°C)

Chainflex® Air - Metric Sizes

Part No.	Inner Diameter (approx)		Wall Thickness		Outer Diameter (approx)		Weight	
	in.	(mm)	in.	(mm)	in.	(mm)	lbs.mft	(kg/km)
CAPU-A-06-0	.16	(4)	.04	(1.0)	.24	(6)	12.9	(19)
CAPU-A-08-0	.22	(5.7)	.04	(1.0)	.31	(8)	20.4	(30)
CAPU-A-10-0	.28	(7)	.06	(1.4)	.39	(10)	32.6	(48)
CAPU-A-12-0	.31	(8)	.08	(1.9)	.47	(12)	51.7	(76)
CAPU-A-16-0	.43	(11)	.10	(2.4)	.63	(16)	86.4	(127)

Chainflex® Air - Inch Sizes

Part No.	Inner Diameter (approx)		Wall Thickness		Outer Diameter (approx)		Weight	
	in.		in.		in.		lbs	
CAPU-I-02	.16		.05		.25		15	
CAPU-I-03	.19		.06		.31		26	
CAPU-I-04	.25		.06		.38		32	
CAPU-I-06	.31		.09		.50		45	
CAPU-I-08	.41		.11		.63		58	

Note: Overall diameter tolerances
 1/8" - 1/2" OD = ± .005
 9/16" - 3/4" OD = ± .006

Pneumatic Hose



CF
CleanAIR
PE

Chainflex® CF CleanAIR

PE Energy Chain® air hose, oil-resistant, coolant-resistant, highly abrasion-resistant, outside tolerated*, PVC-free, halogen-free

Technical Data

Material: highly abrasion resistant polyethylene adapted the requirements of Energy Chains®

Color: white

Operating pressure at +68°F (+20°C): 150 psi (10 bar)

Vacuum: at +68°F (20°C) -14 psi (-0.95 bar)

Minimum bending radius for flexible use: 10 x outer hose diameter

Minimum bending radius for static use: 8x outer hose diameter

Temperature range, moving: -13°F to +158°F (-25°C to +70°C)

Temperature range, fixed: -40°F to +158°F (-40°C to +70°C)

Cleanroom: According to ISO Class 1, tube material tested by IPA according to ISO standard 14644-1

Typical Applications

- Especially for high abrasion resistance
- Cleanroom, semi-conductor industry, material handling systems

Chainflex® Air - Metric Sizes

Part No.	Inner Diameter (approx)		Wall Thickness		Outer Diameter (approx)		Weight	
	in.	(mm)	in.	(mm)	in.	(mm)	lbs.mft	(kg/km)
CAPE-A-04-0	.11	2.7	.03	0.7	.16	4.0	4	6
CAPE-A-06-0	.16	4.0	.04	1.0	.24	6.0	10	15
CAPE-A-08-0	.22	5.7	.05	1.2	.32	8.0	14	21
CAPE-A-10-0	.28	7.0	.06	1.5	.39	10.0	26	38
CAPE-A-12-0	.32	8.0	.08	2.0	.47	12.0	36	54
CAPE-A-16-0	.43	11.0	.10	2.5	.63	16.0	60	90

Price Index
















No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

Reboot Cables



Robot Cable Selection

Chainflex® cable	Jacket	Shield	Class	Bending radius moving (factor x d)	Temperature moving from/to °F (°C)	Oil-resistant	Torsion resistant	V max. ft/s (m/s) unsupported	V max. ft/s (m/s) gliding	a max. ft/s² (m/s²)	Approvals and standards
Robot cables											
Hybrid cable/Control cable											
CFROBOT9	PUR		6.1.3	10	-13/+176°F (-25/ +80°C)	✓	✓	32.81 ft/s (10 m/s)	32.81 ft/s (10 m/s)	32.81 ft/s² (10 m/s²)	CE  
Bus cable											
CFROBOT8	PUR	✓	6.1.3	10	-4/+158°F (-20/ +70°C)	✓	✓	32.81 ft/s (10 m/s)	32.81 ft/s (10 m/s)	32.81 ft/s² (10 m/s²)	CE  
Measuring system cable											
CFROBOT4	TPE		6.1.3	10	-13/+176°F (-25/ +80°C)	✓	✓	32.81 ft/s (10 m/s)	32.81 ft/s (10 m/s)	32.81 ft/s² (10 m/s²)	CE  
Fiber optic cable											
CFROBOT5	TPE	✓	7.1.4	12.5	-4/+140°F (-20/ +60°C)	✓	✓	32.81 ft/s (10 m/s)	32.81 ft/s (10 m/s)	32.81 ft/s² (10 m/s²)	CE 
Servo cable/Power cable											
CFROBOT6	PUR	✓	6.1.3	10	-13/+176°F (-25/ +80°C)	✓	✓	32.81 ft/s (10 m/s)	32.81 ft/s (10 m/s)	32.81 ft/s² (10 m/s²)	CE  
CFROBOT7	PUR	✓	6.1.3	10	-13/+176°F (-25/ +80°C)	✓	✓	32.81 ft/s (10 m/s)	32.81 ft/s (10 m/s)	32.81 ft/s² (10 m/s²)	CE  
CFROBOT	TPE		6.1.4	10	-31/+212°F (-35/ +100°C)	✓	✓	32.81 ft/s (10 m/s)	32.81 ft/s (10 m/s)	32.81 ft/s² (10 m/s²)	CE  

Chainflex® cables for robots

In the industrial applications of today ever more complex sequences of movements demand twistable and/or three-dimensional flexible cables with a long service life similar to the Chainflex® cables for use in linear Energy Chain Systems®.

Wires, stranded, shields and sheathing materials must compensate both major changes in bending load and changes in diameter due to torsional movements.

For this purpose, different "soft" structural elements e.g. rayon fibres, PTFE elements or filling elements that absorb torsion forces are used in Chainflex® ROBOT cables.

Special demands are made on the braided shielding in torsion cables. Optimized shield structures with PTFE gliding films are used to absorb the forces caused by torsion movements.

To use and example of Twistable Bus cables, the transmission characteristics such as attenuation, cable capacity and signal quality must remain within very tight tolerance ranges over the whole service life. This is achieved through the use of special insulating materials and mechanical elements with matching capacity values.

The highly abrasion-resistant, halogen-free and flame-resistant PUR sheathing mixture in motor, hybrid/control cables and bus cables protects the core elements from possible damage.

The CFROBOT cable line utilizes two jacket materials PUR and TPE. These materials were carefully chosen to protect the core elements like power conductors, high-speed data pairs and fiber optic components from possible damage. PUR jacket is highly abrasion resistant, halogen free and flame resistant. TPE jacket is highly abrasion resistant and halogen-free.

The special design logic behind CFROBOT cables was developed in theory and needed to be validated through testing. igus® set out to develop a test that would simulate the torsion stress cables will endure in the field. We do this by utilizing the Triflex® R Energy Chain® which can be twisted to various degrees at very high frequencies. This test is referred to as the igus® Torsion Test Standard.

According to this standard, all Chainflex® ROBOT cables of a Triflex® R Energy Chain® are twisted with a fixed-point



distance of one meter and a torsion of +/- 180° at least 3 million times. In addition, a test is carried out on a test bench with a Triflex® R length of approx. 2500 mm with 270° torsion. This test duplicated the forces and impacts that cables are exposed to in industrial robotic applications.

We have also found that all the non-shielded, gusset-filled extruded standard Chainflex® control cables of the series CF5, CF77-UL-D and CF9 correspond to the above-mentioned igus® standard and have been approved for use in torsion applications.

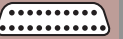
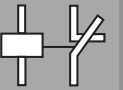
The following twistable CF ROBOT cable types are currently available:

- Hybrid/control cables
- Motor/servo cables
- Bus/data cables
- FOC cables

We can also offer you Chainflex® ROBOT cables terminated with the connectors of your choice as ReadyCable®, or as a ready-to-install ReadyChain® cable assembly.



Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec/RFQ: <http://www.igus.com/quickspec>



CF
ROBOT9



PUR Hybrid Cable, Twistable

Chainflex® CF ROBOT9

PUR outer jacket, unshielded/shielded, oil-resistant and coolant-resistant, notch-resistant, flame-retardant, hydrolysis-resistant and microbe-resistant

CLASS
6.1.3

Price Index



Conductor
Highly flexible special
conductor

Cable core
twisted
together with
dampening

Extremely
torsion
resistant
copper shield

Overall Shield
PTFE barrier

Outer jacket
Pressure
extruded,
PUR blend



Construction

Conductors: Finely stranded bare copper wires

Conductor insulation: Mechanically high quality TPE blend

Total shielding: Torsion flex tinned copper serves, coverage 85% optical

Outer jacket: Low adhesion, halogen-free, highly abrasion resistant PUR blend. Adapted for the requirements of Energy Chain® systems

Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** black.

Technical Data

Minimum bending radius, moving: 10 x outer cable diameter

Minimum bending radius, fixed: 4 x outer cable diameter

Permissible temperature, moving: -13°F to +176°F (-25°C to +80°C)

Permissible temperature, fixed: -40°F to +176°F (-40°C to +80°C)

Torsion: +/-180°, 1m cable length

Voltage: 300V

Testing voltage: 2000V

Oil resistance: High

UV resistance: High

Flame Resistance: According to IEC 60332-1-2, CEI 20-34, FT1, VW-1

Regulations: UL AWM style for USA & Canada: 20317 80°C 300V **Flame Resistance:** FT1CE, RoHS:

2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to ISO Standard 14644-1.

Test cable CF27-07-05-02-01-D

Typical Applications

- for maximum load requirements with torsion movements
- indoor and outdoor applications, UV-resistant
- especially for robots and movements in the 3D range
- robots, handling, spindle drives



10.158

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

PUR Hybrid Cable, Twistable



CF
ROBOT9

Chainflex® CF ROBOT9

PUR outer jacket, unshielded/shielded, oil-resistant and coolant-resistant, notch-resistant, flame-retardant, hydrolysis-resistant and microbe-resistant

Price Index



CLASS
6.1.3

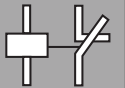
Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CFROBOT9-001	17	5C x 1.0						
	17	1 STP x 1.0	.37	(9.5)	50.3	(75)	86.7	(129)
CFROBOT9-002	18	6C x 0.75						
	18	3C x 0.75 SHLD	.47	(12)	51.0	(76)	96.0	(143)
CFROBOT9-003	20	2C x 0.50						
	20	1 STP x 0.5	.39	(10)	18.1	(27)	50.3	(75)
CFROBOT9-004	17	16C x 1.0						
	17	1 STP x 1.0	.65	(16.5)	118.9	(177)	219.0	(326)
CFROBOT9-005	17	23C x 1.0						
	17	1 STP x 1.0	.77	(19.5)	161.9	(241)	321.2	(478)
CFROBOT9-006	17	24C x 1.0						
	17	1 STP x 1.0	.79	(20)	168.6	(251)	325.2	(484)
CFROBOT9-007	24	15 STP x 0.25						
	24	4C x 0.25 SHLD	.71	(18)	145.8	(217)	221.7	(330)

NOTE: The mentioned external diameters are maximum values.

Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Color code
CFROBOT9-001	17	5C x 1.0	Conductors black with white numerals 1-4, one conductor green-yellow
	17	1 STP x 1.0	Conductors black with white numerals 5-6
CFROBOT9-002	18	6C x 0.75	Conductors black with white numerals 1-5, one conductor green-yellow
	18	3C x 0.75 SHLD	Conductors black with white numerals 6-8
CFROBOT9-003	20	2C x 0.50	Conductors black with white numerals 1-2
	20	1 STP x 0.50	Conductors black with white numerals 3-4
CFROBOT9-004	17	16C x 1.0	Conductors black with white numerals 1-4, 7-17, one conductor green-yellow
	17	1 STP x 1.0	Conductors black with white numerals 5-6
CFROBOT9-005	17	23C x 1.0	Conductors black with white numerals 1-4, 7-24, one conductor green-yellow
	17	1 STP x 1.0	Conductors black with white numerals 5-6
CFROBOT9-006	17	24C x 1.0	Conductors black with white numerals 1-4, 7-25, one conductor green-yellow
	17	1 STP x 1.0	Conductors black with white numerals 5-6
CFROBOT9-007	24	15 STP x 0.25	Color code in accordance with DIN 47100
	24	4C x 0.25 SHLD	white, green, brown, yellow (CAN-Bus)

STP = Individually shielded Pair
 PR = Twisted Pair
 C = Single Conductor
 SC = Individually shielded conductor
 SHLD = Shielded over Precable

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

10.159

PUR Bus Cable, Twistable

Chainflex® CF ROBOT8

PUR outer jacket, shielded, oil-resistant, notch-resistant, flame-retardant, hydrolysis-resistant and microbe-resistant

CLASS
6.1.3

Price Index



Conductor

Especially bend-resistant fine-wire stranded conductor

Cable core

twisted together to an optimized pitch

Strain relief

GRP core element

Gusset-filled extruded dampening elements

PTFE barrier

Overall Shield

Torsion resistant copper shield

Outer jacket

Highly abrasion resistant PUR jacket blend



Construction

Conductors: Finely stranded bare copper wires

Conductor insulation: According to bus specification

Conductor stranding: According to bus specification

Total shielding: Torsion resistant tinned copper serves, coverage 80% optical

Intermediate jacket: Foil taping over the external layer

Outer jacket: Low adhesion, halogen-free, highly abrasion resistant PUR blend. Adapted for the requirements of Energy Chain® systems. Silicon-free in compliance with PV 3.10.7 - status 1992.

Color: Blue.

Technical Data

Minimum bending radius, moving: 10 x outer cable diameter

Minimum bending radius, fixed: 7.5 x outer cable diameter

Permissible temperature, moving: -4°F to +158°F (-20°C to +70°C)

Permissible temperature, fixed: -13°F to +158°F (-25°C to +70°C)

Torsion: +/-180°, 1m cable length

Voltage: 30V

Testing voltage: 500V

Oil resistance: High

UV resistance: High

Flame Resistance: According to IEC 60332-1-2, CEI 20-34, FT1, VW-1

Regulations: UL AWM style for USA & Canada: >24 AWG 20963, ≤ 24 AWG 20236 80°C 30V **Flame**

Resistance: FT1 CE, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1.

Typical Applications

- for maximum load requirements with torsion movements
- indoor and outdoor applications, UV-resistant
- especially for robots and movements in the 3D range
- robots, handling, spindle drives

Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
Profibus								
CFROBOT8-001	22	2C x 0.35	.31	(8)	14.7	(22)	38.3	(57)
Can-Bus								
CFROBOT8-022	20	4C x 0.50	.28	(7)	26.2	(39)	43.6	(65)
GigE								
CFROBOT8-045	26	4 PR x 0.14	.33	(8.5)	23.5	(35)	43.6	(65)

NOTE: The mentioned external diameters are maximum values.

Part No.	Characteristic Impedance Ohms	Core Group	Color Code
CFROBOT8-001	150	2C x 0.35	red, green
CFROBOT8-022	120	4C x 0.5	white, green, brown, yellow (star-quad stranding)
CFROBOT8-045	100	4 PR x 0.14	white-blue/blue, white-orange/orange, white-green/green, white-brown/brown

STP = Individually shielded Pair

PR = Twisted Pair

C = Single Conductor

SC = Individually shielded conductor

SHLD = Shielded over Precable



PUR Measuring System Cable, Twistable



CF
ROBOT4

CLASS
6.1.3

Price Index



Chainflex® CF ROBOT4

PUR outer jacket, shielded, oil-resistant and coolant-resistant, notch-resistant, flame-retardant, hydrolysis-resistant and microbe-resistant

Construction

Conductors: Fine wire stranded conductor in especially bending resistant version consisting of bare copper wires

Conductor insulation: Mechanically high-quality TPE mixture

Shield: Torsion resistant tinned copper shield, coverage 85% optical

Outer jacket: Low adhesion, halogen-free, highly abrasion resistant PUR blend. Adapted for the requirements of Energy Chair® systems. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** Blue.

Technical Data

Minimum bending radius, moving: 10 x outer cable diameter

Minimum bending radius, fixed: 4 x outer cable diameter

Permissible temperature, moving: -13°F to +176°F (-25°C to +80°C)

Permissible temperature, fixed: -40°F to +176°F (-40°C to +80°C)

Torsion: +/-180°, 1m cable length

Voltage: 30V

Testing voltage: 500V

Oil resistance: High

UV resistance: High

Flame Resistance: According to IEC 60332-1-2, CEI 20-34, FT1, VW-1

Regulations: UL AWM style for USA & Canada: 20236 80°C 30V **Flame Resistance:** FT1 **CE, RoHS:**

2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1. Test cable CF27-07-05-02-01-D

Typical Applications

- for maximum load requirements with torsion movements
- indoor and outdoor applications, UV-resistant
- especially for robots and movements in the 3D range
- robots, handling, spindle drives



Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CFROBOT4-001	26	3 STP x 0.14						
	26	4C x 0.14						
	20	2C x 0.5	.43	(11)	44.2	(65)	113.0	(166)
CFROBOT4-002	26	3 STP x 0.14						
	20	2SC x 0.5	.41	(10.5)	45.6	(67)	87.1	(128)
CFROBOT4-009	24	3 PR x 0.24						
	20	2C x 0.5	.35	(9)	36.0	(53)	69.4	(102)
CFROBOT4-015	26	4 PR x 0.14						
	20	4C x 0.5	.35	(9)	36.7	(54)	72.1	(106)
CFROBOT4-028	26	2 PR x 0.14						
	22	2C x 0.38	.30	(7.5)	25.6	(42)	49.0	(72)

Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Color code
CFROBOT4-001	26	3 STP x 0.14	yellow/green, black/brown, red/orange
	26	4C x 0.14	gray, blue, white-yellow, white-black
	20	2C x 0.5	brown-red, brown-blue
CFROBOT4-002	26	3 STP x 0.14	green/yellow, black/brown, red/orange
	20	2SC x 0.5	black, red
CFROBOT4-009	24	3 PR x 0.24	brown/green, blue/violet, gray/pink, red/black
	20	2C x 0.5	white, brown
CFROBOT4-015	26	4 PR x 0.14	brown/green, violet/yellow, gray/pink, red/black
	20	4C x 0.5	blue, white, brown-green, white-green
CFROBOT4-028	26	2 PR x 0.14	green/yellow, pink/blue
	22	2C x 0.38	red, black

TPE Fiber Optic Cable, Twistable

Chainflex® CF ROBOT5

TPE outer jacket, oil-resistant, bio-oil-resistant, UV-resistant, low temperature flexible, hydrolysis-resistant and microbe-resistant

CLASS
7.1.4

Price Index



FOC cores with high tensile aramide fibers

GRP core element

FOC wires stranded with dampers around the GRP core

Outer jacket
Pressure extruded halogen-free TPE blend



Construction

Conductors: 50/125µm, 62.5/125µm special fixed wired elements with aramide strain relief

Conductor stranding: FOC wires stranded with high-tensile aramide dampers around the GRP central element

Outer jacket: Low adhesion, highly flexible, abrasion resistant, TPE blend. Adapted for the requirements of Energy Chain® systems. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** Steel Blue.

Technical Data

Minimum bending radius, moving: 12.5 x outer cable diameter

Minimum bending radius, fixed: 7.5 x outer cable diameter

Permissible temperature, moving: -4°F to +140°F (-20°C to +60°C)

Permissible temperature, fixed: -13°F to +140°F (-25°C to +60°C)

Torsion: +/-180°, 1m cable length

Oil resistance: High

UV resistance: High

Flame Resistance: According to IEC 60332-1-2, CEI 20-34, FT1, VW-1

Regulations: CE, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1. Test cable CF9-15-07

Typical Applications

- for maximum load requirements with torsion movements
- indoor and outdoor applications, UV-resistant
- especially for robots and movements in the 3D range
- robots, handling

Part No.	No. of Fibers	Fiber Diameter approx. µm	Outer Diameter (approx)		Weight	
			in.	(mm)	lbs/mft	(kg/km)
CFROBOT5-500	2	62.5/125	.33	(8.5)	58.4	(87)
CFROBOT5-501	2	50/125	.33	(8.5)	58.4	(87)

NOTE: The mentioned external diameters are maximum values.

Part No.	Bandwidth with 850 nm (MHz x km)	Attenuation with 850 nm (dB/km)	Bandwidth with 1300 nm (MHz x km)	Attenuation with 1300 nm (dB/km)	Color Code
CFROBOT5-500	160-200	3.2	200-500	0.9	blue with white numbers
CFROBOT5-501	200-600	2.5 - 3.5	600-1200	0.7 - 1.5	blue with white numbers



PUR Motor Cable, Twistable



CF
ROBOT6/7

CLASS
6.1.3

Price Index



Chainflex® CF ROBOT6/7

PUR outer jacket, shielded/unshielded, oil-resistant and coolant-resistant, notch-resistant, flame-retardant, hydrolysis-resistant and microbe-resistant

Construction

Conductors: Finely stranded bare copper wires

Conductor insulation: Mechanically high quality TPE blend

Core identification: See table below for conductor identification

Overall shield: Extremely torsion resistant, tinned copper braid, coverage 85% optical

Outer jacket: Low adhesion, halogen-free, highly abrasion resistant PUR blend. Adapted for the requirements of Energy Chain® systems. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** blue.

Technical Data

Minimum bending radius, moving: 10 x outer cable diameter

Minimum bending radius, fixed: 4 x outer cable diameter

Permissible temperature, moving: -13°F to +176°F (-25°C to +80°C)

Permissible temperature, fixed: -40°F to +176°F (-40°C to +80°C)

Torsion: +/-180°, 1m cable length

Voltage: 1000V

Testing voltage: 4000V

Oil resistance: High

UV resistance: High

Regulations: UL AWM Style for USA & Canada: 21223 80°C 1000V **Flame Resistance:** FT1, VW-1 **CE, RoHS:**

2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1. Test cable CF27-07-05-02-01-D

Typical Applications

- for maximum load requirements with torsion movements
- indoor and outdoor applications, UV-resistant
- especially for robots and movements in the 3D range
- robots, handling, spindle drives

Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)

Unshielded - Conductors are black with printed numbers, one conductor is green/yellow

CFROBOT6-100-3	8	3C x 10	.65	(16.5)	192.8	(287)	271.4	(404)
CFROBOT6-160-3	6	3C x 16	.75	(19)	308.4	(459)	403.8	(601)
CFROBOT6-250-3	4	3C x 25	.93	(23.5)	485.1	(722)	622.2	(926)
CFROBOT6-350-3	2	3C x 35	1.02	(26)	685.4	(1020)	828.5	(1233)

Shielded - Conductors are black with printed numbers: One conductor is green/yellow

CFROBOT7-15-03-C	16	3C x 1.5	.31	(8)	38.9	(58)	63.8	(95)
CFROBOT7-25-03-C	14	3C x 2.5	.37	(9.5)	59.8	(89)	92.0	(137)
CFROBOT7-15-04-C	16	4C x 1.5	.33	(8.5)	49.7	(74)	81.3	(121)
CFROBOT7-25-04-C	14	4C x 2.5	.41	(10.5)	77.2	(115)	114.9	(171)

4 conductor power & 2 pairs: Power conductors are black printed as follows: One conductor is green/yellow;

Pair 1: 5 & 6; Pair 2: 7 & 8

CFROBOT7-15-15-02-02-C	16	4C x 1.5						
	16	2 STP x 1.5	.65	(16.5)	127.6	(190)	255.3	(380)
CFROBOT7-25-15-02-02-C	14	4C x 2.5						
	16	2 STP c 1.5	.73	(18.5)	154.5	(230)	302.3	(450)

4 pairs: Power conductors are black printed as follows: One conductor is green/yellow

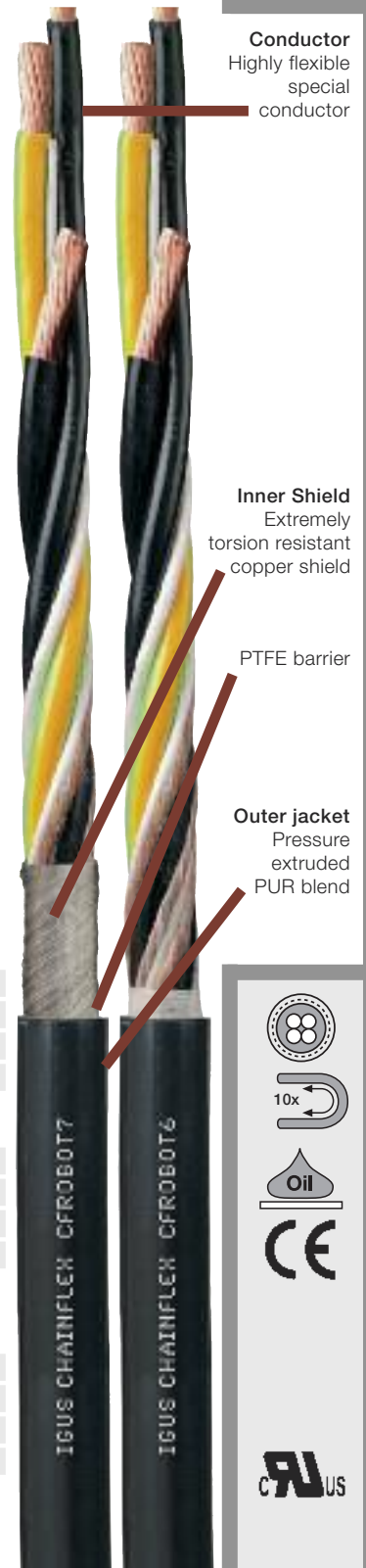
1. U/L1/C/L+ 2. V/L2 3. W/L3/D/L- 4. green/yellow

Pair 1: white & brown Pair 3: gray & pink

Pair 2: green & yellow Pair 4: blue & red

CFROBOT7-40-02-02-04-C	12	4C x 4.0						
	24	4 STP x 0.25	.65	(16.5)	161.2	(240)	228.4	(340)

C = Single conductor; STP = Individually shielded pair



10.163

TPE Robot Cable

CLASS
6.1.4

Price Index



Chainflex® CF ROBOT

TPE Energy Chain® cable, torsion flexing, shielded, oil-resistant, bio-oil-resistant, PVC-free, UV-resistant, flame retardant

Conductor
Highly flexible special conductor

Insulation
Pressure extruded TPE

High quality rayon yarn

PTFE barrier

Shield
Torsion resistant copper shield

High rigidity rayon yarn

Outer jacket
Pressure extruded, TPE blend

Construction

Conductors: Finely stranded bare copper wires

Conductor insulation: Mechanically high quality TPE blend

Total shielding: Torsion flex tinned copper serves, coverage 90% optical

Outer jacket: Low adhesion, abrasion resistant and highly bend resistant TPE base suited for the requirements of Energy Chain® systems

Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** black.

Technical Data

Minimum bending radius, moving: 10 x outer cable diameter

Minimum bending radius, fixed: 4 x outer cable diameter

Permissible temperature, moving: -31°F to +212°F (-35°C to +100°C)

Permissible temperature, fixed: -40°F to +212°F (-40°C to +100°C)

Voltage: 1000V

Testing voltage: 4000V

Torsion: +/- 180°, with 1m cable length

Oil resistance: High

UV resistance: High

Regulations: cRUus: UL AWM style for USA & Canada: 21387 90°C 1000V **Flame Resistance:** FT1, CE, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Typical Applications

- for maximum mechanical load requirements
- indoor and outdoor applications, UV-resistant
- especially for robot and 3D motion
- robots, handling, spindle drives

Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CFROBOT-035	8	1 x 10.0	.41	(10.5)	82.3	(121)	134	(197)
CFROBOT-036	6	1 x 16.0	.45	(11.5)	125.0	(183)	186	(274)
CFROBOT-037	4	1 x 25.0	.55	(14.0)	197.0	(289)	289	(425)
CFROBOT-038	2	1 x 35.0	.61	(15.5)	266.0	(391)	363	(534)
CFROBOT-039	1	1 x 50.0	.69	(17.5)	371.0	(546)	494	(726)









Special Cables



Special Cable Selection

Chainflex® cable	Jacket	Shield	Class	Bending radius moving (factor x d)	Temperature moving from/to °F (°C)	Oil-resistant	Torsion resistant	V max. ft/s (m/s) unsupported	V max. ft/s (m/s) gliding	a max. ft/s² (m/s²)	Approvals and standards
Special cables											
CFFLAT	TPE	7.4.4	5	-31/+194°F (-35/+90°C)	✓			32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	328.1 ft/s² (100 m/s²)	CE 
CFBRAID	TPE	6.4.4	7.5	-31/+194°F (-35/+90°C)	✓			32.81 ft/s (10 m/s)	19.69 ft/s (6 m/s)	262.4 ft/s² (80 m/s²)	CE  
CFTHERMO	PUR	5.2.3	12.5-15	-4/+176°F (-20/+80°C)	✓			6.56 ft/s (2 m/s)	3.28 ft/s (1 m/s)	65.62 ft/s² (20 m/s²)	CE 

CFFLAT



TPE Power Cable

Chainflex® CFFLAT

TPE Energy Chain® cable, oil-resistant, bio-oil-resistant, UV-resistant, flame-retardant

CLASS
7.4.4

Price Index



Conductor
Highly flexible braided special conductor



Construction

Conductors: Highly flexible braided special conductor
Conductor insulation: Mechanically high quality TPE blend.
Outer jacket: TPE - Particularly abrasion-resistant, high-flex blend, oil-resistant, coolant-resistant and UV-resistant. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** black.

Technical Data

Minimum bending radius, moving: 5 x outer cable diameter
Minimum bending radius, fixed: 4 x outer cable diameter
Permissible temperature, moving: -31°F to +194°F (-35°C to +90°C)
Permissible temperature, fixed: -40°F to +194°F (-40°C to +90°C)
Nominal voltage: 1000 V
Testing voltage: 4000V
Oil resistance: High
UV resistance: High
Regulations: CE, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.
Cleanroom: According to ISO Class 1, material/cable tested by IPA according to standard 14644-1.
 Test cable CF9-15-07

Typical Applications

- for maximum mechanical load requirements
- indoor and outdoor applications, UV-resistant
- for unsupported and gliding travel up to 1312 ft (400m) or more
- storage and retrieval units for high-bay warehouses, machine tools, quick handling, cleanroom, semiconductor insertion, ship-to-shore, outdoor cranes, low temperature applications

Conductor insulation
Mechanically high-quality TPE



Outer jacket
Pressure extruded, TPE blend



Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter		Copper Index		Weight	
			in. W x H	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CFFLAT-25-01	14	1 x 2.5	.53x.20	(13.5x5.0)	20	(30)	48	(71)
CFFLAT-40-01	12	1 x 4.0	.55x.20	(14.0x5.0)	30	(46)	73	(109)

NOTE: The mentioned external diameters are maximum values.



IGUS® CHAINFLEX® CF-FLAT

Clean-Room

10.168

TPE Power Cable

Chainflex® CF BRAID

TPE Energy Chain® cable, shielded/unshielded, oil-resistant, bio-oil-resistant, UV-resistant, flame-retardant, hydrolysis-resistant and microbe-resistant



CF BRAID

Price Index



CLASS
6.4.4

Construction

Conductors: Finely stranded bare copper wires, according to EN60882

Conductor insulation: Mechanically high-quality TPE blend. According to DIN VDE 0207 Part 4.

Cable core: Conductors braided together to prevent corkscrew

Inner jacket: TPE blend, adapted to the requirements of the Energy Chain®.

Overall shielding: Tinned copper braid, coverage approx. 90% optical (for shielded types)

Outer jacket: Low-adhesion TPE blend, especially abrasion-resistant, high-flex blend, adapted to the requirements of the Energy Chain®. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** black.

Technical Data

Minimum bending radius, moving: 7.5 x outer cable diameter

Minimum bending radius, fixed: 4 x outer cable diameter

Permissible temperature, moving: -31°F to +158°F (-35°C to +70°C)

Permissible temperature, fixed: -40°F to +158°F (-40°C to +70°C)

Voltage: 1000 V

Testing voltage: 4000V

Oil resistance: High

UV resistance: High

Regulations: cRUus: UL AWM style for USA & Canada: 21184 80°C 1000V **Flame Resistance:** FT1, CE,

RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Typical Applications

- for maximum load requirements
- indoor and outdoor applications, UV-resistant
- for unsupported and gliding travel up to 1312 ft (400m) or more
- storage and retrieval units for high-bay warehouses, quick handling, cleanroom, indoor and outdoor cranes, low temperature applications

Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CFBRAID-25-08	14	8 G 2.5	.79	(20)	130.6	(192)	270.8	(398)
CFBRAID-25-08-C	14	(8 G 2.5) C	.93	(23.5)	217.7	(320)	425.2	(625)

NOTE: The mentioned external diameters are maximum values.

G = with gree-yellow earth core



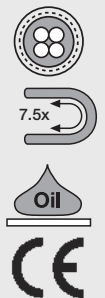
Conductor
Highly flexible special conductor

Core
Conductors stranded using a special technique

Inner Jacket
TPE blend

Overall shield
Highly flexible braided copper shield

Outer jacket
Pressure extruded TPE blend



Clean-room

10.169

Chainflex® CF THERMO

PUR Energy Chain® cable, oil-resistant, coolant resistant, flame retardant, notch resistant, PVC-free/halogen-free, hydrolysis resistant and microbe resistant

CLASS
6.3.3

Price Index



Conductor
Special flexible stranded thermocouple alloys

Core
Individual conductors combined in layers with a short pitch

Overall shield
Highly flexible braided copper shield

Barrier layer
Fleece tape over core

Outer jacket
Pressure extruded, PUR blend



Construction

- Conductors:** Special flexible stranded thermocouple alloys
- Conductor insulation:** Mechanically high-quality TPE mixture
- Conductor twisting:** Conductors are combined together with a short pitch
- Conductor colors:** According to Thermo IEC color code specifications
- Barrier layer:** Fleece tape over core construction
- Element Shield:** Tinned copper braid, 90% optical coverage
- Outer jacket:** PUR: low-adhesion, highly abrasion-resistant, adapted to the requirements in the Energy Chain®. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** green (RAL 6018).

Technical Data

- Minimum bending radius, moving:** <10m travel = 12.5 x diameter; ≥10m travel = 15 x diameter
- Minimum bending radius, fixed:** 5 x outer cable diameter
- Permissible temperature, moving:** -4°F to +176°F (-20°C to +80°C)
- Permissible temperature, fixed:** -40°F to +176°F (-40°C to +80°C)
- Flame resistance:** FT1
- UV resistance:** Medium
- Oil resistance:** High
- Voltage:** 300V
- Test voltage:** 1500V
- Regulations:** CE, DESINA, RoHS: 2002/95/EC;

Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1. Outer jacket material complies with CF27-07-05-02-01-D

Typical Applications

- for high mechanical load requirements
- indoor and outdoor applications with average sun exposure
- especially for unsupported and gliding travel up to 164 ft (50m)
- storage and retrieval units for high-bay warehouses, machining units, packaging machines, quick handling, cleanroom, indoor cranes, refrigerating sector



12.5-15x



IGUS® CHAINFLEX® CF THERMO

Part No.	AWG	No. of Pairs & Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CFTHERMO-J-001	24	1 PR x 0.23	.22	(5.5)	5.4	(8.0)	23.5	(35)
CFTHERMO-K-001	24	1 PR x 0.23	.22	(5.5)	5.4	(8.0)	22.2	(33)
CFTHERMO-K-002	24	1 STP x 0.23	.28	(7.0)	4.7	(15.4)	41.6	(62)
	20	3 C x 0.5						
CFTHERMO-T-002	24	1 STP x 0.23	.28	(7.0)	4.7	(15.4)	41.6	(62)
	20	3 C x 0.5						

Part No.	Thermocouple Alloy Types	Color Code	Jacket Color
CFTHERMO-J-001	Fe-CuNi: iron-constantan	-white, + black	Black
CFTHERMO-K-001	NiCr-Ni: chromel-alumel	-white, + green	Green
CFTHERMO-K-002	NiCr-Ni: chromel-alumel	-white, + green	Green
	power conductors: Copper	brown, blue, yellow-green	
CFTHERMO-T-002	NiCr-Ni: copper-constantan	-white, + brown	Brown
	power conductors: Copper	brown, blue, yellow-green	

Clean-Room



igus® Energy Chain
System®

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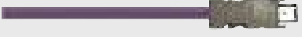











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Camera

Video- vision engineering/bus technology



Camera Cable Selection

Chainflex® cable		Jacket	Shield	Cable type	Approvals and standards		
Video-, vision engineering/bus technology							
	FireWire	TPE	✓	Ready-made cable	CE	UL US	
	USB	TPE	✓	Ready-made cable	CE	UL US	
	GigE	TPE	✓	Ready-made cable	CE	UL US	
	FOC	PUR	✓	Ready-made cable	CE		
	FOC	TPE	✓	Ready-made cable (Robotics)	CE		
	Koax	TPE	✓	Ready-made cable	CE		

TPE Bus Cable

Chainflex® FireWire

TPE outer jacket, oil-resistant, flame-retardant
For the toughest of demands in digital camera technology.

Construction

Conductors: Fine-wire stranded conductor bare copper wires, according to EN 60228

Conductor insulation: Mechanically high-quality PE mixture.

Cable core: Components twisted together with an especially short pitch length.

Element shield: Extremely flexible, tinned copper shield over foil taping.

Coverage approx. 90% optical.

Core identification: 26 AWG: orange/blue, green/red. **22 AWG:** black, white.

Outer jacket: Low-adhesion TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** violet (similar to RAL 4001)

Technical Data

Minimum bending radius, moving: 12.5 x outer cable diameter

Minimum bending radius, fixed: 5 x outer cable diameter

Permissible temperature, moving: -31°F to +158°F (-35°C to +70°C)

Permissible temperature, fixed: -40°F to +158°F (-40°C to +70°C)

Nominal voltage: 30 V

Testing voltage: 500 V

Oil resistance: High

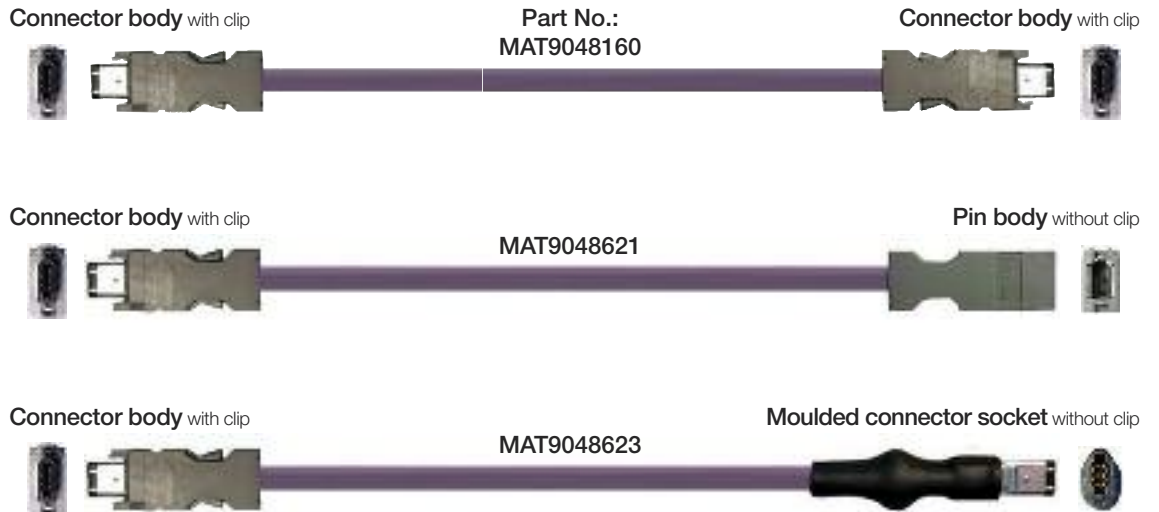
Regulations: cRUus UL AWM style for USA & Canada 21371 80°C 30V, **Flame resistance:** FT1, CE, DESINA

Typical Applications

- FireWire cable for use in Energy Chains® in industrial environments
- Transmission lengths of up to 32.8 ft. (10 m)

Part No.	Number of pairs/conductors nominal cross section (mm ²)	Overall diameter		Copper index		Weight	
		in.	(mm)	lbs/ft.	(kg/km)	lbs/ft.	(kg/km)
CFBUS-055	2 STP x 0.15 + 2 C x 0,34	.30	(7.5)	28.2	(42)	54.4	(81)

Choose from the following preassembled harnessed units.



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

Shield
Extremely bend-resistant, tinned copper shield

Conductor
Especially bend-resistant fine-wire stranded conductor

Core
Components twisted with a short pitch length

Outer jacket
Gusset-filled extruded, flame retardant TPE blend



TPE Bus Cable



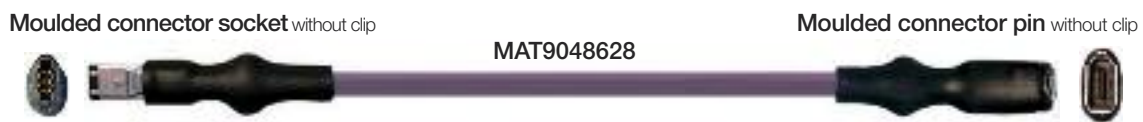
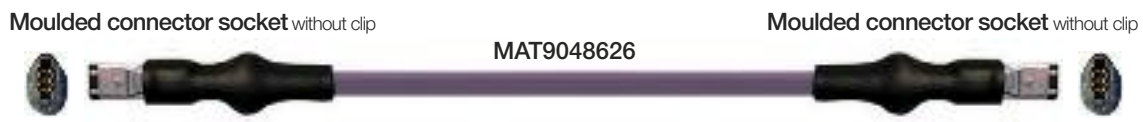
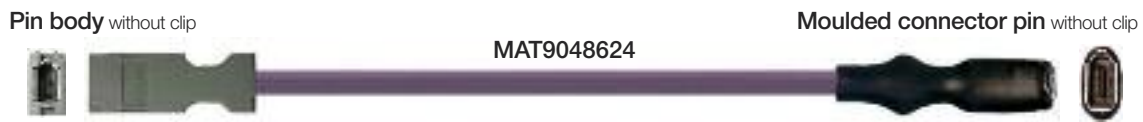
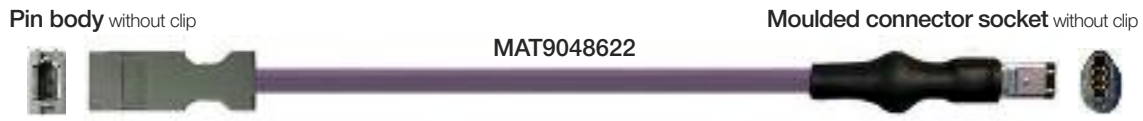
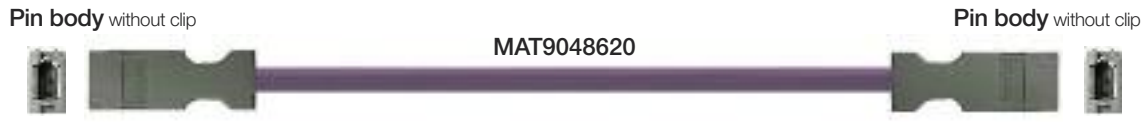
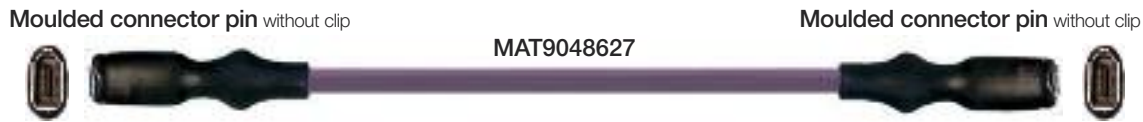
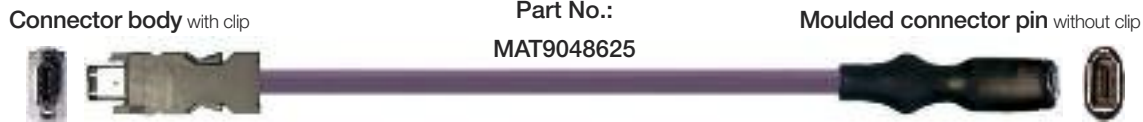
FireWire

Chainflex® FireWire

TPE outer jacket, oil-resistant, flame-retardant

For the toughest of demands in digital camera technology.

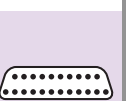
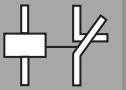
Choose from the following preassembled harnessed units.



We have successfully tested CFBUS-055 for more than 6 million cycles at 32.8 ft and 3.3 ft travel distance
See Design Section for test details.

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec/RFQ: <http://www.igus.com/quickspec>



10.175

TPE Bus Cable

Chainflex® USB

TPE Energy Chain® Cable, USB cable 2.0, shielded, oil resistant, flame retardant

Conductor
Especially bend resistant fine-wire stranded conductor

Core
Components twisted with a short pitch length

Overall Shield
Extremely bend resistant, tinned copper shield

Outer jacket
Pressure extruded, flame-retardant TPE blend



Construction

Conductors: Extremely flexible, very finely stranded bare copper conductor. According to EN 60228.

Conductor insulation: According to Bus specifications

Conductor twisting: Two conductors each, twisted in a short pitch, conductor pairs also twisted in a short pitch.

Conductor colors: **20 AWG:** red, black
28 AWG: white, green (CFBUS.065)
24 AWG: white, green (CFBUS.066)

Shield: Extremely bend resistant, tinned copper braid. Coverage, 90% optical

Outer jacket: Low-adhesion TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** violet (similar to RAL 4001)

Technical Data

Minimum bending radius, moving: 12.5 x outer cable diameter

Minimum bending radius, fixed: 5 x outer cable diameter

Permissible temperature, moving: -31°F to +158°F (-35°C to +70°C)

Permissible temperature, fixed: -40°F to +158°F (-40°C to +70°C)

UV resistance: Medium

Oil resistance: High

Nominal voltage: 30V

Test voltage: 500V

Regulations: cRUus: **UL AWM style for US & Canada:** 21371 80°C 30V **Flame Resistance:** FT1, CE, DESINA, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1. Test cable CF34-25-04

Typical Applications

- USB 2.0 cable for use in E-Chains® in industrial environments
- Transmission lengths of up to 19.6 ft. (6 m) (CFBUS.065)
- Transmission lengths of up to 32.8 ft. (10 m) (CFBUS.066)

Part No.	AWG	No. of Conductors and Rated Cross-Section in mm²	Outer Diameter (approx)		Copper Index		Weight		Characteristic Impedance ohms
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)	
CFBUS-065	20	2 C x 0.5							
	28	1 PR x 0.08	.20	(5.0)	17.5	(26)	30.2	(45)	90

Choose from the following preassembled harnessed units.



TPE Bus Cable

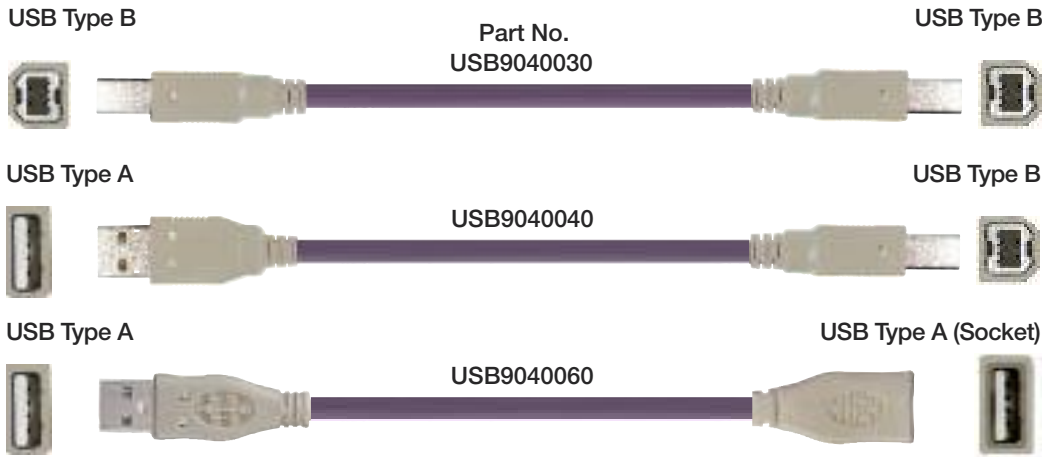
Chainflex® USB

TPE Energy Chain® Cable, shielded, oil resistant, flame retardant



USB

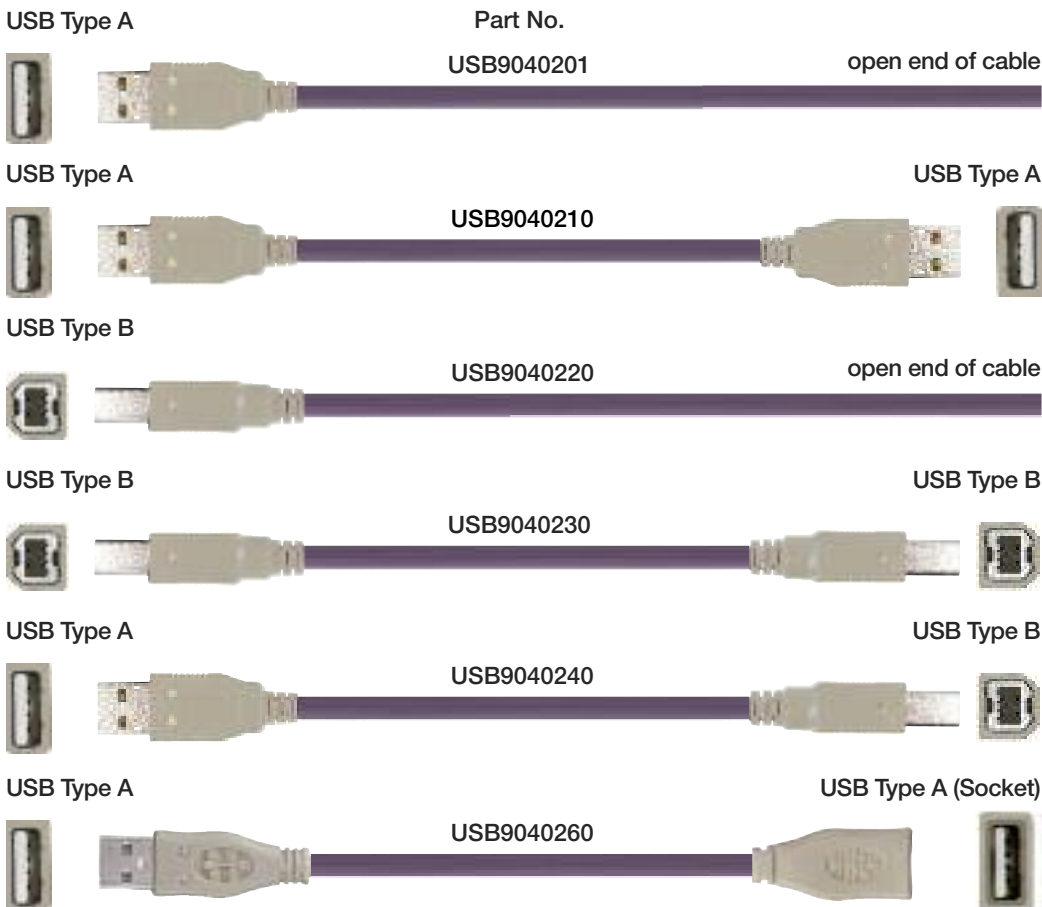
Price Index



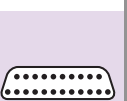
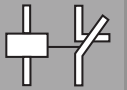
Cable is also available in bulk reels

Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight		Characteristic Impedance ohms
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)	
CFBUS-066	20	2 C x 0.5							90
		1 PR x 0.24	.24	(6.0)	21.5	(32)	37.6	(56)	

Choose from the following preassembled harnessed units.



Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



TPE Bus Cable

Chainflex® GigE

TPE Energy Chain® Cable, Ethernet cable for industrial use, shielded, oil resistant, flame retardant

Conductor

Especially bend resistant fine-wire stranded conductor

Core

Pairs are twisted with an especially short pitch

Inner Jacket

Gusset filled extruded

Overall Shield

Extremely bend resistant, tinned copper shield

Outer jacket

Pressure extruded, flame-retardant TPE blend

Construction

Conductors: Extremely flexible, very finely stranded bare copper conductor. According to EN 60228.

Conductor insulation: According to Bus specifications

Conductor twisting: Two conductors each, twisted in a short pitch, conductor pairs also twisted in a short pitch.

Conductor colors: Color Code in accordance with DIN 47100

Shield: Tinned copper braid. Coverage, 90% optical

Outer jacket: Low-adhesion TPE, especially abrasion-resistant and highly flexible, adapted to suit the requirements in Energy Chains®. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** violet (similar to RAL 4001)

Technical Data

Minimum bending radius, moving: 12.5 x outer cable diameter

Minimum bending radius, fixed: 5 x outer cable diameter

Permissible temperature, moving: -31°F to +158°F (-35°C to +70°C)

Permissible temperature, fixed: -40°F to +158°F (-40°C to +70°C)

UV resistance: Medium

Oil resistance: High

Nominal voltage: 30V

Test voltage: 500V

Regulations: cRUus: **UL AWM style for US & Canada:** 21371 80°C 30V **Flame Resistance:** FT1, CE, DESINA, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1. Test cable CF34-25-04

Typical Applications

- Ethernet cable for use in E-Chains® in industrial environments
- Transmission lengths of up to 50 m (CFBUS.065)



10.178

IGUS® CHAINFLEX® CFBUS.044

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

TPE Bus Cable



GigE

Chainflex® GigE

TPE Energy Chain® Cable, Ethernet cable for industrial use, shielded, oil resistant, flame retardant

Cable is also available in bulk reels

Part No.	AWG	No. of Conductors and Rated Cross-Section in mm ²	Outer Diameter (approx)		Copper Index		Weight	
			in.	(mm)	lbs/mft	(kg/km)	lbs/mft	(kg/km)
CFBUS-044	26	4 PR x 0.14	.32	(8.0)	24.0	(35)	53.7	(79)
CFROBOT8-045	26	(4x(2x0.14)C)	.33	(8.5)	23.5	(35)	43.6	(65)

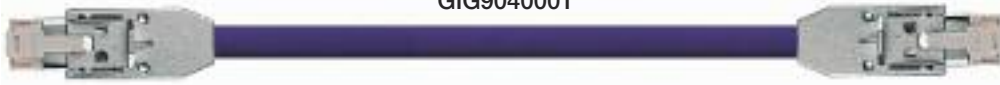
Note: The mentioned external diameters are maximum values

Choose from the following preassembled harnessed units.

Connector RJ45 Metal, 8 poles

Part No.:
GIG9040001

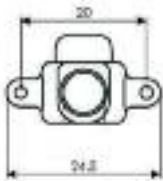
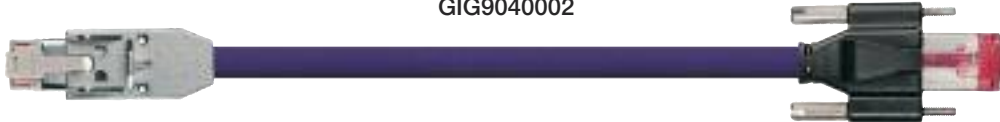
Connector RJ45 Metal, 8 poles



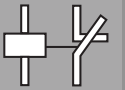
Connector RJ45 Metal, 8 poles

Part No.:
GIG9040002

Plug made of RJ45 plastic with knurled screws



Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

10.179

PUR Fiber Optic Cable

Chainflex® Glass Fiber

PUR Energy Chain® gradient glass fiber optic cable, UV-resistant, halogen-free, oil-resistant, metal-free



Construction

- Fiber:** 50/125 µm; 62.5/125 µm fibers in gel filled hollow tubes
- Core stranding:** Tubes with one fiber in each are twisted with strain relief elements
- Color code:** Black fiber jackets with white printed numbers
- Outer jacket:** Low adhesion PUR **Color:** Black

Technical Data

- Minimum bending radius, moving:** 12.5 outer cable diameter
- Minimum bending radius, fixed:** 7.5 x outer cable diameter
- Permissible temperature, moving:** -4°F to +140°F (-20°C to +60°C)
- Permissible temperature, fixed:** -13°F to +140°F (-25°C to +60°C)
- UV Resistance:** High
- Oil Resistance:** High
- Silicone free:**

Typical Applications

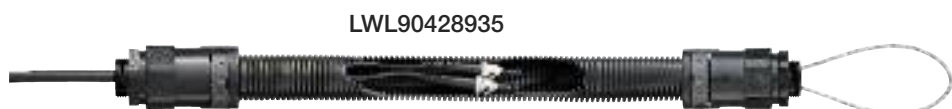
- Fiber optic cable for use in E-Chains® in industrial environments
- Transmission lengths of up to 500 m

Part No. Cable Only	Fiber Count	Fiber Diameter approx (µm)	Outer Diameter		Weight	
			µm (approx)	in. (mm)	lbs/mft	(kg/km)
CFLG-2HG-MF-50/125	2	50/125	.35	(9)	56	(85)

Choose from the following preassembled harnessed units.

		Part No.:																																							
Connector ST		LWL90412393		Connector LC																																					
Connector ST		LWL90412394		Connector ST																																					
Connector LC		LWL90412395		Connector LC																																					
<table border="1"> <thead> <tr> <th>CFLG-2HG-MF-62.5/125</th> <th>2</th> <th>62.5/125</th> <th>.35</th> <th>(9)</th> <th>56</th> <th>(85)</th> </tr> </thead> <tbody> <tr> <td>Connector ST</td> <td></td> <td>LWL90412396</td> <td></td> <td>Connector LC</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Connector ST</td> <td></td> <td>LWL90412397</td> <td></td> <td>Connector ST</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Connector LC</td> <td></td> <td>LWL90412398</td> <td></td> <td>Connector LC</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>					CFLG-2HG-MF-62.5/125	2	62.5/125	.35	(9)	56	(85)	Connector ST		LWL90412396		Connector LC						Connector ST		LWL90412397		Connector ST						Connector LC		LWL90412398		Connector LC					
CFLG-2HG-MF-62.5/125	2	62.5/125	.35	(9)	56	(85)																																			
Connector ST		LWL90412396		Connector LC																																					
Connector ST		LWL90412397		Connector ST																																					
Connector LC		LWL90412398		Connector LC																																					

* 2 ST coupling pieces needed to be ordered extra, if used as extension cable (MAT0176314).



Closed corrugated tube to feed in Fibre optic cables (image shown cut open)



PUR Fiber Optic Cable



FOC

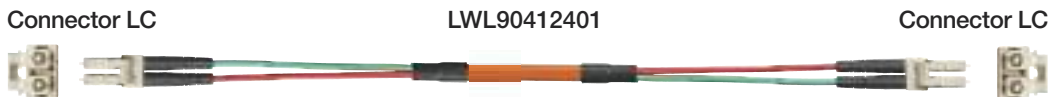
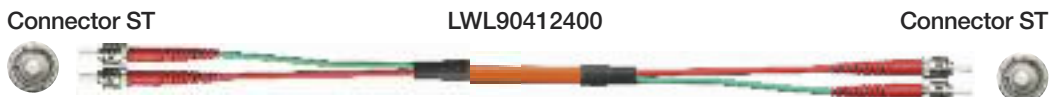
Chainflex® Glass Fiber

PUR Energy Chain® gradient glass fiber optic cable, UV-resistant, halogen-free, oil-resistant, metal-free

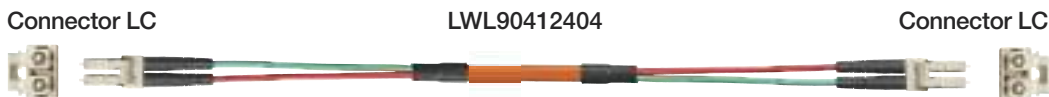
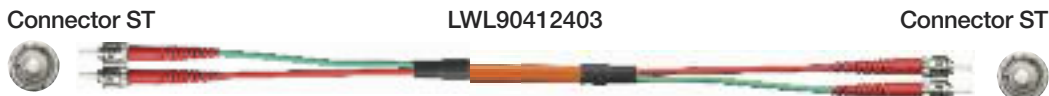
FOC patch cables for static installation

Part No. Cable Only	Fiber Count	Fiber Diameter approx (µm)	Outer Diameter		Weight (approx.)	
			µm (approx)	in. (mm)	lbs/mft	(kg/km)
FFLG-2G-MF-50/125	2	50/125	.25	(6.5)	18.1	(27)

Choose from the following preassembled harnessed units.



FFLG-2G-MF-62.5/125	2	62.5/125	.25	(6.5)	18.1	(27)
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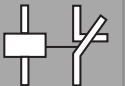


* 2 ST coupling pieces needed to be ordered extra, if used as extension cable (MAT0176314).



Harnessed igus® E6 system on a camera application.

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



TPE Fiber Optic Cable

Chainflex® CF ROBOT5

TPE outer jacket, oil-resistant, bio-oil-resistant, UV-resistant, low temperature flexible, hydrolysis-resistant and microbe-resistant

Fiber optic cable for robotic applications with torsional movements

Construction

Conductors: 50/125µm, 62.5/125µm special fixed wired elements with aramide strain relief

Conductor stranding: FOC wires stranded with high-tensile aramide dampers around the GRP central element

Outer jacket: Low adhesion, highly flexible, abrasion resistant, TPE blend. Adapted for the requirements of Energy Chain® systems. Silicon-free in compliance with PV 3.10.7 - status 1992. **Color:** Steel Blue.

Technical Data

Minimum bending radius, moving: 12.5 x outer cable diameter

Minimum bending radius, fixed: 7.5 x outer cable diameter

Permissible temperature, moving: -4°F to +140°F (-20°C to +60°C)

Permissible temperature, fixed: -13°F to +140°F (-25°C to +60°C)

Oil resistance: High

UV resistance: High

Flame Resistance: According to IEC 60332-1-2, CEI 20-34, FT1, VW-1

Regulations: CE, RoHS: 2002/95/EC; Please reference the Design Section (Chapter 1) for more information.

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1. Test cable CF9-15-07

Typical Applications

- for maximum mechanical load requirements with torsion movements
- indoor and outdoor applications, UV-resistant
- especially for robots and movements in the 3D range
- robots, handling

FOC cores with high tensile aramide fibers

GRP core element

FOC wires stranded with dampers around the GRP core

Outer jacket
Pressure extruded halogen-free TPE blend



Part No. Cable Only	No. of Fibers	Fiber Diameter approx. µm	Outer Diameter (approx)		Weight	
			in.	(mm)	lbs/mft	(kg/km)
CFROBOT5-501	2	50/125	.33	(8.5)	58.4	(87)

Choose from the following preassembled harnessed units.



TPE Coax Cable

Chainflex® CFKoax1

TPE Energy Chain® cable, 75Ω coax cable, oil-resistant, bio-oil-resistant, UV-resistant

Conductor

Specially bend-resistant fine wire stranded conductor

Conductor shield

Highly flexible braided copper shield

Core

Coaxes twisted with short pitch

Outer jacket

gusset filled, pressure extruded, halogen-free TPE blend

Construction

Conductors: Tinned copper wires

Conductor insulation: FEP

Coax shield: Tinned copper braid, 90% optical coverage

Coax jacket/color: TPE, red, green, blue, white, black

Cable core for 5 coax cable: coaxes twisted together with a short pitch length

Outer jacket: TPE abrasion-resistant, high-flex blend, oil-resistant, coolant-resistant. **Color:** dark blue (RAL 5011).

Technical Data

Minimum bending radius, moving: 10 x outer cable diameter

Minimum bending radius, fixed: 7.5 x outer cable diameter

Permissible temperature, moving: -31°F to +212°F (-35°C to +100°C)

Permissible temperature, fixed: -40°F to +212°F (-40°C to +100°C)

UV resistance: High

Oil resistance: High

Nominal voltage: 300V

Test voltage: 1500V

Operating capacitance: approx. 19.5pF/ft

Characteristic impedance: 75Ω

Cleanroom: According to ISO Class 1, material/cable tested by IPA according to ISO standard 14644-1. Test cable CF9-15-07

Coax is compatible with RG179 type connectors

Typical Applications

- for maximum mechanical load requirements
- indoor and outdoor applications, UV resistant
- for unsupported and gliding travel up to 1312 ft (400m)
- storage and retrieval units for high bay warehouses, machine tools, quick handling, cleanroom, semiconductor insertion, outdoor cranes, low temperature applications

Part No.	No. of Coaxes	Diameter		Copper Index		Weight	
		in.	(mm)	lbs/ft	(kg/m)	lbs/mft	(kg/km)
Cable Only							
CF Koax 1-01	1 coaxial element	.18	(4.5)	6.0	(9)	16.7	(25)

Choose from the following preassembled harnessed units.

Connector	MAT90423400	Socket
Connector	MAT90423401	Connector
Socket	MAT90423402	Socket
Connector	MAT90423403	open end of cable
Socket	MAT90423404	open end of cable



TPE Coax Cable



CF Koax

Chainflex® CFKoax5

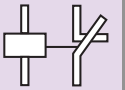
TPE Energy Chain® cable, 75Ω coax cable, oil-resistant, bio-oil-resistant, UV-resistant

Part No. Cable Only	No. of Coaxes	Diameter		Copper Index		Weight	
		in.	(mm)	lbs/ft	(kg/m)	lbs/mft	(kg/km)
CF Koax 1-05	5 coaxial element	.39	(10)	31.5	(47)	16.7	(25)

Choose from the following preassembled harnessed units.



Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>





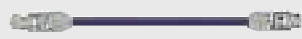



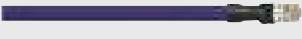

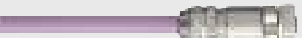

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

Network

Network-/Ethernet-/FOC-cable/Fieldbus



Network Cable Selection

Chainflex® cable		Jacket	Cable type	Approvals and standards
Video-, vision engineering/bus technology (with camera reference list)				
	CFLG-6G	TPE	Gradient glass fiber cable	CE
	CFLG-12G	TPE	Gradient glass fiber cable	CE
	CAT5	TPE	Ethernet cable	CE 
	CAT5	PUR	Ethernet cable, L-/T-angle	CE 
	CAT	TPE	Ethernet cable	CE 
	Profibus	PVC/PUR/TPE	Fieldbus cable	CE 

TPE Fiber Optic Cable

Chainflex® CFLG-6G

TPE Energy Chain® gradient glass fiber optic cable, halogen-free, oil-resistant, low temperature -40°F (-40°C)

Technical Information

- Oil-resistant
- UV-resistant
- Halogen-free
- External jacket on the basis of TPE
- Fiber optic cables: diameter of fibers 62.5/125 µm and 50/125 µm
- Minimum bending radius for use in Energy Chains®: 15 x cable diameter
- Temperature range (moving): -40°F to +140°F (-40°C to +60°C)
- Color: black



- FOC**
Gradient fibers
- Fiber coating**
Gel-filled fiber sheath
- Strain relief**
Stranded GRP rods
- Outer jacket**
Highly abrasion resistant TPE blend with integrated torsion protection braid



Chainflex® TPE gradient glass-fiber cable 50/125 µm

TPE Fiber Optic	igus® Part No.	# of Fibers	Diameter in. (mm)	Bending Radius
ST connectors on both ends	LWL9040030	6 x 50/125	.45 (11.5)	15 x d
ST connectors on both ends incl. conversion to SC	LWL9040031	6 x 50/125	.45 (11.5)	15 x d
ST connectors on both ends incl. conversion to LC	LWL9040032	6 x 50/125	.45 (11.5)	15 x d

Chainflex® TPE gradient glass-fiber cable 62.5/125 µm

TPE Fiber Optic	igus® Part No.	# of Fibers	Diameter in. (mm)	Bending Radius
ST connectors on both ends	LWL9040045	6 x 62.5/125	.45 (11.5)	15 x d
ST connectors on both ends incl. conversion to SC	LWL9040046	6 x 62.5/125	.45 (11.5)	15 x d
ST connectors on both ends incl. conversion to LC	LWL9040047	6 x 62.5/125	.45 (11.5)	15 x d

LWL90428936



Closed corrugated tube to feed in fiber optic cables (image shown cut open)



TPE Fiber Optic Cable

Chainflex® CFLG-12G

TPE Energy Chain® gradient glass fiber optic cable, halogen-free, oil-resistant, low temperature (-40°C)



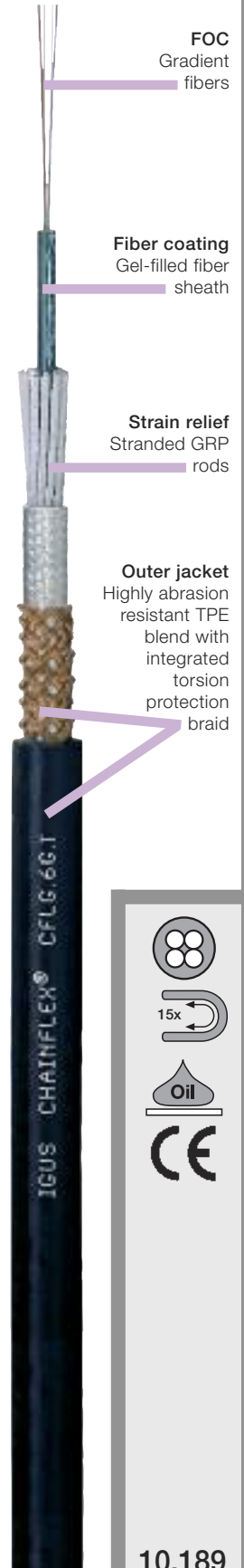
CFLG-12G

Price Index



Technical Information

- Oil-resistant
- UV-resistant
- Halogen-free
- External jacket on the basis of TPE
- Fiber optic cables: diameter of fibers 62.5/125 μm and 50/125 μm
- Minimum bending radius for use in Energy Chains®: 15 x cable diameter
- Temperature range (moving): -4°F to +194°F (-20°C to +90°C)
- Color: black



Chainflex® TPE gradient glass-fiber cable 50/125 μm

TPE Fiber Optic	igus® Part No.	# of Fibers	Diameter		Bending Radius
			in.	(mm)	
ST connectors					
on both ends	LWL9040060	12 x 50/125	.45	(11.5)	15 x d
ST connectors					
on both ends incl.					
conversion to SC	LWL9040061	12 x 50/125	.45	(11.5)	15 x d
ST connectors					
on both ends incl.					
conversion to LC	LWL9040062	12 x 50/125	.45	(11.5)	15 x d

Chainflex® TPE gradient glass-fiber cable 62.5/125 μm

TPE Fiber Optic	igus® Part No.	# of Fibers	Diameter		Bending Radius
			in.	(mm)	
ST connectors					
on both ends	LWL9040075	12 x 62.5/125	.45	(11.5)	15 x d
ST connectors					
on both ends incl.					
conversion to SC	LWL9040076	12 x 62.5/125	.45	(11.5)	15 x d
ST connectors					
on both ends incl.					
conversion to LC	LWL9040077	12 x 62.5/125	.45	(11.5)	15 x d

LWL90428936



Closed corrugated tube to feed in fiber optic cables (image shown cut open)

Technical Information

- Oil-resistant
- UV-resistant
- Halogen-free
- Shielded
- External jacket TPE
- Minimum bending radius for use in Energy Chains®: 12.5 x cable diameter
- Temperature range (moving): -31°F to +158°F (-35°C to +70°C)
- Color: violet

Straight



Cable Type	igus® Part No.	# of Pairs x AWG	Bending Radius	Diameter	
				in.	(mm)
CAT5 - 4 Pole	CAT9040001	2 x 24	12.5 x d	.28	(7.0)



CAT5 - 8 Pole	CAT9040020	4 x 26	12.5 x d	.31	(8.0)
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CAT5 - 8 Pole	CAT9040060	4 x 26	12.5 x d	.31	(8.0)
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CAT5 - 8 Pole	CAT9040140	4 x 26	12.5 x d	.31	(8.0)
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CAT5 - 8 Pole	CAT9040180	4 x 26	12.5 x d	.31	(8.0)
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Cross-Over



Cable Type	igus® Part No.	# of Pairs x AWG	Bending Radius	Diameter	
				in.	(mm)
CAT5 - 8 Pole	CAT9040040	4 x 26	12.5 x d	.31	(8.0)



CAT5 - 8 Pole	CAT9040080	4 x 26	12.5 x d	.31	(8.0)
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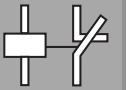


CAT5 - 8 Pole	CAT9040160	4 x 26	12.5 x d	.31	(8.0)
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CAT5 - 8 Pole	CAT9040200	4 x 26	12.5 x d	.31	(8.0)
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Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

Technical Information

- Oil-resistant
- UV-resistant
- Halogen-free
- Shielded
- External jacket TPE
- Minimum bending radius for use in Energy Chains[®]: 12.5 x cable diameter
- Temperature range (moving): -31°F to +158°F (-35°C to +70°C)
- Color: violet

Chainflex[®]-TPE Energy Chains[®] Ethernet special cable



Connector 01 L-angle curve lower



Connector 02 L-angle curve above



Connector 03 T-angle curve outer



Connector 04 T-angle curve inward



Connector 05 straight



Straight - 4 Pole

Part No.	Preassembled with connector combination		# of Pairs x AWG	Diameter		Bending Radius
				in.	(mm)	
CAT9040380	1	2	4 x 26	.31	(8.0)	12.5
CAT9040540	1	3	4 x 26	.31	(8.0)	12.5
CAT9040560	1	4	4 x 26	.31	(8.0)	12.5
CAT9040320	1	5	4 x 26	.31	(8.0)	12.5
CAT9040360	2	1	4 x 26	.31	(8.0)	12.5
CAT9040340	2	2	4 x 26	.31	(8.0)	12.5
CAT9040500	2	3	4 x 26	.31	(8.0)	12.5
CAT9040520	2	4	4 x 26	.31	(8.0)	12.5
CAT9040300	2	5	4 x 26	.31	(8.0)	12.5
CAT9040440	3	3	4 x 26	.31	(8.0)	12.5
CAT9040480	3	4	4 x 26	.31	(8.0)	12.5
CAT9040400	3	5	4 x 26	.31	(8.0)	12.5
CAT9040460	4	4	4 x 26	.31	(8.0)	12.5
CAT9040420	4	5	4 x 26	.31	(8.0)	12.5

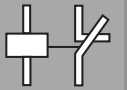
Note: The mentioned external diameters are maximum values

Cross-Over - 8 Pole

Part No.	Preassembled with connector combination		# of Pairs x AWG	Diameter		Bending Radius
				in.	(mm)	
CAT9040380	1	2	4 x 26	.31	(8.0)	12.5
CAT9040390	1	2	4 x 26	.31	(8.0)	12.5
CAT9040550	1	3	4 x 26	.31	(8.0)	12.5
CAT9040570	1	4	4 x 26	.31	(8.0)	12.5
CAT9040330	1	5	4 x 26	.31	(8.0)	12.5
CAT9040370	2	1	4 x 26	.31	(8.0)	12.5
CAT9040350	2	2	4 x 26	.31	(8.0)	12.5
CAT9040510	2	3	4 x 26	.31	(8.0)	12.5
CAT9040530	2	4	4 x 26	.31	(8.0)	12.5
CAT9040310	2	5	4 x 26	.31	(8.0)	12.5
CAT9040450	3	3	4 x 26	.31	(8.0)	12.5
CAT9040490	3	4	4 x 26	.31	(8.0)	12.5
CAT9040410	3	5	4 x 26	.31	(8.0)	12.5
CAT9040470	4	4	4 x 26	.31	(8.0)	12.5
CAT9040430	4	5	4 x 26	.31	(8.0)	12.5

Note: The mentioned external diameters are maximum values

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

Technical Information

- Oil-resistant
- UV-resistant
- Flame-retardant
- Shielded
- Abrasion and tear-resistant
- External jacket on the basis of TPE
- Minimum bending radius for use in Energy Chains®: 12.5 x cable diameter
- Temperature range (moving): -22°F to +176°F (-30°C to +80°C)
- Color: violet

Straight



Connector color may vary

Cable Type	igus® Part No.	# of Pairs x AWG	Bending Radius	Diameter	
				in.	(mm)
CAT5 - 8 Pole	RI9296-2M	4 x 26	12.5 x d	.30	(7.6)
CAT5 - 8 Pole	RI9296-10M	4 x 26	12.5 x d	.30	(7.6)
CAT5 - 8 Pole	RI9296-15M	4 x 26	12.5 x d	.30	(7.6)
CAT5 - 8 Pole	RI9296-25M	4 x 26	12.5 x d	.30	(7.6)
CAT5 - 8 Pole	RI9296-30M	4 x 26	12.5 x d	.30	(7.6)

Cross-Over



Connector color may vary

Cable Type	igus® Part No.	# of Pairs x AWG	Bending Radius	Diameter	
				in.	(mm)
CAT5 - 8 Pole	RI9296-N2M	4 x 26	12.5 x d	.30	(7.6)
CAT5 - 8 Pole	RI9296-N10M	4 x 26	12.5 x d	.30	(7.6)
CAT5 - 8 Pole	RI9296-N15M	4 x 26	12.5 x d	.30	(7.6)
CAT5 - 8 Pole	RI9296-N25M	4 x 26	12.5 x d	.30	(7.6)
CAT5 - 8 Pole	RI9296-N30M	4 x 26	12.5 x d	.30	(7.6)

Note: The mentioned external diameters are maximum values
Custom lengths available upon request (maximum 50 meters)



TPE Ethernet Special Cable

Chainflex® harnessed CAT6 cables



CAT6

Technical Information

- Oil-resistant
- UV-resistant
- Halogen-free
- Shielded
- External jacket TPE
- Minimum bending radius for use in Energy Chains®: 12.5 x cable diameter
- Temperature range (moving): -31°F to +158°F (-35°C to +70°C)
- Color: violet

Straight



Cable Type	igus® Part No.	# of Pairs x AWG	Bending Radius	Diameter	
				in.	(mm)
CAT6 - 8 Pole	CAT9040600	4 x 26	12.5 x d	.39	(10.0)



CAT6 - 8 Pole	CAT9040640	4 x 26	12.5 x d	.39	(10.0)
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CAT6 - 8 Pole	CAT9040680	4 x 26	12.5 x d	.39	(10.0)
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Cross-Over



CAT6 - 8 Pole	CAT9040620	4 x 26	12.5 x d	.39	(10.0)
---------------	------------	--------	----------	-----	--------



CAT6 - 8 Pole	CAT9040660	4 x 26	12.5 x d	.39	(10.0)
---------------	------------	--------	----------	-----	--------



CAT6 - 8 Pole	CAT9040700	4 x 26	12.5 x d	.39	(10.0)
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No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

Technical Information

- Oil-resistant
- UV-resistant
- Flame-retardant
- Shielded
- External jacket on the basis of PVC
- Minimum bending radius for use in Energy Chains®: 12.5 x cable diameter

Chainflex®-PVC Profibus special cable

	Connector 01	M12, 5-pole socket, straight
	Connector 02	M12, 5-pole pin, straight
	Connector 03	M12, 5-pole pin, angled
	Connector 04	M12, 5-pole socket, angled
	Connector 05	M12, 5-pole socket, angled
	Connector 06	M12, 5-pole pin, angled
	Connector 07*	D-SUB, 9-pole pin, straight
	Connector 08*	SUB-D, 9-pole pin, 90°, End plug
	Connector 09*	SUB-D, 9-pole pin, 45°, IP67
	Connector 10*	SUB-D, 9-pole pin, End plug, 45°
	Connector 11*	SUB-D, 9-pole socket/pin, pass, angled 45°
	Connector 12*	SUB-D, 9-pole socket/pin, pass, angled 90°
	Connector 13	open end of cable

* Plugs with IN and OUT connection always will be connected on the IN side if the cable is assembled.
More combinations on request.

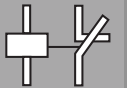


- Total Shield: bend resistant tinned braided copper shield
Coverage approx. 80% optical
- Color: violet
- Temperature range (moving):
-31°F to +158°F (-35°C to +70°C)

Chainflex®-PVC Profibus special cable

Part No.	Preassembled with connector combination		# of Pairs x AWG	Diameter		Bending Radius
				in.	(mm)	
BUS9041004	1	1	1 x 24	.31	(8.0)	12.5
BUS9041001	1	2	1 x 24	.31	(8.0)	12.5
BUS9041011	1	5	1 x 24	.31	(8.0)	12.5
BUS9041006	1	6	1 x 24	.31	(8.0)	12.5
BUS9041005	1	13	1 x 24	.31	(8.0)	12.5
BUS9041002	2	2	1 x 24	.31	(8.0)	12.5
BUS9041013	2	5	1 x 24	.31	(8.0)	12.5
BUS9041007	2	6	1 x 24	.31	(8.0)	12.5
BUS9041054	2	7	1 x 24	.31	(8.0)	12.5
BUS9041059	2	8	1 x 24	.31	(8.0)	12.5
BUS9041062	2	9	1 x 24	.31	(8.0)	12.5
BUS9041055	2	10	1 x 24	.31	(8.0)	12.5
BUS9041003	2	13	1 x 24	.31	(8.0)	12.5
BUS9041066	3	4	1 x 24	.31	(8.0)	12.5
BUS9041064	3	13	1 x 24	.31	(8.0)	12.5
BUS9041065	4	13	1 x 24	.31	(8.0)	12.5
BUS9041014	5	5	1 x 24	.31	(8.0)	12.5
BUS9041010	5	6	1 x 24	.31	(8.0)	12.5
BUS9041012	5	13	1 x 24	.31	(8.0)	12.5
BUS9041009	6	6	1 x 24	.31	(8.0)	12.5
BUS9041008	6	13	1 x 24	.31	(8.0)	12.5
BUS9041053	7	IN 2/OUT 1	1 x 24	.31	(8.0)	12.5
BUS9041056	7	13	1 x 24	.31	(8.0)	12.5
BUS9041061	8	IN 2/OUT 1	1 x 24	.31	(8.0)	12.5
BUS9041060	9	IN 2/OUT 1	1 x 24	.31	(8.0)	12.5
BUS9041063	9	13	1 x 24	.31	(8.0)	12.5
BUS9041052	10	IN 2/OUT 1	1 x 24	.31	(8.0)	12.5
BUS9041057	10	13	1 x 24	.31	(8.0)	12.5
BUS9041058	11	IN 13/OUT 13	1 x 24	.31	(8.0)	12.5
BUS9041051	12	IN 2/OUT 1	1 x 24	.31	(8.0)	12.5

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

Technical Information

- Oil-resistant
- UV-resistant
- Flame-retardant
- Shielded
- External jacket PVC
- Minimum bending radius for use in Energy Chains®: 12.5 x cable diameter

Chainflex®-PUR Profibus special cable

	Connector 01	M12, 5-pole socket, straight
	Connector 02	M12, 5-pole pin, straight
	Connector 03	M12, 5-pole pin, angled
	Connector 04	M12, 5-pole socket, angled
	Connector 05	M12, 5-pole socket, angled
	Connector 06	M12, 5-pole pin, angled
	Connector 07*	D-SUB, 9-pole pin, straight
	Connector 08*	SUB-D, 9-pole pin, 90°, End plug
	Connector 09*	SUB-D, 9-pole pin, 45°, IP67
	Connector 10*	SUB-D, 9-pole pin, End plug, 45°
	Connector 11*	SUB-D, 9-pole socket/pin, pass, angled 45°
	Connector 12*	SUB-D, 9-pole socket/pin, pass, angled 90°
	Connector 13	open end of cable

* Plugs with IN and OUT connection always will be connected on the IN side if the cable is assembled.
More combinations on request.

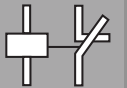


- Total Shield: bend resistant tinned braided copper shield
Coverage approx. 80% optical
- Color: violet
- Temperature range (moving):
-31°F to +158°F (-35°C to +70°C)

Chainflex®-PUR Profibus special cable

Part No.	Preassembled with connector combination		# of Pairs x AWG	Diameter		Bending Radius
				in.	(mm)	
BUS9041104	1	1	1 x 24	.31	(8.0)	12.5
BUS9041101	1	2	1 x 24	.31	(8.0)	12.5
BUS9041111	1	5	1 x 24	.31	(8.0)	12.5
BUS9041106	1	6	1 x 24	.31	(8.0)	12.5
BUS9041105	1	13	1 x 24	.31	(8.0)	12.5
BUS9041102	2	2	1 x 24	.31	(8.0)	12.5
BUS9041113	2	5	1 x 24	.31	(8.0)	12.5
BUS9041107	2	6	1 x 24	.31	(8.0)	12.5
BUS9041154	2	7	1 x 24	.31	(8.0)	12.5
BUS9041159	2	8	1 x 24	.31	(8.0)	12.5
BUS9041162	2	9	1 x 24	.31	(8.0)	12.5
BUS9041155	2	10	1 x 24	.31	(8.0)	12.5
BUS9041103	2	13	1 x 24	.31	(8.0)	12.5
BUS9041166	3	4	1 x 24	.31	(8.0)	12.5
BUS9041164	3	13	1 x 24	.31	(8.0)	12.5
BUS9041165	4	13	1 x 24	.31	(8.0)	12.5
BUS9041114	5	5	1 x 24	.31	(8.0)	12.5
BUS9041110	5	6	1 x 24	.31	(8.0)	12.5
BUS9041112	5	13	1 x 24	.31	(8.0)	12.5
BUS9041109	6	6	1 x 24	.31	(8.0)	12.5
BUS9041108	6	13	1 x 24	.31	(8.0)	12.5
BUS9041153	7	IN 2/OUT 1	1 x 24	.31	(8.0)	12.5
BUS9041156	7	13	1 x 24	.31	(8.0)	12.5
BUS9041161	8	IN 2/OUT 1	1 x 24	.31	(8.0)	12.5
BUS9041160	9	IN 2/OUT 1	1 x 24	.31	(8.0)	12.5
BUS9041163	9	13	1 x 24	.31	(8.0)	12.5
BUS9041152	10	IN 2/OUT 1	1 x 24	.31	(8.0)	12.5
BUS9041157	10	13	1 x 24	.31	(8.0)	12.5
BUS9041158	11	IN 13/OUT 13	1 x 24	.31	(8.0)	12.5
BUS9041151	12	IN 2/OUT 1	1 x 24	.31	(8.0)	12.5

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

Technical Information

- Oil-resistant
- UV-resistant
- Flame-retardant
- Shielded
- External jacket on the basis of PVC
- Minimum bending radius for use in Energy Chains®: 12.5 x cable diameter

Chainflex®-TPE Profibus special cable

	Connector 01	M12, 5-pole socket, straight
	Connector 02	M12, 5-pole pin, straight
	Connector 03	M12, 5-pole pin, angled
	Connector 04	M12, 5-pole socket, angled
	Connector 05	M12, 5-pole socket, angled
	Connector 06	M12, 5-pole pin, angled
	Connector 07*	D-SUB, 9-pole pin, straight
	Connector 08*	SUB-D, 9-pole pin, 90°, End plug
	Connector 09*	SUB-D, 9-pole pin, 45°, IP67
	Connector 10*	SUB-D, 9-pole pin, End plug, 45°
	Connector 11*	SUB-D, 9-pole socket/pin, pass, angled 45°
	Connector 12*	SUB-D, 9-pole socket/pin, pass, angled 90°
	Connector 13	open end of cable

* Plugs with IN and OUT connection always will be connected on the IN side if the cable is assembled.
More combinations on request.

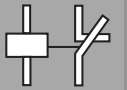


- Total Shield: bend resistant tinned braided copper shield
Coverage approx. 90% optical
- Color: violet
- Temperature range (moving):
-31°F to +158°F (-35°C to +70°C)

Chainflex®-TPE Profibus special cable

Part No.	Preassembled with connector combination		# of Pairs x AWG	Diameter		Bending Radius
				in.	(mm)	
BUS9041204	1	1	1 x 24	.31	(8.0)	12.5
BUS9041201	1	2	1 x 24	.31	(8.0)	12.5
BUS9041211	1	5	1 x 24	.31	(8.0)	12.5
BUS9041206	1	6	1 x 24	.31	(8.0)	12.5
BUS9041205	1	13	1 x 24	.31	(8.0)	12.5
BUS9041202	2	2	1 x 24	.31	(8.0)	12.5
BUS9041213	2	5	1 x 24	.31	(8.0)	12.5
BUS9041207	2	6	1 x 24	.31	(8.0)	12.5
BUS9041254	2	7	1 x 24	.31	(8.0)	12.5
BUS9041259	2	8	1 x 24	.31	(8.0)	12.5
BUS9041262	2	9	1 x 24	.31	(8.0)	12.5
BUS9041255	2	10	1 x 24	.31	(8.0)	12.5
BUS9041203	2	13	1 x 24	.31	(8.0)	12.5
BUS9041266	3	4	1 x 24	.31	(8.0)	12.5
BUS9041264	3	13	1 x 24	.31	(8.0)	12.5
BUS9041265	4	13	1 x 24	.31	(8.0)	12.5
BUS9041214	5	5	1 x 24	.31	(8.0)	12.5
BUS9041210	5	6	1 x 24	.31	(8.0)	12.5
BUS9041212	5	13	1 x 24	.31	(8.0)	12.5
BUS9041209	6	6	1 x 24	.31	(8.0)	12.5
BUS9041208	6	13	1 x 24	.31	(8.0)	12.5
BUS9041253	7	IN 2/OUT 1	1 x 24	.31	(8.0)	12.5
BUS9041256	7	13	1 x 24	.31	(8.0)	12.5
BUS9041261	8	IN 2/OUT 1	1 x 24	.31	(8.0)	12.5
BUS9041260	9	IN 2/OUT 1	1 x 24	.31	(8.0)	12.5
BUS9041263	9	13	1 x 24	.31	(8.0)	12.5
BUS9041252	10	IN 2/OUT 1	1 x 24	.31	(8.0)	12.5
BUS9041257	10	13	1 x 24	.31	(8.0)	12.5
BUS9041258	11	IN 13/OUT 13	1 x 24	.31	(8.0)	12.5
BUS9041251	12	IN 2/OUT 1	1 x 24	.31	(8.0)	12.5

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 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

CF-INI

Industrial Automation Cordsets



Cable Selection

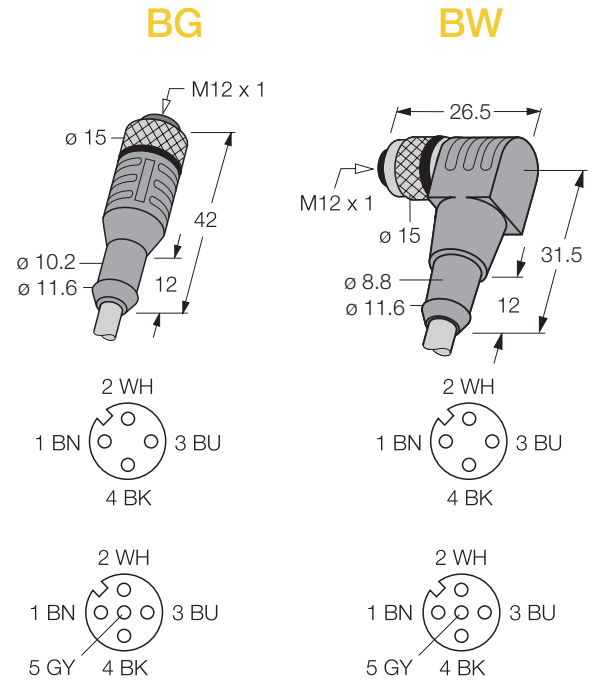
Chainflex® cable	Jacket	Cable type	Approvals and standards
CF9 - CF-INI (minimum bending radius 5 x d)			
	TPE	Direct line M12 x 1, straight/angled	CE
	TPE	Direct line M12 x 1, straight/angled, LED	CE
	TPE	Connecting cable M12 x 1, straight/angled	CE
	TPE	Direct line M8 x 1, straight/angled	CE
	TPE	Direct line M8 x 1, angled, LED	CE
	TPE	Connecting cable M8 x 1, straight/angled	CE
CF10 – CF-INI (minimum bending radius 5 x d) 360° shielded			
	TPE	Direct line M12 x 1, straight/angled	CE
	TPE	Connecting cable M12 x 1, straight/angled	CE
CF98 - CF-INI (minimum bending radius 4 x d)			
	TPE	Direct line M12 x 1, straight/angled	CE
	TPE	Connecting cable M12 x 1, straight/angled	CE
	TPE	Direct line M8 x 1, straight/angled	CE
	TPE	Connecting cable M8 x 1, straight/angled	CE

CF-INI

Chainflex® sensor/actuator cables with 5xd for Energy Chains®

Direct Line M12 x 1, Single end cordset

Plug-type connector	Coupling, M12 x 1
Handle base	Plastic, PP, black
Union nut/screw	Metal, CuZn, nickel-plated
Contact base	Plastic, PP, black
Contacts	Metal, CuZn, gold-plated
Seal	Plastic, FPM (Viton)
Number of poles	4-pole
Ampacity	4 A
Rated voltage of a winding	max. 250 V
Number of poles	5-pole (4-pole + PE)
Ampacity	4 A
Rated voltage of a winding	max. 60 V
Insulation resistance	≥ 10 ⁹ Ω
Contact resistance	≥ 5 m Ω
Ambient temperature of plug-type connector	-40°F to +221°F (-40°C to +105 °C)
Protection class	IP69K, in screwed state
Mechanical service life	max. 100 insertion cycles



CF9-03-04-INI* (4 x 0.34) Type	Part No.	Number Poles	Cable length	
			ft.	(m)
CF-INI-P4-M12-BG-3	MAT9043700	4	9.84	(3.0)
CF-INI-P4-M12-BG-5	MAT9043701	4	16.41	(5.0)
CF-INI-P4-M12-BG-7	MAT9043702	4	22.97	(7.0)
CF-INI-P4-M12-BG-10	MAT9043703	4	32.81	(10.0)
CF-INI-P4-M12-BG-15	MAT9049426	4	49.22	(15.0)
CF9-03-05-INI* (5 x 0.34)				
CF-INI-P5-M12-BG-3	MAT9043737	5	9.84	(3.0)
CF-INI-P5-M12-BG-5	MAT9043738	5	16.41	(5.0)
CF-INI-P5-M12-BG-7	MAT9043739	5	22.97	(7.0)
CF-INI-P5-M12-BG-10	MAT9043740	5	32.81	(10.0)
CF-INI-P5-M12-BG-15	MAT90410077	5	49.22	(15.0)



CF9-03-04-INI* (4 x 0.34) Type	Part No.	Number Poles	Cable length	
			ft.	(m)
CF-INI-P4-M12-BW-3	MAT9043704	4	9.84	(3.0)
CF-INI-P4-M12-BW-5	MAT9043705	4	16.41	(5.0)
CF-INI-P4-M12-BW-7	MAT9043706	4	22.97	(7.0)
CF-INI-P4-M12-BW-10	MAT9043707	4	32.81	(10.0)
CF-INI-P4-M12-BW-15	MAT9049430	4	49.22	(15.0)
CF9-03-05-INI* (5 x 0.34)				
CF-INI-P5-M12-BW-3	MAT9043742	5	9.84	(3.0)
CF-INI-P5-M12-BW-5	MAT9043743	5	16.41	(5.0)
CF-INI-P5-M12-BW-7	MAT9043744	5	22.97	(7.0)
CF-INI-P5-M12-BW-10	MAT9043745	5	32.81	(10.0)
CF-INI-P5-M12-BW-15	MAT90410078	5	49.22	(15.0)



*Refer to the CF9 page in the Control Cable section for more cable information

CF-INI



CF-INI
CF9

Chainflex® sensor/actuator cables with 5xd for Energy Chains®

Direct Line M12 x 1, Single end cordset, LED

Plug-type connector Coupling, M12 x 1
 Handle base Plastic, TPU, transparent
 Union nut/screw Metal, CuZn, nickel-plated
 Contact base Plastic, PA6GF, transparent
 Contacts Metal, CuZn, gold-plated
 Seal Plastic, FPM (Viton)

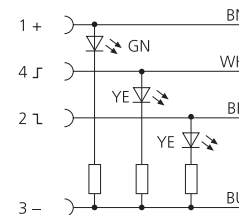
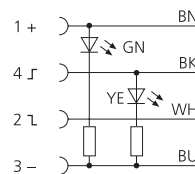
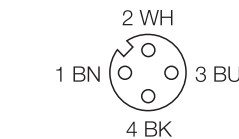
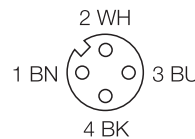
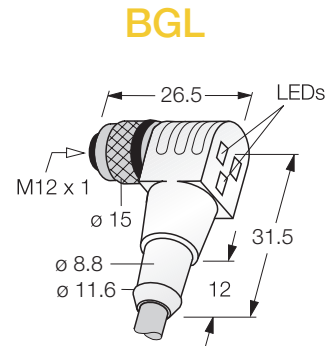
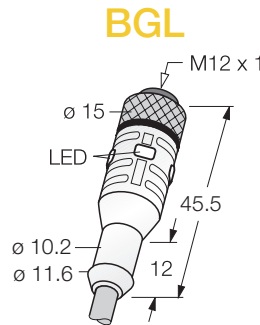
Number of poles 4-pole
 Ampacity 4 A
 Rated voltage of a winding 10...30 V

Insulation resistance $\geq 10^9 \Omega$
 Contact resistance $\geq 5 \text{ m}\Omega$

Operating voltage display LED green
 Switching state display LED yellow/yellow
 Switching function pnp

Ambient temperature of plug-type connector -40°F to +221°F
 (-40°C to +105 °C)

Protection class IP66, in screwed state
 Mechanical service life max. 100 insertion cycles



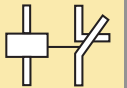
CF9-03-04-INI* (4 x 0.34) Type	Part No.	Number Poles	Cable length	
			ft.	(m)
CF-INI-P4-M12-BGL2-3	MAT9043708	4	9.84	(3.0)
CF-INI-P4-M12-BGL2-5	MAT9043709	4	16.41	(5.0)
CF-INI-P4-M12-BGL2-7	MAT9043710	4	22.97	(7.0)
CF-INI-P4-M12-BGL2-10	MAT9043711	4	32.81	(10.0)
CF-INI-P4-M12-BGL2-15	MAT90410087	4	49.22	(15.0)



CF9-03-04-INI* (4 x 0.34) Type	Part No.	Number Poles	Cable length	
			ft.	(m)
CF-INI-P4-M12-BWL3-3	MAT9043712	4	9.84	(3.0)
CF-INI-P4-M12-BWL3-5	MAT9043713	4	16.41	(5.0)
CF-INI-P4-M12-BWL3-7	MAT9043714	4	22.97	(7.0)
CF-INI-P4-M12-BWL3-10	MAT9043715	4	32.81	(10.0)
CF-INI-P4-M12-BWL3-15	MAT90410088	4	49.22	(15.0)

*Refer to the CF9 page in the Control Cable section for more cable information

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No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

CF-INI

Chainflex® sensor/actuator cables with 5xd for Energy Chains®

Connection cable M12 x 1, connector on each end

Plug-type connector
Handle base
Union nut/screw
Contact base
Contacts
Seal

Coupling, M12 x 1
Plastic, PP, black
Metal, CuZn, nickel-plated
Plastic, PP, black
Metal, CuZn, gold-plated
Plastic, FPM (Viton)

Plug-type connector
Handle base
Union nut/screw
Contact base
Contacts

Connector, M12 x 1
Plastic, PP, black
Metal, CuZn, nickel-plated
Plastic, TPU, black
Metal, CuZn, gold-plated

Rated voltage of a winding

4-pole: max. 250 V
5-pole (4-pole+PE): max. 60 V

Ampacity

4 A

Insulation resistance

≥ 10⁹ Ω

Contact resistance

≥ 5 m Ω

Ambient temperature of plug-type connector

-40°F to +221°F
(-40°C to +105 °C)

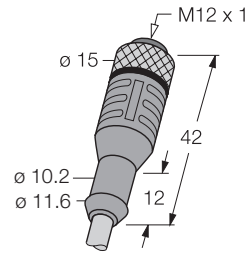
Protection class

IP69K, in screwed state

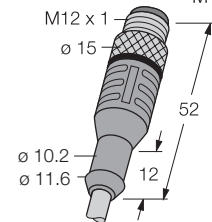
Mechanical service life

max. 100 insertion cycles

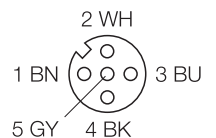
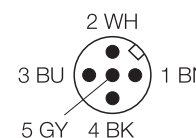
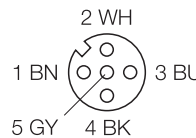
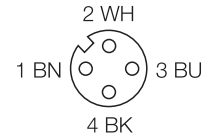
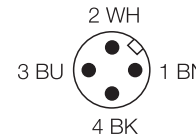
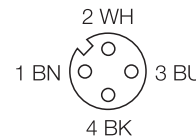
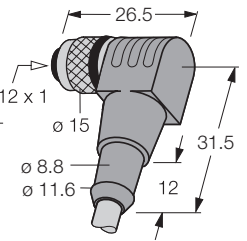
BG



SG



BW



CF9-03-04-INI* (4 x 0.34)	Part No.	Number Poles	Cable length	
			ft.	(m)
CF-INI-P4-M12-BG / M12-SG-2	MAT90410312	4	6.56	(2.0)
CF-INI-P4-M12-BG / M12-SG-5	MAT90410313	4	16.41	(5.0)
CF-INI-P4-M12-BG / M12-SG-10	MAT90410314	4	32.81	(10.0)
CF9-03-05-INI* (5 x 0.34)				
CF-INI-P5-M12-BG / M12-SG-2	MAT90410339	5	6.56	(2.0)
CF-INI-P5-M12-BG / M12-SG-5	MAT90410340	5	16.41	(5.0)
CF-INI-P5-M12-BG / M12-SG-10	MAT90410341	5	32.81	(10.0)
CF9-03-04-INI* (4 x 0.34)				
CF-INI-P4-M12-BW / M12-SG-2	MAT90410315	4	6.56	(2.0)
CF-INI-P4-M12-BW / M12-SG-5	MAT90410316	4	16.41	(5.0)
CF-INI-P4-M12-BW / M12-SG-10	MAT90410317	4	32.81	(10.0)
CF9-03-05-INI* (5 x 0.34)				
CF-INI-P5-M12-BW / M12-SG-2	MAT90410342	5	6.56	(2.0)
CF-INI-P5-M12-BW / M12-SG-5	MAT90410343	5	16.41	(5.0)
CF-INI-P5-M12-BW / M12-SG-10	MAT90410344	5	32.81	(10.0)

*Refer to the CF9 page in the Control Cable section for more cable information



Chainflex® sensor/actuator cables with 5xd for Energy Chains®

Direct Line M8 x 1, single end cordset

Plug-type connector	Coupling, M8 x 1
Handle base	Plastic, PP, black
Union nut/screw	Metal, CuZn, nickel-plated
Contact base	Plastic, PP, black
Contacts	Metal, CuZn, gold-plated
Seal	Plastic, FPM (Viton)

Number of poles	3-pole
Ampacity	4 A
Rated voltage of a winding	max. 60 V

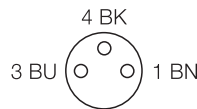
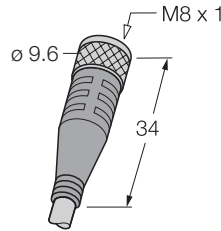
Number of poles	4-pole
Ampacity	4 A
Rated voltage of a winding	max. 30 V

Insulation resistance	≥ 10 ⁹ Ω
Contact resistance	≥ 5 m Ω

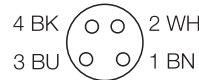
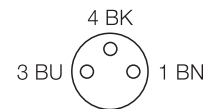
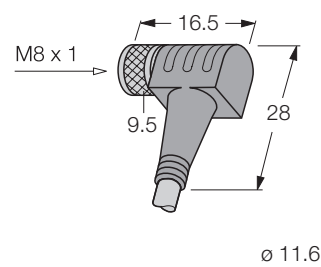
Ambient temperature of plug-type connector	-40°F to +221°F (-40 °C to +105 °C)
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Protection class	IP69K, in screwed state
Mechanical service life	max. 100 insertion cycles

BG



BW

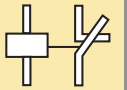


Type	Part No.	Number Poles	Cable length	
			ft.	(m)
CF9-02-03-INI* (3 x 0.25)				
CF-INI-P3-M8-BG-3	MAT9043716	3	9.84	(3.0)
CF-INI-P3-M8-BG-5	MAT9043717	3	16.41	(5.0)
CF-INI-P3-M8-BG-7	MAT9043718	3	22.97	(7.0)
CF-INI-P3-M8-BG-10	MAT9043719	3	32.81	(10.0)
CF-INI-P3-M8-BG-15	MAT9049416	3	49.22	(15.0)
CF9-03-04-INI* (4 x 0.34)				
CF-INI-P4-M8-BG-3	MAT9043728	4	9.84	(3.0)
CF-INI-P4-M8-BG-5	MAT9043729	4	16.41	(5.0)
CF-INI-P4-M8-BG-7	MAT9043730	4	22.97	(7.0)
CF-INI-P4-M8-BG-10	MAT9043731	4	32.81	(10.0)
CF-INI-P4-M8-BG-15	MAT9049466	4	49.22	(15.0)
CF9-02-03-INI* (3 x 0.25)				
CF-INI-P3-M8-BW-3	MAT9043724	3	9.84	(3.0)
CF-INI-P3-M8-BW-5	MAT9043725	3	16.41	(5.0)
CF-INI-P3-M8-BW-7	MAT9043726	3	22.97	(7.0)
CF-INI-P3-M8-BW-10	MAT9043727	3	32.81	(10.0)
CF-INI-P3-M8-BW-15	MAT9049419	3	49.22	(15.0)
CF9-03-04-INI* (4 x 0.34)				
CF-INI-P4-M8-BW-3	MAT9043732	4	9.84	(3.0)
CF-INI-P4-M8-BW-5	MAT9043733	4	16.41	(5.0)
CF-INI-P4-M8-BW-7	MAT9043734	4	22.97	(7.0)
CF-INI-P4-M8-BW-10	MAT9043735	4	32.81	(10.0)
CF-INI-P4-M8-BW-15	MAT9049467	4	49.22	(15.0)

*Refer to the CF9 page in the Control Cable section for more cable information

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec/RFQ: <http://www.igus.com/quickspec>

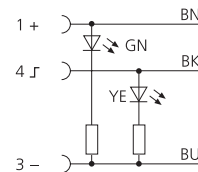
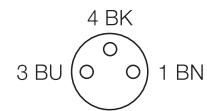
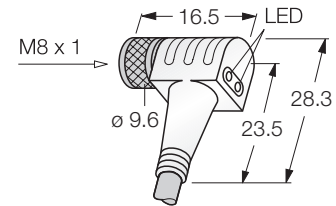


Chainflex® sensor/actuator cables with 5xd for Energy Chains®

Direct line M8 x 1, single end cordset, LED

Plug-type connector	Coupling, M8 x 1
Handle base	Plastic, TPU, transparent
Union nut/screw	Metal, CuZn, nickel-plated
Contact base	Plastic, PA6GF, black
Contacts	Metal, CuZn, gold-plated
Seal	Plastic, FPM (Viton)
Number of poles	3-pole
Ampacity	4 A
Rated voltage of a winding	10...30 V
Insulation resistance	≥ 10 ⁹ Ω
Contact resistance	≥ 5 m Ω
Operating voltage display	LED green
Switching state display	LED yellow
Switching function	pnp
Ambient temperature of plug-type connector	-40°F to +221°F (-40°C to +105 °C)
Protection class	IP66K, in screwed state
Mechanical service life	max. 100 insertion cycles

BWL



CF9-02-03-INI* (3 x 0.25)	Part No.	Number Poles	Cable length	
Type			ft.	(m)
CF-INI-P3-M8-BWL2-3	MAT9043720	3	9.84	(3.0)
CF-INI-P3-M8-BWL2-5	MAT9043721	3	16.41	(5.0)
CF-INI-P3-M8-BWL2-7	MAT9043722	3	22.97	(7.0)
CF-INI-P3-M8-BWL2-10	MAT9043723	3	32.81	(10.0)
CF-INI-P3-M8-BWL2-15	MAT90410196	3	49.22	(15.0)

*Refer to the CF9 page in the Control Cable section for more cable information



Chainflex® sensor/actuator cables with 5xd for Energy Chains®

Connection cable M8 x 1, connector on each end

Plug-type connector
Handle base
Union nut/screw
Contact base
Contacts
Seal

Coupling, M8 x 1
Plastic, PP, black
Metal, CuZn, nickel-plated
Plastic, PP, black
Metal, CuZn, gold-plated
Plastic, FPM (Viton)

Plug-type connector
Handle base
Union nut/screw
Contact base
Contacts

Connector, M8 x 1
Plastic, PP, black
Metal, CuZn, nickel-plated
Plastic, PP, black
Metal, CuZn, gold-plated

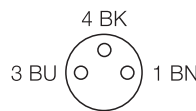
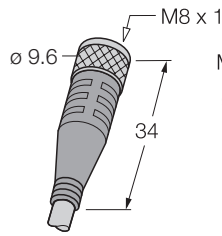
Rated voltage of a winding
3-pole: max. 60 V
4-pole: max. 30 V

Ampacity
4 A
Insulation resistance
≥ 10⁹ Ω
Contact resistance
≥ 5 m Ω

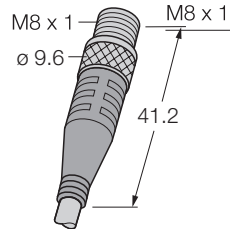
Ambient temperature of plug-type connector
-40°F to +221°F
(-40°C to +105 °C)

Protection class
IP69K, in screwed state
Mechanical service life
max. 100 insertion cycles

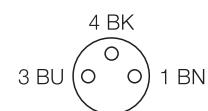
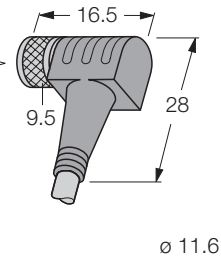
BG



SG



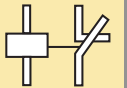
BW



Type	Part No.	Number Poles	Cable length	
			ft.	(m)
CF9-02-03-INI* (3 x 0.25)				
CF-INI-P3-M8-BG / M8-SG-2	MAT90410324	3	6.56	(2.0)
CF-INI-P3-M8-BG / M8-SG-5	MAT90410325	3	49.22	(15.0)
CF-INI-P3-M8-BG / M8-SG-10	MAT90410326	3	32.81	(10.0)
CF9-03-04-INI* (4 x 0.34)				
CF-INI-P4-M8-BG / M8-SG-2	MAT90410333	4	6.56	(2.0)
CF-INI-P4-M8-BG / M8-SG-5	MAT90410334	4	49.22	(15.0)
CF-INI-P4-M8-BG / M8-SG-10	MAT90410335	4	32.81	(10.0)
CF9-02-03-INI* (3 x 0.25)				
CF-INI-P3-M8-BW / M8-SG-2	MAT90410330	3	6.56	(2.0)
CF-INI-P3-M8-BW / M8-SG-5	MAT90410331	3	49.22	(15.0)
CF-INI-P3-M8-BW / M8-SG-10	MAT90410332	3	32.81	(10.0)
CF9-03-04-INI* (4 x 0.34)				
CF-INI-P4-M8-BW / M8-SG-2	MAT90410336	4	6.56	(2.0)
CF-INI-P4-M8-BW / M8-SG-5	MAT90410337	4	49.22	(15.0)
CF-INI-P4-M8-BW / M8-SG-10	MAT90410338	4	32.81	(10.0)

*Refer to the CF9 page in the Control Cable section for more cable information

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec/RFQ: <http://www.igus.com/quickspec>

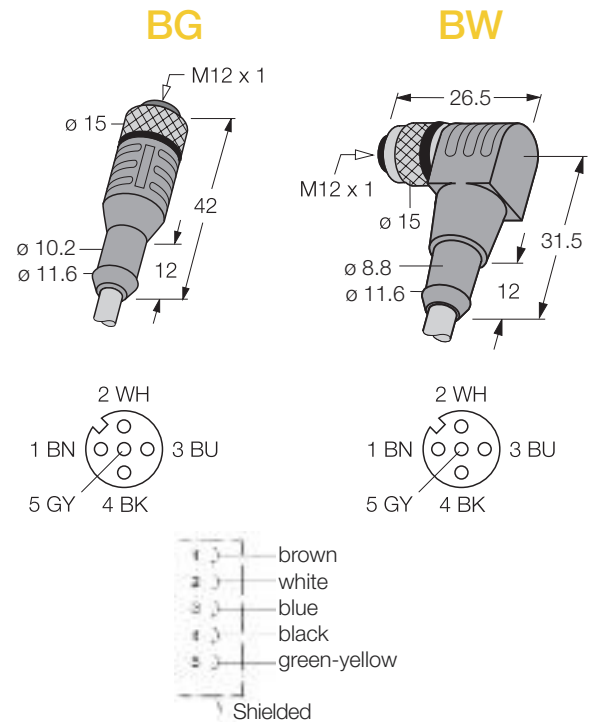


CF-INI

Chainflex® sensor/actuator cables with 5xd for Energy Chains®

Direct line 360° shielded, M12 x 1, single end cordset

Plug-type connector	Coupling, M12 x 1
Handle base	Plastic, PP, black
Union nut/screw	Metal, CuZn, nickel-plated
Contact base	Plastic, PP, black
Contacts	Metal, CuZn, gold-plated
Seal	Plastic, FPM (Viton)
Number of poles	5-pole (4-pole + PE)
Ampacity	4 A
Rated voltage of a winding	max. 60 V
Insulation resistance	≥ 10 ⁹ Ω
Contact resistance	≥ 5 m Ω
Degree of soiling	3/2
Ambient temperature of plug-type connector	-40°F to +221°F (-40°C to +105 °C)
Protection class	IP69K, in screwed state
Mechanical service life	max. 100 insertion cycles



CF10-03-05-INI* (5 x 0.34)C Type	Part No.	Number Poles	Cable length	
			ft.	(m)
CF10-INI-P5-C-M12-BG-3	MAT90424072	5	9.84	3.0
CF10-INI-P5-C-M12-BG-5	MAT90424073	5	16.41	5.0
CF10-INI-P5-C-M12-BG-7	MAT90424074	5	22.97	7.0
CF10-INI-P5-C-M12-BG-10	MAT90424075	5	32.81	10.0
CF10-INI-P5-C-M12-BG-15	MAT90424076	5	49.22	15.0



CF10-03-05-INI* (5 x 0.34)C Type	Part No.	Number Poles	Cable length	
			ft.	(m)
CF10-INI-P5-C-M12-BW-3	MAT90424077	5	9.84	3.0
CF10-INI-P5-C-M12-BW-5	MAT90424078	5	16.41	5.0
CF10-INI-P5-C-M12-BW-7	MAT90424079	5	22.97	7.0
CF10-INI-P5-C-M12-BW-10	MAT90424080	5	32.81	10.0
CF10-INI-P5-C-M12-BW-15	MAT90424081	5	49.22	15.0

*Refer to the CF10 page in the Control Cable section for more cable information



CF-INI

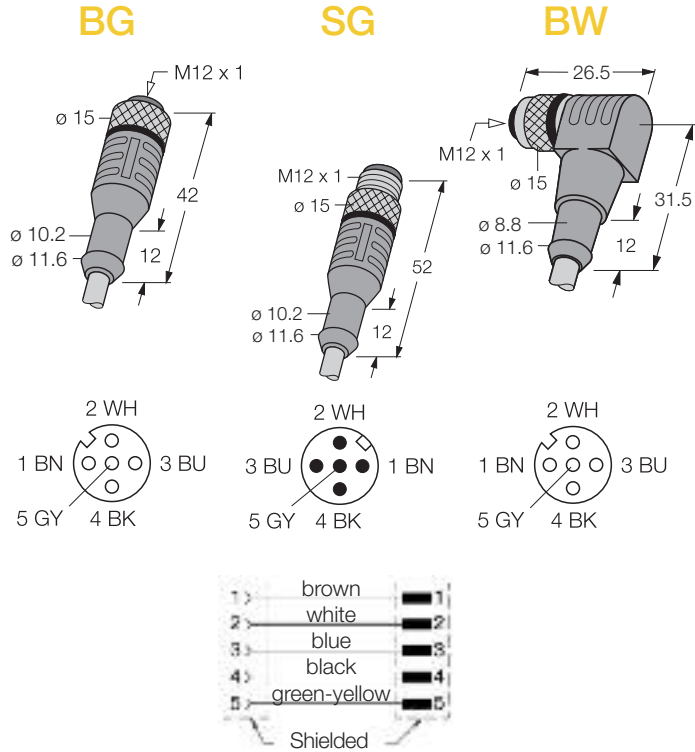


CF-INI
CF10

Chainflex® sensor/actuator cables with 5xd for Energy Chains®

Connection cable 360° shielded, M12 x 1, connector on each end

Plug-type connector	Coupling, M12 x 1
Handle base	Plastic, PP, black
Union nut/screw	Metal, CuZn, nickel-plated
Contact base	Plastic, PP, black
Contacts	Metal, CuZn, gold-plated
Seal	Plastic, FPM (Viton)
Number of poles	5-pole (4-pole + PE)
Ampacity	4 A
Rated voltage of a winding	max. 60 V
Insulation resistance	≥ 10 ⁹ Ω
Contact resistance	≥ 5 m Ω
Degree of soiling	3/2
Ambient temperature of plug-type connector	-40°F to +221°F (-40°C to +105 °C)
Protection class	IP69K, in screwed state
Mechanical service life	max. 100 insertion cycles



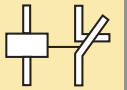
Type	Part No.	Number Poles	Cable length	
			ft.	(m)
CF10-03-05-INI* (5 x 0.34)C				
CF10-INI-P5-C-M12-BG/M12-SG-2	MAT90424082	5	6.56	2.0
CF10-INI-P5-C-M12-BG/M12-SG-5	MAT90424083	5	16.41	5.0
CF10-INI-P5-C-M12-BG/M12-SG-10	MAT90424084	5	32.81	10.0



Type	Part No.	Number Poles	Cable length	
			ft.	(m)
CF10-03-05-INI* (5 x 0.34)C				
CF10-INI-P5-C-M12-BW/M12-SG-2	MAT90424085	5	6.56	2.0
CF10-INI-P5-C-M12-BW/M12-SG-5	MAT90424086	5	16.41	5.0
CF10-INI-P5-C-M12-BW/M12-SG-10	MAT90424087	5	32.81	10.0

*Refer to the CF10 page in the Control Cable section for more cable information

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



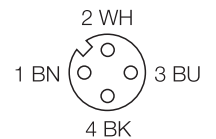
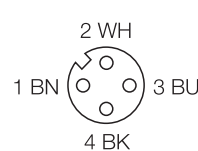
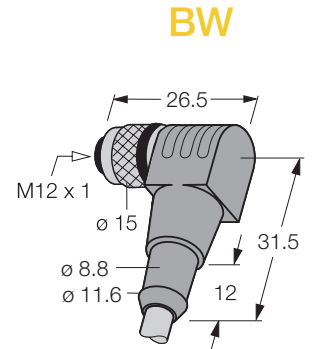
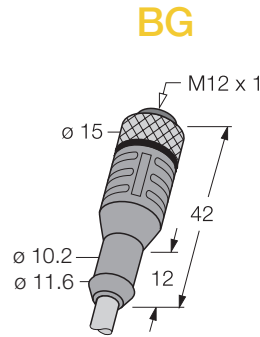
No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

CF-INI

Chainflex® sensor/actuator cables with 5xd for Energy Chains®

Direct line M12 x 1, single end cordset

Plug-type connector	Coupling, M12 x 1
Handle base	Plastic, PP, black
Union nut/screw	Metal, CuZn, nickel-plated
Contact base	Plastic, PP, black
Contacts	Metal, CuZn, gold-plated
Seal	Plastic, FPM (Viton)
Number of poles	4-pole
Ampacity	4 A
Rated voltage of a winding	max. 250 V
Insulation resistance	≥ 10 ⁹ Ohm
Contact resistance	≥ 5 m Ohm
Ambient temperature of plug-type connector	-40°F to +221°F (-40 °C to +105 °C)
Protection class	IP69K, in screwed state
Mechanical service life	max. 100 insertion cycles



CF98-03-04-INI* (4 x 0.34) Type	Part No.	Number Poles	Cable length	
			ft.	(m)
CF98-INI-P4-M12-BG-3	MAT90410235	4	9.84	(3.0)
CF98-INI-P4-M12-BG-5	MAT90410236	4	16.41	(5.0)
CF98-INI-P4-M12-BG-7	MAT90410237	4	22.97	(7.0)
CF98-INI-P4-M12-BG-10	MAT90410238	4	32.81	(10.0)
CF98-INI-P4-M12-BG-15	MAT90410239	4	49.22	(15.0)



CF98-03-04-INI* (4 x 0.34) Type	Part No.	Number Poles	Cable length	
			ft.	(m)
CF98-INI-P4-M12-BW-3	MAT90410240	4	9.84	(3.0)
CF98-INI-P4-M12-BW-5	MAT90410241	4	16.41	(5.0)
CF98-INI-P4-M12-BW-7	MAT90410242	4	22.97	(7.0)
CF98-INI-P4-M12-BW-10	MAT90410243	4	32.81	(10.0)
CF98-INI-P4-M12-BW-15	MAT90410244	4	49.22	(15.0)

*Refer to the CF98 page in the Control Cable section for more cable information



Clean-Room

CF-INI

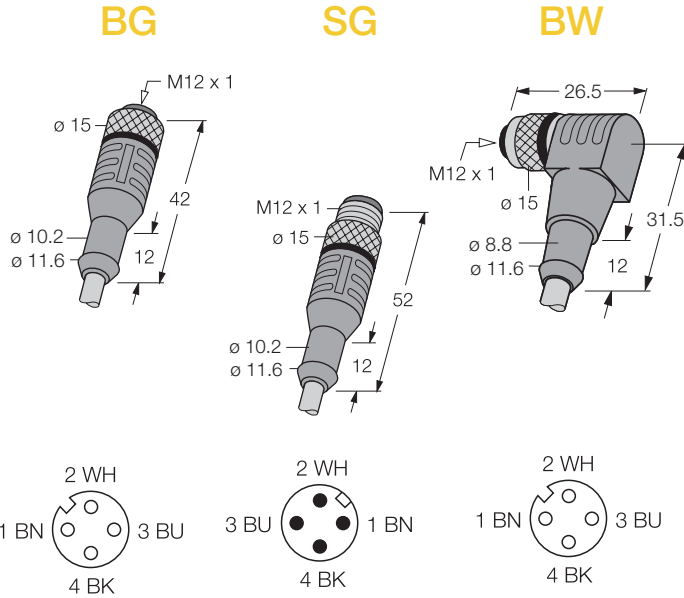


CF-INI
CF98

Chainflex® sensor/actuator cables with 5xd for Energy Chains®

Connection cable M12 x 1, connector on each end

Plug-type connector	Coupling, M12 x 1
Handle base	Plastic, PP, black
Union nut/screw	Metal, CuZn, nickel-plated
Contact base	Plastic, TPU, black
Contacts	Metal, CuZn, gold-plated
Seal	Plastic, FPM (Viton)
Plug-type connector	Connector, M12x1
Handle base	Plastic, PP, black
Union nut/screw	Metal, CuZn, nickel-plated
Contact base	Plastic, TPU, black
Contacts	Metal, CuZn, gold-plated
Rated voltage of a winding	4-pole: max. 250V
Ampacity	4A
Insulation resistance	≥ 10 ⁹ Ohm
Contact resistance	≥ 5m Ohm
Ambient temperature of plug-type connector	-40°F to +221°F (-40°C to +105 °C)
Protection class	IP69K, in screwed state
Mechanical service life	max. 100 Steckzyklen



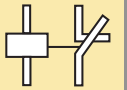
CF98-03-04-INI* (4 x 0.34) Type	Part No.	Number Poles	Cable length	
			ft.	(m)
CF98.INI-P4-M12-BG / M12-SG-2	MAT90410300	4	6.56	(2.0)
CF98.INI-P4-M12-BG / M12-SG-5	MAT90410301	4	16.41	(5.0)
CF98.INI-P4-M12-BG / M12-SG-10	MAT90410302	4	32.81	(10.0)



CF98-03-04-INI* (4 x 0.34) Type	Part No.	Number Poles	Cable length	
			ft.	(m)
CF98.INI-P4-M12-BW / M12-SG-2	MAT90410303	4	6.56	(2.0)
CF98.INI-P4-M12-BW / M12-SG-5	MAT90410304	4	16.41	(5.0)
CF98.INI-P4-M12-BW / M12-SG-10	MAT90410305	4	32.81	(10.0)

*Refer to the CF98 page in the Control Cable section for more cable information

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No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

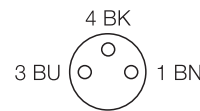
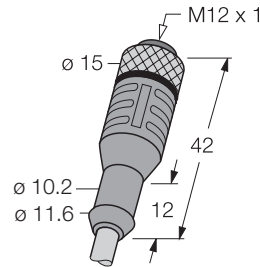
CF-INI

Chainflex® sensor/actuator cables with 5xd for Energy Chains®

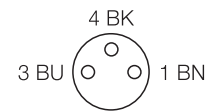
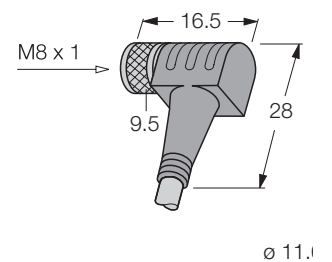
Direct line M8 x 1, single end cordset

Plug-type connector	Coupling, M8 x 1
Handle base	Plastic, PP, black
Union nut/screw	Metal, CuZn, nickel-plated
Contact base	Plastic, PP, black
Contacts	Metal, CuZn, gold-plated
Seal	Plastic, FPM (Viton)
Number of poles	3-pole
Ampacity	4 A
Rated voltage of a winding	max. 60 V
Insulation resistance	≥ 10 ⁹ Ohm
Contact resistance	≥ 5 m Ohm
Ambient temperature of plug-type connector	-40°F to +221°F (-40°C to +105 °C)
Protection class	IP69K, in screwed state
Mechanical service life	max. 100 insertion cycles

BG



BW



CF98-02-03-INI* (3 x 0.25) Type	Part No.	Number Poles	Cable length	
			ft.	(m)
CF98-INI-P3-M8-BG-3	MAT90410245	3	9.84	(3.0)
CF98-INI-P3-M8-BG-5	MAT90410246	3	16.41	(5.0)
CF98-INI-P3-M8-BG-7	MAT90410247	3	22.97	(7.0)
CF98-INI-P3-M8-BG-10	MAT90410248	3	32.81	(10.0)
CF98-INI-P3-M8-BG-15	MAT90410249	3	49.22	(15.0)

*Refer to the CF98 page in the Control Cable section for more cable information



CF98-02-03-INI* (3 x 0.25) Type	Part No.	Number Poles	Cable length	
			ft.	(m)
CF98-INI-P3-M8-BW-3	MAT90410250	3	9.84	(3.0)
CF98-INI-P3-M8-BW-5	MAT90410251	3	16.41	(5.0)
CF98-INI-P3-M8-BW-7	MAT90410252	3	22.97	(7.0)
CF98-INI-P3-M8-BW-10	MAT90410253	3	32.81	(10.0)
CF98-INI-P3-M8-BW-15	MAT90410254	3	49.22	(15.0)



CF-INI



CF-INI
CF98

Chainflex® sensor/actuator cables with 5xd for Energy Chains®

Connection cable M8 x 1, connector on each end

Plug-type connector
Handle base
Union nut/screw
Contact base
Contacts
Seal

Coupling, M8 x 1
Plastic, PP, black
Metal, CuZn, nickel-plated
Plastic, TPU, black
Metal, CuZn, gold-plated
Plastic, FPM (Viton)

Plug-type connector
Handle base
Union nut/screw
Contact base
Contacts

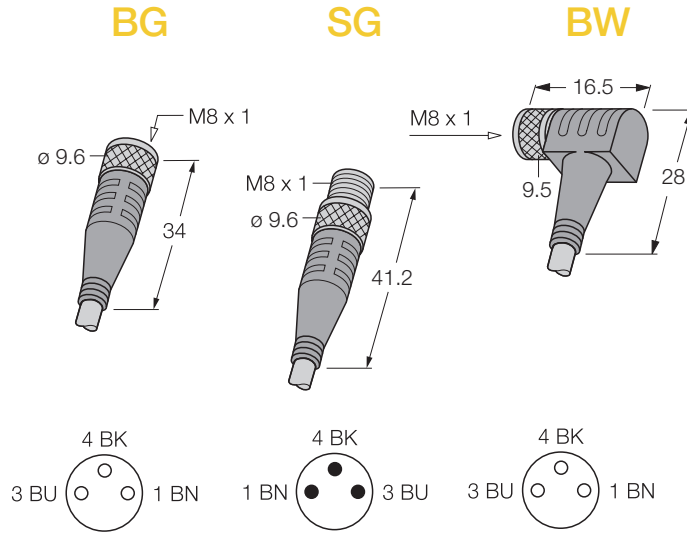
Connector, M8 x 1
Plastic, PP, black
Metal, CuZn, nickel-plated
Plastic, PP, black
Metal, CuZn, gold-plated

Rated voltage of a winding
Ampacity
Insulation resistance
Contact resistance

3-pole: max. 60 V
4A
≥ 10⁹ Ohm
≥ 5 m Ohm

Ambient temperature of plug-type connector
Protection class
Mechanical service life

-40°F to +221°F
(-40°C to +105 °C)
IP69K, in screwed state
max. 100 insertion cycles



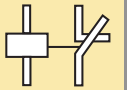
CF98-02-03-INI* (3 x 0.25) Type	Part No.	Number Poles	Cable length	
			ft.	(m)
CF98-INI-P3-M8-BG / M8-SG-2	MAT90410306	3	6.56	(2.0)
CF98-INI-P3-M8-BG / M8-SG-5	MAT90410307	3	16.41	(5.0)
CF98-INI-P3-M8-BG / M8-SG-10	MAT90410308	3	32.81	(10.0)

*Refer to the CF98 page in the Control Cable section for more cable information



CF98-02-03-INI* (3 x 0.25) Type	Part No.	Number Poles	Cable length	
			ft.	(m)
CF98-INI-P3-M8-BW / M8-SG-2	MAT90410309	3	6.56	(2.0)
CF98-INI-P3-M8-BW / M8-SG-5	MAT90410310	3	16.41	(5.0)
CF98-INI-P3-M8-BW / M8-SG-10	MAT90410311	3	32.81	(10.0)

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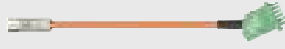


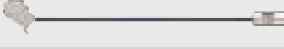
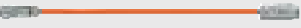

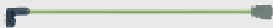
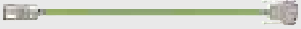
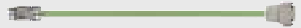
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QuickSpec: <http://www.igus.com/quickspec>

10.217

Drive Technology



ReadyCable Selection

	Cable type	Jacket	Class
Cables for Drive Technology			
Harnessed according to Allen Bradley			
	Motor Power & Feedback	TPE	6.4.4
Harnessed according to Danaher Motion			
	Servo	PVC	5.3.2
	Servo	PUR	6.3.3
	Power	PVC	5.3.2
	Power	TPE	6.4.4
	Position Feedback	PVC	5.3.2
	Position Feedback	TPE	5.3.2
Harnessed according to Fanuc			
	Servo	PUR	4.1.3
	Servo	PUR	6.3.3
	Position Feedback	PUR	6.3.3
Harnessed according to Heidenhain			
	Position Feedback	PUR	6.3.3
	Position Feedback	TPE	6.4.4

ReadyCable Selection

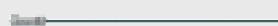
Cable type

Jacket

Class

Cables for Drive Technology

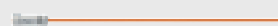
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Servo

PVC

5.3.2



Servo

PUR

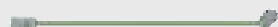
6.3.3



Position Feedback

PVC

5.3.2



Position Feedback

TPE

6.4.4



Control

PVC

4.2.1

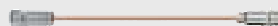
Harnessed according to Rexroth



Servo

PVC

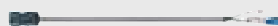
5.3.2



Servo

PUR

6.3.3



Position Feedback

PVC

5.3.2



Position Feedback

TPE

6.4.4

ReadyCable Selection

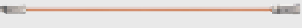



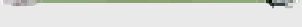
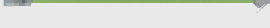
Cable type

Jacket

Class

Cables for Drive Technology

Harnessed according to Siemens

	Servo	PVC	5.3.2
	Servo	PUR	6.3.3
	Power	PVC	5.3.2
	Power	TPE	6.4.4
	Position Feedback	PVC	5.3.2
	Position Feedback	PUR	6.3.3
	Position Feedback	TPE	6.4.4

Construction

Power Harness: See Chainflex® CF35

Feedback Harness: See Chainflex® CFAB-001 Specification (available upon request)

Brake Harness: See Chainflex® section CF8/CF78

Technical Data

Power Harness: See Chainflex® CF35

Feedback Harness: See Chainflex® CFAB-001 Specification (available upon request)

Brake Harness: See Chainflex® section CF8/CF78



Allen Bradley® Part No.	igus® Part No.	Cable Type	Diameter		Bending Radius
			in.	(mm)	
MP Series Power Harness					
2090-XXNPMP-16SXX	AB-PMP-16SXXX	4 X 16	.37	(9.5)	7.5 x d
2090-XXNPMP-14SXX	AB-PMP-14SXXX	4 X 14	.43	(11.0)	7.5 x d
2090-XXNPMP-10SXX	AB-PMP-10SXXX	4 X 10	.61	(15.5)	7.5 x d
2090-XXNPMP-8SXX	AB-PMP-8SXXX	4 X 8	.77	(19.5)	7.5 x d

MP Series Brake Harness

2090-XXNBMP-18SXX	AB-BMP-18XX	2 x 17	.26	(6.5)	7.5 x d
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MP Series Feedback Harness

2090-XXNFBMP-SXX	AB-FBMP-SXX	CFAB-001	.48	(12.2)	10 x d
2090-XXNFMP-SXX	AB-FMP-SXX	CFAB-001	.48	(12.2)	10 x d

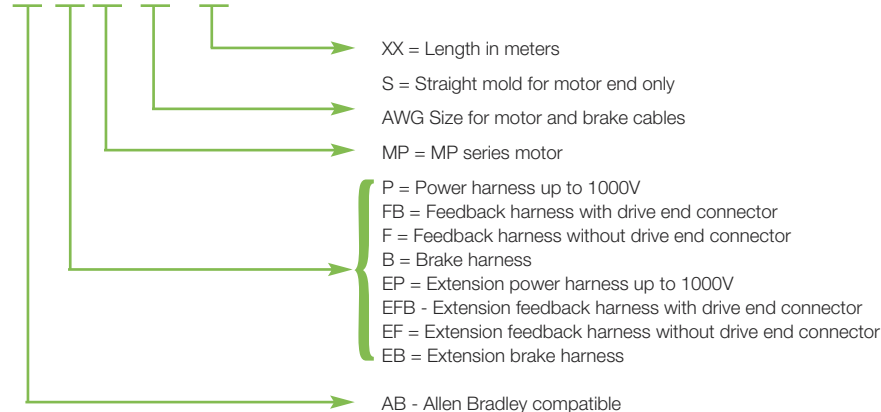
CFAB Feedback cable is also available in bulk

	CFAB-001	7 pr x 26	.48	(12.2)	10 x d
		1 pr x 22			
		1 pr x 16			

Igus Part Number Breakdown

AB-EPMP-16 SXX

Other motor series are available.
Please contact igus with requests.
Note: Allen Bradley is a registered trademark of Rockwell Automation



Drive Cable



AB
Harness

CLASS
6.4.4

Harnessed according to Allen Bradley® Systems
MP Series - Extension Harness with mounting flange male connector. For use with Energy Chains®, injection molded backshell and strain relief

Construction

Power Harness: See Chainflex® CF35

Feedback Harness: See Chainflex® CFAB-001 Specification (available upon request)

Brake Harness: See Chainflex® section CF8/CF78

Technical Data

Power Harness: See Chainflex® CF35

Feedback Harness: See Chainflex® CFAB-001 Specification (available upon request)

Brake Harness: See Chainflex® section CF8/CF78



Allen Bradley® Part No.	igus® Part No.	# of Conductors AWG	Diameter		Bending Radius
			in.	(mm)	
MP Series Power Harness					
2090-XXNPMP-16SXX	AB-EPMP-16SXXX	4 X 16	.37	(9.5)	7.5 x d
2090-XXNPMP-14SXX	AB-EPMP-14SXXX	4 X 14	.43	(11.0)	7.5 x d
2090-XXNPMP-10SXX	AB-EPMP-10SXXX	4 X 10	.66	(15.5)	7.5 x d
2090-XXNPMP-8SXX	AB-EPMP-8SXXX	4 X 8	.77	(19.5)	7.5 x d
MP Series Brake Harness					
2090-XXNBMP-18SXX	AB-EBMP-18XX	2 x 18	.26	(6.5)	7.5 x d
MP Series Feedback Harness					
2090-XXNFBMP-SXX	AB-EFBMP-SXX	CFAB-001	.48	(12.2)	10 x d
2090-XXNFMP-SXX	AB-EFMP-SXX	CFAB-001	.48	(12.2)	10 x d

Other motor series are available. Please contact igus with requests.

Note: Allen Bradley is a registered trademark of Rockwell ASutomation



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

- Oil-resistant
- Shielded
- Flame-retardant
- Nominal voltage: 1000 V
- Temperature range (flexing): +23°F to +158°F (-5°C to +70°C)
- Minimum bending radius for use in Energy Chains®: 7.5 x cable diameter
- Color: green (similar to RAL 6005)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Signal # of Pairs x AWG	Diameter	
				in.	(mm)
107491 16.4 ft. (5m)	MAT9340001	4 x 16	1 x 17	.49	(12.5)
107492 32.8 ft. (10m)	MAT9340005	4 X 16	1 X 17	.49	(12.5)
107493 49.2 ft. (15m)	MAT9340006	4 X 16	1 X 17	.49	(12.5)
107494 65.6 ft. (20m)	MAT9340007	4 X 16	1 X 17	.49	(12.5)
107495 82.0 ft. (25m)	MAT9340008	4 X 16	1 X 17	.49	(12.5)
107479 16.4 ft. (5m)	MAT9340009	4 X 16	1 X 17	.49	(12.5)
107480 32.8 ft. (10m)	MAT9340010	4 X 16	1 X 17	.49	(12.5)
107481 49.2 ft. (15m)	MAT9340011	4 X 16	1 X 17	.49	(12.5)
107482 65.6 ft. (20m)	MAT9340012	4 X 16	1 X 17	.49	(12.5)
107483 82.0 ft. (25m)	MAT9340013	4 X 16	1 X 17	.49	(12.5)
102579 16.4 ft. (5m)	MAT9340014	4 X 16	1 X 17	.49	(12.5)
102580 32.8 ft. (10m)	MAT9340015	4 X 16	1 X 17	.49	(12.5)
102809 49.2 ft. (15m)	MAT9340016	4 X 16	1 X 17	.49	(12.5)
102810 65.6 ft. (20m)	MAT9340017	4 X 16	1 X 17	.49	(12.5)
102811 82.0 ft. (25m)	MAT9340018	4 X 16	1 X 17	.49	(12.5)
90088 16.4 ft. (5m)	MAT9340019	4 X 16	1 X 17	.49	(12.5)
90089 32.8 ft. (10m)	MAT9340020	4 X 16	1 X 17	.49	(12.5)
90090 49.2 ft. (15m)	MAT9340021	4 X 16	1 X 17	.49	(12.5)
90091 65.6 ft. (20m)	MAT9340022	4 X 16	1 X 17	.49	(12.5)
90092 82.0 ft. (25m)	MAT9340023	4 X 16	1 X 17	.49	(12.5)
89957 16.4 ft. (5m)	MAT9340024	4 X 16	1 X 17	.49	(12.5)
89961 32.8 ft. (10m)	MAT9340025	4 X 16	1 X 17	.49	(12.5)
89963 49.2 ft. (15m)	MAT9340026	4 X 16	1 X 17	.49	(12.5)
89965 65.6 ft. (20m)	MAT9340027	4 X 16	1 X 17	.49	(12.5)
89967 82.0 ft. (25m)	MAT9340028	4 X 16	1 X 17	.49	(12.5)

Note: The mentioned external diameters are maximum values.



Harnessed according to Danaher Motion

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Signal # of Pairs x AWG	Diameter	
				in.	(mm)
89968 16.4 ft. (5m)	MAT9340029	4 X 14	1 X 17	.53	(13.5)
89970 32.8 ft. (10m)	MAT9340030	4 X 14	1 X 17	.53	(13.5)
89971 49.2 ft. (15m)	MAT9340031	4 X 14	1 X 17	.53	(13.5)
89972 65.6 ft. (20m)	MAT9340032	4 X 14	1 X 17	.53	(13.5)
89969 82.0 ft. (25m)	MAT9340033	4 X 14	1 X 17	.53	(13.5)
200462 16.4 ft. (5m)	MAT9340034	4 X 16	1 X 17	.49	(12.5)
200463 32.8 ft. (10m)	MAT9340035	4 X 16	1 X 17	.49	(12.5)
200464 49.2 ft. (15m)	MAT9340036	4 X 16	1 X 17	.49	(12.5)
200465 65.6 ft. (20m)	MAT9340037	4 X 16	1 X 17	.49	(12.5)
200466 82.0 ft. (25m)	MAT9340038	4 X 16	1 X 17	.49	(12.5)
200474 16.4 ft. (5m)	MAT9340039	4 X 14	1 X 17	.53	(13.5)
200475 32.8 ft. (10m)	MAT9340040	4 X 14	1 X 17	.53	(13.5)
200476 49.2 ft. (15m)	MAT9340041	4 X 14	1 X 17	.53	(13.5)
200477 65.6 ft. (20m)	MAT9340042	4 X 14	1 X 17	.53	(13.5)
200478 82.0 ft. (25m)	MAT9340043	4 X 14	1 X 17	.53	(13.5)
200623 16.4 ft. (5m)	MAT9340044	4 X 12	1 X 17	.61	(15.5)
200624 32.8 ft. (10m)	MAT9340045	4 X 12	1 X 17	.61	(15.5)
200625 49.2 ft. (15m)	MAT9340046	4 X 12	1 X 17	.61	(15.5)
200626 65.6 ft. (20m)	MAT9340047	4 X 12	1 X 17	.61	(15.5)
200627 82.0 ft. (25m)	MAT9340048	4 X 12	1 X 17	.61	(15.5)

Note: The mentioned external diameters are maximum values.

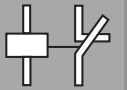
Chainflex® PVC cables



Typical application area – PVC

- for high mechanical load requirements
- light oil influence
- preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- especially for unsupported and gliding travel distances up to 100 m
- storage and retrieval units for high-bay warehouses, machining units/packaging machines, quick handling, indoor cranes, timber processing

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

- Oil-resistant and coolant resistant
- Shielded
- Flame-retardant
- Notch-resistant, hydrolysis-resistant and microbe resistant
- Nominal voltage: 1000 V
- Temperature range (flexing): -4°F to +176°F (-20°C to +80°C)
- Minimum bending radius for use in Energy Chains®: 7.5 x cable diameter
- Color: orange (similar to RAL 2003)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Signal # of Pairs x AWG	Diameter	
				in.	(mm)
107491 16.4 ft. (5m)	MAT9440001	4 x 16	1 x 17	.49	(12.5)
107492 32.8 ft. (10m)	MAT9440005	4 X 16	1 X 17	.49	(12.5)
107493 49.2 ft. (15m)	MAT9440006	4 X 16	1 X 17	.49	(12.5)
107494 65.6 ft. (20m)	MAT9440007	4 X 16	1 X 17	.49	(12.5)
107495 82.0 ft. (25m)	MAT9440008	4 X 16	1 X 17	.49	(12.5)
107479 16.4 ft. (5m)	MAT9440009	4 X 16	1 X 17	.49	(12.5)
107480 32.8 ft. (10m)	MAT9440010	4 X 16	1 X 17	.49	(12.5)
107481 49.2 ft. (15m)	MAT9440011	4 X 16	1 X 17	.49	(12.5)
107482 65.6 ft. (20m)	MAT9440012	4 X 16	1 X 17	.49	(12.5)
107483 82.0 ft. (25m)	MAT9440013	4 X 16	1 X 17	.49	(12.5)
102579 16.4 ft. (5m)	MAT9440014	4 X 16	1 X 17	.49	(12.5)
102580 32.8 ft. (10m)	MAT9440015	4 X 16	1 X 17	.49	(12.5)
102809 49.2 ft. (15m)	MAT9440016	4 X 16	1 X 17	.49	(12.5)
102810 65.6 ft. (20m)	MAT9440017	4 X 16	1 X 17	.49	(12.5)
102811 82.0 ft. (25m)	MAT9440018	4 X 16	1 X 17	.49	(12.5)
90088 16.4 ft. (5m)	MAT9440019	4 X 16	1 X 17	.49	(12.5)
90089 32.8 ft. (10m)	MAT9440020	4 X 16	1 X 17	.49	(12.5)
90090 49.2 ft. (15m)	MAT9440021	4 X 16	1 X 17	.49	(12.5)
90091 65.6 ft. (20m)	MAT9440022	4 X 16	1 X 17	.49	(12.5)
90092 82.0 ft. (25m)	MAT9440023	4 X 16	1 X 17	.49	(12.5)
89957 16.4 ft. (5m)	MAT9440024	4 X 16	1 X 17	.49	(12.5)
89961 32.8 ft. (10m)	MAT9440025	4 X 16	1 X 17	.49	(12.5)
89963 49.2 ft. (15m)	MAT9440026	4 X 16	1 X 17	.49	(12.5)
89965 65.6 ft. (20m)	MAT9440027	4 X 16	1 X 17	.49	(12.5)
89967 82.0 ft. (25m)	MAT9440028	4 X 16	1 X 17	.49	(12.5)

Note: The mentioned external diameters are maximum values.



Harnessed according to Danaher Motion

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Signal # of Pairs x AWG	Diameter	
				in.	(mm)
89968 16.4 ft. (5m)	MAT9440029	4 X 14	1 X 17	.53	(13.5)
89970 32.8 ft. (10m)	MAT9440030	4 X 14	1 X 17	.53	(13.5)
89971 49.2 ft. (15m)	MAT9440031	4 X 14	1 X 17	.53	(13.5)
89972 65.6 ft. (20m)	MAT9440032	4 X 14	1 X 17	.53	(13.5)
89969 82.0 ft. (25m)	MAT9440033	4 X 14	1 X 17	.53	(13.5)
200462 16.4 ft. (5m)	MAT9440034	4 X 16	1 X 17	.49	(12.5)
200463 32.8 ft. (10m)	MAT9440035	4 X 16	1 X 17	.49	(12.5)
200464 49.2 ft. (15m)	MAT9440036	4 X 16	1 X 17	.49	(12.5)
200465 65.6 ft. (20m)	MAT9440037	4 X 16	1 X 17	.49	(12.5)
200466 82.0 ft. (25m)	MAT9440038	4 X 16	1 X 17	.49	(12.5)
200474 16.4 ft. (5m)	MAT9440039	4 X 14	1 X 17	.53	(13.5)
200475 32.8 ft. (10m)	MAT9440040	4 X 14	1 X 17	.53	(13.5)
200476 49.2 ft. (15m)	MAT9440041	4 X 14	1 X 17	.53	(13.5)
200477 65.6 ft. (20m)	MAT9440042	4 X 14	1 X 17	.53	(13.5)
200478 82.0 ft. (25m)	MAT9440043	4 X 14	1 X 17	.53	(13.5)
200623 16.4 ft. (5m)	MAT9440044	4 X 12	1 X 17	.61	(15.5)
200624 32.8 ft. (10m)	MAT9440045	4 X 12	1 X 17	.61	(15.5)
200625 49.2 ft. (15m)	MAT9440046	4 X 12	1 X 17	.61	(15.5)
200626 65.6 ft. (20m)	MAT9440047	4 X 12	1 X 17	.61	(15.5)
200627 82.0 ft. (25m)	MAT9440048	4 X 12	1 X 17	.61	(15.5)

Note: The mentioned external diameters are maximum values.

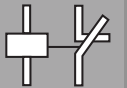
Chainflex® PUR cables



Typical application area – PUR

- for maximum mechanical load requirements
- almost unlimited resistance to oil
- Indoor and outdoor applications, UV-resistant
- especially for unsupported and gliding travel distances up to 100 m
- storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, outdoor cranes, low-temperature applications

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

- Oil-resistant
- Shielded
- Flame-retardant
- Nominal voltage: 1000 V
- Temperature range (flexing): +23°F to +158°F (-5°C to +70°C)
- Minimum bending radius for use in Energy Chains®: 7.5 x cable diameter
- Color: black (similar to RAL 9005)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
107485 16.4 ft. (5m)	MAT9340002	4 x 16	.41	(10.5)
107486 32.8 ft. (10m)	MAT9340049	4 x 16	.41	(10.5)
107487 49.2 ft. (15m)	MAT9340050	4 x 16	.41	(10.5)
107488 65.6 ft. (20m)	MAT9340051	4 x 16	.41	(10.5)
107489 82.0 ft. (25m)	MAT9340052	4 x 16	.41	(10.5)
107473 16.4 ft. (5m)	MAT9340053	4 x 16	.41	(10.5)
107474 32.8 ft. (10m)	MAT9340054	4 x 16	.41	(10.5)
107475 49.2 ft. (15m)	MAT9340055	4 x 16	.41	(10.5)
107476 65.6 ft. (20m)	MAT9340056	4 x 16	.41	(10.5)
107477 82.0 ft. (25m)	MAT9340057	4 x 16	.41	(10.5)
102575 16.4 ft. (5m)	MAT9340058	4 x 16	.41	(10.5)
102576 32.8 ft. (10m)	MAT9340059	4 x 16	.41	(10.5)
102806 49.2 ft. (15m)	MAT9340060	4 x 16	.41	(10.5)
102807 65.6 ft. (20m)	MAT9340061	4 x 16	.41	(10.5)
102808 82.0 ft. (25m)	MAT9340062	4 x 16	.41	(10.5)
90083 16.4 ft. (5m)	MAT9340063	4 x 16	.41	(10.5)
90084 32.8 ft. (10m)	MAT9340064	4 x 16	.41	(10.5)
90085 49.2 ft. (15m)	MAT9340065	4 x 16	.41	(10.5)
90086 65.6 ft. (20m)	MAT9340066	4 x 16	.41	(10.5)
90087 82.0 ft. (25m)	MAT9340067	4 x 16	.41	(10.5)
89918 16.4 ft. (5m)	MAT9340068	4 x 16	.41	(10.5)
89952 32.8 ft. (10m)	MAT9340069	4 x 16	.41	(10.5)
89953 49.2 ft. (15m)	MAT9340070	4 x 16	.41	(10.5)
89954 65.6 ft. (20m)	MAT9340071	4 x 16	.41	(10.5)
89956 82.0 ft. (25m)	MAT9340072	4 x 16	.41	(10.5)

Note: The mentioned external diameters are maximum values.



Harnessed according to Danaher Motion

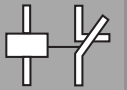
Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
89959 16.4 ft. (5m)	MAT9340004	4 X 14	.49	(12.5)
89960 32.8 ft. (10m)	MAT9340073	4 X 14	.49	(12.5)
89962 49.2 ft. (15m)	MAT9340074	4 X 14	.49	(12.5)
89964 65.6 ft. (20m)	MAT9340075	4 X 14	.49	(12.5)
89966 82.0 ft. (25m)	MAT9340076	4 X 14	.49	(12.5)
200456 16.4 ft. (5m)	MAT9340077	4 X 16	.41	(10.5)
200457 32.8 ft. (10m)	MAT9340078	4 X 16	.41	(10.5)
200458 49.2 ft. (15m)	MAT9340079	4 X 16	.41	(10.5)
200459 65.6 ft. (20m)	MAT9340080	4 X 16	.41	(10.5)
200460 82.0 ft. (25m)	MAT9340081	4 X 16	.41	(10.5)
200468 16.4 ft. (5m)	MAT9340082	4 X 14	.49	(12.5)
200469 32.8 ft. (10m)	MAT9340083	4 X 14	.49	(12.5)
200470 49.2 ft. (15m)	MAT9340084	4 X 14	.49	(12.5)
200471 65.6 ft. (20m)	MAT9340085	4 X 14	.49	(12.5)
200472 82.0 ft. (25m)	MAT9340086	4 X 14	.49	(12.5)
200618 16.4 ft. (5m)	MAT9340087	4 X 12	.41	(10.5)
200619 32.8 ft. (10m)	MAT9340088	4 X 12	.41	(10.5)
200620 49.2 ft. (15m)	MAT9340089	4 X 12	.41	(10.5)
200621 65.6 ft. (20m)	MAT9340090	4 X 12	.41	(10.5)
200622 82.0 ft. (25m)	MAT9340091	4 X 12	.41	(10.5)

Note: The mentioned external diameters are maximum values.

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

- Oil-resistant
- Shielded
- Hydrolysis-resistant and microbe-resistant
- Flame-retardant
- Nominal voltage: 600/1000 V
- Temperature range (flexing): -31°F to +194°F (-35°C to +90°C)
- Minimum bending radius for use in Energy Chains®: 7.5 x cable diameter
- Color: black (similar to RAL 9005)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
107485 16.4 ft. (5m)	MAT9440002	4 x 16	.37	(9.5)
107486 32.8 ft. (10m)	MAT9440049	4 x 16	.37	(9.5)
107487 49.2 ft. (15m)	MAT9440050	4 x 16	.37	(9.5)
107488 65.6 ft. (20m)	MAT9440051	4 x 16	.37	(9.5)
107489 82.0 ft. (25m)	MAT9440052	4 x 16	.37	(9.5)
107473 16.4 ft. (5m)	MAT9440053	4 x 16	.37	(9.5)
107474 32.8 ft. (10m)	MAT9440054	4 x 16	.37	(9.5)
107475 49.2 ft. (15m)	MAT9440055	4 x 16	.37	(9.5)
107476 65.6 ft. (20m)	MAT9440056	4 x 16	.37	(9.5)
107477 82.0 ft. (25m)	MAT9440057	4 x 16	.37	(9.5)
102575 16.4 ft. (5m)	MAT9440058	4 x 16	.37	(9.5)
102576 32.8 ft. (10m)	MAT9440059	4 x 16	.37	(9.5)
102806 49.2 ft. (15m)	MAT9440060	4 x 16	.37	(9.5)
102807 65.6 ft. (20m)	MAT9440061	4 x 16	.37	(9.5)
102808 82.0 ft. (25m)	MAT9440062	4 x 16	.37	(9.5)
90083 16.4 ft. (5m)	MAT9440063	4 x 16	.37	(9.5)
90084 32.8 ft. (10m)	MAT9440064	4 x 16	.37	(9.5)
90085 49.2 ft. (15m)	MAT9440065	4 x 16	.37	(9.5)
90086 65.6 ft. (20m)	MAT9440066	4 x 16	.37	(9.5)
90087 82.0 ft. (25m)	MAT9440067	4 x 16	.37	(9.5)
89918 16.4 ft. (5m)	MAT9440068	4 x 16	.37	(9.5)
89952 32.8 ft. (10m)	MAT9440069	4 x 16	.37	(9.5)
89953 49.2 ft. (15m)	MAT9440070	4 x 16	.37	(9.5)
89954 65.6 ft. (20m)	MAT9440071	4 x 16	.37	(9.5)
89956 82.0 ft. (25m)	MAT9440072	4 x 16	.37	(9.5)

Note: The mentioned external diameters are maximum values.



Harnessed according to Danaher Motion

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
89959 16.4 ft. (5m)	MAT9440004	4 X 14	.43	(11.0)
89960 32.8 ft. (10m)	MAT9440073	4 X 14	.43	(11.0)
89962 49.2 ft. (15m)	MAT9440074	4 X 14	.43	(11.0)
89964 65.6 ft. (20m)	MAT9440075	4 X 14	.43	(11.0)
89966 82.0 ft. (25m)	MAT9440076	4 X 14	.43	(11.0)
200456 16.4 ft. (5m)	MAT9440077	4 X 16	.37	(9.5)
200457 32.8 ft. (10m)	MAT9440078	4 X 16	.37	(9.5)
200458 49.2 ft. (15m)	MAT9440079	4 X 16	.37	(9.5)
200459 65.6 ft. (20m)	MAT9440080	4 X 16	.37	(9.5)
200460 82.0 ft. (25m)	MAT9440081	4 X 16	.37	(9.5)
200468 16.4 ft. (5m)	MAT9440082	4 X 14	.43	(11.0)
200469 32.8 ft. (10m)	MAT9440083	4 X 14	.43	(11.0)
200470 49.2 ft. (15m)	MAT9440084	4 X 14	.43	(11.0)
200471 65.6 ft. (20m)	MAT9440085	4 X 14	.43	(11.0)
200472 82.0 ft. (25m)	MAT9440086	4 X 14	.43	(11.0)
200618 16.4 ft. (5m)	MAT9440087	4 X 12	.55	(14.0)
200619 32.8 ft. (10m)	MAT9440088	4 X 12	.55	(14.0)
200620 49.2 ft. (15m)	MAT9440089	4 X 12	.55	(14.0)
200621 65.6 ft. (20m)	MAT9440090	4 X 12	.55	(14.0)
200622 82.0 ft. (25m)	MAT9440091	4 X 12	.55	(14.0)

Note: The mentioned external diameters are maximum values.

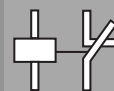
Chainflex® TPE cables



Typical application area – TPE

- for maximum mechanical load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for unsupported and gliding travel distances up to 400 m and more
- storage and retrieval units for high-bay warehouses, machining units/ machine tools, quick handling, clean room, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

- Oil-resistant
- Shielded
- Flame-retardant
- Nominal voltage: 300 V
- Temperature range (flexing): +23°F to +158°F (-5°C to +70°C)
- Minimum bending radius for use in Energy Chains®: 10 x cable diameter
- Color: gray (similar to RAL 7001)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
84972 16.4 ft. (5m)	MAT9320001	4 PR x 24	.31	(8.0)
84973 32.8 ft. (10m)	MAT9320009	4 PR x 24	.31	(8.0)
84974 49.2 ft. (15m)	MAT9320010	4 PR x 24	.31	(8.0)
84975 65.6 ft. (20m)	MAT9320011	4 PR x 24	.31	(8.0)
87655 82.0 ft. (25m)	MAT9320012	4 PR x 24	.31	(8.0)
90287 16.4 ft. (5m)	MAT9320002	8 PR x 24	.45	(11.5)
91019 32.8 ft. (10m)	MAT9320013	8 PR x 24	.45	(11.5)
91811 49.2 ft. (15m)	MAT9320014	8 PR x 24	.45	(11.5)
91807 65.6 ft. (20m)	MAT9320015	8 PR x 24	.45	(11.5)
92205 82.0 ft. (25m)	MAT9320016	8 PR x 24	.45	(11.5)
107915 16.4 ft. (5m)	MAT9320004	8 PR x 24	.45	(11.5)
107916 32.8 ft. (10m)	MAT9320017	8 PR x 24	.45	(11.5)
107917 49.2 ft. (15m)	MAT9320018	8 PR x 24	.45	(11.5)
107918 65.6 ft. (20m)	MAT9320019	8 PR x 24	.45	(11.5)
107919 82.0 ft. (25m)	MAT9320020	8 PR x 24	.45	(11.5)

Note: The mentioned external diameters are maximum values.



Harnessed according to Danaher Motion

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
85034 16.4 ft. (5m)	MAT9320007	6 PR x 24	.37	(9.5)
85035 32.8 ft. (10m)	MAT9320021	6 PR x 24	.37	(9.5)
85036 49.2 ft. (15m)	MAT9320022	6 PR x 24	.37	(9.5)
85037 65.6 ft. (20m)	MAT9320023	6 PR x 24	.37	(9.5)

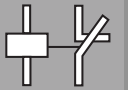
Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
85039 82.0 ft. (25m)	MAT9320008	6 PR x 24	.37	(9.5)
85040 16.4 ft. (5m)	MAT9320024	6 PR x 24	.37	(9.5)
85041 32.8 ft. (10m)	MAT9320025	6 PR x 24	.37	(9.5)
85042 49.2 ft. (15m)	MAT9320026	6 PR x 24	.37	(9.5)

Note: The mentioned external diameters are maximum values.

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

- Oil-resistant
- Shielded
- Nominal voltage: 300 V
- Temperature range (flexing): -31°F to +212°F (-35°C to +100°C)
- Minimum bending radius for use in Energy Chains®: 10 x cable diameter
- Color: Blue

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
84972 16.4 ft. (5m)	MAT9330001	4 PR x 24	.31	(8.0)
84973 32.8 ft. (10m)	MAT9330009	4 PR x 24	.31	(8.0)
84974 49.2 ft. (15m)	MAT9330010	4 PR x 24	.31	(8.0)
84975 65.6 ft. (20m)	MAT9330011	4 PR x 24	.31	(8.0)
87655 82.0 ft. (25m)	MAT9330012	4 PR x 24	.31	(8.0)
90287 16.4 ft. (5m)	MAT9330002	8 PR x 24	.45	(11.5)
91019 32.8 ft. (10m)	MAT9330013	8 PR x 24	.45	(11.5)
91811 49.2 ft. (15m)	MAT9330014	8 PR x 24	.45	(11.5)
91807 65.6 ft. (20m)	MAT9330015	8 PR x 24	.45	(11.5)
92205 82.0 ft. (25m)	MAT9330016	8 PR x 24	.45	(11.5)
107915 16.4 ft. (5m)	MAT9330004	8 PR x 24	.45	(11.5)
107916 32.8 ft. (10m)	MAT9330017	8 PR x 24	.45	(11.5)
107917 49.2 ft. (15m)	MAT9330018	8 PR x 24	.45	(11.5)
107918 65.6 ft. (20m)	MAT9330019	8 PR x 24	.45	(11.5)
107919 82.0 ft. (25m)	MAT9330020	8 PR x 24	.45	(11.5)

Note: The mentioned external diameters are maximum values.



Harnessed according to Danaher Motion

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
85034 16.4 ft. (5m)	MAT9330007	6 PR x 24	.37	(9.5)
85035 32.8 ft. (10m)	MAT9330021	6 PR x 24	.37	(9.5)
85036 49.2 ft. (15m)	MAT9330022	6 PR x 24	.37	(9.5)
85037 65.6 ft. (20m)	MAT9330023	6 PR x 24	.37	(9.5)

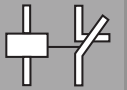
Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
85039 82.0 ft. (25m)	MAT9330008	6 PR x 24	.37	(9.5)
85040 16.4 ft. (5m)	MAT9330024	6 PR x 24	.37	(9.5)
85041 32.8 ft. (10m)	MAT9330025	6 PR x 24	.37	(9.5)
85042 49.2 ft. (15m)	MAT9330026	6 PR x 24	.37	(9.5)

Note: The mentioned external diameters are maximum values.

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

- Oil-resistant, coolant-resistant
- Shielded
- Flame-retardant
- Notch-resistant, hydrolysis-resistant and microbe-resistant
- Nominal voltage: 1000 V
- Temperature range (flexing): -4°F to +176°F (-20°C to +80°C)
- Minimum bending radius for use in Energy Chains®: 10 x cable diameter
- Color: Orange (similar to RAL 2003)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-8077-T261	MAT9200061	4 x 16	.33	(8.5)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-8077-T264	MAT9200064	4 x 14	.41	(10.5)
LX660-8077-T266	MAT9200066	4 x 14	.41	(10.5)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-8077-T265	MAT9200065	4 x 14	.41	(10.5)
LX660-8077-T267	MAT9200067	4 x 14	.41	(10.5)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-8077-T270	MAT9200070	4 x 12	.47	(12.0)
LX660-8077-T272	MAT9200072	4 x 8	.69	(17.5)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-8077-T271	MAT9200071	4 x 12	.47	(12.0)
LX660-8077-T273	MAT9200073	4 x 8	.69	(17.5)

Note: The mentioned external diameters are maximum values.



Harnessed according to Fanuc

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-8077-T291	MAT9200091	4 x 14	.41	(10.5)
LX660-8077-T293	MAT9200093	4 x 12	.47	(12.0)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-8077-T292	MAT9200092	4 x 12	.47	(12.0)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-8077-T296	MAT9200096	4 x 14	.41	(10.5)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-8077-T298	MAT9200098	4 x 12	.61	(15.5)

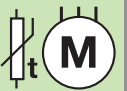
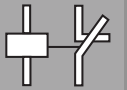
Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-8077-T300	MAT9200300	4 x 14	.49	(12.0)

Note: The mentioned external diameters are maximum values.

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



- Oil-resistant and coolant-resistant
- Shielded
- Flame-retardant
- Notch-resistant, hydrolysis-resistant and microbe-resistant
- Nominal voltage: 1000 V
- Temperature range (flexing): -4°F to +176°F (-20°C to +80°C)
- Minimum bending radius for use in Energy Chains®: 7.5 x cable diameter
- Color: Orange (similar to RAL 2003)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-8077-T261	MAT9210061	4 x 16	.41	(10.5)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-8077-T264	MAT9210064	4 x 14	.47	(12.0)
LX660-8077-T266	MAT9210066	4 x 14	.47	(12.0)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-8077-T265	MAT9210065	4 x 14	.47	(12.0)
LX660-8077-T267	MAT9210067	4 x 14	.47	(12.0)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-8077-T270	MAT9210070	4 x 12	.61	(15.5)
LX660-8077-T272	MAT9210072	4 x 8	.81	(20.5)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-8077-T271 ⁽¹⁾	MAT9210071	4 x 12	.61	(15.5)
LX660-8077-T273	MAT9210073	4 x 8	.81	(20.5)

Note: The mentioned external diameters are maximum values.



Harnessed according to Fanuc

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-8077-T291	MAT9210091	4 x 14	.47	(12.0)
LX660-8077-T293 ⁽¹⁾	MAT9210093	4 x 12	.61	(15.5)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-8077-T292 ⁽¹⁾	MAT9210092	4 x 12	.61	(15.5)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-8077-T296	MAT9210096	4 x 14	.47	(12.0)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-8077-T298 ⁽¹⁾	MAT9210098	4 x 12	.61	(15.5)

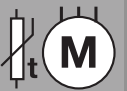
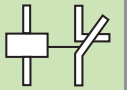
Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-8077-T300	MAT9210300	4 x 14	.49	(12.0)

Note: The mentioned external diameters are maximum values.

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

Harnessed according to Fanuc

CLASS
6.3.3

- Oil-resistant and coolant-resistant
- Shielded
- Flame-retardant
- Notch-resistant, hydrolysis-resistant and microbe-resistant
- Nominal voltage: 30 V
- Temperature range (flexing): -4°F to +176°F (-20°C to +80°C)
- Minimum bending radius for use in Energy Chains®: 10 x cable diameter
- Color: Yellow Green (similar to RAL 6018)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-4077-T296	MAT9300296	5 C x 20 1 PR x 24	.30	(7.5)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-4077-T297	MAT9300297	5 C x 20 1 PR x 24	.30	(7.5)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-4077-T302	MAT9300302	6 C x 20 5 PR x 24	.38	(9.6)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-4077-T303	MAT9300303	6 C x 20 5 PR x 24	.38	(9.6)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-4077-T319	MAT9300319	6 C x 20 5 PR x 24	.38	(9.6)

Note: The mentioned external diameters are maximum values.

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number



Chainflex® TPE Position Feedback



Position
Feedback
TPE

Harnessed according to Fanuc

- Oil-resistant and coolant-resistant
- Shielded
- Nominal voltage: 30 V
- Temperature range (flexing): -31°F to +212°F (-35°C to +100°C)
- Minimum bending radius for use in Energy Chains®: 10 x cable diameter
- Color: Green (similar to RAL 6018)

CLASS
6.4.4

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-4077-T296	MAT9310296	5 C x 20 1 PR x 24	.33	(8.5)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-4077-T297	MAT9310297	5 C x 20 1 PR x 24	.33	(8.5)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-4077-T302	MAT9310302	6 C x 20 5 PR x 24	.49	(12.5)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-4077-T303	MAT9310303	6 C x 20 5 PR x 24	.49	(12.5)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
LX660-4077-T319	MAT9310319	6 C x 20 5 PR x 24	.49	(12.5)

Note: The mentioned external diameters are maximum values.



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number



10.241

- Oil-resistant and coolant-resistant
- Shielded
- Flame-retardant
- Notch-resistant, hydrolysis-resistant and
- microbe-resistant
- Nominal voltage: 30 V
- Temperature range (flexing): -4°F to +176°F (-20°C to +80°C)

Connecting Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter in. (mm)
332 115-xx	MAT94901001	4 PR x 26 (4 C x 26) SHLD 4 C x 20	.47 (12.0)

Connecting Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter in. (mm)
360 472-xx	MAT94901002	4 PR x 26 (4 C x 26) SHLD 4 C x 20	.47 (12.0)

Connecting Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter in. (mm)
310 197-xx	MAT94902001	(3 PR x 26) SHLD (2 C x 20) SHLD	.47 (12.0)

Connecting Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter in. (mm)
324 544-xx	MAT94902002	4 PR x 26 (4 C x 26) SHLD 4 C x 20	.47 (12.0)
310 199-xx	MAT94902003	4 PR x 26 4 C x 20	.39 (10.0)

Connecting Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter in. (mm)
309 738-xx	MAT94903001	4 PR x 26 4 C x 20	.39 (10.0)

Connecting Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter in. (mm)
354 411-xx	MAT94904001	4 PR x 26 (4 C x 26) SHLD 4 C x 20	.47 (12.0)
355 398-xx	MAT94904002	4 PR x 26 (4 C x 26) SHLD 4 C x 20	.47 (12.0)



Harnessed according to Heidenhain

- Minimum bending radius for use in Energy Chains®:
10 x cable diameter
- Color: Green (similar to RAL 6018)

Connecting Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
298 399-xx	MAT94905001	4 PR X 26	.39	(10.0)
		4 C x 20		

Connecting Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
309 774-xx	MAT94906001	4 PR x 26	.39	(10.0)
		4 C x 20		
298 400-xx	MAT94906002	4 PR x 26	.39	(10.0)
		4 C x 20		
323 897-xx	MAT94907004	4 PR x 26	.47	(12.0)
		(4C x 26) SHLD		
		4 C x 20		

Connecting Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
309 777-xx	MAT94907001	4 PR x 26	.39	(10.0)
		4 C x 20		
309 778-xx	MAT94907002	4 PR x 26	.47	(12.0)
		(4 C x 26) SHLD		
		4 C x 20		

Connecting Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
310 193-xx	MAT94907003	(3 PR x 26) SHLD	.47	(12.0)
		2 C x 20) SHLD		

Connecting Cable



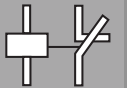
Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
335 077-xx	MAT94908001	4 PR x 26	.39	(10.0)
		4 C x 20		

Connecting Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
298 402-xx	MAT94909001	4 PR x 26	.39	(10.0)
		4 C x 20		

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



- Oil-resistant
- Shielded
- Nominal voltage: 30 V
- Temperature range (flexing): -31°F to +212°F (-35°C to +100°C)
- Minimum bending radius for use in Energy Chains®: 10 x cable diameter

Connecting Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter in. (mm)
332 115-xx	MAT93901001	4 PR x 26 (4 C x 26) SHLD 4 C x 20	.47 (12.0)

Connecting Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter in. (mm)
360 472-xx	MAT93901002	4 PR x 26 (4 C x 26) SHLD 4 C x 20	.47 (12.0)

Connecting Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter in. (mm)
310 197-xx	MAT93902001	(3 PR x 26) SHLD (2 C x 20) SHLD	.49 (12.5)

Connecting Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter in. (mm)
324 544-xx	MAT93902002	4 PR x 26 (4 C x 26) SHLD 4 C x 20	.47 (12.0)
310 199-xx	MAT93902003	4 PR x 26 4 C x 20	.35 (9.0)

Connecting Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter in. (mm)
309 738-xx	MAT93903001	4 PR x 26 4 C x 20	.35 (9.0)

Connecting Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter in. (mm)
354 411-xx	MAT93904001	4 PR x 26 (4 C x 26) SHLD 4 C x 20	.47 (12.0)
355 398-xx	MAT93904002	4 PR x 26 (4 C x 26) SHLD 4 C x 20	.47 (12.0)



Harnessed according to Heidenhain

- Color: Green (similar to RAL 6018)

Connecting Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
298 399-xx	MAT93905001	4 PR X 26 4 C x 20	.35	(9.0)

Connecting Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
309 774-xx	MAT93906001	4 PR x 26 4 C x 20	.35	(9.0)
298 400-xx	MAT93906002	4 PR x 26 4 C x 20	.35	(9.0)
323 897-xx	MAT93907004	4 PR x 26 (4C x 26) SHLD 4 C x 20	.47	(12.0)

Connecting Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
309 777-xx	MAT93907001	4 PR x 26 4 C x 20	.35	(9.0)
309 778-xx	MAT93907002	4 PR x 26 (4 C x 26) SHLD 4 C x 20	.47	(12.0)

Connecting Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
310 193-xx	MAT93907003	(3 PR x 26) SHLD 2 C x 20) SHLD	.49	(12.5)

Connecting Cable



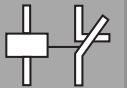
Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
335 077-xx	MAT93908001	4 PR x 26 4 C x 20	.39	(10.0)

Connecting Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
298 402-xx	MAT93909001	4 PR x 26 4 C x 20	.35	(9.0)

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



- Oil-resistant
- Shielded
- Flame-retardant
- Nominal voltage: 1000 V
- Temperature range (flexing): +23°F to +158°F (-5°C to +70°C)
- Minimum bending radius for use in Energy Chains®: 7.5 x cable diameter
- Color: green (similar to RAL 6005)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power	Signal	Diameter	
		# of Conductors x AWG	# of Pairs x AWG	in.	(mm)
EWLMxxxGMS-015C	MAT9130001	4 x 16	1 x 17	.49	(12.5)
EWLMxxxGMS-025	MAT9130002	4 x 16	1 x 17	.53	(13.5)
EYP0010AxxxxM01A00-	MAT9130050	4 x 16	1 x 17	.49	(12.5)
EYP0011AxxxxM01A00-	MAT9130051	4 x 16	1 x 17	.49	(12.5)
EYP0012AxxxxM01A00-	MAT9130052	4 x 14	1 x 17	.53	(13.5)
EYP0012AxxxxM02A00-	MAT9130053	4 x 14	1 x 17	.53	(13.5)
EYP0013AxxxxM02A00-	MAT9130054	4 x 12	1 x 17	.61	(15.5)
EYP0014AxxxxM03A00-	MAT9130055	4 x 10	1 x 17	.71	(18.0)
EYP0015AxxxxM03A00-	MAT9130056	4 x 8	1 x 17	.87	(22.0)
EYP0016AxxxxM03A00-	MAT9130057	4 x 6	1 x 17	.96	(24.5)
EYP0012xxxxA00P02-	MAT9130058	4 x 14	1 x 17	.53	(13.5)
EYP0013xxxxA00P02-	MAT9130059	4 x 12	1 x 17	.61	(15.5)
EYP0014xxxxA00P03-	MAT9130060	4 x 10	1 x 17	.87	(22.0)
EYP0015xxxxA00P03-	MAT9130061	4 x 8	1 x 17	.87	(22.0)
EYP0016xxxxA00P03-	MAT9130062	4 x 6	1 x 17	.96	(24.5)
EYP0010xxxxA00P01-	MAT9130063	4 x 16	1 x 17	.49	(12.5)
EYP0011xxxxA00P01-	MAT9130064	4 x 16	1 x 17	.49	(12.5)
EYP0012xxxxA00P01-	MAT9130065	4 x 14	1 x 17	.53	(13.5)

Note: The mentioned external diameters are maximum values.



Harnessed according to Lenze

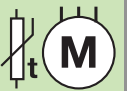
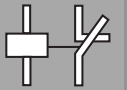
Basic Cable



Manufacturer Part No.	igus® Part No.	Power	Signal	Diameter	
		# of Conductors x AWG	# of Pairs x AWG	in.	(mm)
EWLMxxxZM-015C	MAT9130006	4 x 16	1 x 17	.49	(12.5)
EWLMxxxZM-025	MAT9130007	4 x 16	1 x 17	.53	(13.5)
EYP0012xxxxM02P02-	MAT9130066	4 x 14	1 x 17	.53	(13.5)
EYP0013xxxxM02P02-	MAT9130067	4 x 12	1 x 17	.61	(15.5)
EYP0014xxxxM03P03-	MAT9130068	4 x 10	1 x 17	.87	(22.0)
EYP0015xxxxM03P03-	MAT9130069	4 x 8	1 x 17	.87	(22.0)
EYP0016xxxxM03P03-	MAT9130070	4 x 6	1 x 17	.96	(24.5)
EYP0010xxxxM01P01-	MAT9130071	4 x 16	1 x 17	.49	(12.5)
EYP0011xxxxM01P01-	MAT9130072	4 x 16	1 x 17	.49	(12.5)
EYP0012xxxxM01P01-	MAT9130073	4 x 14	1 x 17	.53	(13.5)

Note: The mentioned external diameters are maximum values.

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



Chainflex® PVC cables



Typical application area – PVC

- for high mechanical load requirements
- light oil influence
- preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- especially for unsupported and gliding travel distances up to 100 m
- storage and retrieval units for high-bay warehouses, machining units/packaging machines, quick handling, indoor cranes, timber processing

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

- Oil-resistant and coolant resistant
- Shielded
- Flame-retardant
- Notch-resistant, hydrolysis-resistant and microbe resistant
- Nominal voltage: 1000 V
- Temperature range (flexing): -4°F to +176°F (-20°C to +80°C)
- Minimum bending radius for use in Energy Chains®: 7.5 x cable diameter
- Color: orange (similar to RAL 2003)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Signal # of Pairs x AWG	Diameter	
				in.	(mm)
EWLMxxxGMS-015C	MAT9120001	4 x 16	1 x 17	.49	(12.5)
EWLMxxxGMS-025	MAT9120002	4 x 16	1 x 17	.53	(13.5)
EYP0010AxxxxM01A00-	MAT9120050	4 x 16	1 x 17	.49	(12.5)
EYP0011AxxxxM01A00-	MAT9120051	4 x 16	1 x 17	.49	(12.5)
EYP0012AxxxxM01A00-	MAT9120052	4 x 14	1 x 17	.53	(13.5)
EYP0012AxxxxM02A00-	MAT9120053	4 x 14	1 x 17	.53	(13.5)
EYP0013AxxxxM02A00-	MAT9120054	4 x 12	1 x 17	.61	(15.5)
EYP0014AxxxxM03A00-	MAT9120055	4 x 10	1 x 17	.69	(17.5)
EYP0015AxxxxM03A00-	MAT9120056	4 x 8	1 x 17	.81	(20.5)
EYP0016AxxxxM03A00-	MAT9120057	4 x 6	1 x 17	.91	(23.0)
EYP0012xxxxA00P02-	MAT9120058	4 x 14	1 x 17	.53	(13.5)
EYP0013xxxxA00P02-	MAT9120059	4 x 12	1 x 17	.61	(15.5)
EYP0014xxxxA00P03-	MAT9120060	4 x 10	1 x 17	.81	(20.5)
EYP0015xxxxA00P03-	MAT9120061	4 x 8	1 x 17	.81	(20.5)
EYP0016xxxxA00P03-	MAT9120062	4 x 6	1 x 17	.91	(23.0)
EYP0010xxxxA00P01-	MAT9120063	4 x 16	1 x 17	.49	(12.5)
EYP0011xxxxA00P01-	MAT9120064	4 x 16	1 x 17	.49	(12.5)
EYP0012xxxxA00P01-	MAT9120065	4 x 14	1 x 17	.53	(13.5)

Note: The mentioned external diameters are maximum values.



Harnessed according to Lenze

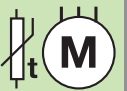
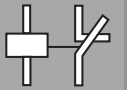
Basic Cable



Manufacturer Part No.	igus® Part No.	Power	Signal	Diameter	
		# of Conductors x AWG	# of Pairs x AWG	in.	(mm)
EWLMxxxZM-015C	MAT9120006	4 x 16	1 x 17	.49	(12.5)
EWLMxxxZM-025	MAT9120007	4 x 16	1 x 17	.53	(13.5)
EYP0012xxxxM02P02-	MAT9120066	4 x 14	1 x 17	.53	(13.5)
EYP0013xxxxM02P02-	MAT9120067	4 x 12	1 x 17	.61	(15.5)
EYP0014xxxxM03P03-	MAT9120068	4 x 10	1 x 17	.69	(17.5)
EYP0015xxxxM03P03-	MAT9120069	4 x 8	1 x 17	.81	(20.5)
EYP0016xxxxM03P03-	MAT9120070	4 x 6	1 x 17	.91	(23.0)
EYP0010xxxxM01P01-	MAT9120071	4 x 16	1 x 17	.49	(12.5)
EYP0011xxxxM01P01-	MAT9120072	4 x 16	1 x 17	.49	(12.5)
EYP0012xxxxM01P01-	MAT9120073	4 x 14	1 x 17	.53	(13.5)

Note: The mentioned external diameters are maximum values.

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



Chainflex® PUR cables



Typical application area – PUR

- for maximum mechanical load requirements
- almost unlimited resistance to oil
- Indoor and outdoor applications, UV-resistant
- especially for unsupported and gliding travel distances up to 100 m
- storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, outdoor cranes, low-temperature applications

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

Harnessed according to Lenze

CLASS
5.3.2

- Oil-resistant
- Shielded
- Flame-retardant
- Nominal voltage: 300 V
- Temperature range (flexing): +23°F to +158°F (-5°C to +70°C)
- Minimum bending radius for use in Energy Chains®: 10 x cable diameter
- Color: gray (similar to RAL 7001)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EWLRxxxGM-T	MAT9130021	(3 PR x 26) SHLD	.35	(9.0)
2 C x 20				

Linking Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EWLRxxxZMST	MAT9130022	(3 PR x 26) SHLD	.35	(9.0)
2 C x 20				

Terminal Box connection cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EWLRxxxGX-T	MAT9130023	(3 PR x 26) SHLD	.35	(9.0)
2 C x 20				

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EWLExxxGM-T	MAT9130026	4 PR x 24	.37	(9.5)
2 C x 17				

Linking Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EWLExxxZMST	MAT9130027	4 PR x 24	.37	(9.5)
2 C x 17				

Terminal Box connection cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EWLExxxGX-T	MAT9130028	4 PR x 24	.37	(9.5)
2 C x 17				



Harnessed according to Lenze

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EYF0020VxxxxA00G01	MAT9130080	3 PR x 26	.37	(9.5)
		3 C x 26		
EYF0019VxxxxA00G02	MAT9130081	(4 PR x 26) SHLD	.43	(11.0)
		2 C x 17		
EYF0022VxxxxA00G03	MAT9130082	(3 PR x 26) SHLD	.43	(11.0)
		(4 C x 26) SHLD		
		2 PR x 20		

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EYF0021AxxxxF03S03	MAT9130086	3 PR x 26	.43	(11.0)
		4 C x 26		
		2 PR x 20		
EYF0018AxxxxF02S03	MAT9130088	4 PR x 26	.43	(11.0)
		2 C x 17		
EYF0020AxxxxF01S05	MAT9130090	3 PR x 26	.37	(9.5)
		3 C x 26		

Basic Cable



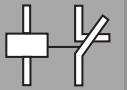
Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EYF0018AxxxxF02W02	MAT9130087	(4 PR x 26) SHLD	.43	(11.0)
		2 C x 17		
EYF0020AxxxxF01S04	MAT9130089	(3 PR x 26) SHLD	.37	(9.5)
		3 C x 26		

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EYF0018AxxxxA00W02	MAT9130091	(4 PR x 26) SHLD	.43	(11.0)
		2 C x 17		
EYF0020AxxxxA00S04	MAT9130092	(3 PR x 26) SHLD	.37	(9.5)
		3 C x 26		

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

Harnessed according to Lenze

CLASS
5.3.2

- Oil-resistant
- Shielded
- Flame-retardant
- Nominal voltage: 300 V
- Temperature range (flexing): +23°F to +158°F (-5°C to +70°C)
- Minimum bending radius for use in Energy Chains®: 10 x cable diameter
- Color: gray (similar to RAL 7001)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EYF0020AxxxxA00S05	MAT9130093	(3 PR x 26) SHLD 3 C x 26	.37	(9.5)
EYF0021AxxxxA00S03	MAT9130094	(3 PR x 26) SHLD (4 C x 26) SHLD 2 PR x 20	.43	(11.0)
EYF0018AxxxxA00S03	MAT9130095	(4 PR x 26) SHLD 2 C x 17	.43	(11.0)

Linking Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EYF0020VxxxxF01G01	MAT9130083	(3 PR x 26) SHLD 3 C x 26	.37	(9.5)
EYF0019VxxxxF02G02	MAT9130084	(4 PR x 26) SHLD 2 C x 17	.43	(11.0)
EYF0022VxxxxF03G03	MAT9130085	(3 PR x 26) SHLD (4 C x 26) SHLD 2 PR x 20	.43	(11.0)



Harnessed according to Lenze

Connecting Cable



Manufacturer	igus®	Power	Diameter	
Part No.	Part No.	# of Conductors x AWG	in.	(mm)
EYD0017AxxxxW01S01	MAT9130100	(3 PR x 26) SHLD	.37	(9.5)
3 C x 26				

Connecting Cable



Manufacturer	igus®	Power	Diameter	
Part No.	Part No.	# of Conductors x AWG	in.	(mm)
EYD0017AxxxxW01S02	MAT9130101	(3 PR x 26) SHLD	.37	(9.5)
3 C x 26				

Connecting Cable



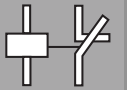
Manufacturer	igus®	Power	Diameter	
Part No.	Part No.	# of Conductors x AWG	in.	(mm)
EYD0017AxxxxW03S01	MAT9130102	(3 PR x 26) SHLD	.37	(9.5)
3 C x 26				

Connecting Cable



Manufacturer	igus®	Power	Diameter	
Part No.	Part No.	# of Conductors x AWG	in.	(mm)
EYD0017AxxxxW03S02	MAT9130103	(3 PR x 26) SHLD	.37	(9.5)
3 C x 26				

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



Harnessed according to Lenze

CLASS
6.4.4

- Oil-resistant
- Shielded
- Nominal voltage: 30 V
- Temperature range (flexing): -31°F to +212°F (-35°C to +100°C)
- Minimum bending radius for use in Energy Chains®: 10 x cable diameter
- Color: Green (similar to RAL 6018)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EWLRxxxGM-T	MAT9120021	(3 PR x 26) SHLD	.49	(12.5)
2 C x 20				

Linking Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EWLRxxxZMST	MAT9120022	(3 PR x 26) SHLD	.49	(12.5)
2 C x 20				

Terminal Box connection cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EWLRxxxGX-T	MAT9120023	(3 PR x 26) SHLD	.49	(12.5)
2 C x 20				

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EWLExxxGM-T	MAT9120026	4 PR x 24	.37	(9.5)
2 C x 17				

Linking Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EWLExxxZMST	MAT9120027	4 PR x 24	.37	(9.5)
2 C x 17				

Terminal Box connection cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EWLExxxGX-T	MAT9120028	4 PR x 24	.37	(9.5)
2 C x 17				



Clean-Room

Harnessed according to Lenze

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EYF0020VxxxxA00G01	MAT9120080	3 PR x 26	.37	(9.5)
		3 C x 26		
EYF0019VxxxxA00G02	MAT9120081	(4 PR x 26) SHLD	.43	(11.0)
		2 C x 17		
EYF0022VxxxxA00G03	MAT9120082	(3 PR x 26) SHLD	.47	(12.0)
		(4 C x 26) SHLD		
		2 PR x 20		

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EYF0021AxxxxF03S03	MAT9120086	3 PR x 26	.47	(12.0)
		4 C x 26		
		2 PR x 20		
EYF0018AxxxxF02S03	MAT9120088	4 PR x 26	.43	(11.0)
		2 C x 17		
EYF0020AxxxxF01S05	MAT9120090	3 PR x 26	.37	(9.5)
		3 C x 26		

Basic Cable



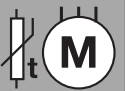
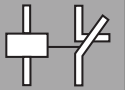
Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EYF0018AxxxxF02W02	MAT9120087	(4 PR x 26) SHLD	.43	(11.0)
		2 C x 17		
EYF0020AxxxxF01S04	MAT9120089	(3 PR x 26) SHLD	.37	(9.5)
		3 C x 26		

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EYF0018AxxxxA00W02	MAT9120091	(4 PR x 26) SHLD	.43	(11.0)
		2 C x 17		
EYF0020AxxxxA00S04	MAT9120092	(3 PR x 26) SHLD	.37	(9.5)
		3 C x 26		

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

Harnessed according to Lenze

CLASS
6.4.4

- Oil-resistant
- Shielded
- Nominal voltage: 30 V
- Temperature range (flexing): -31°F to +212°F (-35°C to +100°C)
- Minimum bending radius for use in Energy Chains®: 10 x cable diameter
- Color: Green (similar to RAL 6018)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EYF0020AxxxxA00S05	MAT9120093	(3 PR x 26) SHLD 3 C x 26	.37	(9.5)
EYF0021AxxxxA00S03	MAT9120094	(3 PR x 26) SHLD (4 C x 26) SHLD 2 PR x 20	.47	(12.0)
EYF0018AxxxxA00S03	MAT9120095	(4 PR x 26) SHLD 2 C x 17	.43	(11.0)

Linking Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EYF0020VxxxxF01G01	MAT9120083	(3 PR x 26) SHLD 3 C x 26	.37	(9.5)
EYF0019VxxxxF02G02	MAT9120084	(4 PR x 26) SHLD 2 C x 17	.43	(11.0)
EYF0022VxxxxF03G03	MAT9120085	(3 PR x 26) SHLD (4 C x 26) SHLD 2 PR x 20	.47	(12.0)



Clean-Room

Harnessed according to Lenze

Connecting Cable



Manufacturer	igus®	Power	Diameter	
Part No.	Part No.	# of Conductors x AWG	in.	(mm)
EYD0017AxxxxW01S01	MAT9120100	(3 PR x 26) SHLD	.37	(9.5)
3 C x 26				

Connecting Cable



Manufacturer	igus®	Power	Diameter	
Part No.	Part No.	# of Conductors x AWG	in.	(mm)
EYD0017AxxxxW01S02	MAT9120101	(3 PR x 26) SHLD	.37	(9.5)
3 C x 26				

Connecting Cable



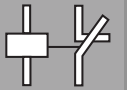
Manufacturer	igus®	Power	Diameter	
Part No.	Part No.	# of Conductors x AWG	in.	(mm)
EYD0017AxxxxW03S01	MAT9120102	(3 PR x 26) SHLD	.37	(9.5)
3 C x 26				

Connecting Cable



Manufacturer	igus®	Power	Diameter	
Part No.	Part No.	# of Conductors x AWG	in.	(mm)
EYD0017AxxxxW03S02	MAT9120103	(3 PR x 26) SHLD	.37	(9.5)
3 C x 26				

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



Harnessed according to Lenze

- Oil-resistant
- Flame-retardant
- Nominal voltage: 300 V
- Temperature range (flexing): +23°F to +158°F (-5°C to +70°C)
- Minimum bending radius for use in Energy Chains®: 6.8 - 7.5 x cable diameter
- Color: green (similar to RAL 6005)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EWLLxxxGMS	MAT9130031	3 X 17	.28	(7.0)
EYL002AxxxxL01A00	MAT9130040	5 X 17	.33	(8.5)
EYL002AxxxxL02A00	MAT9130041	5 X 17	.33	(8.5)
EYL002VxxxxA00J01	MAT9130042	5 X 17	.33	(8.5)
EYL002VxxxxA00J02	MAT9130043	5 X 17	.33	(8.5)

Linking Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EWLLXXXZM	MAT9130032	3 x 17	.28	(7.0)
EYL002VxxxxL01J01	MAT9130044	5 X 17	.33	(8.5)
EYL002VxxxxL02J02	MAT9130045	5 X 17	.33	(8.5)

Note: The mentioned external diameters are maximum values.



Chainflex® TPE Control Cable



Control
TPE

Harnessed according to Lenze

- Oil-resistant and bio-oil-resistant
- Nominal voltage: 300 V
- Temperature range (flexing): -31°F to +212°F (-35°C to +100°C)
- Minimum bending radius for use in Energy Chains®: 5 x cable diameter
- Color: Blue (similar to RAL 5011)

CLASS
7.4.4

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EWLLxxxGMS	MAT9120031	3 X 17	.24	(6.0)
EYL002AxxxxL01A00	MAT9120040	5 X 17	.28	(7.0)
EYL002AxxxxL02A00	MAT9120041	5 X 17	.28	(7.0)
EYL002VxxxxA00J01	MAT9120042	5 X 17	.28	(7.0)
EYL002VxxxxA00J02	MAT9120043	5 X 17	.28	(7.0)

Linking Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
EWLLXXXZM	MAT9120032	3 x 17	.24	(6.0)
EYL002VxxxxL01J01	MAT9120044	5 X 17	.28	(7.0)
EYL002VxxxxL02J02	MAT9120045	5 X 17	.28	(7.0)

Note: The mentioned external diameters are maximum values.



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number



10.259

- Oil-resistant
- Shielded
- Flame-retardant
- Nominal voltage: 1000 V
- Temperature range (flexing): +23°F to +158°F (-5°C to +70°C)
- Minimum bending radius for use in Energy Chains®: 7.5 x cable diameter
- Color: green (similar to RAL 6005)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power	Signal	Diameter	
		# of Conductors x AWG	# of Pairs x AWG	in.	(mm)
IKG0001	MAT9190022	4 x 17	2 x 18	.53	(13.5)
IKG0006	MAT9190067	4 x 17	2 x 18	.53	(13.5)
IKG0011	MAT9190023	4 x 17	2 x 18	.53	(13.5)
IKG0021	MAT9190024	4 x 14	2 x 16	.63	(16.0)
IKG0041	MAT9190017	4 x 14	2 x 16	.63	(16.0)
IKG0042	MAT9190077	4 x 14	2 x 16	.63	(16.0)
IKG0061	MAT9190018	4 x 12	2 x 16	.71	(18.0)
IKG0081	MAT9190030	4 x 10	2 x 16	.77	(19.5)
IKG0101	MAT9190025	4 x 10	2 x 16	.77	(19.5)
IKG0121	MAT9190019	4 x 6	2 x 16	.93	(23.5)
IKG0161	MAT9190063	4 x 4	2 x 16	1.18	(30.0)
IKG0331	MAT9190014	4 x 18	1 x 20	.43	(11.0)
IKG4008	MAT9190064	4 x 16	2 x 18	.57	(14.5)
IKG4009	MAT9190001	4 x 16	2 x 18	.57	(14.5)
IKG4017	MAT9190002	4 x 16	2 x 18	.57	(14.5)
IKG4018	MAT9190003	4 x 16	2 x 18	.57	(14.5)
IKG4020	MAT9190004	4 x 16	2 x 18	.57	(14.5)
IKG4055	MAT9190005	4 x 16	2 x 18	.57	(14.5)
IKG4060	MAT9190006	4 x 16	2 x 18	.57	(14.5)
IKG4067	MAT9190007	4 x 14	2 x 16	.65	(16.5)
IKG4070	MAT9190008	4 x 14	2 x 16	.65	(16.5)
IKG4072	MAT9190068	4 x 14	2 x 16	.65	(16.5)
IKG4087	MAT9190009	4 x 12	2 x 16	.72	(18.5)
IKG4090	MAT9190010	4 x 12	2 x 16	.72	(18.5)
IKG4100	MAT9190020	4 x 17	2 x 18	.53	(13.5)
IKG4103	MAT9190076	4 x 10	2 x 16	.81	(20.5)
IKG4107	MAT9190011	4 x 10	2 x 16	.81	(20.5)
IKG4118	MAT9190070	4 x 10	2 x 16	.81	(20.5)
IKG4119	MAT9190027	4 x 17	2 x 18	.53	(13.5)
IKG4147	MAT9190038	4 x 10	2 x 16	.81	(20.5)
IKG4150	MAT9190012	4 x 10	2 x 16	.81	(20.5)
IKG4155	MAT9190028	4 x 10	2 x 16	.77	(19.5)
IKG4164	MAT9190035	4 x 8	2 x 16	.93	(23.5)
IKG4167	MAT9190013	4 x 8	2 x 16	.94	(24.0)
IKG4172	MAT9190069	4 x 6	2 x 16	1.02	(26.0)
IKG4173	MAT9190072	4 x 4	2 x 16	1.18	(30.0)
IKG4186	MAT9190021	4 x 6	2 x 16	1.02	(26.0)
IKG4200	MAT9190032	4 x 6	2 x 16	1.02	(26.0)
IKG4204	MAT9190052	4 x 4	2 x 16	1.18	(30.0)

Note: The mentioned external diameters are maximum values.

No Minimum Order • No Cut Charges on up to 10 cuts of the same part number



Harnessed according to Rexroth

Connecting Cable with adapter plugs



Manufacturer Part No.	igus® Part No.	Power		Signal		Diameter	
		# of Conductors x AWG	# of Pairs x AWG	# of Pairs x AWG	# of Pairs x AWG	in.	(mm)
IKG0023	MAT9191013	4 x 16	2 x 18	2 x 18	2 x 18	.57	(14.5)
IKG0089	MAT9191005	4 x 10	2 x 16	2 x 16	2 x 16	.77	(19.5)
IKG0168	MAT9191006	4 x 4	2 x 16	2 x 16	2 x 16	1.18	(30.0)
IKG0332	MAT9190015	4 x 18	2 x 20	2 x 20	2 x 20	.43	(11.0)
IKG4006	MAT9191001	4 x 16	2 x 18	2 x 18	2 x 18	.57	(14.5)
IKG4016	MAT9191002	4 x 16	2 x 18	2 x 18	2 x 18	.57	(14.5)
IKG4061	MAT9191004	4 x 24	2 x 16	2 x 16	2 x 16	.65	(16.5)
IKG4074	MAT9191014	4 x 24	2 x 16	2 x 16	2 x 16	.65	(16.5)
IKG4081	MAT9191016	4 x 10	2 x 16	2 x 16	2 x 16	.81	(20.5)
IKG4141	MAT9191003	4 x 10	2 x 16	2 x 16	2 x 16	.77	(19.5)
IKG4161	MAT9191036	4 x 8	2 x 16	2 x 16	2 x 16	.93	(23.5)

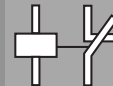
Basic Cable



IKG4300	MAT9190071	4 x 16	2 x 18	2 x 18	2 x 18	.57	(14.5)
IKG4301	MAT9190037	4 x 16	2 x 18	2 x 18	2 x 18	.57	(14.5)
IKG4302	MAT9190026	4 x 17	2 x 18	2 x 18	2 x 18	.53	(13.5)
IKG4303	MAT9190029	4 x 17	2 x 18	2 x 18	2 x 18	.53	(13.5)
IKG4306	MAT9190040	4 x 16	2 x 18	2 x 18	2 x 18	.57	(14.5)
IKG4307	MAT9190041	4 x 16	2 x 18	2 x 18	2 x 18	.57	(14.5)
IKG4308	MAT9190033	4 x 14	2 x 16	2 x 16	2 x 16	.63	(16.0)
IKG4309	MAT9190042	4 x 14	2 x 16	2 x 16	2 x 16	.63	(16.0)
IKG4310	MAT9190043	4 x 14	2 x 16	2 x 16	2 x 16	.63	(16.0)
IKG4313	MAT9190062	4 x 12	2 x 16	2 x 16	2 x 16	.71	(18.0)
IKG4314	MAT9190060	4 x 12	2 x 16	2 x 16	2 x 16	.74	(18.8)
IKG4315	MAT9190059	4 x 12	2 x 16	2 x 16	2 x 16	.71	(18.0)
IKG4317	MAT9190061	4 x 10	2 x 16	2 x 16	2 x 16	.77	(19.5)
IKG4318	MAT9190047	4 x 10	2 x 16	2 x 16	2 x 16	.77	(19.5)
IKG4320	MAT9190039	4 x 16	2 x 18	2 x 18	2 x 18	.57	(14.5)
IKG4321	MAT9190075	4 x 14	2 x 16	2 x 16	2 x 16	.63	(16.0)
IKG4322	MAT9190078	4 x 12	2 x 16	2 x 16	2 x 16	.71	(18.0)
IKG4323	MAT9190073	4 x 10	2 x 16	2 x 16	2 x 16	.77	(19.5)
IKG4324	MAT9190079	4 x 8	2 x 16	2 x 16	2 x 16	.93	(23.5)
IKG4325	MAT9190049	4 x 16	2 x 18	2 x 18	2 x 18	.57	(14.5)
IKG4326	MAT9190045	4 x 14	2 x 16	2 x 16	2 x 16	.63	(16.0)
IKG4327	MAT9190050	4 x 12	2 x 16	2 x 16	2 x 16	.71	(18.0)
IKG4328	MAT9190057	4 x 10	2 x 16	2 x 16	2 x 16	.77	(19.5)
IKG4329	MAT9190051	4 x 8	2 x 16	2 x 16	2 x 16	.93	(23.5)
IKG4330	MAT9190080	4 x 6	2 x 16	2 x 16	2 x 16	1.02	(26.0)
IKG4331	MAT9190081	4 x 4	2 x 16	2 x 16	2 x 16	1.18	(30.0)

Note: The mentioned external diameters are maximum values.

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



- Oil-resistant and coolant resistant
- Shielded
- Flame-retardant
- Notch-resistant, hydrolysis-resistant and microbe resistant
- Nominal voltage: 1000 V
- Temperature range (flexing): -4°F to +176°F (-20°C to +80°C)
- Minimum bending radius for use in Energy Chains®: 7.5 x cable diameter



Basic Cable

Manufacturer Part No.	igus® Part No.	Power	Signal	Diameter	
		# of Conductors x AWG	# of Pairs x AWG	in.	(mm)
IKG0001	MAT9090022	4 x 17	2 x 18	.53	(13.5)
IKG0006	MAT9090067	4 x 17	2 x 18	.53	(13.5)
IKG0011	MAT9090023	4 x 17	2 x 18	.53	(13.5)
IKG0021	MAT9090024	4 x 14	2 x 16	.63	(16.0)
IKG0041	MAT9090017	4 x 14	2 x 16	.63	(16.0)
IKG0042	MAT9090077	4 x 14	2 x 16	.63	(16.0)
IKG0061	MAT9090018	4 x 12	2 x 16	.71	(18.0)
IKG0081	MAT9090030	4 x 10	2 x 16	.77	(19.5)
IKG0101	MAT9090025	4 x 10	2 x 16	.77	(19.5)
IKG0121	MAT9090019	4 x 6	2 x 16	.93	(23.5)
IKG0161	MAT9090063	4 x 4	2 x 16	1.18	(30.0)
IKG0331	MAT9090014	4 x 18	1 x 20	.43	(11.0)
IKG4008	MAT9090064	4 x 16	2 x 18	.57	(14.5)
IKG4009	MAT9090001	4 x 16	2 x 18	.57	(14.5)
IKG4017	MAT9090002	4 x 16	2 x 18	.57	(14.5)
IKG4018	MAT9090003	4 x 16	2 x 18	.57	(14.5)
IKG4020	MAT9090004	4 x 16	2 x 18	.57	(14.5)
IKG4055	MAT9090005	4 x 16	2 x 18	.57	(14.5)
IKG4060	MAT9090006	4 x 16	2 x 18	.57	(14.5)
IKG4067	MAT9090007	4 x 14	2 x 16	.65	(16.5)
IKG4070	MAT9090008	4 x 14	2 x 16	.65	(16.5)
IKG4072	MAT9090068	4 x 14	2 x 16	.65	(16.5)
IKG4087	MAT9090009	4 x 12	2 x 16	.72	(18.5)
IKG4090	MAT9090010	4 x 12	2 x 16	.72	(18.5)
IKG4100	MAT9090020	4 x 17	2 x 18	.53	(13.5)
IKG4103	MAT9090076	4 x 10	2 x 16	.81	(20.5)
IKG4107	MAT9090011	4 x 10	2 x 16	.81	(20.5)
IKG4118	MAT9090070	4 x 10	2 x 16	.81	(20.5)
IKG4119	MAT9090027	4 x 17	2 x 18	.53	(13.5)
IKG4147	MAT9090038	4 x 10	2 x 16	.81	(20.5)
IKG4150	MAT9090012	4 x 10	2 x 16	.81	(20.5)
IKG4155	MAT9090028	4 x 10	2 x 16	.77	(19.5)
IKG4164	MAT9090035	4 x 8	2 x 16	.93	(23.5)
IKG4167	MAT9090013	4 x 8	2 x 16	.94	(24.0)
IKG4172	MAT9090069	4 x 6	2 x 16	1.02	(26.0)
IKG4173	MAT9090072	4 x 4	2 x 16	1.18	(30.0)
IKG4186	MAT9090021	4 x 6	2 x 16	1.02	(26.0)
IKG4200	MAT9090032	4 x 6	2 x 16	1.02	(26.0)
IKG4204	MAT9090052	4 x 4	2 x 16	1.18	(30.0)

Note: The mentioned external diameters are maximum values.



Harnessed according to Rexroth

- Color: orange (similar to RAL 2003)

Connecting Cable with adapter plugs



Manufacturer Part No.	igus® Part No.	Power		Diameter	
		# of Conductors x AWG	# of Pairs x AWG	in.	(mm)
IKG0023	MAT9091013	4 x 16	2 x 18	.57	(14.5)
IKG0089	MAT9091005	4 x 10	2 x 16	.77	(19.5)
IKG0168	MAT9091006	4 x 4	2 x 16	1.18	(30.0)
IKG0332	MAT9090015	4 x 18	2 x 20	.43	(11.0)
IKG4006	MAT9091001	4 x 16	2 x 18	.57	(14.5)
IKG4016	MAT9091002	4 x 16	2 x 18	.57	(14.5)
IKG4061	MAT9091004	4 x 24	2 x 16	.65	(16.5)
IKG4074	MAT9091014	4 x 24	2 x 16	.65	(16.5)
IKG4081	MAT9091016	4 x 10	2 x 16	.81	(20.5)
IKG4141	MAT9091003	4 x 10	2 x 16	.77	(19.5)
IKG4161	MAT9091036	4 x 8	2 x 16	.93	(23.5)

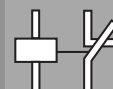


Basic Cable

IKG4300	MAT9090071	4 x 16	2 x 18	.57	(14.5)
IKG4301	MAT9090037	4 x 16	2 x 18	.57	(14.5)
IKG4302	MAT9090026	4 x 17	2 x 18	.53	(13.5)
IKG4303	MAT9090029	4 x 17	2 x 18	.53	(13.5)
IKG4306	MAT9090040	4 x 16	2 x 18	.57	(14.5)
IKG4307	MAT9090041	4 x 16	2 x 18	.57	(14.5)
IKG4308	MAT9090033	4 x 14	2 x 16	.63	(16.0)
IKG4309	MAT9090042	4 x 14	2 x 16	.63	(16.0)
IKG4310	MAT9090043	4 x 14	2 x 16	.63	(16.0)
IKG4313	MAT9090062	4 x 12	2 x 16	.71	(18.0)
IKG4314	MAT9090060	4 x 12	2 x 16	.74	(18.8)
IKG4315	MAT9090059	4 x 12	2 x 16	.71	(18.0)
IKG4317	MAT9090061	4 x 10	2 x 16	.77	(19.5)
IKG4318	MAT9090047	4 x 10	2 x 16	.77	(19.5)
IKG4320	MAT9090039	4 x 16	2 x 18	.57	(14.5)
IKG4321	MAT9090075	4 x 14	2 x 16	.63	(16.0)
IKG4322	MAT9090078	4 x 12	2 x 16	.71	(18.0)
IKG4323	MAT9090073	4 x 10	2 x 16	.77	(19.5)
IKG4324	MAT9090079	4 x 8	2 x 16	.93	(23.5)
IKG4325	MAT9090049	4 x 16	2 x 18	.57	(14.5)
IKG4326	MAT9090045	4 x 14	2 x 16	.63	(16.0)
IKG4327	MAT9090050	4 x 12	2 x 16	.71	(18.0)
IKG4328	MAT9090057	4 x 10	2 x 16	.77	(19.5)
IKG4329	MAT9090051	4 x 8	2 x 16	.93	(23.5)
IKG4330	MAT9090080	4 x 6	2 x 16	1.02	(26.0)
IKG4331	MAT9090081	4 x 4	2 x 16	1.18	(30.0)

Note: The mentioned external diameters are maximum values.

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



Harnessed according to Rexroth

CLASS
5.3.2

- Oil-resistant
- Shielded
- Flame-retardant
- Nominal voltage: 300 V
- Temperature range (flexing): +23°F to +158°F (-5°C to +70°C)
- Minimum bending radius for use in Energy Chains®: 10 x cable diameter
- Color: gray (similar to RAL 7001)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
IKS0203	MAT9110008	2 PR x 24	.28	(7.0)
		2 C x 20		
IKS0232	MAT9110009	2 PR x 24	.28	(7.0)
		2 C x 20		
IKS0301	MAT9110015	4 PR x 24	.37	(9.5)
		2 C x 17		
IKS0315	MAT9110020	4 PR x 24	.37	(9.5)
		2 C x 17		
IKS0374	MAT9110011	4 PR x 24	.37	(9.5)
		2 C x 17		
IKS4001	MAT9110026	4 PR x 26	.35	(9.0)
		4 C x 17		
		(4 C x 17) SHLD		
IKS4002	MAT9110010	3 C x 24	.35	(9.0)
		(3 PR x 24) SHLD		
		2 C x 17		
IKS4020	MAT9110006	4 PR x 26	.35	(9.0)
		4 C x 17		
		(4 C x 17) SHLD		
IKS4038	MAT9110027	4 PR x 26	.35	(9.0)
		4 C x 17		
		(4 C x 17) SHLD		
IKS4041	MAT9110028	3 C x 24	.35	(9.0)
		(3 PR x 24) SHLD		
		2 C x 17		
IKS4042	MAT9110017	4 PR x 24	.35	(9.0)
		2 C x 17		
IKS4066	MAT9110025	4 PR x 24	.35	(9.0)
		2 C x 17		
IKS4103	MAT9110001	4 PR x 24	.35	(9.0)
		2 C x 17		
IKS4142	MAT9110007	4 PR x 26	.35	(9.0)
		4 C x 17		
		(4 C x 17) SHLD		

Note: The mentioned external diameters are maximum values.



Harnessed according to Rexroth

- Color: gray (similar to RAL 7001)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
IKS4314	MAT9110004	4 PR x 24	.35	(9.0)
		2 C x 17		
IKS4374	MAT9110002	4 PR x 24	.35	(9.0)
		2 C x 17		
IKS4375	MAT9110003	4 PR x 24	.35	(9.0)
		2 C x 17		
IKS4384	MAT9110005	3 C x 24	.35	(9.0)
		(3 PR x 24) SHLD		
		2 C x 17		
IKS4389	MAT9110033	3 C x 24	.35	(9.0)
		(3 PR x 24) SHLD		
		2 C x 17		

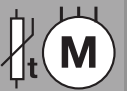
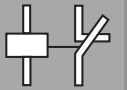
Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
RKG0014	MAT9110030	3 C x 24	.35	(9.0)
		(3 PR x 24) SHLD		
		2 C x 17		
RKG0020	MAT9110034	4 PR x 24	.37	(9.5)
		2 C x 20		
RKG0026	MAT9110029	3 C x 24	.35	(9.0)
		(3 PR x 24) SHLD		
		2 C x 17		
RKG0028	MAT9110031	3 C x 24	.35	(9.0)
		(3 PR x 24) SHLD		
		2 C x 17		
RKG4200	MAT9110013	4 PR x 24	.37	(9.5)
		2 C x 20		

Note: The mentioned external diameters are maximum values.

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



Harnessed according to Rexroth

CLASS
5.3.2

- Oil-resistant
- Shielded
- Flame-retardant
- Nominal voltage: 300 V
- Temperature range (flexing): +23°F to +158°F (-5°C to +70°C)
- Minimum bending radius for use in Energy Chains®: 10 x cable diameter
- Color: gray (similar to RAL 7001)

Connecting Cable with
adapter plugs

Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
IKS0303	MAT9110019	4 PR x 24	.37	(9.5)
		2 C x 17		
IKS4065	MAT9111001	4 PR x 24	.35	(9.0)
		2 C x 20		
IKS4151	MAT9111002	4 PR x 24	.35	(9.0)
		2 C x 20		
IKS4153	MAT9111003	4 PR x 24	.35	(9.0)
		2 C x 20		
IKS4376	MAT9111004	4 PR x 24	.35	(9.0)
		2 C x 20		
IKS4322	MAT9111005	4 PR x 24	.35	(9.0)
		2 C x 20		

Connecting Cable with
adapter plugs

Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
RKG4201	MAT9111006	4 PR x 24	.37	(9.5)
		2 C x 20		

Note: The mentioned external diameters are maximum values.



Chainflex® TPE Position Feedback



Position
Feedback
TPE

Harnessed according to Rexroth

- Oil-resistant
- Shielded
- Nominal voltage: 30 V
- Temperature range (flexing): -31°F to +212°F (-35°C to +100°C)
- Minimum bending radius for use in Energy Chains®: 10 x cable diameter
- Color: Green (similar to RAL 6018)

CLASS
6.4.4

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
IKS0203	MAT9100008	2 PR x 24	.28	(7.0)
		2 C x 20		
IKS0251	MAT9100014 ⁽¹⁾	12 C x 20	.45	(11.5)
IKS0253	MAT9100023 ⁽¹⁾	12 C x 20	.45	(11.5)
IKS0259	MAT9100032 ⁽¹⁾	12 C x 20	.45	(11.5)
IKS0262	MAT9100016 ⁽¹⁾	12 C x 20	.45	(11.5)
IKS0301	MAT9100015	4 PR x 24	.37	(9.5)
		2 C x 17		
IKS0315	MAT9100020	4 PR x 24	.37	(9.5)
		2 C x 17		
IKS0374	MAT9100011	4 PR x 24	.37	(9.5)
		2 C x 17		
IKS4001	MAT9100026	4 PR x 26	.35	(9.0)
		4 C x 17		
		(4 C x 26) SHLD		
IKS4002	MAT9100010	3 C x 24	.35	(9.0)
		(3 PR x 24) SHLD		
		2 C x 17		
IKS4020	MAT9100006	4 PR x 26	.35	(9.0)
		4 C x 17		
		(4 C x 26) SHLD		
IKS4038	MAT9100027	4 PR x 26	.35	(9.0)
		4 C x 17		
		(4 C x 26) SHLD		
IKS4041	MAT9100028	3 C x 24	.35	(9.0)
		(3 PR x 24) SHLD		
		2 C x 17		
IKS4042	MAT9100017	4 PR x 24	.35	(9.0)
		2 C x 17		
IKS4066	MAT9100025	4 PR x 24	.35	(9.0)
		2 C x 17		
IKS4103	MAT9100001	4 PR x 24	.37	(9.5)
		2 C x 17		
IKS4142	MAT9100007	4 PR x 26	.35	(9.0)
		4 C x 17		
		(4 C x 26) SHLD		

Note: The mentioned external diameters are maximum values.



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number



10.267

Harnessed according to Rexroth

CLASS
6.4.4

- Oil-resistant
- Shielded
- Nominal voltage: 30 V
- Temperature range (flexing): -31°F to +212°F
- (-35°C to +100°C)
- Minimum bending radius for use in Energy Chains®:
10 x cable diameter
- Color: green (similar to RAL 6018)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
IKS4314	MAT9100004	4 PR x 24	.37	(9.5)
		2 C x 17		
IKS4374	MAT9100002	4 PR x 24	.37	(9.5)
		2 C x 17		
IKS4375	MAT9100003	4 PR x 24	.37	(9.5)
		2 C x 17		
IKS4384	MAT9100005	3 C x 24	.35	(9.0)
		(3 PR x 24) SHLD		
		2 C x 17		
IKS4389	MAT9100033	3 C x 24	.35	(9.0)
		(3 PR x 24) SHLD		
		2 C x 17		

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
RKG0014	MAT9100030	3 C x 24	.35	(9.0)
		(3 PR x 24) SHLD		
		2 C x 17		
RKG0020	MAT9100034	4 PR x 24	.37	(9.5)
		2 C x 20		
RKG0026	MAT9100029	3 C x 24	.35	(9.0)
		(3 PR x 24) SHLD		
		2 C x 17		
RKG0028	MAT9100031	3 C x 24	.35	(9.0)
		(3 PR x 24) SHLD		
		2 C x 17		
RKG4200	MAT9100013	4 PR x 24	.37	(9.5)
		2 C x 20		

Note: The mentioned external diameters are maximum values.



Harnessed according to Rexroth

Connecting Cable with adapter plugs



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
IKS0232	MAT9100009	2 PR x 24	.28	(7.0)
		2 C x 20		
IKS0255	MAT9100018 ⁽¹⁾	12 C x 20	.45	(11.5)
IKS0303	MAT9100019	4 PR x 24	.37	(9.5)
		2 C x 17		
IKS4065	MAT9101001	4 PR x 24	.35	(9.0)
		2 C x 20		
IKS4151	MAT9101002	4 PR x 24	.35	(9.0)
		2 C x 20		
IKS4153	MAT9101003	4 PR x 24	.35	(9.0)
		2 C x 20		
IKS4376	MAT9101004	4 PR x 24	.35	(9.0)
		2 C x 20		
IKS4322	MAT9101005	4 PR x 24	.35	(9.0)
		2 C x 20		

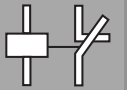
Connecting Cable with adapter plugs



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
RKG4201	MAT9101006	4 PR x 24	.37	(9.5)
		2 C x 20		

Note: The mentioned external diameters are maximum values.

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



- Oil-resistant
- Shielded
- Flame-retardant
- Nominal voltage: 1000 V
- Temperature range (flexing): +23°F to +158°F
- (-5°C to +70°C)
- Minimum bending radius for use in Energy Chains®: 7.5 x cable diameter
- Color: green (similar to RAL 6005)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Signal # of Pairs x AWG	Diameter	
				in.	(mm)
6FX8002-5DA01	MAT9160001	4 x 16	1 x 17	.49	(12.5)
6FX8002-5DA11	MAT9160002	4 x 14	1 x 17	.53	(13.5)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Signal # of Pairs x AWG	Diameter	
				in.	(mm)
6FX8002-5DA21	MAT9160003	4 x 16	1 x 17	.49	(12.5)
6FX8002-5DA31	MAT9160004	4 x 14	1 x 17	.53	(13.5)
6FX8002-5DA41	MAT9160005	4 x 12	1 x 17	.61	(15.5)
6FX8002-5DA51	MAT9160006	4 x 10	1 x 17	.71	(18.0)
6FX8002-5DA61	MAT9160007	4 x 8	1 x 16	.87	(22.0)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Signal # of Pairs x AWG	Diameter	
				in.	(mm)
6FX8002-5DA23	MAT9160008	4 x 6	1 x 17	.96	(24.5)
6FX8002-5DA33	MAT9160009	4 x 4	1 x 16	1.16	(29.5)
6FX8002-5DA43	MAT9160010	4 x 2	1 x 16	1.30	(33.0)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Signal # of Pairs x AWG	Diameter	
				in.	(mm)
6FX8002-5DS01	MAT9160020	4 x 16	1 x 17	.49	(12.5)
6FX8002-5DS21	MAT9160021	4 x 16	1 x 17	.49	(12.5)
6FX8002-5DS61	MAT9160022	4 x 8	1 x 16	.89	(22.5)

Note: The mentioned external diameters are maximum values.



Harnessed according to Siemens

Extension Cable



Manufacturer Part No.	igus® Part No.	Power	Signal	Diameter	
		# of Conductors x AWG	# of Pairs x AWG	in.	(mm)
6FX8002-5DA05	MAT9161001	4 x 16	1 x 17	.49	(12.5)
6FX8002-5DA15	MAT9161002	4 x 14	1 x 17	.53	(13.5)

Extension Cable



Manufacturer Part No.	igus® Part No.	Power	Signal	Diameter	
		# of Conductors x AWG	# of Pairs x AWG	in.	(mm)
6FX8002-5DA28	MAT9161003	4 x 16	1 x 17	.49	(12.5)
6FX8002-5DA38	MAT9161004	4 x 14	1 x 17	.53	(13.5)
6FX8002-5DA48	MAT9161005	4 x 12	1 x 17	.61	(15.5)
6FX8002-5DA58	MAT9161006	4 x 10	1 x 17	.71	(18.0)
6FX8002-5DA68	MAT9161007	4 x 8	1 x 16	.87	(22.0)

Extension Cable



Manufacturer Part No.	igus® Part No.	Power	Signal	Diameter	
		# of Conductors x AWG	# of Pairs x AWG	in.	(mm)
6FX8002-5DX28	MAT9161008	4 x 16	1 x 17	.96	(24.5)
6FX8002-5DX38	MAT9161009	4 x 16	1 x 17	1.16	(29.5)
6FX8002-5DX48	MAT9161010	4 x 16	1 x 17	1.30	(33.0)

Note: The mentioned external diameters are maximum values.

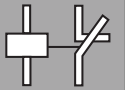
Chainflex® PVC cables



Typical application area – PVC

- for high mechanical load requirements
- light oil influence
- preferably indoor applications, but also outdoor ones at temperatures > 5 °C
- especially for unsupported and gliding travel distances up to 100 m
- storage and retrieval units for high-bay warehouses, machining units/packages machines, quick handling, indoor cranes, timber processing

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

- Oil-resistant and coolant resistant
- Shielded
- Flame-retardant
- Notch-resistant, hydrolysis-resistant and microbe resistant
- Nominal voltage: 1000 V
- Temperature range (flexing): -4°F to +176°F (-20°C to +80°C)
- Minimum bending radius for use in Energy Chains®: 7.5 x cable diameter
- Color: orange (similar to RAL 2003)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Signal # of Pairs x AWG	Diameter	
				in.	(mm)
6FX8002-5DA01	MAT9060001	4 x 16	1 x 17	.49	(12.5)
6FX8002-5DA11	MAT9060002	4 x 14	1 x 17	.53	(13.5)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Signal # of Pairs x AWG	Diameter	
				in.	(mm)
6FX8002-5DA21	MAT9060003	4 x 16	1 x 17	.49	(12.5)
6FX8002-5DA31	MAT9060004	4 x 14	1 x 17	.53	(13.5)
6FX8002-5DA41	MAT9060005	4 x 12	1 x 17	.61	(15.5)
6FX8002-5DA51	MAT9060006	4 x 10	1 x 17	.69	(17.5)
6FX8002-5DA61	MAT9060007	4 x 8	1 x 16	.81	(20.5)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Signal # of Pairs x AWG	Diameter	
				in.	(mm)
6FX8002-5DA23	MAT9060008	4 x 6	1 x 17	.94	(24.0)
6FX8002-5DA33	MAT9060009	4 x 4	1 x 16	1.12	(28.5)
6FX8002-5DA43	MAT9060010	4 x 2	1 x 16	1.28	(32.5)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Signal # of Pairs x AWG	Diameter	
				in.	(mm)
6FX8002-5DS01	MAT9060020	4 x 16	1 x 17	.49	(12.5)
6FX8002-5DS21	MAT9060021	4 x 16	1 x 17	.49	(12.5)
6FX8002-5DS61	MAT9060022	4 x 8	1 x 16	.81	(20.5)

Note: The mentioned external diameters are maximum values.



Harnessed according to Siemens

- Color: orange (similar to RAL 2003)

Extension Cable



Manufacturer Part No.	igus® Part No.	Power		Signal		Diameter	
		# of Conductors x AWG	# of Pairs x AWG	# of Pairs x AWG	in.	(mm)	
6FX8002-5DA05	MAT9061001	4 x 16		1 x 17	.49	(12.5)	
6FX8002-5DA15	MAT9061002	4 x 14		1 x 17	.53	(13.5)	

Extension Cable



Manufacturer Part No.	igus® Part No.	Power		Signal		Diameter	
		# of Conductors x AWG	# of Pairs x AWG	# of Pairs x AWG	in.	(mm)	
6FX8002-5DA28	MAT9061003	4 x 16		1 x 17	.49	(12.5)	
6FX8002-5DA38	MAT9061004	4 x 14		1 x 17	.53	(13.5)	
6FX8002-5DA48	MAT9061005	4 x 12		1 x 17	.61	(15.5)	
6FX8002-5DA58	MAT9061006	4 x 10		1 x 17	.69	(17.5)	
6FX8002-5DA68	MAT9061007	4 x 8		1 x 16	.81	(20.5)	

Extension Cable



Manufacturer Part No.	igus® Part No.	Power		Signal		Diameter	
		# of Conductors x AWG	# of Pairs x AWG	# of Pairs x AWG	in.	(mm)	
6FX8002-5DX28	MAT9061008	4 x 16		1 x 17	.94	(24.0)	
6FX8002-5DX38	MAT9061009	4 x 16		1 x 17	1.12	(28.5)	
6FX8002-5DX48	MAT9061010	4 x 16		1 x 17	1.28	(32.5)	

Note: The mentioned external diameters are maximum values.

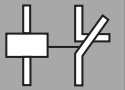
Chainflex® PUR cables



Typical application area – PUR

- for maximum mechanical load requirements
- almost unlimited resistance to oil
- Indoor and outdoor applications, UV-resistant
- especially for unsupported and gliding travel distances up to 100 m
- storage and retrieval units for high-bay warehouses, machining units/machine tools, quick handling, clean room, semiconductor insertion, outdoor cranes, low-temperature applications

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

- Oil-resistant
- Shielded
- Flame-retardant
- Nominal voltage: 1000 V
- Temperature range (flexing): +23°F to +158°F (-5°C to +70°C)
- Minimum bending radius for use in Energy Chains®: 7.5 x cable diameter
- Color: black (similar to RAL 9005)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-5CA01	MAT9150001	4 C x 16	.49	(12.5)
6FX8002-5CA11	MAT9150002	4 C x 14	.59	(15.0)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-5CA21	MAT9150003	4 C x 16	.49	(12.5)
6FX8002-5CA31	MAT9150004	4 C x 14	.59	(15.0)
6FX8002-5CA41	MAT9150005	4 C x 12	.62	(16.0)
6FX8002-5CA51	MAT9150006	4 C x 10	.75	(19.0)
6FX8002-5CA61	MAT9150007	4 C x 8	.94	(24.0)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-5CA23	MAT9150008	4 C x 6	1.06	(27.0)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-5CS01	MAT9150020	4 C x 16	.41	(10.5)
6FX8002-5CS21	MAT9150021	4 C x 16	.41	(10.5)
6FX8002-5CS61	MAT9150022	4 C x 14	.49	(12.5)

Note: The mentioned external diameters are maximum values.



Harnessed according to Siemens

- Color: black (similar to RAL 9005)

Extension Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-5CA05	MAT9151001	4 C x 16	.49	(12.5)
6FX8002-5CA15	MAT9151002	4 C x 14	.59	(15.0)

Extension Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-5CA28	MAT9151003	4 C x 16	.49	(12.5)
6FX8002-5CA38	MAT9151004	4 C x 14	.59	(15.0)
6FX8002-5CA48	MAT9151005	4 C x 12	.62	(16.0)
6FX8002-5CA58	MAT9151006	4 C x 10	.75	(19.0)
6FX8002-5CA68	MAT9151007	4 C x 8	.94	(24.0)

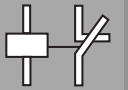
Extension Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-5CX28	MAT9151008	4 C x 6	1.06	(27.0)

Note: The mentioned external diameters are maximum values.

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

- Oil-resistant
- Shielded
- Hydrolysis-resistant and microbe-resistant
- Flame-retardant
- Nominal voltage: 1000 V
- Temperature range (flexing): -31°F to +194°F (-35°C to +90°C)
- Minimum bending radius for use in Energy Chains®: 7.5 x cable diameter
- Color: black (similar to RAL 9005)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-5CA01	MAT9050001	4 C x 16	.39	(10.0)
6FX8002-5CA11	MAT9050002	4 C x 14	.45	(11.5)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-5CA21	MAT9050003	4 C x 16	.39	(10.0)
6FX8002-5CA31	MAT9050004	4 C x 14	.45	(11.5)
6FX8002-5CA41	MAT9050005	4 C x 12	.51	(13.0)
6FX8002-5CA51	MAT9050006	4 C x 10	.59	(15.0)
6FX8002-5CA61	MAT9050007	4 C x 8	.79	(20.0)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-5CA23	MAT9050008	4 C x 6	.87	(22.0)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-5CS01	MAT9150020	4 C x 16	.37	(9.5)
6FX8002-5CS21	MAT9150021	4 C x 16	.37	(9.5)
6FX8002-5CS61	MAT9150022	4 C x 14	.43	(11.0)

Note: The mentioned external diameters are maximum values.



Harnessed according to Siemens

Extension Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-5CA05	MAT9051001	4 C x 16	.39	(10.0)
6FX8002-5CA15	MAT9051002	4 C x 14	.45	(11.5)

Extension Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-5CA28	MAT9051003	4 C x 16	.39	(10.0)
6FX8002-5CA38	MAT9051004	4 C x 14	.45	(11.5)
6FX8002-5CA48	MAT9051005	4 C x 12	.51	(13.0)
6FX8002-5CA58	MAT9051006	4 C x 10	.59	(15.0)
6FX8002-5CA68	MAT9051007	4 C x 8	.79	(20.0)

Extension Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-5CX28	MAT9051008	4 C x 6	.87	(22.0)

Note: The mentioned external diameters are maximum values.

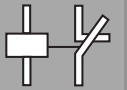
Chainflex® TPE cables



Typical application area – TPE

- for maximum mechanical load requirements
- almost unlimited resistance to oil, also with bio-oils
- indoor and outdoor applications, UV-resistant
- especially for unsupported and gliding travel distances up to 400 m and more
- storage and retrieval units for high-bay warehouses, machining units/ machine tools, quick handling, clean room, semiconductor insertion, ship to shore, outdoor cranes, low-temperature applications

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

- Oil-resistant
- Shielded
- Flame-retardant
- Nominal voltage: 300 V
- Temperature range (flexing): +23°F to +158°F (-5°C to +70°C)
- Minimum bending radius for use in Energy Chains®: 10 x cable diameter
- Color: gray (similar to RAL 7001)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-2AD00	MAT9170001	(3 PR x 26) SHLD	.35	(9.0)
		4 C x 26		
		2 C x 20		
6FX8002-2CA11	MAT9170002	4 PR x 22	.35	(9.0)
		4 C x 20		
		2 C x 20		
6FX8002-2CA15	MAT9170003	(3 PR x 26) SHLD	.35	(9.0)
		4 C x 26		
		2 C x 20		

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-2CA31	MAT9170004	(3 PR x 26) SHLD	.37	(9.5)
		2 C x 20		
		4 C x 26		
		4 C x 24		

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-2CA51	MAT9170005	(3 PR x 26) SHLD	.35	(9.0)
		4 C x 26		
		2 C x 20		
6FX8002-2CA71	MAT9170006	4 PR x 22	.35	(9.0)
		4 C x 20		
		2 C x 20		
6FX8002-2CB51	MAT9170008	4 PR x 22	.35	(9.0)
		4 C x 20		
		2 C x 20		
6FX8002-2CC11	MAT9170009	4 PR x 22	.35	(9.0)
		4 C x 20		
		2 C x 20		
6FX8002-2CD01	MAT9170010	4 PR x 22	.35	(9.0)
		4 C x 20		
		2 C x 20		



Harnessed according to Siemens

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-2CF01	MAT9170021	(3 PR x 26) SHLD	.35	(9.0)
		4 C x 26		
		2 C x 20		
6FX8002-2CF02	MAT9170011	(3 PR x 26) SHLD	.35	(9.0)
		4 C x 26		
		2 C x 20		
6FX8002-2CG00	MAT9170012	4 PR x 22	.35	(9.0)
		4 C x 20		

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-2CH00	MAT9170013	(3 PR x 26) SHLD	.35	(9.0)
		4 C x 26		
		2 C x 20		

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-2CK00	MAT9170014	(3 PR x 26) SHLD	.35	(9.0)
		2 C x 20		
6FX8002-2CL00	MAT9170015	(3 PR x 26) SHLD	.35	(9.0)
		2 C x 20		

Basic Cable



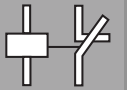
Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-2EQ00	MAT9170016	(3 PR x 26) SHLD	.37	(9.5)
		2 C x 20		
		4 C x 26		
		4 C x 24		

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-2EQ10	MAT9170017	(3 PR x 26) SHLD	.37	(9.5)
		2 C x 20		
		4 C x 26		
		4 C x 24		

Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>



- Oil-resistant
- Shielded
- Flame-retardant
- Nominal voltage: 300 V
- Temperature range (flexing): +23°F to +158°F (-5°C to +70°C)
- Minimum bending radius for use in Energy Chains®: 10 x cable diameter

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-2AH00	MAT9170018	4 PR x 22	.35	(9.0)
		4 C x 20		

Extension Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-2AD04	MAT9171001	(3 PR x 26) SHLD	.35	(9.0)
		4 C x 26		
		2 C x 20		
6FX8002-2CB54	MAT9171002	4 PR x 22	.35	(9.0)
		4 C x 20		
6FX8002-2CA54	MAT9171003	(3 PR x 26) SHLD	.35	(9.0)
		4 C x 26		
		2 C x 20		
6FX8002-2CA34	MAT9171004	(3 PR x 26) SHLD	.37	(9.5)
		2 C x 20		
		4 C x 26		
6FX8002-2CC14	MAT9171009	4 PR x 22	.35	(9.0)
		4 C x 20		
		2 C x 20		
6FX8002-2CF04	MAT9171011	(3 PR x 26) SHLD	.35	(9.0)
		4 C x 26		
		2 C x 20		
6FX8002-2EQ14	MAT9171017	(3 PR x 26) SHLD	.37	(9.5)
		2 C x 20		
		4 C x 26		
6FX8002-2AH04	MAT9171018	4 PR x 22	.35	(9.0)
		4 C x 24		
		4 C x 20		



Chainflex® PUR Position Feedback



Position
Feedback
PUR

Harnessed according to Siemens

- Oil-resistant and coolant-resistant
- Shielded
- Notch-resistant, hydrolysis-resistant and microbe-resistant
- Nominal voltage: 30 V
- Temperature range (flexing): -4°F to +176°F (-20°C to +80°C)
- Minimum bending radius for use in Energy Chains®: 10 x cable diameter
- Color: Green (similar to RAL 6018)

CLASS
6.3.3

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-2DC10	MAT9070030	2 PR x 26	.30	(7.5)
		2 C x 22		
6FX8002-2DC20	MAT9070031	2 PR x 26	.30	(7.5)
		2 C x 22		
6FX8002-1DC00	MAT9070032	2 PR x 26	.30	(7.5)
		2 C x 22		



No Minimum Order • No Cut Charges on up to 10 cuts of the same part number

10.281

- Oil-resistant
- Shielded
- Nominal voltage: 30 V
- Temperature range (flexing): -31°F to +212°F (-35°C to +100°C)
- Minimum bending radius for use in Energy Chains®: 10 x cable diameter
- Color: Green (similar to RAL 6018)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-2AD00	MAT9070001	(3 PR x 26) SHLD	.41	(10.5)
		4 C x 26		
		2 C x 20		
6FX8002-2CA11	MAT9070002	4 PR x 22	.37	(9.5)
		4 C x 20		
6FX8002-2CA15	MAT9070003	(3 PR x 26) SHLD	.41	(10.5)
		4 C x 26		
		2 C x 20		

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-2CA31	MAT9070004	(3 PR x 26) SHLD	.45	(11.5)
		2 C x 20		
		4 C x 26		
		4 C x 24		

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-2CA51	MAT9070005	(3 PR x 26) SHLD	.41	(10.5)
		4 C x 26		
		2 C x 20		
6FX8002-2CA71	MAT9070006	4 PR x 22	.37	(9.5)
		4 C x 20		

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-2CB31	MAT9070007	12 C X 24	.35	(9.0)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-2CB51	MAT9070008	4 PR x 22	.37	(9.5)
		4 C x 20		
6FX8002-2CC11	MAT9070009	4 PR x 22	.37	(9.5)
		4 C x 20		
6FX8002-2CD01	MAT9070010	4 PR x 22	.37	(9.5)
		4 C x 20		



Harnessed according to Siemens

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-2CF01	MAT9070021	(3 PR x 26) SHLD	.41	(10.5)
		4 C x 26		
		2 C x 20		
6FX8002-2CF02	MAT9070011	(3 PR x 26) SHLD	.41	(10.5)
		4 C x 26		
		2 C x 20		
6FX8002-2CG00	MAT9070012	4 PR x 22	.37	(9.5)
		4 C x 20		
6FX8002-2CH00	MAT9070013	(3 PR x 26) SHLD	.41	(10.5)
		4 C x 26		
		2 C x 20		

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-2CK00	MAT9070014	(3 PR x 26) SHLD	.41	(10.5)
		2 C x 20		

Basic Cable

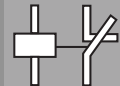


Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-2CL00	MAT9070015	(3 PR x 26) SHLD	.41	(10.5)
		2 C x 20		

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-2EQ00	MAT9070016	(3 PR x 26) SHLD	.45	(11.5)
		2 C x 20		
		4 C x 26		
		4 C x 24		
6FX8002-2EQ10	MAT9070017	(3 PR x 26) SHLD	.45	(11.5)
		2 C x 20		
		4 C x 24		

 Internet: <http://www.igus.com>
 email: sales@igus.com
 QuickSpec/RFQ: <http://www.igus.com/quickspec>


Harnessed according to Siemens

CLASS
6.4.4

- Oil-resistant
- Shielded
- Nominal voltage: 30 V
- Temperature range (flexing): -31°F to +212°F (-35°C to +100°C)
- Minimum bending radius for use in Energy Chains®: 10 x cable diameter
- Color: Green (similar to RAL 6018)

Basic Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-2AH00	MAT9070018	4 PR x 22	.37	(9.5)
		4 C x 20		

Extension Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-2AD04	MAT9071001	(3 PR x 26) SHLD	.41	(10.5)
		4 C x 26		
		2 C x 20		
6FX8002-2CB54	MAT9071002	4 PR x 22	.37	(9.5)
		4 C x 20		
6FX8002-2CA54	MAT9071003	(3 PR x 26) SHLD	.41	(10.5)
		4 C x 26		
		2 C x 20		
6FX8002-2CA34	MAT9071004	(3 PR x 26) SHLD	.45	(11.5)
		2 C x 20		
		4 C x 26		
		4 C x 24		

Extension Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-2CB34	MAT9071007	12 C X 24	.35	(9.0)

Extension Cable



Manufacturer Part No.	igus® Part No.	Power # of Conductors x AWG	Diameter	
			in.	(mm)
6FX8002-2CC14	MAT9071009	4 PR x 22	.37	(9.5)
		4 C x 20		
6FX8002-2CF04	MAT9071011	(3 PR x 26) SHLD	.41	(10.5)
		4 C x 26		
		2 C x 20		
6FX8002-2EQ14	MAT9071017	(3 PR x 26) SHLD	.45	(11.5)
		2 C x 20		
		4 C x 26		
		4 C x 24		
6FX8002-2AH04	MAT9071018	4 PR x 22	.37	(9.5)
		4 C x 20		





igus® Energy Chain
System®

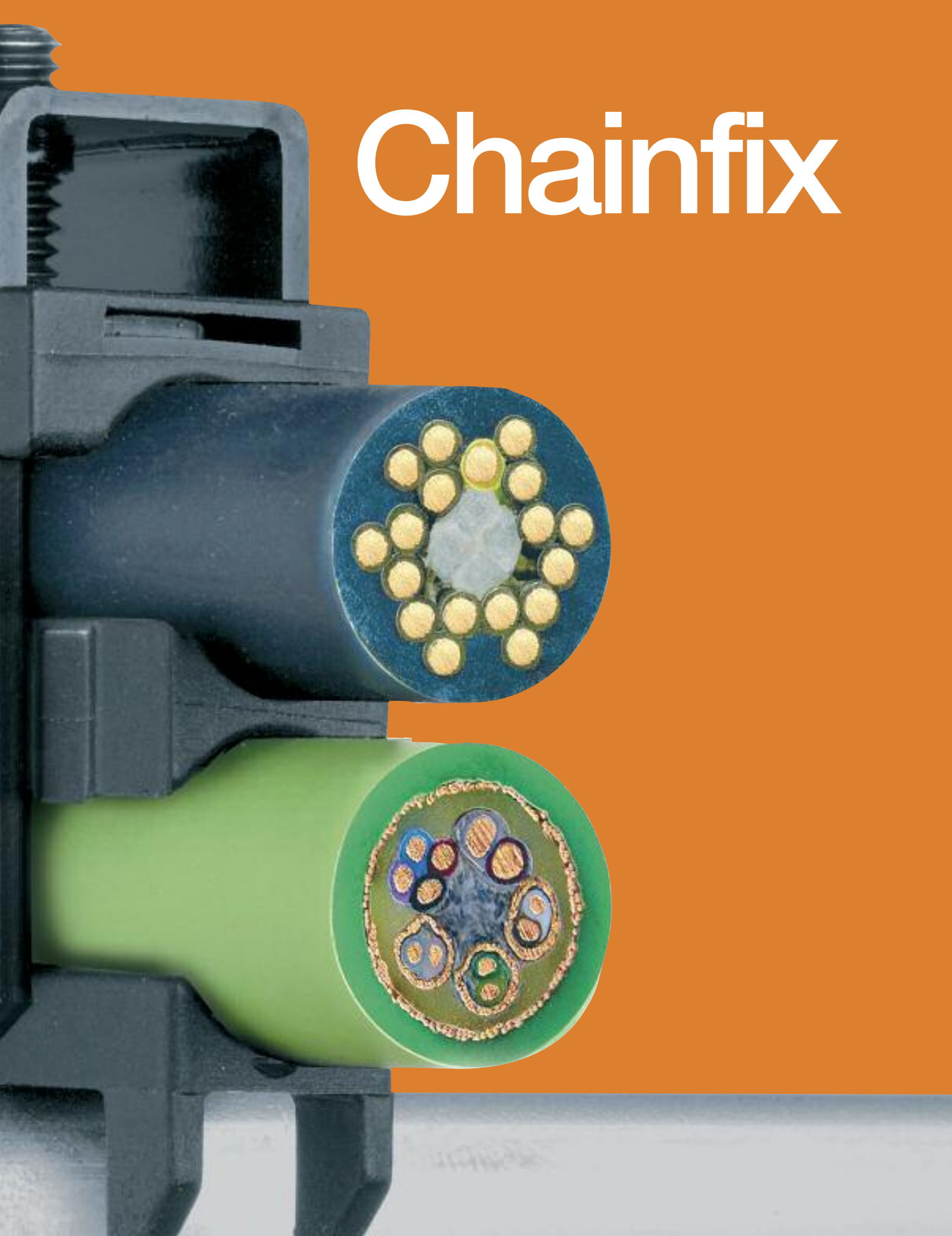
Telephone 1-800-521-2747
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Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>



igus

Chainfix



Chainfix Strain Relief

Overview

Chainfix clamps and stainless-steel clamps - for maximum pull forces



Clamps and saddle clamp elements

Single clamp housing*, including top/bottom saddle clamps
Double clamp housing*, incl. top/bottom saddle clamps and 1 stacker saddle clamp
Triple clamp housing*, incl. top/bottom saddle clamps and 2 stacker saddle clamp
Chainfix Multi-Clamps*

*Standard material zinc-coated steel. Stainless-steel (1.4301) version also available.

Chainfix tiwrap plates - for universal tiwrap, bolted or clip-on



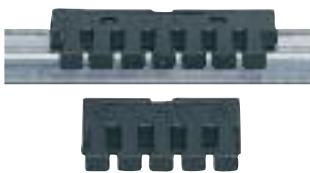
Chainfix tiwrap plates

Option 1: Chainfix tiwrap plates as single parts Series 2000

Option 1: Chainfix tiwrap plates as single parts Series 3000

Cable tiwraps

Chainfix tiwrap plates - for strain relief with cable tiwraps



Chainfix tiwrap plates

Option 2: Tiwrap plates with clip-on connection for the profile rail

Option 3: Clip-on tiwrap plates for opening or fixed crossbars

Option 4: Integrated strain relief for E2 Tubes - Series R

Chainfix Clips - high pull forces, plug-in



Chainfix Clips

Available for all igus® Energy Chain Systems® with profile rails and also suitable for assembly in the KMA mounting brackets and clip-on strain relief for crossbars

Chainfix strain relief separators - with integrated teeth



Chainfix strain relief separators

Separator with integrated strain relief - easy strain relief with tie wrap

Blocks - Special strain relief for hoses. A Modular, space-saving system



Blocks

Strain relief for hoses, modular, space-saving system

Chainfix Strain Relief Selection Guide

Energy Chain® Series	Chainfix				Chainfix tiewrap plates							
	Clamp	Clip for profile rail	Clip crossbar	Nugget	Strain relief separator	Single part 2000	Single part 3000	Clip-on for profile rail	Fixed crossbar	Cross-bar	For Triflex®(1)	For E-Tube
E-Z Chain®												
E/Z200						20XX-ZB			2050-Z			
E/Z26							30XX-ZB					
E/Z300							30XX-ZB					
E2/000												
1400/1500						20XX-ZB						
1450/1480						20XX-ZB						
E2 Medium												
240/250					2020-Z	20XX-ZB			2050-Z			
26/27	X	X		X	262-Z		30XX-ZB	30XX-ZC	2050-Z	2050-Z		
340/350	X	X		X	301-Z		30XX-ZB	30XX-ZC	30XX-Z	30XX-ZS		
E2 Tubes												
R48					481-ZR	20XX-ZB						
R58												5850-Z
R68												30XX-Z
R117/118						20XX-ZB						
R157/158					1585.01-Z							
R167/168					1685.01-Z							
2480					2020-ZR	20XX-ZB						
2680	X	X		X			30XX-ZB	30XX-ZC				
3480	X	X		X	34501-Z		30XX-ZB	30XX-ZC				
E4-1												
E4-21												
E4-28/R4-28						20XX-Z				2050-Z		
E4-32/H4-32/R4-32	X	X		X			30XX-ZB	30XX-ZC		3850-ZS		
E4-42/H4-42/R4-42	X	X		X			30XX-ZB	30XX-ZC		3850-ZS		
E4-56/H4-56/R4-56	X	X	X	X			30XX-ZB	30XX-ZC		45XX-ZS		
E4-80/H4-80/R4-80	X	X	X	X			30XX-ZB	30XX-ZC		45XX-ZS		
840		X	X				30XX-ZB					
E4/4												
2828/2928/R7728	X	X		X			30XX-ZB	30XX-ZC		3850-ZS		
3838/3938/R7838	X	X		X			30XX-ZB	30XX-ZC		3850-ZS		
4040/4140/R8840	X	X	X	X			30XX-ZB	30XX-ZC		45XX-ZS		
5050/5150/R9850	X	X	X	X			30XX-ZB	30XX-ZC		45XX-ZS		
E4/00												
220/R760						20XX-Z				2050-Z		
280/290/R770	X	X		X			30XX-ZB	30XX-ZC		3850-ZS		
380/390/R780	X	X		X			30XX-ZB	30XX-ZC		3850-ZS		
400/410/R880	X	X	X	X			30XX-ZB	30XX-ZC		45XX-ZS		
600/601/R608			X				30XX-ZB					
640			X				30XX-ZB					
800							30XX-ZB					
E4/light												
14040/14140/R18840	X	X	X	X			30XX-ZB	30XX-ZC		45XX-ZS		
15050/15150/R19850	X	X	X				30XX-ZB	30XX-ZC		45XX-ZS		
1640/R1608			X				30XX-ZB					
14240/14340	X	X		X			30XX-ZB	30XX-ZC		3850-ZS		
E6												
E6-29					E6-29-02-Z	20XX-ZB						
R6-29						20XX-ZB						
E6-35					E6-35-02-Z	20XX-ZB						
E6-40	X	X		X	E6-40-02-Z	20XX-ZB						
E6-52	X	X		X			30XX-ZB	30XX-ZC		3850-ZS		
R6-52	X	X		X			30XX-ZB	30XX-ZC				
E6-62	X	X		X			30XX-ZB	30XX-ZC		3850-ZS		
E6-80L	X	X	X	X			30XX-ZB	30XX-ZC		45XX-ZS		
E6-80	X	X	X	X			30XX-ZB	30XX-ZC		45XX-ZS		
Triflex®												
E-Z Triflex®											E33X-XX-2	
Triflex®											33X-XX	

Recommended strain relief for selected Energy Chain®



For Series:

System E2 Medium

- 26/27/27i
- 340/350

System E2 Tubes

- 2680
- 3480

System E4/4

- 2828/2928/R7728*
- 3838/3938/R7838
- 4040/4140/R8840
- 5050/5150/R9850

System E4/00

- 280/290/R770*
- 380/390/R780
- 400/410/R880

System E4/light

- 14040/14140/R18840
- 14240/14340
- 15050/15150/R19850

System E6

- E6-40
- E6-52 / R6-52
- E6-62
- E6-80L / E6-80

*Add and "M" to the end of the part number for this series



Strain Relief Elements for Energy Chains® and Energy Tubes with igus® Chainfix Clamps and Saddle Clamp Elements

The Chainfix clamp system design principle has proven itself as effective, life-prolonging strain relief for igus® Energy Chain Systems®.

Important improvements are offered by igus® exclusive Chainfix products:

- Optimal igus® Chainfix housing with reduced height
- Long service life for dynamic applications thanks to improved clamping elements.
- Integration with igus® KMA mounting brackets
 - Saves both time and space during installation
 - Available for complete systems with cables and strain relief

Ideally, the cables/hoses should be strain relieved at both ends of the Energy Chain®. At the very least, they must be strain relieved at the moving end of the Energy Chain®.

Overall Height Restrictions

If the Energy Chain® glides on itself over long travel distances, the screw heads of the strain relief on the fixed end must be at least .39 (10 mm) below the Energy Chain® link height. Our clamp housing with setscrews reduces the overall height by up to .59 (15 mm) compared to conventional clamp housings. In the case of unsupported Energy Chains®, the strain relief elements may be used with no problems. When using Chainfix clamps on profile rail in the mounting bracket for Series 280, 2828, 28, 290, 2928, 29, R770, R7728, R77 a shortened clamp saddle must be used. The part numbers for the modified clamps can be found within each series section.



Setscrew and reduced optimal housing height for use in long/gliding travel applications

Features of the igus® Chainfix Clamps

- Improved housing foot clamp for easy fit into profile rail
- Newly developed housing with reduced overall height
- Black housing and setscrews for attractive appearance
- Setscrews, tightened with Allen wrench, for easy installation

Features of the igus® Saddle Clamps

- Long support surface for improved stability
- Inherently high material rigidity for increased reliability
- Integrated ribbing to keep cables/hoses firmly strain relieved



Improved housing foot clamp for easy fit into profile rail



Ribbed strain relief saddle clamps withstands increased pull forces for long-term durability

Chainfix Strain Relief Clamps



Chainfix



Single clamp housing, including top/bottom saddle clamps

Part No. Steel	Part No. Stainless Steel	For cable diameters		B	H
		in.	(ø mm)		
CFX12-1	CFX12-1E	.24-.47	(6 – 12)	.63 (16)	1.57 (40)
CFX14-1	CFX14-1E	.47-.55	(12 – 14)	.71 (18)	1.97 (50)
CFX16-1	CFX16-1E	.55-.63	(14 – 16)	.79 (20)	2.05 (52)
CFX18-1	CFX18-1E	.63-.71	(16 – 18)	.87 (22)	2.13 (54)
CFX20-1	CFX20-1E	.71-.79	(18 – 20)	.94 (24)	2.20 (56)
CFX22-1	CFX22-1E	.79-.87	(20 – 22)	1.02 (26)	2.28 (58)
CFX26-1	CFX26-1E	.87-1.02	(22 – 26)	1.18 (30)	2.64 (67)
CFX30-1	CFX30-1E	1.02-1.18	(26 – 30)	1.34 (34)	2.80 (71)
CFX34-1	CFX34-1E	1.18-1.34	(30 – 34)	1.50 (38)	2.95 (75)
CFX38-1	CFX38-1E	1.34-1.50	(34 – 38)	1.65 (42)	3.11 (79)
CFX42-1	CFX42-1E	1.50-1.65	(38 – 42)	1.81 (46)	3.27 (83)

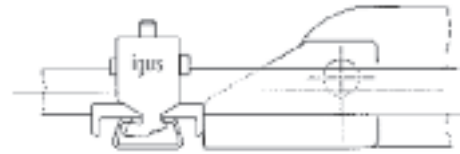
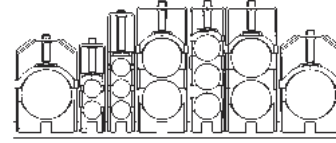
Add and "M" to the end of the part number for this series



Double clamp housing, including top/bottom saddle clamps and one stacker saddle clamp

Part No. Steel	Part No. Stainless Steel	For cable diameters		B	H
		in.	(ø mm)		
CFX12-2	CFX12-2E	.24-.47	(6 – 12)	.63 (16)	2.83 (67)
CFX14-2	CFX14-2E	.47-.55	(12 – 14)	.71 (18)	2.80 (71)
CFX16-2	CFX16-2E	.55-.63	(14 – 16)	.79 (20)	2.95 (75)
CFX18-2	CFX18-2E	.63-.71	(16 – 18)	.87 (22)	3.11 (79)
CFX20-2	CFX20-2E	.71-.79	(18 – 20)	.94 (24)	3.27 (83)
CFX22-2	CFX22-2E	.79-.87	(20 – 22)	1.02 (26)	3.43 (87)
CFX26-2	CFX26-2E	.87-1.02	(22 – 26)	1.18 (30)	4.13 (105)
CFX30-2	CFX30-2E	1.02-1.18	(26 – 30)	1.34 (34)	4.45 (113)
CFX34-2	CFX34-2E	1.18-1.34	(30 – 34)	1.50 (38)	4.76 (121)

The dimensions given for H in the tables are based on the maximum cable diameter. Cables with smaller diameters may result in lower overall clamp housing heights.

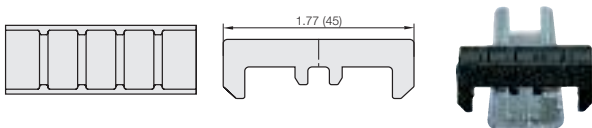


Triple clamp housing, including top/bottom saddle clamps and two stacker saddle clamps

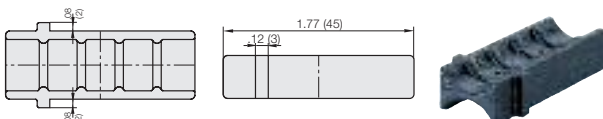
Part No. Steel	For cable diameters		B	H
	in.	(ø mm)		
CFX12-3	.24-.47	(6 – 12)	.63 (16)	3.78 (86)
CFX14-3	.47-.55	(12 – 14)	.71 (18)	3.62 (92)
CFX16-3	.55-.63	(14 – 16)	.79 (20)	3.86 (98)
CFX18-3	.63-.71	(16 – 18)	.87 (22)	4.09 (104)
CFX20-3	.71-.79	(18 – 20)	.94 (24)	4.33 (110)
CFX22-3	.79-.87	(20 – 22)	1.02 (26)	4.57 (116)

Separate Parts

Bottom saddle clamps as separate part. For insertion into profile rail



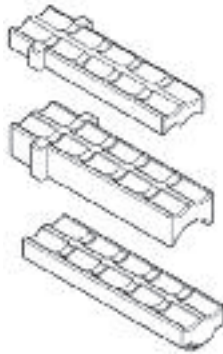
Stacker saddle clamps as a separate part. For placement between stacked cables in double and triple clamps.



Part No. bottom saddle clamp	Part No. stacker saddle clamps	Diameter	
		in.	(mm)
CG12	CD12	.24-.47	(6 – 12)
CG14	CD14	.47-.55	(12 – 14)
CG16	CD16	.55-.63	(14 – 16)
CG18	CD18	.63-.71	(16 – 18)
CG20	CD20	.71-.79	(18 – 20)
CG22	CD22	.79-.87	(20 – 22)
CG26	CD26	.87-1.02	(22 – 26)
CG30	CD30	1.02-1.18	(26 – 30)
CG34	CD34	1.18-1.34	(30 – 34)
CG38	—	1.34-1.50	(34 – 38)
CG42	—	1.50-1.65	(38 – 42)

PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



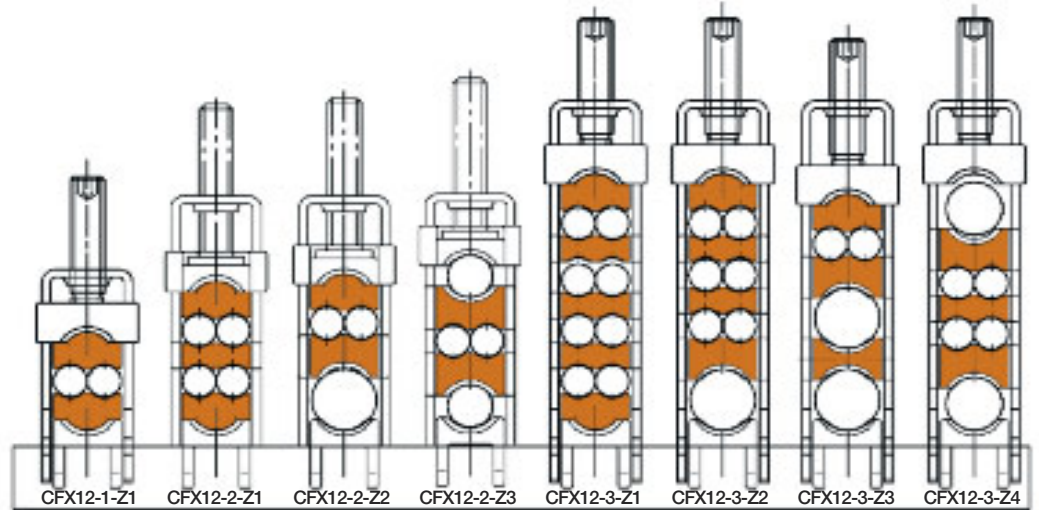


New universal saddle clamps

Multi-Clamps

The proven Chainfix-clamps now even more versatility. New parts offer numberless solutions to assemble.

- New universal strain relief
- Save assembly time and space
- Compact and modular
- For small outer diameters
- Cost-effective



Part No.	Part No. trays as single parts				For cables Max. Diameter	
	CDA-4/4-8	CD-4/4	CD-4/4-8	CD-12	in.	(mm)
CFX12-1-Z1	X (2-piece)	-	-	-	.24	(6)
CFX12-2-Z1	X (2-piece)	X (1-piece)	-	-	.24	(6)
CFX12-2-Z2	X (1-piece)	-	X (1-piece)	-	.24 + .47	(6 + 12)
CFX12-2-Z3	-	-	X (2-piece)	-	.24 + .31	(6 + 8)
CFX12-3-Z1	X (2-piece)	X (3-piece)	-	-	.24	(6)
CFX12-3-Z2	X (1-piece)	X (2-piece)	X (1-piece)	-	.24 + .47	(6 + 12)
CFX12-3-Z3	X (1-piece)	-	X (1-piece)	X (1-piece)	.24 + .47	(6 + 12)
CFX12-3-Z4	-	X (1-piece)	X (2-piece)	-	.24 + .39	(6 + 10)

For stainless-steel version please insert index **-E** Example: Part No. CFX-12-3-Z1-E

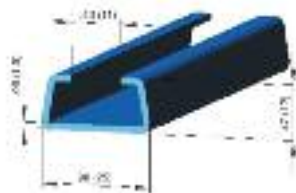
Standard material steel zinc-coated

Profile rail for clamps and KMA mounting brackets

The profile rail CF-92-42KMA is used in conjunction with igus® Chainfix cable/hose strain relief clamps and can also be integrated into the KMA mounting brackets for the following E4 Energy Chain System® carriers:

280, 380, 2828, 3838, 400, 4040, 5050, 14040, 15050, and 14240.

For stainless steel version please use part number CF-92-42KMASS



Three times higher tensile strength than other industry-standard clamps

We have tested three different strain relief types:

- A. Standard, hot-dipped galvanized steel strain relief clamp with single and double impact-resistant polymer saddle clamp elements (Part No. CF14-1-Z, standard elements)
- B. Standard strain relief housings (as used in A) with igumid G clamp saddles (Part No. CFY14-1)
- C. igus® Chainfix strain relief elements (Part No. CFX14-1)

Results:

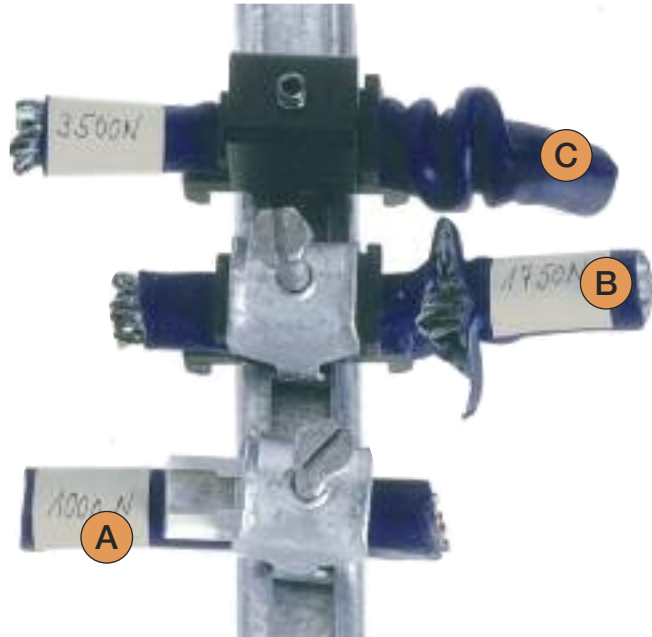
Strain relief element "A" saddle clamps loosen at 1,000 N of pull force. The resulting diagonal position of the saddle clamp distorts the screw.

Strain relief element "B" saddle clamps loosen at 1,750 N of pull force. The improved igumid G saddle clamps attempt to hold the cable, causing the outer jacket to "peel."

Strain relief element "C" (igus® new Chainfix system) saddle clamps loosen and slant 5° at 1,750 N. At 2,500 N of pull force, the cable jacket bunches up behind the clamp and, at 3,500 N of pull force, the clamps loosen completely and the cable becomes inoperative.

Conclusion:

The tensile strength of the "Chainfix" line of strain relief elements developed by igus® is more than three times higher than the tensile strength of standard strain relief elements.



Test example with cable diameter .41" (10.5 mm)

Tiewrap Plate 2070-ZB with one cable tie

Result: tensile force 290 N

Chainfix Clip CFC-12-M

Result: tensile force 350 N



Pull Force Test for igus Tiewrap Plates with Cable Tiewraps

Results:

Two tiewraps are more stable than one tiewrap. If one cable tiewrap is used, **the breaking force is (approx.) 350 N**. If the cable is secured with **two** cable tiewraps, **the breaking force increases to 830 N**, i.e. pull force resistance more than doubles when using two cable tiewraps.

Technical data:

Tiewrap plates: 2100-ZB/3100-ZB
 Cable: CF130-07-12
 Cable tiewrap: CFB-001



igus® Energy Chain
System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>



For Series:

E-Z Chain®

- E200/Z200

System E2/000

- 1400/1500/1450/1480

System E2 Medium

- 240/250

System E2 Tubes

- R117/R118
- R48

System E4/00

- 220 (2050.Z)

System E6

- E6-29/R6-29
- E6-35
- E6-40



For Series:

E-Z Chain®

- E26/Z26
- E300/Z300

System E2 Medium

- 26/27/27i
- 340/350

System E4/00

- 280/290/R770
- 380/390/R780
- 400/410/R880
- 600/601/R608

- 640

- 800

System E4/4

- 2828/2928/R7728
- 3838/3938/R7828
- 4040/4140/R8840
- 5050/5150/R9850

System E4/light

- 14040/14140/R18840
- 15050/15150/R19850
- 14240/14340
- 1640

System E6

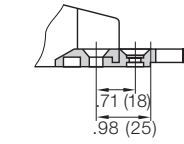
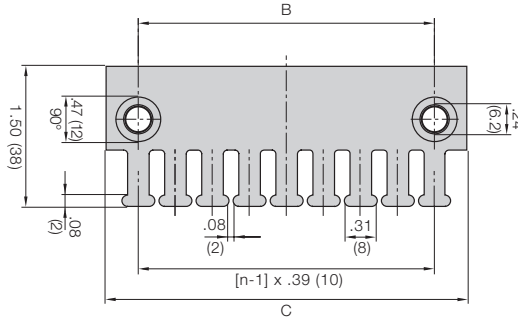
- E6-52/R6-52
- E6-62
- E6-80L / E6-80

Option 1:

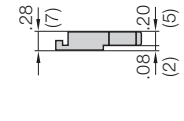
Tiewrap plates as an individual part

Available as an individual component or can be fixed onto a mounting bracket with the use of a profile rail.

Series 2000



Shown assembled



Single tie-wrap plate

Tiewrap Plates	n Number of Teeth	Dimension C	Dimension B
2020-ZB	3	1.18 (30)	.59 (15)
2030-ZB	4	1.57 (40)	.79 (20)
2040-ZB	5	1.97 (50)	1.18 (30)
2050-ZB	6	2.36 (60)	1.57 (40)
2070-ZB	8	3.15 (80)	2.36 (60)
2090-ZB	9	3.54 (90)	2.76 (70)
2100-ZB	10	3.94 (100)	3.15 (80)
2125-ZB	12	4.72 (120)	3.94 (100)

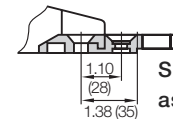
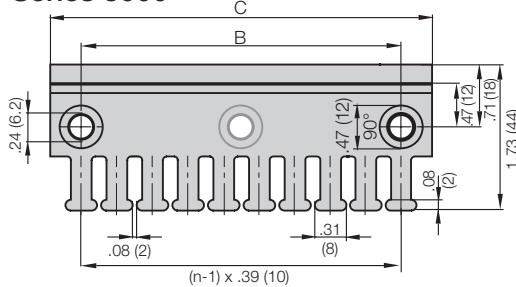
If used with KMA brackets with profile rail please add "KMA" to the end of the part number.

Example: 2020-ZBKMA

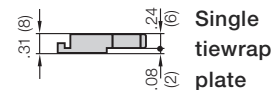
= 2030-ZB + 2040-ZB combined

=2050-ZB x 2 pieces combined

Series 3000



Shown assembled



Single tie-wrap plate

Tiewrap Plate	n Number of Teeth	C Overall Width in. (mm)	B Bore Width in. (mm)	Center Bore
3050-ZB	5	1.97 (50)	1.18 (30)	no
3075-ZB	7	2.95 (75)	2.16 (55)	no
3100-ZB	10	3.94 (100)	3.15 (80)	no
3115-ZB	11	4.53 (115)	3.74 (95)	no
3125-ZB	12	4.92 (125)	4.13 (105)	no
3150-ZB	15	5.91 (150)	5.12 (130)	no
3175-ZB	17	6.89 (175)	6.10 (155)	no
3200-ZB	20	7.87 (200)	7.09 (180)	yes
3225-ZB	22	8.86 (225)	8.07 (205)	yes
3250-ZB	25	9.84 (250)	9.06 (230)	yes

If used with KMA brackets with profile rail please add "KMA" to the end of the part number.

Example: 3050-ZBKMA

Cable tiewraps as individual parts

Cable tiewraps 100 pieces/bag	Width x Length		Maximum Ø		Tensile Strength	
	in.	(mm)	in.	(mm)	lbs	(N)
CFB-001	.19 x 5.91	(4.8 x 150)	1.42	(36)	50	(222)

Chainfix Strain Relief Tiewrap Plates



Chainfix

Option 2:

Clip-on Tiewrap plates for profile rails

Available as a clip-on tiewrap plate without the use of bolts. They are inserted and removed with a screwdriver used as a lever.

Part No.	Number of Teeth	Width of Strain Relief	
		in.	(mm)
3050-ZC	5	1.97	(50)
3075-ZC	7	2.95	(75)



For Series:

Tiewrap plates for profile rail

For all mounting brackets with profile rail option



Option 3:

Clip-on tiewrap plates for opening or fixed crossbars

Characteristic features:

- Can be plugged on the fixed crossbars
- Can be used when cables are laid out in both upper and lower compartments of interior separation and require strain relief
- If the KMA is too small for the profile rail
- Easy to assemble without any screws

Part No.	Width		Number of teeth	For Series
	in.	(mm)		
fixed crossbar				
2050-Z	2.36	(60)	6	240250, 26/27
3050-Z	1.97	(50)	5	340/350
3075-Z	2.91	(74)	7	340/350
Part No.	Width		Number of teeth	For Series
fixed crossbar	in.	(mm)		
2050-Z	2.36	(60)	6	220
3035-ZS	1.38	(35)	3	340/350
3050-ZS	1.97	(50)	5	340/350
3075-ZS	2.95	(75)	7	340/350
3850-ZS	1.89	(48)	5	280/290/R770, 380/390/R780, 2828/2928/R7728, 3838/3938/R7838, 14240/14340, E6-52, E6-62
4550-ZS	1.89	(48)	5	400/410/R880, 4040/4140/R8840, 5050/5150/R9850, 14040/14140/R18840, 15050/15150/R19850, E6-80L, E6-80
4575-ZS	2.91	(74)	7	400/410/R880, 4040/4140/R8840, 5050/5150/R9850, 14040/14140/R18840, 15050/15150/R19850, E6-80L, E6-80



PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



Option 4: integrated strain relief for E2 Tubes - Series R

Characteristic features:

- Strain relief disappears completely in the Energy Tube
- Easy to assemble without any screws

Part No.	Width		Number of teeth	For Series
	in.	(mm)		
fixed crossbar				
3050-Z	1.97	(50)	5	R68
3075-Z	2.95	(75)	7	R68
5850-Z	1.81	(46)	4	R58



For Series:

System E2 E-Tubes

- R58
- R68





For Series:

Tiewrap plates for profile rail

For all KMA mounting brackets with profile rail option



Clip for Profile rail
Part No. CFC-XX-C

Modular snap-on strain relief for the profile rail

Available for all igus® Energy Chain Systems® with profile rails.

Characteristic features:

- Series of clamps and bottom parts made of plastic for cable diameters ranging from .16" - .94" (4 to 24 mm)
- Quick assembly without any tools
- 2 and 3 layers on top of one another possible
- Each layer can be detached and changed later on
- High tensile forces with single-layer installation, decreases with each layer

Cable ø in. (mm)	Part No. Clamp	Part No. Bottom	Dimension A		Dimension B		Dimension C	
			in. (mm)	in. (mm)	in. (mm)	in. (mm)		
.16-.31 (04-08)	CFC-08-M	CFC-08-C	.51 (13.0)	.57 (14.5)	1.18 (30)			
.31-.47 (08-12)	CFC-12-M	CFC-12-C	.94 (24.0)	.93 (23.7)	1.42 (36)			
.47-.63 (12-16)	CFC-16-M	CFC-16-C	1.26 (32.1)	1.28 (32.4)	1.65 (42)			
.63-.79 (16-20)	CFC-20-M	CFC-20-C	1.54 (39.1)	1.70 (43.2)	1.77 (45)			
.79-.94 (20-24)	CFC-24-M	CFC-24-C	1.97 (50.0)	2.13 (54.0)	1.97 (50)			



For Series:

Clips for crossbars E4/00

- 400/410
- 640

Clips for crossbars E4/4

- 4040/4140
- 5050/5150

Clips for crossbars E4/light

- 14040/14140
- 15050/15150
- 1640

Clips for crossbars E6

- E6-80L
- E6-80



Clip for crossbars
Part No. CFC-XX-B

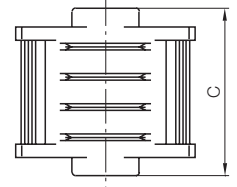
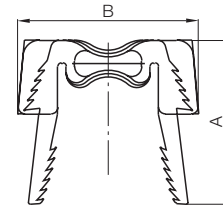
Modular snap-on for crossbars

Available for all igus® Energy Chain Systems® with crossbar series Part. No. 450-XX.

Characteristic features:

- Series of clamps and bottom parts made of plastic for cable diameters ranging from .31" to .47" (8 to 12 mm)
- Quick assembly without any tools
- 2 and 3 layers on top of one another possible
- Each layer can be detached and changed later on
- High tensile forces in case of single-layer installation, decreasing with the number of layers

Cable ø in. (mm)	Part No. Clamp	Part No. Bottom	Dimension A		Dimension B		Dimension C	
			in. (mm)	in. (mm)	in. (mm)	in. (mm)		
.31-.47 (08-12)	CFC-12-M	CFC-12-B	.94 (24.0)	.93 (23.7)	1.42 (36)			



Chainfix Strain Relief Strain Relief Separator



Chainfix

Strain relief separator - Separator with integrated strain relief

Characteristic features:

- For the use in the first or last chain link
- Accessory for igus® Energy Chain Systems®
- Easy to assemble without any screws
- The number of *teeth* is dependent upon the selection of cable (diameter, type) and available space

For Series	Part No. Strain Relief Separator	Number Of Teeth	Dimension A		Dimension B		Dim. C		Dim. D	
			in.	(mm)	in.	(mm)	Min. distance L/R	in.	(mm)	max. cable Ø
240/250	▶ 2020-Z	2	.39	(10)	.16	(4)	-	-	.24	(6)
2480	▶ 2020-ZR	2	.39	(10)	.16	(4)	-	-	.24	(6)
26/27/27i	▶ 262-Z	3	.39	(10)	.16	(4)	-	-	.24	(6)
340/350	▶ 301-Z	3	.71	(18)	.16	(4)	-	-	.55	(14)
3480	▶ 34501-Z	3	.55	(14)	.16	(4)	-	-	.39	(10)
R157/R158	▶ 1585-01-Z	3	.87	(22)	.16	(4)	-	-	.71	(18)
R167/R168	▶ 1685-01-Z	4	.87	(22)	.16	(4)	-	-	.71	(18)
R48	▶ 481-ZR	2	.39	(10)	.14	(3.5)	.39	(10)	.26	(6.5)
E6-29	▶ E6-29-02-Z	2	.31	(8)	.16	(4)	.47	(12)	.16	(4)
E6-35	▶ E6-35-02-Z	3	.31	(8)	.16	(4)	.47	(12)	.16	(4)
E6-40	▶ E6-40-02-Z	3	.51	(13)	.16	(4)	-	-	.31	(8)



For Series:

System E2 Medium

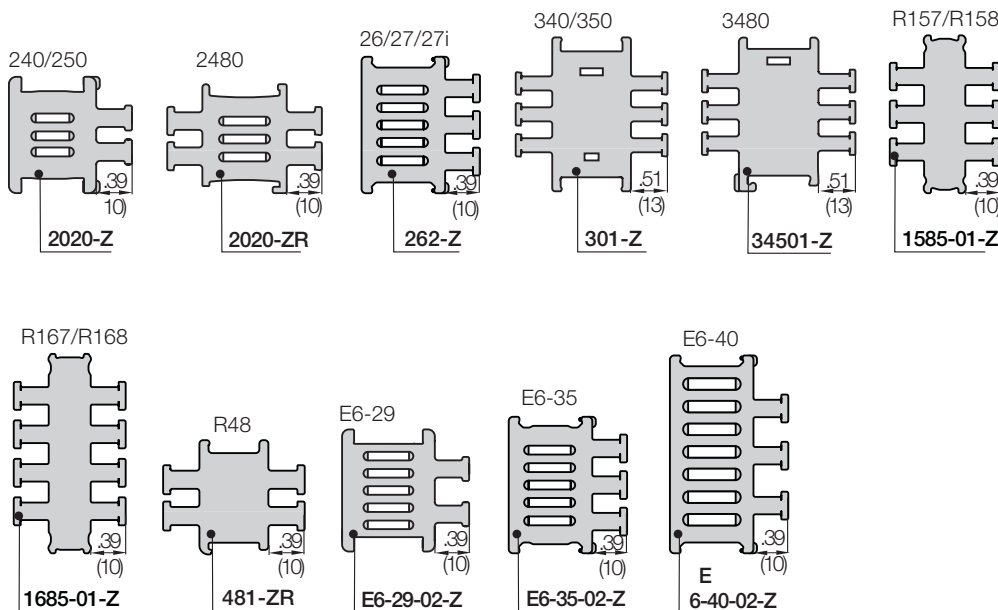
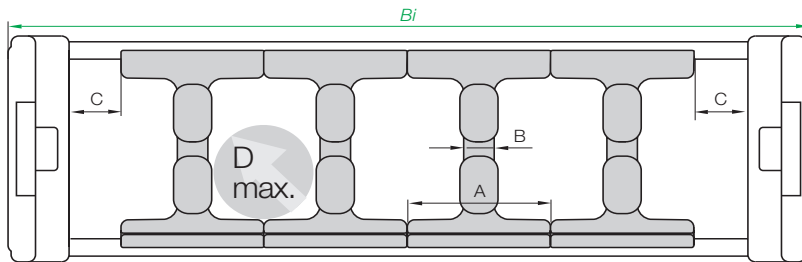
- 240/250
- 26/27/27i
- 340/350

System E2 Tubes

- R157/R158
- R167/R168
- R48
- 2480
- 3480

System E6

- E6-29
- E6-35
- E6-40



PDF: www.igus.com/e-chain-pdfs
 Specs/CAD/RFQ: www.igus.com/e-chains
 RoHS info: www.igus.com/RoHS



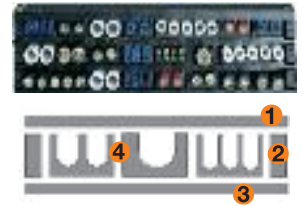
igus® strain relief block for small hoses and cables

- Modular system for great adaptability
- No hose damage
- Space-saving design
- Hoses and cables can be installed together in the same Energy Chain®
- Accommodation of hose diameters from .17 to .55 (4.3 to 14 mm)
- Easy installation - pressing the hose into the locating notch provides reliable fastening without hardware

The modules accommodate hoses from .17 to .55 (4.3 to 14 mm), 3 x .17 (3 x 4.3 mm) hoses can be fitted on top of each in module CFS-4.3 and 2 hoses can be fitted directly on top of each other in one notch using module CFS-6. The modules have a width of 1.08 (27.5), are inserted into the base plate and then fastened in position with M4 countersunk-head screws. The exception is module CFS-55.9 which offers the capacity for 5 x .35 (5 x 9 mm) hoses with twice the width. The base plate and cover plate are available in widths ranging from 2.95 to 9.45 (75 to 240 mm). The height of the spacers and modules is .63 (16 mm). Several layers can be installed directly above one another.

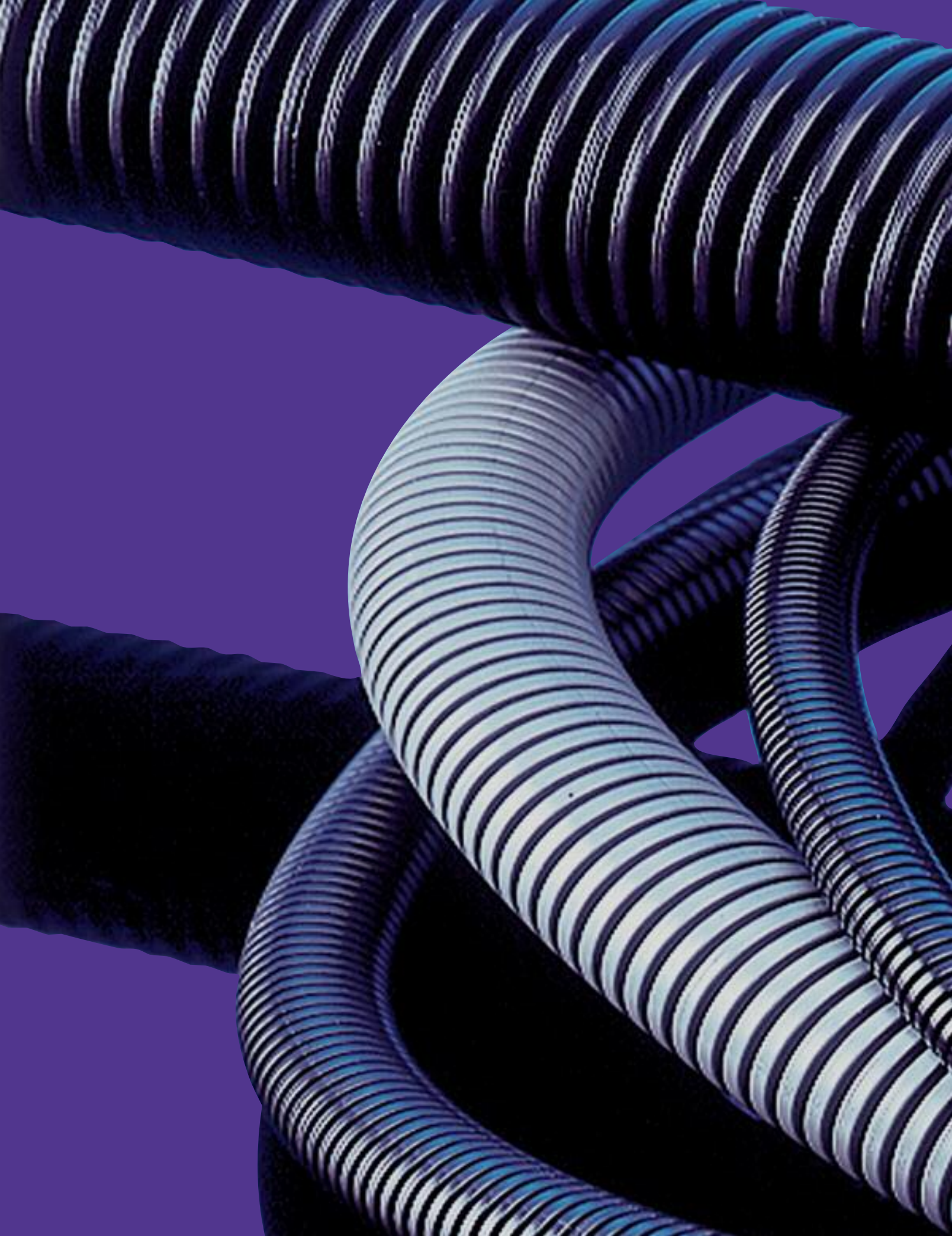
Part No. Block	Hose Ø mm	Number of Hoses	Width in. (mm)
CFS-4.3	.17 (4.3)	4 – 12	1.08 (27.5)
CFS-6	.24 (6)	3 – 6	1.08 (27.5)
CFS-9	.35 (9)	2	1.08 (27.5)
CFS-55.9	.35 (9)	5	2.16 (55.0)
CFS-10	.39 (10)	2	1.08 (27.5)
CFS-14	.55 (14)	1	1.08 (27.5)

Part No. Base Plate	Part No. Cover Plate	Width in. (mm)	Part No. Spacer	Height in. (mm)
CFSU-75	CFS-P-75	2.95 (75)	CFSD	.63 (16)
CFSU-102.5	CFS-P-102.5	4.04 (102.5)	CFSD	.47 (12)
CFSU-130	CFS-P-130	5.12 (130)		
CFSU-185	CFS-P-185	7.28 (185)		
CFSU-212	CFS-P-212	8.34 (212)		
CFSU-240	CFS-P-240	9.45 (240)		



- 1 Cover plate
- 2 Spacers
- 3 Base plate
- 4 Grid-dimensioned modules
W = 1.08 (27.5 mm)
H = .63 (16 mm)







PMA

PMA Overview

PMAFLEX | Conduits | Cable protection



Product	Description
PMA conduits	
PACO	Flexible, medium, split
PPCO	Very flexible, medium, split
TN	Split connectors, PG
GTN	Split lock nuts, PG
VCS	Flexible, heavy
PIS/PIH	Highly flexible, medium
CYL	Very flexible, medium

PMAFIX | Connectors | Safety and sealing systems



Product	Description
PMA connectors	
IP66 - stat., IP54 dyn.	Universal safety clip
IP68 - stat., IP67 dyn.	Oval clip
PMAFIX / PMAFLEX	Connectors
PMAFIX connectors VW	90° elbow, metric & PG
PMAFIX connectors VA	45° elbow, metric & PG
PMAFIX connectors VN	Straight, metric
PMAFIX connectors VN	Straight, PG
PMAFIX connectors VB	90° curved elbow, metric & PG
PMAFIX connectors VO	Flange 90°

PMA | Accessories



Product	Description
PMA accessories	
PMAFIX FH-O	One-piece system support
PMA VH	System supports
PMA GPS	One-piece system supports
PMA MN	Hexagonal lock nuts, metric & PG
PMA SGB	Tube clamps
PMA 514	Plug screws, metric & PG

PMA Protective Corrugated Tubing

Tubes, connectors, system supports, and accessories

Advantages of PMA

- Wide range of tubes
- Long service life of the tubes especially through millions of reverse bending cycles
- UL-recognized products available
- Outstanding tear-out resistance of the connections
- PMAFIX safety locking system



igus® Energy Chain® System E4 combined with PMAFIX protective tubing and igus Chainflex® CF9

PMA™ protective hoses can be used in applications requiring flexible protection for electrical wires and cables. They also provide outstanding protection for cables within Energy Chain Systems®. Simple applications include general mechanical and automotive engineering systems. Advanced applications include chemical plant technology with temperatures ranging

between -200°F and 482°F, to robots that undergo several million cycles at high speeds. PMA protective tubes are subjected to extensive testing including resistance to impact, reverse bending fatigue, peak load, heat aging, cold wind, self-extinguishing, and tear out resistance.





PACO - medium sized, flexible, split

The PMA COFLEX conduit type PACO has been created for retrofit and pre-loomed applications. New cables can be added to existing arrangements without the need for re-wiring or re-threading within the building of machines and installations. This product is suitable for vehicle manufacturing and building construction. Split connectors and locknuts are available for this product group.

Temperature range:

-40°F to +212°F (-40°C to +100°C), or a short time up to +266°F (+130°C)

Features:

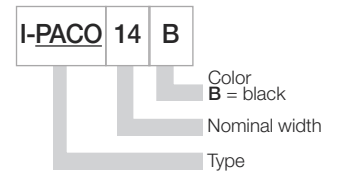
- specially modified PA6 (polyamide 6)
- good closure up to IP50
- self-extinguishing
- halogen-free and cadmium-free

Chemical resistance:

- fuels
- mineral oils
- fats
- alkalis
- weak acids and bases, etc.

Part No. (Black)	Inside diameter (mm)	Outside diameter (mm)	Radius (stat.) (mm)	Nominal Width	Suitable for PG	Maximum Coil Length (m)
I-PACO-10B	8.9	13.6	55	10	09	50
I-PACO-14B	12.9	18.7	75	14	13.5	50
I-PACO-20B	19.8	25.9	105	20	21	50
I-PACO-23B	23.7	31.3	125	23	29	50
I-PACO-37B	31.7	41.9	170	37	29	25
I-PACO-45B	43.1	54.2	180	45	—	25

Part No. structure



! I-PACO is suitable for static use only!



PPCO - medium sized, very flexible, split

The PMA COFLEX conduit type PPCO has been created for retrofit and pre-loomed applications. New cables can be added to existing arrangements without the need for re-wiring or re-threading within the building of machines and installations. This product is suitable for vehicle manufacturing and building construction. Split connectors and locknuts are available for this product group.

Temperature range:

-4°F to +203°F (-20 °C to +95 °C), or a short time up to +248°F (+120°C)

Features:

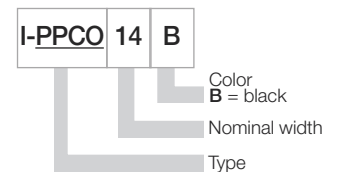
- specially modified polypropylene
- good closure up to IP50
- self-extinguishing,

Chemical resistance:

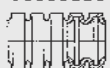
- fuels
- mineral oils
- fats
- alkalis
- acids, etc.

Part No. (Black)	Inside diameter (mm)	Outside diameter (mm)	Radius (stat.) (mm)	Nominal width	Suitable for PG	Maximum Coil Length (m)
I-PPCO-10B	8.7	13.6	70	10	09	50
I-PPCO-14B	12.5	18.5	95	14	13.5	50
I-PPCO-20B	19.5	25.5	130	20	21	50
I-PPCO-23B	24.2	31.0	155	23	29	50
I-PPCO-37B	31.0	41.4	190	37	29	25
I-PPCO-45B	42.7	54.0	205	45	-	25

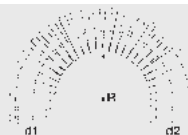
Part No. structure



Fine profile T - tight bending radius



Coarse profile G - high pull-out strength



** stat. R = lowest recommended bending radius for static (fixed) installation



TN - Split connectors, PG

These split connectors are suitable for repairs or where cable protection systems are installed after wiring has taken place in the machine building and installation industry. Further, these products will be used increasingly in the vehicle building and building construction.

Temperature range:

-22°F to +212°F (-30 °C to +100 °C), or a short time up to +266°F (+130°C)

Features:

- specially formulated polyamide
- IP50
- self-extinguishing
- free of halogen, cadmium and phosphor
- very good impact strength

PMA-COFIX TN: two-piece connector

Part No. PMA-COFIX	Inside (mm)	Length (mm)	Wrench Size (mm)	Thread PG	Suitable for PMA COFLEX NW
I-BTNO-P0910	09	28	19	9	10
I-BTNO-P1314	13	35	24	13.5	14
I-BTNO-P2120	20	34	32	21	20
I-BTNO-P2923	31	42	41	29	23
I-BTNO-P2937	31	50	50	29	37



GTN - Split lock nuts, PG

These split lock nuts are used in conjunction with the connectors TN for repairs or where cable protection systems are installed after wiring has taken place in the machine building and installation industry. Further, these products will be used increasingly in the vehicle building and building construction.

Temperature range:

-22°F to +212°F (-30 °C to +100 °C), or a short time up to +266°F (+130°C)

Features:

- specially formulated polyamide
- IP50
- self-extinguishing
- free of halogen, cadmium and phosphor
- very good impact strength

PMA-COFIX GTN: two-piece locking nut

Part No. PMA-COFIX	Height in. (mm)	Outside diameter (mm)	Thread PG	Suitable for PMA COFIX TN
I-BGTN-P0910	11	22	9	I-BTNO-P0910
I-BGTN-P1314	14	30	13.5	I-BTNO-P1314
I-BGTN-P2120	14	36	21	I-BTNO-P2120
I-BGTN-P2923	17	46	29	I-BTNO-P2923
I-BGTN-P2937	17	55	29	I-BTNO-P2937

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PMAFLEX Conduits VCS - flexible, heavy

PMAFLEX VCS heavy conduit is characterized by high impact resistance at low temperatures and good weather resistance. These conduits find their application primarily in railway vehicle undercarriages, but are also well-suited to static applications in general construction of machinery or installations.

Temperature range:

-58°F to +221°F (-50 °C to +105 °C), or a short time up to +302°F (+150°C)

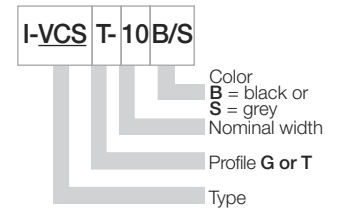
Features:

- specially modified PA6 (polyamide 6) for cold impact
- excellent mechanical properties also at low temperatures
- self-extinguishing
- halogen-free and cadmium-free

Chemical resistance:

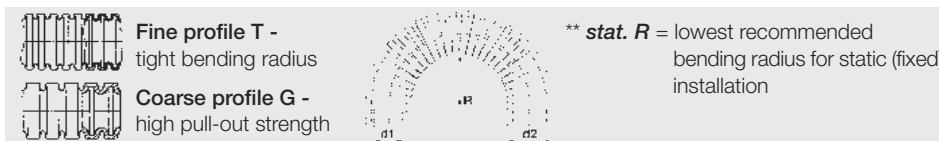
- fuels
- mineral oils
- fats
- alkalis
- weak acids and bases, etc.

Part No. structure



Part No. black	Part No. grey*	Conduit size NW	Conduit size metric	Inside diameter (mm)	Outside diameter (mm)	Radius (stat.)** (mm)	PU (m)
I-VCST-07B	I-VCST-07S	7	10	6.0	10.0	20	100
I-VCST-10B	I-VCST-10S	10	12	9.2	13.0	25	50
I-VCST-12B	I-VCST-12S	12	16	11.8	15.8	30	50
I-VCST-17B	I-VCST-17S	17	20	16.0	21.2	40	50
I-VCSG-17B	I-VCSG-17S	17	20	15.2	21.2	40	50
I-VCSG-23B	I-VCSG-23S	23	25	22.0	28.5	50	50
I-VCSG-29B	I-VCSG-29S	29	32	27.7	34.4	60	50
I-VCSG-36B	I-VCSG-36S	36	40	35.8	42.4	70	30
I-VCSG-48B	I-VCSG-48S	48	50	46.8	54.4	80	30
I-VCSG-56B	I-VCSG-56S	56	68	56.1	67.2	150	30
I-VCSG-70B	I-VCSG-70S	70	80	66.5	80.0	200	10
I-VCSG-95B	I-VCSG-95S	95	106	91.0	106.0	300	10

*Grey part is a special order, call igus® for availability



I-VCST/VCSG - is suitable for static use only!



PMAFLEX Conduits PIS/PIH - highly flexible, medium

These highly flexible products are used primarily in automation applications and for connections subject to intense movements in general machinery construction. Their outstanding material properties make these conduits especially suitable for outdoor applications where they are exposed to intensive sunlight (UV).

Temperature range:

-58°F to +203°F (-50 °C to +95 °C), or a short time up to +302°F (+150°C)

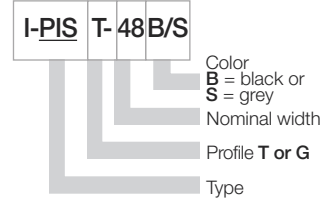
Features:

- specially modified polyamide 12
- **PIS: medium-wall (nominal width 07 to 48)**
- **PIH: heavy-wall (nominal width 56 to 125)**
- self-extinguishing
- halogen-free and cadmium-free
- good mechanical properties also at low temperatures

Chemical resistance:

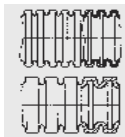
- fuels
- mineral oils
- fats
- alkalis
- acids etc.

Part No. structure

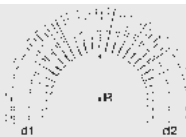


Part No. black	Part No. grey*	Conduit size NW	Conduit size metric	Inside diameter (mm)	Outside diameter (mm)	Radius stat.**/dyn.*** (mm)	PU (m)
I-PIST-07B	I-PIST-07S	7	10	6.2	10.0	15 / 40	50
I-PIST-10B	I-PIST-10S	10	12	9.6	13.0	20 / 50	50
I-PIST-12B	I-PIST-12S	12	16	11.9	15.8	25 / 65	50
I-PIST-17B	I-PIST-17S	17	20	16.4	21.1	30 / 65	50
I-PIST-23B	I-PIST-23S	23	25	22.6	28.4	35 / 90	50
I-PIST-29B	I-PIST-29S	29	32	29.0	34.3	45 / 110	50
I-PIST-36B	I-PIST-36S	36	40	36.5	42.5	60 / 165	30
I-PIST-48B	I-PIST-48S	48	50	47.5	54.5	70 / 180	30
I-PISG-17B	-	17	20	15.2	21.1	30 / 80	50
I-PISG-23B	I-PISG-23S	23	25	21.7	28.4	40 / 100	50
I-PISG-29B	I-PISG-29S	29	32	27.4	34.3	50 / 120	50
I-PISG-36B	I-PISG-36S	36	40	35.8	42.3	60 / 180	30
I-PISG-48B	I-PISG-48S	48	50	46.7	54.2	70 / 200	30
I-PIHG-56B	I-PIHG-56S	56	68	56.3	67.2	110 / 270	30
I-PIHG-70B	I-PIHG-70S	70	80	67.2	79.6	150 / 350	30
I-PIHG-95B	I-PIHG-95S	95	106	91.3	106.0	170 / 450	30
I-PIHG-125B	I-PIHG-125S	125	146	126.5	146.5	350 / 580	20

*Grey part is a special order, call igus® for availability



Fine profile T - tight bending radius
Coarse profile G - high pull-out strength



** *stat. R* = lowest recommended bending radius for static (fixed) installation
 *** *dyn. R* = lowest recommended bending radius for dynamic (flexible) installation

I-PIS/PIH is recommended for highly flexible application

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PMAFLEX Conduits CYL - very flexible, medium, economy

PMA CYL ECONOMY conduit exhibits very good flexibility and is also suitable for low temperature applications. These conduits are used primarily in construction of machinery and equipment.

Temperature range:

-40°F to +221°F (-40 °C to +105 °C), or a short time up to +302°F (+150°C)

Features:

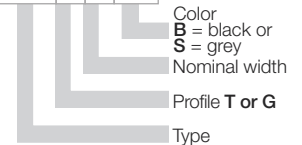
- specially modified polyamide 6/6.6 for cold impact
- good impact strength also at low temperatures
- self-extinguishing
- halogen-free and cadmium-free

Chemical resistance:

- fuels
- mineral oils
- fats
- alkalis
- weak acids and bases, etc.

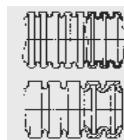
Part No. structure

I-CYL T-29B/S



Part No. black	Part No. grey*	Conduit size NW	Conduit size metric	Inside diameter (mm)	Outside diameter (mm)	Radius (stat.)** (mm)	PU (m)
I-CYLT-07B	I-CYLT-07S	7	10	6.2	10.0	15	50
I-CYLT-10B	I-CYLT-10S	10	12	9.6	13.0	20	50
I-CYLT-12B	I-CYLT-12S	12	16	12.0	15.8	30	50
I-CYLT-17B	I-CYLT-17S	17	20	16.2	21.2	40	50
I-CYLT-23B	I-CYLT-23S	23	25	22.6	28.5	40	50
I-CYLT-29B	I-CYLT-29S	29	32	29.0	34.5	50	50
I-CYLT-36B	I-CYLT-36S	36	40	36.5	42.5	60	30
I-CYLT-48B	I-CYLT-48S	48	50	47.5	54.5	70	30
I-CYLG-23B	I-CYLG-23S	23	25	21.9	28.5	45	50
I-CYLG-29B	I-CYLG-29S	29	32	27.6	34.5	55	50
I-CYLG-36B	I-CYLG-36S	36	40	36.0	42.5	60	30
I-CYLG-48B	I-CYLG-48S	48	50	47.0	54.5	70	30
I-CYLG-56B	-	56	68	56.3	67.2	120	30
I-CYLG-70B	-	70	80	68.0	80.0	160	30
I-CYLG-95B	-	95	106	91.9	106.0	210	10
I-CYLG-125B	-	125	146	126.5	146.5	450	6

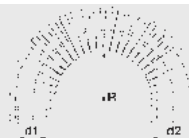
*Grey part is a special order, call igus® for availability



Fine profile T -
tight bending radius



Coarse profile G -
high pull-out strength



** *stat. R* = lowest recommended bending radius for static (fixed) installation

*** *dyn. R* = lowest recommended bending radius for dynamic (flexible) installation

**I-CYLT/CYLG -
is recommended
for static use!**

(moderate dynamic
application possible)

IP66 - static, IP54 dynamic - universal safety clip

- One piece Fitting, sealing by cone
- Easy "push-in" installation
- Pre-installed safety clip AFN2
- Fits any type of conduit profile (T and G)
- Excellent pull-out strength
- Re-opening for safety reasons only possible with a screwdriver
- Clip pre-installed in all IP66 connectors



Installation



IP68 - static - oval clip

- High sealing through additional seal cap
- For highest dynamic applications
- Fits any type of conduit profile (T and G)
- Excellent pull-out strength
- Re-opening for safety reasons only possible with a screwdriver



Installation



* For safety reasons, oval clip will not fit if seal cap is not fully installed.

Ensure to follow O-ring manufacturers guidelines when using O-rings for sealing purposes.

PMAFIX - Connectors

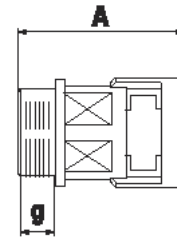
The designation **PMAFIX** describes a very large range of connectors for PMA conduits with the patented PMA safety clip system. Connectors are available for ingress protection IP66 and IP68. IP66 connectors are fitted with a preinstalled universal safety clip which ensures a quick "push-in" installation. IP68 connectors for increased requirements will be delivered with a special conduit seal cap.

Table 1 - PMAFIX / PMAFLEX conduit code

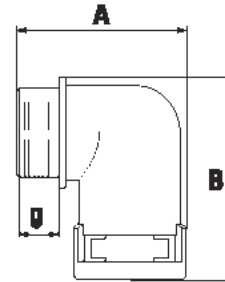
Nominal width	PMA code
7	M
10	0
12	2
17	7
23	3
29	9
36	6
48	8

Table 2 - Thread codes

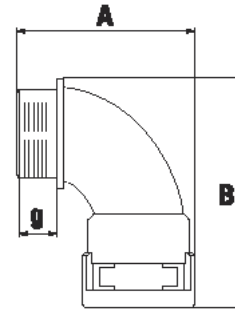
Thread metric	PMA code	Thread PG	PMA code
M12 x 1.5	M12	PG07	P07
M16 x 1.5	M16	PG09	P09
M20 x 1.5	M20	PG11	P11
-	-	PG13.5	P13
M25 x 1.5	M25	PG16	P16
M32 x 1.5	M32	PG21	P21
M40 x 1.5	M40	PG29	P29
M50 x 1.5	M50	PG36	P36
M63 x 1.5	M63	PG42	P42
		PG48	P48



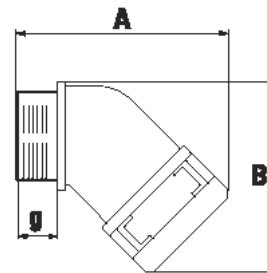
g = Thread length
A = Overall length



g = Thread length
A x B = External dimensions



g = Thread length
A x B = External dimensions

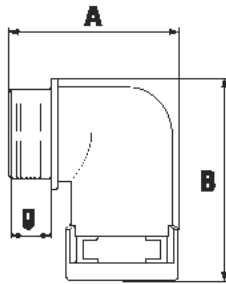


g = Thread length
A x B = External dimensions

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g = Thread length

A x B = External dimensions

PMAFIX Connectors VW - 90° elbow, metric & PG

These PMAFIX connectors are used in a wide range of applications. Together with PMAFLEX conduits they offer the highest grade of safety and sealing.

Temperature range:

-40°F to +221°F (-40 °C to +105 °C), or a short time up to +320°F (+160°C)

Content of delivery IP66:

Fitting with pre-assembled universal safety clips (AFN2)

Content of delivery IP68:

Fitting with oval clips (OVN2), conduit and thread seal (NVN3, SVN4)

Features:

- high grade formulated polyamide
- excellent impact strength
- self-extinguishing
- free of halogen, phosphor and cadmium

Part No. IP66	Part No. IP68	Thread PG	Fits to conduit size:		Thread length [mm]	External dim. [mm]
			NW	metric		
I-_VWD-P07MGT-11	I-_VWV-P07M	7	7	10	(11.0)	32.0 x 35.0
I-_VWD-P070GT-11	I-_VWV-P070	7	10	12	(11.0)	34.0 x 39.5
I-_VWD-P09MGT-11	—	9	7	10	(11.0)	32.0 x 36.5
I-_VWD-P090GT-11	I-_VWV-P090	9	10	12	(11.0)	34.0 x 39.5
I-_VWD-P092GT-11	I-_VWV-P092	9	12	16	(11.0)	38.5 x 44.5
I-_VWD-P11MGT-11	—	11	7	10	(11.0)	32.0 x 38.0
I-_VWD-P110GT-11	I-_VWV-P110	11	10	12	(11.0)	34.0 x 41.0
I-_VWD-P112GT-11	I-_VWV-P112	11	12	16	(11.0)	38.5 x 46.0
I-_VWD-P13MGT-11	—	13.5	7	10	(11.0)	32.0 x 39.5
I-_VWD-P130GT-11	I-_VWV-P130	13.5	10	12	(11.0)	34.0 x 42.5
I-_VWD-P132GT-11	I-_VWV-P132	13.5	12	16	(11.0)	38.5 x 47.5
I-_VWD-P137GT-11	I-_VWV-P137	13.5	17	20	(11.0)	43.5 x 58.5
I-_VWD-P167GT-11	I-_VWV-P167	16	17	20	(11.0)	43.5 x 58.5
I-_VWD-P213GT	I-_VWV-P213	21	23	25	(11.0)	54.0 x 67.0
I-_VWD-P299GT	I-_VWV-P299	29	29	32	(12.0)	61.5 x 74.5
I-_VWD-P366GT	I-_VWV-P366	36	36	40	(13.0)	72.0 x 98.0
I-_VWD-P488GT	I-_VWV-P488	48	48	50	(13.0)	85.5 x 111.0

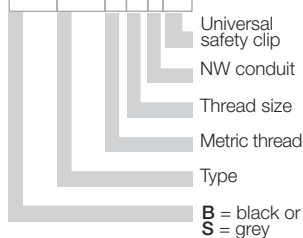
Fill in the blank with either "B" to order black or "S" to order grey*

For smaller conduit sizes NW 07 to NW 12 appropriate standard elbows of type VB are available

*Grey part is a special order, call igus® for availability

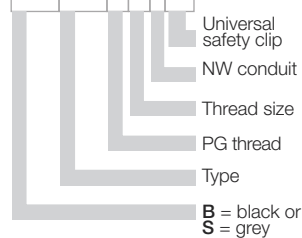
Part No. structure metric

I-B/SVWDM202GT



Part No. structure PG

I-B/SVWDP213GT





PMAFIX Connectors VA - 45° elbow, metric & PG

These PMAFIX connectors are used in a wide range of applications. Together with PMAFLEX conduits they offer the highest grade of safety and sealing.

Temperature range:

-40°F to +221°F (-40 °C to +105 °C), or a short time up to +320°F (+160°C)

Content of delivery IP66:

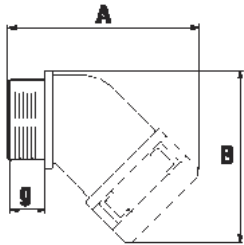
Fitting with pre-assembled universal safety clips (AFN2)

Content of delivery IP68:

Fitting with oval clips (OVN2), conduit and thread seal (NVN3, SVN4)

Features:

- high grade formulated polyamide
- excellent impact strength
- self-extinguishing
- free of halogen, phosphor and cadmium



g = Thread length

A x B = External dimensions

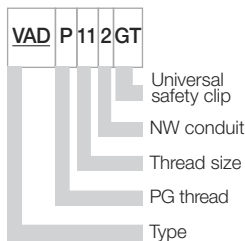
Part No. IP66	Part No. IP68	Thread metric	Fits to conduit size:		Thread length [mm]	External dim. [mm]
			NW	metric		
I-__VAD-M120GT	—	M12 x 1.5	10	12	11.0	43.5 x 37.0
I-__VAD-M160GT	I-__VAV-M160	M16 x 1.5	10	12	11.0	43.5 x 38.0
I-__VAD-M162GT	I-__VAV-M162	M16 x 1.5	12	16	11.0	48.0 x 40.0
I-__VAD-M202GT	I-__VAV-M202	M20 x 1.5	12	16	11.0	48.0 x 41.5
I-__VAD-M207GT	I-__VAV-M207	M20 x 1.5	17	20	11.0	55.5 x 51.5
I-__VAD-M253GT	I-__VAV-M253	M25 x 1.5	23	25	12.0	65.0 x 58.5
I-__VAD-M329GT	I-__VAV-M329	M32 x 1.5	29	32	15.0	73.5 x 66.5
I-__VAD-M406GT	I-__VAV-M406	M40 x 1.5	36	40	19.0	92.5 x 85.5
I-__VAD-M506GT	I-__VAV-M506	M50 x 1.5	36	40	19.0	100.0 x 89.5
I-__VAD-M508GT	I-__VAV-M508	M50 x 1.5	48	50	19.0	100.0 x 96.0
I-__VAD-M638GT	I-__VAV-M638	M63 x 1.5	48	50	19.0	100.0 x 104.0

Part No. IP66	Part No. IP68	Thread PG	Fits to conduit size:		Thread length [mm]	External dim. [mm]
			NW	metric		
I-__VAD-P090GT	I-__VAV-P090	9	10	12	11.0	43.5 x 37.0
I-__VAD-P112GT	I-__VAV-P112	11	12	16	11.0	48.0 x 40.0
I-__VAD-P132GT	I-__VAV-P132	13.5	12	16	11.0	48.0 x 41.5
I-__VAD-P137GT	I-__VAV-P137	13.5	17	20	11.0	55.0 x 50.0
I-__VAD-P167GT	I-__VAV-P167	16	17	20	11.0	55.0 x 51.5
I-__VAD-P213GT	I-__VAV-P213	21	23	25	12.0	67.0 x 59.0
I-__VAD-P299GT	I-__VAV-P299	29	29	32	12.0	69.0 x 67.0
I-__VAD-P366GT	I-__VAV-P366	36	36	40	13.0	86.0 x 86.0
I-__VAD-P488GT	I-__VAV-P488	48	48	50	13.0	93.0 x 99.0

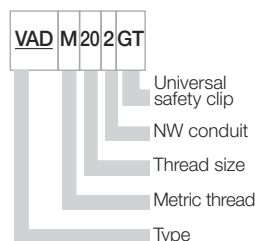
Fill in the blank with either "B" to order black or "S" to order grey*

*Grey part is a special order, call igus® for availability

Part No. structure PG



Part No. structure metric



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PMAFIX Connectors VN - straight, metric

These PMAFIX connectors are used in a wide range of applications. Together with PMAFLEX conduits they offer the highest grade of safety and sealing.

Temperature range:

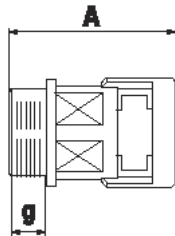
-40°F to +221°F (-40 °C to +105 °C), or a short time up to +320°F (+160°C)

Content of delivery IP66:

Fitting with pre-assembled universal safety clips (AFN2)

Content of delivery IP68:

Fitting with oval clips (OVN2), conduit and thread seal (NVN3, SVN4)



Features:

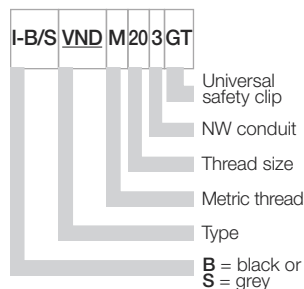
- high grade formulated polyamide
- excellent impact strength
- self-extinguishing
- free of halogen, phosphor and cadmium

Part No. IP66	Part No. IP68	Thread metric	Fits to conduit size:		Thread length [mm]	Overall length [mm]
			NW	metric		
I-_VND-M12MGT	I-_VNV-M12M	M12 x 1.5	7	10	11.0	34.5
I-_VND-M120GT	I-_VNV-M120	M12 x 1.5	10	12	11.0	36.5
I-_VND-M160GT	I-_VNV-M160	M16 x 1.5	10	12	11.0	36.5
I-_VND-M162GT	I-_VNV-M162	M16 x 1.5	12	16	11.0	39.5
I-_VND-M202GT	I-_VNV-M202	M20 x 1.5	12	16	11.0	39.5
I-_VND-M207GT	I-_VNV-M207	M20 x 1.5	17	20	11.0	47.5
I-_VND-M257GT	I-_VNV-M257	M25 x 1.5	17	20	12.0	48.5
I-_VND-M253GT	I-_VNV-M253	M25 x 1.5	23	25	12.0	52.0
I-_VND-M323GT	I-_VNV-M323	M32 x 1.5	23	25	15.0	55.5
I-_VND-M329GT	I-_VNV-M329	M32 x 1.5	29	32	15.0	56.0
I-_VND-M409GT	I-_VNV-M409	M40 x 1.5	29	32	19.0	60.0
I-_VND-M406GT	I-_VNV-M406	M40 x 1.5	36	40	19.0	72.5
I-_VND-M506GT	I-_VNV-M506	M50 x 1.5	36	40	19.0	72.0
I-_VND-M508GT	I-_VNV-M508	M50 x 1.5	48	50	19.0	72.5
I-_VND-M638GT	I-_VNV-M638	M63 x 1.5	48	50	19.0	72.0

Fill in the blank with either "B" to order black or "S" to order grey*

*Grey part is a special order, call igus® for availability

Part No. structure metric





PMAFIX Connectors VN - straight, PG

These PMAFIX connectors are used in a wide range of applications. Together with PMAFLEX conduits they offer the highest grade of safety and sealing.

Temperature range:

-40°F to +221°F (-40 °C to +105 °C), or a short time up to +320°F (+160°C)

Content of delivery IP66:

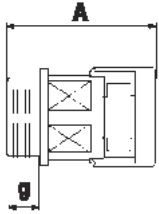
Fitting with pre-assembled universal safety clips (AFN2)

Content of delivery IP68:

Fitting with oval clips (OVN2), conduit and thread seal (NVN3, SVN4)

Features:

- high grade formulated polyamide
- excellent impact strength
- self-extinguishing
- free of halogen, phosphor and cadmium



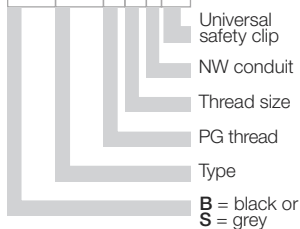
Part No. IP66	Part No. IP68	Thread PG	Fits to conduit size:		Thread length [mm]	Overall length [mm]
			NW	metric		
I-__VND-P07MGT-11	I-__VNV-P07M	7	7	10	11.0	34.5
I-__VND-P070GT-11	I-__VNV-P070	7	10	12	11.0	36.5
I-__VND-P072GT-11	—	7	12	16	11.0	39.0
I-__VND-P09MGT-11	I-__VNV-P09M	9	7	10	11.0	34.5
I-__VND-P090GT-11	I-__VNV-P090	9	10	12	11.0	36.5
I-__VND-P092GT-11	I-__VNV-P092	9	12	16	11.0	39.0
I-__VND-P097GT-11	I-__VNV-P097	9	17	20	11.0	47.5
I-__VND-P11MGT-11	I-__VNV-P11M	11	7	10	11.0	34.5
I-__VND-P110GT-11	I-__VNV-P110	11	10	12	11.0	36.5
I-__VND-P112GT-11	I-__VNV-P112	11	12	16	11.0	39.0
I-__VND-P117GT-11	I-__VNV-P117	11	17	20	11.0	47.5
I-__VND-P13MGT-11	—	13.5	7	10	11.0	34.5
I-__VND-P130GT-11	I-__VNV-P130	13.5	10	12	11.0	36.5
I-__VND-P132GT-11	I-__VNV-P132	13.5	12	16	11.0	39.0
I-__VND-P137GT-11	I-__VNV-P137	13.5	17	20	11.0	47.5
I-__VND-P160GT-11	—	16	10	12	11.0	36.5
I-__VND-P162GT-11	I-__VNV-P162	16	12	16	11.0	39.0
I-__VND-P167GT-11	I-__VNV-P167	16	17	20	11.0	47.5
I-__VND-P163GT-11	I-__VNV-P163	16	23	25	11.0	51.0
I-__VND-P213GT	I-__VNV-P213	21	23	25	12.0	52.0
I-__VND-P299GT	I-__VNV-P299	29	29	32	12.0	53.0
I-__VND-P296GT	I-__VNV-P296	29	36	40	12.0	67.5
I-__VND-P366GT	I-__VNV-P366	36	36	40	13.0	66.0
I-__VND-P368GT	—	36	48	50	13.0	68.5
I-__VND-P428GT	I-__VNV-P428	42	48	50	13.0	68.5
I-__VND-P488GT	I-__VNV-P488	48	48	50	13.0	66.5

Fill in the blank with either "B" to order black or "S" to order grey*

*Grey part is a special order, call igus® for availability

Part No. structure PG

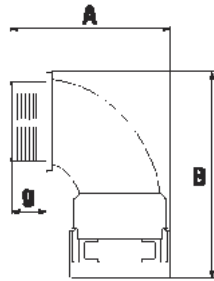
I-B/S VND P 21 3GT



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g = Thread length

A x B = External dimensions

PMAFIX Connectors VB - 90° curved elbow, metric & PG

These PMAFIX connectors are used in a wide range of applications. Together with PMAFLEX conduits they offer the highest grade of safety and sealing.

Temperature range:

-40°F to +221°F (-40 °C to +105 °C), or a short time up to +320°F (+160°C)

Content of delivery IP66:

Fitting with pre-assembled universal safety clips (AFN2)

Content of delivery IP68:

Fitting with oval clips (OVN2), conduit and thread seal (NVN3, SVN4)

Features:

- high grade formulated polyamide
- excellent impact strength
- self-extinguishing
- free of halogen, phosphor and cadmium

Part No. IP66	Part No. IP68	Thread metric	Fits to conduit size:		Thread length [mm]	External dim. [mm]
			NW	metric		
I-__VBD-M207GT	I-__VBV-M207	M20 x 1.5	17	20	11.0	47.5 x 73.0
I-__VBD-M257GT	I-__VBV-M257	M25 x 1.5	17	20	12.0	48.5 x 76.0
I-__VBD-M253GT	I-__VBV-M253	M25 x 1.5	23	25	12.0	57.5 x 83.0
I-__VBD-M323GT	I-__VBV-M323	M32 x 1.5	23	25	15.0	61.0 x 87.5
I-__VBD-M329GT	I-__VBV-M329	M32 x 1.5	29	32	15.0	70.5 x 93.0
I-__VBD-M409GT	I-__VBV-M409	M40 x 1.5	29	32	19.0	74.5 x 98.5
I-__VBD-M406GT	I-__VBV-M406	M40 x 1.5	36	40	19.0	85.0 x 121.0
I-__VBD-M506GT	I-__VBV-M506	M50 x 1.5	36	40	19.0	85.0 x 125.0
I-__VBD-M508GT	I-__VBV-M508	M50 x 1.5	48	50	19.0	98.5 x 130.0
I-__VBD-M638GT	I-__VBV-M638	M63 x 1.5	48	50	19.0	98.5 x 138.0

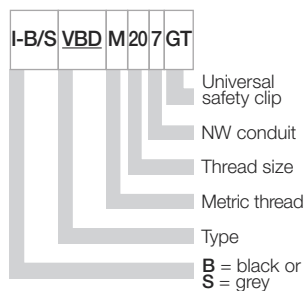
Part No. IP66	Part No. IP68	Thread metric	Fits to conduit size:		Thread length [mm]	External dim. [mm]
			NW	metric		
I-__VBD-P167GT	I-__VBV-P167	16	17	20	11.0	47.4 x 73.0
I-__VBD-P213GT	I-__VBV-P213	21	23	25	12.0	57.5 x 85.0
I-__VBD-P299GT	I-__VBV-P299	29	29	32	12.0	67.5 x 96.0
I-__VBD-P366GT	I-__VBV-P366	36	36	40	13.0	79.0 x 123.0
I-__VBD-P488GT	I-__VBV-P488	48	48	50	13.0	92.5 x 135.0

Fill in the blank with either "B" to order black or "S" to order grey*

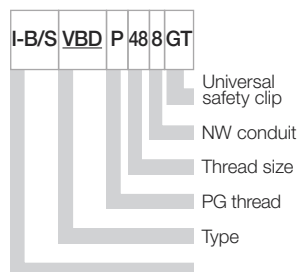
*Grey part is a special order, call igus® for availability

For smaller conduit sizes NW 07 to NW 12 appropriate standard elbows of type VW are available

Part No. structure metric



Part No. structure PG





PMAFIX Connectors VO - Flange 90°

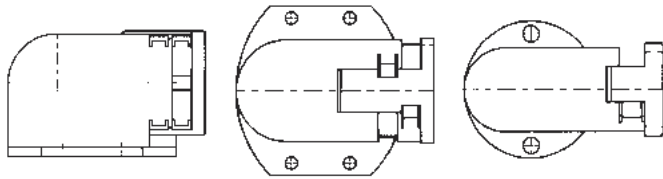
These PMAFIX connectors are used in a wide range of applications. Together with PMAFLEX conduits they offer the highest grade of safety and sealing.

Content of delivery IP66:

Fitting with pre-assembled universal safety clips (AFN2), flange seal (FG04)

Content of delivery IP68:

Fitting with oval clips (OVN2), conduit and thread seal (NVN3, FG04)

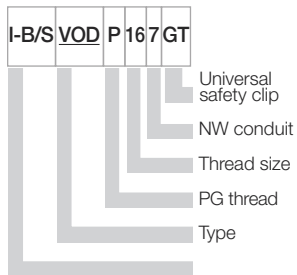


Part No. IP66	Part No. IP68	Fits to conduit size:		Dimensions width x length x depth	Fixing screws
		NW	metric		
I-__VOD-P167GT	I-__VOV-P167	17	20	46.0 x 66.0 x 35.5	2 x M5
I-__VOD-P213GT	I-__VOV-P213	23	25	65.5 x 70.0 x 43.0	2 x M6
I-__VOD-P299GT	I-__VOV-P299	29	32	67.0 x 78.0 x 49.5	4 x M6
I-__VOD-P366GT	I-__VOV-P366	36	40	85.0 x 102.0 x 65.5	4 x M6
I-__VOD-P488GT	I-__VOV-P488	48	50	86.0 x 119.0 x 77.5	4 x M6

Fill in the blank with either "B" to order black or "S" to order grey*

*Grey part is a special order, call igus® for availability

Part No. structure PG



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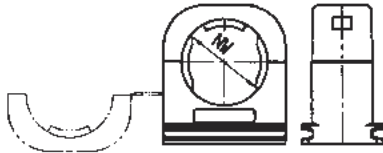


PMAFIX FH-0 - One-piece system supports

The one-piece PMACLIP system support is designed for fixation of PMAFLEX conduits. This product can be used in all machine and installation applications for easy assembly of the PMA system.

Temperature range:

-40°F to +221°F (-40 °C to +105 °C), or a short time up to +320°F (+160°C)



Features:

- high grade formulated polyamide
- excellent impact strength
- self-extinguishing
- free of halogen, phosphor and cadmium

Part No. black	Part No. grey	Fits to conduit size:		Dimensions width x length x depth	Fixing screw
		NW	metric		
I-BFH-07-0	I-SFH-07-0	7	10	17.0 x 21.5 x 20.0	1 x M4
I-BFH-10-0	I-SFH-10-0	10	12	20.5 x 24.5 x 20.0	1 x M5
I-BFH-12-0	I-SFH-12-0	12	16	24.0 x 27.0 x 20.0	1 x M5
I-BFH-17-0	I-SFH-17-0	17	20	30.0 x 34.0 x 20.0	1 x M6
I-BFH-23-0	I-SFH-23-0	23	25	38.5 x 42.0 x 20.0	1 x M6
I-BFH-29-0	I-SFH-29-0	29	32	45.5 x 48.0 x 20.0	1 x M6
I-BFH-36-0	I-SFH-36-0	36	40	55.5 x 56.0 x 20.0	1 x M6
I-BFH-48-0	I-SFH-48-0	48	50	67.5 x 68.0 x 20.0	1 x M6



PMAFIX VH - System supports

These PMACLIP system supports are designed for support and guidance of PMA conduits with fine or coarse profile and can be used in all machine building and installation applications. The system is safe against turning/movement and offers maximum security with the additional safety clip, variable assembly due to six hole fastening and optimal strain relief due to integrated rib.

Temperature range:

-40°F to +221°F (-40 °C to +105 °C), or a short time up to +320°F (+160°C)

Features:

- high grade formulated polyamide
- excellent impact strength
- self-extinguishing
- free of halogen, phosphor and cadmium

Part No. Support only	Part No. Locking clip	Part No. Complete	Fits to conduit size:		Dimensions width x length x depth	Fixing screw
			NW	metric		
I-BVH-07	BVH-07-020	BVH-07-000	7	10	17.0 x 21.5 x 20.0	1 x M4
I-BVH-10	BVH-10-020	BVH-10-000	10	12	20.5 x 24.5 x 20.0	1 x M5
I-BVH-12	BVH-12-020	BVH-12-000	12	16	24.0 x 27.0 x 20.0	1 x M5
I-BVH-17	BVH-17-020	BVH-17-000	17	20	35.0 x 36.0 x 36.0	6 x M5
I-BVH-23	BVH-23-020	BVH-23-000	23	25	35.0 x 44.0 x 36.0	6 x M5
I-BVH-29	BVH-29-020	BVH-29-000	29	32	46.0 x 52.0 x 40.0	6 x M5
I-BVH-36	BVH-36-020	BVH-36-000	36	40	53.0 x 58.0 x 60.0	6 x M5
I-BVH-48	BVH-48-020	BVH-48-000	48	50	66.0 x 72.0 x 60.0	6 x M5



PMAFIX GPS - One-piece System supports for stacking

The PMAFIX system supports for stacking are specially designed for increased mechanical requirements in the traction and heavy machine building industries. The one-piece systems supports offer a clasp for easy pre-mounting and final assembly. Fixation in standard rails type C and strain relief due to gripping around the conduit. In addition these products are partially stackable.

Temperature range:

-40°F to +221°F (-40 °C to +105 °C), or a short time up to +320°F (+160°C)

Features:

- high grade formulated polyamide
- excellent impact strength
- self-extinguishing
- free of halogen, phosphor and cadmium

Stacking options

The following nominal widths can be combined for stacking:

- NW 17 with NW23
- NW 29 with NW 36
- NW 48 with NW 56

Part No. fine profile	Fits to conduit size			Dimensions		
	NW	metric	DIN-NW	width	height	depth
BGPS-17	17	20	2	70.0	45.0	30.0
BGPS-23	23	25	2	70.0	45.0	30.0
BGPS-29	29	32	3	85.0	60.0	30.0
BGPS-36	36	40	3	85.0	60.0	30.0
BGPS-48	48	50	4	115.0	90.0	30.0
BGPS-56	56	-	4	115.0	90.0	30.0

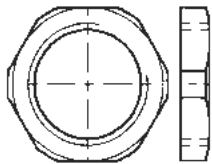


PMA MN - Hexagonal Lock Nuts, metric & PG

These hexagonal lock nuts are suitable for a wide range of applications. High torque guarantees a safe connection of the system. Made of reinforced polyamide glass fiber

Temperature range:

-40°F to +221°F (-40 °C to +105 °C), or a short time up to +302°F (+150°C)



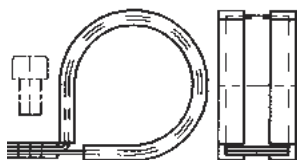
Part No. black	Part No. grey	Fits to thread: metric	Wrench size	Dimensions height
I-BMN-M12	I-GMN-M12	M12 x 1.5	17.0	5.0
I-BMN-M16	I-GMN-M16	M16 x 1.5	22.0	5.0
I-BMN-M20	I-GMN-M20	M20 x 1.5	27.0	6.0
I-BMN-M25	I-GMN-M25	M25 x 1.5	32.0	6.0
I-BMN-M32	I-GMN-M32	M32 x 1.5	41.0	7.0
I-BMN-M40	I-GMN-M40	M40 x 1.5	50.0	7.0
I-BMN-M50	I-GMN-M50	M50 x 1.5	60.0	8.0
I-BMN-M63	I-GMN-M63	M63 x 1.5	75.0	8.0

Part No. black	Part No. grey	Fits to thread: PG	Wrench size	Dimensions height
I-BMN-07	I-GMN-07	7	19.0	5.0
I-BMN-09	I-GMN-09	9	22.0	5.0
I-BMN-11	I-GMN-11	11	24.0	5.3
I-BMN-13	I-GMN-13	13.5	27.0	6.3
I-BMN-16	I-GMN-16	16	30.0	6.3
I-BMN-21	I-GMN-21	21	36.0	7.0
I-BMN-29	I-GMN-29	29	46.0	7.0
I-BMN-36	I-GMN-36	36	60.0	8.0
I-BMN-48	I-GMN-48	48	70.0	8.0

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PMA SGB - Tube clamps

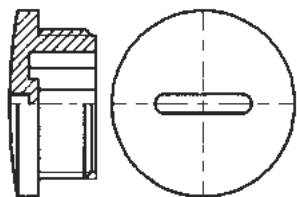
These tube clamps are used for the mounting and smooth connection to the PMA conduits in the general machine and installation applications. They are especially suitable for the mounting of static conduits.

Temperature range: -58°F to +221°F (-50 °C to +105 °C)

Features:

- galvanized steel according to DIN 3016
- Elastomer free of halogen

Part No.	Fits to conduit size		Dimensions width [mm]	Fixing screw
	NW	metric		
I-SGB-07	7	10	13.0	1 x M4
I-SGB-09	10	12	13.0	1 x M4
I-SGB-11	12	16	13.0	1 x M4
I-SGB-16	17	20	16.0	1 x M5
I-SGB-21	23	25	16.0	1 x M5
I-SGB-29	29	32	19.0	1 x M6
I-SGB-36	36	40	19.0	1 x M6
I-SGB-48	48	50	19.0	1 x M6



PMA 514 - Plug Screws, metric & PG

These plug screws are suitable for an accurate termination where no thread holes in casing and distribution boxes are needed.

Temperature range: -4°F to +212°F (-20 °C to +100 °C), or a short time up to +302°F (+150°C)

Features:

- product with metric thread: PA-GF
- product with PG thread: PS
- free of halogen, phosphor and cadmium
- IP54

Part No.	Fits to thread	Outside	Total length	Thread length
	metric	Ø [mm]	[mm]	[mm]
I-514-M12	M12 x 1.5	15.0	8.0	6.0
I-514-M16	M16 x 1.5	20.0	9.0	6.0
I-514-M20	M20 x 1.5	24.0	9.5	6.0
I-514-M25	M25 x 1.5	30.0	11.5	8.0
I-514-M32	M32 x 1.5	37.0	12.0	8.0
I-514-M40	M40 x 1.5	46.0	13.0	8.0
I-514-M50	M50 x 1.5	56.0	15.0	10.0
I-514-M63	M63 x 1.5	70.0	17.0	12.0

Part No.	Fits to thread	Outside	Total length	Thread length
	PG	Ø [mm]	[mm]	[mm]
I-514-07	7	15.0	8.0	6.0
I-514-09	9	19.0	9.5	6.5
I-514-11	11	22.0	10.0	6.5
I-514-13	13.5	25.0	10.0	6.5
I-514-16	16	27.0	10.0	6.5
I-514-21	21	33.0	12.0	8.0
I-514-29	29	44.0	11.5	8.0
I-514-36	36	55.0	14.0	10.0
I-514-48	48	68.0	16.0	12.0



PMA Connectors - Accessories

PMA

igus® Energy Chain System®

Telephone 1-800-521-2747
Fax 1-401-438-7270

Internet: <http://www.igus.com>
email: sales@igus.com
QuickSpec: <http://www.igus.com/quickspec>

11.23

Standard Corrugated Conduits						
Products		CYL PA6 3A	VCS PA6 3A	PIS PA12	FH	VH
Tube size: metric	width [mm]	Very flexible, medium wall corrugated conduits	Flexible, very heavy corrugated conduits	Highly flexible medium wall corrugated conduits	PMACLIP - one-piece system support	PMACLIP two-piece system support
10	07	CYLT-07* –	VCST-07* –	PIST-07* –	*FH-07-0	*VH-17-000
12	10	CYLT-10* –	VCST-10* –	PIST-10* –	*FH-10-0	*VH-23-000
16	12	CYLT-12* –	VCST-12* –	PIST-12* –	*FH-12-0	*VH-29-000
20	17	CYLT-17* –	VCST-17* –	PIST-17* –	*FH-17-0	*VH-36-000
25	23	CYLT-23* CYLG-23*	–	PIST-23* PISG-23*	*FH-23-0	*VH-48-000
32	29	CYLT-29* CYLG-29*	–	PIST-29* PISG-29*	*FH-29-0	
40	36	CYLT-36* CYLG-36*	–	PIST-36* PISG-36*	*FH-36-0	
50	48	CYLT-48* CYLG-48*	–	PIST-48* PISG-48*	*FH-48-0	
			VCSG-56*			
			VCSG-70*			
			VCSG-95*			

* = replaced by "B" for black or "S" for gray

T or D = fine profile

G = coarse profile







Standard Corrugated Conduits						
Products		CYL PA6 3A	VCS PA6 3A	PIS PA12	FH	VH
Tube size: metric	width [mm]	Very flexible, medium wall corrugated conduits	Flexible, very heavy corrugated conduits	Highly flexible medium wall corrugated conduits	PMACLIP - one-piece system support	PMACLIP two-piece system support
10	07	CYLT-07* –	VCST-07* –	PIST-07* –	*FH-07-0	*VH-17-000
12	10	CYLT-10* –	VCST-10* –	PIST-10* –	*FH-10-0	*VH-23-000
16	12	CYLT-12* –	VCST-12* –	PIST-12* –	*FH-12-0	*VH-29-000
20	17	CYLT-17* –	VCST-17* –	PIST-17* –	*FH-17-0	*VH-36-000
25	23	CYLT-23* CYLG-23*	–	PIST-23* PISG-23*	*FH-23-0	*VH-48-000
32	29	CYLT-29* CYLG-29*	–	PIST-29* PISG-29*	*FH-29-0	
40	36	CYLT-36* CYLG-36*	–	PIST-36* PISG-36*	*FH-36-0	
50	48	CYLT-48* CYLG-48*	–	PIST-48* PISG-48*	*FH-48-0	
			VCSG-56*			
			VCSG-70*			
			VCSG-95*			

* = replaced by "B" for black or "S" for gray

T or D = fine profile

G = coarse profile

JUMBO Corrugated Conduits PMAGRIP					
Products		PIHG PA12	BGG 3A	BGO 3A	SGS
Tube size: Width [mm]		Highly flexible medium wall corrugated conduits	PMAGRIP-straight	PMAGRIP-90° angle	PMAGRIP-tube clamps
56		PIHG-56*	*GG-56	*GO-56	SGS-56
70		PIHG-70*	*GG-70	*GO-70	SGS-70
95		PIHG-95*	*GG-95	*GO-95	SGS-95
125		PIHG-125*	*GG-125	–	SGS-125

PMAFIX							
Products		IP66 - VN 90°	IP66 - VA 90°	IP66 - VW 90°	IP66 - VB 90°	IP68 - VNZ 90°	MN
Thread Typ		PMAFIX straight	PMAFIX 45° angle	PMAFIX 90° angle	PMAFIX 90° elbow angle	Straight with strain relief	PMA hexagonal lock nuts
M12x1.5		*VND-M12MGT	–	*VWD-M12MGT	–	–	*MN-M12
M12x1.5		*VND-M120GT	*VAD-M120GT	*VWD-M120GT	–	–	*MN-M12
M16x1.5		*VND-M162GT	*VAD-M162GT	*VWD-M162GT	–	*VNZ-M162S	*MN-M16
M20x1.5		*VND-M207GT	*VAD-M207GT	*VWD-M207GT	*VBD-M207GT	*VNZ-M207S	*MN-M20
M25x1.5		*VND-M253GT	*VAD-M253GT	*VWD-M253GT	*VBD-M253GT	*VNZ-M253S	*MN-M25
M32x1.5		*VND-M329GT	*VAD-M329GT	*VWD-M329GT	*VBD-M329GT	*VNZ-M329S	*MN-M32
M40x1.5		*VND-M406GT	*VAD-M406GT	*VWD-M406GT	*VBD-M406GT	*VNZ-M406S	*MN-M40
M50x1.5		*VND-M508GT	*VAD-M508GT	*VWD-M508GT	*VBD-M508GT	*VNZ-M508S	*MN-M50

* = replaced by "B" for black or "S" for gray

PMAFIX						
Products		IP66 - VOD 90°	IP66 - VY 90°	IP66 - FT/VT 90°	IP66 - FV 90°	SGB
Tube size: metric width [mm]		PMAFIX flange 90°	PMAFIX Y-distribution piece	PMAFIX T-distribution piece	PMAFIX V-distribution piece	PMAFIX-tube clamps
10	07	–	–	–	–	SGB-07
12	10	–	*VYD-100707GT	*FTD-101010GT	*FVD-100707GT	SGB-09
16	12	–	*VYD-121010GT	*FTD-121212GT	*FVD-121010GT	SGB-11
20	17	*VOD-P167GT	*VYD-171212GT	*FTD-171717GT	*FVD-171212GT	SGB-16
25	23	*VOD-P213GT	*VYD-231717GT	*FTD-232323GT	*FVD-231717GT	SGB-21
32	29	*VOD-P299GT	*VYD-292323GT	*FTD-292929GT	–	SGB-29
40	36	*VOD-P366GT	*VYD-362929GT	*FTD-363636GT	–	SGB-36
50	48	*VOD-P488GT	*VYD-483636GT	–	–	SGB-48

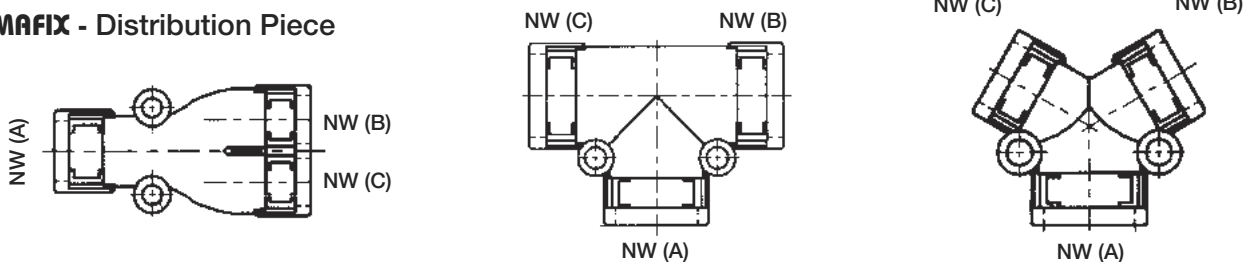
* = replaced by "B" for black or "S" for gray

PMAFIX - Order Example

XXXX-10 07 07 XX



PMAFIX - Distribution Piece



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System®

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email: sales@igus.com
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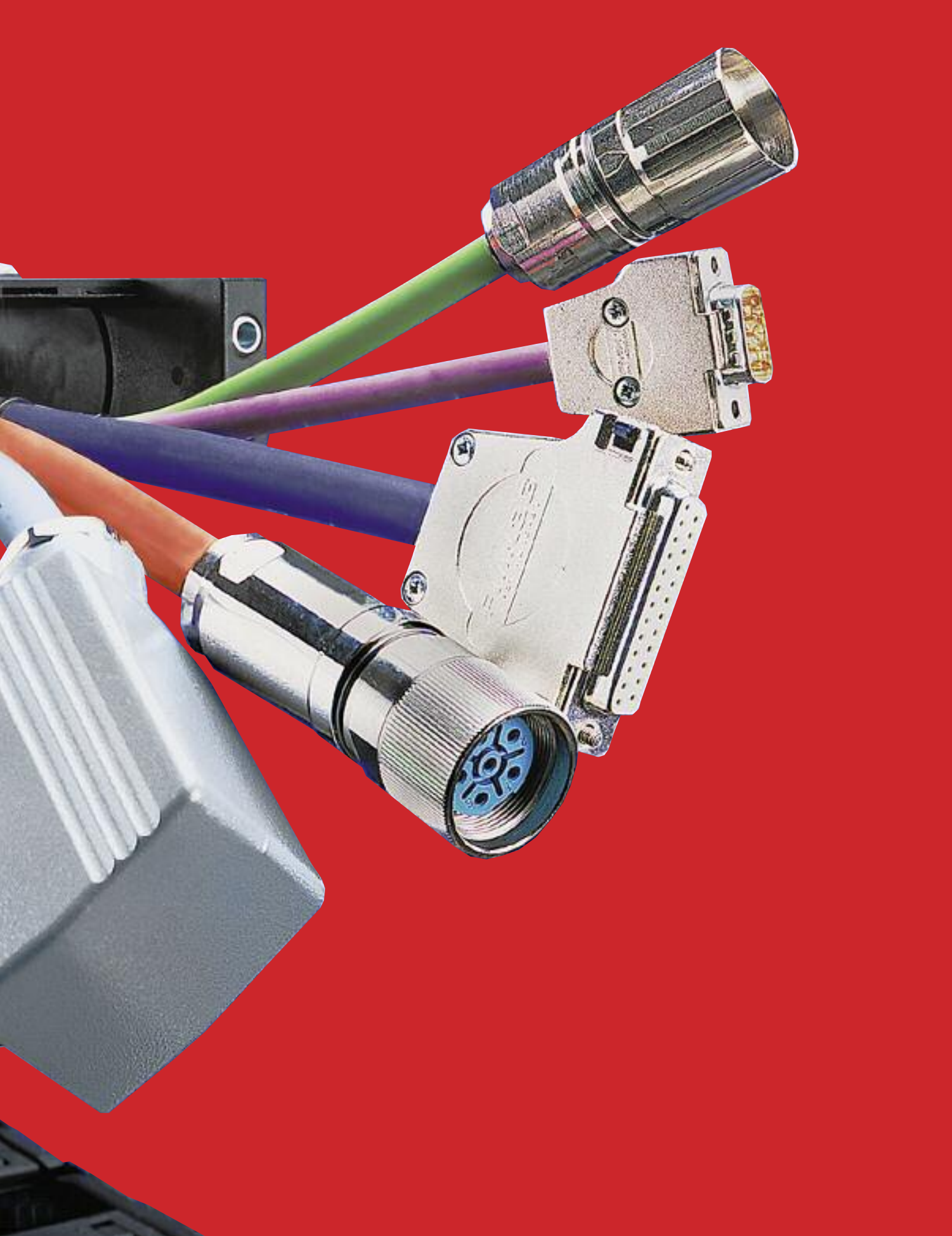
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QuickSpec: <http://www.igus.com/quickspec>

ReadyChain[®]





What is ReadyChain®?

Just open the box,
plug in the cables...



and in minutes your Energy
Chain System® is ready to
supply power to your
machine.

Think of it as
“Assembly Instructions
NOT Included”

With an igus® ReadyChain® assembly, instructions are a thing of the past. Customers receive a complete out-of-the-box solution: no assembly required.

- No more fumbling with cables, attaching connectors and assembling separators, mounting brackets and other accessories: *with ReadyChain®, the connectors are already attached to the cables which are installed and separated in the required order within the carrier.*
- Stop spending valuable time assembling an Energy Chain System®: *now engineers can focus on what they were hired to do.*

Leave the assembly to the experts at igus dedicated to building and assembling your ReadyChain®.

ReadyChain® is a complete solution delivered into your hands for immediate installation. You'll save hours of time which can be better spent doing what you do best.

ReadyChain® Options

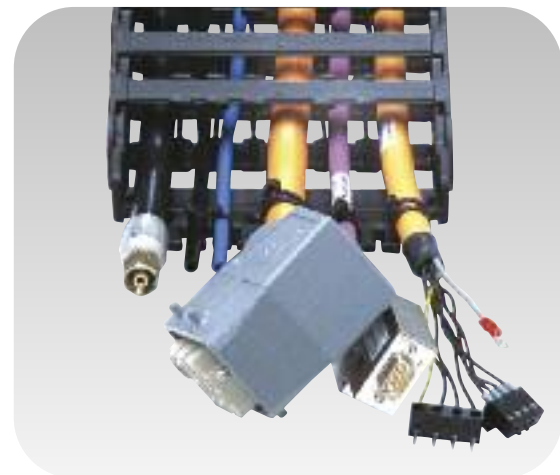
ReadyChain® Basic

igus® offers simple harnessing services comprised of just the Energy Chain® and Chainflex® cables.



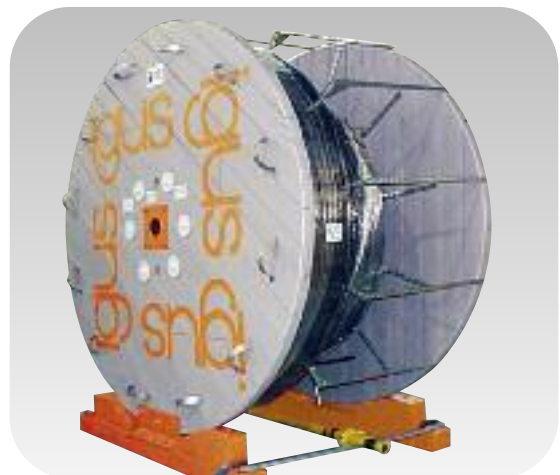
ReadyChain® Standard

We'll also provide a complete harnessed system, including cable carrier, cables, interior separation, connectors, guide trough and other accessories.



ReadyChain® Project

If you need a more complex solution, including a complete harnessed ReadyChain® with special parts (custom mounts, metal brackets etc.) for a structural attachment on a multi-axis installation, igus can deliver.



ReadyChain[®] Examples

for a wide variety of applications.



Assembly Line

This Energy Chain System[®] for automated assembly in an automotive plant includes Series 780 cable carrier, pneumatic hoses and connectors as one unit, assembled and shipped by igus[®].



Robotics

Energy Chain Systems[®] designed for robotic applications typically include the placement and harnessing of electrical cables, pneumatic hoses and liquid-extraction hoses. The cable carrier is also included and supplied from igus[®] stock.



Textile Machinery

In long-travel textile machinery applications, the Energy Chain System[®] typically consists of Series 250 Energy Chain[®], as well as Chainflex[®] CF31 power cables and CF5 control cables with connectors. The chain length here is approximately 89 ft (27 m) with 50 different configurations possible and just-in-time delivery. All carriers and cables are supplied from igus[®] stock.



Gantry Cranes

For this gantry crane application, 262 ft (80 m) of Series 4040 cable carrier, Chainflex[®] cables and interior separation are the basis of the Energy Chain System[®]. The drum on which the system is spooled for transportation is also included.

ReadyChain[®] Space Saver

A successful Application with igus[®] ReadyChain[®]

Company: Price Industries
Dutton, Mich.

Price Industries, a leading, full-service metal fabricator, uses igus[®] ReadyChain to save time and money on its high-speed cranes for the wet process industry

Application: Metal Fabricator

Price's automated cranes are used in a variety of industries to move process materials to and from storage, loading and unloading areas, and through product finishing process lines. The company was harnessing its own cable carrier systems, often wasting money in scrap and material drops which were also leading to production delays. Price was also wasting valuable engineering time on the assemblies.

The ReadyChain systems used by Price vary in size, but are generally comprised of a System E4 Energy Chain[®], which houses electrical cables and conductors and enables the crane to travel horizontally to distances in excess of 360 feet. Price chose System E4 Energy Chains[®] based on their noise reduction and long life.

Benefits:

- Increase in production throughput
- Just-in-time delivery
- Increase in valuable factory floor space by eliminating inventory
- Performance reliability

"We no longer have to devote manpower and engineering expertise to something that isn't our specialty. We know when igus builds our systems they will be built properly and to our specifications. Floor space is valuable, and on larger jobs building cable carrier systems frequently caused logistic and material flow problems. All of that is alleviated with ReadyChain."

— Sam Boeshart, Controls Engineering Manager, Price Industries



Applications

More examples of successful applications with igus® ReadyChain



igus® ReadyChain® used for GEORG disposal vehicle - tested quality under tough conditions



igus® ReadyChain® used for travel axles for 6-axes robots



igus® ReadyChain® for plastic processing machines



igus® ReadyChain® with industry connectors – faster start-up, simple assembly



igus® ReadyChain® used for a zigzag application of an illumination cross arm, Royal Opera, London



igus® ReadyChain® used for terotechnology – applications with different travels



Energy Chain Systems®

Classic Carriers

Zipper

- Series 15

E2 Mini

- Series 10
- Series 11
- Series 14
- Series B15/B15i (old)

E2 Medium

- Series 20/25
- Series 30/35/36
- Series 255

E2 Tubes

- Series R58 (old)
- Series R68 (old)

E4/0

- Series 22/23/R76
- Series 28/29/R77
- Series 38/39/R78
- Series 40/41/R88
- Series 50/51/R98

E4 Light

- Series 140/141
- Series 150/151
- Series 142/143



A collection of carriers from the past
still available to our customers of today.
Please contact igus for more information or visit our
website at www.igus.com

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05	4.19
06	4.23
08	4.27
10	4.37
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B17	4.49
1400	4.61
1450	4.61

1500	4.61
200	4.69
240	4.69
250	4.69
26	4.79
27	4.79
27i	4.79
340	4.89
350	4.89

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R58	5.25
R68	5.33
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2928	6.77
R7728	6.77
3838	6.89
3938	6.89
R7838	6.89
4040	6.101
4140	6.101
R8840	6.101
5050	6.113
5150	6.113
R9850	6.113
220	6.131
R760	6.131
280	6.131
290	6.139
R770	6.139
380	6.139
390	6.149
R780	6.149

400	6.149
410	6.159
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600	6.159
601	6.169
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800	6.187
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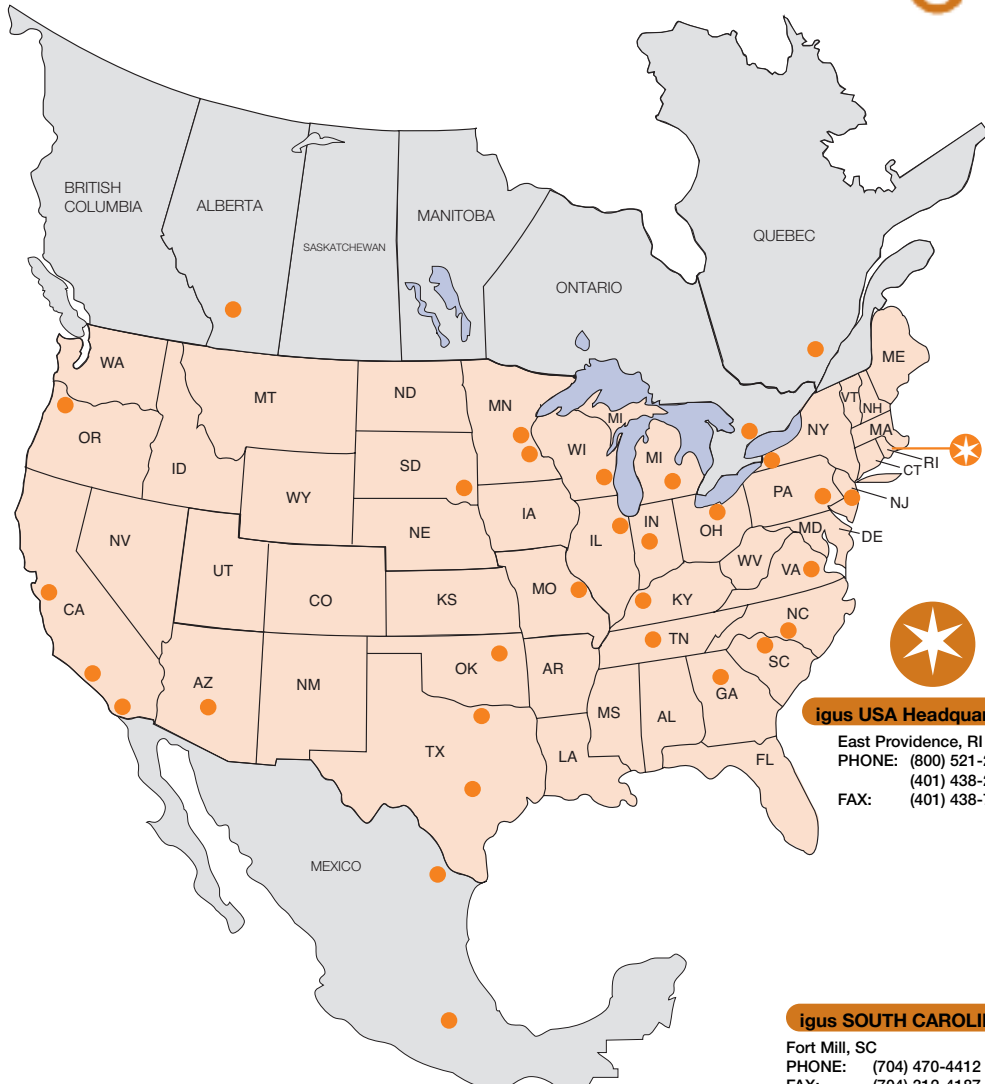
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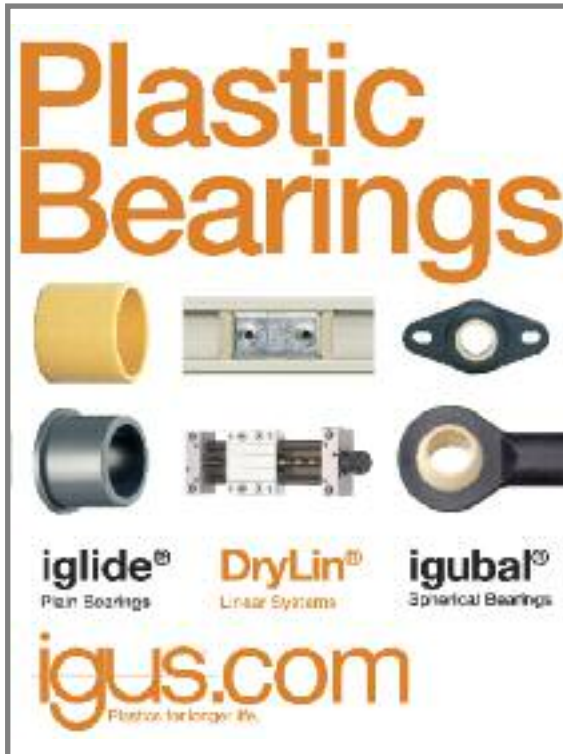
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