

M O D U L A R L I N E A R A C T U A T O R S

4th Edition

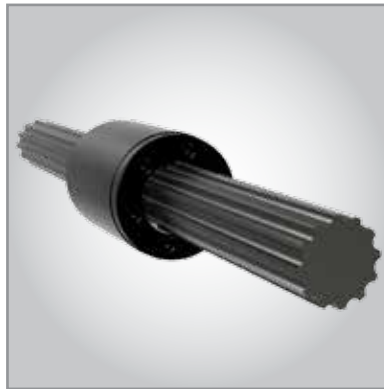


www.nookindustries.com





Precision Ball Screws



Ball Splines



CC™ Cylinders



Worm Gear Screw Jacks



Profile Rails



Planetary Roller Screws

NOOK HISTORY






In 1969, Joseph H. Nook Jr. founded Nook Industries, Inc., intent on becoming a global supplier of Linear Motion products. Ball screws, both rolled and ground, were the cornerstone products in the early 1970's, putting Nook Industries on the map as a successful business and a trusted company.






Through the years, Nook Industries has served as a leading manufacturer of engineered products. From the first ball





screws to the latest technologies, Nook Industries strives to provide customers with high quality products and engineered solutions.

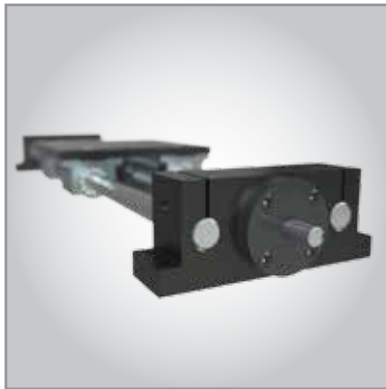
Companies around the world depend on the quality products provided by Nook Industries to ensure their success. Nook Industries provides a complete line of linear motion products, serving a wide range of market segments.

MARKET SEGMENTS SERVED

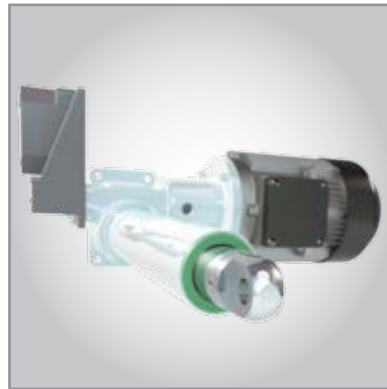
-  Aerospace
-  Packaging
-  Automotive
-  Electronics
-  Transportation

-  Tire Manufacturing
-  Entertainment
-  Semiconductor
-  Military and Defense
-  Factory Automation

-  Pulp & Paper
-  Steel
-  Chemical
-  Medical & Diagnostic



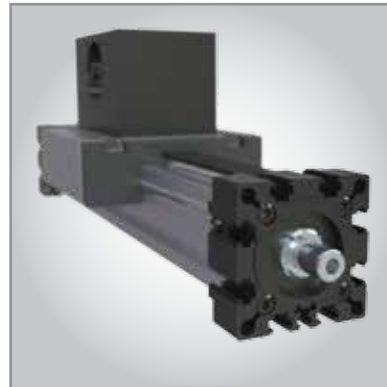
Linear Slides



Electric Cylinders



EZZE Mounts™



Modular Linear Actuators

NOOK MISSION

Pairing traditional and proven design with the latest technology, Nook Industries manufactures products that customers value. The expansion of product lines and the development of application specific components and engineered systems have propelled Nook Industries to the forefront of the industry.

Nook Industries is committed to customer satisfaction and providing high-quality, high-value products that are delivered on time at a competitive price.

NOOK PARTNERS



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QUALITY

HISTORY

Since 1,969, Nook Industries, Inc. has relentlessly and continuously developed the capabilities and skills to deliver products of the highest quality. Knowledge of testing and design, coupled with this experience working with stringent customer requirements in aerospace, medical, energy and military applications has provided the background to be a reliable partner.

HIGH TECH QUALITY EXPERIENCE

When you select Nook Industries as a supplier, you can be assured that your product will be designed and tested to rigorous product planning. Pre-design activity includes understanding of customer requirements applied to predictive models, engineering calculations and linear modeling through prototype development, stereolithography samples of form, fit, and function that verify design criteria.

VALIDATION AND VERIFICATION

Through many years of rigorous development, Nook Industries has proven its designs and manufacturing processes against the most stringent standards and specifications. Design and process verification and validation tools are employed throughout the product life cycle.

CERTIFICATIONS

Nook Industries, Inc. is certified to ISO-9,001-2,008 Internationally Recognized Quality System. Nook also serves many customers in the Aerospace and Medical device markets and has complied with those Quality System Requirements as well.

ITAR



Nook Industries is registered with the Department Of State For International Traffic In Arms Compliance.



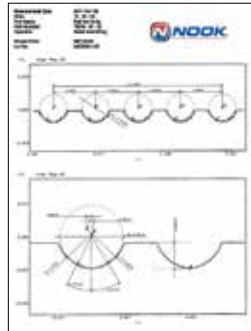
INSPECTION CAPABILITY



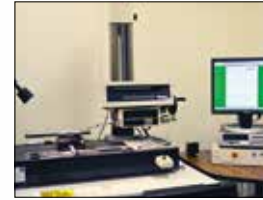
Laser Lead Measurement - Precise lead error gauging is utilized to validate processes to conform to Nook internal specifications and customer requirements.



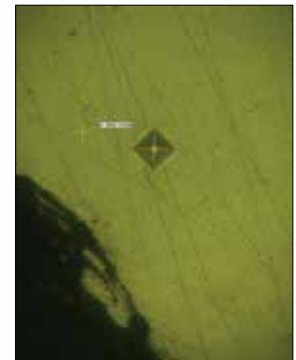
Zeiss Roundness Measurement - Critical to quality, characteristics such as roundness are monitored throughout the screw manufacturing process.



Zeiss Contour Readers - Prior to the start of any production run, thread form geometry is precisely measured to stringent engineering specifications.



Metallurgical Lab - The metallurgical lab is capable of determining material composition from raw materials to final product. A micro hardness and case depth inspection is a routine check that validates the heat treat process.

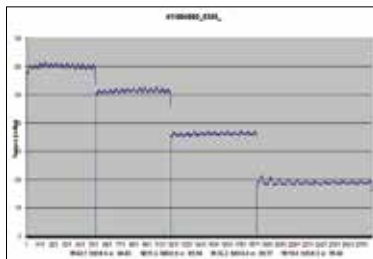


QUALITY TOOLS:

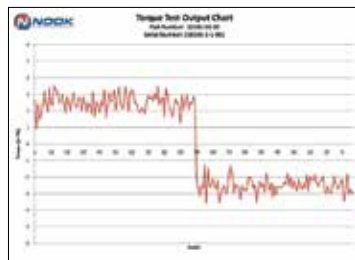
- Design for Six Sigma manufacturing
- D.O.E. (Design of Experiments)
- APQP (Advanced Product Quality Planning)
- DFMEA, PFEMA
- FEA (Finite Element Analysis)
- DVP&R (Design Verification Plan & Report)
- Reliability Testing
- Process validation to 21 CFR Part 82 (Medical Device)



TESTING



Efficiency Measurement - Nook Engineering has designed test machines to measure and validate screw assembly efficiency.



Torque Measurement - Preloaded ball screw assemblies are evaluated to determine compliance with engineering specifications utilizing a Dynamic Torque Testing Machine.



FUNCTIONAL TESTING

Nook test systems and engineered testing processes perform analysis, verification, and solidification of life, durability, and performance. The functional testing defines operating limits in specifications and helps set defined targets in Product Launch Process and Assurance Plans.

The engineered testing provides predictive tools, generates data for prognostics, and validates performance wear models. Life tests help determine performance in multiple operating conditions as well. Nook offers proof testing for customers developing new systems and actuators to help accelerate product release dates.



High Load Modular Test System
40,000 lb load - 100" CC



Convertible Test System
20,000 lb load - 100" CC

- DEVELOPED MANUFACTURING SYSTEMS
- QUALITY SYSTEMS AND ACCREDITATIONS
- SUPPLY CHAIN APPROVAL PROCESS
- STATE OF THE ART MANAGEMENT SYSTEMS
- APQP LAUNCH PROTOCOLS
- SYSTEM AND PROCESS PROTOCOLS
- ENGINEERING ANALYSIS AND PREDICTIVE TOOLS
- CTQ/KPV ENGINEERING SPECIFICATION PROCESSES
- RELIABILITY ENGINEERING AND TESTING
- DVP&R AND TEST PLANNING
- NOOK DESIGNED AND BUILT TEST MACHINES
- CUSTOM ENGINEERED AND BUILT TEST INSTRUMENTATION
- DESIGN AND TEST FOR FAULT TOLERANCE AND PROGNOSTICS
- OVERLOAD/PROOF END OF LINE TESTING
- CERTIFICATION TESTING

INTRODUCTION

Nook Modular Linear Actuators are flexible positioning systems made of self-supporting and wear resistant aluminum profiles. Modular linear actuators can be used as a single axis solution or assembled for a multitude of gantry XY and XYZ positioning duties including inspection, pick-and-place, assembly or dispensing applications.

DRIVE

SCREW DRIVEN MODULAR ACTUATORS

Screw Driven Modular Actuators use the finest acme and ball screws manufactured in the world. They allow for direct in-line motor mount with or without an in-line or parallel gear box.



Acme Screws

Nook Industries acme screws are made of high strength materials. The screw shaft is made of high alloy steel. Nook acme nut material has been selected for low friction, minimum wear, long life, and clean operations.

Ball Screws

Nook Industries ball screws offer an efficient means of converting rotary motion to linear motion. A ball screw is an improvement over an acme screw just as an anti-friction ball bearing is an improvement over a plain bushing. Nook Industries ball screws are made of high strength materials. The screw shaft is made of medium carbon induction hardenable alloy steel. Ball nuts are manufactured from high grade bearing steel. Both the ball screw and nuts are heat-treated to a surface hardness not less than 56 HRC with a case depth suitably chosen to carry the load.

BELT DRIVEN MODULAR ACTUATORS

Belt Driven Modular Actuators have a distinct advantage due to their ability to be manufactured in virtually any length. Models include either an external, trapped, or internal belt arrangements. The Belts are made of a high tension steel material that only requires a single adjustment after initial use. No further tensioning is required. The pulleys have maintenance free ball bearings. Belt tension can be readjusted by a simple screw adjustment device in the carriage. This

device can also be used for symmetrical adjustment of two or more linear units running parallel. Belts can be supplied for clean room and explosion proof environments.

A modular actuator can be driven by either an internal or external belt.

External Belt Driven

In an external belt-driven actuator, the carriage, using an external linear belt, is driven along an external linear guide rods and ball bearings that can be adjusted to remove lash. This provides a low friction smooth linear movement.

Internal Belt Driven

In an internal belt-driven actuator, the carriage is driven by an internal linear belt that can be adjusted to reduce lash is driven along the external roller bearings. These units are ideal for applications in clean rooms with a clean-room classifications of 1,000 (corresponding to US Fed. Standard 209 E). This arrangement allows for easy adjustment and belt tensioning, which can be readjusted by a single screw adjustment device in the carriage. The pulleys have maintenance-free ball bearings.



RACK AND PINION DRIVEN MODULAR ACTUATORS

The Rack and Pinion Driven Modular Actuator come with an internal linear ball bearings that can be adjusted free of play, is driven along the guide rods by a high precision rack. The rack and pinion system is suitable for highly dynamic servo operation and ideal for lifting movements. The pinion has maintenance-free ball bearings. The rack is lubricated by a toothed felt wheel.



MODULAR LINEAR ACTUATORS

INTRODUCTION

NON-DRIVEN MODULAR ACTUATORS

Non-Driven Modular Actuators are specifically designed to be used in parallel with either of the driven modular actuators. Each is designed to provide linear guidance to help support a given load without causing tension or binding with another driven actuator.

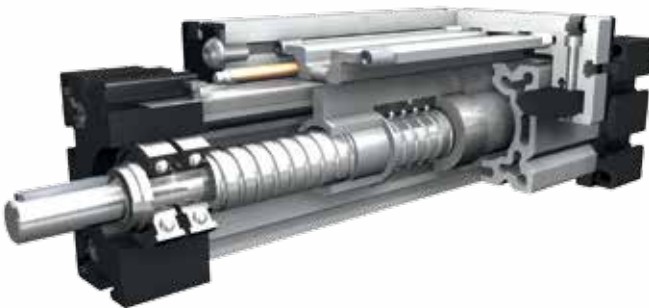
Non-Driven Modular Actuators should not be used if the parallel placement is greater than 500mm.



GUIDANCE

V GROOVE GUIDED

The carriage moves along the unit guided by V-slides that are adjustable to reduce lash. The linear opening of the unit is sealed with a stainless steel cover band to make the unit splash-proof and dust-tight.



EXTERNAL ROLLER BEARING GUIDED

The carriage moves along the unit guided by hardened steel guide rods on the outside of the actuator that are adjustable to reduce lash. The linear opening of the unit is sealed with a stainless steel cover band to make the unit splash-proof and dust-tight.



INTERNAL ROLLER BEARING GUIDED

The carriage moves along the unit guided by hardened steel guide rods on the inside of the actuator that are adjustable to reduce lash. The linear opening of the unit is sealed with a stainless steel cover band to make the unit splash-proof and dust-tight.



INTERNAL PROFILE RAIL GUIDED

The carriage moves along the unit guided by a single or dual internal profile rail on the outside of the actuator that are adjustable to reduce lash. The linear opening of the unit is sealed with a stainless steel cover band to make the unit splash-proof and dust-tight.



MODULAR LINEAR ACTUATORS



Nook Modular Linear Actuators are used heavily in factory automation.



SCREW DRIVEN

V-GROOVE GUIDED	8-10
EGT/EGK.....	8-10
EXTERNAL ROLLER BEARING GUIDED	12-14
ELT/ELK.....	12-14
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DLT/DLK.....	16-18
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EGT/EGK 30, 40, 60, 80

V-GROOVE GUIDED

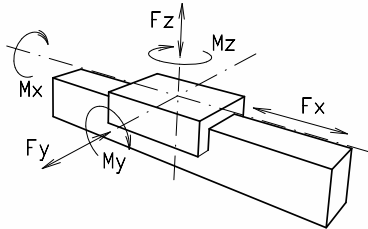


Function:

This unit consists of an aluminium square profile with lateral V-guides. The carriage, which is driven by means of a trapezoidal/ballscrew threaded screw with lead screw, moves along the unit guided by V-slides that are adjustable free of play. Where two linear units are used in parallel or where two carriages are mounted on one unit, the leading-nut receiver can be used to adjust the symmetry of the carriages. The linear opening of the unit is sealed with a stainless steel cover band to make the unit splash-proof and dust-tight.

Fitting position: As required. Max. length 3,000 mm
 Carriage mounting: T-slots, tapped holes (size 40)
 Unit mounting: By T-slots or tapped holes in the bearing block, mounting sets.

FORCES AND TORQUES



FORCES / TORQUES	EG 30		EG 40		EG 60		EG 80	
	static	dynamic	static	dynamic	static	dynamic	static	dynamic
F_x (N)	750	600	1,500	1,200	2,500	2,000	4,200	3,500
F_y (N)	90	60	350	315	500	450	1,000	900
F_z (N)	90	60	500	450	750	675	1,125	1,000
M_x (Nm)	10	5	20	18	33	30	82	75
M_y (Nm)	13	6	44	40	77	70	220	200
M_z (Nm)	14	7	33	30	55	50	165	150

All forces and torques relate to the following:

$$\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

	EG 30	EG 40	EG 60	EG 80
Trapezoidal thread	10x3	-	18x4	18x8
(Nm)	0.4	-	0.70	0.70
Ballscrew	8x2.5	-	16x5	16x10
(Nm)	0.25	-	0.40	0.60

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

	EG 30	EG 40	EG 60	EG 80
I_x mm ⁴	4.09×10^4	1.35×10^5	5.65×10^5	19.14×10^5
I_y mm ⁴	4.00×10^4	1.48×10^5	6.12×10^5	20.12×10^5
Elastic-modulus N/mm ²	70,000	70,000	70,000	70,000

Formula: EGT/K

Driving torque:

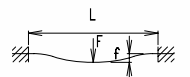
$$M_a = \frac{F \cdot P \cdot S_f \cdot w}{2,000 \cdot \mu} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

F = force (N)
 P = thread pitch (mm)
 S_f = safety factor 1.2 ... 2
 M_{leer} = no-load torque (Nm)
 n = rpm of screw (min⁻¹)
 M_a = driving torque (Nm)
 μ = screw efficiency
 w = friction coefficient ~ 1.22
 P_a = motor power (KW)

Efficiency of lead screws:

All ballscrews: 0.900
 Tr 10x3 0.375
 Tr 18x4 0.399 Tr 18x8 0.565
 Tr 24x5 0.384 Tr 24x10 0.550
 Tr 28x5 0.349 Tr 28x10 0.513

$$f = \frac{F \cdot L^3}{E \cdot I^* \cdot 192}$$


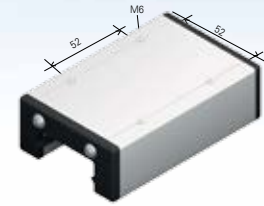
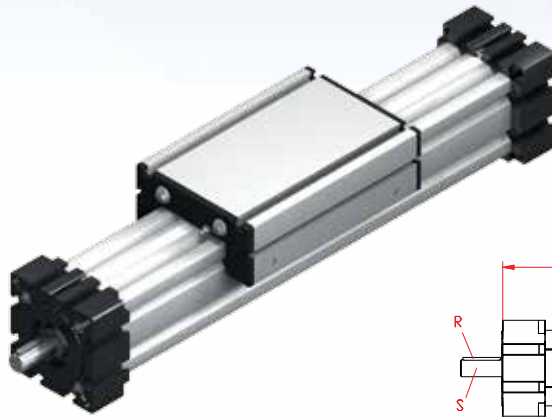
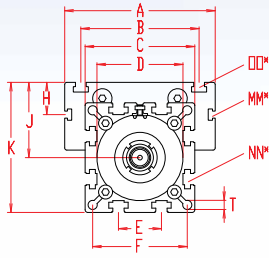
f = deflection (mm)
 F = load (N)
 L = free length (mm)
 E = elastic modulus 70,000 (N/mm²)
 I = second moment of area (mm⁴)

For the diagram for critical speeds of lead screws refer to page 175

MODULAR LINEAR ACTUATORS

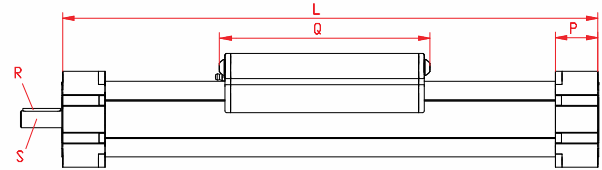
SCREW DRIVEN

SCREW DRIVEN



Size 40 without T-slots

Dimensions (mm)



*For slide nuts refer to page 136

Increasing the carriage length will increase the basic length by the same amount.

SIZE	L**	A	B	C	D	E	F	H	J	K	MM	NN for	OO for	P	Q	R	S (Ø x length)	T	BASIC WEIGHT	WEIGHT per 100 mm
EG 30	120	70	56	42	40x1	13	35	-	26	47	-	M6	M6	18	82	-	5x15	4.2	0.6 kg	0.16 kg
EG 40	169	70	-	58	48x1	18	47	-	35	64	-	M6	M6	25	117	3x3x25	10x27	6.5	1.3 kg	0.36 kg
EG 60	235	100	80	82	62x1	30	69	-	49	90	-	M8	M8	35	165	5x5x28	14x35	8.5	4.0 kg	0.67 kg
EG 80	286	140	110	102	80x1	40	88	30	70	121	M6	M0	M10	45	193	6x6x40	18x45	8.5	6.7 kg	1.14 kg

T Screw:

(T) Trapezoidal thread (K) Ballscrew

1 Selection of screw:
(1) right hand (2) left hand (Ballscrew by inquiry)

0 Choice of guide body profile:
(0) Standard (2) corrosion-protected guide rods (only size 30) and screws

0 Choice of carriages:



VERSION 1		
	Q	L
30	94	132
40	133	185
60	181	253
80	209	302

0 Drive version:
(0) one shaft (locating bearing side) (1) one shaft (non-locating bearing side) (2) shaft on both sides

Size	Standard trapezoidal thread		Standard ballscrew		(3) Kg 20x50
	(0) Tr	(1) Tr	(0) Kg	(1) Kg (2) Kg	
30	(0) Tr 10x3		(0) Kg 8x2.5		
40	(0) Tr 18x4	(1) Tr 18x8	(0) Kg 16x5	(1) Kg 16x10 (2) Kg 16x16	
60	(0) Tr 24x5	(1) Tr 24x10	(0) Kg 25x5	(1) Kg 20x20 (2) Kg 25x10	
80	(0) Tr 28x5	(1) Tr 28x10	(0) Kg 32x5	(1) Kg 25x25 (2) Kg 32x10	

0 Ballscrew pitch accuracy:
(0) 0.1 mm / 300 mm (Standard) (1) 0.05 mm / 300 mm (2) 0.025 mm / 300 mm

0 End play of ball nut:
(0) 0.04 mm (Standard), (1)* < 0.02 mm, (2)* 2% apply prestress
* only in combination with pitch accuracy (1) or (2)

Repeatability:
± 0.2 mm Trapezoidal
± 0.025 mm Ballscrew

1500

**L + Stroke + Overtravel = Total Length

Recommended minimum 25mm on each end

For mounting hardware and other accessories, refer to pages 134 to 153.

EG	T	40	1	0	0	0	0	0	0	0	01500
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Pos. 1 2 3 4 5 6 7

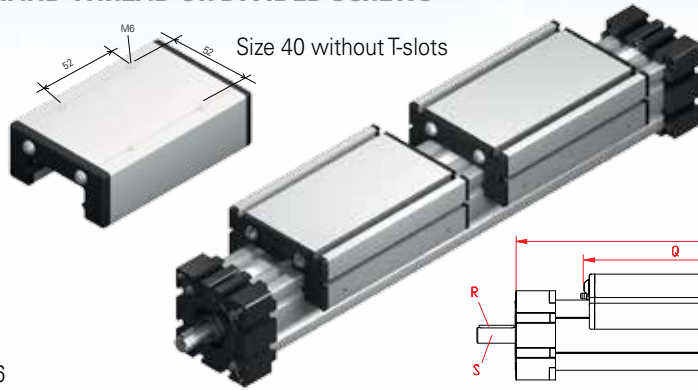
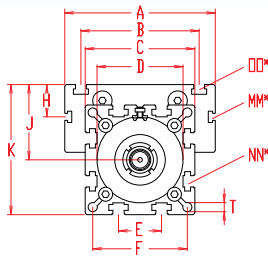
Sample ordering code:

EGT40, trapezoidal right hand thread, standard body profile, top carriage, one shaft (locating bearing side), screw 18x4, 1,331 mm stroke

EGT/EGK 30, 40, 60, 80 (continued)

V-GROOVE GUIDED

RIGHT-HAND AND LEFT-HAND THREAD OR DIVIDED SCREWS



Increasing the carriage length will increase the basic length by the same amount.

Dimensions (mm)

*For slide nuts refer to page 136

SIZE	L**	A	B	C	D	E	F	H	J	K	MM for	NN for	OO for	P	Q	R	S Ø x length	T	BASIC WEIGHT	WEIGHT per 100 mm
EG 30	202	70	56	42	40x1	13	35	-	26	47	-	M6	M6	18	82	-	5x15	4.2	1.0 kg	0.16 kg
EG 40	286	70	-	58	48x1	18	47	-	35	64	-	M6	M6	25	117	3x3x25	10x27	6.5	2.5 kg	0.36 kg
EG 60	402	100	80	82	62x1	30	69	-	49	90	-	M8	M8	35	165	5x5x28	14x35	8.5	6.2 kg	0.67 kg
EG 80	480	140	110	102	80x1	40	88	30	70	121	M6	M10	M10	45	193	6x6x40	18x46	8.5	12.0 kg	1.14 kg

T

Screw:

(T) Trapezoidal thread (K) Ballscrew

3

Selection of screw:

(3) right - left hand (4) divided screw

0

Choice of guide body profile:

(0) Standard (2) corrosion-protected guide rods (only size 30) and screws

0

Choice of carriages:

(0)



(1)



VERSION 1

Q L

30	94	226
40	133	318
60	181	434
80	209	512

0

Drive version:

(0) shaft right hand thread (1) shaft left hand thread (2) shaft on both sides

0

Selection of screw:

Size	Standard trapezoidal thread	Multistart screw trapezoidal thread	Standard ballscrew	Multistart screw ballscrew
30	(0) Tr 10x3		(0) Kg 8x2.5*	
40	(0) Tr 18x4	(1) Tr 18x8	(0) Kg 16x5	(1) Kg 16x10* / (2) 16x16*
60	(0) Tr 24x5	(1) Tr 24x10	(0) Kg 25x5	(1) Kg 20x20* / (2) 25x10*
80	(0) Tr 28x5	(1) Tr 28x10	(0) Kg 32x5	(1) Kg 25x25* / (2) 32x10*

* = only for selection of divided screw

0

Ballscrew pitch accuracy:

(0) 0.1 mm / 300 mm (Standard) (1) 0.05 mm / 300 mm (2) 0.025 mm / 300 mm

0

End play of ball nut:

(0) 0.04 mm (Standard), (1)* < 0.02 mm, (2)* 2% apply prestress

* only in combination with pitch accuracy (1) or (2)

Repeatability:

± 0.2 mm Trapezoidal
± 0.025 mm Ballscrew

2200

**L + Stroke + Overtravel = Total Length

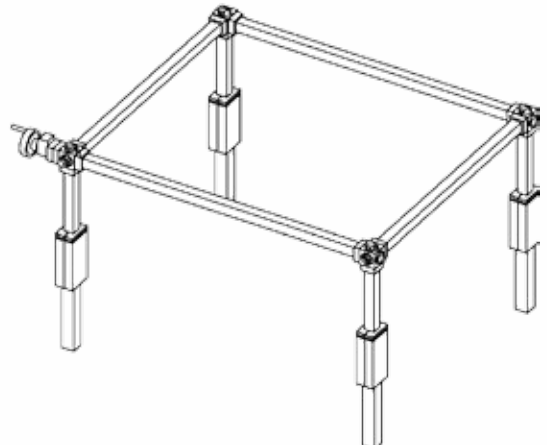
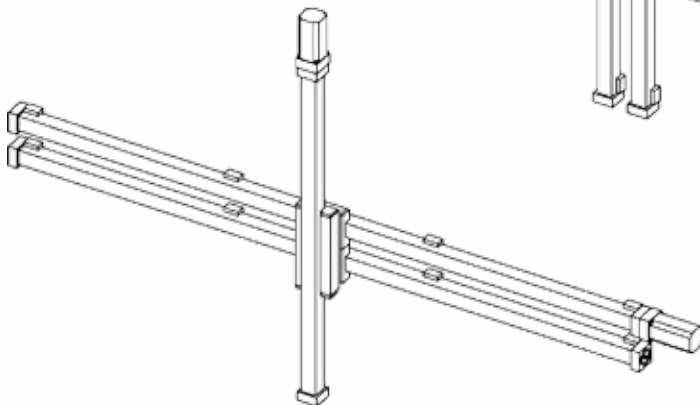
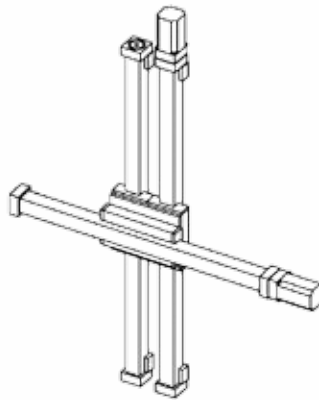
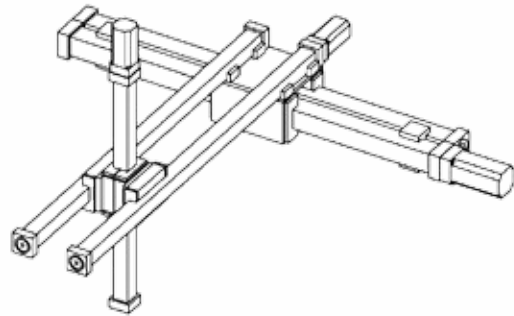
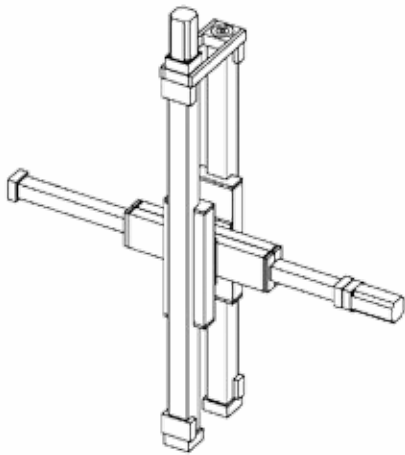
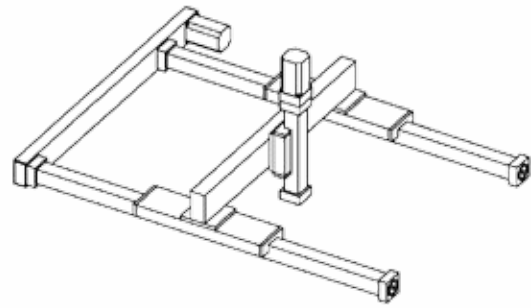
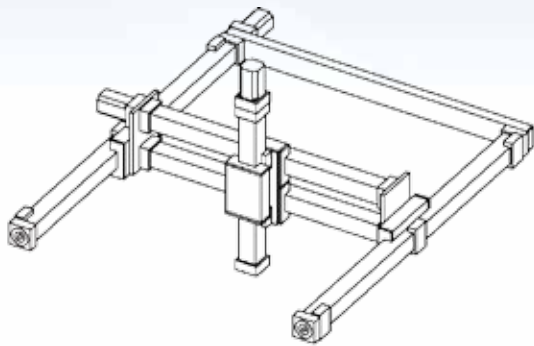
EG T 40 3 0 0 0 0 0 0 0 2200

Pos. 1 2 3 4 5 6 7

For mounting hardware and other accessories, refer to pages 134 to 153.

Sample ordering code: EGT40, trapezoidal right - left hand thread, standard body profile, 2 top carriage, one shaft on right hand side, screw 18x4, 1,914 mm stroke

SUGGESTED MOUNTING CONFIGURATIONS



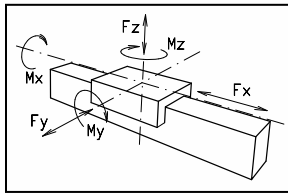
ELT/ELK 30, 40, 60, 60S, 80, 80S, 100, 125

EXTERNAL ROLLER BEARING GUIDED



Function:

This linear unit consists of an aluminium hollow section with integral, parallel ground and hardened steel guide rods. The carriage has play-adjustable ball-bearing rollers which engage with the guide rods. The rotating trapezoidal/ballscrew causes linear motion of the ballnut, which is connected to the carriage. The slot necessary for this is covered by a stainless steel strip, making the unit dust- and splash-proof. Lateral adjustment of movement for parallel units, or when two carriages are mounted on one unit, is provided by the ballnut mounting.



Fitting position: As required, max. length 3,000 mm
 Carriage mounting: By T-slots and tapped holes
 Unit mounting: By T-slots and tapped holes in the mounting surfaces.

Forces and torques

FORCES/TORQUES	EL 30		EL 40		EL 60		EL 60 S		EL 80		EL 80S		EL 100		EL 125	
	static	dyna.	static	dyna.	static	dyna.	static	dyna.	static	dyna.	static	dyna.	static	dyna.	static	dyna.
F_x (N)	750	600	1,500	1,200	2,500	2,000	2,500	2,000	5,000	4,000	5,000	4,000	10,000	8,000	15,000	12,000
F_y (N)	90	60	1,200	700	3,000	2,000	4,100	3,100	3,000	2,000	4,600	3,600	8,000	6,500	12,000	9,000
F_z (N)	90	60	900	650	1,700	1,100	2,160	1,600	1,700	1,100	3,000	1,800	3,600	2,200	6,000	4,500
M_x (Nm)	12	10	25	20	67	43	88	65	90	55	170	140	300	230	600	450
M_y (Nm)	12	10	32	18	90	70	190	140	110	80	270	230	400	270	750	600
M_z (Nm)	15	12	35	25	120	100	230	170	150	120	300	220	750	500	1,350	1,150

All forces and torques relate to the following:

$$\text{existing values} \quad \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

	EL 30	EL 40	EL 60	EL 60 S	EL 80	EL 80S	EL 100	EL 125
Trapezoidal thread	10x3	18x4/18x8	24x5/24x10	24x5/24x10	28x5/28x10	28x5/28x10	32x6/32x12	40x7/40x14
(Nm)	0.3	0.4/0.5	0.6/0.8	0.6/0.8	0.8/1.0	0.8/1.0	0.9/1.1	1.2/1.4
Ballscrew	8x2.5	16x5/16x10	25x5/25x10	25x5/25x10	32x5/32x10	32x5/32x10	32x5/32x10	40x10/40x20
(Nm)	0.15	0.2/0.4	0.4/0.6	0.4/0.6	0.6/0.8	0.6/0.8	0.7/0.9	1.0/1.2

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

	EL 30	EL 40	EL 60	EL 60 S	EL 80	EL 80S	EL 100	EL 125
I_x mm ⁴	4.09x10 ⁴	1.32x10 ⁵	6.79x10 ⁵	6.79x10 ⁵	18.99x10 ⁵	18.99x10 ⁵	44.4x10 ⁵	101.5x10 ⁵
I_y mm ⁴	4.00x10 ⁴	1.34x10 ⁵	6.97x10 ⁵	6.97x10 ⁵	18.97x10 ⁵	18.97x10 ⁵	44.8x10 ⁵	101.5x10 ⁵
E-Modulus N/mm ²	70,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000

Formula: ELT/K

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_s}{2,000 \cdot \mu} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

F = force (N)
 P = thread pitch (mm)
 S_s = safety factor 1.2 ... 2
 M_{leer} = no-load torque (Nm)
 n = rpm of screw (min⁻¹)
 M_a = driving torque (Nm)
 μ = screw efficiency
 P_a = motor power (KW)

Efficiency of lead screws:

Lead screw	Efficiency
All ballscrew	0.900
Tr 10x3	0.375
Tr 18x4	0.399
Tr 18x8	0.565
Tr 24x5	0.384
Tr 24x10	0.550
Tr 28x5	0.349
Tr 28x10	0.513
Tr 32x6	0.360
Tr 32x12	0.524
Tr 40x7	0.344
Tr 40x14	0.509

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

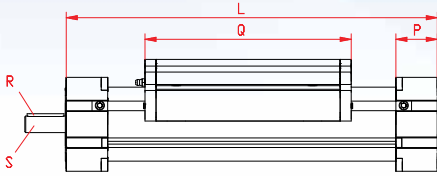
f = deflection (mm)
 F = load (N)
 L = free length (mm)
 E = elastic modulus 70,000 (N/mm²)
 I = second moment of area (mm⁴)

For the diagram for critical speeds of lead screws refer to page 175.

MODULAR LINEAR ACTUATORS

SCREW DRIVEN

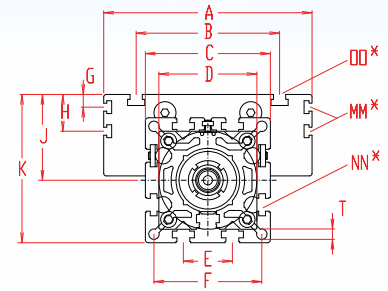
SCREW DRIVEN



Increasing the carriage length will increase the basic length by the same amount.



Dimensions (mm)



*For slide nuts refer to page 136

SIZE	L**	A	B	C	D	E	F	G	H	J	K	MM for	NN for	OO for	P	Q	R	S Ø x length	T	BASIC WEIGHT	WEIGHT per 100 mm
EL 30	120	70	56	42	40x1	13	35	-	-	26	47	-	M 6	M 6	18	82	-	5x15	4.2	0.7 kg	0.16 kg
EL 40	175	100	66	58	48x1	18	47	-	-	35	64	-	M 6	M 6	25	122	3x3x25	10x27	6.5	1.7 kg	0.37 kg
EL 60	245	144	96	82	62x1	30	69	-	-	49	90	-	M 8	M 8	35	168	5x5x28	14x35	8.5	5.1 kg	0.89 kg
EL 60S	270	170	108	82	62x1	30	69	-	-	53	94	-	M 8	M 8	35	194	5x5x28	14x35	8.5	5.1 kg	0.89 kg
EL 80	285	170	117	102	80x1	40	88	10	30	70	121	M 6	M 10	M 10	45	194	6x6x40	18x45	8.5	10.0 kg	1.48 kg
EL 80S	305	190	126	102	80x1	40	88	12.5	30	71	122	M 6	M 10	M 8	45	214	6x6x40	18x45	8.5	11.0 kg	1.48 kg
EL 100	410	230	155	130	110x1	50	112	-	29	89	154	M 10	M 10	M 10	55	300	6x6x40	22x45	10.5	19.0 kg	2.00 kg
EL 125	510	295	200	165	130x1	60	142	-	30	107.5	190	M 10	M 12	M 12	65	365	8x7x50	25x55	13.0	33.0 kg	2.89 kg

T

Screw:

(T) Trapezoidal thread (K) Ballscrew

1

Selection of screw:

(1) right hand (2) left hand (Ballscrew by inquiry)

0

Choice of guide body profile:

(0) Standard (2) corrosion-protected guide rods and screws
(4) expanded corrosion-protected version (depending on the availability of components)

0

Choice of carriages:

(0)



(1)



0

Drive version:

(0) one shaft (locating bearing side) (1) one shaft (non-locating bearing side)
(2) shaft on both sides

0

Selection of screw:

Size	Standard trapezoidal thread		Standard ballscrew		
	Standard	Multistart screw	Standard	Multistart screw	
30	(0) Tr 10x3		(0) Kg 8x2.5		
40	(0) Tr 18x4	(1) Tr 18x8	(0) Kg 16x5	(1) Kg 16x10 (2) Kg 16x16	
60	(0) Tr 24x5	(1) Tr 24x10	(0) Kg 25x5	(1) Kg 20x20 (2) Kg 25x10	(3) Kg 20x50
80	(0) Tr 28x5	(1) Tr 28x10	(0) Kg 32x5	(1) Kg 25x25 (2) Kg 32x10	
100	(0) Tr 32x6	(1) Tr 32x12	(0) Kg 32x5	(1) Kg 32x10 (2) Kg 32x20	(3) Kg 32x32
125	(0) Tr 40x7	(1) Tr 40x14	(0) Kg 40x10	(1) Kg 40x20 (2) Kg 40x40	

0

Ballscrew pitch accuracy:

(0) 0.1 mm / 300 mm (Standard) (1) 0.05 mm / 300 mm (2) 0.025 mm / 300 mm

0

End play of ball nut:

(0) 0.04 mm (Standard), (1)* < 0.02 mm, (2)* 2% apply prestress
* only in combination with pitch accuracy (1) or (2)

Repeatability:

± 0.2 mm Trapezoidal
± 0.025 mm Ballscrew

1500

**L + Stroke + Overtravel = Total Length

EL T 40 1 0 0 0 0 0 0 0 01500

Pos. 1 2 3 4 5 6 7

For mounting hardware and other accessories, refer to pages 134 to 153.

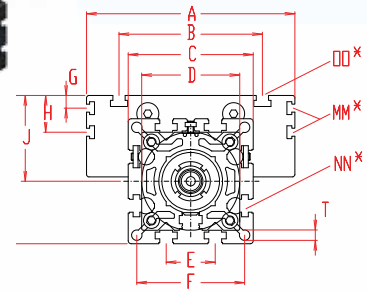
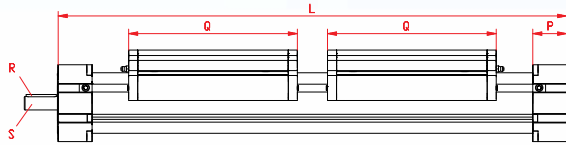
Sample ordering code: ELT40, trapezoidal right hand thread, standard body profile, top carriage, one shaft (locating bearing side), screw 18x4, 1,325 mm stroke

ELT/ELK 30, 40, 60, 60S, 80, 80S, 100, 125 (continued)

EXTERNAL ROLLER BEARING GUIDED

RIGHT-HAND AND LEFT-HAND THREAD OR DIVIDED SCREWS

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.

*For slide nuts refer to page 136

SIZE	L**	A	B	C	D	E	F	G	H	J	K	MM for	NN for	OO for	P	Q	R	S Ø x length	T	BASIC WEIGHT	Weight per 100 mm
EL 30	202	70	56	42	40x1	13	35	-	-	26	47	-	M6	M6	18	82	-	5 x 15	4.2	1.1 kg	0.16 kg
EL 40	300	100	66	58	48x1	18	47	-	-	35	64	-	M6	M6	25	122	3x3x25	10 x 27	6.5	2.5 kg	0.37 kg
EL 60	410	144	96	82	62x1	30	69	-	-	49	90	-	M8	M8	35	168	5x5x28	14 x 35	8.5	8.1 kg	0.89 kg
EL 60S	460	170	108	82	62x1	30	69	-	-	53	94	-	M8	M8	35	194	5x5x28	14 x 35	8.5	10.1 kg	0.89 kg
EL 80	480	170	117	102	80x1	40	88	10	30	70	121	M6	M10	M10	45	194	6x6x40	18 x 45	8.5	15.0 kg	1.48 kg
EL 80S	520	190	126	102	80x1	40	88	12.5	30	71	122	M6	M10	M8	45	214	6x6x40	18 x 45	8.5	17.0 kg	1.48 kg
EL 100	720	230	155	130	110x1	50	112	-	29	89	154	M10	M10	M10	55	300	6x6x40	22 x 45	10.5	32.0 kg	2.00 kg
EL 125	880	295	200	165	130x1	60	142	-	30	107.5	190	M10	M12	M12	65	365	8x7x50	25 x 55	13	48.0 kg	2.89 kg

T

Screw:

(T) Trapezoidal thread (K) Ballscrew

3

Selection of screw:

(3) right - left hand (4) divided screw

0

Choice of guide body profile:

(0) Standard (2) corrosion-protected guide rods and screws

(4) expanded corrosion-protected version (depending on the availability of components)

0

Choice of carriages:

(0)



(1)



0

Drive version:

(0) shaft right hand thread (1) shaft left hand thread (2) shaft on both sides

0

Selection of screw:

Size

Standard

Multistart screw

Standard

Multistart screw

trapezoidal thread

ballscrew

30

(0) Tr 10x3

(0) Kg 8x2.5*

40

(0) Tr 18x4

(1) Tr 18x8

(0) Kg 16x5

(1) Kg 16x10* (1) Kg 16x16*

60

(0) Tr 24x5

(1) Tr 24x10

(0) Kg 25x5

(1) Kg 20x20* (2) Kg 25x10*

80

(0) Tr 28x5

(1) Tr 28x10

(0) Kg 32x5

(1) Kg 25x25* (2) Kg 32x10*

100

(0) Tr 32x6

(1) Tr 32x12

(0) Kg 32x5

(1) Kg 32x10* (2) Kg 32x20* (3) Kg 32x32*

125

(0) Tr 40x7

(1) Tr 40x14

(0) Kg 40x10

(1) Kg 40x20* (2) Kg 40x40*

* = only for selection of divided screw

0

Ballscrew pitch accuracy:

(0) 0.1 mm / 300 mm (Standard) (1) 0.05 mm / 300 mm (2) 0.025 mm / 300 mm

0

End play of ball nut:

(0) 0.04 mm (Standard), (1)* < 0.02 mm, (2)* 2% apply prestress

* only in combination with pitch accuracy (1) or (2)

Repeatability:

± 0.2 mm Trapezoidal

± 0.025 mm Ballscrew

2200

**L + Stroke + Overtravel = Total Length

EL T 40 3 0 0 0 0 0 0 0 2200

Pos. 1 2 3 4 5 6 7

For mounting hardware and other accessories, refer to pages 134 to 153.

Sample ordering code: ELT40, trapezoidal right - left hand thread, standard body profile, 2 top carriage, shaft on right hand side, screw 18x4, 1,900 mm stroke

SUGGESTED MOUNTING CONFIGURATIONS



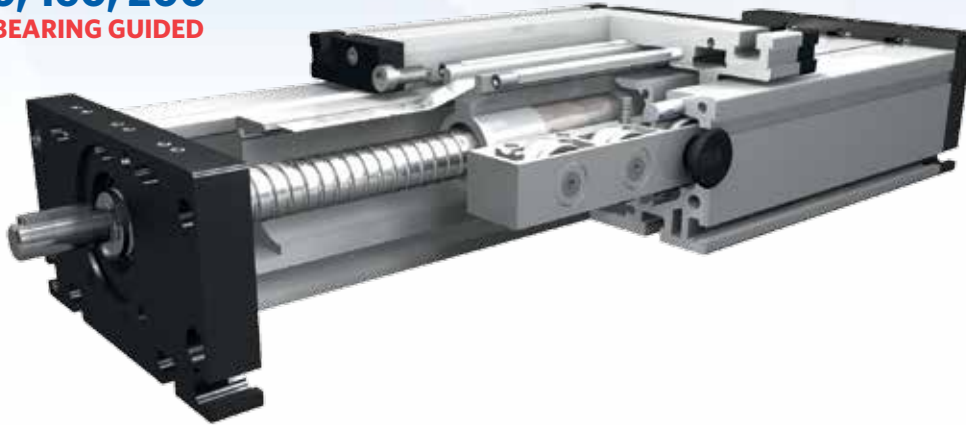
DSZ-160 (2)
DSK-160



QSZ-80 (2)
DSZ-120
DSSZ-120

DLT/DLK 120, 160, 200

INTERNAL ROLLER BEARING GUIDED

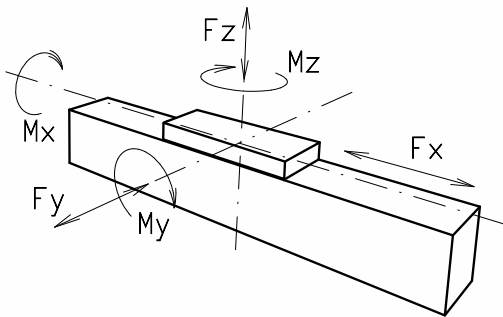


Function:

This unit consists of a rectangular aluminium profile with 2 integrated roller guides. The carriage is driven by means of a rotating spindle with leading nut. Where two parallel linear units are used or where two carriages are mounted on one unit, the leading-nut receiver can be used to adjust the symmetry of the carriages. The openings of the guide body are sealed with 3 stainless steel cover bands to protect the drive from splash water and dust.

- Fitting position: As required. Max. length 3,000 mm without joints.
- Carriage mounting: By T-slots.
- Unit mounting: By T-slots and mounting sets. The linear axis can be combined with any T-slot profile.
- Carriage support: In the standard version, the carriage runs on 8 rollers which can be adjusted and serviced at a central servicing position. For longer carriages, the number of rollers can be increased. Repeatability ballscrew ± 0.025 mm, trapezoidal thread ± 0.2 mm.

FORCES AND TORQUES



FORCES/TORQUES	120		160		200	
	static	dynamic	static	dynamic	static	dynamic
F_x (N)	900	800	5,000	4,000	10,000	8,000
F_y (N)	1,100	900	3,000	2,000	4,400	3,100
F_z (N)	1,250	1,000	3,500	2,800	4,900	4,400
M_x (Nm)	150	125	400	320	600	510
M_y (Nm)	140	120	360	300	560	480
M_z (Nm)	100	90	180	150	310	275

ALL FORCES AND TORQUES RELATED TO THE FOLLOWING:

$$\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

	18 x 4	18 x 8	24 x 5	24 x 10	32 x 6	32 x 12
Trapezoidal thread (Nm)	0.6	0.9	0.6	0.9	0.9	1.1
Ballscrew (Nm)	0.5	0.8	0.5	0.8	0.7	0.9

GEOMETRICAL MOMENTS OF INERTIA OF ALUMINIUM PROFILE

	120	160	200
I_x mm ⁴	6.6×10^5	22.2×10^5	63.8×10^5
I_y mm ⁴	38.6×10^5	122.0×10^5	335.0×10^5
Elastic modulus N/mm ²	70,000	70,000	70,000

Formula: DLT/K

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_f}{2000 \cdot \eta \cdot \mu} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9550}$$

- F = force (N)
- P = thread pitch (mm)
- S_f = safety factor 1.2 ... 2
- M_{leer} = no-load torque (Nm)
- n = rpm of screw (min⁻¹)
- M_a = driving torque (Nm)
- μ = screw efficiency
- P_a = motor power (KW)

Efficiency of lead screws:

- All ballscrew 0.900
- Tr 18x4 0.399
- Tr 18x8 0.565
- Tr 24x5 0.384
- Tr 24x10 0.550
- Tr 32x6 0.360
- Tr 32x12 0.524

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

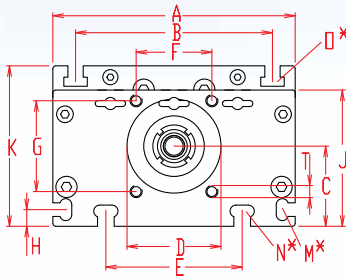
- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000 (N/mm²)
- I = second moment of area (mm⁴)

For the diagram for critical speeds of lead screws refer to page 175.

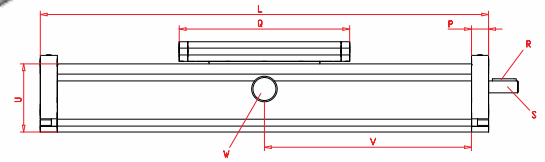
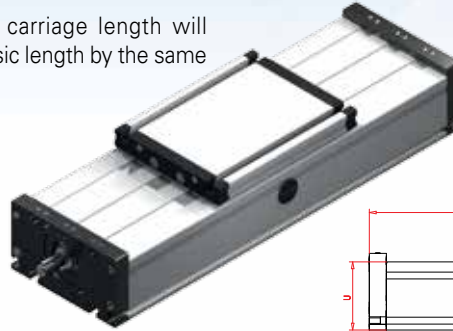
MODULAR LINEAR ACTUATORS

SCREW DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.



*For slide nuts refer to page 136

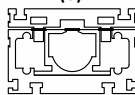
V = Q + 100 mm W = servicing position

SIZE	L**	A	B	C	D	E	F	G	H	J	K	SHAFT			R	S	T	U	BASIC WEIGHT	WEIGHT per 100 mm		
												for	for	for								
DL 120	200	120	96	39	47	78	42	42	10	68	79	M5	M6	M6	15	156	3x3x25	10h6x27	M6	60	3.9 kg	0.92 kg
DL 160	260	160	130	53	62	90	50	60	11	90	106	M6	M8	M8	20	200	5x5x28	14h6x35	M8	80	8.2 kg	1.96 kg
DL 200	320	200	160	66	68	140	60	60	15	110	129	M8	M10	M10	20	270	6x6x40	22h6x45	M8	100	19.6 kg	2.82 kg

T Screw:
(T) Trapezoidal thread (K) Ballscrew

1 Selection of screw:
(1) right hand (2) left hand (Ballscrew by inquiry)

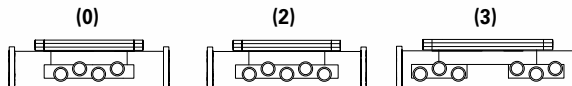
0 Choice of guide body profile:
(0)



internal profile with cover bands

Stainless versions upon request.

0 Choice of carriages:



0 Drive version:
(0) one shaft (locating bearing side) (1) one shaft (non-locating bearing side) (2) shaft on both sides

Selection of screw:	Size	Standard	Multistart screw				
			(1)	(2)	(3)	(4)	(5)
Ballscrew right hand	120	(0) 16x5	(1) 16x10	(2) 16x16	(3) 20x20	(4) 25x5	(5) 25x10
	160	(0) 25x5	(1) 20x20	(2) 25x10	(3) 25x25		
	200	(0) 32x5	(1) 32x10	(2) 32x20	(3) 32x32		
Ballscrew left hand		upon request					

Trapezoidal right hand thread	Size	Standard	Multistart screw	
			(1)	(2)
	120	(0) 18x4	(1) 18x8	
	160	(0) 24x5	(1) 24x10	
	200	(0) 32x6	(1) 32x12	
Trapezoidal left hand thread	Size	Standard	Multistart screw	
			(1)	(2)
			120	(0) 18x4
	160	(0) 24x5	(1) 24x10	
	200	(0) 32x6	(1) 32x12	

0 Ballscrew pitch accuracy:
(0) 0.1 mm / 300 mm (Standard) (1) 0.05 mm / 300 mm (2) 0.025 mm / 300 mm

0 End play of ball nut:
(0) 0.04 mm (Standard). (1)* < 0.02 mm. (2)* 2% apply prestress
* only in combination with pitch accuracy (1) or (2)

Repeatability:
± 0.2 mm Trapezoidal
± 0.025 mm Ballscrew

1500 **L + Stroke + Overtravel = Total Length

DL T 160 1 0 0 0 0 0 0 0 1500

Pos. 1 2 3 4 5 6 7

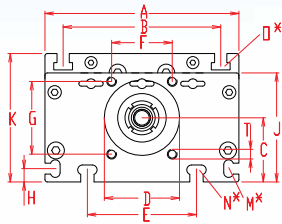
Sample ordering code: DLT160. trapezoidal right hand thread, with internal profile and cover bands, standard carriage, one shaft (locating bearing side), screw 24x5, 1240 mm stroke.

DLT/DLK 120, 160, 200

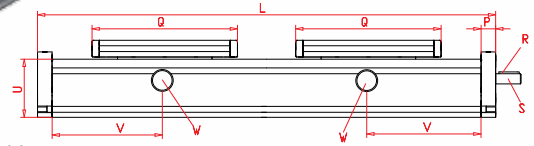
INTERNAL ROLLER BEARING GUIDED

RIGHT-HAND AND LEFT-HAND THREAD OR DIVIDED SCREWS

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.



*For slide nuts refer to page 136

$$V = Q + 100 \text{ mm}$$

W = servicing position

SIZE	L**	A	B	C	D	E	F	G	H	J	K	M	N	O	P	Q	SHAFT				BASIC WEIGHT	WEIGHT per 100 mm	
																	R	S	T	U			
DL 120	360	120	96	39	47	78	42	42	10	68	79	M5	M6	M6	15	156	3x3x25	10	h6 x 27	M6	60	5.1 kg	0.92 kg
DL 160	470	160	130	53	62	90	50	60	11	90	106	M6	M8	M8	20	200	5x5x28	14	h6 x 35	M8	80	12.0 kg	1.96 kg
DL 200	590	200	160	66	68	140	60	60	15	110	129	M8	M10	M10	20	270	6x6x40	22	h6 x 45	M8	100	27.1 kg	2.82 kg

T

Screw:

(T) Trapezoidal thread (K) Ballscrew

3

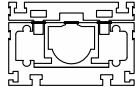
Selection of screw:

(3) right - left hand (4) divided screw

0

Choice of guide body profile:

(0)



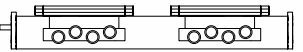
internal profile with cover bands

Stainless versions upon request.

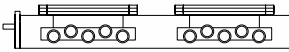
0

Choice of carriages:

(0)



(2)



(3)



	VERSION 0		VERSION 2		VERSION 3	
	Q	L	Q	L	Q	L
120	156	360	196	440	>236	>530
160	200	470	250	570	>300	>670
200	270	600	330	720	>410	>880

0

Drive version:

(0) shaft right hand thread (1) shaft left hand thread (2) shaft on both sides

0

Selection of screw:

Ballscrew right hand

Size **Standard**

120 (0) 16x5

160 (0) 25x5

200 (0) 32x5

Multistart screw

(1) 16x10* (2) 16x16* (3) 20x20* (4) 25x5* (5) 25x10*

(1) 20x20* (2) 25x10* (3) 25x25*

(1) 32x10* (2) 32x20* (3) 32x32*

Ballscrew left hand

upon request

Trapezoidal right hand thread

120 (0) 18x4

160 (0) 24x5

200 (0) 32x6

(1) 18x8

(1) 24x10

(1) 32x12

Trapezoidal left hand thread

120 (0) 18x4

160 (0) 24x5

200 (0) 32x6

(1) 18x8

(1) 24x10

(1) 32x12

* = only for selection of divided screw

0

Ballscrew pitch accuracy:

(0) 0.1 mm / 300 mm (Standard) (1) 0.05 mm / 300 mm (2) 0.025 mm / 300 mm

0

End play of ball nut:

(0) 0.04 mm (Standard), (1)* < 0.02 mm, (2)* 2% apply prestress

* only in combination with pitch accuracy (1) or (2)

Repeatability:

± 0.2 mm Trapezoidal

± 0.025 mm Ballscrew

1500

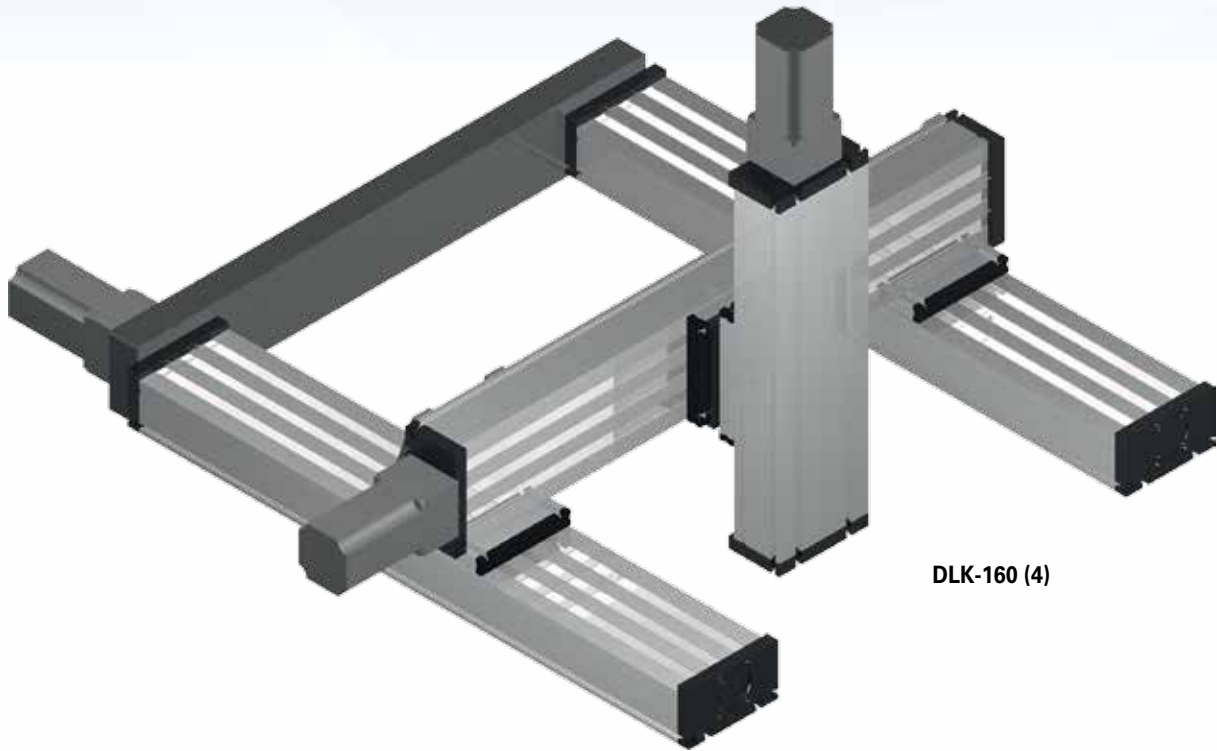
**L + Stroke + Overtravel = Total Length

DL	T	160	3	0	0	0	0	0	0	01500
----	---	-----	---	---	---	---	---	---	---	-------

Pos. 1 2 3 4 5 6 7

Sample ordering code: DLT160, trapezoidal right - left hand thread, with internal profile and cover bands, standard carriage, shaft on the right hand side, spindle 24x5, 1,030 mm stroke

SUGGESTED MOUNTING CONFIGURATIONS



DLK-160 (4)



DSK-160 (2)
DSK-120

QST/K 60, 80, 100

INTERNAL PROFILE RAIL GUIDED

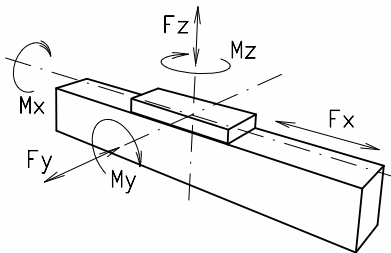


Function:

This unit consists of a square aluminium profile with an integrated ball rail. The carriage is driven by means of a rotating screw with leading nut. The openings of the guide body are sealed by a stainless steel cover band to protect the drive from splash water and dust.

Fitting position: As required, max. length 3000mm
 Carriage connection: By T-slots
 Unit mounting: By half round slots and tapped holes in the bearing blocks, mounting sets

FORCES AND TORQUES



PERMITTED DYN. FORCES*	QST/K 60		QST/K 80		QST/K 100	
	5,000 km	10,000 km	5,000 km	10,000 km	5,000 km	10,000 km
F _x (N)	900	800	2,500	2,000	5,000	4,000
F _y (N)	1,415	1,010	3,570	2,542	4,082	2,910
F _z (N)	3,525	2,510	8,500	6,050	10,300	7,360
M _x (Nm)	33	23	107	76	142	101
M _y (Nm)	190	143	604	430	838	597
M _z (Nm)	176	125	550	392	745	532
C (N)	7,800	7,800	18,800	18,800	22,800	22,800

All forces and torques related to the following:

$$\frac{\text{existing values}}{\text{table values}} = \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

	QST/K 60	QST/K 80	QST/K 100
Trapezoidal	18x4/18x8	24x5/24x10	32x6/32x12
Nm	0.6/0.7	0.6/0.8	1.5/1.7
Ballscrew	16x5/16x10	25x5/20x20/25x10	32x5/32x10
Nm	0.4/0.6	0.4/0.7/0.6	1.3/1.6

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

	QST/K 60	QST/K 80	QST/K 100
I _x mm ⁴	4.3x10 ⁵	14.0x10 ⁵	43.0x10 ⁵
I _y mm ⁴	4.8x10 ⁵	16.6x10 ⁵	48.8x10 ⁵
E-Modulus N/mm ²	70,000	70,000	70,000

Formula: QST/K

Driving torque:

$$M_a = \frac{F * P * S}{2,000 * \pi * \mu} + M_{leer}$$

$$P_a = \frac{M_a * n}{9,550}$$

- F = force (N)
- P = thread pitch (mm)
- S_i = safety factor 1.2 ... 2
- M_{leer} = no-load torque (Nm)
- n = rpm of screw (min⁻¹)
- M_a = driving torque (Nm)
- μ = screw efficiency
- P_a = motor power (KW)

- Efficiency of lead screws: All ballscrew 0.900
- Tr 18x4 0.399
- Tr 18x8 0.565
- Tr 24x5 0.384
- Tr 24x10 0.550
- Tr 32x6 0.360
- Tr 32x12 0.524

Deflection:

$$f = \frac{F * L^3}{E * I * 192}$$

- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000 (N/mm²)
- I = second moment of area (mm⁴)

* referred to lifetime

Nominal lifetime:

$$L = \left(\frac{C}{F}\right)^3 \times 10^5$$

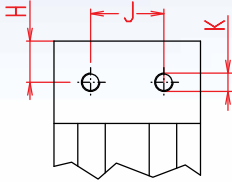
- L = Lifetime in meters
- C = Dynamic load factor (N)
- F = Medium load (N)

For the diagram for critical speeds of lead screws refer to page 175.

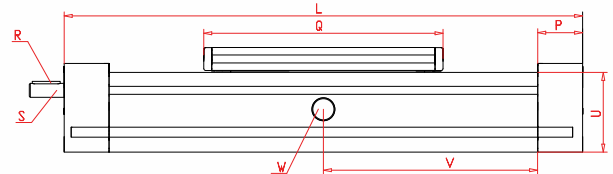
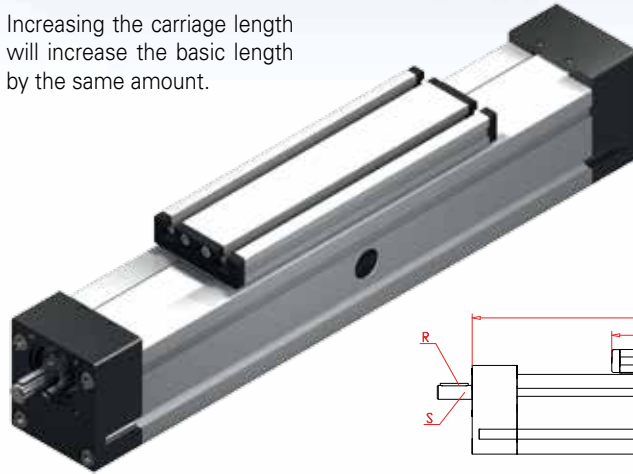
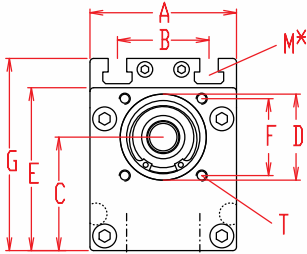
MODULAR LINEAR ACTUATORS

SCREW DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.



*For slide nuts refer to page 136

$$V = Q + 100 \text{ mm}$$

W = servicing position

SHAFT

SIZE	L**	A	B	C	D	E	F	G	H	J	K	M for	P	Q	R Key	S Øh6 x length	T for	U	BASIC WEIGHT	WEIGHT per 100 mm
QST/K 60	270	60	36	45	37	67	32	79	19	18	M6	M6	38	188	3x3x25	10h6x27	M5	60	4.1 kg	0.5 kg
QST/K 80	350	80	50	62	47	89	42	106	22.5	40	M10	M8	45	250	5x5x28	14h6x35	M6	80	7.5 kg	0.9 kg
QST/K 100	410	100	66	75	68	112	60	129	28.5	50	M10	M10	57	288	6x6x40	22h6x45	M8	100	14.8 kg	1.3 kg

K

Screw:

(T) Trapezoidal thread (K) Ballscrew

1

Selection of screw:

(1) right hand (Standard) (2) left hand (Ballscrew by inquiry)

0

Choice of carriage:



CARRIAGE VERSION 1

	Q	L**
60	255	350
80	336	436
100	383	510

0

Drive version:

(0) one shaft (locating bearing side) (1) one shaft (non-locating bearing side) (2) shaft on both sides

0

Selection of screw:

Size	Standard trapezoidal thread	Multistart screw trapezoidal thread	Standard ballscrew	Multistart screw ballscrew	
60	(0) Tr 18x4	(1) Tr 18x8	(0) Kg 16x5	(1) Kg 16x10	(2) Kg 16x16
80	(0) Tr 24x5	(1) Tr 24x10	(0) Kg 25x5	(1) Kg 20x20	(2) Kg 25x10 (3) Kg 25x25
100	(0) Tr 32x6	(1) Tr 32x12	(0) Kg 32x5	(1) Kg 32x10	(2) Kg 32x32 * (3) Kg 32x20

* = Basic and carriage length (L and Q) increase over 47 mm

0

Choice of guide body profile:

(0) Standard (1) corrosion-protected screws
(4) expanded corrosion-protected version (depending on the availability of components)

0

Ballscrew pitch accuracy:

(0) 0.1 mm / 300 mm (Standard) (1) 0.05 mm / 300 mm (2) 0.025 mm / 300 mm

0

End play of ball nut:

(0) 0.04 mm (Standard) (1)* < 0.02 mm (2)* 2% apply prestress
* only in combination with pitch accuracy (1) or (2)

1500

**L + Stroke + Overtravel = Total Length

QS K 80 1 0 0 0 0 0 0 0 1500

Pos 1 2 3 4 5 6 7

Sample ordering code: QSK80, ballscrew right hand thread, standard carriage, one shaft (locating bearing side), screw 25x5, 1,150 mm stroke.

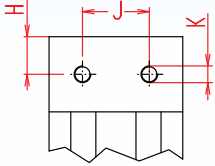
nookindustries.com

QST/K 60, 80, 100 (continued)

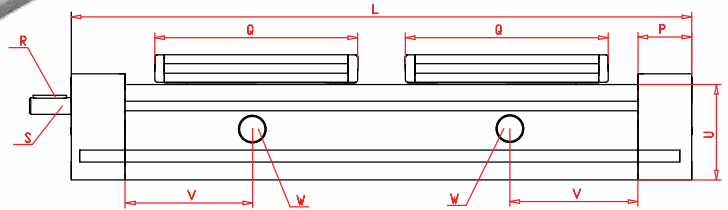
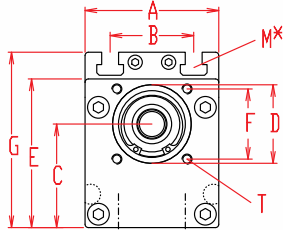
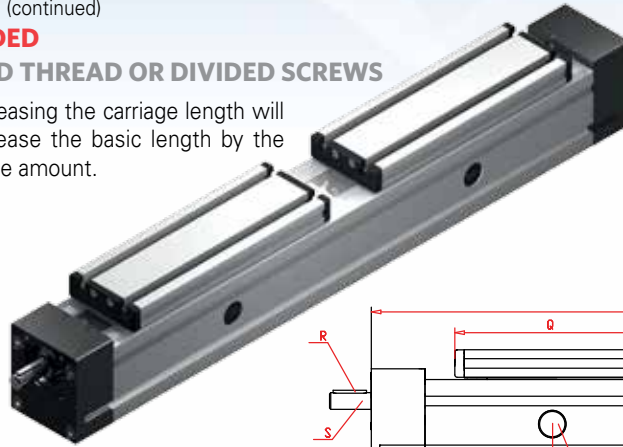
INTERNAL PROFILE RAIL GUIDED

RIGHT-HAND AND LEFT-HAND THREAD OR DIVIDED SCREWS

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.



$V = Q + 100 \text{ mm}$

W = servicing position

*For slide nuts refer to page 136

SIZE	selection of screw													SHAFT				BASIC WEIGHT	WEIGHT per 100 mm		
	3	4	A	B	C	D	E	F	G	H	J	K	M for	P	Q	R Key	S Øh6x length			T for	U
QST/K 60	460	500	60	36	45	37	67	32	79	19	18	M6	M6	38	188	3x3x25	10h6x27	M5	60	5.4 kg	0.5 kg
QST/K 80	600	640	80	50	62	47	89	42	106	22.5	40	M10	M8	45	250	5x5x28	14h6x35	M6	80	9.8 kg	0.9 kg
QST/K 100	700	740	100	66	75	68	112	60	129	28.5	50	M10	M10	57	288	6x6x40	22h6x45	M8	100	18.6 kg	1.3 kg

K

Screw:

(T) Trapezoidal thread (K) Ballscrew

3

Selection of screw:

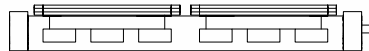
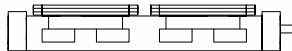
(3) right - left hand (4) divided screw

0

Choice of carriage:

(0)

(1)



0

Drive version:

(0) shaft right hand thread (1) shaft left hand thread (2) shaft on both sides

0

Selection of screw:

Ballscrew right hand

Ballscrew left hand

Trapezoidal right hand thread

Trapezoidal left hand thread

Size

60

80

100

upon request

60

80

100

60

80

100

Standard

(0) 16x5

(0) 25x5

(0) 32x5

upon request

(0) 18x4

(0) 24x5

(0) 32x6

(0) 18x4

(0) 24x5

(0) 32x6

Multistart screw

(1) 16x10*

(1) 20x20*

(1) 32x10*

upon request

(1) 18x8

(1) 24x10

(1) 32x12

(1) 18x8

(1) 24x10

(1) 32x12

(2) 16x16*

(2) 25x10*

(2) 32x32**

0

Choice of guide body profile:

(0) Standard (1) corrosion-protected screws

(4) expanded corrosion-protected version (depending on the availability of components)

0

Ballscrew pitch accuracy:

(0) 0.1 mm / 300 mm (Standard) (1) 0.05 mm / 300 mm (2) 0.025 mm / 300 mm

0

End play of ball nut:

(0) 0.04 mm (Standard) (1)* < 0.02 mm (2)* 2% apply prestress

* only in combination with pitch accuracy (1) or (2)

QS K 80 3 0 0 0 0 0 0 0 0 1500

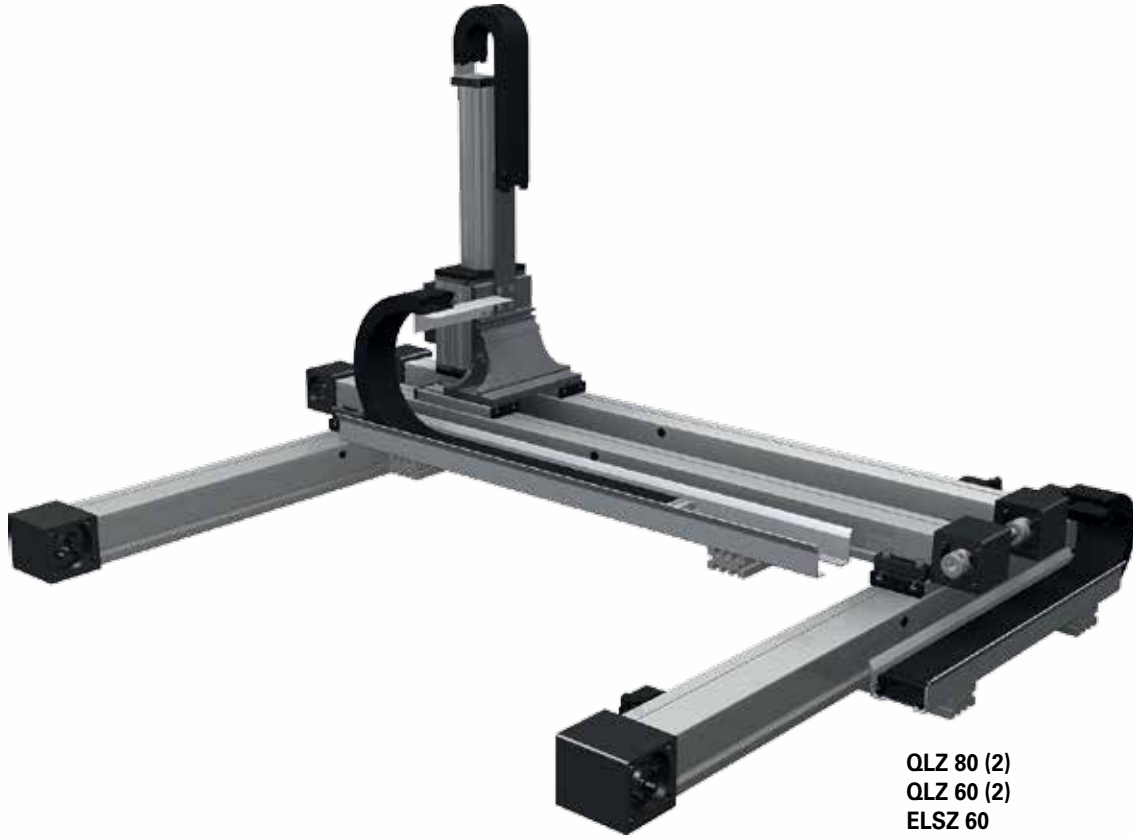
1500

**L + Stroke + Overtravel = Total Length

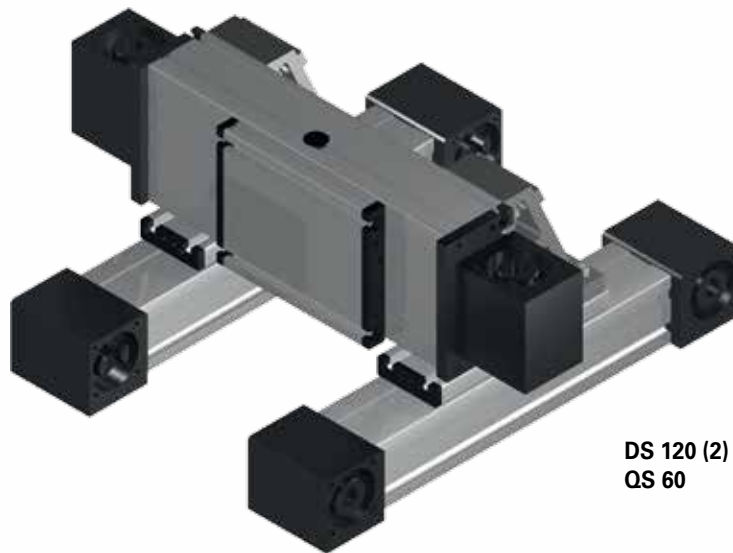
Pos. 1 2 3 4 5 6 7

Sample ordering code: QSK80, ballscrew right - left hand thread, standard carriage, shaft on right hand thread, screw 25x5, 860 mm stroke.

SUGGESTED MOUNTING CONFIGURATIONS



QLZ 80 (2)
QLZ 60 (2)
ELSZ 60



DS 120 (2)
QS 60

QST/KE 60, 80, 100

INTERNAL PROFILE RAIL GUIDED
STAINLESS STEEL

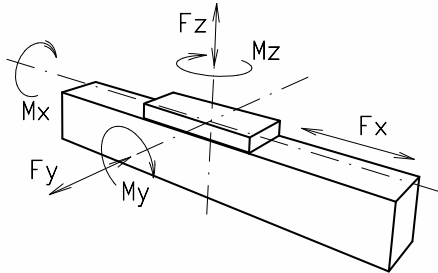


Function:

This unit consists of a square aluminium profile with an integrated ball rail and is covered by a stainless steel sheet (thickness 0.37mm, material 1.4,301). The carriage is driven by means of a rotating screw with leading nut. The openings of the guide body are sealed by a stainless steel cover band to protect the drive from splash water and dust.

Fitting position: As required, max. length 3000mm
 Carriage connection: By T-nuts and bores through the cover.
 Unit mounting: By the bearing blocks

FORCES AND TORQUES



PERMITTED DYN. FORCES*	QST/KE 60		QST/KE 80		QST/KE 100	
	5,000 km	10,000 km	5,000 km	10,000 km	5,000 km	10,000 km
F_x (N)	900	800	2,500	2,000	5,000	4,000
F_y (N)	1,415	1,010	3,570	2,542	4,082	2,910
F_z (N)	3,525	2,510	8,500	6,050	10,300	7,360
M_x (Nm)	33	23	107	76	142	101
M_y (Nm)	190	143	604	430	838	597
M_z (Nm)	176	125	550	392	745	532

All forces and torques related to the following:

$$\frac{\text{existing values}}{\text{table values}} \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

	QST/KE 60	QST/KE 80	QST/KE 100
Trapezoidal	18x4/18x8	24x5/24x10	32x6/32x12
Nm	0.8/0.9	0.8/1.0	2.0/2.2
Ballscrew	16x5/16x10	25x5/20x20/25x10	32x5/32x10
Nm	0.5/0.8	0.5/0.9/0.8	1.7/2.1

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

	QST/KE 60	QST/KE 80	QST/KE 100
I_x mm ⁴	4.3x10 ⁵	14.0x10 ⁵	43.0x10 ⁵
I_y mm ⁴	4.8x10 ⁵	16.6x10 ⁵	48.8x10 ⁵
E-Modulus N/mm ²	70,000	70,000	70,000

* referred to life-time

Formula: QST/KE

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_i}{2,000 \cdot \pi \cdot \mu} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

F = force (N)
 P = thread pitch (mm)
 S_i = safety factor 1.2 ... 2
 M_{leer} = no-load torque (Nm)
 n = rpm of screw (min⁻¹)
 M_a = driving torque (Nm)
 μ = screw efficiency
 P_a = motor power (KW)

Efficiency of lead screws:

All ballscrew 0.900

Tr 18x4 0.399
 Tr 18x8 0.565
 Tr 24x5 0.384
 Tr 24x10 0.550
 Tr 32x6 0.360
 Tr 32x12 0.524

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

f = deflection (mm)
 F = load (N)
 L = free length (mm)
 E = elastic modulus 70,000 (N/mm²)
 I = second moment of area (mm⁴)

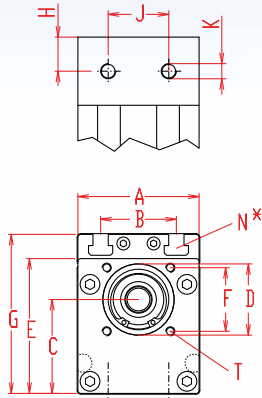
For the diagram for critical speeds of lead screws refer to page 175.

MODULAR LINEAR ACTUATORS

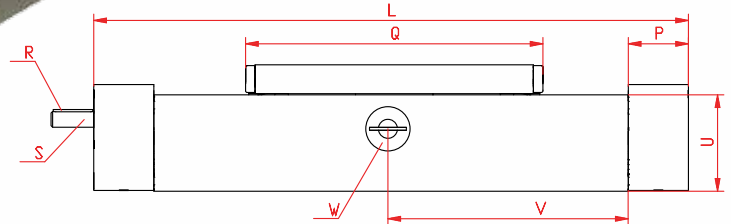
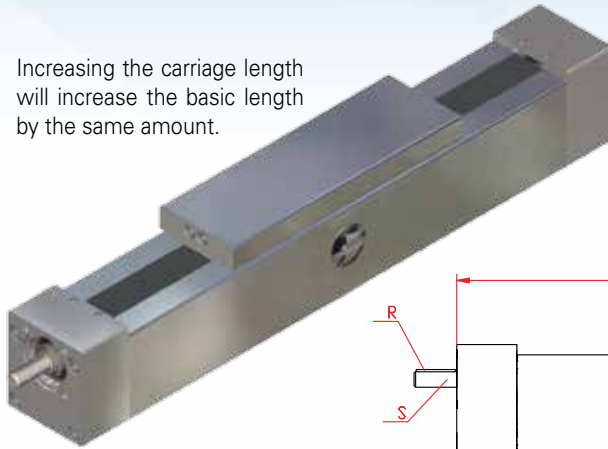
SCREW DRIVEN

SCREW DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.



*For slide nuts refer to page 136

$$V = Q + 100 \text{ mm}$$

W = servicing position

SIZE	L**	SHAFT											R Key	S Øh6 x length	T for	U	BASIC WEIGHT	WEIGHT per 100 mm		
		A	B	C	D	E	F	G	H	J	K for	N for							P	Q
QST/KE 60	270	61	36	45.5	37	67.5	32	80	19	18	M6	M6	38	188	3x3x25	10h6x27	M5	61	4.1 kg	0.5 kg
QST/KE 80	350	81	50	62.5	47	89.5	42	107	22.5	40	M10	M8	45	250	5x5x28	14h6x35	M6	81	7.5 kg	0.9 kg
QST/KE 100	410	101	66	75.5	68	112.5	60	130	28.5	50	M10	M10	57	288	6x6x40	22h6x45	M8	101	14.8 kg	1.3 kg

K

Screw:

(T) Trapezoidal thread (K) Ballscrew

1

Selection of screw:

(1) right hand (Standard) (2) left hand (Ballscrew by inquiry)

0

Choice of guide body profile:

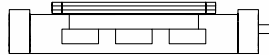
(0) Version with corrosion-protected components
(1) Version 0 but with not corrosion-protected guidings

0

Choice of carriage:

(0)

(1)



0

Drive version:

(0) one shaft (locating bearing side) (1) one shaft (non-locating bearing side) (2) shaft on both sides

0

Selection of screw:

Size	Standard	Multistart screw	Standard	Multistart screw
		trapezoidal thread standard	ballscrew standard	
60	(0) Tr 18x4	(1) Tr 18x8	(0) Kg 16x5	(1) Kg 16x10 (2) Kg 16x16
80	(0) Tr 24x5	(1) Tr 24x10	(0) Kg 25x5	(1) Kg 20x20 (2) Kg 25x10
100	(0) Tr 32x6	(1) Tr 32x12	(0) Kg 32x5	(1) Kg 32x10 (2) Kg 32x32 *
		trapezoidal thread stainless	ballscrew stainless by inquiry	
60	(4) Tr 18x4	(5) Tr 18x8		
80	(4) Tr 24x5	(5) Tr 24x10		
100	(4) Tr 32x6	(5) Tr 32x12		

* Basic and carriage length (L and Q) increase by 47 mm

0

Ballscrew pitch accuracy:

(0) 0.1 mm / 300 mm (Standard) (1) 0.05 mm / 300 mm (2) 0.025 mm / 300 mm

0

End play of ball nut:

(0) 0.04 mm (Standard) (1)** < 0.02 mm (2)** 2% apply prestress
** only in combination with pitch accuracy (1) or (2)

1500

$$**L + \text{Stroke} + \text{Overtravel} = \text{Total Length}$$

QS KE 80 1 0 0 0 0 0 0 0 1500

Pos. 1 2 3 4 5 6 7

Sample ordering code: QSKE80, ballscrew right hand thread, full stainless version, standard carriage, one shaft (locating bearing side), screw 25x5, 1,150 mm stroke.

DST/DSK 120, 160, 200

INTERNAL PROFILE RAIL GUIDED

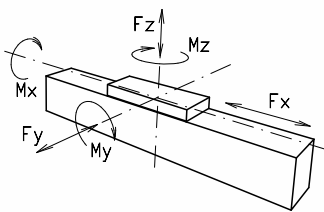


Function:

This unit consists of a rectangular aluminium profile with 2 integrated rail guides. The carriage is driven by means of a rotating screw with leading nut. Where two parallel linear units are used or where two carriages are mounted on one unit, the leading-nut receiver can be used to adjust the symmetry of the carriages. The openings of the guide body are sealed with 3 stainless steel cover bands to protect the drive from splash water and dust.

Fitting position: As required. Max. length 3,000 mm without joints.
 Carriage mounting: By T-slots.
 Unit mounting: By T-slots and mounting sets. The linear axis can be combined with any T-slot profile.
 Carriage support: In the standard version, the carriage runs on 4 runner blocks which can be serviced at a central servicing position. For longer carriages the number of runner blocks can be increased.
 Repeatability: Ballscrew ± 0.025 mm, trapezoidal thread ± 0.2 mm.

FORCES AND TORQUES



	120		160		200	
PERMITTED DYN. FORCES*	5,000 km	10,000 km	5,000 km	10,000 km	5,000 km	10,000 km
F_x (N)	900	800	5,000	4,000	10,000	8,000
F_y (N)	1,776	1,405	5,570	3,900	15,600	11,080
F_z (N)	2,090	1,650	7,050	5,020	20,600	14,600
M_x (Nm)	81	64	358	255	1,285	915
M_y (Nm)	97	77	369	262	1,375	980
M_z (Nm)	96	76	364	258	1,345	960
C (N)	2,310	2,310	7,800	7,800	22,800	22,800

All forces and torques related to the following:

$$\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Trapezoidal thread	18 x 4	18 x 8	24 x 5	24 x 10	32 x 6	32 x 12	-	-
(Nm)	0.8	1.1	1.0	1.3	1.5	1.7	-	-
Ballscrew	16 x 5	16 x 10	25 x 5	20 x 20	32 x 5	32 x 10	32 x 20	32 x 32
(Nm)	0.7	1.0	1.0	1.2	1.3	1.6	1.7	1.7

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	5.61 x 10 ⁵	2.13 x 10 ⁶	4.81 x 10 ⁶
I_y mm ⁴	34.19 x 10 ⁵	12.33 x 10 ⁶	26.0 x 10 ⁶
Elastic modulus N/mm ²	70,000	70,000	70,000

* referred to lifetime

Formula: DST/K

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_f}{2,000 \cdot \pi \cdot \mu} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

F = force (N)
 P = thread pitch (mm)
 S_f = safety factor 1,2 ... 2
 M_{leer} = no-load torque (Nm)
 n = rpm of screw (min⁻¹)
 M_a = driving torque (Nm)
 μ = screw efficiency
 P_a = motor power (KW)

Deflection:

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

f = deflection (mm)
 F = load (N)
 L = free length (mm)
 E = elastic modulus 70000(N/mm²)
 I = second moment of area (mm⁴)

Efficiency of lead

screws:
 All ballscrew 0.900
 Tr 24x5 0.384
 Tr 24x10 0.550
 Tr 32x6 0.360
 Tr 32x12 0.524

Nominal lifetime:

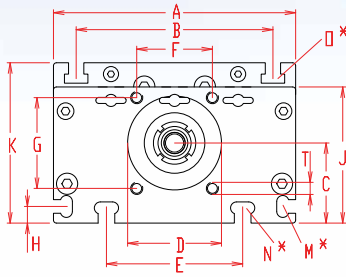
$L = \left(\frac{C}{F}\right)^3 \times 10^5$
 L = Lifetime in meter
 C = Dynamic load factor (N)
 F = Middle load (N)

For the diagram for critical speeds of lead screws refer to page 175.

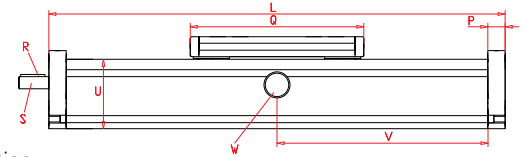
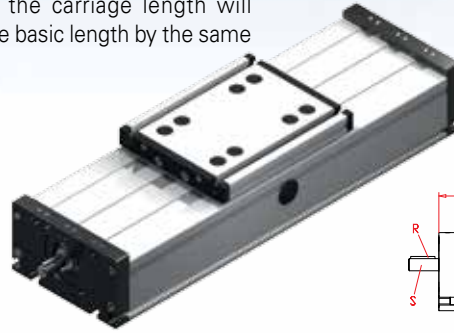
MODULAR LINEAR ACTUATORS

SCREW DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.



*For slide nuts refer to page 136

V = Q + 100 mm

W = servicing position

SIZE	L**	SHAFT											R	S	T	U	BASIC WEIGHT	WEIGHT per 100 mm				
		A	B	C	D	E	F	G	H	J	K	M							N	O	P	Q
DS 120	200	120	96	39	47	78	42	42	10	68	79	M5	M 6	M 6	15	156	3x3x25	10 h6 x 27	M 6	60	3.9 kg	0.92 kg
DS 160	260	160	130	53	62	90	50	60	11	90	106	M6	M 8	M 8	20	200	5x5x28	14 h6 x 35	M 8	80	7.2 kg	2.1 kg
DS 200	320	200	160	66	68	140	60	60	15	110	129	M8	M 10	M 10	20	270	6x6x40	22 h6 x 45	M 8	100	19.4 kg	3.5 kg

T

Screw:

(T) Trapezoidal thread (K) Ballscrew

1

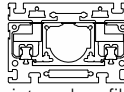
Selection of screw:

(1) right hand (2) left hand (Ballscrew by inquiry)

0

Choice of guide body profile:

(0)



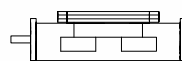
internal profile with cover bands

Stainless versions upon request.

0

Choice of carriages:

(0)



(1)



0

Drive version:

(0) one shaft (locating bearing side) (1) one shaft (non-locating bearing side) (2) shaft on both sides

0

Selection of screw:

Ballscrew right hand

Size

120

Standard

(0) 16x5

Multistart screw

(1) 16x10

(2) 16x16

(3) 20x20

(4) 25x5 (5) 25x10

160

(0) 25x5

(1) 20x20

(2) 25x10

(3) 25x25

200

(0) 32x5

(1) 32x10

(2) 32x20

(3) 32x32

Ballscrew left hand

upon request

Trapezoidal right hand thread

120

(0) 18x4

(1) 18x8

160

(0) 24x5

(1) 24x10

200

(0) 32x6

(1) 32x12

Trapezoidal left hand thread

120

(0) 18x4

(1) 18x8

160

(0) 24x5

(1) 24x10

200

(0) 32x6

(1) 32x12

0

Ballscrew pitch accuracy:

(0) 0.1 mm / 300 mm (Standard) (1) 0.05 mm / 300 mm (2) 0.025 mm / 300 mm

0

End play of ball nut:

(0) 0.04 mm (Standard) (1)* < 0.02 mm (2)* 2% apply prestress

* only in combination with pitch accuracy (1) or (2)

1500

**L + Stroke + Overtravel = Total Length

DS T 160 1 0 0 0 0 0 0 0 1500

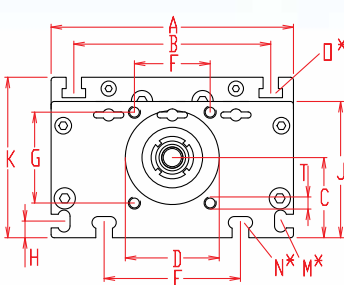
Pos. 1 2 3 4 5 6 7

Sample ordering code: DST,160, trapezoidal right hand thread, with internal profile and cover bands, standard carriage, one shaft (locating bearing side), screw 24x5, 1,240 mm stroke.

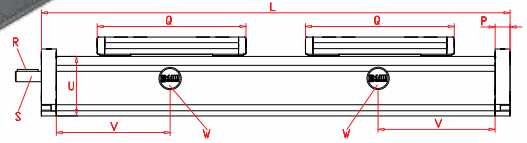
DST/DSK 120, 160, 200 (continued)

Dimensions (mm)

INTERNAL PROFILE RAIL GUIDED RIGHT-HAND AND LEFT-HAND THREAD OR DIVIDED SCREWS



Increasing the carriage length will increase the basic length by the same amount.



*For slide nuts refer to page 136

$$V = Q + 100 \text{ mm}$$

W = servicing position

SIZE	L**	A	B	C	D	E	F	G	H	J	K	M for	N for	O FOR	P	Q	SHAFT		T	U	BASIC WEIGHT	WEIGHT per 100 mm
																	R Key	S Ø x length				
DS 120	360	120	96	39	47	78	42	42	10	68	79	M 5	M 6	M 6	15	156	3x3x25	10 h6 x 27	M 6	60	5.1 kg	0.92 kg
DS 160	470	160	130	53	62	90	50	60	11	90	106	M 6	M 8	M 8	20	200	5x5x28	14 h6 x 35	M 8	80	10.1 kg	2.1 kg
DS 200	590	200	160	66	68	140	60	60	15	110	129	M 8	M 10	M 10	20	270	6x6x40	22 h6 x 45	M 8	100	35.9 kg	3.5 kg

T

Screw:

(T) Trapezoidal thread (K) Ballscrew

3

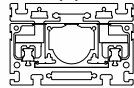
Selection of screw:

(3) right - left hand (ballscrew by inquiry) (4) divided screw

0

Choice of guide body profile:

(0)



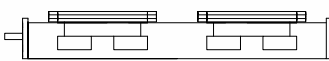
internal profile with cover bands

Stainless versions upon request.

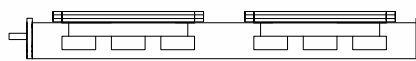
0

Choice of carriages:

(0)



(1)



	VERSION 0		VERSION 1	
	Q	L	Q	L
120	156	360	156	360
160	200	470	>230	>530
200	270	590	>310	>680

0

Drive version:

(0) shaft right hand thread (1) shaft left hand thread (2) shaft on both sides

0

Selection of screw:

Ballscrew right hand

Size

Standard

Multistart screw

120 (0) 16x5 (1) 16x10* (2) 16x16* (3) 20x20* (4) 25x5 (5) 25x10*
 160 (0) 25x5 (1) 20x20* (2) 25x10* (3) 25x25*
 200 (0) 32x5 (1) 32x10* (2) 32x20* (3) 32x32*

Ballscrew left hand

upon request

Trapezoidal right hand thread

120 (0) 18x4 (1) 18x8

160 (0) 24x5 (1) 24x10

200 (0) 32x6 (1) 32x12

Trapezoidal left hand thread

120 (0) 18x4 (1) 18x8

160 (0) 24x5 (1) 24x10

200 (0) 32x6 (1) 32x12

* = only for selection of divided screw

0

Ballscrew pitch accuracy:

(0) 0.1 mm / 300 mm (Standard) (1) 0.05 mm / 300 mm (2) 0.025 mm / 300 mm

0

End play of ball nut:

(0) 0.04 mm (Standard) (1)* < 0.02 mm (2)* 2% apply prestress

* only in combination with pitch accuracy (1) or (2)

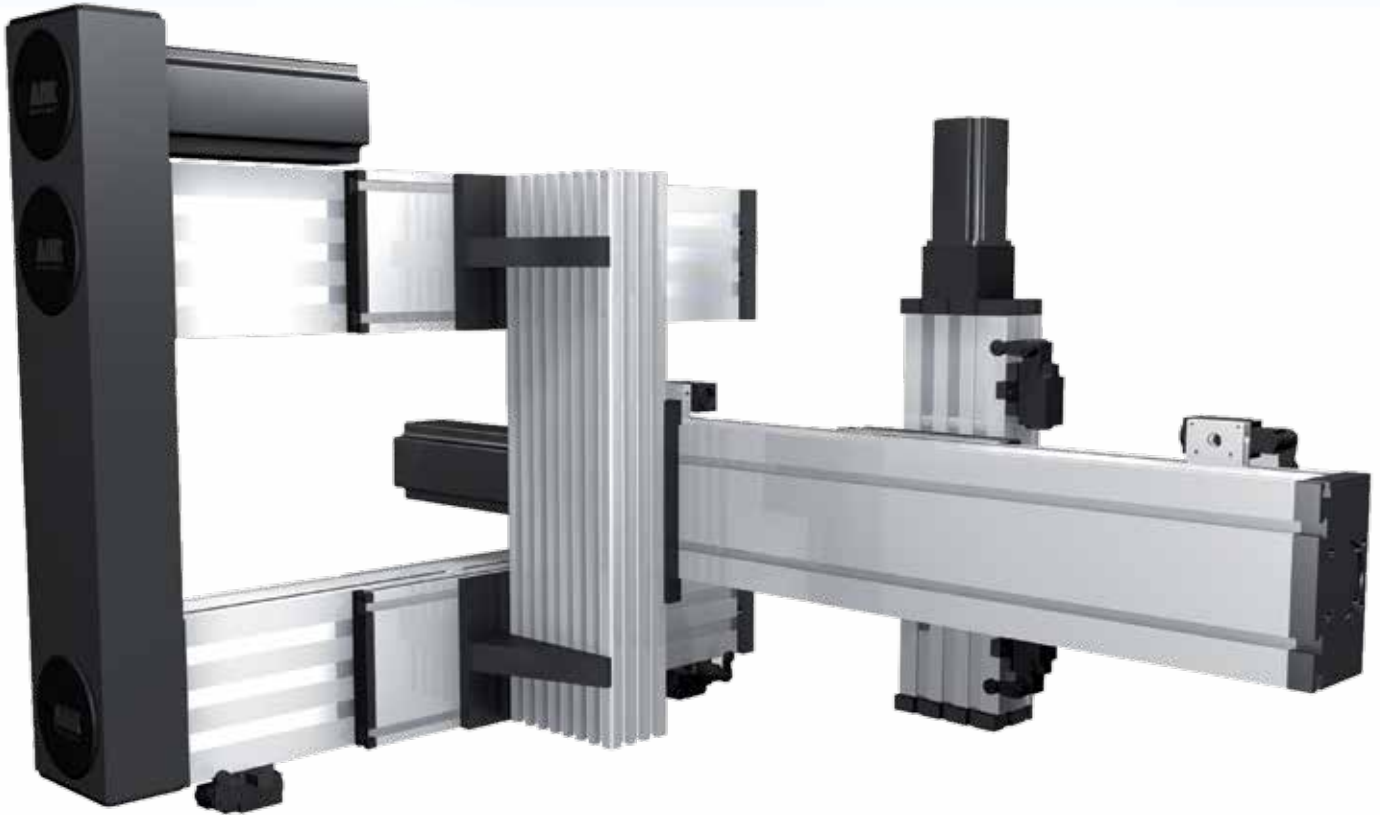
1500

**L + Stroke + Overtravel = Total Length

DS	T	160	3	0	0	0	0	0	0	0	01500
Pos.	1	2	3	4	5	6	7				

Sample ordering code: DST,160, trapezoidal right - left hand thread, with internal profile and cover bands, standard carriage, shaft on right hand thread, screw 24x5.1,030 mm stroke.

SUGGESTED MOUNTING CONFIGURATIONS



DLK 160 (4)

MODULAR LINEAR ACTUATORS



Nook Modular Linear Actuators are used in many conveyor applications.



BELT DRIVEN

V-GROOVE GUIDED.....	32-33
EGZ.....	32-33

EXTERNAL ROLLER BEARING GUIDED....	34-65
ELZ, ELZex	34-38
ELZG.....	39
ELZZ.....	40-41
ELSZ.....	42-45
ELSD.....	46-49
ELZT.....	50-53
ELFZ, ELFZex	54-57
ELHZ.....	58-59
ELVZ.....	60-63
MLZ.....	64-65

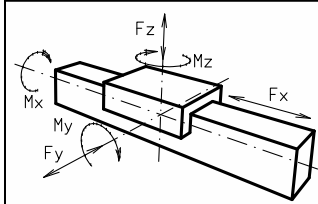
INTERNAL ROLLER BEARING GUIDED.....	66-77
QLZ.....	66-67
DLZ.....	68-69
DLSZ.....	70-71
DLVZ.....	72-73
LLZ.....	74-75
LLZE.....	76-77

INTERNAL PROFILE RAIL GUIDED.....	78-93
QSZ.....	78-79
QSSZ.....	80-81
QSZE.....	82-83
DSZ.....	84-85
DSSZ.....	86-87
DSZS.....	88-89
DSZPVI.....	90-91
DSZPVIE.....	92-93

MULTI-AXIS.....	94-96
ELZU.....	94-95
ELZI.....	96-97

EGZ 30, 40, 60, 60S, 80

V-GROOVE GUIDED



Function:

This linear unit consists of an aluminum square profile with lateral V-guides. The carriage that can be adjusted free of play is driven along the V-guides by a timing belt. The pulleys have maintenance-free ball bearings. Belt tension can be readjusted by a simple screw adjustment device in the carriage. This device can also be used for symmetrical adjustment of two or more linear units running parallel.

- Fitting length: As required. Max. length 6,000 mm without joints.
- Carriage mounting: T-slots
- Unit mounting: T-slots or tapped holes in the bearing block, mounting sets.
- Belt type: HTD with steel reinforcement, no backlash when changing direction, repeatability: ± 0.1 mm.

FORCES/TORQUES	EGZ 30		EGZ 40		EGZ 60		EGZ 80	
	static	dynamic	static	dynamic	static	dynamic	static	dynamic
F_x (N)	200	180	390	350	894	800	1,900	1,800
F_y (N)	90	60	350	315	500	450	1,000	900
F_z (N)	90	60	500	450	750	675	1,125	1,000
M_x (Nm)	10	5	20	18	33	30	82	75
M_y (Nm)	13	6	44	40	77	70	220	200
M_z (Nm)	14	7	33	30	55	50	165	150

All forces and torques relate to the following:

$$\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO LOAD TORQUE

Nm	0.2	0.3	0.6	0.9
----	-----	-----	-----	-----

SPEED

(m/sec) max	2	2	2	2
-------------	---	---	---	---

TENSILE FORCE

permanent (N)	200	390	900	1,900
0.2 sec (N)	280	480	1,000	2,090

MOMENTS OF INERTIA OF ALUMINUM PROFILE

I_x mm ⁴	4.09×10^4	1.4×10^5	5.62×10^5	19.23×10^5
I_y mm ⁴	4.00×10^4	1.47×10^5	6.05×10^5	20.09×10^5
E-Modulus N/mm ²	70,000	70,000	70,000	70,000

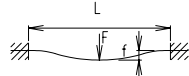
Formula: EGZ

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_i}{2,000 \cdot \pi} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

- F = force (N)
- P = pulley action perimeter (mm)
- S_i = safety factor 1.2 ... 2
- M_{leer} = no-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

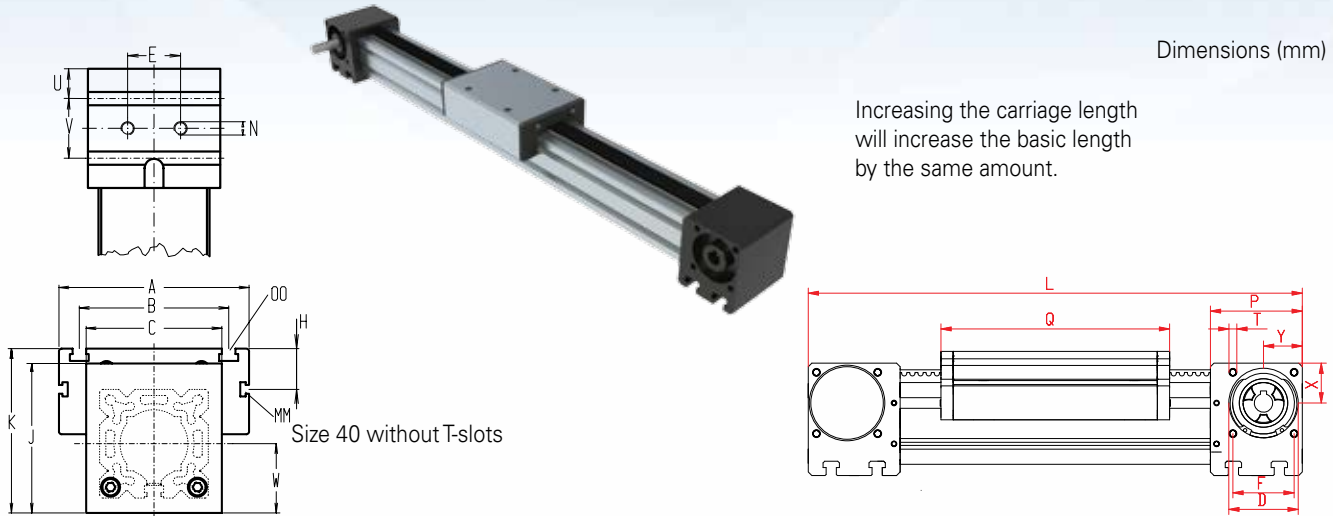
$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$


- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000 (N/mm²)
- I = second moment of area (mm⁴)

MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.

SIZE	L**	A	B	C	D	E	F	H	J	K	MM	N	OO	P	Q	T	U	V	W	X	Y	BASIC WEIGHT	ADDITIONAL WEIGHT per 100 mm
EGZ30	158	70	56	42	28	13	25	-	44	47	-	M5	M6	36	82	M4	-	-	21	16	16	0.8 kg	0.13 kg
EGZ40	225	70	-	58	37	18	32	-	58	64	-	M6	M6	49	118	M5	12.5	24	29	20.5	20.5	1.74 kg	0.22 kg
EGZ60	290	100	80	80	47	30	42	-	82	90	-	M8	M8	59	164	M6	15	30	41	27	26	4.32 kg	0.41 kg
EGZ80	375	140	110	100	68	40	60	30	110	121	M6	M10	M10	90	193	M8	22.5	45	51	39	38	9.36 kg	0.82 kg

0

Choice of guide body profile:

(0) Standard (1) stainless guide rods (only Size 30) (2) stainless guide rods and screws (only Size 30)

0

Choice of carriages:

(0)



For standard carriage length see 'Q' in table. Non-standard length on request. The longer the carriage, the greater the load capacity.

(1)

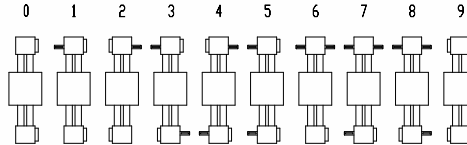


Top and bottom carriages are rigidly joined, enabling higher loads to be applied. This increases the basic length by 12-16 mm. Thickness of jointing plate refer to accessory section.

0

Coupling - shaft mounting:

0



9 is as 0, but with jaw coupling on both sides.

The standard version is supplied without shaft. A shaft can be retrofitted by inserting it into the pulley bore and securing it with 2 locking rings.

Belt table

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 1	30	3M12	75	25
0 3	40	5M15	100	20
0 4	60 (S)	5M25	130	26
0 7	80 (S)	8M30	192	24

Shaft dimensions

SIZE	SHAFT Ø h6 x length	KEY
30	6 x 15	2x2x12
40	10 x 27	3x3x25
60	14 x 35	5x5x28
80	18 x 45	6x6x40

**L + Stroke + Overtravel = Total Length

EGZ 40 1 0 0 0 0 3 1 01500

Pos. 1 2 3 4 5 6 7

For mounting hardware and other accessories, refer to pages 134 to 153.

Sample ordering code: ELZ 40 with standard body profile, standard carriage, coupling claw on one side, 1,275 mm stroke.

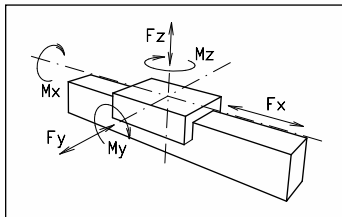
ELZ 30, 40, 60, 60S, 80, 80S, 100, 125

EXTERNAL ROLLER BEARING GUIDED
EXTERNAL BELT DRIVEN



Function:

This linear unit consists of an aluminium square profile with integrated, hardened steel guide rods. The carriage, which has internal linear ball bearings that can be adjusted free of play, is driven along the guide rods by a timing belt. The pulleys have maintenance-free ball bearings. Belt tension can be readjusted by a simple screw adjustment device in the carriage. This device can also be used for symmetrical adjustment of two or more linear units running parallel.



Fitting position:
Carriage mounting:
Unit mounting:
Belt type:

As required. Max. length 6,000 mm without joints.
By T-slots.
By T-slots or tapped holes in the bearing block, mounting sets.
HTD with steel reinforcement, no backlash when changing direction, repeatability: ± 0.1 mm.

FORCES/TORQUES	ELZ 30		ELZ 40		ELZ 60		ELZ 60 S		ELZ 80		ELZ 80 S		ELZ 100		ELZ 125	
	static	dynamic	static	dynamic	static	dynamic	static	dynamic	static	dynamic	static	dynamic	static	dynamic	static	dynamic
F_x (N)	200	180	390	350	894	800	894	800	1900	1800	1900	1800	4000	3800	5900	5750
F_y (N)	90	60	1200	700	3000	2000	4100	3100	3000	2000	4600	3600	8000	6500	12000	9000
F_z (N)	90	60	900	650	1700	1100	2160	1600	1700	1100	3000	1800	3600	2200	6000	4500
M_x (Nm)	10	5	25	20	67	43	88	65	90	55	170	140	300	230	600	450
M_y (Nm)	13	6	32	18	90	70	190	140	110	80	270	230	400	270	750	600
M_z (Nm)	14	7	35	25	120	100	230	170	150	120	300	220	750	500	1350	1150

All forces and torques relate to the following:

$$\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Nm	0.2	0.3	0.6	0.7	0.9	1.2	1.4	1.8
----	-----	-----	-----	-----	-----	-----	-----	-----

SPEED

(m/s) max	2	4	5	7	6	8	10	10
-----------	---	---	---	---	---	---	----	----

TENSILE FORCE

permanent (N)	200	390	900	900	1,900	1,900	4,000	5,900
0.2 s (N)	280	480	1,000	1,000	2,090	2,090	4,300	6,350

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	4.09×10 ⁴	1.32×10 ⁵	6.79×10 ⁵	6.79×10 ⁵	18.99×10 ⁵	18.99×10 ⁵	44.4×10 ⁵	101.5×10 ⁵
I_y mm ⁴	4.00×10 ⁴	1.34×10 ⁵	6.97×10 ⁵	6.97×10 ⁵	18.97×10 ⁵	18.97×10 ⁵	44.8×10 ⁵	101.5×10 ⁵
E-Modulus N/mm ²	70,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000

Formula: ELZ

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_i}{2,000 \cdot \pi} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

F = force (N)
P = pulley action perimeter (mm)
S_i = safety factor 1.2 ... 2
M_{leer} = no-load torque (Nm)
n = rpm pulley (min⁻¹)
M_a = driving torque (Nm)
P_a = motor power (KW)

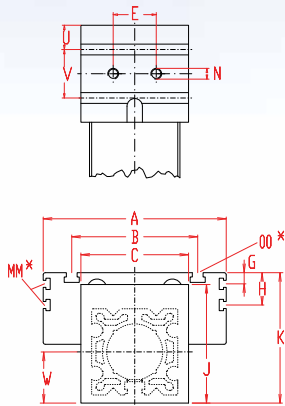
$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

f = deflection (mm)
F = load (N)
L = free length (mm)
E = elastic modulus 70,000 (N/mm²)
I = second moment of area (mm⁴)

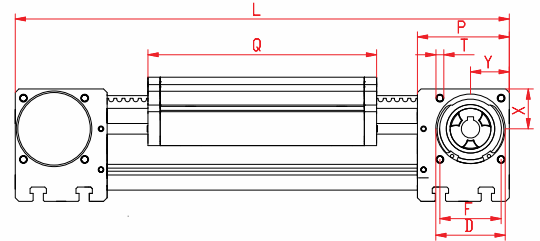
MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.



*For slide nuts refer to page 136

SIZE	L**	A	B	C	D	E	F	G	H	J	K	MM for	OO for	P	Q	T	U	V	W	X	Y	BASIC WEIGHT	WEIGHT per 100 mm	
ELZ 30	158	70	56	42	28	13	25	-	-	44	47	-	M5	M6	36	82	M4	10	16	21	16	16	0.8 kg	0.13 kg
ELZ 40	225	100	66	58	37	18	32	-	-	58	64	-	M6	M6	49	122	M5	12.5	24	29	20.5	20.5	1.9 kg	0.24 kg
ELZ 60	290	144	96	80	47	30	42	-	-	82	90	-	M8	M8	59	168	M6	15	30	41	27	26	4.8 kg	0.62 kg
ELZ 60S	315	170	108	80	47	30	42	-	-	82	94	-	M8	M8	59	194	M6	15	30	41	27	26	5.8 kg	0.62 kg
ELZ 80	375	170	117	100	68	40	60	10	30	110	121	M6	M10	M10	90	194	M8	22.5	45	51	39	38	10.0 kg	1.00 kg
ELZ 80S	395	190	126	100	68	40	60	12.5	30	110	122	M6	M10	M8	90	214	M8	22.5	45	51	39	38	11.0 kg	1.00 kg
ELZ 100	530	230	155	130	90	50	80	-	29	135	154	M10	M12	M10	110	300	M10	23	64	65	50	50	24.0 kg	1.60 kg
ELZ 125	625	295	200	160	110	60	100	-	30	167	191	M10	M12	M12	130	365	M10	38	50	82	60	60	37.0 kg	2.10 kg

0

Choice of guide body profile:

- (0) Standard (2) corrosion-protected guide rods and screws
- (4) expanded corrosion-protected version (depending on the availability of components)

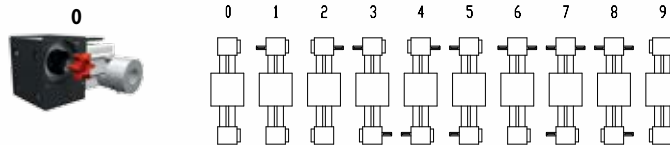
0

Choice of carriages:



0

Drive version:



The standard version is supplied without shaft. A shaft can be retrofitted by inserting it into the pulley bore and securing it with 2 locking rings or tension sets (size 100 and 125).

VERSION 1

	Q	L
30	94	170
40	138	241
60	184	306
60S	214	335
80	210	391
80S	234	415
100	316	546
125	389	649

Version 9 is the same as 0, but with double sided coupling claw.

Belt table

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 1	30	3M12	75	25
0 3	40	5M15	100	20
0 4	60 (S)	5M25	130	26
0 7	80 (S)	8M30	192	24
0 9	100	8M50	256	32
1 0	125	8M70	304	38

Shaft dimensions

SIZE	SHAFT Ø h6 x length	KEY
30	6 x 15	2x2x12
40	10 x 27	3x3x25
60 (S)	14 x 35	5x5x28
80 (S)	18 x 45	6x6x40
100	22 x 45	6x6x40
125	30 x 55	8x7x50

**L + Stroke + Overtravel = Total Length

ELZ 40 1 0 0 0 0 3 1 01500

Pos. 1 2 3 4 5 6 7

For mounting hardware and other accessories, refer to pages 134 to 153.

Sample ordering code: ELZ 40 with standard body profile, standard carriage, coupling claw on one side, 1,275 mm stroke.

ELZex 40, 60, 60S, 80, 80S, 100, 125

EXTERNAL ROLLER BEARING GUIDED
EXTERNAL BELT DRIVEN
EXPLOSION-PROOF



ATEX 95
 II 2G c IIB T4
 II 3D T125°C

Function:

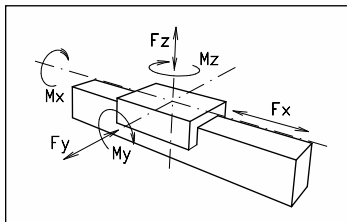
Like ELZ. The positioning system is suitable for use according to the intended purpose in potentially explosive areas (see ATEX 95 marking). An operating manual is included in the scope of delivery. The system is certified for the following areas:

ATEX 95 II 2G EEx c IIB T4:

All application areas except for underground mining. Gas atmosphere category 2, explosion protection category: protection due to secure construction (design security). Equipment group IIB. Temperature class T4=135°C

ATEX 95 II 3D T125°C:

All application areas except for underground mining. Dust atmosphere category 3. Maximum permissible surface temperature: 125°C.



Fitting position:
 Carriage mounting:
 Unit mounting:
 Belt type:

As required, max. length 6,000 mm.
 T-slots
 By T-slots or tapped holes in the bearing block, mounting sets.
 HTD with steel reinforcement, no backlash when changing direction, repeatability: ± 0.1 mm.

	ELZex 40		ELZex 60		ELZex 60 S		ELZex 80		ELZex 80 S		ELZex 100		ELZex 125	
FORCES/TORQUES	static	dynamic	static	dynamic	static	dynamic	static	dynamic	static	dynamic	static	dynamic	static	dynamic
F _x (N)	178	142	312	250	312	250	1,083	866	1,083	866	1,127	902	2,067	1,654
F _y (N)	517	414	1,330	1,064	1,910	1,528	1,584	1,267	2,219	1,775	3,100	2,480	4,980	3,984
F _z (N)	355	284	742	594	935	748	613	490	1,052	842	1,292	1,034	2,190	1,752
M _x (Nm)	12	10	36	29	52	41	36	29	67	54	101	81	220	176
M _y (Nm)	13	11	39	32	66	53	39	32	87	70	136	109	280	224
M _z (Nm)	19	15	70	56	137	110	100	81	182	146	326	260	636	509

All forces and torques relate to the following

$$\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Nm	0.3	0.6	0.7	0.9	1.2	1.4	1.8
----	-----	-----	-----	-----	-----	-----	-----

SPEED

(m/s) max	1	1	1	1	1	1	1
-----------	---	---	---	---	---	---	---

TENSILE FORCE

permanent (N)	178	312	312	1,083	1,083	1,127	2,067
---------------	-----	-----	-----	-------	-------	-------	-------

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I _x mm ⁴	1.32×10 ⁵	6.79×10 ⁵	6.79×10 ⁵	18.99×10 ⁵	18.99×10 ⁵	44.4×10 ⁵	101.5×10 ⁵
I _y mm ⁴	1.34×10 ⁵	6.97×10 ⁵	6.97×10 ⁵	18.97×10 ⁵	18.97×10 ⁵	44.8×10 ⁵	101.5×10 ⁵
E-Modulus N/mm ²	70,000	70,000	70,000	70,000	70,000	70,000	70,000

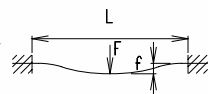
Formula: ELZex

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_i}{2,000 \cdot \pi} + M_{ier}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

F = force (N)
 P = pulley action perimeter (mm)
 S_i = safety factor 1.2 ... 2
 M_{ier} = no-load torque (Nm)
 n = rpm pulley (min⁻¹)
 M_a = driving torque (Nm)
 P_a = motor power (KW)

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$


f = deflection (mm)
 F = load (N)
 L = free length (mm)
 E = elastic modulus 70,000 (N/mm²)
 I = second moment of area (mm⁴)

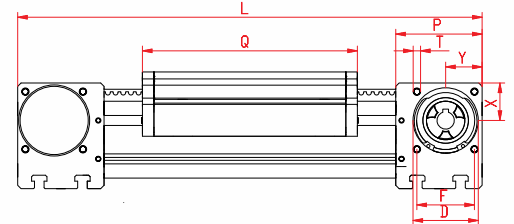
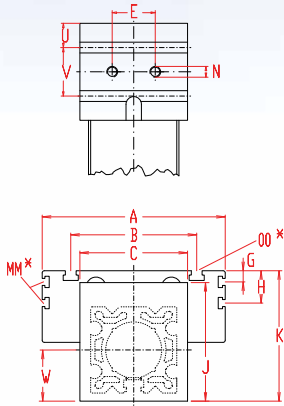
MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)

ATEX 95
II 2G c IIB T4
II 3D T125°C

Increasing the carriage length will increase the basic length by the same amount.



*For slide nuts refer to page 136

SIZE	L**	A	B	C	D	E	F	G	H	J	K	MM for	OO for	P	Q	T	U	V	W	X	Y	BASIC WEIGHT	WEIGHT per 100 mm	
ELZex 40	225	100	66	58	37	18	32	-	-	58	64	-	M6	M6	49	122	M5	12.5	24	29	20.5	20.5	1.9 kg	0.24 kg
ELZex 60	290	144	96	80	47	30	42	-	-	82	90	-	M8	M8	59	168	M6	15	30	41	27	26	4.8 kg	0.62 kg
ELZex 60S	315	170	108	80	47	30	42	-	-	82	94	-	M8	M8	59	194	M6	15	30	41	27	26	5.8 kg	0.62 kg
ELZex 80	375	170	117	100	68	40	60	10	30	110	121	M6	M10	M10	90	194	M8	22.5	45	51	39	38	10.0 kg	1.00 kg
ELZex 80S	395	190	126	100	68	40	60	12.5	30	110	122	M6	M10	M8	90	214	M8	22.5	45	51	39	38	11.0 kg	1.00 kg
ELZex 100	530	230	155	130	90	50	80	-	29	135	154	M10	M12	M10	110	300	M10	23	64	65	50	50	24.0 kg	1.60 kg
ELZex 125	625	295	200	160	110	60	100	-	30	167	191	M10	M12	M12	130	365	M10	38	50	82	60	60	37.0 kg	2.10 kg

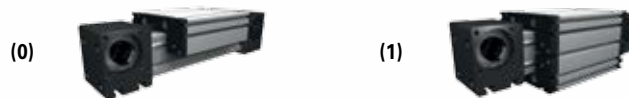
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Choice of guide body profile:

- (0) Standard (2) corrosion-protected guide rods and screws
- (4) expanded corrosion-protected version (depending on the availability of components)

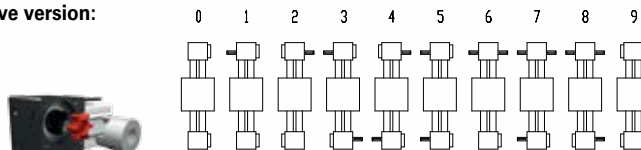
0

Choice of carriages:



0

Drive version:



The standard version is supplied without shaft. A shaft can be retrofitted by inserting it into the pulley bore and securing it with 2 locking rings or tension sets (size 100 and 125).

VERSION 1

	Q	L
40	138	241
60	184	306
60S	214	335
80	210	391
80S	234	415
100	316	546
125	389	649

Version 9 is the same as 0, but with double sided coupling claw.

Belt table

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 3	40	5M15	100	20
0 4	60 (S)	5M25	130	26
0 7	80 (S)	8M30	192	24
0 9	100	8M50	256	32
1 0	125	8M70	304	38

Shaft dimensions

SIZE	SHAFT Ø h6 x length	KEY
40	10 x 27	3x3x25
60 (S)	14 x 35	5x5x28
80 (S)	18 x 45	6x6x40
100	22 x 45	6x6x40
125	30 x 55	8x7x50

**L + Stroke + Overtravel = Total Length

ELZex 40 1 0 0 0 0 3 1 01500

Pos. 1 2 3 4 5 6 7

For mounting hardware and other accessories, refer to pages 134 to 153.

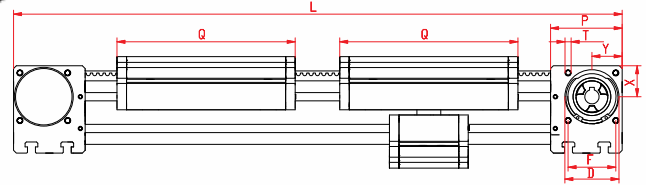
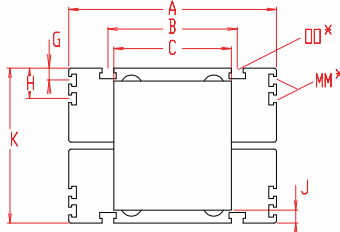
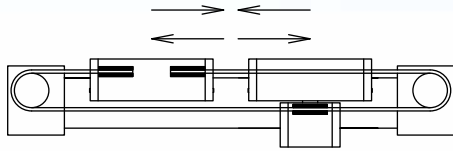
Sample ordering code:

ELZex 40, standard body profile, standard carriage, coupling claw on one side, 1,275 mm stroke.

ELZ 30, 40, 60, 60S, 80, 80S, 100, 125

EXTERNAL ROLLER BEARING GUIDED
EXTERNAL BELT DRIVEN
DUAL CARRIAGE

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.

*For slide nuts refer to page 136

SIZE	L**	A	B	C	D	F	G	H	J	K	MM for	OO for	P	Q	T	X	Y	BASIC WEIGHT	WEIGHT per 100 mm
ELZ 30	250	70	56	42	28	25	-	-	5	52	-	M6	36	82	M4	16	16	1.2 kg	0.13 kg
ELZ 40	350	100	66	58	37	32	-	-	6	70	-	M6	49	122	M5	20.5	20.5	2.8 kg	0.24 kg
ELZ 60	460	144	96	80	47	42	-	-	8	98	-	M8	59	168	M6	27	26	7.4 kg	0.62 kg
ELZ 60S	510	170	108	80	47	42	-	-	12	106	-	M8	59	194	M6	27	26	7.4 kg	0.62 kg
ELZ 80	570	170	117	100	68	60	10	30	19	140	M6	M10	90	194	M8	39	39	15.0 kg	1.00 kg
ELZ 80S	610	190	126	100	68	60	12.5	30	21	142	M6	M8	90	214	M8	39	39	17.0 kg	1.00 kg
ELZ 100	830	230	155	130	90	80	-	29	24	178	M10	M10	110	300	M10	50	50	34.0 kg	1.60 kg
ELZ 125	990	295	200	160	110	100	-	30	25.5	216	M10	M12	130	365	M10	60	60	53.5 kg	2.10 kg

0

Choice of guide body profile:

- (0) Standard (2) corrosion-protected guide rods and screws
- (4) expanded corrosion-protected version (depending on the availability of components)

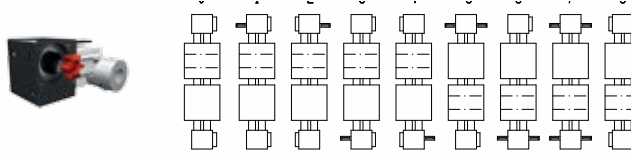
0

Choice of carriages:



0

Coupling - shaft mounting:



The standard version is supplied without shaft. A shaft can be retrofitted by inserting it into the pulley bore and securing it with 2 locking rings or tension sets (size 100 and 125).

	VERSION 1	
	Q	L
30	94	274
40	138	382
60	184	492
60S	214	554
80	210	602
80S	234	650
100	316	862
125	389	1,038

Version 8 is the same as 0, but with double sided coupling claw.

Belt table

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 1 30	30	3M12	75	25
0 3 40	40	5M15	100	20
0 4 60 (S)	60 (S)	5M25	130	26
0 7 80 (S)	80 (S)	8M30	192	24
0 9 100	100	8M50	256	32
1 0 125	125	8M70	304	38

Shaft dimensions

SIZE	SHAFT Ø h6 x length	KEY
30	6 x 15	2x2x12
40	10 x 27	3x3x25
60 (S)	14 x 35	5x5x28
80 (S)	18 x 45	6x6x40
100	22 x 45	6x6x40
125	30 x 55	8x7x50

**L + Stroke + Overtravel = Total Length

ELZ 40 3 0 0 0 3 1 01500
 Pos. 1 2 3 4 5 6 7

For mounting hardware and other accessories, refer to pages 134 to 153.

Sample ordering code: ELZ 40, right/left hand with standard body profile, standard carriage, coupling claw on one side, 1,150 mm stroke.

MODULAR LINEAR ACTUATORS

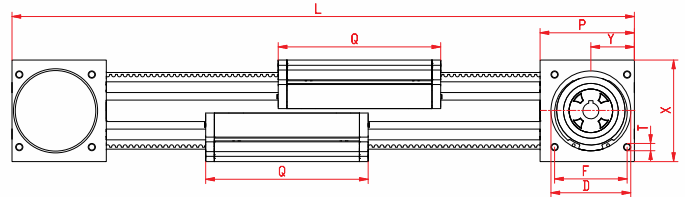
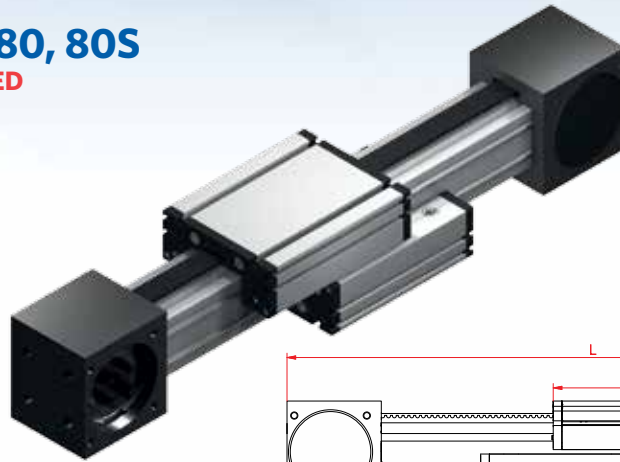
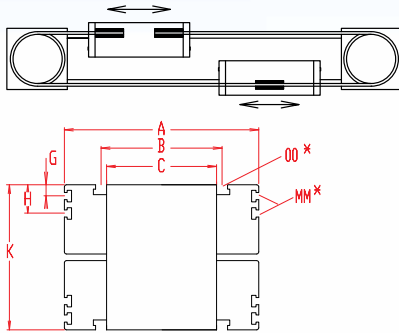
BELT DRIVEN

ELZG 30, 40, 60, 60S, 80, 80S

EXTERNAL ROLLER BEARING GUIDED
EXTERNAL BELT DRIVEN

Dimensions (mm)

Increasing the carriage length will increase the basic length by the same amount.



*For slide nuts refer to page 136

SIZE	L**	A	B	C	D	F	G	H	K	MM for	OO for	P	Q	T	X	Y	BASIC WEIGHT	WEIGHT per 100 mm
ELZG 30	195	70	56	48	47	42	-	-	52	-	M6	55	82	M6	52	27	1.1 kg	0.13 kg
ELZG 40	265	100	66	60	55	55	-	-	70	-	M6	70	122	M6	70	33	4.0 kg	0.29 kg
ELZG 60	365	144	96	88	80	70	-	-	98	-	M8	95	168	M8	98	46	10.3 kg	0.65 kg
ELZG 60S	390	170	108	88	80	70	-	-	106	-	M8	95	194	M8	98	46	12.3 kg	0.65 kg
ELZG 80	460	170	117	118	110	100	10	30	140	M6	M10	130	194	M10	140	60	23.5 kg	1.15 kg
ELZG 80S	480	190	126	118	110	100	12.5	30	142	M6	M8	130	214	M10	140	60	24.5 kg	1.15 kg

0

Choice of guide body profile:

- (0) Standard (2) corrosion-protected guide rods and screws
- (4) expanded corrosion-protected version (depending on the availability of components)

0

Choice of carriages:

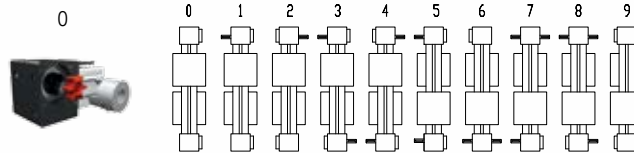
(0)



For standard carriage length see 'Q' in table. The carriages can be delivered in any non-standard length upon request; the longer the carriage, the higher the load capacity.

0

Drive version:



Version 9 is the same as 0, but with double sided coupling claw.

The standard version is supplied without shaft. A shaft can be retrofitted by inserting it into the pulley bore and securing it with 2 locking rings or tension sets (size 80).

Belt table

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 1 30	30	3M12	120	40
0 3 40	40	5M15	160	32
0 4 60 (S)	60 (S)	5M25	220	44
0 7 80 (S)	80 (S)	8M30	320	40

Shaft dimensions

SIZE	SHAFT Ø h6 × length	KEY
30	10 × 27	3×3×25
40	14 × 35	5×5×28
60 (S)	18 × 45	6×6×40
80 (S)	22 × 45	6×6×40

**L + Stroke + Overtravel = Total Length

ELZG	40	1	0	0	0	0	3	1	01500
Pos.	1	2	3	4	5	6	7		

For mounting hardware and other accessories, refer to pages 134 to 153.

Sample ordering code: ELZG 40, standard body profile, standard carriage and coupling claw on one side, 1,235 mm stroke.

ELZZ 60, 60S, 80, 80S, 100, 125

EXTERNAL ROLLER BEARING GUIDED
EXTERNAL BELT DRIVEN



Function:

Same functions as ELZ, but each carriage can be moved separately by its own drive. This unit has twin pulleys, which run on separate bearings, and two independent, parallel drive belts, one for each carriage.

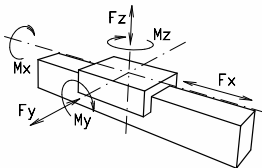
- Fitting position: As required. Max. length 4,000 mm without joints.
- Carriage mounting: By T-slots.
- Unit mounting: By T-slots or tapped holes in the bearing block, mounting sets.
- Belt type: HTD with steel reinforcement, no backlash when changing direction, repeatability ± 0.1 mm.

FORCES AND TORQUES

FORCES/TORQUES	ELZZ 60		ELZZ 60 S		ELZZ 80		ELZZ 80 S		ELZZ 100		ELZZ 125	
	static	dynamic	static	dynamic	static	dynamic	static	dynamic	static	dynamic	static	dynamic
F_x (N)	298	250	298	250	679	500	679	500	1,210	1,100	1,900	1,800
F_y (N)	3,000	2,000	4,100	3,100	3,000	2,000	4,600	3,600	8,000	6,500	12,000	9,000
F_z (N)	1,700	1,100	2,160	1,600	1,700	1,100	3,000	2,600	3,600	2,200	6,000	4,500
M_x (Nm)	67	43	88	65	90	55	170	140	300	230	600	450
M_y (Nm)	90	70	190	140	110	80	270	230	400	270	750	600
M_z (Nm)	120	100	230	170	150	120	300	220	750	500	1,350	1,150

All forces and torques relate to the following:

$$\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$



NO-LOAD TORQUE

Nm	0.6	0.7	0.9	1.2	1.4	1.8
----	-----	-----	-----	-----	-----	-----

SPEED

(m/s) max	5	5	6	8	10	10
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TENSILE FORCE

permanent (N)	298	298	679	679	1,210	1,900
0.2 s (N)	333	333	746	746	1,331	2,090

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	6.79×10^5	6.79×10^5	18.99×10^5	18.99×10^5	44.4×10^5	101.5×10^5
I_y mm ⁴	6.97×10^5	6.97×10^5	18.97×10^5	18.97×10^5	44.8×10^5	101.5×10^5
E-Modulus N/mm ²	70,000	70,000	70,000	70,000	70,000	70,000

Formula: ELZZ

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_s}{2,000 \cdot \pi} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

- F = force (N)
- P = pulley action perimeter (mm)
- S_s = safety factor 1.2 ... 2
- M_{leer} = no-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

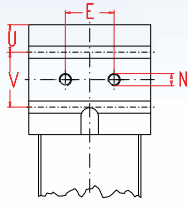
$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000 (N/mm²)
- I = second moment of area (mm⁴)

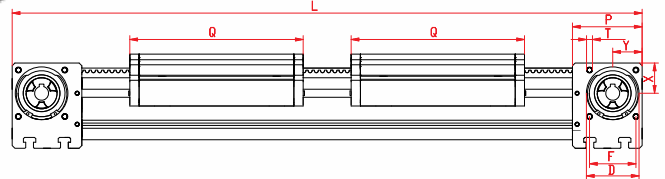
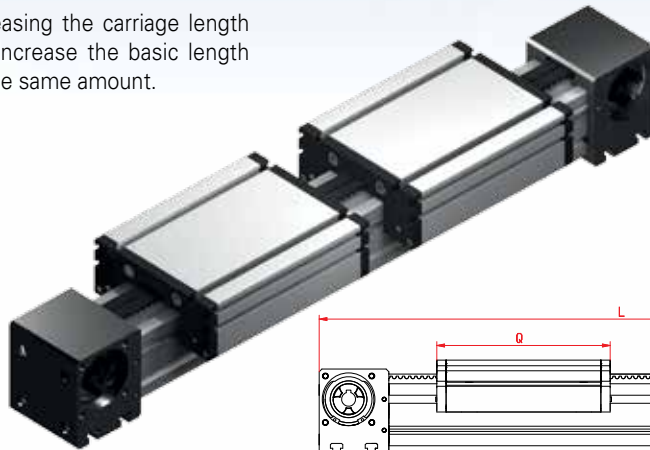
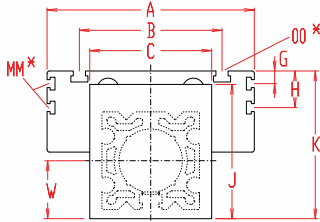
MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.



*For slide nuts refer to page 136

SIZE	L**	A	B	C	D	E	F	G	H	J	K	MM for	OO for	P	Q	T	U	V	W	X	Y	BASIC WEIGHT	WEIGHT per 100 mm	
ELZZ 60	460	144	96	80	47	30	42	-	-	82	90	M 8	M 8	59	168	M 6	15	30	41	27	26	7.4 kg	0.62 kg	
ELZZ 60S	510	170	108	80	47	30	42	-	-	82	94	M 8	M 8	59	194	M 6	15	30	41	27	26	9.4 kg	0.62 kg	
ELZZ 80	570	170	117	100	68	40	60	10	30	110	121	M 6	M 10	M 10	90	194	M 8	22.5	45	51	39	38	12.8 kg	1.00 kg
ELZZ 80S	610	190	126	100	68	40	60	12.5	30	110	122	M 6	M 10	M 8	90	214	M 8	22.5	45	51	39	38	14.8 kg	1.00 kg
ELZZ 100	830	230	155	130	90	50	80	-	29	135	154	M 10	M 12	M 10	110	300	M 10	23	64	65	50	50	33.0 kg	1.60 kg
ELZZ 125	990	295	200	160	110	60	100	-	30	167	191	M 10	M 12	M 12	130	365	M 10	38	50	82	60	60	52.0 kg	2.10 kg

- 0** Choice of guide body profile:
 (0) Standard (2) corrosion-protected guide rods and screws
 (4) expanded corrosion-protected version (depending on the availability of components)

- 0** Choice of carriages:

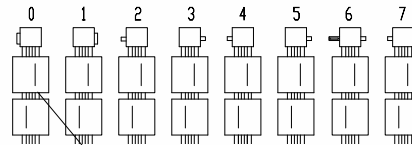


	VERSION 1	
	Q	L
60	184	492
60S	214	550
80	210	602
80S	234	650
100	316	862
125	389	1,038

- 0** Drive version:



The standard version is supplied without shaft.



connected with the left belt

- Coupling claw on one side
- Standard-shaft1
- Shaft one size smaller2

Belt table

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 2 60 (S)	60 (S)	5M09	130	26
0 5 80 (S)	80 (S)	8M12	192	24
0 6 100	100	8M20	256	32
0 7 125	125	8M30	304	38

Shaft dimensions

SIZE	SHAFT	
	Ø h6 × length	KEY
60 (S) ¹	14 × 35	5×5×30
60 (S) ²	10 × 27	3×3×25
80 (S) ¹	18 × 45	6×6×40
80 (S) ²	14 × 35	5×5×28
100 ¹	22 × 45	6×6×40
100 ²	18 × 45	6×6×40
125 ¹	30 × 55	8×7×50
125 ²	22 × 45	6×6×40

**L + Stroke + Overtravel = Total Length

ELZZ 60 4 0 0 0 2 1 01500
 Pos. 1 2 3 4 5 6 7

For mounting hardware and other accessories, refer to pages 134 to 153.

Sample ordering code: ELZZ 60 with standard body profile, standard carriage and coupling claw on one side, 1,040 mm stroke

ELSZ 30, 40, 60, 60S, 80, 80S, 100, 125

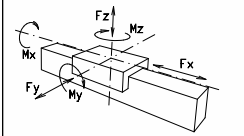
EXTERNAL ROLLER BEARING GUIDED
EXTERNAL BELT DRIVEN



Function:

This linear unit consists of an aluminium square profile with hardened steel guide rods. The carriage, which has internal linear ball bearings that can be adjusted free of play, is driven along the guide rods by a timing belt. The pulley has maintenance-free ball bearings. Belt tension can be readjusted by a simple tensioning device in one of the end blocks. This device can also be used for symmetrical adjustment of two or more linear units running parallel.

FORCES AND TORQUES



Fitting position:
Carriage mounting:
Unit mounting:
Belt type:

As required. Max. length without joints 6,000 mm.
By T-slots.
By T-slots or tapped holes in the bearing blocks, or mounting sets.
HTD with steel reinforcement, no backlash when changing direction, repeatability ± 0.1 mm.

FORCES/TORQUES	ELSZ 30		ELSZ 40		ELSZ 60		ELSZ 60 S		ELSZ 80		ELSZ 80 S		ELSZ 100		ELSZ 125	
	static	dynam.	static	dynam.	static	dynam.	static	dynam.	static	dynam.	static	dynam.	static	dynam.	static	dynam.
F_x (N)	200	180	390	350	894	800	894	800	1,900	1,800	1,900	1,800	4,000	3,800	5,900	5,750
F_y (N)	90	60	1,200	700	3,000	2,000	4,100	3,100	3,000	2,000	4,600	3,600	8,000	6,500	12,000	9,000
F_z (N)	90	60	900	650	1,700	1,100	2,160	1,600	1,700	1,100	3,000	1,800	3,600	2,200	6,000	4,500
M_x (Nm)	10	5	25	20	67	43	88	65	90	55	170	140	300	230	600	450
M_y (Nm)	13	6	32	18	90	70	190	140	110	80	270	230	400	270	750	600
M_z (Nm)	14	7	35	25	120	100	230	170	150	120	300	220	750	500	1,350	1,150

All forces and torques relate to the following:

$$\frac{\text{existing values}}{\text{table values}} \left(\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \right) \leq 1$$

NO-LOAD TORQUE

Nm	0.2	0.7	0.9	0.9	1.1	1.2	1.5	1.8
----	-----	-----	-----	-----	-----	-----	-----	-----

SPEED

(m/s) max	2	4	5	7	6	8	8	10
-----------	---	---	---	---	---	---	---	----

TENSILE FORCE

permanent (N)	200	390	900	900	1,900	1,900	4,000	5,900
0.2 s (N)	280	480	1,000	1,000	2,090	2,090	4,300	6,350

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	4.09×10^4	1.32×10^5	6.79×10^5	6.79×10^5	18.99×10^5	18.99×10^5	44.4×10^5	101.5×10^5
I_y mm ⁴	4.00×10^4	1.34×10^5	6.97×10^5	6.97×10^5	18.97×10^5	18.97×10^5	44.8×10^5	101.5×10^5
E-Modulus N/mm ²	70,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000

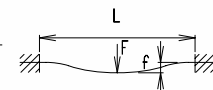
Formula: ELSZ

Driving torque:

$$M_a = \frac{F * P * S_s}{2,000 * \pi} + M_{leer}$$

$$P_a = \frac{M_a * n}{9,550}$$

F = force (N)
P = pulley action perimeter (mm)
 S_s = safety factor 1.2 ... 2
 M_{leer} = no-load torque (Nm)
n = rpm pulley (min⁻¹)
 M_a = driving torque (Nm)
 P_a = motor power (KW)

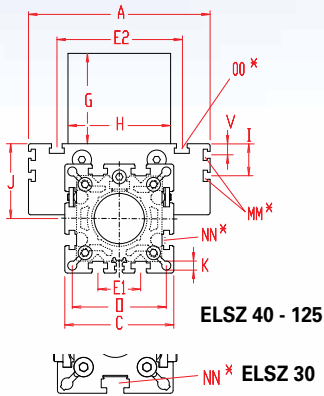
$$f = \frac{F * L^3}{E * I * 192}$$


f = deflection (mm)
F = load (N)
L = free length (mm)
E = elastic modulus 70,000 (N/mm²)
I = second moment of area (mm⁴)

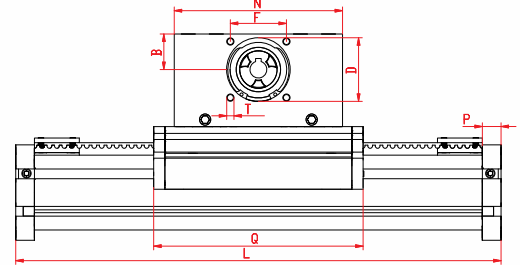
MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.



*For slide nuts refer to page 136

SIZE	L**	A	B	C	D	E1	E2	F	G	H	I	J	K	MM for	N	NN for	O	OO for	P	Q	T	V	BASIC WEIGHT	WEIGHT per 100 mm
ELSZ 30	182	70	16	42	28	-	56	25	45	42	-	26	4.2	-	90	M6	35	M6	12	108	M4	-	1.33 kg	0.16 kg
ELSZ 40	230	100	20	58	37	25	66	32	65	60	-	35	6.5	-	110	M6	47	M6	12	142	M5	-	2.1 kg	0.24 kg
ELSZ 60	280	144	30	82	47	30	96	42	80	80	-	49	8.5	-	130	M8	69	M8	16	168	M6	-	5.1 kg	0.62 kg
ELSZ 60S	305	170	30	82	47	30	108	42	80	80	-	53	8.5	-	130	M8	69	M8	16	194	M6	-	6.1 kg	0.62 kg
ELSZ 80	365	170	39	102	68	40	117	60	100	100	30	70	8.5	M6	180	M10	88	M10	20	214	M8	10	11.0 kg	1.00 kg
ELSZ 80S	375	190	39	102	68	40	126	60	100	100	30	71	8.5	M6	180	M8	88	M8	20	225	M8	12.5	12.0 Kg	1.00 Kg
ELSZ 100	535	230	60	130	90	50	155	80	130	130	29	89	10.5	M10	270	M12	112	M10	30	310	M10	-	25.8 kg	1.60 kg
ELSZ 125	595	295	62	165	110	60	200	100	139	160	30	107.5	M10	M10	310	M12	140	M12	30	365	M10	-	54.5 kg	1.94 kg

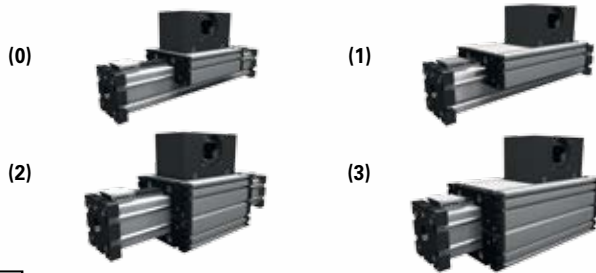
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Choice of guide body profile:

- (0) Standard (2) corrosion-protected guide rods and screws
- (4) expanded corrosion-protected version (depending on the availability of components)

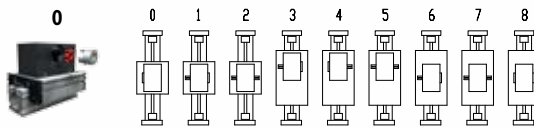
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Choice of carriages:



0

Drive version:



Version 8 is the same as 0, but with double sided coupling claw.

Belt table

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 1 30		3M12	75	25
0 3 40		5M15	100	20
0 4 60 (S)		5M25	130	26
0 7 80 (S)		8M30	192	24
0 9 100		8M50	256	32
1 0 125		8M70	304	38

**L + Stroke + Overtravel = Total Length

	VERSION 1		VERSION 2		VERSION 3	
	Q	L	Q	L	Q	L
30	175	245	124	194	197	267
40	237	325	158	246	253	341
60	303	415	184	296	319	431
60S	329	431	214	325	349	451
80	379	525	230	381	395	541
80S	399	545	245	395	419	565
100	535	760	326	551	551	776
125	640	870	389	619	664	894

The standard version is supplied without shaft. A shaft can be retrofitted by inserting it into the pulley bore and securing it with 2 locking rings or tension sets (size 100 + 125).

Shaft dimensions

SIZE	SHAFT	KEY
	Ø h6 x length	
30	6 x 15	2x2x12
40	10 x 27	3x3x25
60 (S)	14 x 35	5x5x28
80 (S)	18 x 45	6x6x40
100	22 x 45	6x6x40
125	30 x 55	8x7x50

ELSZ 60 0 0 0 0 0 4 1 01500

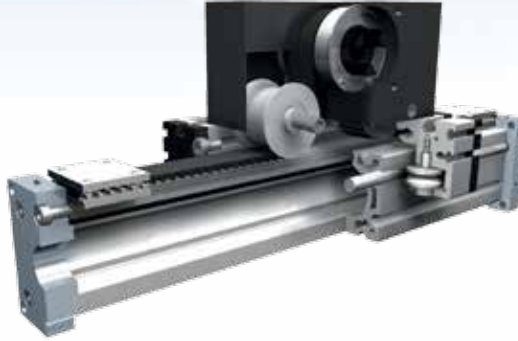
Pos. 1 2 3 4 5 6 7

For mounting hardware and other accessories, refer to pages 134 to 153.

Sample ordering code: ELSZ 60 with standard body profile, standard carriage and coupling claw on one side, 1,220 mm stroke.

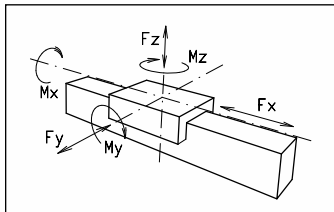
ELSZ 30, 40, 60, 60S, 80, 80S, 100, 125 (continued)

EXTERNAL ROLLER BEARING GUIDED
EXTERNAL BELT DRIVEN
WITH WIDENED BELT DRIVE



Function:

This linear unit consists of an aluminium square profile with hardened steel guide rods. The carriage, which has internal linear ball bearings that can be adjusted free of play, is driven along the guide rods by a timing belt. The pulley has maintenance-free ball bearings. Belt tension can be readjusted by a simple tensioning device in one of the end blocks. This device can also be used for symmetrical adjustment of two or more linear units running parallel.



Fitting position: As required. Max. length without joints 6,000 mm.
 Carriage mounting: By T-slots.
 Unit mounting: By T-slots, threads or tapped holes in the bearing blocks, or mounting sets.
 Belt type: HTD with steel reinforcement, no backlash when changing direction, repeatability ± 0.1 mm.

FORCES/TORQUES	ELSZ 30		ELSZ 40		ELSZ 60		ELSZ 60 S		ELSZ 80		ELSZ 80 S		ELSZ 100		ELSZ 125	
	static	dynam.	static	dynam.	static	dynam.	static	dynam.	static	dynam.	static	dynam.	static	dynam.	static	dynam.
F _x (N)	390	350	894	800	1,900	1,800	1,900	1,800	4,000	3,800	4,000	3,800	5,900	5,750	7,900	7,500
F _y (N)	90	60	1,200	700	3,000	2,000	4,100	3,100	3,000	2,000	4,600	3,600	8,000	6,500	12,000	9,000
F _z (N)	90	60	900	650	1,700	1,100	2,160	1,600	1,700	1,100	3,000	1,800	3,600	2,200	6,000	4,500
M _x (Nm)	10	5	25	20	67	43	88	65	90	55	170	140	300	230	600	450
M _y (Nm)	13	6	32	18	90	70	190	140	110	80	270	230	400	270	750	600
M _z (Nm)	14	7	35	25	120	100	230	170	150	120	300	220	750	500	1,350	1,150

All forces and torques relate to the following:

$$\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Nm	0.5	0.7	0.9	0.9	1.2	1.2	1.5	1.8
----	-----	-----	-----	-----	-----	-----	-----	-----

SPEED

(m/s) max	2	4	5	7	8	8	8	8
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TENSILE FORCE

permanent (N)	390	894	1,900	1,900	4,000	4,000	5,900	7,900
0.2 s (N)	480	480	2,090	2,090	4,300	4,300	6,350	8,500

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I _x mm ⁴	4.09×10 ⁴	1.32×10 ⁵	6.79×10 ⁵	6.79×10 ⁵	18.99×10 ⁵	18.99×10 ⁵	44.4×10 ⁵	101.5×10 ⁵
I _y mm ⁴	4.00×10 ⁴	1.34×10 ⁵	6.97×10 ⁵	6.97×10 ⁵	18.97×10 ⁵	18.97×10 ⁵	44.8×10 ⁵	101.5×10 ⁵
E-Modulus N/mm ²	70,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000

Formula: ELSZ

Driving torque:

$$M_a = \frac{F \cdot P \cdot S}{2,000 \cdot \pi} + M_{eer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

- F = force (N)
- P = pulley action perimeter (mm)
- S = safety factor 1.2 ... 2
- M_{eer} = no-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

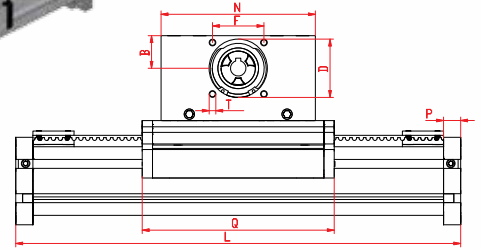
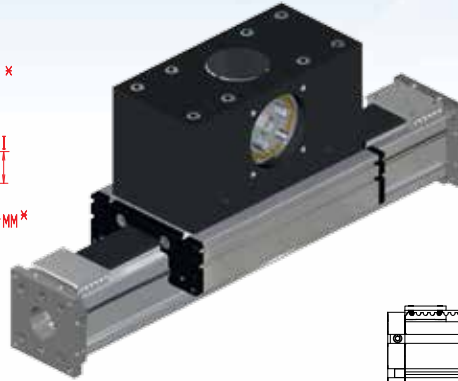
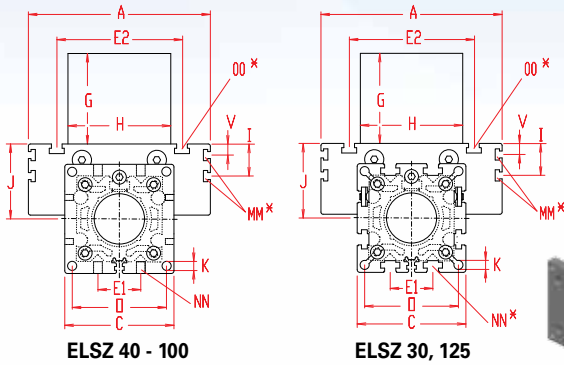
- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000 (N/mm²)
- I = second moment of area (mm⁴)

MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)

Increasing the carriage length will increase the basic length by the same amount.



*For slide nuts refer to page 136

SIZE	L**	A	B	C	D	E1	E2	F	G	H	I	J	K	MM for	N	NN for	O	OO for	P	Q	T	V	BASIC WEIGHT	WEIGHT per 100 mm
ELSZ 30	210	70	20	42	37	-	56	32	55	60	-	26	4.2	-	110	M6	35	M6	12	128	M5	-	1.5 kg	0.16 kg
ELSZ 40	260	100	30	58	47	18	66	42	83	80	-	35	6.5	-	130	M6	47	M6	12	164	M6	-	2.7 kg	0.24 kg
ELSZ 60	355	144	39	82	68	30	96	60	105	100	-	49	8.5	-	180	M8	69	M8	16	214	M8	-	6.3 kg	0.62 kg
ELSZ 60S	355	170	39	82	68	30	108	60	105	100	-	53	8.5	-	180	M8	69	M8	16	214	M8	-	7.3 kg	0.62 kg
ELSZ 80	460	170	60	102	90	40	117	80	140	130	30	70	8.5	M6	270	M10	88	M10	20	304	M10	10	14.0 kg	1.00 kg
ELSZ 80S	460	190	60	102	90	40	126	80	140	130	30	71	8.5	M6	270	M10	88	M8	20	304	M10	12.5	15.0 kg	1.00 kg
ELSZ 100	575	230	62	130	110	50	155	100	143	160	29	89	M12	M10	310	M10	112	M10	30	350	M10	-	31.0 kg	1.60 kg
ELSZ 125	605	295	62	165	110	60	200	100	139	180	30	107.5	M12	M10	310	M12	140	M12	30	365	M10	-	57.4 kg	1.96 kg

0

Choice of guide body profile:

- (0) Standard (2) corrosion-protected guide rods and screws
- (4) expanded corrosion-protected version (depending on the availability of components)

0

Choice of carriages:

(0)



(1)



(2)



(3)



	VERSION 1		VERSION 2		VERSION 3	
	Q	L	Q	L	Q	L
30	195	279	140	222	207	291
40	257	355	180	276	273	371
60	353	494	230	371	369	510
60S	379	520	234	375	399	540
80	469	625	320	476	485	641
80S	489	645	324	480	509	665
100	575	800	366	591	591	816
125	640	870	389	619	664	894

0

Drive version:



0



1



2



3



4



5



6



7



8

Version 8 is the same as 0, but with double sided coupling claw.

The standard version is supplied without shaft. A shaft can be retrofitted by inserting it into the pulley bore and securing it with 2 locking rings or tension sets (size 80 + 100).

Belt table

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 3	30	5M15	100	20
0 4	40	5M25	130	26
0 7	60 (S)	8M30	192	24
0 9	80 (S)	8M50	256	32
1 0	100	8M70	304	38
1 4	125	8M,100	304	38

Shaft dimensions

SIZE	SHAFT	
	Ø h6 x length	KEY
30	10 x 27	3x3x25
40	14 x 35	5x5x28
60 (S)	18 x 45	6x6x40
80 (S)	22 x 45	6x6x40
100	30 x 55	8x7x50
125	40 x 55	12x8x50

**L + Stroke + Overtravel = Total Length

ELSZ 60 0 0 0 0 7 1 01500
Pos. 1 2 3 4 5 6 7

For mounting hardware and other accessories, refer to pages 134 to 153.

Sample ordering code: ELSZ 60 with standard body profile, standard carriage with widened belt and coupling claw on one side, 1,170 mm stroke.

ELSD 40, 60, 60S, 80, 80S, 100

EXTERNAL ROLLER BEARING GUIDED

EXTERNAL BELT DRIVEN

Belt drive with rotary shaft



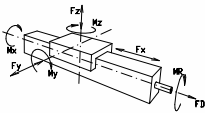
Function:

Same as ELSZ, but with an additional rotary shaft, fitted within the aluminium body. One end can be driven by any suitable motor, and the other end is provided with a shaft with feather key and an axial tapped hole for fitting grippers or other components.

- Fitting position: As required. Max. length 2,000 mm.
- Carriage mounting: By T-slots.
- Unit mounting: By T-slots or tapped holes in the bearing blocks, mounting sets.
- Belt type: HTD with steel reinforcement, no backlash when changing direction, repeatability ± 0.1 mm.

FORCES/TORQUES

	ELSD 40		ELSD 60		ELSD 60 S		ELSD 80		ELSD 80 S		ELSD 100	
FORCES/TORQUES	static	dynamic	static	dynamic	static	dynamic	static	dynamic	static	dynamic	static	dynamic
F _x (N)	390	350	894	800	894	800	1,900	1,800	1,900	1,800	4,000	3,800
F _y (N)	1,200	700	3,000	2,000	4,100	3,100	3,000	2,000	4,600	3,600	8,000	6,500
F _z (N)	900	650	1,700	1,100	2,160	1,600	1,700	1,100	3,000	1,800	3,600	2,200
F _D (N)	50	50	150	150	150	150	250	250	250	250	400	400
M _x (Nm)	25	20	67	43	88	65	90	55	170	140	300	230
M _y (Nm)	32	18	90	70	190	140	110	80	270	230	400	270
M _z (Nm)	35	25	120	100	230	170	150	120	300	220	750	500
M _{tr} (Nm)	5	5	10	10	10	10	20	20	20	20	30	30



All forces and torques relate to the following:

$$\frac{\text{existing values}}{\text{table values}} \cdot \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Nm	0.7	0.9	0.9	1.1	1.2	1.5
Stiction torque M _s (Nm)	0.1	0.1	0.1	0.1	0.1	0.1

SPEED

(m/s) max	4	5	7	6	8	8
-----------	---	---	---	---	---	---

TENSILE FORCE

permanent (N)	390	900	900	1,900	1,900	4,000
0.2 s (N)	480	1,000	1,000	2,090	2,090	4,300

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I _x mm ⁴	1.32×10 ⁵	6.79×10 ⁵	6.79×10 ⁵	18.99×10 ⁵	18.99×10 ⁵	44.4×10 ⁵
I _y mm ⁴	1.34×10 ⁵	6.97×10 ⁵	6.97×10 ⁵	18.97×10 ⁵	18.97×10 ⁵	44.8×10 ⁵
E-Modulus N/mm ²	70,000	70,000	70,000	70,000	70,000	70,000

Formula: ELSD

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_i}{2,000 \cdot \pi} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

- F = force (N)
- P = pulley action perimeter (mm)
- S_i = safety factor 1.2 ... 2
- M_{leer} = No-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

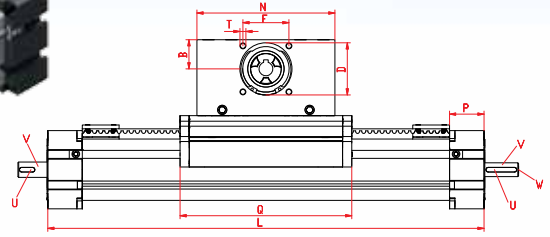
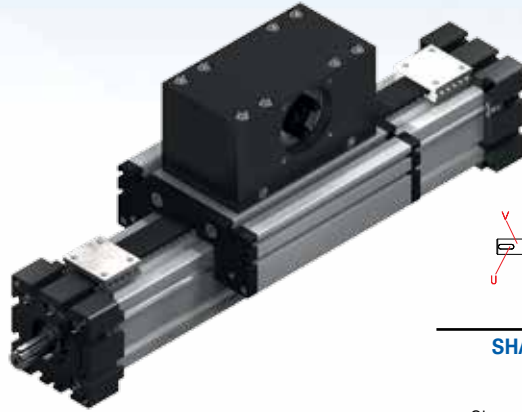
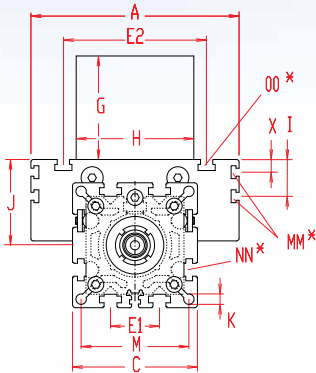
$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000 (N/mm²)
- I = second moment of area (mm⁴)

MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.

*For slide nuts refer to page 136

Size	SHAFT (DRIVE END)			SHAFT (LOAD END)		
	Shaft ∅ h6 × length (V)	Key (U)	Thread (W)	Shaft ∅ h6 × length (V)	Key (U)	Thread (W)
40	10×20	3×3×10	M6×12	12×20	4×4×10	M8×20
60(S)	14×25	5×5×20	M8×20	17×25	5×5×20	M8×20
80(S)	18×30	6×6×20	M10×20	20×30	6×6×20	M10×20
100	22×35	6×6×30	M12×25	25×35	8×7×30	M12×25

SIZE	L**	A	B	C	D	E1	E2	F	G	H	I	J	K	M	MM for	NN for	OO for	P	Q	T	X	BASIC WEIGHT	WEIGHT per 100 mm
ELSD 40	260	100	20	58	37	25	66	32	65	60	-	35	6.5	47	-	110	M6	25	142	M5	-	2.4 kg	0.40 kg
ELSD 60	320	144	30	82	47	30	96	42	80	80	-	49	8.5	69	-	130	M8	35	168	M6	-	5.9 kg	0.87 kg
ELSD 60S	345	170	30	82	47	30	108	42	80	80	-	53	8.5	69	-	130	M8	35	194	M6	-	6.9 kg	0.87 kg
ELSD 80	415	170	39	102	68	40	117	60	100	100	30	70	8.5	88	M6	180	M10	45	214	M8	10	12.5 kg	1.30 kg
ELSD 80S	430	190	39	102	68	40	126	60	100	100	30	71	8.5	88	M6	180	M10	45	225	M8	12.5	14.0 kg	1.30 kg
ELSD 100	585	230	60	130	90	50	155	80	130	130	29	89	10.5	112	M10	270	M10	55	310	M10	-	27.0 kg	1.70 kg

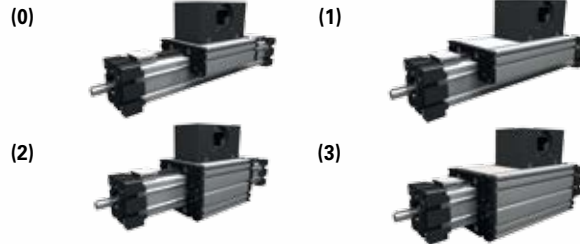
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Choice of guide body profile:

- (0) Standard (2) corrosion-protected guide rods and screws
- (4) expanded corrosion-protected version (depending on the availability of components)

0

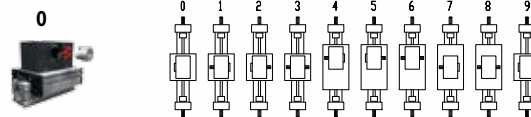
Choice of carriages:



	VERSION 1		VERSION 2		VERSION 3	
	Q	L	Q	L	Q	L
40	237	355	160	276	253	371
60	303	453	184	336	319	469
60S	329	469	214	365	349	489
80	379	575	230	431	395	591
80S	399	595	245	450	419	615
100	535	810	326	601	551	826

0

Drive version:



Version 9 is the same as 0, but with double sided coupling claw.

The standard version is supplied without shaft. A shaft can be retrofitted by inserting it into the pulley bore and securing it with 2 locking rings or tension sets (size 100).

Belt table

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 3 40	5M15	100	20	
0 4 60 (S)	5M25	130	26	
0 7 80 (S)	8M30	192	24	
0 9 100	8M50	256	32	

Shaft dimensions

SIZE	SHAFT ∅ h6 × length	KEY
40	10 × 27	3×3×25
60 (S)	14 × 35	5×5×28
80 (S)	18 × 45	6×6×40
100	22 × 45	6×6×40

**L + Stroke + Overtravel = Total Length

ELSD 60 0 0 0 0 0 4 1 01500
Pos. 1 2 3 4 5 6 7

For mounting hardware and other accessories, refer to pages 134 to 153.

Sample ordering code: ELSD 60 with standard body profile, standard carriage and coupling claw on one side, 1,180 mm stroke

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ELSD 40, 60, 60S, 80, 80S, 100 (continued)

EXTERNAL ROLLER BEARING GUIDED
EXTERNAL BELT DRIVEN
WIDENED BELT AND ROTARY SHAFT

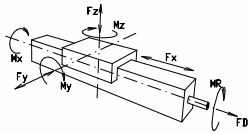


Function:

Same as ELSZ, but with an additional rotary shaft, fitted within the aluminium body. One end can be driven by any suitable motor, and the other end is provided with a shaft with feather key and an axial tapped hole for fitting grippers or other components.

- Fitting position: As required. Max. length 2,000 mm.
- Carriage mounting: By T-slots.
- Unit mounting: By T-slots or tapped holes in the bearing blocks, mounting sets.
- Belt type: HTD with steel reinforcement, no backlash when changing direction, repeatability ± 0.1 mm.

FORCES AND TORQUES



FORCES/TORQUES	ELSD 40		ELSD 60		ELSD 60 S		ELSD 80		ELSD 80 S		ELSD 100	
	static	dynam.	static	dynam.	static	dynam.	static	dynam.	static	dynam.	static	dynam.
F_x (N)	894	800	1,900	1,800	1,900	1,800	4,000	3,800	4,000	3,800	5,900	5,750
F_y (N)	1,200	700	3,000	2,000	4,100	3,100	3,000	2,000	4,600	3,600	8,000	6,500
F_z (N)	900	650	1,700	1,100	2,160	1,600	1,700	1,100	3,000	1,800	3,600	2,200
F_D (N)	50	50	150	150	150	150	250	250	250	250	400	400
M_x (Nm)	25	20	67	43	88	65	90	55	170	140	300	230
M_y (Nm)	32	18	90	70	190	140	110	80	270	230	400	270
M_z (Nm)	35	25	120	100	230	170	150	120	300	220	750	500
M_p (Nm)	5	5	10	10	10	10	20	20	20	20	30	30

All forces and torques relate to the following:

$$\frac{\text{existing values}}{\text{table values}} \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Nm	0.7	0.9	0.9	1.1	1.2	1.5
Stiction torque M_p (Nm)	0.1	0.1	0.1	0.1	0.1	0.1

SPEED

(m/s) max	4	5	7	6	8	8
-----------	---	---	---	---	---	---

TENSILE FORCE

permanent (N)	900	1,900	1,900	4,000	4,000	5,900
0.2 s (N)	1,000	2,090	2,090	4,300	4,300	6,350

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	1.32×10^5	6.79×10^5	6.79×10^5	18.99×10^5	18.99×10^5	44.4×10^5
I_y mm ⁴	1.34×10^5	6.97×10^5	6.97×10^5	18.97×10^5	18.97×10^5	44.8×10^5
E-Modulus N/mm ²	70,000	70,000	70,000	70,000	70,000	70,000

Formula: ELSZ

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_i}{2,000 \cdot \pi} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

- F = force (N)
- P = pulley action perimeter (mm)
- S_i = safety factor 1.2 ... 2
- M_{leer} = No-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

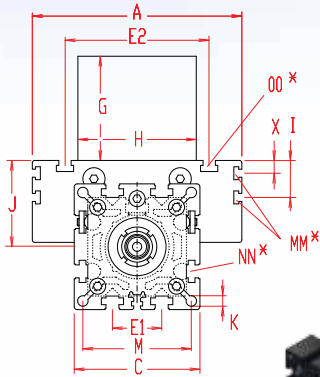
$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000 (N/mm²)
- I = second moment of area (mm⁴)

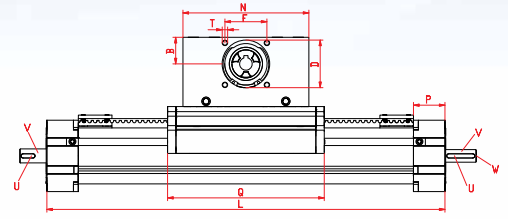
MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.



Size	SHAFT (DRIVE END)			SHAFT (LOAD END)		
	Shaft Ø h6 × length (V)	Key (U)	Thread (W)	Shaft Ø h6 × length (V)	Key (U)	Thread (W)
40	10×20	3×3×10	M6×12	12×20	4×4×10	M6×12
60(S)	14×25	5×5×20	M8×20	17×25	5×5×20	M8×20
80(S)	18×30	6×6×20	M10×20	20×30	6×6×20	M10×20
100	22×35	6×6×30	M12×25	25×35	8×7×30	M12×25

*For slide-nuts refer to page 136.

SIZE	L**	A	B	C	D	E1	E2	F	G	H	I	J	K	M	MM for	NN for	OO for	P	Q	T	X	BASIC WEIGHT	WEIGHT per 100 mm	
ELSD 40	286	100	30	58	47	25	66	42	83	80	-	35	6.5	47	-	130	M6	M6	25	164	M6	-	2.7 kg	0.40 kg
ELSD 60	395	144	39	82	68	30	96	60	105	100	-	49	8.5	69	-	180	M8	M8	35	214	M8	-	6.5 kg	0.87 kg
ELSD 60S	395	170	39	82	68	30	108	60	105	100	-	53	8.5	69	-	180	M8	M8	35	214	M8	-	7.5 kg	0.87 kg
ELSD 80	510	170	60	102	90	40	117	80	140	130	30	70	8.5	88	M6	270	M10	M10	45	304	M10	10	13.7 kg	1.30 kg
ELSD 80S	510	190	60	102	90	40	126	80	140	130	30	71	8.5	88	M6	270	M10	M8	45	304	M10	12.5	15.2 kg	1.30 kg
ELSD 100	625	230	62	130	110	50	155	100	143	160	29	89	10.5	112	M10	310	M10	M10	55	350	M10	-	33.4 kg	1.70 kg

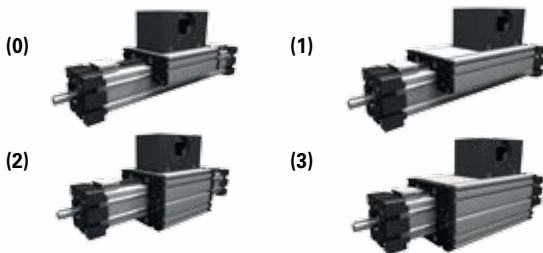
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Choice of guide body profile:

- (0) Standard
- (2) corrosion-protected guide rods and screws
- (4) expanded corrosion-protected version (depending on the availability of components)

0

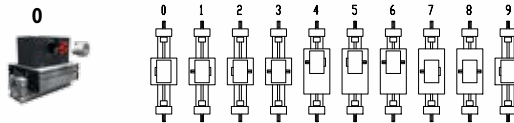
Choice of carriages:



SIZE	VERSION 1		VERSION 2		VERSION 3	
	Q	L	Q	L	Q	L
40	257	381	180	302	273	397
60	353	534	230	411	369	550
60S	379	560	234	415	399	580
80	469	675	320	526	485	691
80S	489	695	324	530	509	715
100	575	850	366	641	591	866

0

Drive version:



Version 9 is the same as 0, but with double sided coupling claw.

The standard version is supplied without shaft. A shaft can be retrofitted by inserting it into the pulley bore and securing it with 2 locking rings or tension sets (size 80 + 100).

Belt table

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 4	40	5M25	130	26
0 7	60 (S)	8M30	192	24
0 9	80 (S)	8M50	256	32
1 0	100	8M70	304	38

Shaft dimensions

SIZE	SHAFT Ø h6 × length	KEY
40	14 × 35	5×5×28
60 (S)	18 × 45	6×6×40
80 (S)	22 × 45	6×6×40
100	30 × 55	8×7×40

**L + Stroke + Overtravel = Total Length

ELSD 60 0 0 0 0 0 7 1 01500

Pos. 1 2 3 4 5 6 7

For mounting hardware and other accessories, refer to pages 134 to 153.

Sample ordering code: ELSD 60 with standard body profile, standard carriage and coupling claw on one side, 1,146 mm stroke

ELZT 40, 60, 60S, 80, 80S, 100

EXTERNAL ROLLER BEARING GUIDED

EXTERNAL BELT DRIVEN

TELESCOPIC BELT DRIVE



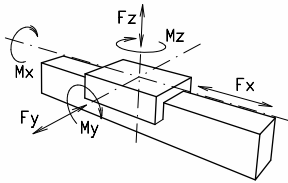
Function:

This unit consists of an aluminium square profile with integrated, hardened steel guide rods. Two carriages, which have internal linear ball bearings that can be adjusted free of play, are driven along the guide rods in opposite directions by 2 belts. The pulleys include maintenance-free ball bearings. One belt is tensioned by a tensioning device within the carriage. The other timing belt is tensioned by a tensioning device within the bearing block. The carriage with the drive block (with motor) is screwed to the crosshead. A T-slot profile is screwed to the carriage as an extension arm which can be adjusted to any length (see functional diagram on page 51).

Fitting position: As required. Max. length 3,000 mm.
 Unit mounting: By T-slots in the carriage, extension arm
 Belt type: HTD with steel reinforcement, no backlash when changing direction, repeatability +/- 0.1 mm.

FORCES AND TORQUES

FORCES/TORQUES	ELZT 40		ELZT 60		ELZT 60 S		ELZT 80		ELZT 80 S		ELZT 100	
	static	dynam.	static	dynam.	static	dynam.	static	dynam.	static	dynam.	static	dynam.
F_x (N)	360	300	580	470	580	470	1,800	1,570	1,800	1,570	4,000	3,500
F_y (N)	1,200	700	3,000	2,000	4,100	3,100	3,000	2,000	4,600	3,600	8,000	6,500
F_z (N)	900	650	1,700	1,100	2,160	1,600	1,700	1,100	3,000	1,800	3,600	2,200
M_x (Nm)	25	20	67	43	88	65	90	55	170	140	300	230
M_y (Nm)	32	18	90	70	190	140	110	80	270	230	400	270
M_z (Nm)	35	25	120	100	230	170	150	120	370	310	750	500



All forces and torques relate to the following:

$$\frac{\text{existing values}}{\text{table values}} \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Nm	0.9	1.1	1.1	1.3	1.2	2.4
----	-----	-----	-----	-----	-----	-----

SPEED

(m/s) max	4	5	7	6	8	8
-----------	---	---	---	---	---	---

TENSILE FORCE

permanent (N)	360	580	580	1,800	1,800	4,000
0.2 s (N)	450	700	700	2,200	2,200	4,300

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	1.32×10^5	6.79×10^5	6.79×10^5	18.99×10^5	18.99×10^5	44.4×10^5
I_y mm ⁴	1.34×10^5	6.97×10^5	6.97×10^5	18.97×10^5	18.97×10^5	44.8×10^5
E-Modulus N/mm ²	70,000	70,000	70,000	70,000	70,000	70,000

Formula: ELZT

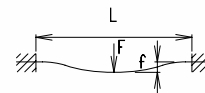
Driving torque:

$$M_a = \frac{F \cdot P \cdot S}{2,000 \cdot \pi} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

- F = force (N)
- P = pulley action perimeter (mm)
- S_f = safety factor 1.2 ... 2
- M_{leer} = No-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

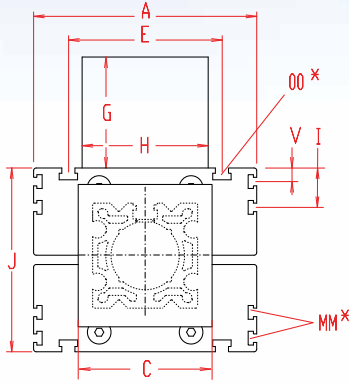


- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000 (N/mm²)
- I = second moment of area (mm⁴)

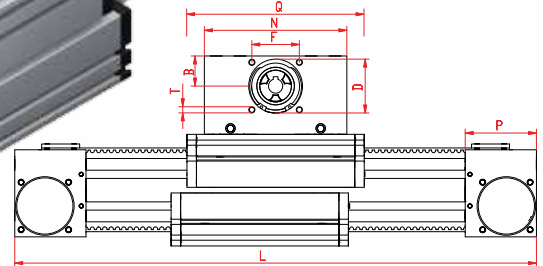
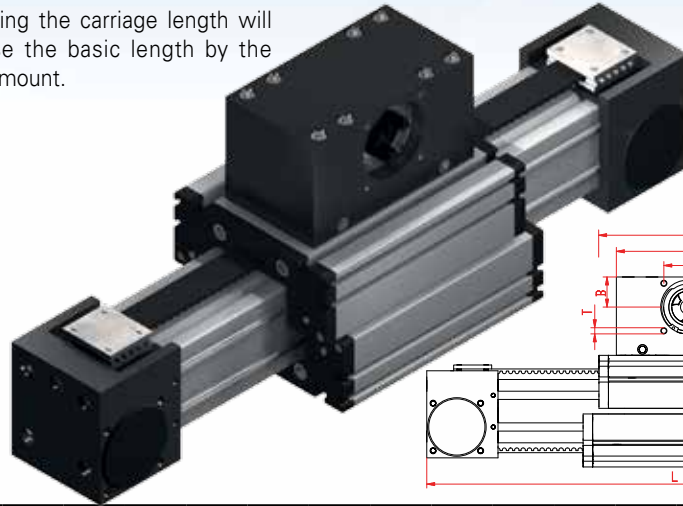
MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.



*For slide nuts refer to page 136

SIZE	L**	A	B	C	D	F	G	H	I	J	MM for	OO for	N	P	Q	T	V	BASIC WEIGHT	WEIGHT per 100 mm
ELZT 40	265	100	30	58	47	42	83	80	-	70	-	M6	130	49	164	M6	-	3.6 kg	0.31 kg
ELZT 60	345	144	39	80	68	60	105	100	-	98	-	M8	180	59	218	M8	-	9.1 kg	0.73 kg
ELZT 60S	370	170	39	80	68	60	105	100	-	106	-	M8	180	59	220	M8	-	10.1 kg	0.73 kg
ELZT 80	494	170	60	100	90	80	140	130	30	140	M6	270	M10	90	304	M10	10	24.0 kg	1.14 kg
ELZT 80S	494	190	60	100	90	80	140	130	30	142	M6	270	M8	90	304	M10	12.5	26.0 Kg	1.14 kg
ELZT 100	570	230	62	130	110	100	143	160	29	178	M10	310	M10	110	350	M10	-	40.6 kg	1.95 kg

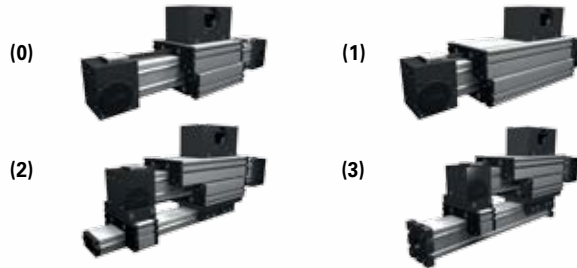
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Choice of guide body profile:

- (0) Standard (2) corrosion-protected guide rods and screws
- (4) expanded corrosion-protected version (depending on the availability of components)

0

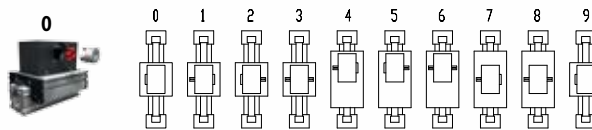
Choice of carriages:



	VERSION 1		VERSION 2		VERSION 3	
	Q	L	Q	L	Q	L
40	257	360	257	360	257	360
60	353	480	353	480	353	480
60S	379	506	379	506	379	506
80	469	659	469	659	469	659
80S	489	679	489	679	489	679
100	575	795	575	795	575	795

0

Drive version:



The standard version is supplied without shaft. A shaft can be retrofitted by inserting it into the pulley bore and securing it with 2 locking rings or tension sets (size 80 + 100).

Version 9 is the same as 0, but with double sided coupling claw.

Belt table

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 4	40	5M25	130	26
0 7	60 (S)	8M30	192	24
0 9	80 (S)	8M50	256	32
1 0	100	8M70	304	38

Shaft dimensions

SIZE	SHAFT Ø h6 x length	KEY
40	14 x 35	5x5x28
60 (S)	18 x 45	6x6x40
80 (S)	22 x 45	6x6x40
100	30 x 55	8x7x40

**L + 1/2 stroke = total length

ELZT 60 6 0 0 0 0 4 1 01500

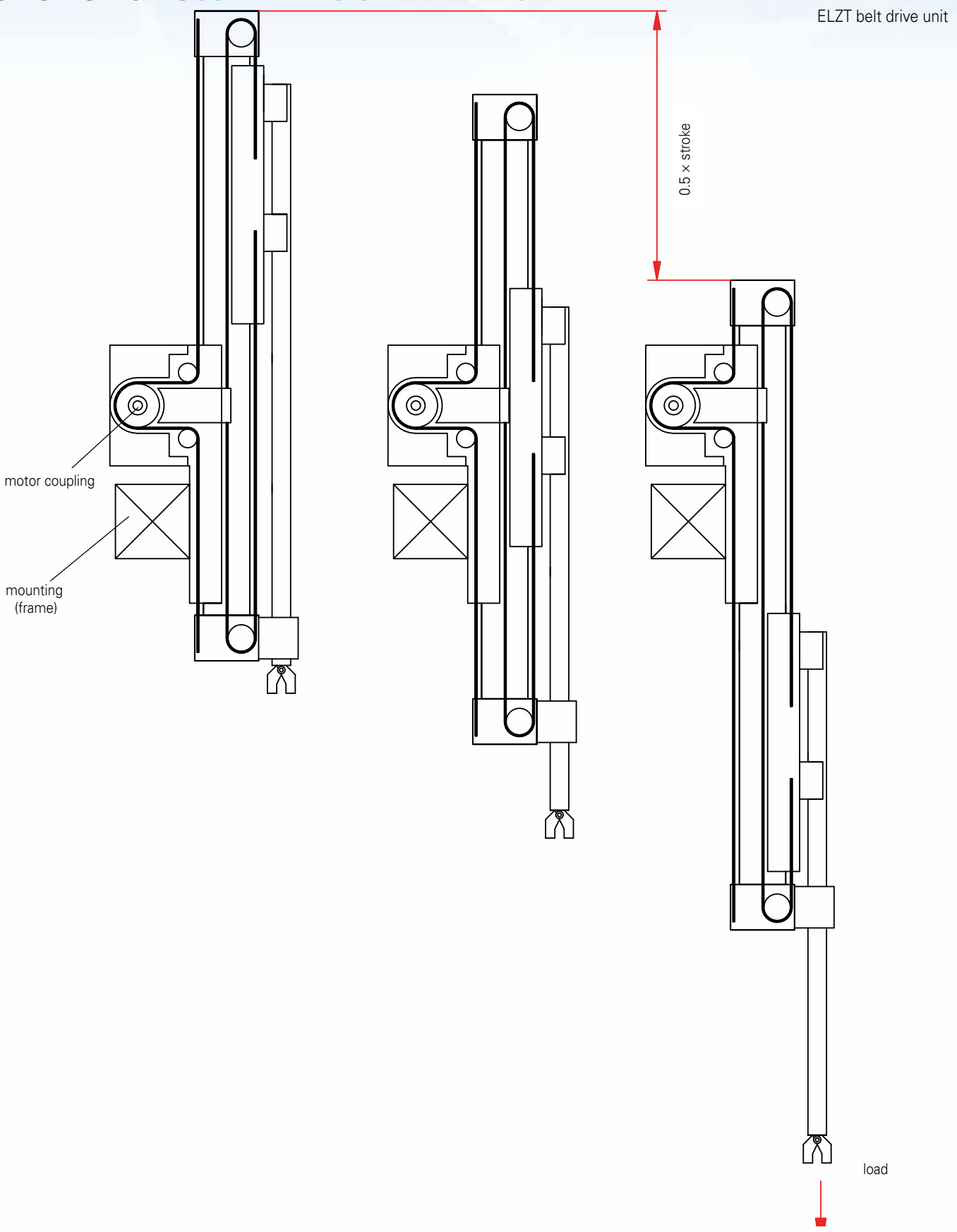
Pos. 1 2 3 4 5 6 7

For mounting hardware and other accessories, refer to pages 134 to 153.

Sample ordering code: ELZT 60 with standard body profile, standard carriage and coupling claw on one side, 2,310 mm stroke

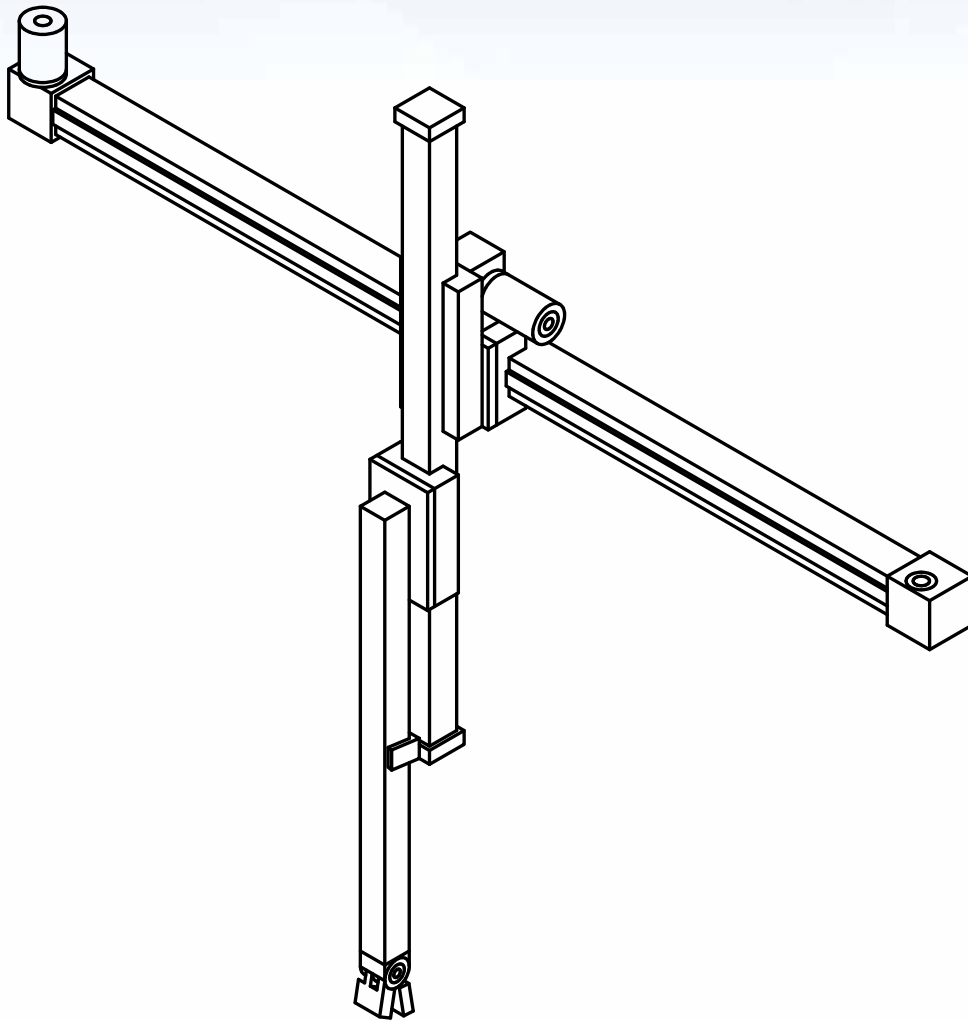
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FUNCTION & POSSIBILITIES OF VARIATION



MODULAR LINEAR ACTUATORS BELT DRIVEN

ELZT belt drive unit



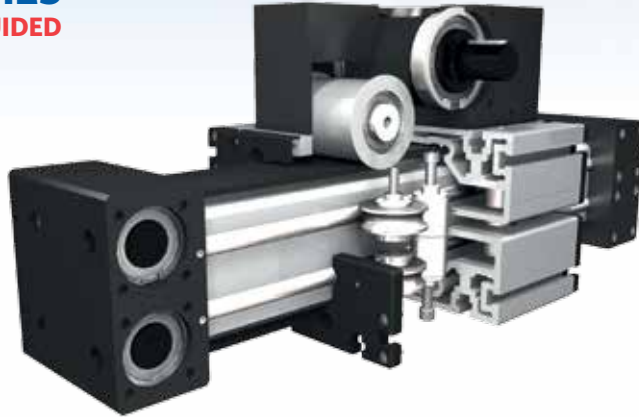
BELT DRIVEN



Nook Modular Linear Actuators used in a plasma cutting application.

ELFZ 60S, 80S, 100, 125

EXTERNAL ROLLER BEARING GUIDED
EXTERNAL BELT DRIVEN

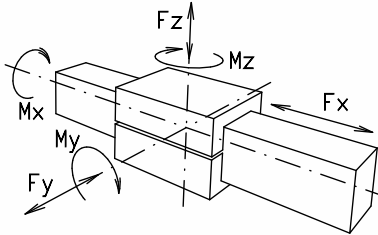


Function:

This special lifting unit consists of an aluminium square profile with hardened steel guide rods. The carriages, which have internal linear ball bearings that can be adjusted free of play, are driven along the guide rods by a timing belt. The rotating timing belt pulleys have maintenance-free ball bearings. One rotation of the drive pulley complies with 1/2 linear circumference of the drive pulley. Belt tension can be readjusted by a simple tensioning device in one of the carriages. This device can also be used for symmetrical adjustment of two or more linear units running parallel.

- Fitting position: As required. Max. length without joints 6,000 mm.
- Carriage mounting: By T-slots.
- Unit mounting: By T-slots or tapped holes in the bearing blocks, or mounting sets.
- Belt type: HTD with steel reinforcement, no backlash when changing direction, repeatability ± 0.1 mm.

FORCES AND TORQUES



FORCES/TORQUES	ELFZ 60S		ELFZ 80S		ELFZ 100		ELFZ 125	
	static	dynamic	static	dynamic	static	dynamic	static	dynamic
F_x (N)	3,600	3,200	6,200	5,400	8,700	7,600	12,000	10,400
F_y (N)	8,200	6,200	9,200	7,200	16,000	13,000	24,000	18,000
F_z (N)	4,320	3,200	6,000	3,600	7,200	4,400	12,000	9,000
M_x (Nm)	176	130	340	280	600	460	1,200	900
M_y (Nm)	380	280	540	460	800	540	1,500	1,200
M_z (Nm)	460	340	600	440	1,500	1,000	2,700	2,300

All forces and torques relate to the following:

$$\begin{matrix} \text{existing values} & \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1 \\ \text{table values} & \end{matrix}$$

NO-LOAD TORQUE

Nm	1.3	1.5	2	2
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SPEED

(m/s) max	4	4	4	4
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DRIVE TORQUE

max (Nm)	48	120	386	500
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MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	6.79×10 ⁵	1.89×10 ⁶	4.44×10 ⁶	10.15×10 ⁶
I_y mm ⁴	6.97,10 ⁵	1.89,10 ⁶	4.48×10 ⁶	10.15×10 ⁶
E-Modulus N/mm ²	70,000	70,000	70,000	70,000

Formula: ELFZ

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_f}{2,000 \cdot \pi^2} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

- F = force (N)
- P = pulley action perimeter (mm)
- S_f = safety factor 1.2 ... 2
- M_{leer} = no-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

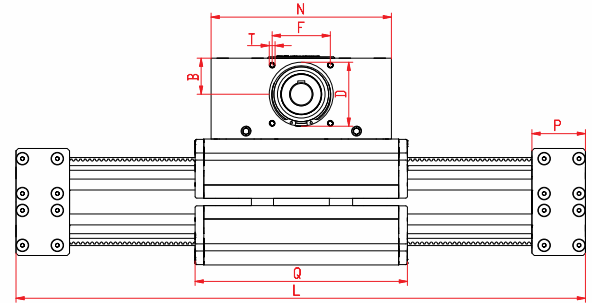
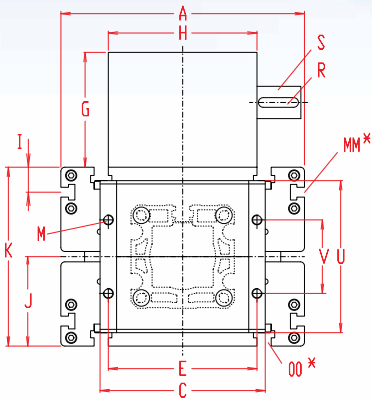
$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000 (N/mm²)
- I = second moment of area (mm⁴)

MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.

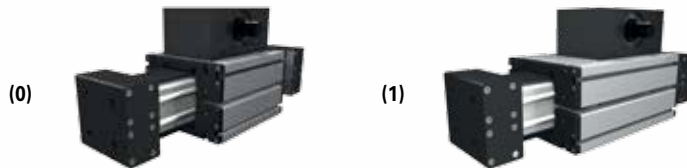
*For slide nuts refer to page 136

BELT DRIVEN

SIZE	L**	A	B	C	D	E	F	G	H	I	J	K	MM for	M	N	OO for	P	Q	R	S	T	U	V	BASIC WEIGHT	WEIGHT per 100 mm
ELFZ 60S	410	170	38	108	68	97	60	102	100	-	53	106	-	M8	180	M8	97	214	6x6x40	18x45	M8	97	60	23.1 kg	0.64 kg
ELFZ 80S	580	190	60	126	90	106	80	139	130	12.5	71	142	M6	M10	270	M8	130	315	8x7x40	30x45	M10	130	70	51 kg	1.20 kg
ELFZ 100	530	230	62	170	110	150	100	143	160	29	89	178	M10	M10	310	M10	77	365	12x8x50	40x55	M10	150	80	69 kg	1.80 kg
ELFZ 125	560	295	62	200	110	180	100	139	180	30	107.5	218	M10	M12	310	M12	92	365	12x8x50	40x55	M10	186	89	87.5 kg	2.70 kg

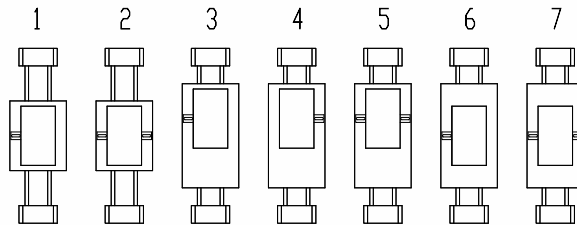
- 0 Choice of guide body profile:**
 (0) Standard (2) corrosion-protected guide rods and screws
 (4) expanded corrosion-protected version (depending on the availability of components)

- 0 Choice of carriages:**



	VERSION 1	
	Q	L
60S	380	580
80S	489	750
100	575	740
125	640	830

- 1 Drive version:**



Belt table

CODE	SIZE	BELT	MM/REV. ≈ LINEAR	NUMBER OF TEETH
0 3	60S	8M30	192 ≈ 96	24
0 4	80S	8M50	256 ≈ 128	32
0 7	100	8M70	304 ≈ 152	38
0 9	125	8M,100	304 ≈ 152	38

Shaft dimensions

SIZE	SHAFT Ø h6 x length	KEY
60S	18 x 45	6x6x40
80S	30 x 45	8x7x40
100	40 x 55	12x8x50
125	40 x 55	12x8x50

**L + Stroke + Overtravel = Total Length

ELFZ 125 0 0 0 1 0 9 1 01500
 Pos. 1 2 3 4 5 6 7

For mounting hardware and other accessories, refer to pages 134 to 153.

Sample ordering code: ELFZ 125 with standard body profile, standard carriage, shaft Pos. 1, 940 mm stroke

ELFZex 60S, 80S, 100, 125

EXTERNAL ROLLER BEARING GUIDED
EXTERNAL BELT DRIVEN
EXPLOSION-PROOF



ATEX 95
 II 2G c IIB T4
 II 3D T125°C

Function:

Like ELFZ. The positioning system is suitable for use according to the intended purpose in potentially explosive areas (see ATEX 95 marking). An operating manual is included in the scope of delivery. The system is certified for the following areas:

ATEX 95 II 2G EEx c IIB T4:

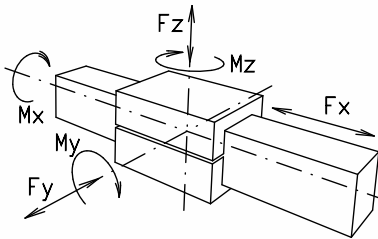
All application areas except for underground mining. Gas atmosphere category 2, explosion protection category: protection due to secure construction (design security). Equipment group IIB. Temperature class T4=135°C

ATEX 95 II 3D T,125°C:

All application areas except for underground mining. Dust atmosphere category 3. Maximum permissible surface temperature: 125°C.

- Fitting position: As required. Max. length without joints 3,000 mm.
- Carriage mounting: By T-slots.
- Unit mounting: By T-slots or tapped holes in the bearing blocks, or mounting sets.
- Belt type: HTD with steel reinforcement, no backlash when changing direction, repeatability ± 0.1 mm.

FORCES AND TORQUES



FORCES/TORQUES	ELFZex 60S		ELFZex 80S		ELFZex 100		ELFZex 125	
	static	dynamic	static	dynamic	static	dynamic	static	dynamic
F _x (N)	1,800	1,550	3,000	2,600	4,200	3,650	6,000	5,200
F _y (N)	3,820	3,056	4,438	3,550	6,200	4,960	9,960	7,968
F _z (N)	1,870	1,496	1,052	842	1,292	1,043	2,190	1,752
M _x (Nm)	104	82	134	108	202	162	440	352
M _y (Nm)	132	106	154	140	272	218	560	448
M _z (Nm)	274	220	364	292	652	520	1,272	1,018

All forces and torques relate to the following:

$$\frac{\text{existing values}}{\text{table values}} \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Nm	1.2	1.5	2	2
----	-----	-----	---	---

SPEED

(m/s) max	1	1	1	1
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DRIVE TORQUE

max (Nm)	27	62	101	145
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MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I _x mm ⁴	6.79×10 ⁵	1.89×10 ⁶	4.44×10 ⁶	10.15×10 ⁶
I _y mm ⁴	6.97×10 ⁵	1.89×10 ⁶	4.48×10 ⁶	10.15×10 ⁶
E-Modulus N/mm ²	70,000	70,000	70,000	70,000

Formula: ELFZ

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_i}{2,000 \cdot \pi \cdot 2} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

F = force (N)
 P = pulley action perimeter (mm)
 S_i = safety factor 1.2 ... 2
 M_{leer} = no-load torque (Nm)
 n = rpm pulley (min⁻¹)
 M_a = driving torque (Nm)
 P_a = motor power (KW)

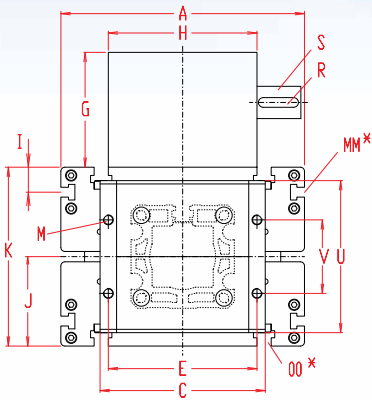
$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000 (N/mm²)
- I = second moment of area (mm⁴)

MODULAR LINEAR ACTUATORS

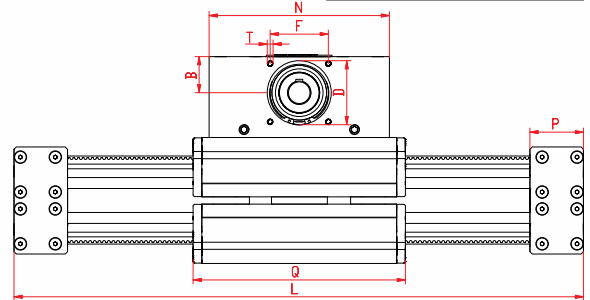
BELT DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.

ATEX 95
 II 2G c IIB T4
 II 3D T125°C



*For slide nuts refer to page 136

SIZE	L**	A	B	C	D	E	F	G	H	I	J	K	MM for	M	N	OO for	P	Q	R	S	T	U	V	BASIC WEIGHT	WEIGHT per 100 mm
ELFZex 60S	430	170	38	108	68	97	60	102	100	-	53	106	-	M8	180	M8	97	214	6×6×40	18×45	M8	97	60	23.2 kg	0.64 kg
ELFZex 80S	600	190	60	126	90	106	80	139	130	12.5	71	142	M6	M10	270	M8	130	315	8×7×40	30×45	M10	130	70	51 kg	1.20 kg
ELFZex 100	560	230	62	170	110	150	100	143	160	29	89	178	M10	M10	310	M10	77	365	12×8×50	40×55	M10	150	80	69 kg	1.80 kg
ELFZex 125	590	295	62	200	110	180	100	139	180	30	107.5	218	M10	M12	310	M12	92	365	12×8×50	40×55	M10	186	89	87.5 kg	2.70 kg

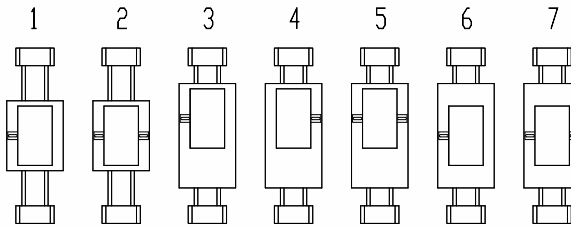
- 0** Choice of guide body profile:
 (0) Standard (2) corrosion-protected guide rods and screws
 (4) expanded corrosion-protected version (depending on the availability of components)

- 0** Choice of carriages:



	VERSION 1	
	Q	L
60S	380	600
80S	489	770
100	575	770
125	640	860

- 1** Drive version:



Belt table

CODE	SIZE	BELT	MM/REV. ≈ LINEAR	NUMBER OF TEETH
0 3	60S	8M30	192 ≈ 96	24
0 4	80S	8M50	256 ≈ 128	32
0 7	100	8M70	304 ≈ 152	38
0 9	125	8M,100	304 ≈ 152	38

Shaft dimensions

SIZE	SHAFT	
	Ø h6 × length	KEY
60S	18 × 45	6×6×40
80S	30 × 45	8×7×40
100	40 × 55	12×8×50
125	40 × 55	12×8×50

**L + Stroke + Overtravel = Total Length

ELFZex 125 0 0 0 1 0 9 1 01500

Pos. 1 2 3 4 5 6 7

For mounting hardware and other accessories, refer to pages 134 to 153.

Sample ordering code: ELFZ 125 with standard body profile, standard carriage, shaft Pos. 1, 910 mm stroke

ELHZ 60, 60S, 80, 80S, 100, 125

EXTERNAL ROLLER BEARING GUIDED
INTERNAL BELT DRIVEN



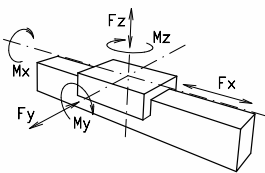
Function:

This linear unit consists of an aluminium square profile with integrated, hardened steel guide rods. The carriage, which has internal linear ball bearings that can be adjusted free of play, is driven along the guide rods by a timing belt. Toothed pulley has maintenance-free ball bearings. Belt tension can be readjusted by a simple screw adjustment device in the carriage. This device can also be used for symmetrical adjustment of two or more linear units running parallel.

This linear unit is suitable for application in clean rooms of clean-room classification 1,000 (corresponding to US Fed. Standard 209 E).

- Fitting position: As required. Max. length 3,000 mm without joints.
- Carriage mounting: By T-slots.
- Unit mounting: By tapped holes or tapped holes in the bearing block, mounting sets.
- Belt type: HTD with steel reinforcement, no backlash when changing direction, repeatability ± 0.1 mm.

FORCES AND TORQUES



	ELHZ 60		ELHZ 60 S		ELHZ 80		ELHZ 80 S		ELHZ 100		ELHZ 125	
FORCES/TORQUES	static	dynam.	static	dynam.	static	dynam.	static	dynam.	static	dynam.	static	dynam.
F_x (N)	700	580	700	580	1,000	840	1,000	840	3,100	2,600	5,000	4,950
F_y (N)	3,000	2,000	4,100	3,100	3,000	2,000	4,600	3,600	8,000	6,500	12,000	9,000
F_z (N)	1,700	1,100	2,160	1,600	1,700	1,100	3,000	1,800	3,600	2,200	6,000	4,500
M_x (Nm)	67	43	88	65	90	55	170	140	300	230	600	450
M_y (Nm)	90	70	190	140	110	80	270	230	400	270	750	600
M_z (Nm)	120	100	230	170	150	120	300	220	750	500	1,350	1,150

All forces and torques relate to the following:

$$\frac{\text{existing values}}{\text{table values}} \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Nm	0.5	0.5	0.8	1.2	1.2	1.6
----	-----	-----	-----	-----	-----	-----

SPEED

(m/s) max	3	4	4	4	5	6
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TENSILE FORCE

permanent (N)	700	700	1,000	1,000	3,100	5,000
0.2 s (N)	800	800	1,150	1,150	3,400	5,450

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	6.79×10^5	6.79×10^5	18.99×10^5	18.99×10^5	44.4×10^5	101.5×10^5
I_y mm ⁴	6.97×10^5	6.97×10^5	18.97×10^5	18.97×10^5	44.8×10^5	101.5×10^5
E-Modulus N/mm ²	70,000	70,000	70,000	70,000	70,000	70,000

Formula: ELHZ

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_i}{2,000 \cdot \pi} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

- F = force (N)
- P = pulley action perimeter (mm)
- S_i = safety factor 1.2 ... 2
- M_{leer} = no-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

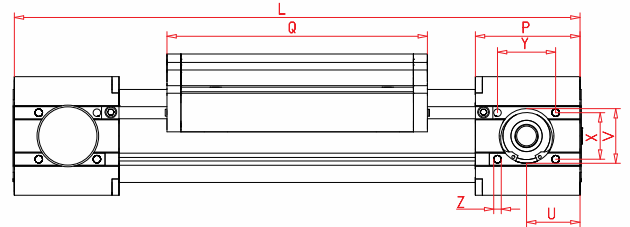
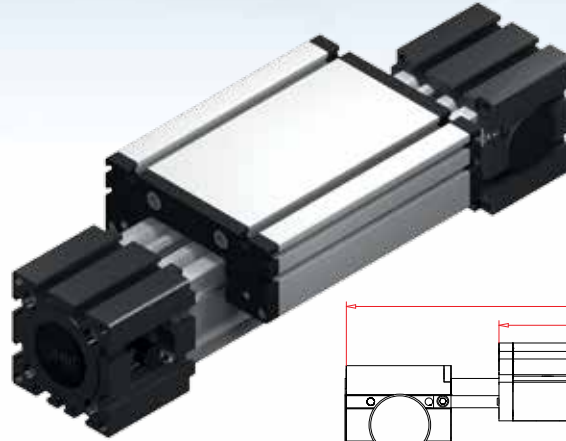
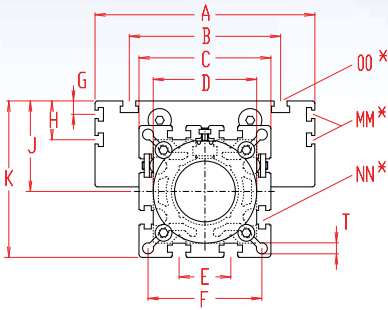
$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000 (N/mm²)
- I = second moment of area (mm⁴)

MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.

*For slide nuts refer to page 136

BELT DRIVEN

SIZE	L**	A	B	C	D	E	F	G	H	J	K	MM for	NN for	OO for	P	Q	T	U	V	W1	X	Y	Z	BASIC WEIGHT	WEIGHT per 100 mm
ELHZ 60	290	144	96	82	62x1	30	69	-	-	49	90	-	M 8	M 8	59	168	8.5	23	37	14	30	36	M 6	4.8 kg	0.62 kg
ELHZ 60S	315	170	108	82	62x1	30	69	-	-	53	94	-	M 8	M 8	59	194	8.5	23	37	14	30	36	M 6	5.8 kg	0.62 kg
ELHZ 80	375	170	117	102	80x1	40	88	10	30	70	121	M 6	M 10	M 10	90	194	8.5	38	47	18	40	50	M 8	10.0 kg	1.00 kg
ELHZ 80S	395	190	126	102	80x1	40	88	12.5	30	71	122	M 6	M 10	M 8	90	214	8.5	38	47	18	40	50	M 8	11.0 kg	1.00 kg
ELHZ 100	530	230	155	130	110x1	50	112	-	29	89	154	M 10	M 10	M 10	110	300	10.5	45	68	19	50	64	M 10	24.0 kg	1.60 kg
ELHZ 125	630	295	200	165	130x2	60	142	-	30	107.5	190	M 10	M 10	M 12	132	365	13.0	58	90	35	60	85	M 10	37.0 kg	2.10 kg

W1 = standard shaft

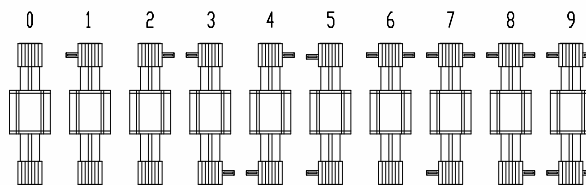
- 0** Choice of guide body profile:
 (0) Standard (2) corrosion-protected guide rods and screws
 (4) expanded corrosion-protected version (depending on the availability of components)

- 0** Choice of carriages:



	VERSION 1	
	Q	L
60	184	306
60S	214	336
80	210	391
80S	234	415
100	316	546
125	389	649

- 0** Drive version:



The standard version 0 is supplied with 4 flush mounted shafts.

Belt table

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 4	60 (S)	5M 25	80	16
0 4	80 (S)	5M 25	110	22
0 9	100	8M 48	144	18
0 9	125	8M 50	192	24

Shaft dimensions

SIZE	SHAFT Ø h6 x length	KEY
60 (S)	14 x 35	5x5x28
80 (S)	18 x 45	6x6x40
100	22 x 45	6x6x40
125	30 x 55	8x7x50

**L + Stroke + Overtravel = Total Length

ELHZ 60 0 0 0 0 0 4 1 01500
 Pos. 1 2 3 4 5 6 7

For mounting hardware and other accessories, refer to pages 134 to 153.

Sample ordering code: ELHZ 60, with standard body profile, standard carriage and 4 flush mounted shafts, 1,210 mm stroke.

ELVZ 60, 60S, 80, 80S, 100, 125

EXTERNAL ROLLER BEARING GUIDED
INTERNAL BELT DRIVEN



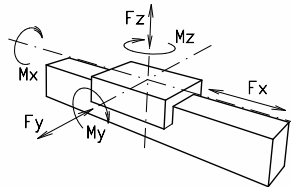
Function:

This linear unit consists of an aluminium square profile with integrated, hardened steel guide rods. The carriage, which has internal linear ball bearings that can be adjusted free of play, is driven along the guide rods by a toothed belt. Toothed pulley has maintenance-free ball bearings. Belt tension can be readjusted by a simple screw adjustment device in the carriage. This device can also be used for symmetrical adjustment of two or more linear units running parallel.

This linear unit is suitable for application in clean rooms of clean-room classification 1,000 (corresponding to US Fed. Standard 209 E).

- Fitting position: As required. Max. length 3,000 mm without joints.
- Carriage mounting: By T-slots.
- Unit mounting: By tapped holes or tapped holes in the bearing block, mounting sets.
- Belt type: HTD with steel reinforcement, no backlash when changing direction, repeatability ± 0.1 mm.

FORCES AND TORQUES



FORCES/TORQUES	ELVZ 60		ELVZ 60 S		ELVZ 80		ELVZ 80 S		ELVZ 100		ELVZ 125	
	static	dynam.	static	dynam.	static	dynam.	static	dynam.	static	dynam.	static	dynam.
F_x (N)	700	580	700	580	1,000	840	1,000	840	3,100	2,600	5,000	4,950
F_y (N)	3,000	2,000	4,100	3,100	3,000	2,000	4,600	3,600	8,000	6,500	12,000	9,000
F_z (N)	1,700	1,100	2,160	1,600	1,700	1,100	3,000	1,800	3,600	2,200	6,000	4,500
M_x (Nm)	67	43	88	65	90	55	170	140	300	230	600	450
M_y (Nm)	90	70	190	140	110	80	270	230	400	270	750	600
M_z (Nm)	120	100	230	170	150	120	300	220	750	500	1,350	1,150

All forces and torques relate to the following:

$$\frac{\text{existing values}}{\text{table values}} \cdot \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Nm	0.5	0.5	0.8	1.2	1.2	1.6
----	-----	-----	-----	-----	-----	-----

SPEED

(m/s) max	3	4	4	4	5	6
-----------	---	---	---	---	---	---

TENSILE FORCE

permanent (N)	700	700	1,000	1,000	3,100	5,000
0.2 s (N)	800	800	1,150	1,150	3,400	5,450

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	6.79×10^5	6.79×10^5	18.99×10^5	18.99×10^5	44.4×10^5	101.5×10^5
I_y mm ⁴	6.97×10^5	6.97×10^5	18.97×10^5	18.97×10^5	44.8×10^5	101.5×10^5
E-Modulus N/mm ²	70,000	70,000	70,000	70,000	70,000	70,000

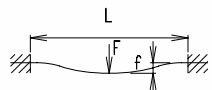
Formula: ELVZ

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_s}{2,000 \cdot \pi} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

- F = force (N)
- P = pulley action perimeter (mm)
- S_s = safety factor 1.2 ... 2
- M_{leer} = no-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

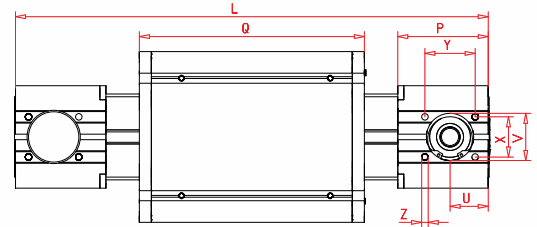
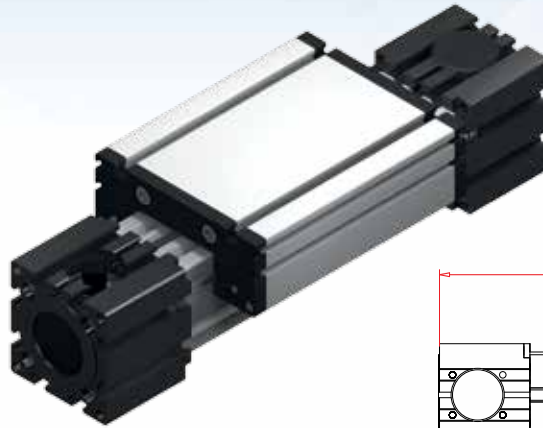
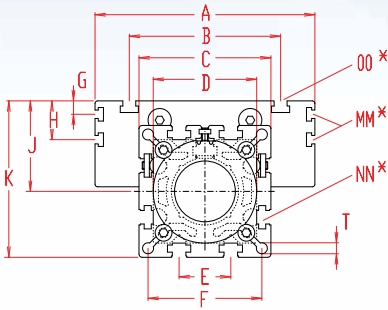
$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$


- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000 (N/mm²)
- I = second moment of area (mm⁴)

MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount

*For slide nuts refer to page 136

SIZE	L**	A	B	C	D	E	F	G	H	J	K	MM for	NN for	OO for	P	Q	T	U	V	W1	X	Y	Z	BASIC WEIGHT	WEIGHT per 100 mm
ELVZ 60	290	144	96	82	62x1	30	69	-	-	49	90	-	M8	M8	59	168	8.5	23	37	14	30	36	M6	4.8 kg	0.62 kg
ELVZ 60S	315	170	108	82	62x1	30	69	-	-	53	94	-	M8	M8	59	194	8.5	23	37	14	30	36	M6	5.8 kg	0.62 kg
ELVZ 80	375	170	117	102	80x1	40	88	10	30	70	121	M6	M10	M10	90	194	8.5	38	47	18	40	50	M8	10.0 kg	1.00 kg
ELVZ 80S	395	190	126	102	80x1	40	88	12.5	30	71	122	M6	M10	M8	90	214	8.5	38	47	18	40	50	M8	11.0 kg	1.00 kg
ELVZ 100	530	230	155	130	110x1	50	112	-	29	89	154	M10	M10	M10	110	300	10.5	45	68	19	50	64	M10	24.0 kg	1.60 kg
ELVZ 125	630	295	200	165	130x2	60	142	-	30	107.5	190	M10	M10	M12	130	365	13	58	90	35	60	85	M10	37.0 kg	2.10 kg

W1 = standard shaft



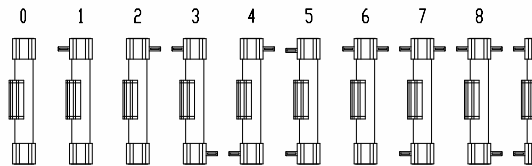
- 0** Choice of guide body profile:
(0) Standard **(2)** corrosion-protected guide rods and screws
(4) expanded corrosion-protected version (depending on the availability of components)

- 0** Choice of carriages:



	VERSION 1	
	Q	L
60	184	306
60S	214	336
80	210	391
80S	234	415
100	316	546
125	389	649

- 0** Drive version:



The standard version 0 is supplied with 4 flush mounted shafts.

Belt table

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 4	60 (S)	5M 25	80	16
0 4	80 (S)	5M 25	110	22
0 9	100	8M 48	144	18
0 9	125	8M 50	192	24

Shaft dimensions

SIZE	SHAFT	
	Ø h6 x length	KEY
60 (S)	14 x 35	5x5x28
80 (S)	18 x 45	6x6x40
100	22 x 45	6x6x40
125	30 x 55	8x7x50

**L + Stroke + Overtravel = Total Length

ELVZ 60 1 0 0 0 0 4 1 01500
 Pos. 1 2 3 4 5 6 7

For mounting hardware and other accessories, refer to pages 134 to 153.

Sample ordering code: ELVZ 60 with belt connection right, standard body profile, standard carriage and 4 flush mounted shafts, 1,210 mm stroke.

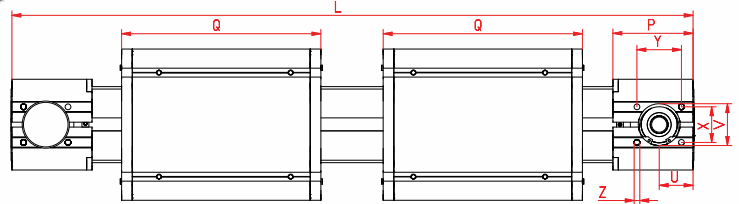
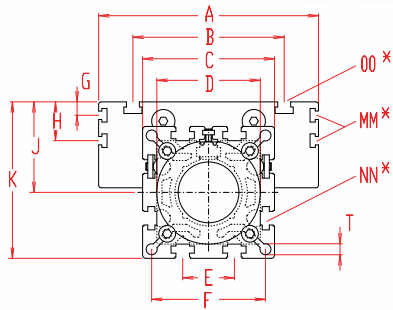
ELVZ 60, 60S, 80, 80S, 100, 125 (continued)

EXTERNAL ROLLER BEARING GUIDED

INTERNAL BELT DRIVEN

WITH TWO CARRIAGES MOVING IN OPPOSITE DIRECTIONS

Dimensions (mm)

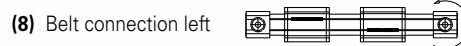


Increasing the carriage length will increase the basic length by the same amount

*For slide nuts refer to page 136

SIZE	L**	A	B	C	D	E	F	G	H	J	K	MM for	NN for	OO for	P	Q	T	U	V	W ¹	X	Y	Z	BASIC WEIGHT	WEIGHT per 100 mm
ELVZ 60	460	144	96	82	62x1	30	69	--	--	49	90	--	M8	M8	59	168	8.5	23	37	14	30	36	M6	6.5 kg	0.62 kg
ELVZ 60S	510	170	108	82	62x1	30	69	--	--	53	94	--	M8	M8	59	194	8.5	23	37	14	30	36	M6	8.5 kg	0.62 kg
ELVZ 80	570	170	117	102	80x1	40	88	10	30	70	121	M6	M10	M10	90	194	8.5	38	47	18	40	50	M8	13.0 kg	1.00 kg
ELVZ 80S	610	190	123	102	80x1	40	88	12.5	30	71	122	M6	M10	M8	90	214	8.5	38	47	18	40	50	M8	15.0 kg	1.00 kg
ELVZ 100	830	230	155	130	110x1	50	112	--	29	89	154	M10	M10	M10	110	300	10.5	45	68	19	50	64	M10	31.0 kg	1.60 kg
ELVZ 125	990	295	200	165	130x2	60	142	--	30	107.5	190	M10	M10	M12	130	365	13	58	90	35	60	85	M10	50.5 kg	2.10 kg

W¹ = standard shaft



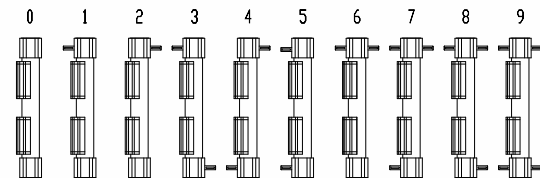
0 Choice of guide body profile:

- (0) Standard (2) corrosion-protected guide rods and screws
- (4) expanded corrosion-protected version (depending on the availability of components)

0 Choice of carriages:



0 Drive version:



	VERSION 1	
	Q	L
60	184	492
60S	214	542
80	210	602
80S	234	650
100	316	862
125	389	1,038

The standard version 0 is supplied with 4 flush mounted shafts.

Belt table

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 4	60 (S)	5M 25	80	16
0 4	80 (S)	5M 25	110	22
0 9	100	8M 48	144	18
0 9	125	8M 50	192	24

Shaft dimensions

SIZE	SHAFT Ø h6 x length	KEY
60 (S)	14 x 35	5x5x28
80 (S)	18 x 45	6x6x40
100	22 x 45	6x6x40
125	30 x 55	8x7x50

**L + Stroke + Overtravel = Total Length

ELVZ 60 7 0 0 0 4 1 01500
Pos. 1 2 3 4 5 6 7

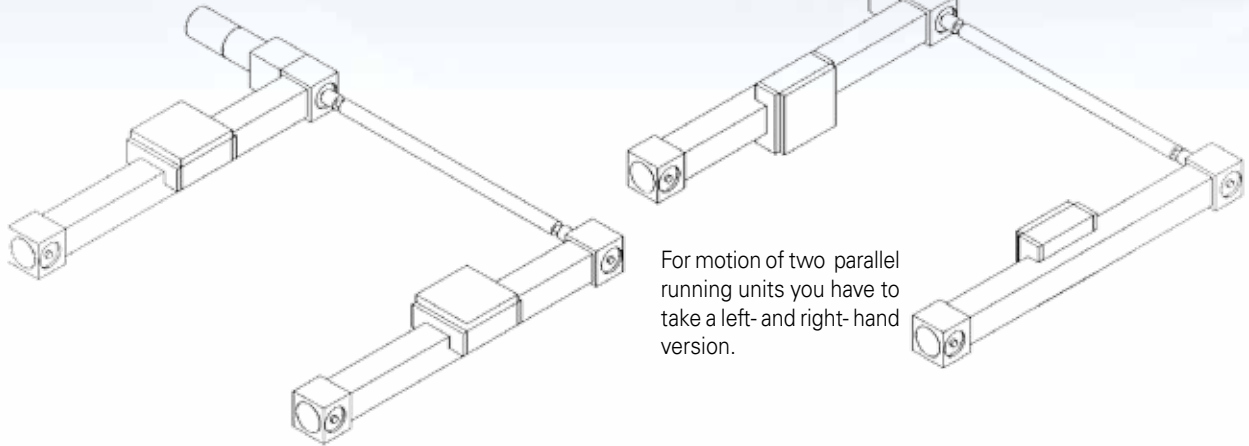
For mounting hardware and other accessories, refer to pages 134 to 153.

Sample ordering code: ELVZ 60 right/left-hand with belt connection right, standard body profile, standard carriage and 4 flush mounted shafts, 1,040 mm stroke

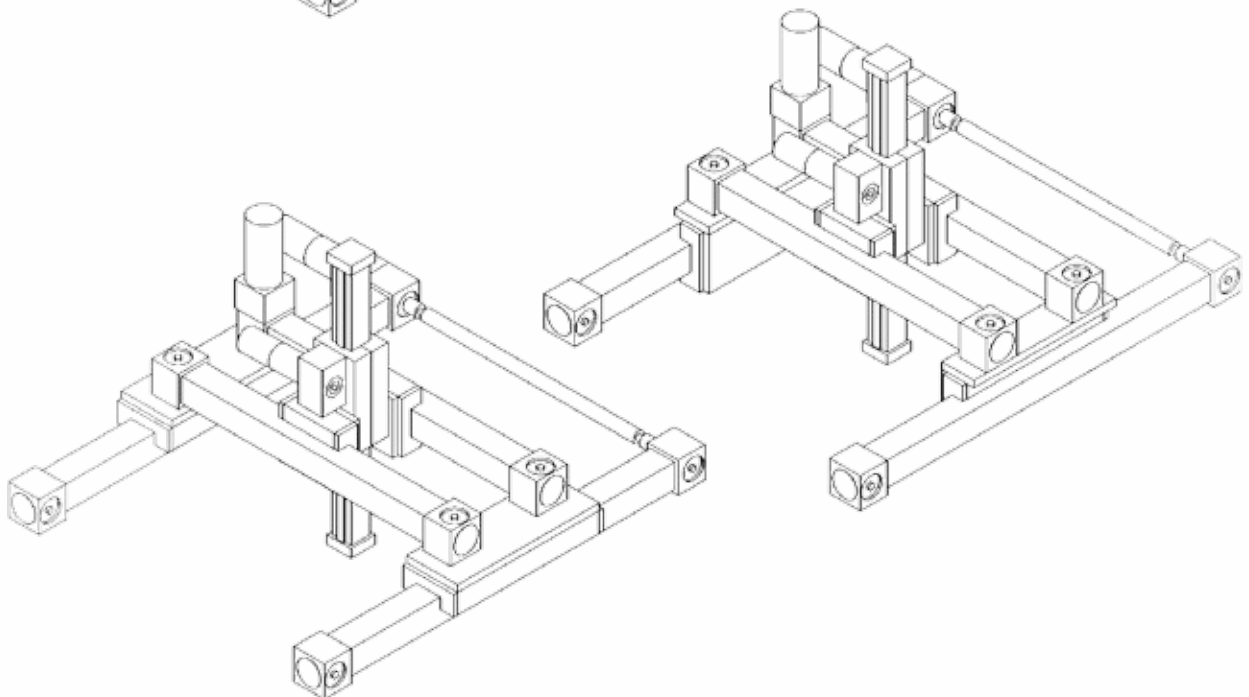
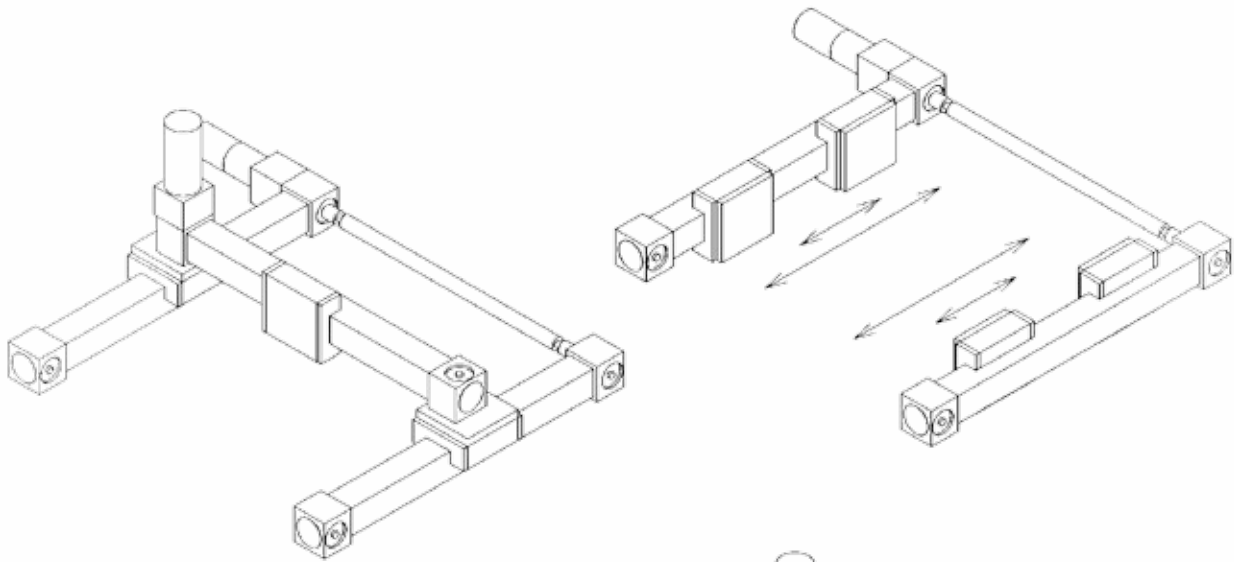
MODULAR LINEAR ACTUATORS BELT DRIVEN

SUGGESTED MOUNTING CONFIGURATIONS

ELHZ, ELVZ belt drive units



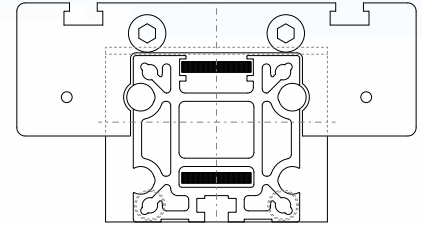
For motion of two parallel running units you have to take a left- and right- hand version.



BELT DRIVEN

MLZ 60, 60S, 80, 80S, 100

EXTERNAL ROLLER BEARING GUIDED
TRAPPED BELT DRIVEN



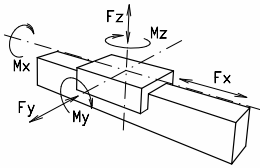
Function:

This linear unit consists of an aluminium square profile with integrated, hardened steel guide rods. The carriage, which has internal linear ball bearings, that can be adjusted free of play, is driven along the guide rods by a timing belt. The advantage of this system is that the belt is guided within the profile, ensuring that the belt is always tight and thus enabling the system to be operated e.g. when lying on its side. The pulleys have maintenance-free ball bearings. Belt tension can be readjusted by a simple screw adjustment device in the carriage. This device can also be used for symmetrical adjustment of two or more linear units running parallel.

- Fitting position: As required, max. length 6,000 mm without joints.
- Carriage mounting: By T-slots.
- Unit mounting: By T-slots or tapped holes in the bearing block, mounting sets.
- Belt type: HTD with steel reinforcement, no backlash when changing direction, repeatability: ± 0.1 mm.

FORCES AND TORQUES

FORCES/TORQUES	MLZ 60		MLZ 60 S		MLZ 80		MLZ 80 S		MLZ 100	
	static	dynamic	static	dynamic	static	dynamic	static	dynamic	static	dynamic
F _x (N)	894	800	894	800	1,900	1,800	1,900	1,800	4,000	3,800
F _y (N)	3,000	2,000	4,100	3,100	3,000	2,000	4,600	3,600	8,000	6,500
F _z (N)	1,700	1,100	2,160	1,600	1,700	1,100	3,000	1,800	3,600	2,200
M _x (Nm)	67	43	88	65	90	55	170	140	300	230
M _y (Nm)	90	70	190	140	110	80	270	230	400	270
M _z (Nm)	120	100	230	170	150	120	300	220	750	500



All forces and torques relate to the following:

$$\frac{\text{existing values}}{\text{table values}} = \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Nm	0.6	0.7	0.9	1.2	1.4
----	-----	-----	-----	-----	-----

SPEED

(m/s) max	5	7	6	8	10
-----------	---	---	---	---	----

TENSILE FORCE

permanent (N)	900	900	1,900	1,900	4,000
0.2 s (N)	1,000	1,000	2,090	2,090	4,300

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I _x mm ⁴	4.83×10 ⁵	4.83×10 ⁵	17.49×10 ⁵	17.49×10 ⁵	39.4×10 ⁵
I _y mm ⁴	5.03×10 ⁵	5.03×10 ⁵	18.02×10 ⁵	18.02×10 ⁵	43.5×10 ⁵
E-Modulus N/mm ²	70,000	70,000	70,000	70,000	70,000

Formula: MLZ

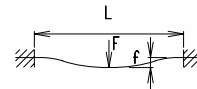
Driving torque:

$$M_a = \frac{F * P * S}{2,000 * \pi} + M_{leer}$$

$$P_a = \frac{M_a * n}{9,550}$$

- F = force (N)
- P = pulley action perimeter (mm)
- S = safety factor 1.2 ... 2
- M_{leer} = no-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

$$f = \frac{F * L^3}{E * I * 192}$$

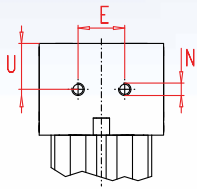


- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000 (N/mm²)
- I = second moment of area (mm⁴)

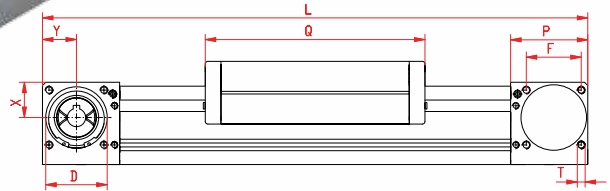
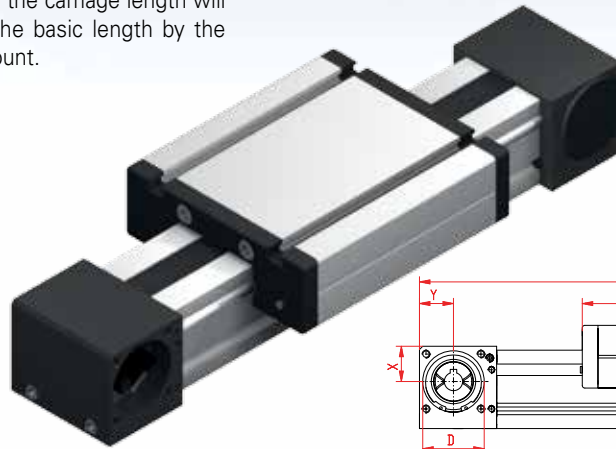
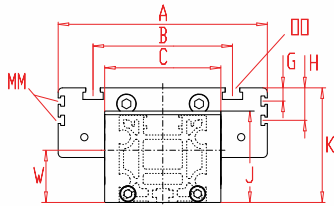
MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.



*For slide nuts refer to page 136

SIZE	L**	A	B	C	D	E	F	G	H	J	K	MM for	OO for	P	Q	T	U	W	X	Y	BASIC WEIGHT	WEIGHT per 100 mm	
MLZ 60	290	144	96	80	47	30	42	-	-	63	79	-	M8	M8	59	168	M6	29.5	36	27	26	4.7 kg	0.6 kg
MLZ 60S	315	170	108	80	47	30	42	-	-	63	83	-	M8	M8	59	194	M6	29.5	30	27	26	5.7 kg	0.6 kg
MLZ 80	375	170	117	100	68	40	60	10	30	93	110	M6	M10	M10	90	194	M8	47.5	40	45	40	9.6 kg	1.0 kg
MLZ 80 S	395	190	126	100	68	40	60	12.5	30	93	111	M6	M10	M8	90	214	M8	47.5	40	45	40	10.8 kg	1.0 kg
MLZ 100	530	230	155	130	90	50	80	-	29	110	139	M10	M12	M10	110	300	M10	55	50	49	50	22.5 kg	1.55 kg

0

Choice of guide body profile:

- (0) Standard (2) corrosion-protected guide rods and screws
- (4) expanded corrosion-protected version (depending on the availability of components)

0

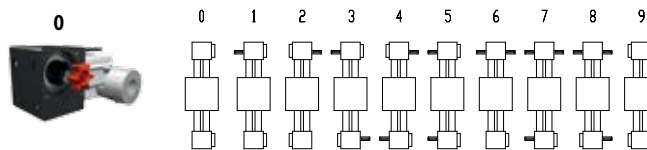
Choice of carriages:



	VERSION 1	
	Q	L
60	184	306
60S	214	336
80	210	391
80S	234	415
100	316	546

0

Drive version:



The standard version is supplied without shaft.

Version 9 is the same as 0, but with double sided coupling claw.

Belt table

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 4	60 (S)	5M25	130	26
0 7	80 (S)	8M30	176	22
0 9	100	8M50	224	28

Shaft dimensions

SIZE	SHAFT Ø h6 × length	KEY
60 (S)	14 × 35	5×5×28
80 (S)	18 × 45	6×6×40
100	22 × 45	6×6×40

**L + Stroke + Overtravel = Total Length

MLZ 60 1 0 0 0 0 4 1 01500
Pos. 1 2 3 4 5 6 7

For mounting hardware and other accessories, refer to pages 134 to 153.

Sample ordering code: MLZ 60 with standard body profile, standard carriage, coupling claw on one side, 1,210 mm stroke.

QLZ 60, 80, 100

INTERNAL ROLLER BEARING GUIDED

TRAPPED BELT DRIVEN

CLEAN ROOM CERTIFIED



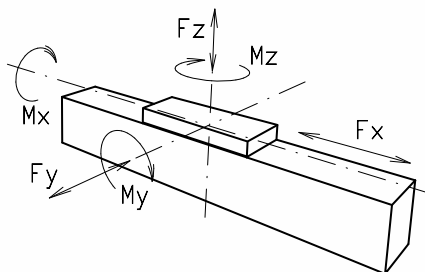
Function:

This unit consists of a square aluminium profile with an integrated roller guide. The carriage is driven by a timing belt. Each standard pulley includes one coupling claw on one side. Belt tension can be readjusted by a simple screw adjustment device in the carriage. This device can also be used for symmetrical adjustment of two or more linear units running parallel.

This linear unit is suitable for application in clean rooms of clean-room classification 1,000 (corresponding to US Fed. Standard 209 E).

- Fitting position: As required. Max. length 6,000 mm without joints.
- Carriage mounting: By T-slots.
- Unit mounting: By T-slots and mounting sets. The linear axis can be combined with any T-slot profile.
- Belt performance: HTD with steel reinforcement, no backlash when changing direction, repeatability ± 0.1 mm.
- Carriage support: In the standard version, the carriage runs on 4 rollers which can be adjusted and serviced at a central servicing position. For longer carriages the number of rollers can be increased.

FORCES AND TORQUES



FORCES/TORQUES	60		80		100	
	static	dynamic	static	dynamic	static	dynamic
F _x (N)	894	800	1,900	1,800	4,000	3,800
F _y (N)	600	500	1,600	1,240	1,900	1,500
F _z (N)	900	650	1,500	1,200	2,100	1,700
M _x (Nm)	15	10	50	40	85	60
M _y (Nm)	60	50	100	80	140	110
M _z (Nm)	40	30	75	60	110	90

All forces and torques related to the following:

$$\frac{\text{existing values}}{\text{table values}} \cdot \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Nm	0.6	0.8	1.2
----	-----	-----	-----

SPEED

(m/s) max	4	6	7
-----------	---	---	---

TENSILE FORCE

permanent (N)	900	1,900	4,000
0.2 s (N)	1,000	2,090	4,300

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I _x mm ⁴	4.3×10 ⁵	16.5×10 ⁵	43.0×10 ⁵
I _y mm ⁴	4.8×10 ⁵	18.7×10 ⁵	48.8×10 ⁵
Elastic modulus N/mm ²	70,000	70,000	70,000

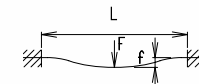
Formula: QLZ

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_f}{2,000 \cdot \pi} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

- F = force (N)
- P = pulley action perimeter (mm)
- S_f = safety factor 1.2 ... 2
- M_{leer} = no-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

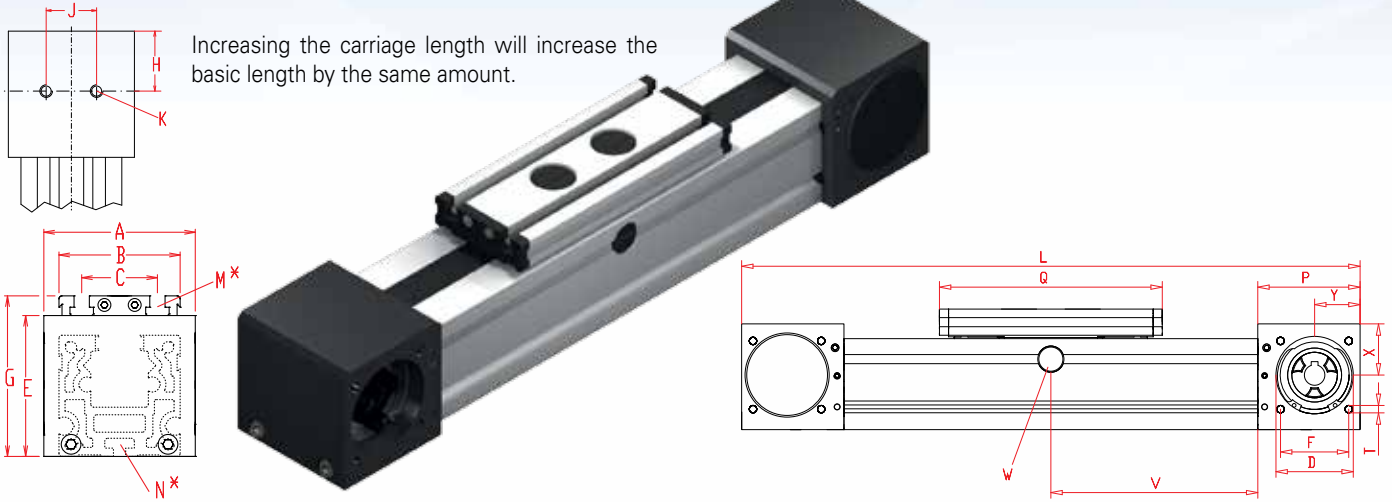
$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$


- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000 (N/mm²)
- I = second moment of area (mm⁴)

MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)



*For slide nuts refer to page 136

$$V = Q + 100 \text{ mm}$$

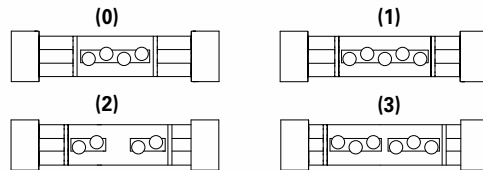
W = servicing position

SIZE	L**	A	B	C	D	E	F	G	H	J	K	N for	M for	P	Q	T	X	Y	BASIC WEIGHT	WEIGHT per 100 mm
QLZ 60	280	80	60	36	47	63	42	79	29.5	30	M8	M5	M6	59	152	M6	27	26	3.2 Kg	0.39 kg
QLZ 80	390	100	80	50	68	93	60	106	47.5	40	M10	M6	M8	90	196	M8	45	40	9.6 Kg	0.86 Kg
QLZ 100	490	130	100	66	90	110	80	129	55	50	M12	M10	M10	110	260	M10	49	50	15.8 kg	1.23 Kg

0 Choice of guide body profile:

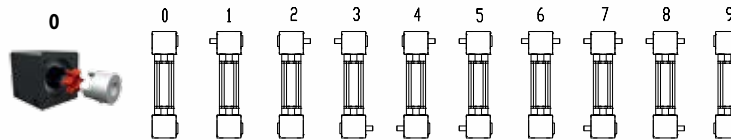
- (0) Standard (2) corrosion-protected guide rods and screws
- (4) expanded corrosion-protected version (depending on the availability of components)

0 Choice of carriages:



	VERSION 0		VERSION 1		VERSION 2		VERSION 3	
	Q	L	Q	L	Q	L	Q	L
60	152	280	192	320	>232	>360	>232	>360
80	196	390	246	440	>296	>490	>296	>490
100	260	490	320	550	>388	>610	>388	>610

0 Drive version:



	SHAFT		KEY
	Ø h6 x length		
60	14 x 35	5x5x28	
80	18 x 45	6x6x40	
100	22 x 45	6x6x40	

9 is as 0, but with coupling claws on both sides. The standard version is supplied without shaft. A shaft can be retrofitted by inserting it into the pulley bore and securing it with 2 locking rings or tension sets (size 100).

Belt table

CODE	SIZE	BELT	PULLEY	
			mm/rev.	Number of teeth
0 3	60	5M25	130	26
0 4	80	8M30	176	22
0 7	100	8M50	224	28

$$**L + \text{Stroke} + \text{Overtravel} = \text{Total Length}$$

For additional accessories refer to pages 134 to 153.

QLZ	80	1	0	0	0	0	4	1	01500
Pos.	1	2	3	4	5	6	7		

Sample ordering code: QLZ80, standard body profile, standard carriage, coupling claw on one side, 1,110 mm stroke

DLZ 120, 160, 200

INTERNAL ROLLER BEARING GUIDED
INTERNAL BELT DRIVEN



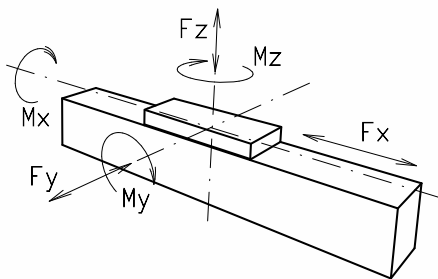
Function:

This unit consists of a rectangular aluminium profile with 2 integrated roller guides. The carriage is moved by a belt drive. Each standard pulley has got one coupling claw on one side. Belt tension can be readjusted by a simple screw adjustment device in the carriage. This device can also be used for symmetrical adjustment of two or more linear units running parallel. The openings of the guide body are sealed with 3 stainless steel cover bands to protect the guide from splash water and dust. Alternatively, the opening can also be covered with a bellow or can be delivered without cover bands.

- Fitting position: As required. Max. length 6,000 mm without joints.
- Carriage mounting: By T-slots.
- Unit mounting: By T-slots and mounting sets. The linear axis can be combined with any T-slot profile.
- Belt type: HTD with steel reinforcement, no backlash when changing direction, repeatability ± 0.1 mm.
- Carriage support: In the standard version, the carriage runs on 8 rollers which can be adjusted and serviced at a central servicing position. For longer carriages the number of rollers can be increased.

FORCES AND TORQUES

FORCES/TORQUES	120		160		200	
	static	dynamic	static	dynamic	static	dynamic
F_x (N)	894	800	1,900	1,800	4,000	3,800
F_y (N)	1,100	900	3,000	2,000	4,400	3,100
F_z (N)	1,250	1,000	3,500	2,800	4,900	4,400
M_x (Nm)	150	125	400	320	600	510
M_y (Nm)	140	120	360	300	560	480
M_z (Nm)	100	90	180	150	310	275



All forces and torques related to the following:

$$\frac{\text{existing values}}{\text{table values}} \left(\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \right) \leq 1$$

NO-LOAD TORQUE

Nm without cover bands	1.2	1.5	1.8
Nm with cover bands	1.6	2.1	4

SPEED

(m/s) max	4	6	8
-----------	---	---	---

TENSILE FORCE

permanent (N)	900	1,900	4,000
0.2 s (N)	1,000	2,090	4,300

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	6.6×10^5	22.2×10^5	63.8×10^5
I_y mm ⁴	38.6×10^5	122.0×10^5	335×10^5
Elastic modulus N/mm ²	70,000	70,000	70,000

Formula: DLZ

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_f}{2,000 \cdot \pi} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

- F = force (N)
- P = pulley action perimeter (mm)
- S_f = safety factor 1.2 ... 2
- M_{leer} = no-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

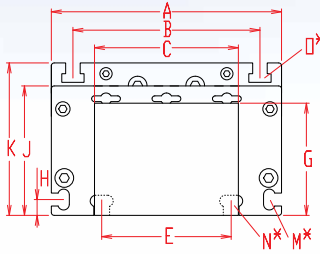
$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000 (N/mm²)
- I = second moment of area (mm⁴)

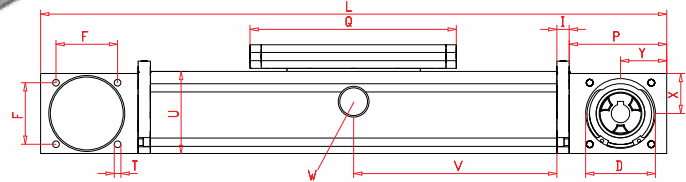
MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.



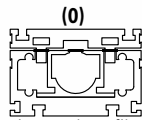
*For slide nuts refer to page 136

$V = Q + 100 \text{ mm}$

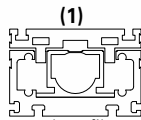
$W = \text{servicing position}$

SIZE	L**	A	B	C	D	E	F	G	H	I	J	K	M for	N for	O for	P	Q	T	U	X	Y	BASIC WEIGHT	WEIGHT per 100 mm
DLZ 120	330	120	96	80	47	78	42	58	10	10	68	79	M 5	M 6	M 6	70	156	M 6	60	28	35	5.1 Kg	0.85 Kg
DLZ 160	440	160	130	100	68	90	60	78	11	12	90	106	M 6	M 8	M 8	95	200	M 8	80	39	45	13.0 kg	1.69 kg
DLZ 200	530	200	160	130	90	140	80	97	15	15	110	129	M 8	M 10	M 10	110	270	M 10	100	49	50	23.4 kg	2.33 kg

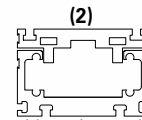
0 Choice of guide body profile:



internal profile with cover bands



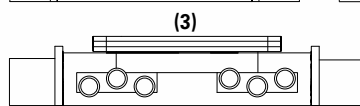
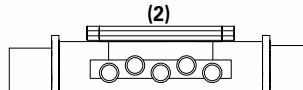
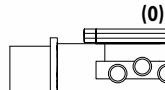
internal profile without cover bands



without internal profile and cover bands

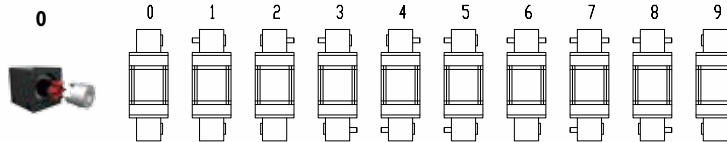
Stainless versions upon request.

0 Choice of carriage:



	VERSION 0		VERSION 2		VERSION 3	
	Q	L	Q	L	Q	L
120	156	330	196	370	>236	>410
160	200	440	250	490	>300	>540
200	270	530	330	600	>410	>680

0 Drive version:



9 is as 0, but with coupling claws on both sides.

The standard version is supplied without shaft. A shaft can be retrofitted by inserting it into the pulley bore and securing it with 2 locking rings or tension sets (size 200).

Belt table

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 4	120	5M25	130	26
0 7	160	8M30	176	22
0 9	160	8M50	176	22
0 9	200	8M50	224	28
1 0	200	8M70	224	28

Shaft dimensions

SIZE	SHAFT $\varnothing h6 \times \text{length}$	KEY
120 (5M25)	14 x 35	5x5x28
160 (8M30)	18 x 45	6x6x40
160 (8M50)	25 x 35	8x7x32
200 (8M50)	22 x 45	6x6x40
200 (8M70)	30 x 55	8x7x50

DLZ 160 1 0 0 0 0 7 1 01500

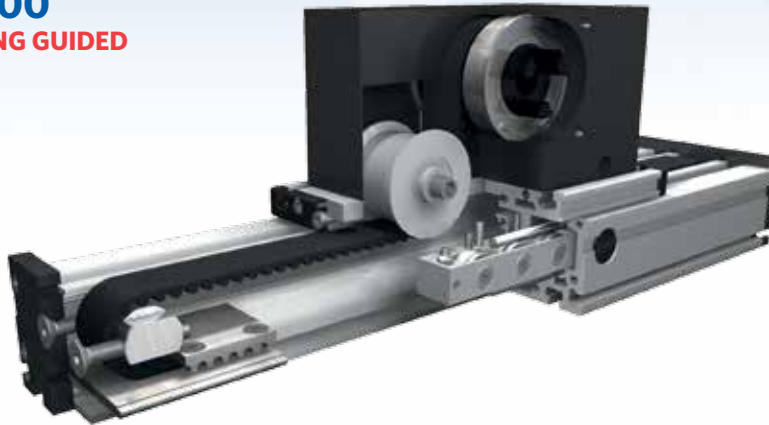
Pos. 1 2 3 4 5 6 7

**L + Stroke + Overtravel = Total Length

Sample ordering code: DLZ, 160 with internal profile and cover bands, standard carriage, coupling claw on one side, 1,060 mm stroke.

DLSZ 120, 160, 200

INTERNAL ROLLER BEARING GUIDED

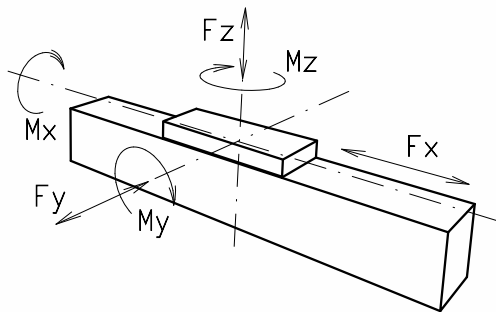


Function:

This linear unit consists of a rectangular aluminium profile with integrated, hardened steel guide rods. The carriage, which has linear ball bearings that can be adjusted free of play, is driven along the guide rods by a timing belt. Each standard pulley includes a coupling claw on one side and is equipped with maintenance-free ball bearings. Belt tension can be readjusted by a simple screw adjustment device in the carriage. This device can also be used for symmetrical adjustment of two or more linear units running parallel.

- Fitting position: As required. Max. length 6,000 mm without joints.
- Carriage mounting: By T-slots.
- Unit mounting: By T-slots and mounting sets. The linear axis can be combined with any T-slot profile.
- Belt performance: HTD with steel reinforcement, no backlash when changing direction, repeatability $\pm 0,1$ mm.
- Carriage support: In the standard version, the carriage runs on 8 rollers which can be adjusted and serviced at a central servicing position. For longer carriages the number of rollers can be increased.

FORCES AND TORQUES



FORCES/TORQUES	120		160		200	
	static	dynamic	static	dynamic	static	dynamic
F_x (N)	1,900	1,800	4,000	3,800	5,900	5,750
F_y (N)	1,100	900	3,000	2,000	4,400	3,100
F_z (N)	1,250	1,000	3,500	2,800	4,900	4,400
M_x (Nm)	150	125	400	320	600	510
M_y (Nm)	140	120	360	300	560	480
M_z (Nm)	100	90	180	150	310	275

All forces and torques related to the following:

$$\frac{\text{existing values}}{\text{table values}} = \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Nm	1.1	1.5	1.8
----	-----	-----	-----

SPEED

(m/s) max	4	6	8
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TENSILE FORCE

permanent (N)	1,900	4,000	5,900
0.2 s (N)	2,090	4,300	6,350

GEOMETRICAL MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	6.6×10^5	2.22×10^6	6.38×10^6
I_y mm ⁴	38.6×10^5	12.20×10^6	33.5×10^6
Elastic modulus N/mm ²	70,000	70,000	70,000

Formula: DLSZ

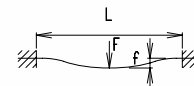
Driving torque:

$$M_a = \frac{F \cdot P \cdot S_f}{2000 \cdot \pi} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9550}$$

- F = force (N)
- P = thread pitch (mm)
- S_f = safety factor 1,2 ... 2
- M_{leer} = no-load torque (Nm)
- n = rpm of screw (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

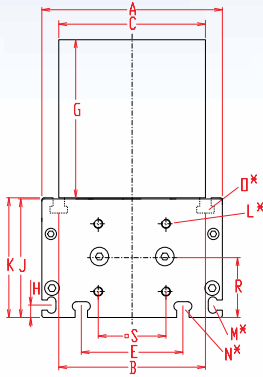


- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000 (N/mm²)
- I = second moment of area (mm⁴)

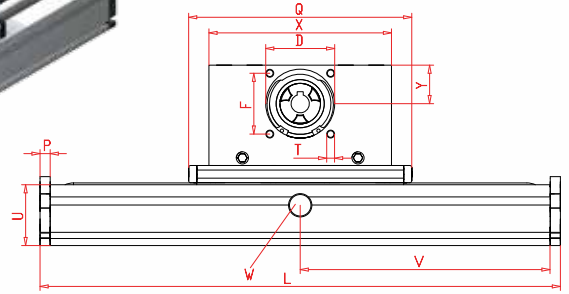
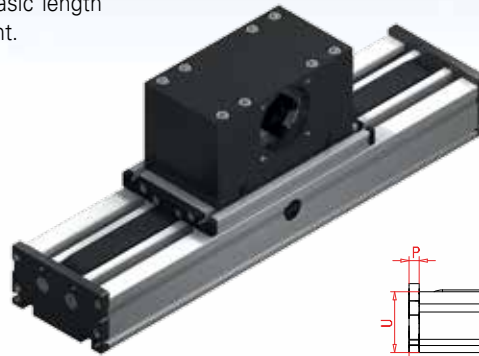
MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.



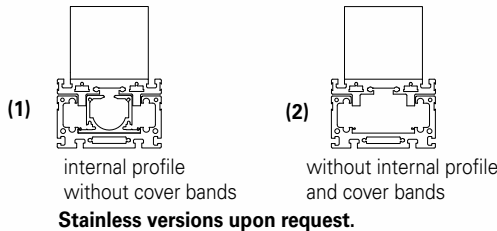
*For slide nuts refer to page 136

V = Q + 100 mm

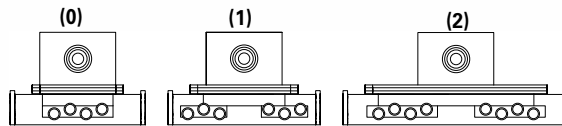
W = servicing position

SIZE	L**	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	X	Y	BASIC WEIGHT	WEIGHT per 100 mm
DLSZ 120	230	120	96	100	68	78	60	100	10	68	79	M 6	M 5	M 6	M 6	10	200	39	42	M 8	60	180	39	12.0 kg	1.2 kg
DLSZ 160	330	160	130	130	90	90	80	130	11	105	106	M 8	M 6	M 8	M 8	12	290	53	60	M 10	80	270	60	27.0 kg	1.8 kg
DLSZ 200	380	200	160	160	110	140	100	145	15	128	129	M 10	M 8	M 10	M 10	15	340	69	95	M 10	100	310	62	53.0 kg	2.6 kg

1 Choice of guide body profile:

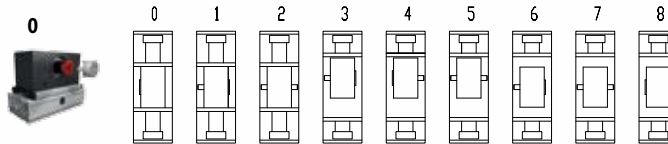


0 Choice of carriages:



	VERSION 0		VERSION 1		VERSION 2	
	Q	L	Q	L	Q	L
120	200	230	>280	>310	>360	>390
160	290	330	>390	>430	>490	>530
200	340	380	>480	>520	>610	>650

0 Drive version:



8 is as 0, but with coupling claws on both sides. The standard version is supplied without shaft. A shaft can be retrofitted by inserting it into the pulley bore and securing it with 2 locking rings or tension sets (size 160 and 200).

Belt table

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 7	120	8M30	192	24
0 9	160	8M50	256	32
1 0	200	8M70	304	38

Shaft dimensions

SIZE	SHAFT \varnothing h6 x length	KEY
120	18 x 45	6x6x40
160	22 x 45	6x6x40
200	30 x 55	8x7x50

**L + Stroke + Overtravel = Total Length

DLSZ 120 1 1 0 0 0 7 2 01500
Pos. 1 2 3 4 5 6 7

Sample ordering code:

DLSZ,120, body profile with internal profile without cover bands, standard carriage, coupling claws on one side, 1,270 mm stroke

DLVZ 120, 160

INTERNAL ROLLER BEARING GUIDED
INTERNAL BELT DRIVEN



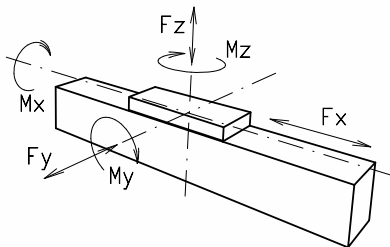
Function:

This unit consists of a rectangular aluminium profile with 2 integrated roller guides. The carriage is moved by a belt drive. Belt tension can be readjusted by a simple screw adjustment device in the carriage. This device can also be used for symmetrical adjustment of two or more linear units running parallel. The openings of the guide body are sealed with 3 stainless steel cover bands to protect the guide from splash water and dust. Alternatively, the opening can also be covered with a bellows or can be delivered without cover bands.

- Fitting position: As required. Max. length 3,000 mm without joints.
- Carriage mounting: By T-slots.
- Unit mounting: By T-slots and mounting sets. The linear axis can be combined with any T-slot profile.
- Belt type: HTD with steel reinforcement, no backlash when changing direction, repeatability ± 0.1 mm.
- Carriage support: In the standard version, the carriage runs on 8 rollers which can be adjusted and serviced at a central servicing position. For longer carriages the number of rollers can be increased.

FORCES AND TORQUES

FORCES/TORQUES	DLVZ 120		DLVZ 160	
	static	dynamic	static	dynamic
F _x (N)	894	800	1,000	840
F _y (N)	1,100	900	3,000	2,000
F _z (N)	1,250	1,000	3,500	2,800
M _x (Nm)	150	125	400	320
M _y (Nm)	140	120	360	300
M _z (Nm)	100	90	180	150



All forces and torques relate to the following:

$$\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Nm	1.4	1.8
----	-----	-----

SPEED

(m/s) max	3	4
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TENSILE FORCE

permanent (N)	900	1,000
0.2 s (N)	1,000	1,150

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I _x mm ⁴	6.6×10 ⁵	22.2×10 ⁵
I _y mm ⁴	38.6×10 ⁵	122.0×10 ⁵
E-Modulus N/mm ²	70,000	70,000

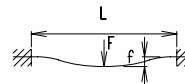
Formula: DLVZ

Driving torque:

$$M_a = \frac{F \cdot P \cdot S}{2,000 \cdot \pi} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

- F = force (N)
- P = pulley action perimeter (mm)
- S_i = safety factor 1.2 ... 2
- M_{leer} = no-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

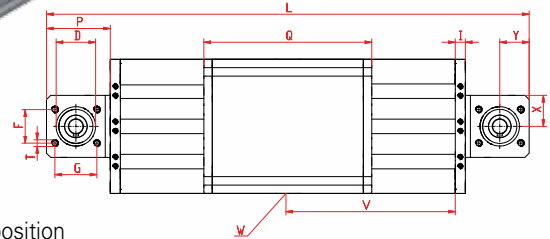
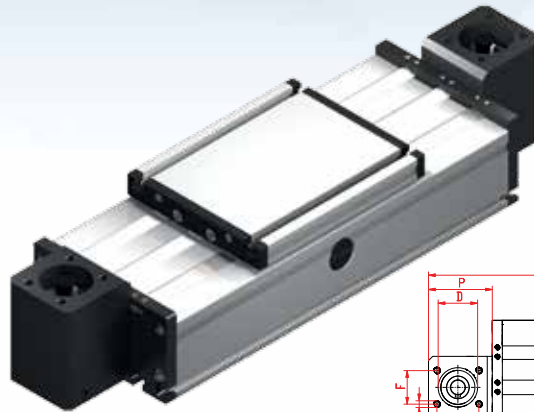
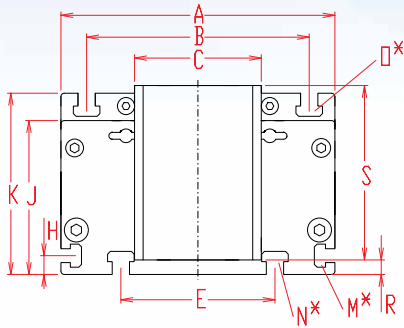
$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$


- f = deflection (mm)
- F = load (N)
- L = free length
- E = elastic modulus 70,000 (N/mm²)
- I = second moment of area (mm⁴)

MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount

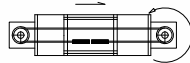
*For slide nuts refer to page 136

$$V = Q + 100 \text{ mm}$$

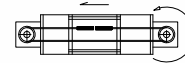
W = servicing position

SIZE	L**	A	B	C	D	E	F	G	H	I	J	K	M for	N for	O for	P	Q	R	S	T	U	X	Y	BASIC WEIGHT	WEIGHT per 100 mm
DLVZ 120	300	120	96	56	37	78	30	36	10	10	68	79	M5	M6	M6	56	156	2.5	82	M6	60	28	24	4.62 kg	0.82 kg
DLVZ 160	410	160	130	74	47	90	40	50	11	12	90	106	M6	M8	M8	76	200	8.5	102	M8	80	37	35	11.23 kg	1.76 kg

1 (1) Belt connection right

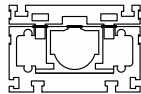


(2) Belt connection left



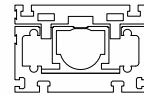
0 Choice of guide body profile:

(0)



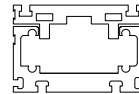
internal profile with cover bands

(1)



internal profile without cover bands

(2)

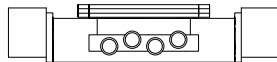


without internal profile and cover bands

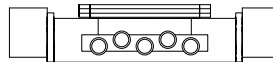
Stainless versions upon request.

0 Choice of carriages:

(0)



(2)

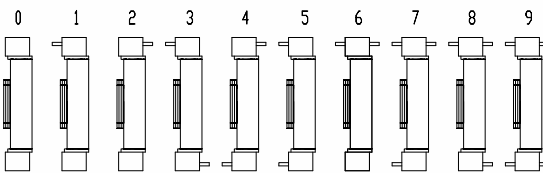


(3)



	VERSION 0		VERSION 2		VERSION 3	
	Q	L	Q	L	Q	L
120	156	300	196	340	236	380
160	200	410	250	460	>300	>510

0 Drive version:



The standard version 0 is supplied with 4 flush mounted shafts.

Belt table

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 4	120	5M25	80	16
0 4	160	5M25	110	22

Shaft dimensions

SIZE	SHAFT \varnothing h6 x length	KEY
120	14 x 35	5x5x28
160	18 x 45	6x6x40

**L + Stroke + Overtravel = Total Length

DLVZ 160 1 0 0 0 0 4 1 01500

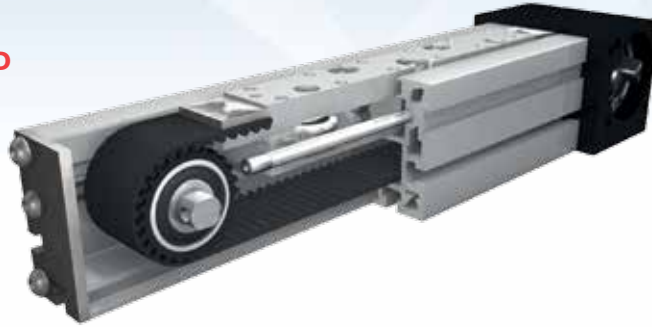
Pos. 1 2 3 4 5 6 7

For mounting hardware and other accessories, refer to pages 134 to 153.

Sample ordering code: DLVZ 160 with belt connection right, internal profile with cover bands, standard carriage and 4 flush mounted shafts, 1,090 mm stroke

LLZ 60

INTERNAL ROLLER BEARING GUIDED



Function:

The guide body consists of an aluminium square profile, with an integrated roller guide. The carriage is moved by means of an internal rotating toothed belt. On one end there is a pulley block with coupling claws on both sides (standard version). On the opposite end there is a plate with a retensioning device for the toothed belt.

Fitting position:

As required. Max. length 6,000 mm without joints.

Carriage mounting:

By tapped holes.

Unit mounting:

By T-slots and mounting sets. The linear axis can be combined with any T-slot profile.

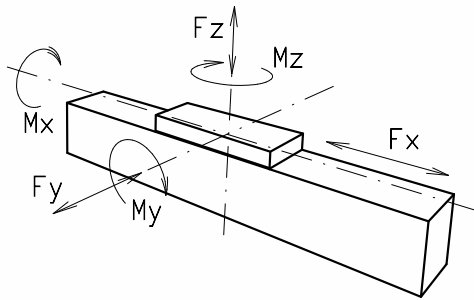
Belt performance:

HTD with steel reinforcement, no backlash when changing direction, repeatability ± 0.1 mm.

Carriage support:

The carriage runs on 5 rollers which can be adjusted and serviced at a central servicing position. Two hose connections enable relubrication of the positioning system.

FORCES AND TORQUES



	60	
FORCES/TORQUES	static	dynamic
F_x (N)	1,073	960
F_y (N)	780	650
F_z (N)	1,170	845
M_x (Nm)	20	13
M_y (Nm)	78	65
M_z (Nm)	52	39

All forces and torques related to the following:

$$\frac{\text{existing values}}{\text{table values}} = \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Nm	0.6
----	-----

SPEED

(m/s) max	4
-----------	---

TENSILE FORCE

permanent (N)	1,050
0.2 s (N)	1,150

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	4.47×10^5
I_y mm ⁴	5.59×10^5
Elastic modulus N/mm ²	70,000

* referred to lifetime

Formula: LLZ

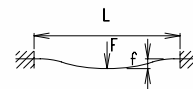
Driving torque:

$$M_a = \frac{F \cdot P \cdot S_f}{2,000 \cdot \pi} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

- F = force (N)
- P = pulley action perimeter (mm)
- S_f = safety factor 1.2 ... 2
- M_{leer} = no-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

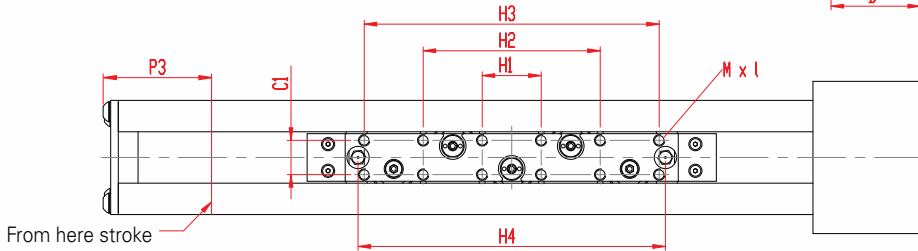
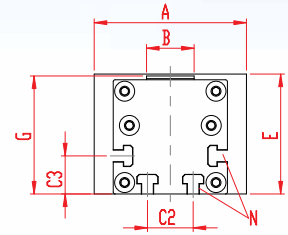
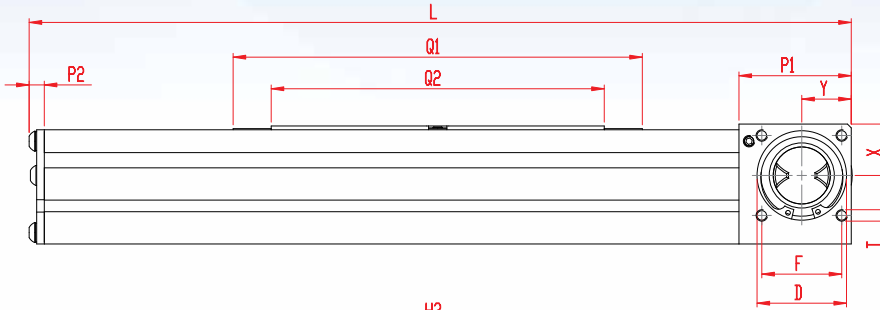


- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000 (N/mm²)
- I = second moment of area (mm⁴)

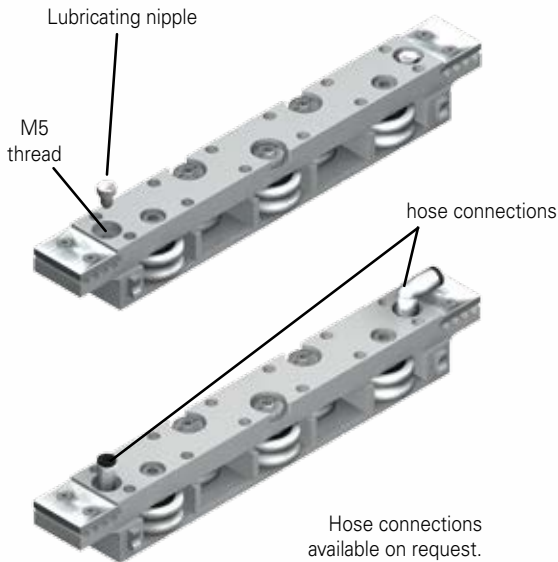
MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)



From here stroke



Lubricating nipple

M5 thread

hose connections

Hose connections available on request.

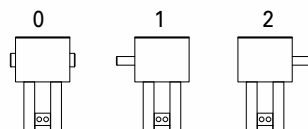


BELT DRIVEN

*For slide nuts refer to page 136

SIZE	L**	A	B	C1	C2	C3	D	E	F	G	H1	H2	H3	H4	M	N for	P1	P2	P3	Q1	Q2	T for	X	Y	BASIC WEIGHT	WEIGHT per 100 mm
LLZ 60	330	80	25	18	24	20	47	63	42	62	31	93	155	161.5	M6x6	M5	59	6	55	215	175	M6	27	26	2.75 kg	0.41 kg

0 Drive version:



SIZE	SHAFT	FEATHER KEY
60	14 x 35	5x5x28

Belt table:

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 3	60	5M30	130	26

LLZ 60 1 0 0 0 0 3 1 01500 **L + Stroke + Overtravel = Total Length
Pos. 1 2 3 4 5 6 7

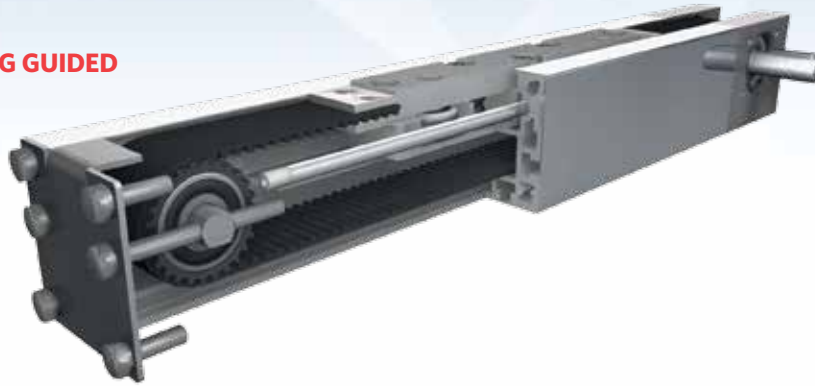
Sample ordering code: LLZ60, standard body profile, double-sided coupling claw, 1,170 mm stroke

nookindustries.com

The specifications and data in this publication are believed to be accurate and reliable. However, it is the responsibility of the product user to determine the suitability of Nook Industries products for a specific application. While defective products will be replaced without charge if promptly returned, no liability is assumed beyond such replacement.

LLZE 60

**INTERNAL ROLLER BEARING GUIDED
STAINLESS STEEL**

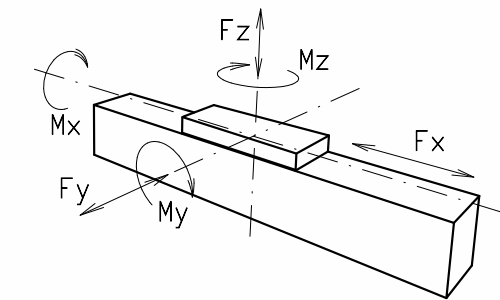


Function:

This unit consists of a square aluminium profile with an integrated roller guide and is covered by a stainless steel sheet (thickness 0.37mm, material 1.4,301). The carriage is moved by means of an internal rotating toothed belt. On one end there is a pulley block with shaft(s). On the opposite end there is a plate with a retensioning device for the toothed belt.

- Fitting position: As required. Max. length 3,000 mm without joints.
- Carriage mounting: By tapped holes.
- Unit mounting: By T-slots and mounting sets. The linear axis can be combined with any T-slot profile.
- Belt performance: HTD with steel reinforcement, no backlash when changing direction, repeatability ± 0.1 mm.
- Carriage support: The carriage runs on 5 rollers which can be adjusted and serviced at a central servicing position. Two hose connections enable relubrication of the positioning system.

FORCES AND TORQUES



FORCES/TORQUES	60	
	static	dynamic
F_x (N)	1,073	960
F_y (N)	780	650
F_z (N)	1,170	845
M_x (Nm)	20	13
M_y (Nm)	78	65
M_z (Nm)	52	39

ALL FORCES AND TORQUES RELATED TO THE FOLLOWING:

$$\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Nm	0.6
----	-----

SPEED

(m/s) max	4
-----------	---

TENSILE FORCE

permanent (N)	1,050
0.2 s (N)	1,150

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	4.47×10^5
I_y mm ⁴	5.59×10^5
Elastic modulus N/mm ²	70,000

* referred to lifetime

Formula: LLZE

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_i}{2,000 \cdot \pi} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

- F = force (N)
- P = pulley action perimeter (mm)
- S_i = safety factor 1.2 ... 2
- M_{leer} = no-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

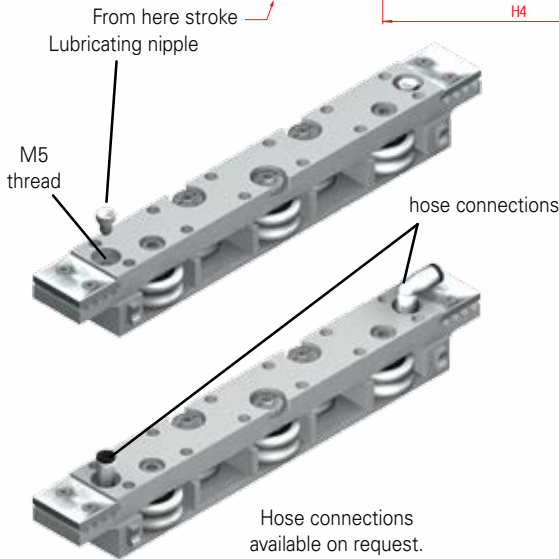
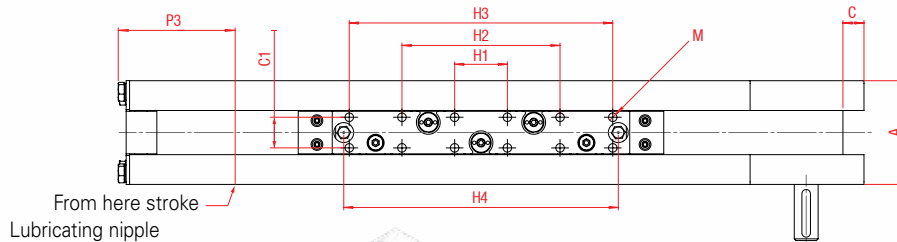
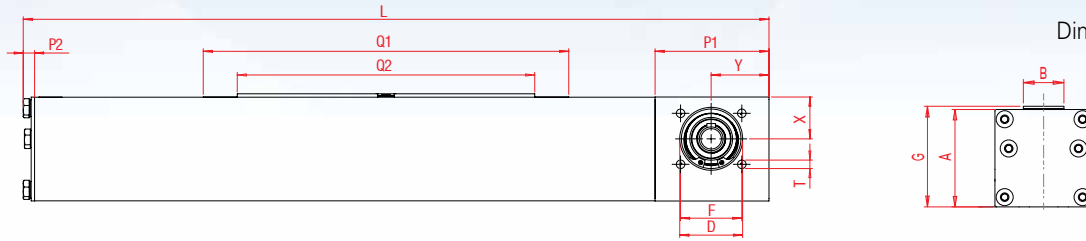


- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000 (N/mm²)
- I = second moment of area (mm⁴)

MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)



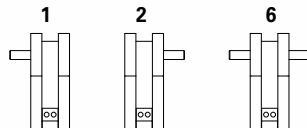
BELT DRIVEN

*For slide nuts refer to page 136

SIZE	L**	A	B	C	C1	D	F	G	H1	H2	H3	H4	M	P1	P2	P3	Q1	Q2	T for	X	Y	BASIC WEIGHT	WEIGHT per 100 mm
LLZE 60	339	61	26	12.4	18	37	36	63	31	93	155	161.5	M6x6	67	7	56	215	175	M6	24.6	34	2.99 kg	0.49 kg

0 Choice of guide body profile:
(0) Version with corrosion-protected components

1 Drive version:



SIZE	SHAFT	FEATHER KEY
60	14 x 35	5x5x28

Belt table:

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 3	60	5M30	130	26

LLZE 60 1 0 0 1 0 3 1 01500 **L + Stroke + Overtravel = Total Length

Pos. 1 2 3 4 5 6 7

Sample ordering code: LLZE60, standard body profile, drive version 1, 1,161 mm stroke

QSZ 60, 80, 100, 125

INTERNAL PROFILE RAIL GUIDED

TRAPPED BELT DRIVEN



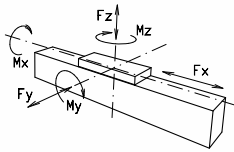
QSZ 125

Function:

This unit consists of a square aluminium profile with an integrated ball rail. The carriage is moved by a belt drive. Each standard pulley includes one coupling claw on one side. Belt tension can be readjusted by a simple screw adjustment device in the carriage. This device can also be used for symmetrical adjustment of two or more linear units running parallel.

- Fitting position: As required. Max. length 6,000 mm without joints.
- Carriage mounting: By T-slots.
- Unit mounting: By T-slots and mounting sets. The linear axis can be combined with any T-slot profile.
- Belt performance: HTD with steel reinforcement, no backlash when changing direction, repeatability ± 0.1 mm.
- Carriage support: In the standard version, the carriage runs on two runner blocks which can be adjusted and serviced at a central servicing position. For longer carriages the number of runner blocks can be increased.

FORCES AND TORQUES



	60		80		100		125	
PERMITTED DYN. FORCES*	5,000 km	10,000 km	5,000 km	10,000 km	5,000 km	10,000 km	5,000 km	10,000 km
F_x (N)	894	800	1,900	1,800	4,000	3,800	5,900	5,750
F_y (N)	1,410	990	3,570	2,550	4,080	2,900	6,892	5,470
F_z (N)	3,520	2,500	8,500	6,050	10,300	7,270	17,205	13,659
M_x (Nm)	33	23	107	75	142	101	288	228
M_y (Nm)	104	73	310	222	439	311	1,110	881
M_z (Nm)	100	70	296	210	412	292	1,012	803
C (N)	7,800	7,800	18,800	18,800	22,800	22,800	31,700	31,700

All forces and torques related to the following:

$$\frac{\text{existing values}}{\text{table values}} \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Nm	1.0	1.4	1.8
----	-----	-----	-----

SPEED

(m/s) max	5	5	5	5
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TENSILE FORCE

permanent (N)	900	1,900	4,000	5,900
0.2 s (N)	1,000	2,090	4,300	6,350

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	4.3×10 ⁵	16.5×10 ⁵	43.0×10 ⁵	74.9×10 ⁵
I_y mm ⁴	4.8×10 ⁵	18.7×10 ⁵	48.8×10 ⁵	106.5×10 ⁵
Elastic modulus N/mm ²	70,000	70,000	70,000	70,000

* referred to lifetime

Formula: QSZ

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_i}{2,000 \cdot \pi} + M_{leer}$$

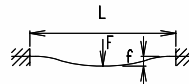
$$P_a = \frac{M_a \cdot n}{9,550}$$

- F = force (N)
- P = pulley action perimeter (mm)
- S_i = safety factor 1.2 ... 2
- M_{leer} = no-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

Deflection:

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000 (N/mm²)
- I = second moment of area (mm⁴)



Nominal lifetime:

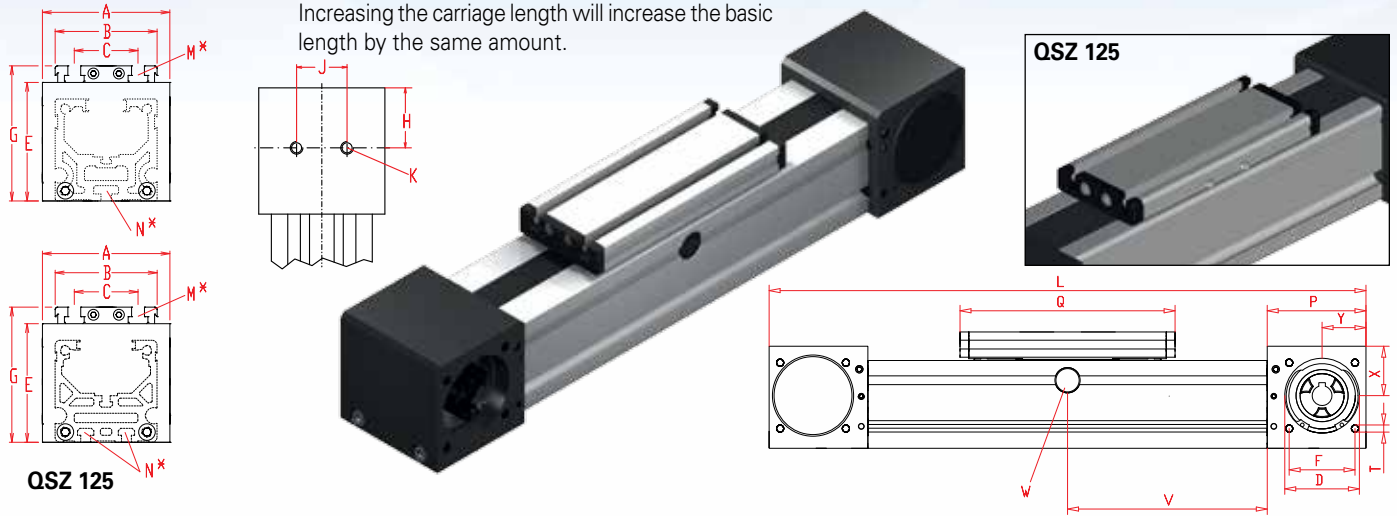
$$L = \left(\frac{C}{F}\right)^3 \times 10^5$$

- L = lifetime in meters
- C = dynamic load factor (N)
- F = medium load (N)

MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)



*For slide nuts refer to page 136 $V = Q + 100$ mm

W = servicing position

SIZE	L**	A	B	C	D	E	F	G	H	J	K	N for	M for	P	Q	T	X	Y	BASIC WEIGHT	WEIGHT per 100 mm
QSZ 60	300	80	60	36	47	63	42	79	29.5	30	M8	M5	M6	59	177	M6	27	26	3.5 kg	0.55 kg
QSZ 80	430	100	80	50	68	93	60	106	47.5	40	M10	M6	M8	90	232	M8	45	40	10.4 kg	0.96 kg
QSZ 100	510	130	100	66	90	110	80	129	55	50	M12	M10	M10	110	268	M10	49	50	15.9 kg	1.47 kg
QSZ 125	570	160	125	82	110	134.5	100	157.5	65	60	M12	M10	M12	130	300	M10	60	60	30.5 kg	2.21 kg

0

Choice of guide body profile:

(0) Standard (1) corrosion-protected screws (4) expanded corrosion-protected version (depending on the availability of components)

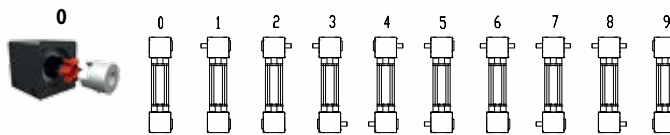
0

Choice of carriages:

	VERSION 0		VERSION 2		VERSION 3	
	Q	L	Q	L	Q	L
60	177	300	242	370	302	430
80	232	430	312	510	390	585
100	268	510	362	610	448	690
125	300	570	365	635	467	740

0

Drive version:



SIZE	SHAFT	
	Ø h6 × length	KEY
60	14 × 35	5×5×28
80	18 × 45	6×6×40
100	22 × 45	6×6×40
125	30 × 55	8×7×50

9 is as 0, but with coupling claws on both sides. The standard version is supplied without shaft. A shaft can be retrofitted by inserting it into the pulley bore and securing it with 2 locking rings or clamping sets (Size 100 + 125).

Belt table

CODE	SIZE	BELT	PULLEY	
			mm/rev.	Number of teeth
0 3	60	5M25	130	26
0 4	80	8M30	176	22
0 7	100	8M50	224	28
0 9	125	8M70	288	36

**L + Stroke + Overtravel = Total Length

For additional accessories refer to pages 134 to 153.

QSZ 80 1 0 0 0 0 4 1 01500

Pos. 1 2 3 4 5 6 7

Sample ordering code: QSZ80 with standard body profile, standard carriage, coupling claw on one side, 1,070 mm stroke

nookindustries.com

QSSZ 60, 80

INTERNAL PROFILE RAIL GUIDED
TRAPPED BELT DRIVEN

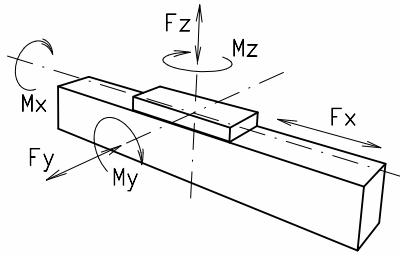


Function:

This linear unit consists of a square aluminium profile with integrated rail guidance. The carriage, which has runner blocks, is driven by a timing belt. Each standard pulley includes a coupling claw on one side and is equipped with maintenance-free ball bearings. Belt tension can be readjusted by a simple screw adjustment device in the carriage. This device can also be used for symmetrical adjustment of two or more linear units running parallel.

- Fitting position: As required. Max. length 3,000 mm without joints.
 Carriage mounting: By T-slots.
 Unit mounting: By T-slots and mounting sets. The linear axis can be combined with any T-slot profile.
 Belt performance: HTD with steel reinforcement, no backlash when changing direction, repeatability ± 0.1 mm.
 Carriage support: In the standard version, the carriage runs on 2 runner blocks which can be serviced at a central servicing position. For longer carriages the number of runner blocks can be increased.

FORCES AND TORQUES



	60		80	
PERMITTED DYN. FORCES*	5,000 km	10,000 km	5,000 km	10,000 km
F_x (N)	97	87	223	200
F_y (N)	350	240	890	630
F_z (N)	880	625	2,100	1,500
M_x (Nm)	8	6	26	18
M_y (Nm)	26	18	77	55
M_z (Nm)	25	17	74	52

All forces and torques related to the following:

$$\frac{\text{existing values}}{\text{table values}} = \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Nm	1.0	1.4
----	-----	-----

SPEED

(m/s) max	3	3
-----------	---	---

TENSILE FORCE

permanent (N)	LIFETIME CALCULATION SEE THE INTERNET	
---------------	--	--

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	16.5×10 ⁵
I_y mm ⁴	18.7×10 ⁵
Elastic modulus N/mm ²	70,000

* referred to lifetime

Formula: QSSZ

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_i}{2,000 \cdot \pi} + M_{leer}$$

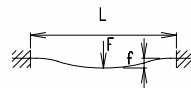
$$P_a = \frac{M_a \cdot n}{9,550}$$

- F = force (N)
 P = pulley action perimeter (mm)
 S_i = safety factor 1.2 ... 2
 M_{leer} = no-load torque (Nm)
 n = rpm pulley (min⁻¹)
 M_a = driving torque (Nm)
 P_a = motor power (KW)

Deflection:

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

- f = deflection (mm)
 F = load (N)
 L = free length (mm)
 E = elastic modulus 70,000 (N/mm²)
 I = second moment of area (mm⁴)



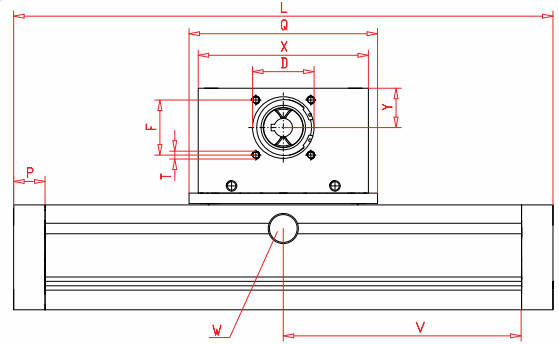
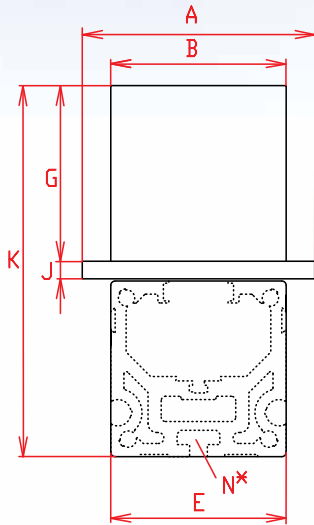
Nominal lifetime:

$$L = \left(\frac{C}{F} \right)^3 \times 10^5$$

- L = Lifetime in meters
 C = Dynamic load factor (N)
 F = Medium load (N)

MODULAR LINEAR ACTUATORS

BELT DRIVEN



*For slide nuts refer to page 136

$$V = Q + 100 \text{ mm}$$

W = servicing position

SIZE	L**	A	B	D	E	F	G	J	K	N for	P	Q	T	X	Y	BASIC WEIGHT	WEIGHT per 100 mm
QSSZ 60	168	60	60	37	60	32	65	7.50	134.5	M5	20	124	M 5	110	20	3.30 kg	0.47 kg
QSSZ 80	200	106	80	47	80	42	80	8	169	M6	24	144	M 6	130	30	5.7 kg	1.02 kg

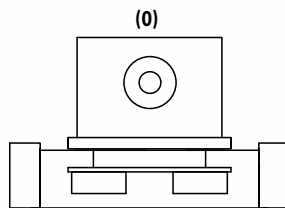
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Choice of guide body profile:

(0) Standard (1) corrosion-protected screws (4) expanded corrosion-protected version (depending on the availability of components)

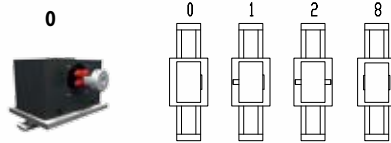
0

Choice of carriages:



0

Drive version:



SIZE	SHAFT Ø h6 × length	KEY
60	10 × 27	3×3×25
80	14 × 35	5×5×28

8 is as 0, but with coupling claws on both sides. The standard version is supplied without shaft. A shaft can be retrofitted by inserting it into the pulley bore and securing it with 2 locking rings.

Belt table

CODE	SIZE	BELT	PULLEY	
			mm/rev.	Number of teeth
0 3	60	5M15	100	20
0 7	80	5M25	130	26

**L + Stroke + Overtravel = Total Length

For additional accessories refer to pages 134 to 153.

QSSZ 80 1 0 0 0 0 7 1 01500

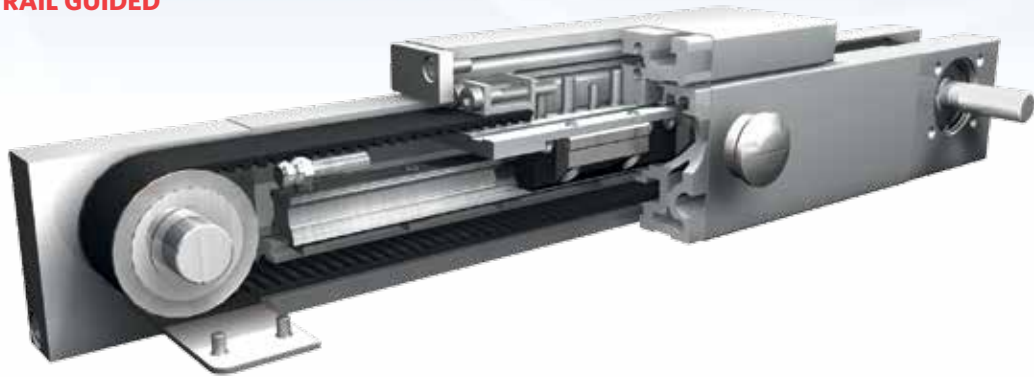
Pos. 1 2 3 4 5 6 7

Sample ordering code: QSSZ80, standard body profile, standard carriage, coupling claw on one side, 1,300 mm stroke

nookindustries.com

QSIZE 60, 80, 100

INTERNAL PROFILE RAIL GUIDED
STAINLESS STEEL

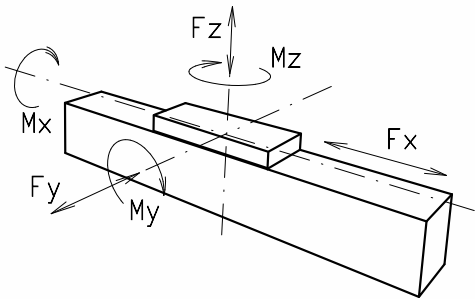


Function:

This unit consists of a square aluminium profile with an integrated ball rail guide and is covered by a stainless steel sheet (thickness 0.37mm, material 1.4,301). The carriage is moved by a belt drive. Belt tension can be readjusted by a simple screw adjustment device in the carriage. This device can also be used for symmetrical adjustment of two or more linear units running parallel.

- Fitting position: As required. Max. length 3,000 mm without joints.
- Carriage mounting: By T-nuts and bores through the cover.
- Unit mounting: By T-nuts and bores through the cover.
- Belt performance: HTD with kevlar reinforcement, no backlash when changing direction, repeatability ± 0.1 mm.
- Carriage support: In the standard version, the carriage runs on two runner blocks which can be adjusted and serviced at a central servicing position. For longer carriages the number of runner blocks can be increased.

FORCES AND TORQUES



	60		80		100	
PERMITTED DYN. FORCES*	5,000 km	10,000 km	5,000 km	10,000 km	5,000 km	10,000 km
F_x (N)	894	800	1,900	1,800	4,000	3,800
F_y (N)	1,410	990	3,570	2,550	4,080	2,900
F_z (N)	3,520	2,500	8,500	6,050	10,300	7,270
M_x (Nm)	33	23	107	75	142	101
M_y (Nm)	104	73	310	222	439	311
M_z (Nm)	100	70	296	210	412	292
C (N)	7,800	7,800	18,800	18,800	22,800	22,800

All forces and torques related to the following:

$$\frac{\text{existing values}}{\text{table values}} = \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Nm	1.3	1.8	2.3
----	-----	-----	-----

SPEED

(m/s) max	5	5	5
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TENSILE FORCE

permanent (N)	900	1,900	4,000
0.2 s (N)	1,000	2,090	4,300

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	4.3×10^5	16.5×10^5	43.0×10^5
I_y mm ⁴	4.8×10^5	18.7×10^5	48.8×10^5
Elastic modulus N/mm ²	70,000	70,000	70,000

* referred to lifetime

Formula: QSIZE

Driving torque:

$$M_a = \frac{F \cdot P \cdot S}{2,000 \cdot \pi} + M_{leer}$$

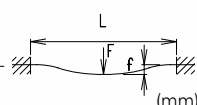
$$P_a = \frac{M_a \cdot n}{9,550}$$

- F = force (N)
- P = pulley action perimeter (mm)
- S_f = safety factor 1,2 ... 2
- M_{leer} = no-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

Deflection:

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

f = deflection (mm)
 F = load (N)
 L = free length (mm)
 E = elastic modulus 70000 (N/mm²)
 I = second moment of area (mm⁴)



Nominal lifetime:

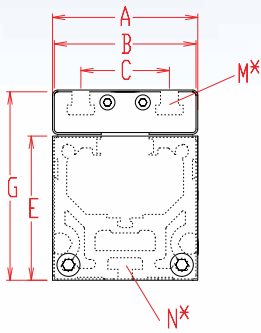
$$L = \left(\frac{C}{F} \right)^3 \times 10^5$$

L = Lifetime in meter
 C = Dynamic load factor (N)
 F = Middle load (N)

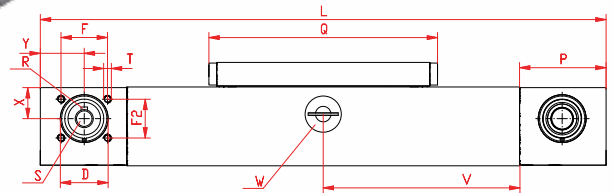
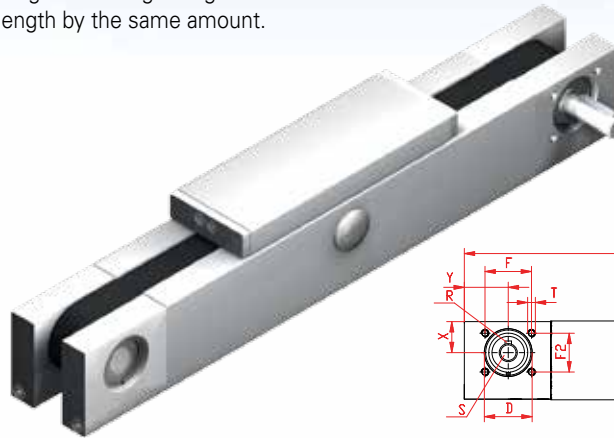
MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.



*For slide nuts refer to page 136

$$V = Q + 100 \text{ mm}$$

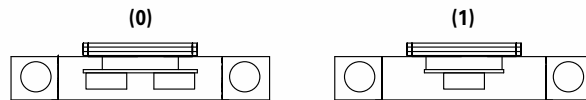
W = servicing position

SIZE	L**	A	B	C	D	E	F/F2	G	N for	M for	P	Q	T	X	Y	BASIC WEIGHT	WEIGHT per 100 mm
QSIZE 60	316	61	60	36	37	61	36/30	80	M5	M6	67	177	M6	24.5	34	4.2 Kg	0.64 kg
QSIZE 80	440	81	80	50	55	81	50/50	107	M6	M8	95	232	M8	32.5	47	10.6 Kg	1.08 Kg
QSIZE 100	504	101	100	66	62	101	62/58	130	M10	M10	107	268	M10	40	54	19.5 Kg	1.61 Kg

0 Choice of guide body profile:

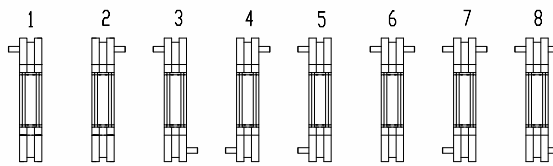
- (0) Version with corrosion-protected components
- (1) Version 0 but with not corrosion-protected guidings

0 Choice of carriages:



	VERSION 0		VERSION 1	
	Q	L	Q	L
60	177	316	152	296
80	232	440	196	400
100	268	504	260	494

2 Drive version:



The standard version is supplied shaft pos. 2

	SHAFT	
	R Key	S Ø h6 × length
60	5×5×28	14 × 35
80	6×6×40	18 × 45
100	6×6×40	22 × 45

Belt table

CODE	SIZE	BELT	PULLEY	
			mm/rev.	Number of teeth
0 3	60	5M25	130	26
0 4	80	8M30	176	22
0 7	100	8M50	224	28

$$**L + \text{Stroke} + \text{Overtravel} = \text{Total Length}$$

For additional accessories refer to pages 134 to 153.

QSIZE 80 1 0 0 2 0 4 1 01500
Pos. 1 2 3 4 5 6 7

Sample ordering code: QSIZE80, standard body profile, standard carriage, shaft pos2, 1,060 mm stroke

DSZ 120, 160, 200

INTERNAL PROFILE RAIL GUIDED
INTERNAL BELT DRIVEN



Function:

This unit consists of a rectangular aluminium profile with 2 integrated rail guidess. The carriage is moved by a belt drive. Each standard pulley has got one coupling claw on one side. Belt tension can be readjusted by a simple screw adjustment device in the carriage. This device can also be used for symmetrical adjustment of two or more linear units running parallel. The openings of the guide body are sealed with 3 stainless steel cover bands to protect the guide from splash water and dust. Alternatively, the opening can also be covered with a bellow or can be delivered without cover bands.

Fitting position:

As required. Max. length 6,000 mm without joints.

Carriage mounting:

By T-slots.

Unit mounting:

By T-slots and mounting sets. The linear axis can be combined with any T-slot profile.

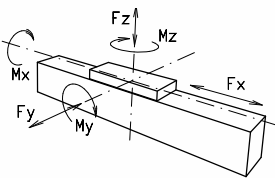
Belt type:

HTD with steel reinforcement, no backlash when changing direction, repeatability ± 0.1 mm.

Carriage support:

In the standard version, the carriage runs on 4 runner blocks which can be serviced at a central servicing position. For longer carriages the number of runner blocks can be increased.

FORCES AND TORQUES



	120		160		200	
PERMITTED DYN. FORCES*	5,000 km	10,000 km	5,000 km	10,000 km	5,000 km	10,000 km
F_x (N)	894	800	1,900	1,800	4,000	3,800
F_y (N)	1,776	1,405	2,236	1,775	5,155	4,092
F_z (N)	2,090	1,650	5,278	4,189	11,311	8,977
M_x (Nm)	81	64	282	224	752	597
M_y (Nm)	97	77	283	225	813	646
M_z (Nm)	96	76	300	238	862	684
C (N)	2,310	2,310	7,800	7,800	22,800	22,800

All forces and torques related to the following:

$$\frac{\text{existing values}}{\text{table values}} \cdot \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Nm without cover bands	1.2	1.5	2.0
Nm with cover bands	1.6	2.1	4

SPEED

(m/s) max	5	5	5
-----------	---	---	---

TENSILE FORCE

permanent (N)	900	1,900	4,000
0.2 s (N)	1,000	2,090	4,300

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	5.61×10^6	2.13×10^6	4.81×10^6
I_y mm ⁴	34.19×10^6	12.33×10^6	26.0×10^6
Elastic modulus N/mm ²	70,000	70,000	70,000

* referred to lifetime

Formula: DSZ

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_i}{2,000 \cdot \pi} + M_{leer}$$

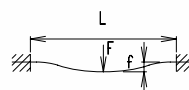
$$P_a = \frac{M_a \cdot n}{9,550}$$

F = force (N)
P = pulley action perimeter (mm)
 S_i = safety factor 1.2 ... 2
 M_{leer} = no-load torque (Nm)
n = rpm pulley (min⁻¹)
 M_a = driving torque (Nm)
 P_a = motor power (KW)

Deflection:

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

f = deflection (mm)
F = load (N)
L = free length (mm)
E = elastic modulus 70,000
I = second moment of area (mm⁴)



Nominal lifetime:

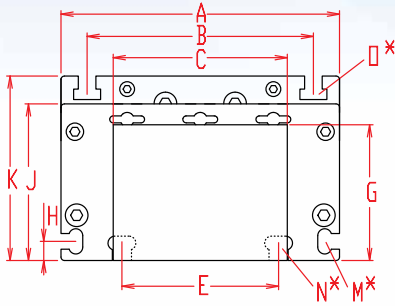
$$L = \left(\frac{C}{F} \right)^3 \times 10^6$$

L = Lifetime in meter
C = Dynamic load factor (N)
F = Middle load (N)

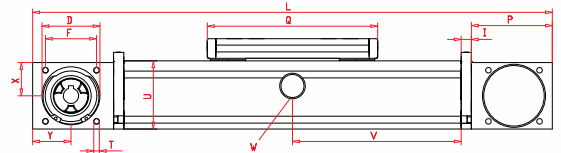
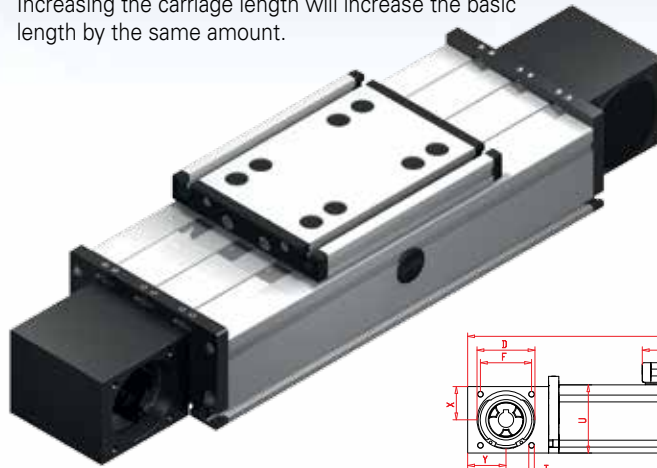
MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.



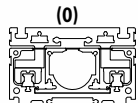
*For slide nuts refer to page 136

$$V = Q + 100 \text{ mm}$$

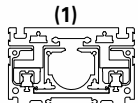
W = servicing position

SIZE	L**	A	B	C	D	E	F	G	H	I	J	K	M	N	O	P	Q	T	U	X	Y	BASIC WEIGHT	WEIGHT per 100 mm
DSZ 120	330	120	96	80	47	78	42	58	10	10	68	79	M5	M6	M6	70	156	M6	60	28	35	5.1 Kg	0.85 Kg
DSZ 160	440	160	130	100	68	90	60	78	11	12	90	106	M6	M8	M8	95	200	M8	80	39	45	12.0 kg	1.9 kg
DSZ 200	530	200	160	130	90	140	80	97	15	15	110	129	M8	M10	M10	110	270	M10	100	49	50	21.3 kg	2.9 kg

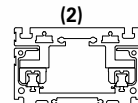
0 Choice of guide body profile:



internal profile with cover bands



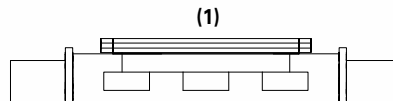
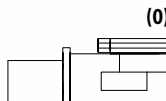
internal profile without cover bands



without internal profile and cover bands

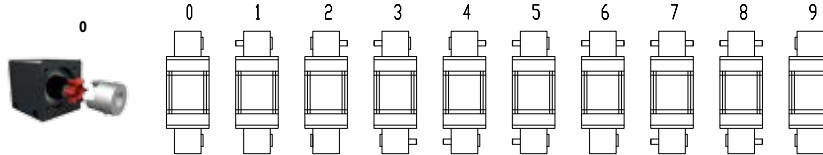
Stainless versions upon request.

0 Choice of carriages:



	VERSION 0		VERSION 1	
	Q	L	Q	L
120	156	330	156	330
160	200	440	>230	>470
200	270	530	>310	>570

0 Drive version:



9 is as 0, but with coupling claws on both sides.

The standard version is supplied without shaft. A shaft can be retrofitted by inserting it into the pulley bore and securing it with 2 locking rings or tension sets (size 200).

Belt table

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 4	120	5M25	130	26
0 7	160	8M30	176	22
0 9	160	8M50	176	22
0 9	200	8M50	224	28
1 0	200	8M70	224	28

Shaft dimensions

SIZE	SHAFT Ø h6 × length	KEY
120(5M25)	14 × 35	5×5×28
160(8M30)	18 × 45	6×6×40
160(8M50)	25 × 35	8×7×32
200(8M50)	22 × 45	6×6×40
200(8M70)	30 × 55	8×7×50

$$**L + \text{Stroke} + \text{Overtravel} = \text{Total Length}$$

DSZ 160 1 0 0 0 0 7 1 01500
Pos. 1 2 3 4 5 6 7

Sample ordering code: DSZ,160 with internal profile and cover bands, standard carriage, coupling claw on one side, 1,060 mm stroke.

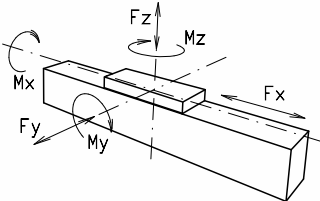


Function:

This linear unit consists of a rectangular aluminium profile with integrated rail guides. The carriage, which has runner blocks, is driven by a timing belt. Each standard pulley includes a coupling claw on one side and is equipped with maintenance-free ball bearings. Belt tension can be readjusted by a simple screw adjustment device in the carriage. This device can also be used for symmetrical adjustment of two or more linear units running parallel.

- Fitting position: As required. Max. length 6,000 mm without joints.
- Carriage mounting: By T-slots.
- Unit mounting: By T-slots and mounting sets. The linear axis can be combined with any T-slot profile.
- Belt performance: HTD with steel reinforcement, no backlash when changing direction, repeatability ± 0,1 mm.
- Carriage support: In the standard version, the carriage runs on 4 runner blocks which can be serviced at a central servicing position. For longer carriages the number of runner blocks can be increased.

Forces and torques



	120		160		200	
PERMITTED DYN. FORCES*	5,000 km	10,000 km	5,000 km	10,000 km	5,000 km	10,000 km
F _x (N)	1,900	1,800	4,000	3,800	5,900	5,750
F _y (N)	1,776	1,405	2,236	1,775	15,600	11,080
F _z (N)	2,090	1,650	5,278	4,189	20,600	14,600
M _x (Nm)	81	64	282	224	1,285	915
M _y (Nm)	97	77	283	225	1,375	980
M _z (Nm)	96	76	300	238	1,345	960
C (N)	2,310	2,310	7,800	7,800	22,800	22,800

All forces and torques related to the following:

$$\frac{\text{existing values}}{\text{table values}} \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE		
(Nm)	1.4	1.8
SPEED		
(m/s) max	5	5
TENSILE FORCE		
permanent (N)	1,900	4,000
0.2 s (N)	2,090	4,300
MOMENTS OF INERTIA OF ALUMINIUM PROFILE		
I _x mm ⁴	5.61 × 10 ⁵	2.13 × 10 ⁶
I _y mm ⁴	34.19 × 10 ⁵	12.33 × 10 ⁶
Elastic modulus N/mm ²	70,000	70,000

* referred to lifetime

Formula: DSSZ

Driving torque:

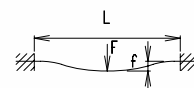
$$M_a = \frac{F \cdot P \cdot S_1}{2,000 \cdot \pi} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

- F = force (N)
- P = pulley action perimeter (mm)
- S₁ = safety factor 1.2 ... 2
- M_{leer} = no-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

Deflection:

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$



- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000 (N/mm²)
- I = second moment of area (mm⁴)

Nominal lifetime:

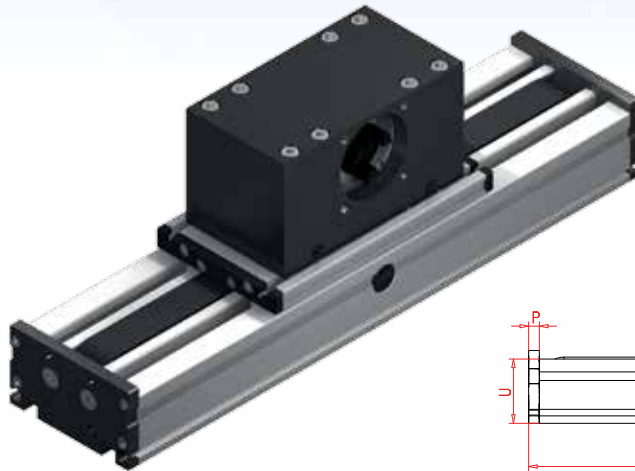
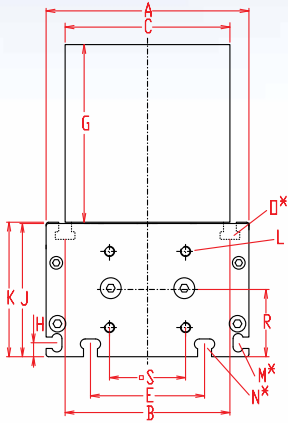
$$L = \left(\frac{C}{F}\right)^3 \times 10^5$$

- L = Lifetime in meter
- C = Dynamic load factor (N)
- F = Middle load (N)

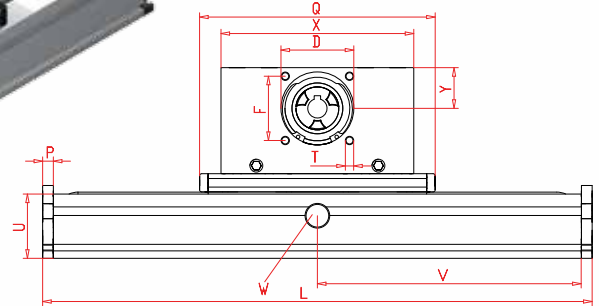
MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.

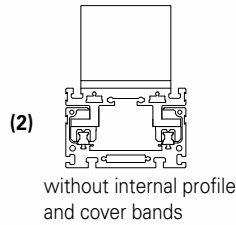
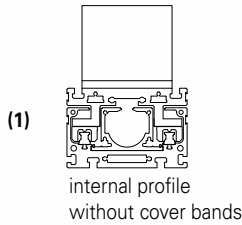


*For slide nuts refer to page 136

$V = Q + 100 \text{ mm}$ $W = \text{servicing position}$

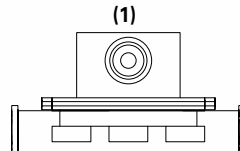
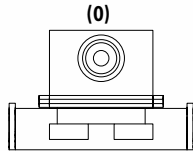
SIZE	L**	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U	X	Y	BASIC WEIGHT	WEIGHT per 100 mm
DSSZ 120	230	120	96	100	68	78	60	100	10	68	79	M6	M5	M6	M6	10	200	39	42	M8	60	180	39	12.0 kg	1.2 kg
DSSZ 160	330	160	130	130	90	90	80	130	11	105	106	M8	M6	M8	M8	12	290	53	60	M10	80	270	60	27.8 kg	1.8 kg
DSSZ 200	380	200	160	160	110	140	100	145	15	128	129	M10	M8	M10	M10	15	340	62.5	95	M10	100	310	62	53.0 kg	2.6 kg

1 Choice of guide body profile:



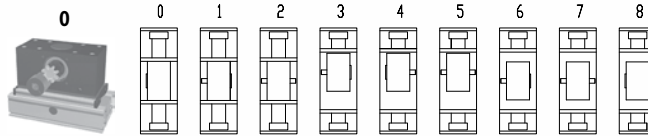
Stainless versions upon request.

0 Choice of carriages:



SIZE	VERSION 0		VERSION 1	
	Q	L	Q	L
120	200	230	200	230
160	290	330	290	330
200	340	380	340	380

0 Drive version:



8 is as 0, but with coupling claws on both sides. The standard version is supplied without shaft. A shaft can be retrofitted by inserting it into the pulley bore and securing it with 2 locking rings or tension sets (size 200).

Belt table

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 7	120	8M30	192	24
0 9	160	8M50	256	32
1 0	200	8M70	304	38

Shaft dimensions

SIZE	SHAFT $\phi h6 \times \text{length}$	KEY
120	18x45	6x6x40
160	22x45	6x6x40
200	30x55	8x7x50

**L + Stroke + Overtravel = Total Length

DSSZ 160 1 1 0 0 0 9 1 01500
Pos. 1 2 3 4 5 6 7

Sample ordering code: DSSZ160, body profile with internal profile without cover bands, standard carriage, coupling claws on one side, 1170 mm stroke

nookindustries.com

DSZS 160

INTERNAL PROFILE RAIL GUIDED
INTERNAL BELT DRIVEN



Function:

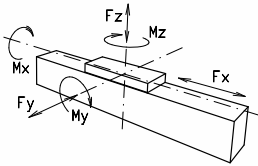
This unit consists of a rectangular aluminium profile with 2 integrated rail guidess. The carriage is moved by a belt drive. An innovation is that the toothed belt is diverted within a drive block positioned centrally. The result is an enormous compactness with regard to the overall system length. The toothed drive pulley has a coupling claw in the standard version. Belt tension can be readjusted by a simple screw adjustment device in the carriage. This device can also be used for symmetrical adjustment of two or more linear units running parallel. The openings of the guide body are sealed with 3 stainless steel cover bands to protect the guide from splash water and dust. Alternatively, the opening can also delivered without cover bands.

Fitting position:	As required. Max. length 6,000 mm without joints.
Carriage mounting:	By T-slots.
Unit mounting:	By T-slots and mounting sets. The linear axis can be combined with any T-slot profile.
Belt type:	HTD with steel reinforcement, no backlash when changing direction, repeatability ± 0.1 mm.
Carriage support:	In the standard version, the carriage runs on 4 runner blocks which can be serviced at a central servicing position. For longer carriages the number of runner blocks can be increased.

FORCES AND TORQUES

160

PERMITTED DYN. FORCES*	5,000 km	10,000 km
F_x (N)	1,900	1,800
F_y (N)	5,570	3,900
F_z (N)	7,050	5,020
M_x (Nm)	358	255
M_y (Nm)	369	262
M_z (Nm)	364	258
C (N)	7,800	7,800



All forces and torques related to the following:

$$\frac{\text{existing values}}{\text{table values}} \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Nm without cover bands	1.5
Nm with cover bands	2.1

SPEED

(m/s) max	5
-----------	---

TENSILE FORCE

permanent (N)	1,900
0.2 s (N)	2,090

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	21.32 × 10 ⁵
I_y mm ⁴	123.36 × 10 ⁵
Elastic modulus N/mm ²	70,000

* referred to lifetime

Formula: DSZS

Driving torque:

$$M_a = \frac{F \cdot P \cdot S}{2,000 \cdot \pi} + M_{leer}$$

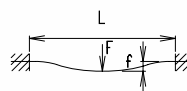
$$P_a = \frac{M_a \cdot n}{9,550}$$

F	= force	(N)
P	= pulley action perimeter	(mm)
S_1	= safety factor 1.2 ... 2	
M_{leer}	= no-load torque	(Nm)
n	= rpm pulley	(min ⁻¹)
M_a	= driving torque	(Nm)
P_a	= motor power	(KW)

Deflection:

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

f	= deflection	(mm)
F	= load	(N)
L	= free length	(mm)
E	= elastic modulus	70,000
I	= second moment of area	(mm ⁴)



Nominal lifetime:

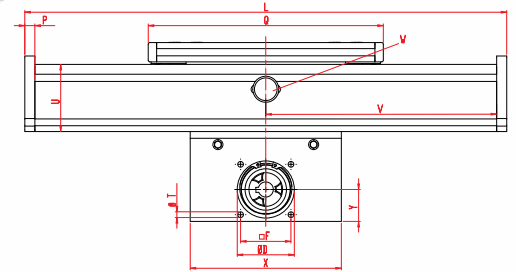
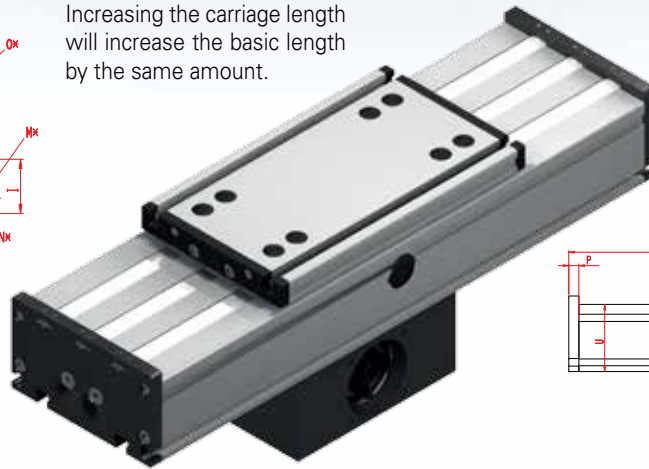
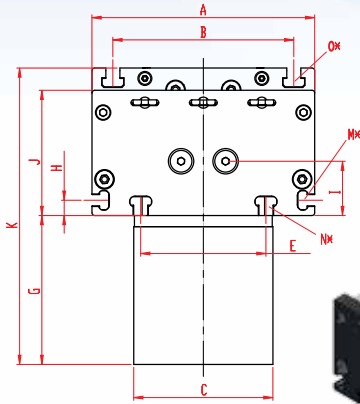
$$L = \left(\frac{C}{F}\right)^3 \times 10^5$$

L	= Lifetime in meter	
C	= Dynamic load factor	(N)
F	= Middle load	(N)

MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)



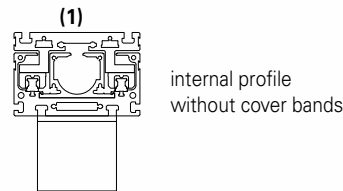
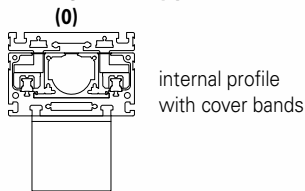
*For slide nuts refer to page 136

V = Q + 100 mm

W = servicing position

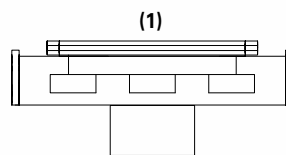
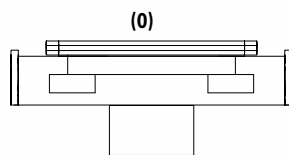
SIZE	L**	A	B	C	D	E	F	G	H	I	J	K	M for	N for	O for	P	Q	T	U	X	Y	BASIC WEIGHT	WEIGHT per 100 mm
DSZS 160	310	160	130	100	68	90	60	107	11	39	90	213	M6	M8	M8	12	280	M8	80	180	38	23.0 kg	1.9 kg

0 Choice of guide body profile:



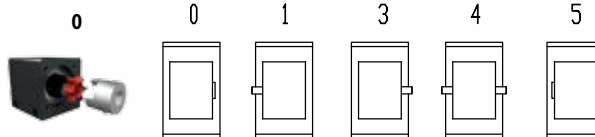
Stainless versions upon request.

0 Choice of carriages:



	VERSION 0		VERSION 1	
	Q	L	Q	L
160	280	310	280	310

0 Drive version:



5 is as 0, but with coupling claws on both sides.

The standard version is supplied without shaft. A shaft can be retrofitted by inserting it into the pulley bore and securing it with 2 locking rings or tension sets (size 200).

Belt table

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 7	160	8M30	192	24

Shaft dimensions

SIZE	SHAFT Ø h6 x length	KEY
160	18 x 45	6x6x40

**L + Stroke + Overtravel = Total Length

DSZS 160 1 0 0 0 0 7 1 01500

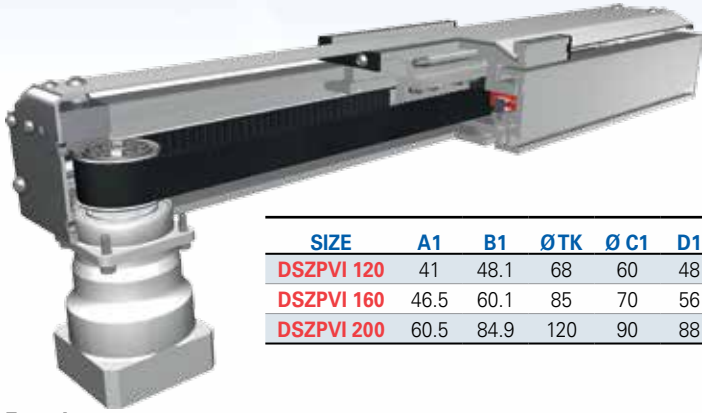
Pos. 1 2 3 4 5 6 7

Sample ordering code: DSZS,160 with internal profile and cover bands, standard carriage, coupling claw on one side, 1,190 mm stroke.

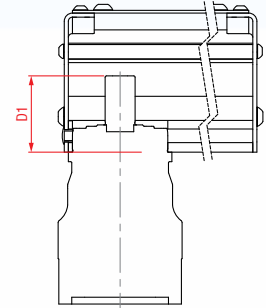
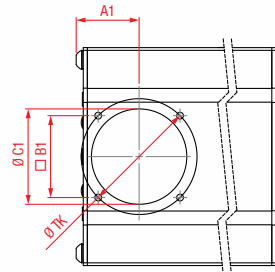
nookindustries.com

DSZPVI 120, 160, 200

INTERNAL PROFILE RAIL GUIDED



SIZE	A1	B1	ØTK	ØC1	D1
DSZPVI 120	41	48.1	68	60	48
DSZPVI 160	46.5	60.1	85	70	56
DSZPVI 200	60.5	84.9	120	90	88

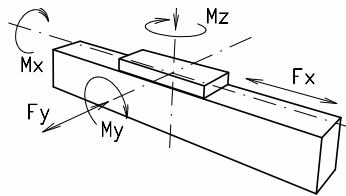


Function:

This unit consists of a rectangular aluminium profile with 2 integrated rail guides. The carriage is moved by a belt drive. On the drive side the pulley is beared on the shaft of a planetary gear. Belt tension can be readjusted by a simple screw adjustment at the opposite side of the drive. A special curved aluminium sheet is covering the carriage side. There is only a small gap between carriage and aluminium sheet. Because of its special design it is possible to drive the carriage over the pulley areas. This fact is making the unit very compact.

- Fitting position: As required, max. 3,000 mm
- Carriage mounting: By tapped holes.
- Unit mounting: T-slots
- Belt type: HTD with steel reinforcement, no backlash when changing direction, repeatability ± 0.1 mm.
- Carriage support: In the standard version, the carriage runs on 4 runner blocks which can be serviced at a central servicing position. For longer carriages the number of runner blocks can be increased.

FORCES AND TORQUES



PERMITTED DYN. FORCES*	120		160		200	
	5,000 km	10,000 km	5,000 km	10,000 km	5,000 km	10,000 km
F _x (N)	894	800	1,900	1,800	4,000	3,800
F _y (N)	1,776	1,405	5,570	3,900	15,600	11,080
F _z (N)	2,090	1,650	7,050	5,020	20,600	14,600
M _x (Nm)	81	64	358	255	1,285	915
M _y (Nm)	97	77	369	262	1,375	980
M _z (Nm)	96	76	364	258	1,645	960
C (N)	2,310	2,310	7,800	7,800	22,800	22,800

All forces and torques related to the following:

$$\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Nm without cover bands	1.2	1.5	2.0
------------------------	-----	-----	-----

SPEED

(m/s) max	5	5	5
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TENSILE FORCE

permanent (N)	900	1,900	4,000
0.2 s (N)	1,000	2,090	4,300

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I _x mm ⁴	5.61 × 10 ⁵	2.32 × 10 ⁵	48.07 × 10 ⁵
I _y mm ⁴	34.19 × 10 ⁵	123.36 × 10 ⁵	259.99 × 10 ⁵
Elastic modulus N/mm ²	70,000	70,000	70,000

Formula: DSZPVI

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_p}{2,000 \cdot \pi} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

- F = force (N)
- P = pulley action perimeter (mm)
- S_p = safety factor 1.2 ... 2
- M_{leer} = no-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

Deflection:

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000
- I = second moment of area (mm⁴)

Nominal lifetime:

$$L = \left(\frac{C}{F} \right)^3 \times 10^5$$

- L = Lifetime in meter
- C = Dynamic load factor (N)
- F = Middle load (N)

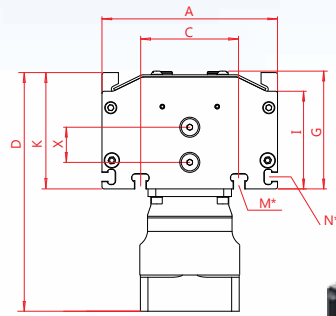
* referred to lifetime

MODULAR LINEAR ACTUATORS

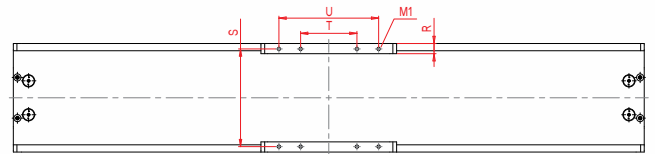
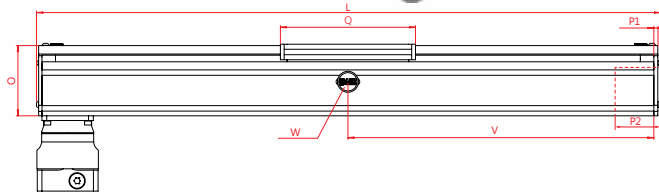
BELT DRIVEN

Dimensions (mm)

Increasing the carriage length will increase the basic length by the same amount.



Optionally available with angular planetary gearbox



$$V = Q + 100$$

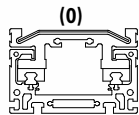
W = servicing position

*For slide nuts refer to page 136

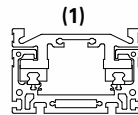
DSZPVI 160 M1 = thread depth M8 x 12 DSZPVI 200 M1 = M10 x 12

SIZE	L**	A	C	D	G	I	K	M for	N for	O	P1	P2	Q	R	S	T	U	X	BASIC WEIGHT	WEIGHT
																			without gearbox	per 100 mm
DSZPVI 120	223	120	78	169	82.5	60	79.5	M6	M5	78	2	35	148	11.5	106	40	120	48.5	3.45 kg	0.87 kg
DSZPVI 160	298	160	90	217.5	108.5	80	106	M8	M6	104	3	52.5	188	15	144	80	160	57	10.27 kg	2.24 kg
DSZPVI 200	383	200	140	251	132.5	100	129	M10	M8	128	3	62.5	248	17	180	100	200	82	18.20 kg	3.15 kg

0 Choice of guide body profile:



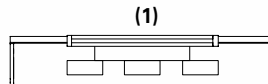
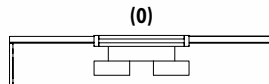
with cover profile



without cover profile

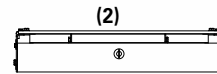
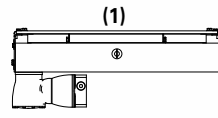
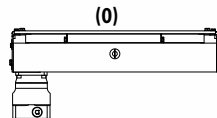
Stainless versions upon request.

0 Choice of carriages:



	VERSION 0		VERSION 1	
	Q	L	Q	L
120	148	223	>148	>223
160	188	298	>220	>330
200	248	383	>290	>430

0 Drive version:



- (0) planetary gearbox
- (1) angular planetary gearbox
- (2) without gearbox

Belt table:

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 4	120	5M25	130	26
0 7	160	8M30	176	22
0 9	200	8M50	224	28

DSZPVI 160 1 0 0 0 0 7 1 01500

**L + Stroke + Overtravel = Total Length

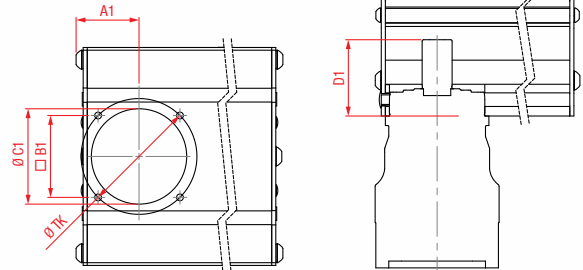
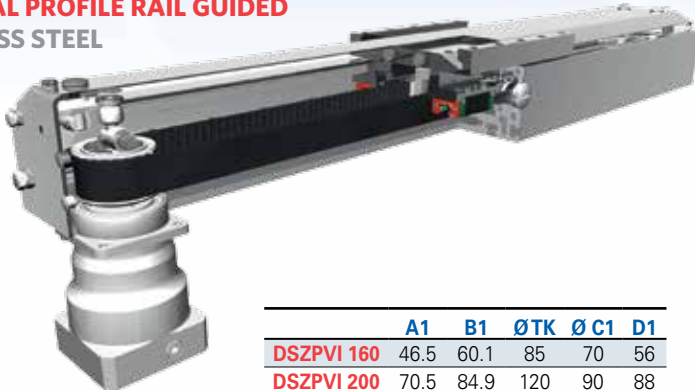
Pos. 1 2 3 4 5 6 7

Sample ordering code: DSZPVI 160 with cover bands, standard carriage, with planetary gearbox, 1,202 mm stroke.

DSZPVIE 160, 200

INTERNAL PROFILE RAIL GUIDED

STAINLESS STEEL



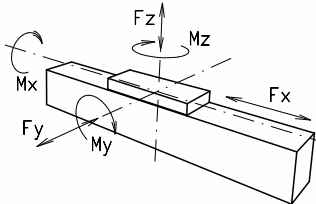
	A1	B1	ØTK	ØC1	D1
DSZPVI 160	46.5	60.1	85	70	56
DSZPVI 200	70.5	84.9	120	90	88

Function:

This unit consists of a rectangular aluminium profile with 2 integrated rail guides and is covered by a stainless steel sheet (thickness 0.37mm, material 1.4,301). The carriage is moved by a belt drive. On the drive side the pulley is beared on the shaft of a planetary gear. Belt tension can be readjusted by a simple screw adjustment at the opposite side of the drive. A special curved aluminium sheet is covering the carriage side. There is only a small gap between carriage and aluminium sheet. Because of its special design it is possible to drive the carriage over the pulley areas. This fact is making the unit very compact.

- Fitting position: As required, max. 3,000 mm
- Carriage mounting: By tapped holes.
- Unit mounting: T-slots
- Belt type: HTD with steel reinforcement, no backlash when changing direction, repeatability ± 0.1 mm.
- Carriage support: In the standard version, the carriage runs on 4 runner blocks which can be serviced at a central servicing position. For longer carriages the number of runner blocks can be increased.

FORCES AND TORQUES



PERMITTED DYN. FORCES*	160		200	
	5,000 km	10,000 km	5,000 km	10,000 km
F_x (N)	1,900	1,800	4,000	3,800
F_y (N)	5,570	3,900	15,600	11,080
F_z (N)	7,050	5,020	20,600	14,600
M_x (Nm)	358	255	1,285	915
M_y (Nm)	369	262	1,375	980
M_z (Nm)	364	258	1,345	960
C (N)	7,800	7,800	22,800	22,800

All forces and torques related to the following:

$$\frac{\text{existing values } F_y}{\text{table values } F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Nm without cover bands	1.5	2.0
Nm with cover bands	2.1	2.9

SPEED

(m/s) max	5	5
-----------	---	---

TENSILE FORCE

permanent (N)	1,900	4,000
0.2 s (N)	2,090	4,300

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	21.32×10^5	48.07×10^5
I_y mm ⁴	123.36×10^5	259.99×10^5
Elastic modulus N/mm ²	70,000	70,000

Formula: DSZPVIE

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_1}{2,000 \cdot \pi} + M_{leer}$$

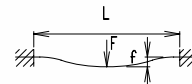
$$P_a = \frac{M_a \cdot n}{9,550}$$

- F = force (N)
- P = pulley action perimeter (mm)
- S_1 = safety factor 1.2 ... 2
- M_{leer} = no-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

Deflection:

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000
- I = second moment of area (mm⁴)



* referred to lifetime

Nominal lifetime:

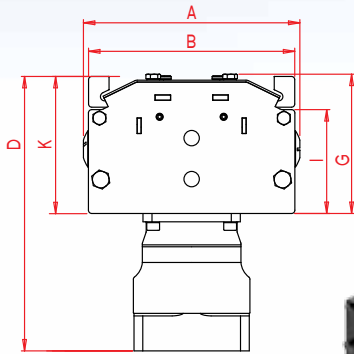
$$L = \left(\frac{C}{F} \right)^3 \times 10^5$$

- L = Lifetime in meter
- C = Dynamic load factor (N)
- F = Middle load (N)

MODULAR LINEAR ACTUATORS

BELT DRIVEN

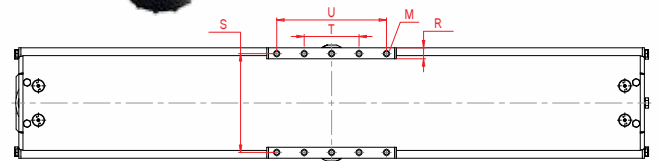
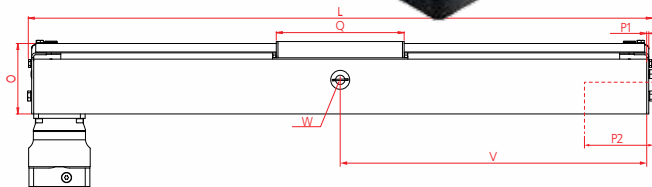
Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.



Optionally available with angular planetary gearbox



M = thread depth M6 x 12

W = servicing position

V = Q + 100

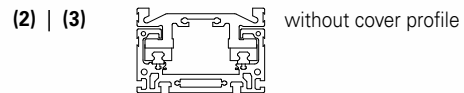
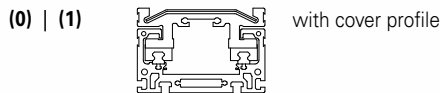
SIZE	L**	A	C	D	G	I	K	M for	N for	O	P1	P2	Q	R	S	T	U	X	BASIC WEIGHT without gearbox	WEIGHT per 100 mm
DSZPVI 160	298	160	90	217.5	108.5	80	107.5	M8	M6	104	3	52.5	188	15	144	80	160	57	9.83 kg	1.98 kg
DSZPVI 200	384	200	140	251	132.5	100	130.5	M10	M8	128	3	62.5	248	17	180	100	200	82	18.95 kg	3.71 kg

0

Choice of guide body profile:

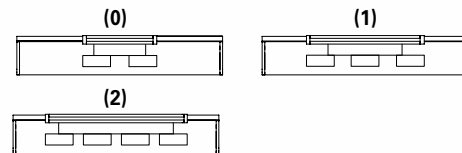
- (0) corrosion-protected components
- (1) as above, but with standard components

- (2) like version (0), but without cover profile
- (3) as above (0), but with standard components



0

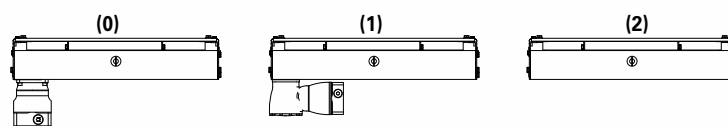
Choice of carriages:



	VERSION 0		VERSION 1		VERSION 2	
	Q	L	Q	L	Q	L
160	189	298	203	303	268	368
200	248	384	288	423	398	533

0

Drive version:



- (0) planetary gearbox
- (1) angular planetary gearbox
- (2) without gearbox

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 7	160	8M 30	176	22
0 9	200	8M 50	224	28

DSZPVIE 160 1 0 0 0 0 7 1 1500

**L + Stroke + Overtravel = Total Length

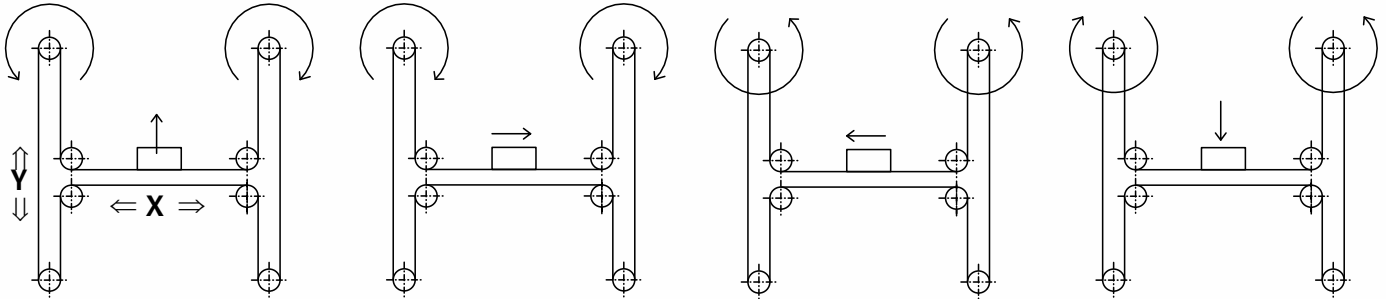
Sample ordering code: DSZPVIE 160 with standard body profile, standard carriage, with planetary gearbox, 1,211 mm stroke.

ELZU 30, 40, 60, 60S, 80, 80S, 100

MULTI-AXIS

EXTERNAL ROLLER BEARING GUIDED

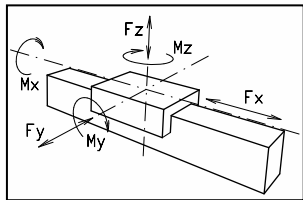
EXTERNAL BELT DRIVEN



Function:

Surface portal, consisting of 2 Y-axes and 1 X-axis, driven by one rotating belt. This belt runs around different deflection pulleys. Positioning is achieved by two motors. The coordinate is diagonal to the deflection points of the Y-axis.

Advantage: Only small weights are moved, thus enabling high accelerations to be achieved.



- Fitting position: As required. Max. length and width 3,000 mm.
- Carriage mounting: By T-slots.
- Unit mounting: By T-slots or tapped holes in the bearing block, mounting sets.
- Belt type: HTD w. steel reinforcement, no backlash when changing direction, repeatability: ± 0.1 mm.

FORCES AND TORQUES

FORCES/TORQUES	ELZU 30		ELZU 40		ELZU 60		ELZU 60 S		ELZU 80		ELZU 80 S		ELZU 100	
	static	dynamic	static	dynamic	static	dynamic	static	dynamic	static	dynamic	static	dynamic	static	dynamic
F_x (N)	200	180	390	350	894	800	894	800	1,900	1,800	1,900	1,800	4,000	3,800
F_y (N)	90	60	1,200	700	3,000	2,000	4,100	3,100	3,000	2,000	4,600	3,600	8,000	6,500
F_z (N)	90	60	900	650	1,700	1,100	2,160	1,600	1,700	1,100	3,000	1,800	3,600	2,200
M_x (Nm)	10	5	25	20	67	43	88	65	90	55	170	140	300	230
M_y (Nm)	13	6	32	18	90	70	190	140	110	80	270	230	400	270
M_z (Nm)	14	7	35	25	120	100	230	170	150	120	300	220	750	500

All forces and torques relate to the following:

$$\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Nm	0.2	0.6	1.2	1.2	1.8	1.8	2.6
----	-----	-----	-----	-----	-----	-----	-----

SPEED

(m/s) max	2	4	5	5	6	6	8
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TENSILE FORCE

permanent (N)	200	390	900	900	1,900	1,900	3,600
0.2 s (N)	280	480	1,000	1,000	2,090	2,090	4,000

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	4.09×10^4	1.32×10^5	6.79×10^5	6.79×10^5	18.99×10^5	18.99×10^5	44.4×10^5
I_y mm ⁴	4.00×10^4	1.34×10^5	6.97×10^5	6.97×10^5	18.97×10^5	18.97×10^5	44.8×10^5
E-Modulus N/mm ²	70,000	70,000	70,000	70,000	70,000	70,000	70,000

Formula: ELZU

Driving torque:

$$M_a = \frac{F * P * S_i}{2,000 * \pi} + M_{leer}$$

$$P_a = \frac{M_a * n}{9,550}$$

- F = force (N)
- P = pulley action perimeter (mm)
- S_i = safety factor 1.2 ... 2
- M_{leer} = no-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

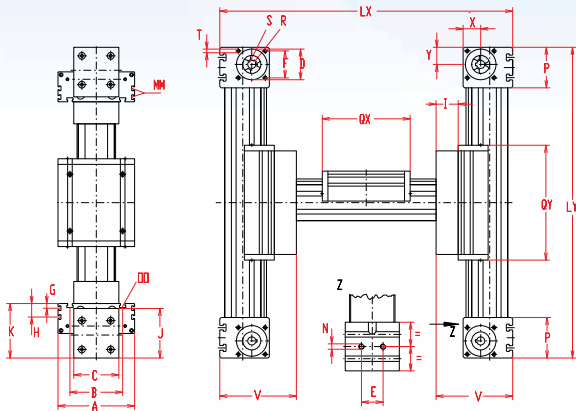
$$f = \frac{F * L^3}{E * I * 192}$$

- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000 (N/mm²)
- I = second moment of area (mm⁴)

MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)



BELT DRIVEN

*For slide nuts refer to page 136

SIZE	LX	LY	A	B	C	D	E	F	G	H	I	J	K	MM for	N for	OO for	P	OX	QY	T	V	X	Y	BASIC WEIGHT	WEIGHT per 100 mm
ELZU 30	240	210	70	56	42	28	13	25	-	-	27	44	47	-	M5	M6	36	82	126	M5	74	16	16	6.3 kg	0.13 kg
ELZU 40	304	250	100	66	58	37	18	32	-	-	26	58	64	-	M6	M6	49	122	147	M5	90	20.5	20.5	6.8 kg	0.24 kg
ELZU 60	426	330	144	96	80	47	30	42	-	-	33	82	90	-	M8	M8	59	168	210	M6	123	27	26	14.7 kg	0.62 kg
ELZU 60S	450	330	170	108	80	47	30	42	-	-	33	82	94	-	M8	M8	59	194	210	M6	127	27	26	17.7 kg	0.62 kg
ELZU 80	535	435	170	117	100	68	40	60	10	30	44	110	121	M6	M10	M10	90	194	244	M8	165	39	38	31.0 kg	1.00 kg
ELZU 80S	555	455	190	126	100	68	40	60	12.5	30	45	110	122	M6	M10	M8	90	214	264	M8	167	39	38	32.0 kg	1.00 kg
ELZU 100	758	590	230	155	130	90	50	80	-	29	69	135	154	M10	M12	M10	110	300	360	M10	223	50	50	47.3 kg	1.40 kg

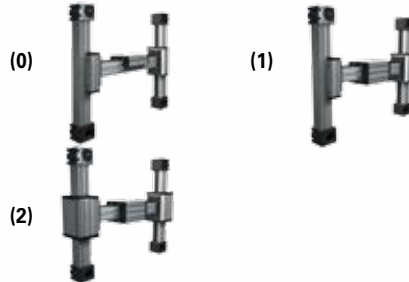
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Choice of guide body profile:

- (0) Standard (2) corrosion-protected guide rods and screws
- (4) expanded corrosion-protected version (depending on the availability of components)

0

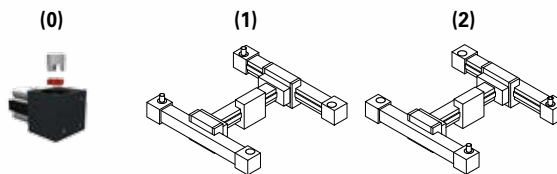
Choice of carriages:



	VERSION 1				VERSION 2			
	OX	LX	QY	LY	OX	LX	QY	LY
30	94	252	126	210	94	252	138	222
40	138	320	147	250	138	320	163	266
60	184	442	210	330	184	442	226	346
60S	214	468	210	330	214	468	230	350
80	210	551	244	435	210	551	260	451
80S	234	575	264	455	234	575	284	475
100	316	774	360	590	316	774	376	606

0

Drive version:



The standard version is supplied without shaft. A shaft can be retrofitted by inserting it into the pulley bore and securing it with 2 locking rings.

Belt table

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 1	30	3M12	75	25
0 3	40	5M15	100	20
0 4	60 (S)	5M25	130	26
0 7	80 (S)	8M30	192	24
0 9	100	8M50	256	32

Shaft dimensions

SIZE	SHAFT \varnothing h6 x length	KEY
30	6 x 15	2x2x12
40	10 x 27	3x3x25
60 (S)	14 x 35	5x5x28
80 (S)	18 x 45	6x6x40
100	22 x 45	6x6x40

X-Axis **LX + Stroke + Overtravel = Total Length

Y-Axes **LY + Stroke + Overtravel = Total Length

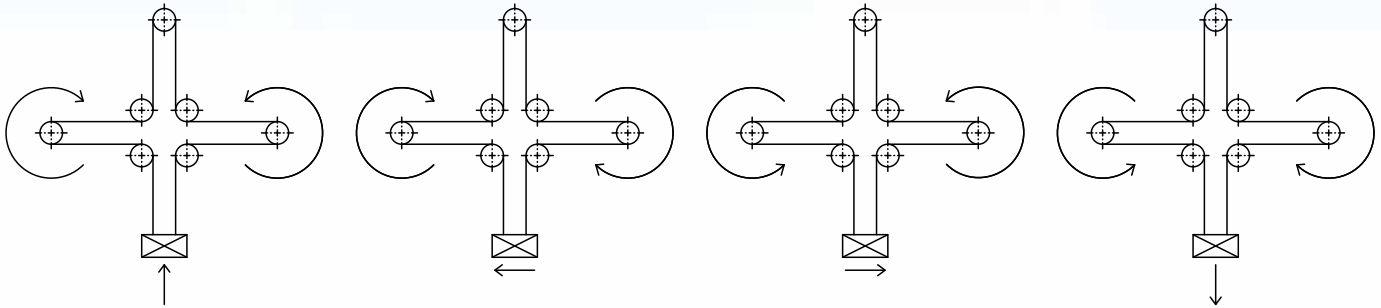
ELZU	60	7	0	0	0	0	4	1	01500
ELZU	60	8	0	0	0	0	4	1	00700
Pos.	1	2	3	4	5	6	7		

Sample ordering code: ELZU 60 with standard body profile, standard carriage, coupling claw on one side, stroke $x = 1,074 / Y = 370$ mm

For mounting hardware and other accessories, refer to pages 134 to 153.

ELZI 30, 40, 60

MULTI-AXIS



Function:

X/Z gantry consisting of a double guide in the horizontal x level and a vertical Z axis. The belt is fixed and tensioned at the load end. The unit is driven by a rotating belt, which remains connected through various deflection points. The movement is realised by two motors. The coordinate lies diagonal to the deflection points of the x axes and the Z axis.

Advantage: Only small masses are moved and thus it is possible to achieve high accelerations.

Fitting position:

As required, max. length for x-axes 2000mm, for z-axis 1000mm

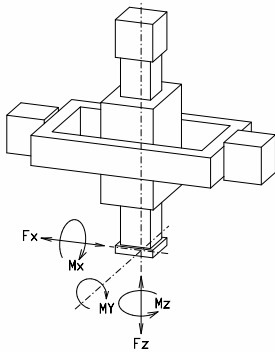
Unit mounting:

By tapped holes in the bearing block, mounting sets.

Belt type:

HTD with steel reinforcement, no backlash when changing direction, repeatability: ± 0.1 mm.

FORCES AND TORQUES



FORCES/TORQUES	ELZI 30		ELZI 40		ELZI 60	
	static	dynam.	static	dynam.	static	dynam.
F_x (N)	390	350	894	800	1,900	1,800
F_z (N)	180	160	1,200	900	1,600	1,200
M_x (Nm)	15	9	25	20	67	43
M_y (Nm)	20	13	32	22	90	70
M_z (Nm)	23	18	35	25	120	100

All forces and torques relate to the following:

$$\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE HORIZONTAL MOVEMENT

Nm	ELZI 30	ELZI 40	ELZI 60
	2 x 0.4	2 x 0.6	2 x 1.1

SPEED

(m/s) max	ELZI 30	ELZI 40	ELZI 60
	2	4	5

TENSILE FORCE (please use the Mulco lifetime calculation, see page 174)

permanent (N)	ELZI 30	ELZI 40	ELZI 60
	390	894	1,900
0.2 s (N)	480	1,000	2,090

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴ (X-/Z-Achse)	ELZI 30	ELZI 40	ELZI 60
	0.31x10 ⁵ / 0.41x10 ⁵	1.12x10 ⁵ / 1.32x10 ⁵	4.06x10 ⁵ / 6.79x10 ⁵
I_y mm ⁴ (X-/Z-Achse)	1.70x10 ⁵ / 0.40x10 ⁵	7.20x10 ⁵ / 1.34x10 ⁵	24.3x10 ⁵ / 6.97x10 ⁵
E-Modulus N/mm ²	70,000	70,000	70,000

Formula: ELZI

Driving torque:

$$M_a = \frac{F \cdot P \cdot S}{2,000 \cdot \pi} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

- F = force (N)
- P = pulley action perimeter (mm)
- S₁ = safety factor 1.2 ... 2
- M_{leer} = no-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

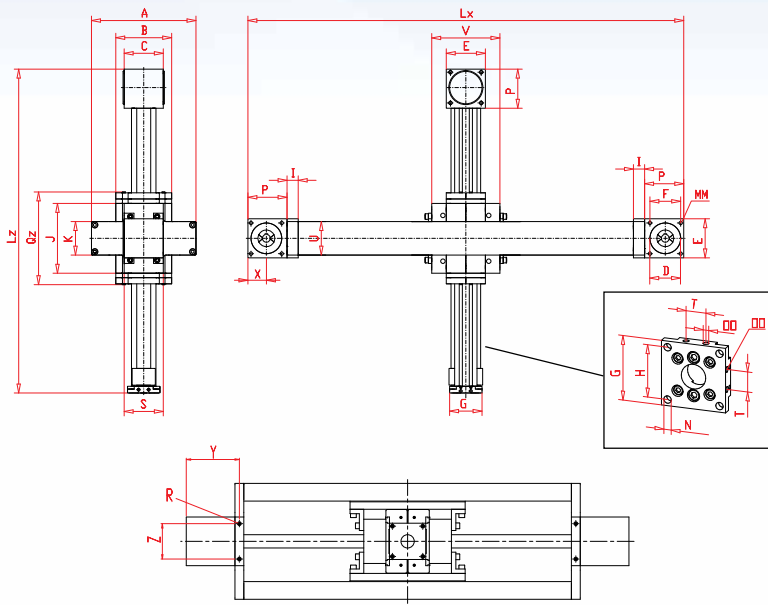
$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000 (N/mm²)
- I = second moment of area (mm⁴)

MODULAR LINEAR ACTUATORS

BELT DRIVEN

Dimensions (mm)



Endpiece for gripper

X-AXIS			Z-AXIS	
Profile	moving mass	Profile	moving mass	
30	2 x UL40	4.5 kg	EL30	1.0 kg
40	2 x UL60	7.0 kg	EL40	2.4 kg
60	2 x UL80	19.0 kg	EL60	6.5 kg

SIZE	LX	LZ	A	B	C	D	E	F	G	H	I	J	K	MM for	ØN for	OO for	P	QZ	R for	S	T	U	V	X	Y	Z	BASIC WEIGHT	WEIGHT per 100 mm X/Z-axis
ELZI 30	290	245	137	70	51	47	52	42	42	35	15	114	40	M6	4.2	M6	55	144	M6	60	-	40	112	26.5	62.5	35	5.20 kg	0.32/0.18 kg
ELZI 40	380	290	187	100	70	55	70	55	58	47	20	125	60	M6	6.6	M6	70	165	M8	70	18	60	122	33	80	50	11.5 kg	0.68/0.3 kg
ELZI 60	525	425	262	144	110	90	100	80	82	68	20	192	80	M10	8.5	M8	110	235	M10	100	30	80	198	50	120	80	33.0 kg	1.13/0.67 kg

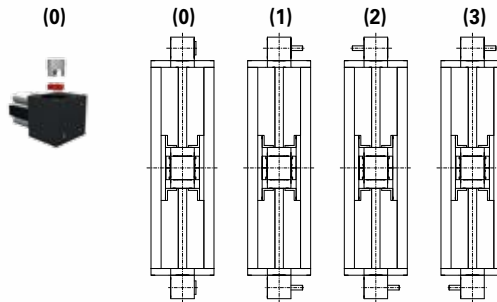
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Choice of guide body profile:

- (0) Standard (2) corrosion-protected guide rods and screws
- (4) expanded corrosion-protected version (depending on the availability of components)

0

Drive version:



Belt table

CODE	SIZE	BELT	MM/REV.	NUMBER OF TEETH
0 3	30	5M15	120	24
0 4	40	5M25	160	32
0 6	60	8M30	224	28

Shaft dimensions / Coupling Type

SIZE	SHAFT ø h6 x length	KEY	COUPLING
30	10x27	3x3x25	Type 9
40	14x35	5x5x28	Type 14
60	22x45	6x6x35	Type 24

X-Axis **L + Stroke + Overtravel = Total Length

Y-Axes **L + Stroke + Overtravel = Total Length

ELZI	40	0	0	0	0	0	4	1	01500
ELZI	40	1	0	0	0	0	4	1	00700

Pos. 1 2 3 4 5 6 7

Sample ordering code: ELZI 40, with standard body profile, coupling claw on one side, stroke x = 1,120 / Z = 410mm

MODULAR LINEAR ACTUATORS



Nook Modular Linear Actuators used in an automatized wood factory.



RACK AND PINION DRIVEN

EXTERNAL ROLLER BEARING GUIDED 100-103

ELZA, ELDZA 100-101

ELZO 102-103

INTERNAL ROLLER BEARING GUIDED 104-109

DLZA 104-105

DSZA 106-107

SLTZA 108-109

ELZA 40 / ELDZA 60, 60S, 80, 80S, 100

EXTERNAL ROLLER BEARING GUIDED



ELZA 40



ELDZA 60, 60S, 80, 80S, 100

We have been implementing comprehensive model improvement measures so that we are able to offer our products in the segment of toothed rack drives in a more cost-effective and application-oriented way.

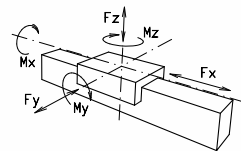
New innovative guiding profiles ELDZA have been developed, which can be used effectively in combination with standardized toothed racks. Depending on the specific task (e. g. load, mounting position, service life or cost) it is possible to use different material combinations.

Function:

This unit consists of an aluminium square profile with integrated, hardened steel guide rods. The carriage, which has internal linear ball bearings that can be adjusted free of play, is driven by a rack and pinion. The pinion is equipped with maintenance-free ball bearings.

- Fitting position: As required. Max. length without joints 6,000 mm.
- Carriage mounting: By T-slots.
- Unit mounting: By T-slots and holes in the bearing blocks, mounting sets.
- Rack: C45, Steel 1.4,305 or plastic (PA 6) possible. Repeatability: ± 0.2 mm.

FORCES AND TORQUES



FORCES/TORQUES	ELZA 40		ELDZA 60		ELDZA 60 S		ELDZA 80		ELDZA 80 S		ELDZA 100	
	static	dyn.	static	dyn.	static	dyn.	static	dyn.	static	dyn.	static	dyn.
F_x (N)	900	750	1,500*	1,200*	1,500*	1,200*	2,200*	1,800*	2,200*	1,800*	2,900*	2,500*
F_y (N)	1,200	700	3,000	2,000	4,100	3,100	3,000	2,000	4,600	3,600	8,000	6,500
F_z (N)	900	650	1,700	1,100	2,160	1,600	1,700	1,100	3,000	1,800	3,600	2,200
M_x (Nm)	25	20	67	43	88	65	90	55	170	140	300	230
M_y (Nm)	32	18	90	70	190	140	110	80	270	230	400	270
M_z (Nm)	35	25	120	100	230	170	150	120	300	220	750	500

All forces and torques related to the following:

$$\frac{\text{existing values}}{\text{table values}} \cdot \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

SPEED

(m/s) max	2	2.5	2.5	3	3	3
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MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	1.32×10 ⁵	4.86×10 ⁵	4.86×10 ⁵	18.99×10 ⁵	18.99×10 ⁵	44.4×10 ⁵
I_y mm ⁴	1.34×10 ⁵	4.87×10 ⁵	4.87×10 ⁵	18.97×10 ⁵	18.97×10 ⁵	44.8×10 ⁵
E-Modulus N/mm ²	70,000	70,000	70,000	70,000	70,000	70,000

* = Depending on material combinations (see page 101) F_x values could be different!

Formula: ELZA/ELDZA

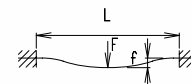
Driving torque:

$$M_a = \frac{F \cdot P \cdot S}{2,000 \cdot \pi} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

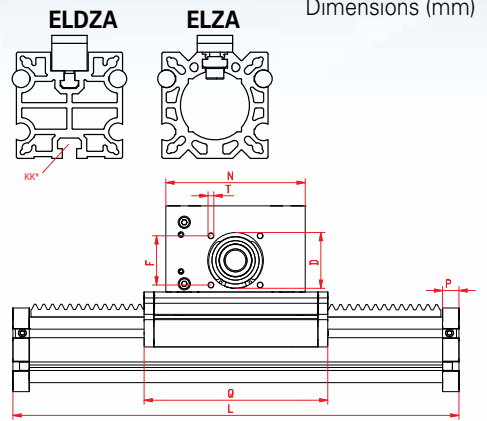
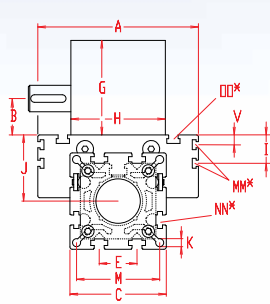
F = force (N)
 P = pulley action perimeter (mm)
 S = safety factor 1.2 ... 2
 M_{leer} = no-load torque (Nm)
 n = rpm pulley (min⁻¹)
 M_a = driving torque (Nm)
 P_a = motor power (KW)

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$



- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70000 (N/mm²)
- I = second moment of area (mm⁴)

MODULAR LINEAR ACTUATORS RACK AND PINION DRIVEN



Increasing the carriage length will increase the basic length by the same amount.

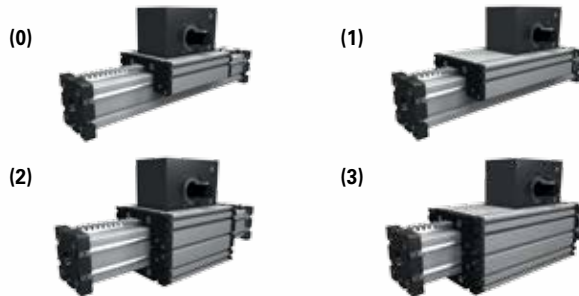
*For slide nuts refer to page 136

SIZE	L**	A	B	C	D	E	F	G	H	I	J	K	KK for	M	MM for	N	NN for	OO for	P	Q	T	V
ELZA 40	150	100	21.5	58	37	18	32	60	56	-	35	6.5	-	47	-	100	M6	M6	12	122	M6	-
ELDZA 60	205	144	28.0	82	47	30	42	75	63	-	49	8.5	M6	69	-	130	M8	M8	16	168	M6	-
ELDZA 60S	230	170	34.5	82	47	30	42	92	63	-	53	8.5	M6	69	-	150	M8	M8	16	194	M6	10
ELDZA 80	240	170	39.0	102	68	40	60	105	100	30	70	8.5	-	88	M6	170	M10	M10	20	194	M8	10
ELDZA 80S	260	190	39.0	102	68	40	60	105	100	30	71	8.5	-	88	M6	170	M10	M8	20	214	M8	12.5
ELDZA 100	360	230	55.3	130	90	50	80	155	120	29	89	10.5	-	112	M10	240	M10	M10	30	300	M10	-

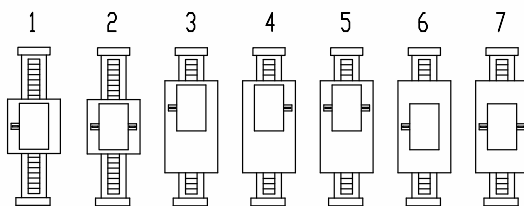
0 Choice of guide body profile:

- (0) Standard (2) corrosion-protected guide rods and screws (Version 0 and 2)
 - (4) expanded corrosion-protected version (Version 1 and 3)
- (depending on the availability of components)

0 Choice of carriages:



1 Drive version:



0 Rack/Pinion Version: (ONLY for ELDZA)

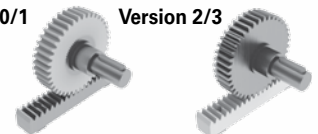
VERSION	0	1	2	3
Material Rack/Pinion	Steel/Plastic (Standard)	Stainless steel/Plastic	Plastic/Steel	Plastic/Stainless steel

1500

**L + Stroke + Overtravel = Total Length

Version 0/1

Version 2/3



ELDZA	60	0	0	0	1	0	3	0	01500
Pos.	1	2	3	4	5	6	7		

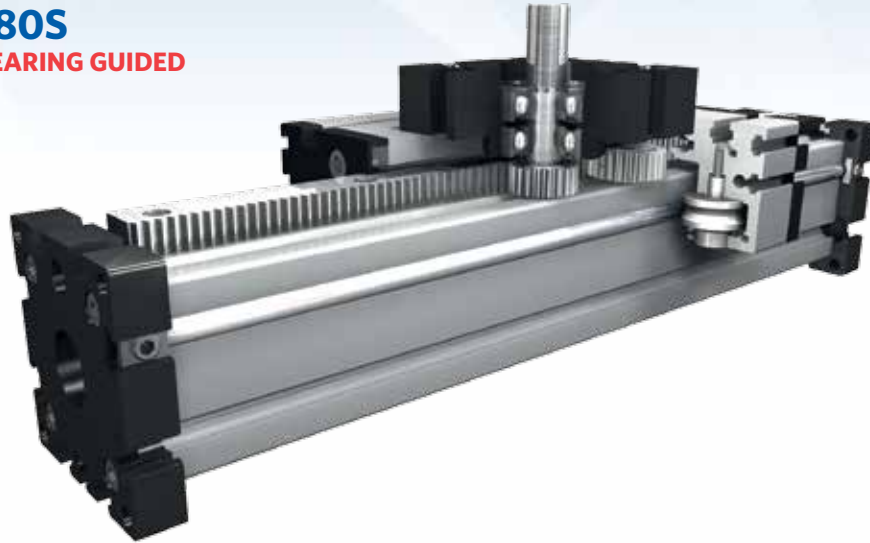
For mounting hardware and other accessories, refer to pages 134 to 153.

Sample ordering code: ELDZA 60 with standard body profile, standard carriage, standard shaft, steel pinion, 1,295 mm stroke

nookindustries.com

ELZQ 60, 80, 80S

EXTERNAL ROLLER BEARING GUIDED

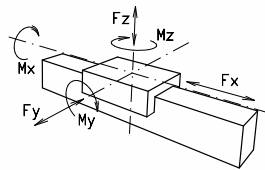


Function:

This unit consists of an aluminium square profile with integrated, hardened steel guide rods. The carriage, which has internal linear ball bearings that can be adjusted free of play, is driven along the guide rods by a high precision rack. The rack and pinion system is suitable for highly dynamic servo operation and ideal for lifting movements. The pinion has maintenance-free ball bearings. The rack is lubricated by a toothed felt wheel.

Fitting position: As required. Max. length without joints 6,000 mm.
 Carriage mounting: By T-slots.
 Unit mounting: By T-slots and holes in the bearing block, mounting sets.
 Rack: Cf53; h6= hardened and ground; h7 = finely toothed. Repeatability: ± 0.1 mm.

FORCES AND TORQUES



FORCES/TORQUES	ELZQ 60 H6		ELZQ 60 H7		ELZQ 80 H6		ELZQ 80 H7		ELZQ 80S H6		ELZQ 80S H7	
	static	dyn.	static	dyn.	static	dyn.	static	dyn.	static	dyn.	static	dyn.
F_x (N)	1,800	1,400	940	780	1,800	1,400	940	780	1,800	1,400	940	780
F_y (N)	3,000	2,000	3,000	2,000	3,000	2,000	3,000	2,000	4,600	3,600	4,600	3,600
F_z (N)	1,700	1,100	1,700	1,100	1,700	1,100	1,700	1,100	3,000	1,800	3,000	1,800
M_x (Nm)	67	43	67	43	90	55	90	55	170	140	170	140
M_y (Nm)	90	70	90	70	110	80	110	80	270	230	270	230
M_z (Nm)	120	100	120	100	150	120	150	120	300	220	300	220

All forces and torques related to the following:

$$\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

SPEED

(m/s) max	4	4	4	4	4	4
-----------	---	---	---	---	---	---

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	6.79×10^5	6.79×10^5	18.99×10^5	18.99×10^5	18.99×10^5	18.99×10^5
I_y mm ⁴	6.97×10^5	6.97×10^5	18.97×10^5	18.97×10^5	18.97×10^5	18.97×10^5
E-Modulus N/mm ²	70,000	70,000	70,000	70,000	70,000	70,000

Formula: ELZQ

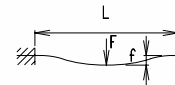
Driving torque:

$$M_a = \frac{F \cdot P \cdot S_f}{2,000 \cdot \pi} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

- F = force (N)
- P = pulley action perimeter (mm)
- S_f = safety factor 1.2 ... 2
- M_{leer} = no-load torque (Nm)
- n = rpm pulley (min⁻¹)
- M_a = driving torque (Nm)
- P_a = motor power (KW)

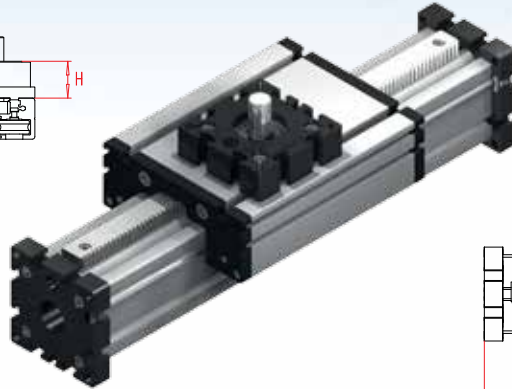
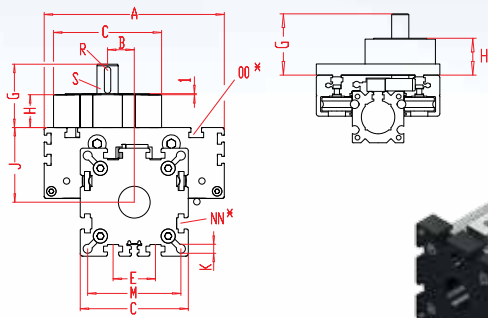
$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$



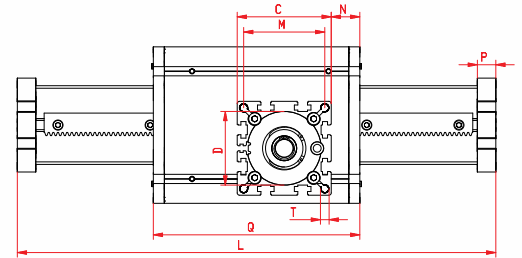
- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70000 (N/mm²)
- I = second moment of area (mm⁴)

MODULAR LINEAR ACTUATORS RACK AND PINION DRIVEN

Dimensions (mm)



Size 60 with mounting plate on carriage.



Increasing the carriage length will increase the basic length by the same amount.

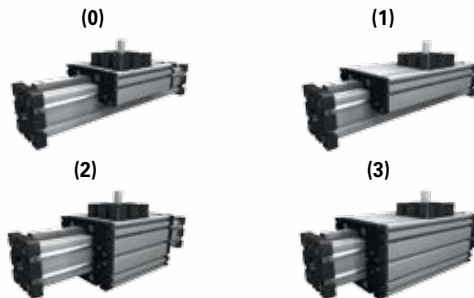
*For slide nuts refer to page 136

SIZE	L**	A	B	C	ØD	E	G	H	J	K	M	N	NN for	OO for	P	Q	T	BASIC WEIGHT	WEIGHT per 100 mm
ELZQ 60	230	144	25.5	82	62	30	71.5	42	49	8.5	69	32	M8	M8	16	194	M10	5.0 kg	0.68 kg
ELZQ 80	260	170	25.5	102	80	40	60.5	31	70	8.5	88	25	M10	M10	20	214	M10	11.0 kg	1.19 kg
ELZQ 80S	280	190	25.5	102	80	40	60.5	31	71	8.5	88	25	M10	M8	20	234	M10	12.0 Kg	1.19 kg

0 Choice of guide body profile:

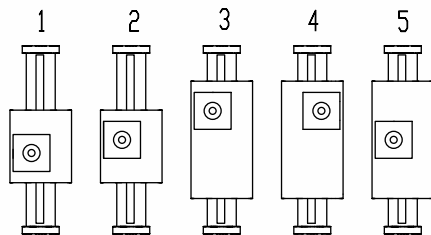
- (0) Standard (2) corrosion-protected guide rods and screws
- (4) expanded corrosion-protected version (depending on the availability of components)

0 Choice of carriages:



	VERSION 1		VERSION 2		VERSION 3	
	Q	L	Q	L	Q	L
60	338	374	210	246	354	390
80	384	430	230	276	400	446
80S	404	450	254	300	420	466

1 Drive version:



	SHAFT	KEY	PINION
	Ø h6 x length	mm/rev.	module
60	20 x 29.5	6x6x25	100 1.6
80 (S)	20 x 29.5	6x6x25	100 1.6

0 Rack and pinion accuracy:

- (0) h7 (standard)
- (1) h6 (hardened and ground, finely toothed)

1500

**L + Stroke + Overtravel = Total Length

ELZQ 60 0 0 0 1 0 2 0 01500
Pos. 1 2 3 4 5 6 7

For mounting hardware and other accessories, refer to pages 134 to 153.

Sample ordering code:

ELZQ 60 with standard body profile, standard carriage, position of drive 1, rack and pinion accuracy class h7, 1,270 mm stroke

nookindustries.com

DLZA 160, 200

INTERNAL ROLLER BEARING GUIDED



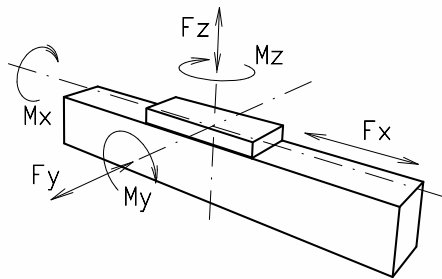
Function:

This unit consists of a rectangular aluminium profile with 2 integrated roller guides. The carriage, which has internal linear ball bearings that can be adjusted free of play, is driven along the guide rods by a high precision rack. The rack and pinion system is suitable for highly dynamic servo operation and ideal for lifting movements. The pinion is equipped with maintenance-free ball bearings. The rack is lubricated by a toothed felt wheel.

- Fitting position: As required. Max. length 6,000 mm without joints.
 Carriage mounting: By T-slots.
 Unit mounting: By T-slots and mounting sets. The linear axis can be combined with any T-slot profile.
 Rack: 6h23 Modul 2 (hardened and ground), repeatability ± 0.1 mm.
 Carriage support: In the standard version, the carriage runs on 8 rollers which can be adjusted and serviced at a central servicing position. For longer carriages the number of rollers can be increased.

FORCES AND TORQUES

FORCES/TORQUES	160		200	
	static	dynamic	static	dynamic
F_x (N)	1,900	1,800	4,000	3,800
F_y (N)	3,000	2,000	4,400	3,100
F_z (N)	3,500	2,800	4,900	4,400
M_x (Nm)	400	320	600	510
M_y (Nm)	360	300	560	480
M_z (Nm)	180	150	310	275



All forces and torques related to the following:

$$\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Nm	1.5	2.6
----	-----	-----

SPEED

(m/s) max	3	5.0
-----------	---	-----

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	22.2×10^5	63.8×10^5
I_y mm ⁴	122.0×10^5	335×10^5
Elastic modulus N/mm ²	70,000	70,000

Formula: DLZA

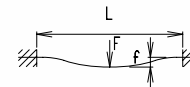
Driving torque:

$$M_a = \frac{F \cdot P \cdot S_i}{2,000 \cdot \pi} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

- F = force (N)
 P = pulley action perimeter (mm)
 S_i = safety factor 1.2 ... 2
 M_{leer} = no-load torque (Nm)
 n = rpm pulley (min⁻¹)
 M_a = driving torque (Nm)
 P_a = motor power (KW)

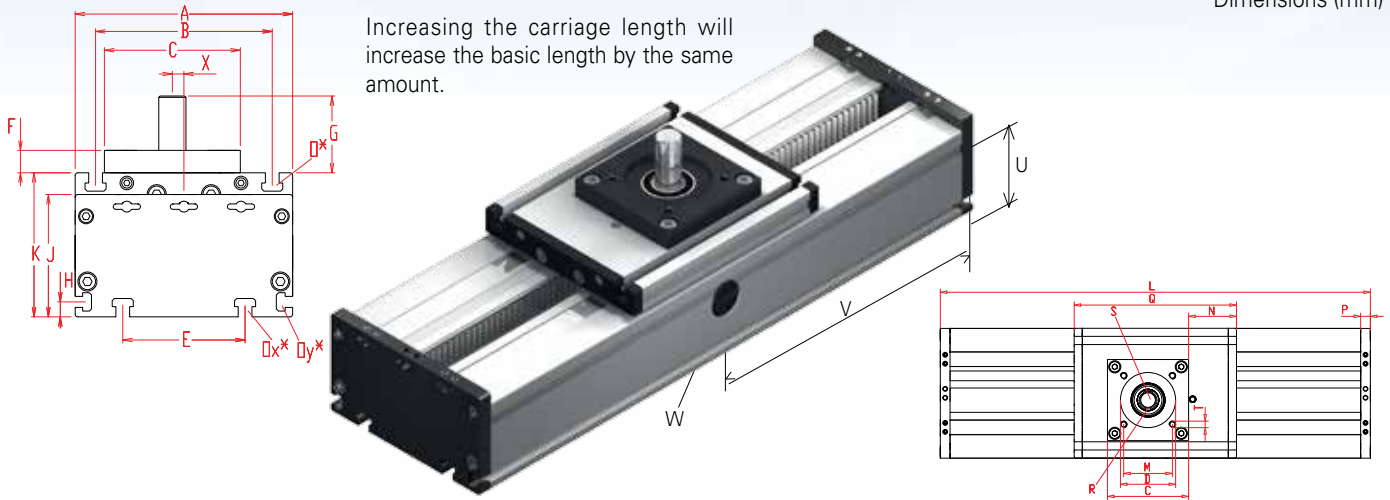
$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$



- f = deflection (mm)
 F = load (N)
 L = free length (mm)
 E = elastic modulus 70,000 (N/mm²)
 I = second moment of area (mm⁴)

MODULAR LINEAR ACTUATORS RACK AND PINION DRIVEN

Dimensions (mm)



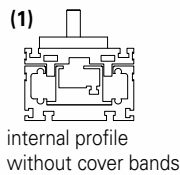
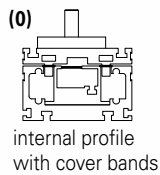
*For slide nuts refer to page 136

$$V = Q + 100 \text{ mm}$$

W = servicing position

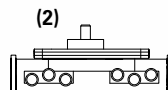
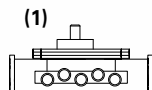
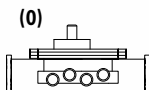
SIZE	L**	A	B	C	D	E	F	G	H	J	K	M	N	O for	OX for	OY for	P	Q	T for	U	X	BASIC WEIGHT	WEIGHT per 100 mm
DLZA 160	240	160	130	100	68	90	16.5	56.5	11	90	106	60	59	M8	M8	M6	12	200	M8	80	8.5	13.0 kg	2.10 kg
DLZA 200	320	200	160	120	90	140	20	45	15	110	129	80	95	M10	M10	M8	15	270	M8	100	5	28.9 kg	6.15 kg

0 Choice of guide body profile:



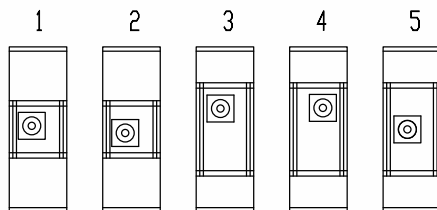
Stainless versions upon request.

0 Choice of carriage:



	VERSION 0		VERSION 1		VERSION 2	
	Q	L	Q	L	Q	L
160	200	240	250	290	>300	>340
200	270	320	330	380	>410	>460

1 Drive version:



Shaft dimensions

	SHAFT	KEY	PINION	
	ø h6 x length (S)	(R)	mm/rev.	module
160	20 x 40	6x6x35	100.53	2
200	18 x 25	6x6x20	94.25	2

**L + Stroke + Overtravel = Total Length

DLZA 160 1 0 0 1 0 0 1 01500

Pos. 1 2 3 4 5 6 7

Sample ordering code: DLZA,160 with internal profile and cover bands, standard carriage, 1,260 mm stroke.

DSZA 160, 200

INTERNAL PROFILE RAIL GUIDED

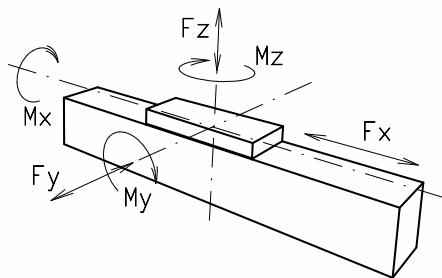


Function:

This unit consists of a rectangular aluminium profile with 2 integrated rail guides. The carriage is driven by a pinion on a high precision rack. The rack and pinion system is suitable for highly dynamic servo operation and ideal for lifting movements. The pinion is equipped with maintenance-free ball bearings. The rack is lubricated by a toothed felt wheel.

Fitting position: As required. Max. length 6,000 mm without joints.
 Carriage mounting: By T-slots.
 Unit mounting: By T-slots and mounting sets. The linear axis can be combined with any T-slot profile.
 Rack: 6h23 Modul 2 (hardened and ground), repeatability ± 0.1 mm.
 Carriage support: In the standard version, the carriage runs on 4 runner blocks which can be serviced at a central servicing position. For longer carriages the number of runner blocks can be increased.

FORCES AND TORQUES



	160		200	
FORCES / TORQUES	static	dynamic	static	dynamic
F_x (N)	1,900	1,800	4,000	3,800
F_y (N)	3,000	2,000	4,400	3,100
F_z (N)	3,500	2,800	4,900	4,400
M_x (Nm)	400	320	600	510
M_y (Nm)	360	300	560	480
M_z (Nm)	180	150	310	275

All forces and torques related to the following:

$$\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

NO-LOAD TORQUE

Nm	1.5	2.6
----	-----	-----

SPEED

(m/s) max	3	5.0
-----------	---	-----

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	22.2×10^5	63.8×10^5
I_y mm ⁴	122.0×10^5	335×10^5
Elastic modulus N/mm ²	70,000	70,000

* referred to lifetime

Formula: DSZA

Driving torque:

$$M_a = \frac{F \cdot P \cdot S_i}{2,000 \cdot \pi} + M_{leer}$$

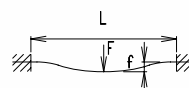
$$P_a = \frac{M_a \cdot n}{9,550}$$

F = force (N)
 P = pulley action perimeter (mm)
 S_i = safety factor 1.2 ... 2
 M_{leer} = no-load torque (Nm)
 n = rpm pulley (min⁻¹)
 M_a = driving torque (Nm)
 P_a = motor power (KW)

Deflection:

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

f = deflection (mm)
 F = load (N)
 L = free length (mm)
 E = elastic modulus 70,000
 I = second moment of area (mm⁴)



Nominal lifetime:

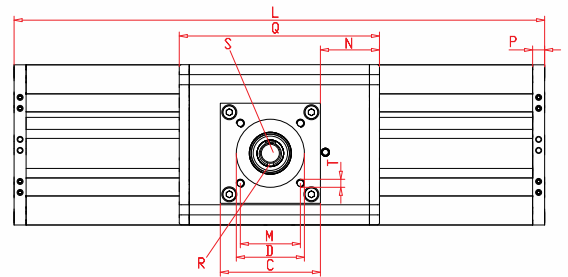
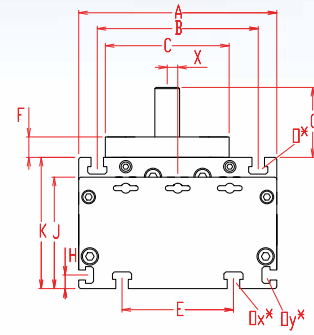
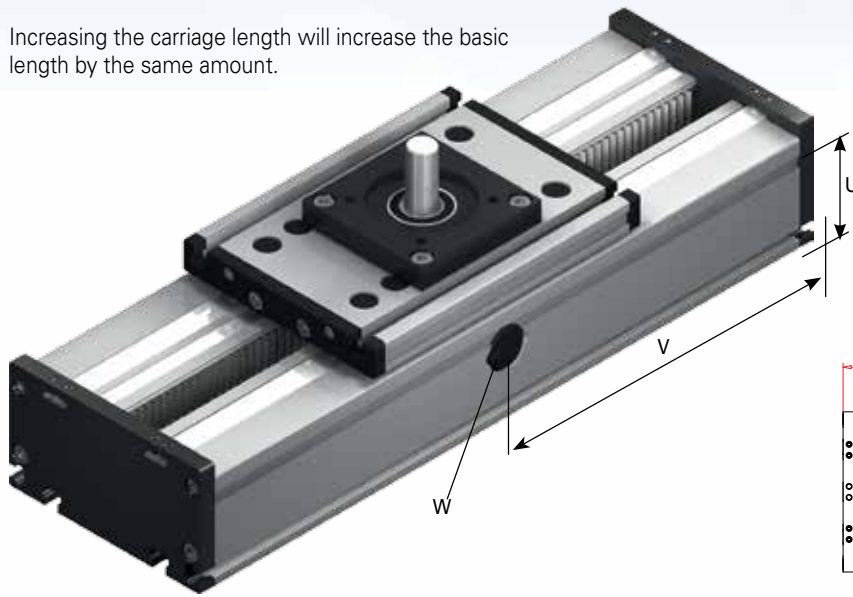
$$L = \left(\frac{C}{F} \right)^3 \times 10^5$$

L = Lifetime in meter
 C = Dynamic load factor (N)
 F = Middle load (N)

MODULAR LINEAR ACTUATORS RACK AND PINION DRIVEN

Dimensions (mm)

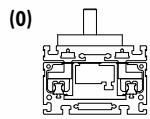
Increasing the carriage length will increase the basic length by the same amount.



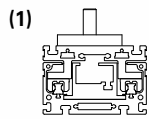
*For slide nuts refer to page 136 $V = Q + 100 \text{ mm}$ $W = \text{servicing position}$

	L**	A	B	C	D	E	F	G	H	J	K	M	N	O	OX	OY	P	Q	T	U	X	BASIC WEIGHT	WEIGHT per 100 mm
DSZA 160	250	160	130	100	68	90	16.5	56.5	11	90	106	60	62	M8	M8	M6	12	224	M8	80	8.5	9.4 kg	2.15 kg
DSZA 200	320	200	160	120	90	140	20	45	15	110	129	80	95	M10	M10	M8	15	270	M8	100	9	28.9 kg	7.10 kg

0 Choice of guide body profile:



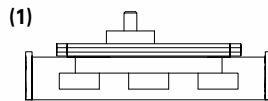
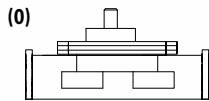
internal profile with cover bands



internal profile without cover bands

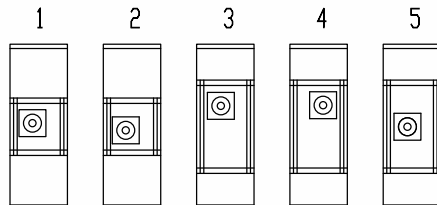
Stainless versions upon request.

0 Choice of carriage:



	VERSION 0		VERSION 1	
	Q	L	Q	L
160	224	250	360	390
200	270	320	320	360

1 Drive version:



Shaft dimensions:

	SHAFT	KEY	PINION	
	ø h6 × length (S)	(R)	mm/U	module
160	20 × 40	6×6×35	100.53	2
200	18 × 26	6×6×20	94.25	2

DSZA 160 1 0 0 1 0 0 1 01500

**L + Stroke + Overtravel = Total Length

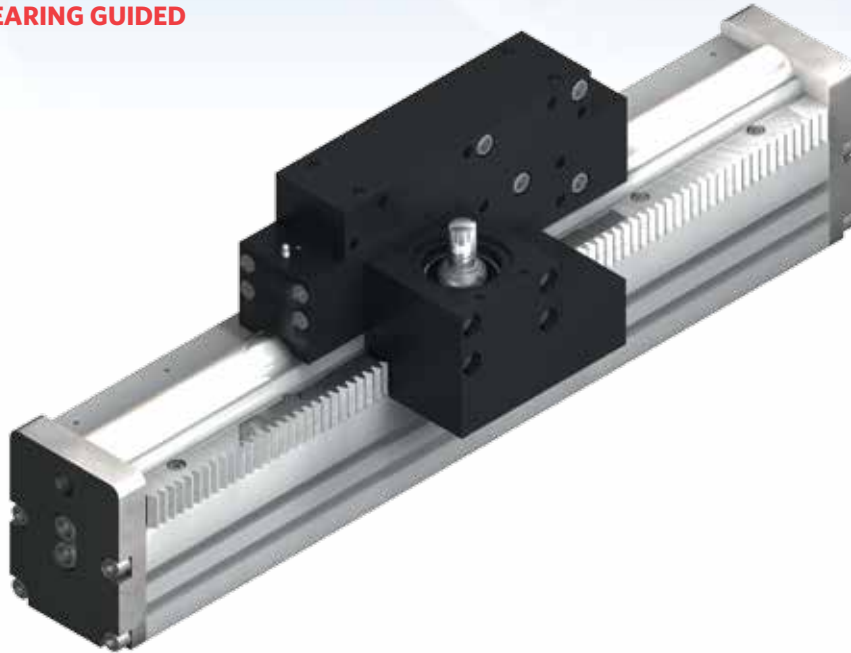
Pos. 1 2 3 4 5 6 7

Sample ordering code: DSZA 160 with internal profile and cover bands, standard carriage, 1250mm stroke.

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SLTZA 30, 50

INTERNAL ROLLER BEARING GUIDED

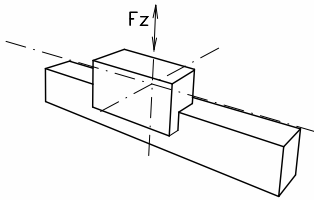


Function:

The guide body consists of an aluminium square profile with a guide rod clamped into it on the upper side free of play. A roller pack containing 2 rollers moves along the guide body. The roller pack is secured against derailing by means of a lateral claw. The system is rack and pinion driven. The number of roller packs is limited due to the length. The system may be extended according to your needs by means of the connecting brackets available as accessories.

Fitting position: horizontal, any max. length
 Unit mounting: by T-Nuts and mounting profiles at the side of the profile

FORCES AND TORQUES



	STLZA 30	STLZA 50
FORCES / TORQUES	static	static
F_z (N)	8,400	17,500
All forces and torques relate to the following:		
existing values	$\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$	
table values		
NO-LOAD TORQUE		
Nm	3	4
MOMENTS OF INERTIA OF ALUMINIUM PROFILE		
I_x mm ⁴	2.10×10^{-7}	8.70×10^{-7}
I_y mm ⁴	3.00×10^{-7}	10.80×10^{-7}
Elastic modulus N/mm ²	70,000	70,000

Formula: SLTZA

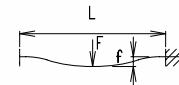
Driving torque:

$$M_a = \frac{F \cdot P \cdot S}{2,000 \cdot \pi} + M_{leer}$$

$$P_a = \frac{M_a \cdot n}{9,550}$$

F = force (N)
 P = pulley action perimeter (mm)
 S = safety factor 1.2 ... 2
 M_{leer} = no-load torque (Nm)
 n = rpm pulley (min⁻¹)
 M_a = driving torque (Nm)
 P_a = motor power (KW)

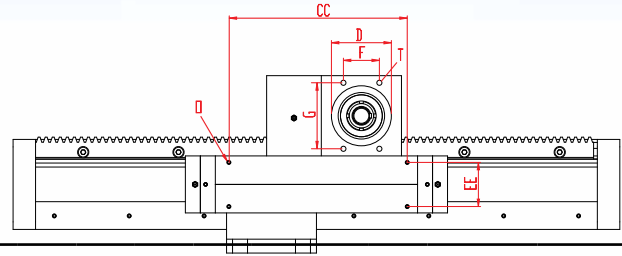
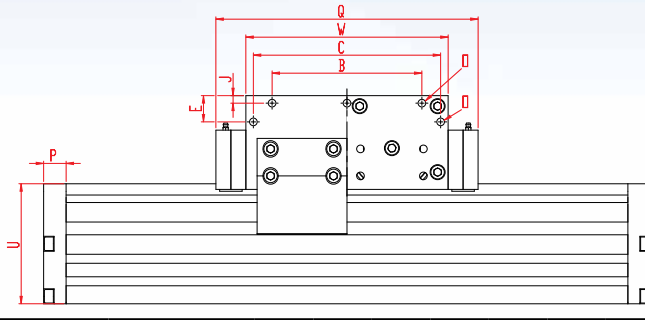
$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$



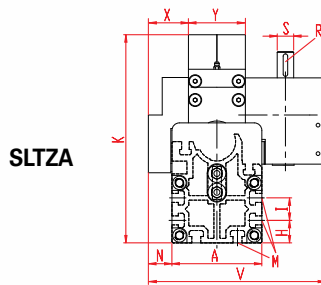
f = deflection (mm)
 F = load (N)
 L = free length (mm)
 E = elastic modulus 70,000 (N/mm²)
 I = second moment of area (mm⁴)

MODULAR LINEAR ACTUATORS RACK AND PINION DRIVEN

Dimensions (mm)



SIZE	L**	B	C	CC	D	E	EE	F	G	J	O	P	Q	T	U	W	BASIC WEIGHT	WEIGHT per 100 mm
SLTZA 30	340	160	210	184	68	23	36	42	75	12	M10	25	290	M8	115	230	19.8 kg	2.00 kg
SLTZA 50	410	186	250	215	80	35	50	48	88	10	M12	30	350	M8	160	270	40.5 kg	4.00 kg



SIZE	A	H	I	K	M	N	R	S	V	X	Y	SHAFT Ø h6 × length	KEY	PINION	
														mm/rev.	module
SLTZA 30	80	24	22	206	M8	28	6×6×30	22h6×35	188	40	56	22 × 35	6×6×30	201.1	2
SLTZA 50	120	30	30	277.5	M10	31.5	6×6×30	22h6×35	236.5	53.5	76	22 × 35	6×6×30	197.9	3

ZA Drive variation:
(ZA) rack and pinion driven

50 Guide rod size / size
Ø=30 mm (SLTZA30), Ø=50 mm (SLTZA50)

0 Choice of guide body profile:
(0) Standard (2) corrosion-protected guide rods and screws (4) expanded corrosion-protected version (depending on the availability of components) (9) corrosion-protected guide rods, rollers, screws and rack

2 Choice of carriage*
(0) without (1) 1 carriage (2) 2 carriages (3) 3 carriages (4) 4 carriages
*= each carriage has 2 rollers

2 Carriage drives
(0) without (1) 1 drive (2) 2 drives (3) 3 drives (4) 4 drives

Rack and pinion accuracy

CODE	QUALITY	RACK ACCURACY	MATERIAL	MARKS
0	10	0.091 mm/300 mm	C45	Hardened teeth
1	9	0.065 mm/300 mm	C45	Milled teeth

910 **L + Stroke + Overtravel = Total Length

SLT ZA 50 0 0 2 2 0 0 0 00910

Pos. 1 2 3 4 5 6 7

Sample ordering code: SLTZA 50, 50 mm guide rods, Standard profil, 2 carriages, 2 drives, rack and pinion accuracy 0.091 mm/300 mm, Stroke 500 mm

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MODULAR LINEAR ACTUATORS



Nook Modular Linear Actuators used in a medical automation application.



NON-DRIVEN

EXTERNAL ROLLER BEARING GUIDED..... 112-119

ELR	112-113
ELRZ	114
ER	115
E	116-117
UL	118-119

INTERNAL ROLLER BEARING GUIDED..... 120-123

QLR	120-121
DLR.....	122-123
SLTR	124-125

INTERNAL PROFILE RAIL GUIDED 126-133

QSR	126-127
QSSR	128-129
QSRZ	130-131
DSR	132-133

NON-DRIVEN

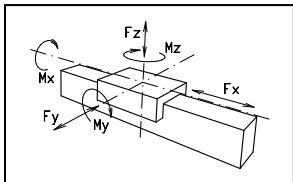
ELR 30, 40, 60, 60S, 80, 80S, 100, 125

EXTERNAL ROLLER BEARING GUIDED



Function:

This unit consists of an aluminium hollow section with integral, parallel ground and hardened steel guide rods. The carriage has play-adjustable ball bearing rollers which engage with the guide rods. Two bearing blocks without bearings are fitted. Actuation can be by pneumatic cylinder or other device, or the unit may be used as load-carrying linear slide.



Fitting position: As required, max. length 6,000 mm
 Carriage connection: By T-slots and tapped holes
 Unit mounting: By T-slots and tapped holes in the mounting surface, mounting sets.

FORCES AND TORQUES

FORCES/TORQUES	ELR 30		ELR 40		ELR 60		ELR 60 S		ELR 80		ELR 80S		ELR 100		ELR 125	
	static	dynam.	static	dynam.	static	dynam.	static	dynam.	static	dynam.	static	dynam.	static	dynam.	static	dynam.
F_x (N)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
F_y (N)	90	60	1,200	700	3,000	2,000	4,100	3,100	3,000	2,000	4,600	3,600	8,000	6,500	12,000	9,000
F_z (N)	90	60	900	650	1,700	1,100	2,160	1,600	1,700	1,100	3,000	1,800	3,600	2,200	6,000	4,500
M_x (Nm)	10	5	25	20	67	43	88	65	90	55	170	140	300	230	600	450
M_y (Nm)	13	6	32	18	90	70	190	140	110	80	270	230	400	270	750	600
M_z (Nm)	14	7	35	25	120	100	230	170	150	120	300	220	750	500	1,350	1,150

All forces and torques relate to the following:
 existing values $\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$
 table values

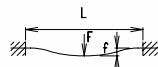
NO-LOAD TORQUE

max. (m/s)	3	4	5	5	6	8	10	10
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MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	4.09×10^4	1.32×10^5	6.79×10^5	6.79×10^5	18.99×10^5	18.99×10^5	44.4×10^5	10.2×10^5
I_y mm ⁴	4.00×10^4	1.34×10^5	6.97×10^5	6.97×10^5	18.97×10^5	18.97×10^5	44.8×10^5	10.2×10^5
E-Modulus N/mm ²	70,000	70,000	70,000	70,000	70,000	7,000	70,000	70,000

Formula: ELR

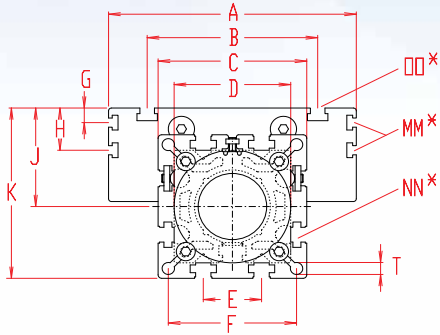
$$f = \frac{F * L^3}{E * I * 192}$$


f = deflection (mm)
 F = load (N)
 L = free length (mm)
 E = elastic modulus 70,000 (N/mm²)
 I = second moment of area (mm⁴)

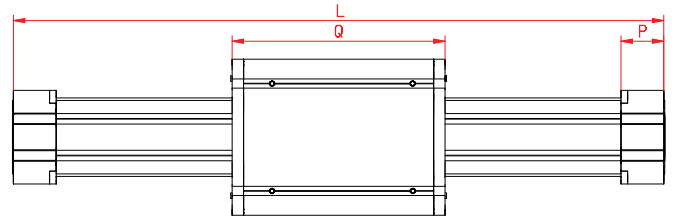
MODULAR LINEAR ACTUATORS

NON-DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.



*For slide nuts refer to page 136

SIZE	L**	A	B	C	D	E	F	G	H	J	K	MM for	NN for	OO for	P	Q	T	BASIC WEIGHT	WEIGHT per 100 mm
ELR 30	120	70	56	42	40x1	13	35	-	-	26	47	-	M6	M6	18	82	4.2	0.5 kg	0.12 kg
ELR 40	175	100	66	58	48x1	18	47	-	-	35	64	-	M6	M6	25	122	6.5	0.9 kg	0.23 kg
ELR 60	245	144	96	82	62x1	30	69	-	-	49	90	-	M8	M8	35	168	8.5	3.1 kg	0.61 kg
ELR 60S	265	170	108	82	62x1	30	69	-	-	53	94	-	M8	M8	35	194	8.5	4.1 kg	0.61 kg
ELR 80	285	170	117	102	80x1	40	88	10	30	70	121	M6	M10	M10	45	194	8.5	5.3 kg	0.90 kg
ELR 80S	305	190	126	102	80x1	40	88	12.5	30	71	122	M6	M10	M8	45	214	8.5	6.3 kg	0.90 kg
ELR 100	410	230	155	130	110x1	50	112	-	29	89	154	M10	M10	M10	55	300	10.5	15.1 kg	1.50 kg
ELR 125	510	295	200	165	130x1	60	142	-	30	107.5	190	M10	M12	M12	65	365	13	26.8 kg	2.05 kg

0

Choice of guide body profile:

- (0) Standard (2) corrosion-protected guide rods and screws
- (4) expanded corrosion-protected version (depending on the availability of components)

0

Choice of carriages:



	VERSION 1	
	Q	L
30	94	132
40	138	191
60	184	261
60S	214	284
80	210	301
80S	234	325
100	316	426
125	389	534

1500

**L + Stroke + Overtravel = Total Length

ELR 40 0 0 0 0 0 0 0 0 1500
Pos. 1 2 3 4 5 6 7

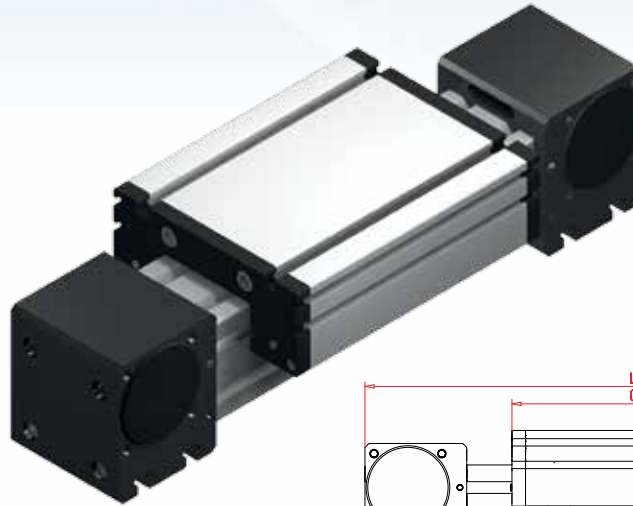
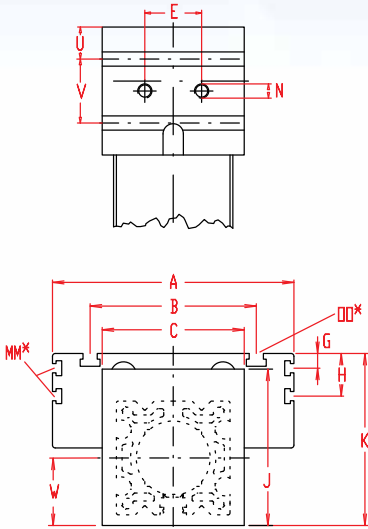
For mounting hardware and other accessories, refer to pages 134 to 153.

Sample ordering code: ELR 40, non driven system, standard body profile, standard carriage, 1,325 mm stroke

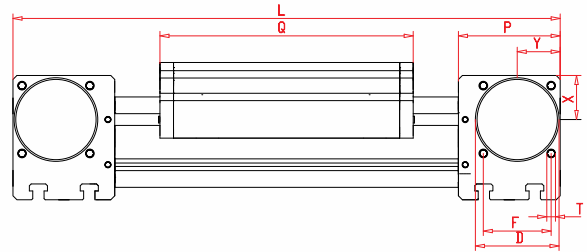
ELRZ 30, 40, 60, 60S, 80, 80S, 100, 125

EXTERNAL ROLLER BEARING GUIDED

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.



*For slide nuts refer to page 136

SIZE	L**	A	B	C	D	E	F	G	H	J	K	MM for	OO for	P	Q	T	U	V	W	X	Y	BASIC WEIGHT	WEIGHT per 100 mm	
ELRZ 30	158	70	56	42	28	13	25	-	-	44	47	-	M6	M6	36	82	M4	10	16	21	16	16	0.6 kg	0.13 kg
ELRZ 40	225	100	66	58	37	18	32	-	-	58	64	-	M6	M6	49	122	M5	12.5	24	29	20.5	20.5	1.2 kg	0.23 kg
ELRZ 60	290	144	96	80	47	30	42	-	-	82	90	-	M8	M8	59	168	M6	15	30	41	27	26	3.4 kg	0.61 kg
ELRZ 60S	315	170	108	80	47	30	42	-	-	82	94	-	M8	M8	59	194	M6	15	30	41	27	26	4.4 kg	0.61 kg
ELRZ 80	375	170	117	100	68	40	60	10	30	110	121	M6	M10	M10	90	194	M8	22.5	45	51	39	38	6.7 kg	0.90 kg
ELRZ 80S	395	190	126	100	68	40	60	12.5	30	110	122	M6	M10	M8	90	214	M8	22.5	45	51	39	38	7.7 kg	0.90 kg
ELRZ 100	530	230	155	130	90	50	80	-	29	135	154	M10	M12	M10	110	300	M10	23	64	65	50	50	17.5 kg	1.50 kg
ELRZ 125	625	295	200	160	110	60	100	-	30	167	191	M10	M12	M12	130	365	M12	38	50	82	60	60	28.3 kg	2.05 kg

- 0** Choice of guide body profile:
 (0) Standard (2) corrosion-protected guide rods and screws
 (4) expanded corrosion-protected version (depending on the availability of components)

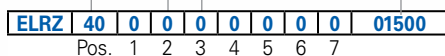
- 0** Choice of carriages:



Application:
 This unit can be used as a load-carrying linear slide, or it may be fitted with a suitable pneumatic drive.

	VERSION 1	
	Q	L
30	94	170
40	138	241
60	184	306
60S	214	335
80	210	391
80S	234	415
100	316	546
125	389	649

1500 Basic length + stroke = total length



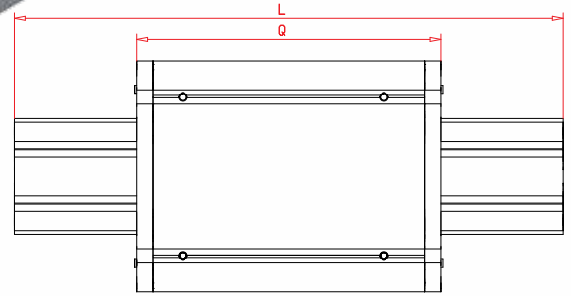
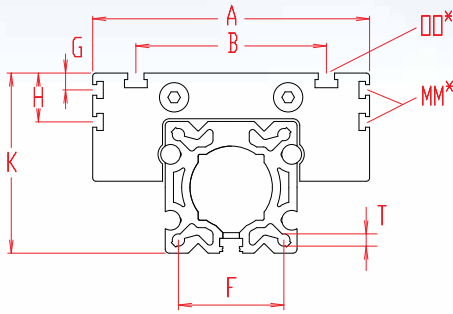
For mounting hardware and other accessories, refer to pages 134 to 153.

Sample ordering code: ELRZ 40, Non driven system, standard body profile, standard carriage, 1,275 mm stroke

MODULAR LINEAR ACTUATORS NON-DRIVEN

ER 30, 40, 60, 60S, 80, 80S, 100, 125 EXTERNAL ROLLER BEARING GUIDED

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.

*For slide nuts refer to page 136

SIZE	L**	A	B	F	G	H	J	K	MM for	OO for	Q	T	BASIC WEIGHT	WEIGHT per 100 mm
ER 30	86	70	56	23	-	-	M6	41	-	M6	82	M4	0.5 kg	0.12 kg
ER 40	126	100	66	29	-	-	M6-M10	55	-	M6	122	M5	0.7 kg	0.23 kg
ER 60	172	144	96	48	-	-	M6-M10	79	-	M8	168	M6	2.4 kg	0.61 kg
ER 60S	198	170	108	48	-	-	M6-M10	83	-	M8	194	M6	3.4 kg	0.61 kg
ER 80	198	170	117	64	10	30	M6-M10	110	M6	M10	194	M8	3.7 kg	0.90 kg
ER 80S	218	190	126	64	12.5	30	M6-M10	111	M6	M8	214	M8	4.7 kg	0.90 kg
ER 100	304	230	155	80	-	29	M10	139	M10	M10	300	M10	10.8 kg	1.50 kg
ER 125	369	295	200	100	-	30	M12	170	M10	M12	365	M12	20.3 kg	2.05 kg

0

Choice of guide body profile:

- (0) Standard (2) corrosion-protected guide rods and screws
- (4) expanded corrosion-protected version (depending on the availability of components)

0

Choice of carriages:



VERSION 1

	Q	L
30	94	98
40	138	142
60	184	188
60S	214	218
80	210	214
80S	234	238
100	316	320
125	389	393

Application:

This unit can be used as a load-carrying linear slide, or it may be fitted with a suitable pneumatic drive.

1500

**L + Stroke + Overtravel = Total Length

ER 40 0 0 0 0 0 0 0 0 01500
Pos. 1 2 3 4 5 6 7

For mounting hardware and other accessories, refer to pages 134 to 153.

Sample ordering code: ER 40, Non driven system, standard body profile, standard carriage, 1,374 mm stroke

E 40, 60, 60S, 80, 80S

EXTERNAL ROLLER BEARING GUIDED

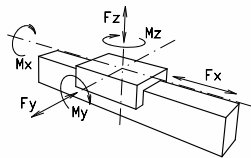


Function:

Very low building system achieved by an aluminium guide body with integrated, hardened steel guide rods. The carriage, which has internal linear ball bearings that can be adjusted free of play, moves along the body.

Fitting position: As required, max. length 6,000 mm.
 Carriage connection: By T-slots.
 Unit mounting: By tapped holes in the mounting surface, bottom surface with T-slots.

FORCES AND TORQUES



FORCES/TORQUES	E 40		E 60		E 60 S		E 80		E 80S	
	static	dynamic	static	dynamic	static	dynamic	static	dynamic	static	dynamic
F_x (N)	-	-	-	-	-	-	-	-	-	-
F_y (N)	1,200	700	3,000	2,000	4,100	3,100	3,000	2,000	4,600	3,600
F_z (N)	900	650	1,700	1,100	2,160	1,600	1,700	1,100	3,000	1,800
M_x (Nm)	25	20	67	43	88	65	90	55	170	140
M_y (Nm)	32	18	90	70	190	140	110	80	270	230
M_z (Nm)	35	25	120	100	230	170	150	120	300	220

All forces and torques relate to the following:

$$\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

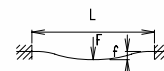
SPEED

max. (m/s)	4	5	5	6	8

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	0.157×10^5	1.71×10^5	1.71×10^5	2.8×10^5	2.8×10^5
I_y mm ⁴	0.654×10^5	6.1×10^5	6.1×10^5	10.59×10^5	10.59×10^5
E-Modulus N/mm ²	70,000	70,000	70,000	70,000	70,000

Formula: E

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$


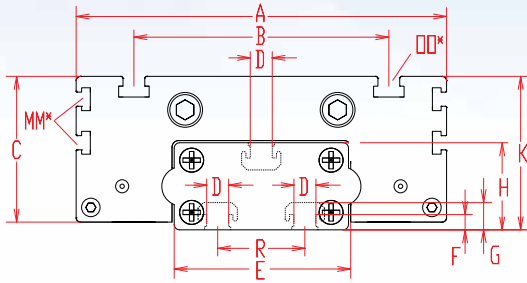
f = deflection (mm)
 F = load (N)
 L = free length (mm)
 E = elastic modulus 70000 (N/mm²)
 I = second moment of area (mm⁴)

MODULAR LINEAR ACTUATORS

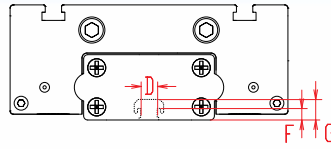
NON-DRIVEN

Dimensions (mm)

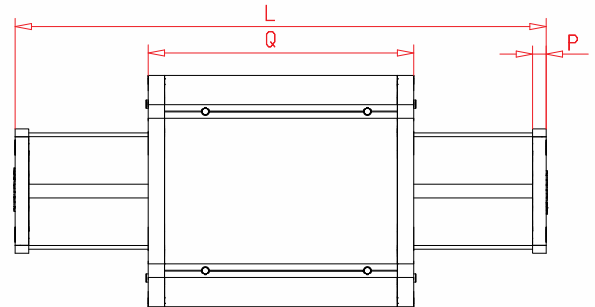
Increasing the carriage length will increase the basic length by the same amount.



Size 80



Size 40, 60



*For slide nuts refer to page 136

SIZE	L**	A	B	C	D	E	F	G	H	K	MM for	OO for	P	Q	R	BASIC WEIGHT	WEIGHT per 100 mm
E 40	136	100	66	34.5	10	40	7	12.5	22	37	-	M6	6	122	-	1.0 kg	0.13 kg
E 60	186	144	96	49	10	60	7	12.5	30	49	-	M8	8	168	-	2.2 kg	0.20 kg
E 60S	212	170	108	53	10	60	7	12.5	30	53	-	M8	8	194	-	3.2 kg	0.20 kg
E 80	215	170	117	66.5	10	80	7	12.5	40	70	M6	M10	10	194	40	3.4 kg	0.48 kg
E 80S	245	190	126	67.5	10	80	7	12.5	40	71	M6	M8	10	214	40	4.4 kg	0.48 kg

0

Choice of guide body profile:

- (0) Standard (2) corrosion-protected guide rods and screws
- (4) expanded corrosion-protected version (depending on the availability of components)

1500

**L + Stroke + Overtravel = Total Length

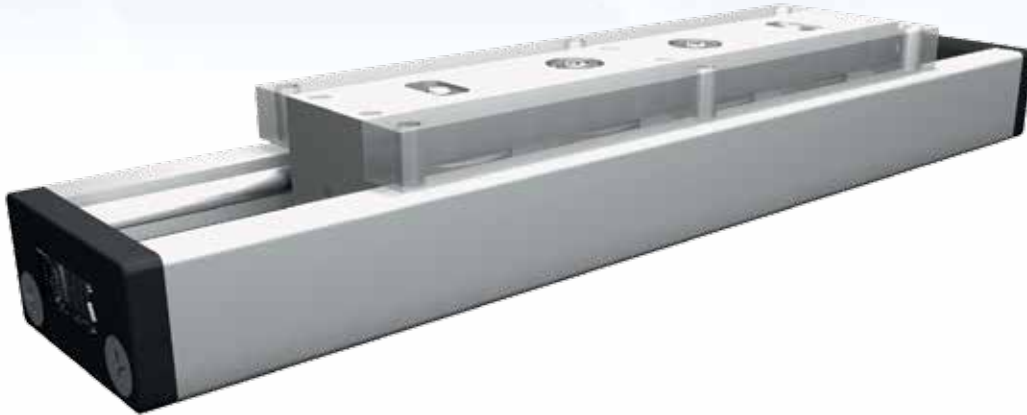
E	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1500
Pos.	1	2	3	4	5	6	7											

For mounting hardware and other accessories, refer to pages 134 to 153.

NON-DRIVEN

UL 40, 60, 80

EXTERNAL ROLLER BEARING GUIDED

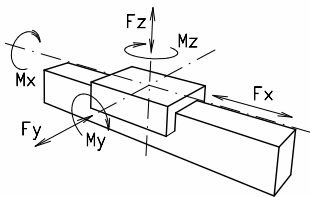


Function:

Very low building roller system achieved by an aluminium guide body with integrated, hardened steel guide rods. The carriage, which has internal linear ball bearings that can be adjusted free of play, moves along the body.

- Fitting position: As required, max. length 6,000 mm.
- Carriage connection: By tapped holes
- Unit mounting: Afterwards by holes or tapped holes

FORCES AND TORQUES



FORCES/TORQUES	UL 40		UL 60		UL 80	
	static	dynamic	static	dynamic	static	dynamic
F _x (N)	-	-	-	-	-	-
F _y (N)	1,200	700	3,000	2,000	3,000	2,000
F _z (N)	900	650	1,700	1,100	1,700	1,100
M _x (Nm)	25	20	67	43	90	55
M _y (Nm)	32	18	90	70	110	80
M _z (Nm)	35	25	120	100	150	120

All forces and torques relate to the following:

$$\begin{matrix} \text{existing values} & \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} & \leq 1 \\ \text{table values} & & \end{matrix}$$

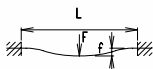
SPEED

max. (m/s)	4	5	6
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MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I _x mm ⁴	0.157×10 ⁵	1.71×10 ⁵	2.8×10 ⁵
I _y mm ⁴	0.654×10 ⁵	6.1×10 ⁵	10.59×10 ⁵
E-Modulus N/mm ²	70,000	70,000	70,000

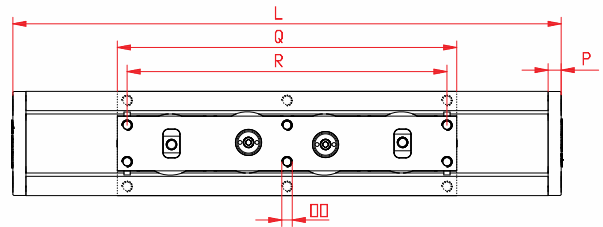
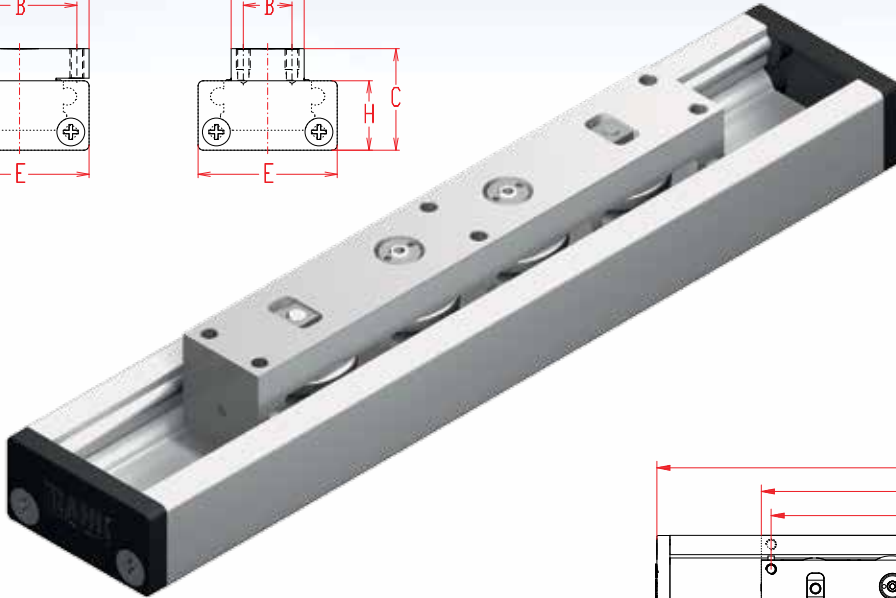
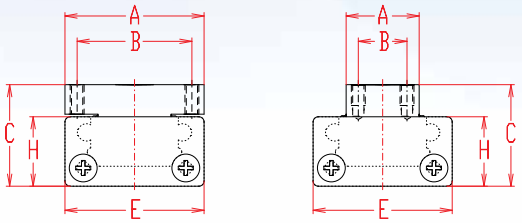
Formula: UL

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$


- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000 (N/mm²)
- I = second moment of area (mm⁴)

MODULAR LINEAR ACTUATORS NON-DRIVEN

Dimensions (mm)



SIZE	L*	A	B	C	E	H	OO for	P	Q	R	BASIC WEIGHT	WEIGHT per 100 mm
UL 40	160	40/20	31/13	33	40	22	M5 / M5x8	6	146*	120	1.2 kg	0.13 kg
UL 60	215	60/29	48/20	43	60	30	M6 / M6x10	8	194*	180	2.1 kg	0.20 kg
UL 80	285	80/42	66/28	58.5	80	40	M8 / M8x12	10	260*	245	4.2 kg	0.48 kg

* = the carriage is not available in different lengths

- 0** Choice of guide body profile:
 (0) Standard (2) corrosion-protected guide rods and screws
 (4) expanded corrosion-protected version (depending on the availability of components)

- 0** Choice of carriage:
 (0) Standard

- (1) narrow carriage



1500 **L + Stroke + Overtravel = Total Length

UL 40 0 0 0 0 0 0 0 0 1500
 Pos. 1 2 3 4 5 6 7

For mounting hardware and other accessories, refer to pages 134 to 153.

Sample ordering code: UL 40, non driven system, standard body profile, standard carriage (wide version), 1,340 mm stroke

QLR 60, 80, 100

INTERNAL ROLLER BEARING GUIDED

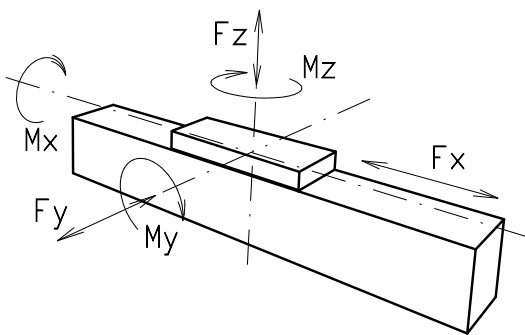


Function:

This unit consists of a square aluminium profile with an integrated roller guide. The carriage, which has internal linear ball bearings that can be adjusted free of play, moves along the guide body. This roller guide can be driven by a pneumatic cylinder or other additional drives or it serves as a load carrying slide unit.

Fitting position:	As required. Max. length 6,000 mm without joints.
Carriage mounting:	By T-slots.
Unit mounting:	By T-slots and mounting sets. The linear axis can be combined with any T-slot profile.
Carriage support:	In the standard version, the carriage runs on 4 rollers which can be adjusted and serviced at a central servicing position. For longer carriages the number of rollers can be increased.

FORCES AND TORQUES



FORCES/TORQUES	60		80		100	
	static	dynamic	static	dynamic	static	dynamic
F_x (N)	-	-	-	-	-	-
F_y (N)	600	500	1,600	1,240	1,900	1,500
F_z (N)	900	650	1,500	1,200	2,100	1,700
M_x (Nm)	15	10	50	40	85	60
M_y (Nm)	60	50	100	80	140	110
M_z (Nm)	40	30	75	60	110	90

All forces and torques related to the following:

$$\begin{array}{l} \text{existing values} \\ \text{table values} \end{array} \quad \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

SPEED

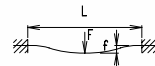
(m/s) max	4	6	7
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MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	4.3×10^5	16.5×10^5	43.0×10^5
I_y mm ⁴	4.8×10^5	18.7×10^5	48.8×10^5
Elastic modulus N/mm ²	70,000	70,000	70,000

Formula: QLR

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

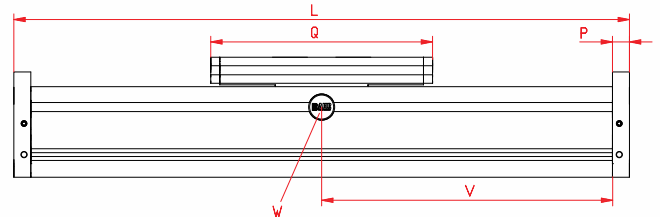
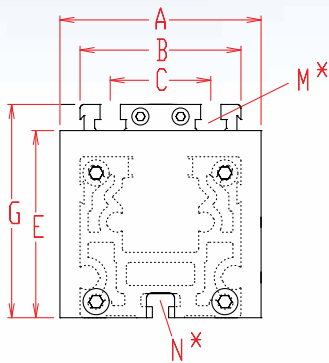


f = deflection	(mm)
F = load	(N)
L = free length	(mm)
E = elastic modulus 70,000	(N/mm ²)
I = second moment of area	(mm ⁴)

MODULAR LINEAR ACTUATORS

NON-DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.

*For slide nuts refer to page 136

$$V = Q + 100 \text{ mm}$$

W = servicing position

SIZE	L**	A	B	C	E	G	N for	M for	P	Q	BASIC WEIGHT	WEIGHT per 100 mm
QLR 60	180	80	60	36	60	79	M5	M6	12	152	1.45 kg	0.36 kg
QLR 80	240	100	80	50	93	106	M6	M8	17	196	4.2 kg	0.75 kg
QLR 100	310	130	100	66	110	129	M10	M10	20	260	7.2 kg	1.42 kg

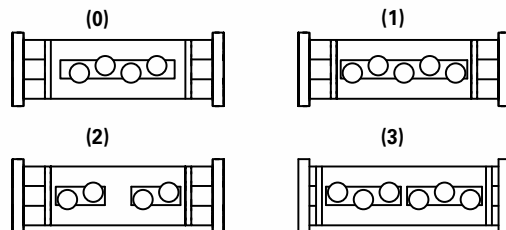
0

Choice of guide body profile:

- (0) Standard (2) corrosion-protected guide rods and screws
- (4) expanded corrosion-protected version (depending on the availability of components)

0

Choice of carriages:



	VERSION 0		VERSION 1		VERSION 2		VERSION 3	
	Q	L	Q	L	Q	L	Q	L
60	152	180	192	220	>232	>260	>232	>260
80	196	240	246	290	>296	>340	>296	>340
100	260	310	320	370	>388	>430	>388	>430

1500

**L + Stroke + Overtravel = Total Length

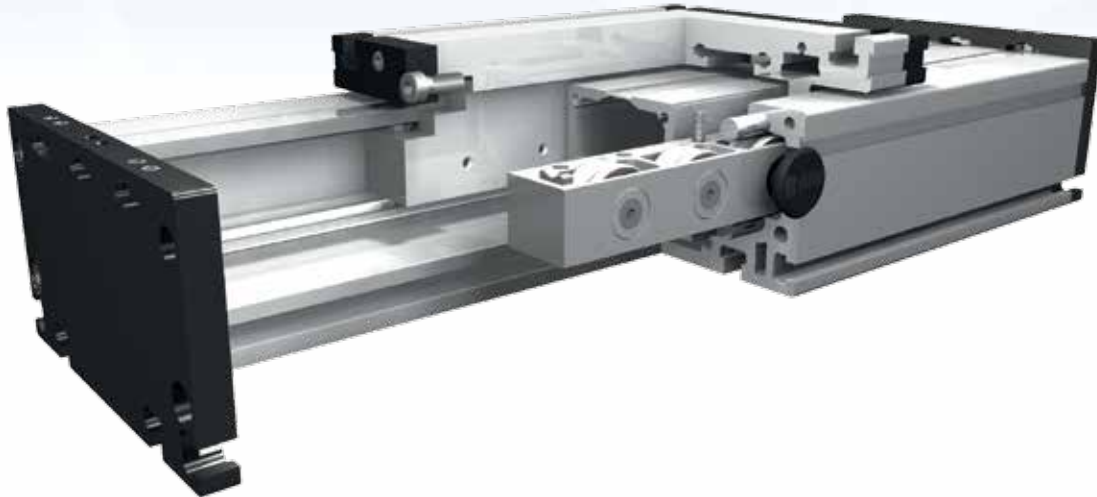
QLR	80	0	0	0	0	0	0	0	0	01500
Pos.	1	2	3	4	5	6	7			

Sample ordering code: QLR80 with standard body profile, standard carriage and 1,260 mm stroke

For additional accessories refer to pages 134 to 153.

DLR 120, 160, 200

INTERNAL ROLLER BEARING GUIDED

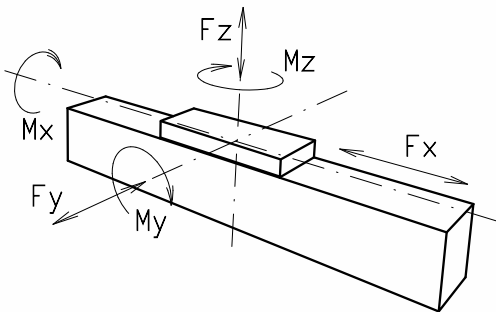


Function:

This unit consists of a rectangular aluminium profile with 2 integrated roller guides. The openings of the guide body are sealed with 3 stainless steel cover bands to protect the guide from splash water and dust. Alternatively, the opening can also be covered with a bellow or can be delivered without cover bands. The roller guide can be either driven by an internal pneumatic cylinder or other additional drives or it serves as load carrying linear slide.

Fitting position: As required. Max. length 6,000 mm without joints.
 Carriage mounting: By T-slots.
 Unit mounting: By T-slots and mounting sets. The linear axis can be combined with any T-slot profile.
 Carriage support: In the standard version, the carriage runs on 8 rollers which can be adjusted and serviced at a central servicing position. For longer carriages the number of rollers can be increased.

FORCES AND TORQUES



FORCES/TORQUES	120		160		200	
	static	dynamic	static	dynamic	static	dynamic
F_x (N)	-	-	-	-	-	-
F_y (N)	1,100	900	3,000	2,000	4,400	3,100
F_z (N)	1,250	1,000	3,500	2,800	4,900	4,400
M_x (Nm)	150	125	400	320	600	510
M_y (Nm)	140	120	360	300	560	480
M_z (Nm)	100	90	180	150	310	275

All forces and torques related to the following:

$$\text{existing values} \quad \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

table values

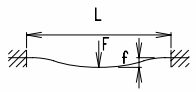
SPEED

(m/s) max	4	6	8
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MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	6.6×10^5	22.2×10^5	63.8×10^5
I_y mm ⁴	38.6×10^5	122.0×10^5	335.0×10^5
Elastic modulus N/mm ²	70,000	70,000	70,000

Formula: DLR

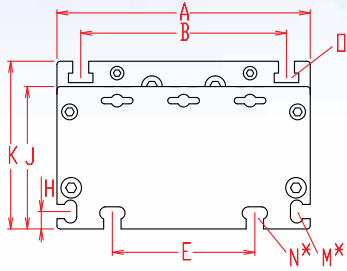
$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$


f = deflection (mm)
 F = load (N)
 L = free length (mm)
 E = elastic modulus 70,000 (N/mm²)
 I = second moment of area (mm⁴)

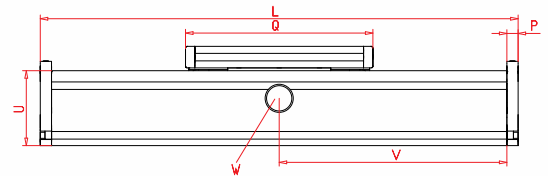
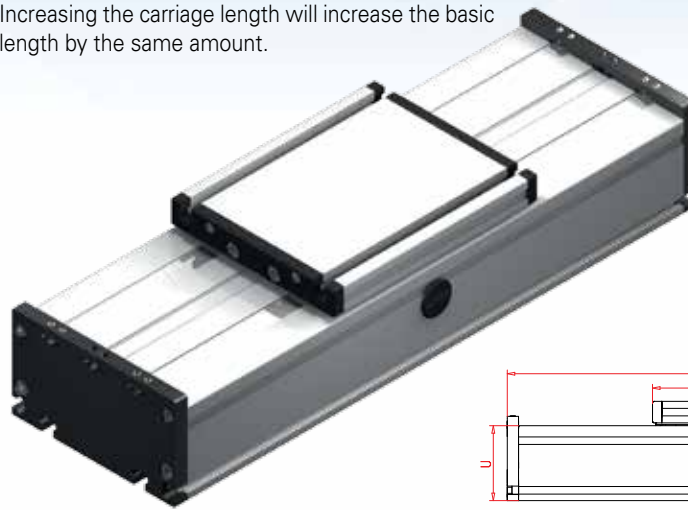
MODULAR LINEAR ACTUATORS

NON-DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.

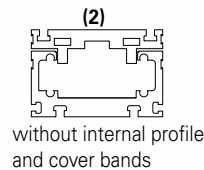
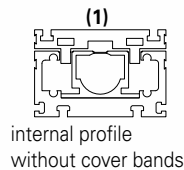
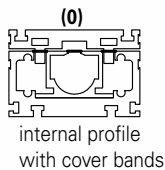


*For slide nuts refer to page 136

V = Q + 100 mm W = servicing position

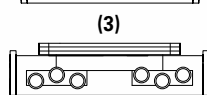
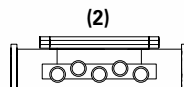
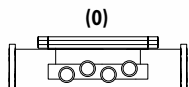
SIZE	L**	A	B	E	H	J	K	M for	N for	O for	P	Q	U	BASIC WEIGHT	WEIGHT per 100 mm
DLR 120	200	120	96	78	10	68	79	M5	M6	M6	10	156	60	3.2 kg	0.71 kg
DLR 160	240	160	130	90	11	90	106	M6	M8	M8	12	200	80	6.9 kg	1.42 kg
DLR 200	320	200	160	140	15	110	129	M8	M10	M10	15	270	100	11.4 kg	2.30 kg

0 Choice of guide body profile:



Stainless versions upon request.

0 Choice of carriages:



	VERSION 0		VERSION 2		VERSION 3	
	Q	L	Q	L	Q	L
120	156	200	196	240	>236	>280
160	200	240	250	290	>300	>340
200	270	320	330	380	>410	>470

1500

**L + Stroke + Overtravel = Total Length

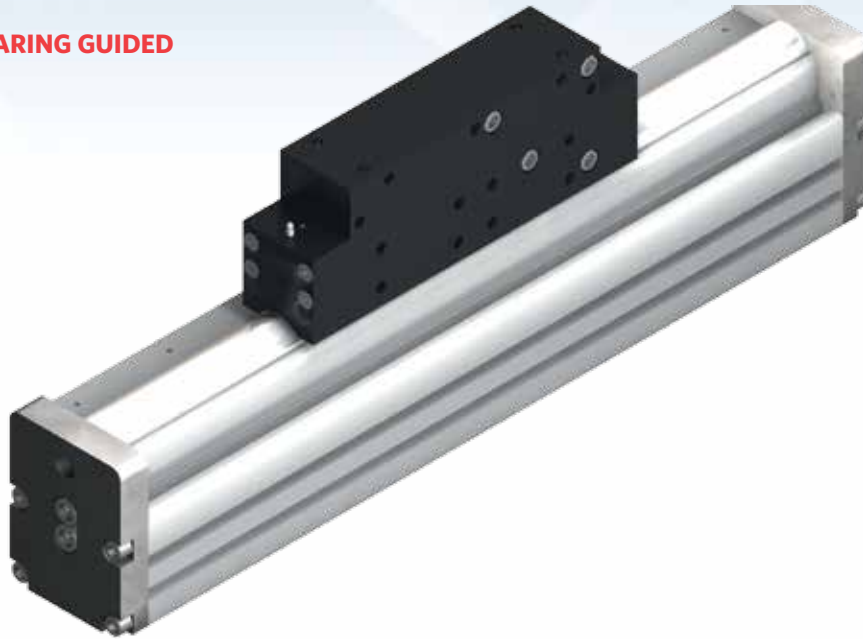
DLR 160 0 0 0 0 0 0 0 0 0 1500
Pos. 1 2 3 4 5 6 7

Sample ordering code: DLR160, with internal profile and cover bands, standard rollers, 1260 mm stroke.

nookindustries.com

SLTR 30, 50

INTERNAL ROLLER BEARING GUIDED

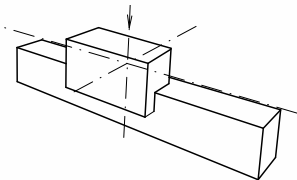


Function:

The guide body consists of an aluminium square profile with a guide rod clamped into it on the upper side free of play. A roller pack containing 2 rollers moves along the guide body. The roller pack is secured against derailing by means of a lateral claw. The system is not driven. The number of roller packs is limited due to the length. The system may be extended according to your needs by means of the connecting brackets available as accessories.

Fitting position: horizontal, any max. length
 Unit mounting: by T-Nuts and mounting profiles at the side of the profile

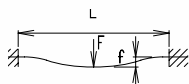
FORCES AND TORQUES



	SLTR 30	SLTR 50
FORCES / TORQUES	static	static
F_z (N)	8,400	17,500
All forces and torques relate to the following:		
existing values	$\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$	
allowable values		
MOMENTS OF INERTIA OF ALUMINIUM PROFILE		
I_x mm ⁴	2.10×10^7	8.70×10^7
I_y mm ⁴	3.00×10^7	10.80×10^7
Elastic modulus N/mm ²	70,000	70,000

Formula: SLTR

Deflection:

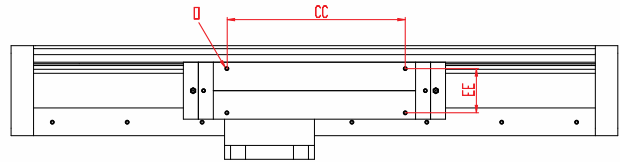
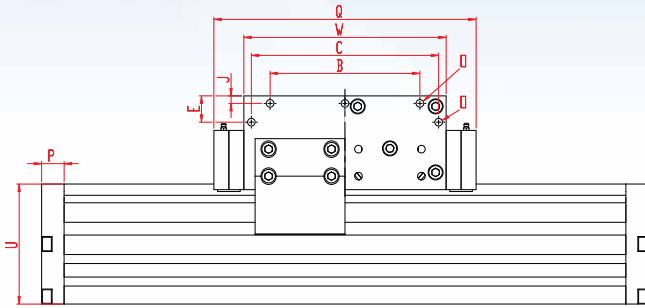
$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$


f = deflection (mm)
 F = load (N)
 L = free length (mm)
 E = elastic modulus 70,000 (N/mm²)
 I = second moment of area (mm⁴)

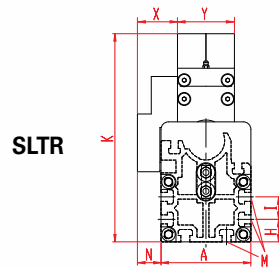
MODULAR LINEAR ACTUATORS

NON-DRIVEN

Dimensions (mm)



SIZE	L**	B	C	CC	E	EE	J	O	P	Q	U	W	BASIC WEIGHT	WEIGHT per 100 mm
SLTR 30	340	160	210	184	23	36	12	M10	25	290	115	230	14.5 kg	1.58 kg
SLTR 50	410	186	250	215	35	50	10	M12	30	350	160	270	33.0 kg	3.37 kg



SIZE	A	H	I	K	M	N	X	Y
SLTR 30	80	24	22	206	M8	28	40	56
SLTR 50	120	30	30	277.5	M10	31.5	53.5	76

R Drive variation:
(R) without drive

50 Guide rod size / size
Ø=30 mm (SLTR30), Ø=50 mm (SLTR50)

0 Choice of guide body profile:
(0) Standard (2) corrosion-protected guide rods and screws
(4) expanded corrosion-protected version (depending on the availability of components)

2 Choice of carriage*
(0) without (1) 1 carriage (2) 2 carriages (3) 3 carriages (4) 4 carriages
* = each carriage has 2 rollers

910 **L + Stroke + Overtravel = Total Length

SLT R 50 0 0 2 0 0 0 0 0 0910
Pos. 1 2 3 4 5 6 7

Sample ordering code: SLTR 50, 50 mm guide rods, Standard profil, 2 carriages, Stroke 500 mm

QSR 60, 80, 100, 125

INTERNAL PROFILE RAIL GUIDED

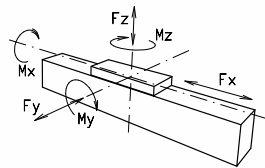


Function:

This unit consists of a square aluminium profile with an integrated ball rail. This unit can be driven by a pneumatic cylinder or other additional drives or it serves as a load carrying slide unit.

Fitting position:	As required. Max. length 6,000 mm without joints.
Carriage mounting:	By T-slots.
Unit mounting:	By T-slots and mounting sets. The linear axis can be combined with any T-slot profile.
Carriage support:	In the standard version, the carriage runs on two runner blocks which can be adjusted and serviced at a central servicing position. For longer carriages the number of runner blocks can be increased.

FORCES AND TORQUES



	60		80		100		125	
PERMITTED DYN. FORCES*	5,000 km	10,000 km	5,000 km	10,000 km	5,000 km	10,000 km	5,000 km	10,000 km
F_x (N)	-	-	-	-	-	-	-	-
F_y (N)	1,410	990	3,570	2,550	4,080	2,900	6,892	5,470
F_z (N)	3,520	2,500	8,500	6,050	10,300	7,270	17,205	13,659
M_x (Nm)	33	23	107	75	142	101	288	228
M_y (Nm)	104	73	310	222	439	311	1,110	881
M_z (Nm)	100	70	296	210	412	292	1,012	803
C (N)	7,800	7,800	18,800	18,800	22,800	22,800	31,700	31,700

All forces and torques related to the following:

$$\begin{array}{l} \text{existing values} \\ \text{table values} \end{array} \quad \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

SPEED

(m/s) max	5	5	5	5
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MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	4.3×10^5	16.5×10^5	43.0×10^5	74.9×10^5
I_y mm ⁴	4.8×10^5	18.7×10^5	48.8×10^5	106.5×10^5
Elastic modulus N/mm ²	70,000	70,000	70,000	70,000

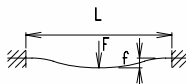
* referred to lifetime

Formula: QSR

Deflection:

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

f = deflection (mm)
 F = load (N)
 L = free length (mm)
 E = elastic modulus 70,000 (N/mm²)
 I = second moment of area (mm⁴)



Nominal lifetime:

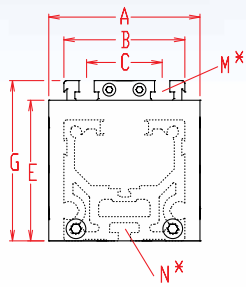
$$L = \left(\frac{C}{F} \right)^3 \times 10^5$$

L = Lifetime in meters
 C = Dynamic load factor (N)
 F = Medium load (N)

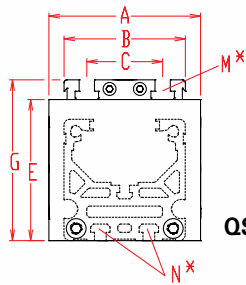
MODULAR LINEAR ACTUATORS

NON-DRIVEN

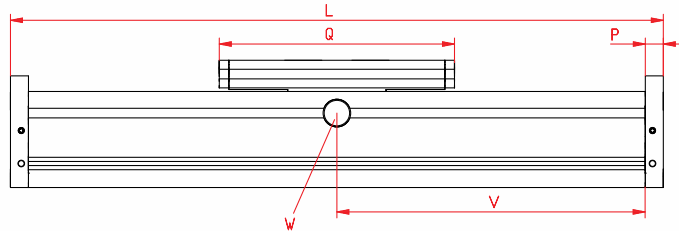
Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.



QSR 125



$V = Q + 100 \text{ mm}$ W = servicing position

*For slide nuts refer to page 136

SIZE	L**	A	B	C	E	G	N for	M for	P	Q	BASIC WEIGHT	WEIGHT per 100 mm
QSR 60	205	80	60	36	60	79	M 5	M 6	12	177	1.8 kg	0.50 kg
QSR 80	270	100	80	50	93	106	M 6	M 8	17	232	4.9 kg	0.96 kg
QSR 100	315	130	100	66	110	129	M 10	M 10	20	268	8.2 kg	1.71 kg
QSR 125	360	160	125	82	134.5	157.5	M 10	M 12	25	300	15.1 kg	2.11 kg

0

Choice of guide body profile:

- (0) Standard (1) corrosion-protected screws
- (4) expanded corrosion-protected version (depending on the availability of components)

0

Choice of carriages:



	VERSION 0		VERSION 1	
	Q	L	Q	L
60	177	205	152	180
80	232	270	196	240
100	268	315	260	310
125	300	360	260	320

1500

**L + Stroke + Overtravel = Total Length

For additional accessories refer to pages 134 to 153.

QSR 80 0 0 0 0 0 0 0 0 0 1500
Pos. 1 2 3 4 5 6 7

Sample ordering code: QSR80 with standard body profile, standard carriage and 1,230 mm stroke

QSSR 60, 80, 100

INTERNAL PROFILE RAIL GUIDED

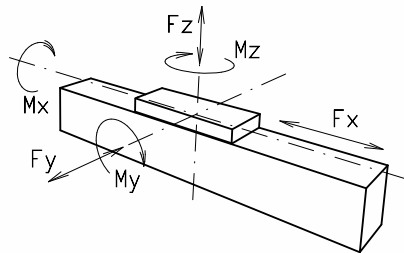


Function:

This unit consists of a square aluminium profile with an integrated ball rail. The carriage is with leading nut and without drive. The openings of the guide body are covered by a stainless steel cover band to protect the system from splash water and dust.

Fitting position: As required, max. length 6,000mm
 Carriage connection: By T-slots
 Unit mounting: By half round slots and tapped holes in the bearing blocks, mounting sets

FORCES AND TORQUES



PERMITTED DYN. FORCES*	QSSR 60		QSSR 80		QSSR 100	
	5,000 km	10,000 km	5,000 km	10,000 km	5,000 km	10,000 km
F _y (N)	1,410	990	3,570	2,550	4,080	2,900
F _z (N)	3,520	2,500	8,500	6,050	10,300	7,270
M _x (Nm)	33	23	107	75	142	101
M _y (Nm)	190	143	604	430	838	597
M _z (Nm)	176	125	550	392	745	532
C (N)	7,800	7,800	18,800	18,800	22,800	22,800

All forces and torques related to the following:

$$\begin{array}{l} \text{existing values} \\ \text{table values} \end{array} \quad \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

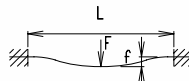
MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I _x mm ⁴	4.3×10 ⁵	14.0×10 ⁵	43.0×10 ⁵
I _y mm ⁴	4.8×10 ⁵	16.6×10 ⁵	48.8×10 ⁵
E-Modulus N/mm ²	70,000	70,000	70,000

* referred to lifetime

Formula: QSSR

Deflection:

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$


f = deflection (mm)
 F = load (N)
 L = free length (mm)
 E = elastic modulus 70,000 (N/mm²)
 I = second moment of area (mm⁴)

Nominal lifetime:

$$L = \left(\frac{C}{F} \right)^3 \times 10^5$$

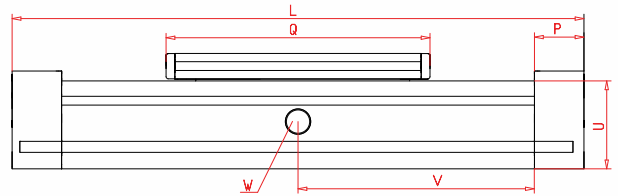
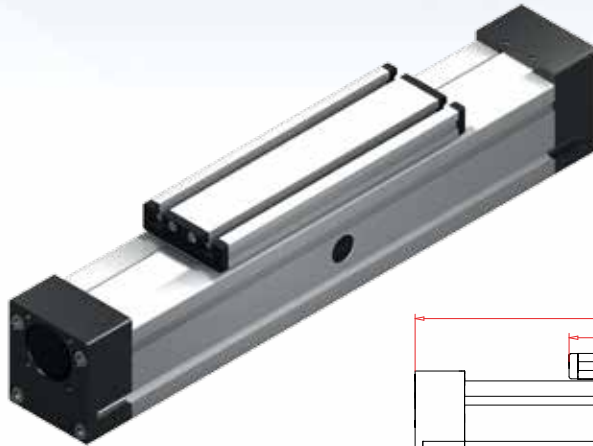
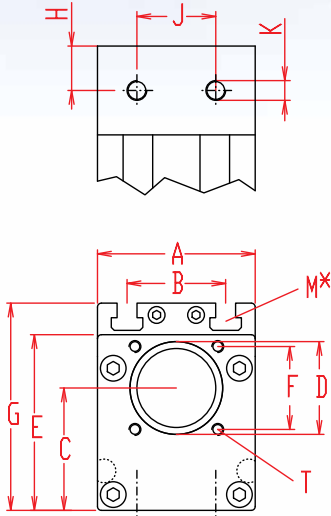
L = Lifetime in meters
 C = Dynamic load factor (N)
 F = Medium load (N)

MODULAR LINEAR ACTUATORS

NON-DRIVEN

Dimensions (mm)

Increasing the carriage length will increase the basic length by the same amount.



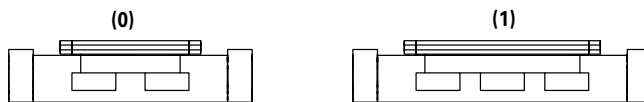
*For slide nuts refer to page 136

$V = Q + 100 \text{ mm}$ $W = \text{servicing position}$

SIZE	L**	A	B	C	D	E	F	G	H	J	K	M for	P	Q	T for	U	BASIC WEIGHT	WEIGHT per 100 mm
QSSR 60	270	60	36	45	37	67	32	79	19	18	M6	M6	38	188	M5	60	3.1 kg	0.3 kg
QSSR 80	350	80	50	62	47	89	42	106	22.5	40	M10	M8	45	250	M6	80	5.7 kg	0.8 kg
QSSR 100	410	100	66	75	68	112	60	129	28.5	50	M10	M10	57	288	M8	100	10.2 kg	1.2 kg

- 0** Choice of guide body profile:
(0) Standard **(1)** corrosion-protected screws
(4) expanded corrosion-protected version (depending on the availability of components)

- 0** Choice of carriage:



CARRIAGE VERSION 1		
	Q	L
60	255	350
80	336	436
100	383	510

1500 **L + Stroke + Overtravel = Total Length

QSSR	80	0	0	0	0	0	0	0	0	0	01500
Pos.	1	2	3	4	5	6	7				

Sample ordering code: QSSR80 with standard body profile, standard carriage, 1,150 mm stroke.

QSRZ 60, 80, 100, 125

INTERNAL PROFILE RAIL GUIDED

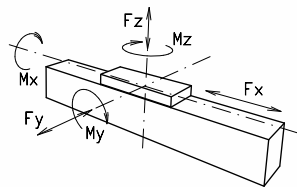


Function:

This unit consists of a square aluminium profile with an integrated ball rail. The carriage is with leading nut and without drive.

- Fitting position: As required, max. length 6,000mm
- Carriage connection: By T-slots
- Unit mounting: By half round slots and tapped holes in the bearing blocks, mounting sets

FORCES AND TORQUES



PERMITTED DYN. FORCES*	QSRZ 60		QSRZ 80		QSRZ 100		QSRZ 125	
	5,000 km	10,000 km	5,000 km	10,000 km	5,000 km	10,000 km	5,000 km	10,000 km
F _y (N)	1,410	990	3,570	2,550	4,080	2,900	6,892	5,470
F _z (N)	3,520	2,500	8,500	6,050	10,300	7,270	17,205	13,659
M _x (Nm)	33	23	107	75	142	101	288	228
M _y (Nm)	104	73	310	222	439	311	1,110	881
M _z (Nm)	100	70	296	210	412	292	1,012	803
C (N)	7,800	7,800	18,800	18,800	22,800	22,800	31,700	31,700

All forces and torques related to the following:

$$\frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I _x mm ⁴	4.3×10 ⁵	16.5×10 ⁵	43.0×10 ⁵	74.9×10 ⁵
I _y mm ⁴	4.8×10 ⁵	18.7×10 ⁵	48.8×10 ⁵	106.5×10 ⁵
E-Modulus N/mm ²	70,000	70,000	70,000	70,000

* referred to lifetime

Formula: QSRZ

Deflection:

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$

- f = deflection (mm)
- F = load (N)
- L = free length (mm)
- E = elastic modulus 70,000 (N/mm²)
- I = second moment of area (mm⁴)

Nominal lifetime:

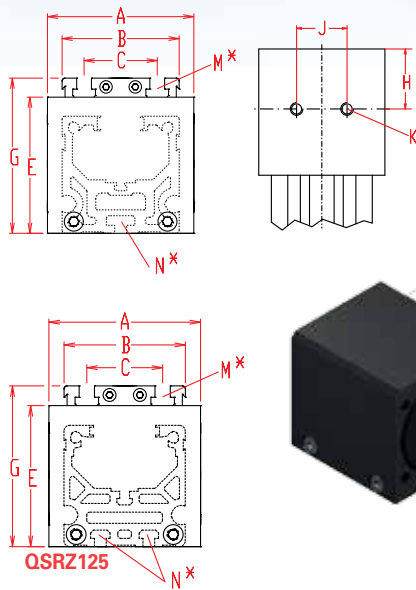
$$L = \left(\frac{C}{F} \right)^3 \times 10^5$$

- L = Lifetime in meters
- C = Dynamic load factor (N)
- F = Medium load (N)

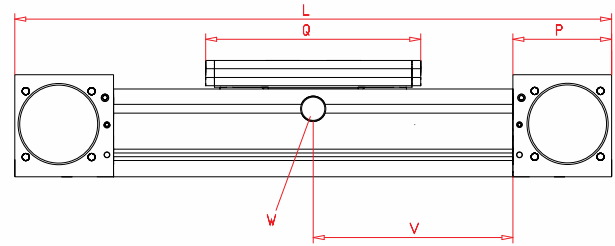
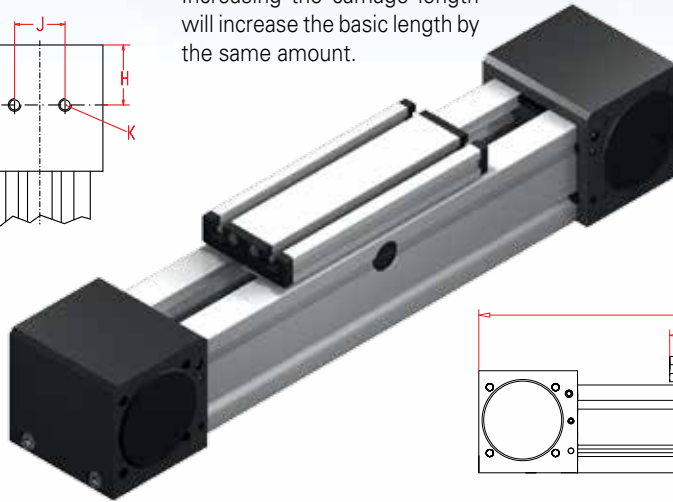
MODULAR LINEAR ACTUATORS

NON-DRIVEN

Dimensions (mm)



Increasing the carriage length will increase the basic length by the same amount.



*For slide nuts refer to page 136

$V = Q + 100 \text{ mm}$ $W = \text{servicing position}$

SIZE	L**	A	B	C	E	G	H	J	K	N for	M for	P	Q	BASIC WEIGHT	WEIGHT per 100 mm
QSRZ 60	300	80	60	36	63	79	29.5	30	M8	M5	M6	59	177	3.5 kg	0.55 kg
QSRZ 80	430	100	80	50	93	106	47.5	40	M10	M6	M8	90	232	10.4 kg	0.96 kg
QSRZ 100	510	130	100	66	110	129	55	50	M12	M10	M10	110	268	15.9 kg	1.47 kg
QSRZ 125	570	160	125	82	134.5	157.5	65	60	M12	M10	M12	130	300	30.5 kg	2.21 kg

- 0** Choice of guide body profile:
 (0) Standard (1) corrosion-protected screws
 (4) expanded corrosion-protected version (depending on the availability of components)

0 Choice of carriages:

	VERSION 0		VERSION 2		VERSION 3	
	Q	L	Q	L	Q	L
60	177	300	242	370	302	430
80	232	430	312	510	444	640
100	268	510	362	610	448	690
125	300	570	365	635	467	740

**L + Stroke + Overtravel = Total Length

For additional accessories refer to pages 134 to 153.

QSRZ 80 0 0 0 0 0 0 0 0 01500
 Pos. 1 2 3 4 5 6 7

Sample ordering code: QSRZ80 with standard body profile, standard carriage, coupling claw on one side, 1,070 mm stroke

nookindustries.com

DSR 120, 160, 200

INTERNAL PROFILE RAIL GUIDED

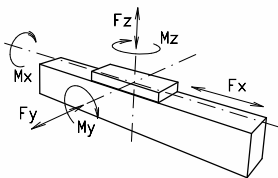


Function:

This unit consists of a rectangular aluminium profile with 2 integrated rail guides. The openings of the guide body are sealed with 3 stainless steel cover bands to protect the guide from splash water and dust. Alternatively, the opening can also be covered with a bellow or can be delivered without cover bands. The positioning system can be either driven by an internal pneumatic cylinder or other additional drives or it serves as load carrying linear slide.

Fitting position: As required. Max. length 6,000 mm without joints.
 Carriage mounting: By T-slots.
 Unit mounting: By T-slots and mounting sets. The linear axis can be combined with any T-slot profile.
 Carriage support: In the standard version, the carriage runs on 4 runner blocks which can be adjusted and serviced at a central servicing position. For longer carriages the number of runner blocks can be increased.

FORCES AND TORQUES



	120		160		200	
PERMITTED DYN. FORCES*	5,000 km	10,000 km	5,000 km	10,000 km	5,000 km	10,000 km
F_y (N)	1,776	1,405	2,236	1,775	5,155	4,092
F_z (N)	2,090	1,650	5,278	4,189	11,311	8,977
M_x (Nm)	81	64	282	224	752	597
M_y (Nm)	97	77	283	225	813	646
M_z (Nm)	96	76	300	238	862	684
C (N)	2,310	2,310	7,800	7,800	22,800	22,800

All forces and torques related to the following:

$$\frac{\text{existing values}}{\text{table values}} \frac{F_y}{F_{y_{dyn}}} + \frac{F_z}{F_{z_{dyn}}} + \frac{M_x}{M_{x_{dyn}}} + \frac{M_y}{M_{y_{dyn}}} + \frac{M_z}{M_{z_{dyn}}} \leq 1$$

SPEED

(m/s) max	5	5	5
-----------	---	---	---

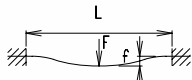
MOMENTS OF INERTIA OF ALUMINIUM PROFILE

I_x mm ⁴	5.61×10^5	2.13×10^6	4.81×10^6
I_y mm ⁴	34.19×10^5	12.33×10^6	26.0×10^6
Elastic modulus N/mm ²	70,000	70,000	70,000

* referred to lifetime

Formula: DSR

Deflection:

$$f = \frac{F \cdot L^3}{E \cdot I \cdot 192}$$


f = deflection (mm)
 F = load (N)
 L = free length (mm)
 E = elastic modulus 70000 (N/mm²)
 I = second moment of area (mm⁴)

Nominal lifetime:

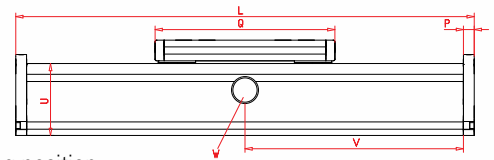
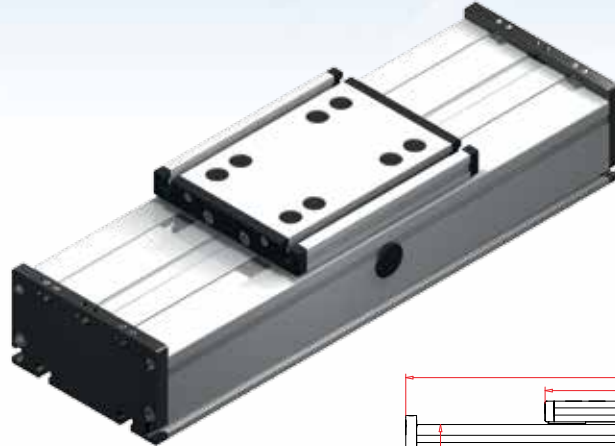
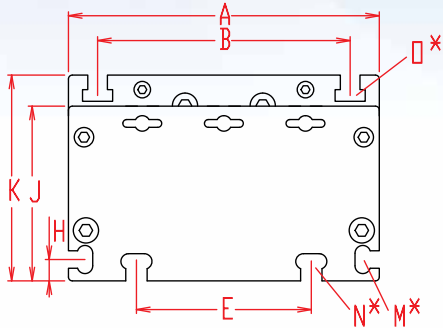
$$L = \left(\frac{C}{F} \right)^3 \times 10^5$$

L = Lifetime in meter
 C = Dynamic load factor (N)
 F = Middle load (N)

MODULAR LINEAR ACTUATORS

NON-DRIVEN

Dimensions (mm)



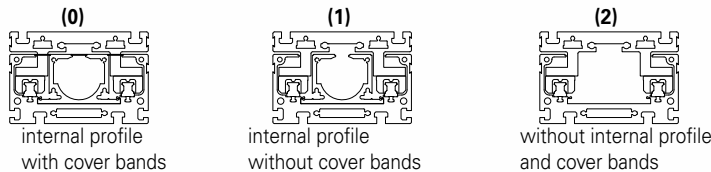
Increasing the carriage length will increase the basic length by the same amount.

*For slide nuts refer to page 136

$$V = Q + 100 \text{ mm} \quad W = \text{servicing position}$$

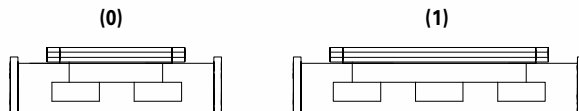
SIZE	L**	A	B	E	H	J	K	M for	N for	O for	P	Q	U	BASIC WEIGHT	WEIGHT per 100 mm
DSR 120	200	120	96	78	10	68	79	M5	M6	M6	10	156	60	3.2 kg	0.71 kg
DSR 160	240	160	130	90	11	90	106	M6	M8	M8	12	200	80	7.0 kg	1.5 kg
DSR 200	320	200	160	140	15	110	129	M8	M10	M10	15	270	100	15.0 kg	2.9 kg

0 Choice of guide body profile:



Stainless versions upon request.

0 Choice of carriages:



	VERSION 0		VERSION 1	
	Q	L	Q	L
120	156	200	156	200
160	200	240	>230	>270
200	270	320	>310	>360

1500

$$**L + \text{Stroke} + \text{Overtravel} = \text{Total Length}$$

DSR 160 0 0 0 0 0 0 0 0 0 1500
Pos. 1 2 3 4 5 6 7

Sample ordering code: DSR,160, with internal profile and cover bands, standard runner blocks, 1,260 mm stroke.

MODULAR LINEAR ACTUATORS



Various accessories for Nook Modular Linear Actuators.



ACCESSORIES & SPARE PARTS

ACCESSORIES 136-153

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Lubricants	163
Toothed Belts.....	164-165
Toothed Pulleys.....	166-167
Pulley Plug and Shaft Tensioning Set	168-169
Belt Adjusters	170-171

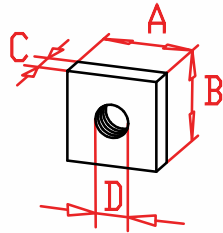
ACCESSORIES

SLIDE NUTS

Square nut



DIN 562



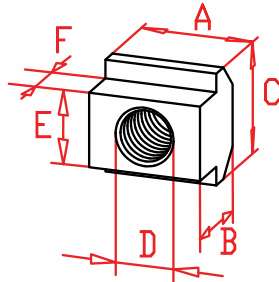
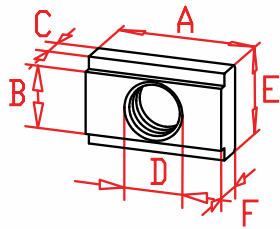
Material: galvanized steel

CODE	TYPE	A	B	C	D
02708	M4	7	7	2.2	M4
02710	M5	8	8	2.7	M5
02715	M6	10	10	3.2	M6
02714	M8	13	13	4	M8
02713	M10	17	17	5	M10
02721	M10	25	20	8	M10

T-nut



DIN 508

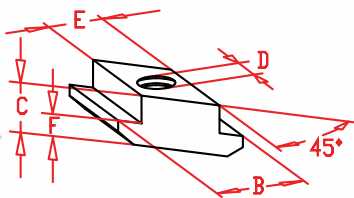


Material: galvanized steel

CODE	TYPE	A	B	C	D	E	F
02717	M3	8	4.2	2.1	M3	6.9	4.3
02739	M4	10	4.2	2.1	M4	6.9	3.3
02742	M5	12	5.3	3	M5	8	4
02709	M5	14	8.1	4.5	M5	14	6
02716	M6	14	8.1	4.5	M6	14	6
02718	M8	18	8.1	4.5	M8	14	6
02719	M10	22	8.1	4.5	M10	14	6
02730	M6	13	10	4	M6	15	8
02731	M8	13	10	4	M8	15	8

CODE	TYPE	A	B	C	D	E	F
02734	M5	10	8	10	M5	6	4
02735	M6	13	10	13	M6	8	4
02736	M8	15	12	15	M8	10	6
02720	M10	18	14	18	M10	12	7
02722	M12	22	16	22	M12	14	8
02737	M16	28	20	28	M16	18	10

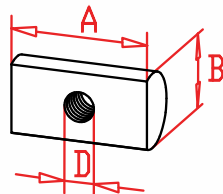
Rhombus nut



Material: galvanized steel

CODE	TYPE	B	C	D	E	F
02732	M8	15	9	M8	10	4.2
02733	M6	15	9	M6	10	4.2

Half round nut



For guide body profile EL, ML, QL / QS and for fastening of jointing and mounting blocks. Material: galvanized steel

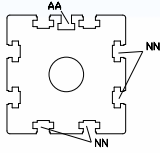
SIZE	CODE	TYPE	A	B	D
30	02724	M3	28	5	2xM3
40	02725	M5	14	6	M5
60 (S)	02726	M6	18	10	M6
80 (S)	02728	M8	22	12	M8
100	02729	M8	22	16	M8
125	02723	M10	25	20	M10

MODULAR LINEAR ACTUATORS

ACCESSORIES & SPARE PARTS

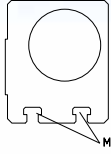
T-NUT ALLOCATION

Bearing block profile EL



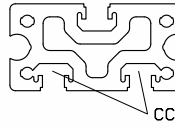
SIZE	SLOT AA CODE	SLOT NN CODE
30	02715	02715
40	02710	02715
60 (S)	02710	02718
80 (S)	02714	02719
100	02714	02720
125	02736	02722

Bearing block profile ELZ



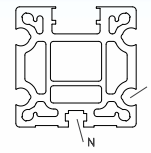
SIZE	SLOT M CODE
30	02709 / 02710
40	02735
60 (S)	02731 / 02719
80 (S)	02736
100	02720
125	02722

Guide body profile E



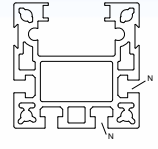
SIZE	SLOT CC CODE
40	02730 / 02731
60	02730 / 02731
80	02730 / 02731

ML

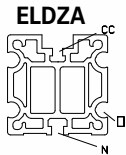
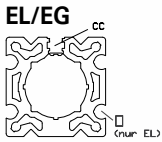


SIZE	SLOT N CODE	SLOT O CODE
ML 60 (S)	02716 / 02718	02726
ML 80 (S)	02719	02728
ML 100	02720	02729
LLZ 60	02734	-

LLZ

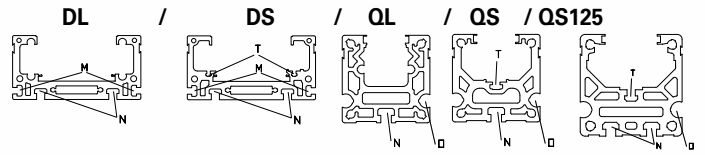


Guide body profile EL / EG



SIZE	SLOT CC CODE	SLOT O CODE	SLOT N CODE
EL 30	02715	02724	-
EL/EG 40	02718	02725	-
EL/EG 60	02718	02726	-
EL/EG 80(S)	02718	02728	-
EL 100	02721	02729	-
EL 125	02721	02723	-
ELDZA 60(S)	02734	02726	02735
ELDZA 80(S)	02730	02728	02720
ELDZA 100	02736	02729	02720

Guide body profile

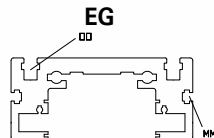
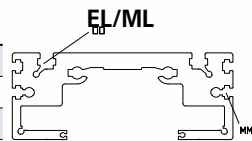


SIZE	SLOT N CODE	SLOT M CODE	SLOT T* CODE	SLOT O* CODE
DL/DS 120	02735	02734	02717	-
DL/DS 160	02736	02735	02739	-
DL/DS 200	02720	02736	02735	-
QL/QS 60	02734**	-	02739	02726
QL/QS 80	02735**	-	02742	02728
QL/QS 100	02720**	-	02716	02729
QS 125	02720	-	02736	02723

* ONLY FOR DS/QS GUIDE BODY PROFILE
 ** NOT IN QST/K GUIDE BODY PROFILE

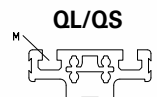
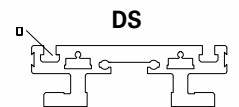
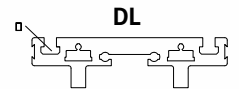
Carriage profile EL / EG

SIZE	SLOT OO CODE	SLOT MM CODE
30	02715	-
40	02716 / 02709	-
60	02718	-
60 S	02736	-
80	02718 / 02719	02715
80S	02736	02735
100	02720	02713
125	02722	02720



Carriage profile DL / DS / QL / QS

SIZE	SLOT O CODE	SLOT M CODE
DL/DS 120	02735	-
DL/DS 160	02736	-
DL/DS 200	02720	-
QL/QS 60	-	02735
QL /QS 80	-	02736
QL/QS 100	-	02720
QS 125	-	02722

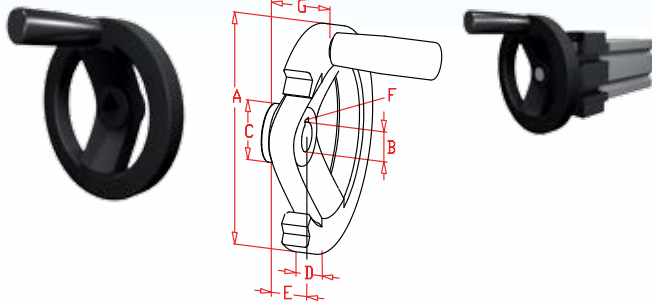


Slide nut dimensions refer to page 136.

ACCESSORIES

HANDWHEEL

Handwheel with keyway and locking screw

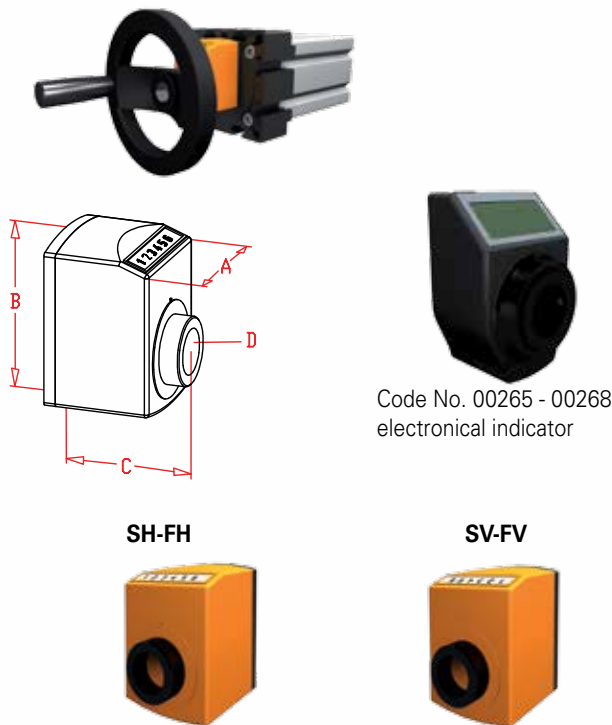


A plastic coated aluminium handwheel with a matt black finish. Equipped with a black handle.

CODE	TYPE	A	B	C	D	E	F	G
00050	30	70	5	17	13	15	-	20
00100	40	100	10	29	14.5	17	3x3	30
00160	60	140	14	36	16.5	19	5x5	36
00200	80	200	18	42	20.5	24	6x6	45
00222	100	200	22	42	20.5	24	6x6	45

POSITIONAL INDICATOR

Positional indicator EL / EG



Code No. 00265 - 00268
electronical indicator

Shell made of polyamide orange. Ambient temperature 80°C. Any fitting position possible. Numeral height 6 mm. Accuracy of reading 0,1 mm.

CODE	SIZE	AxBxC	D	TYPE	PITCH (MM)
00231..	30	33x47x31	6	SH	2.5 or 3
00232..	30	33x47x31	6	FH	2.5 or 3
00233..	30	33x47x31	6	SV	2.5 or 3
00234..	30	33x47x31	6	FV	2.5 or 3
00241..	40, 60, 80	48x67x51	12,17, 20	SH	4 or 8
00242..	40, 60, 80	48x67x51	12,17, 20	FH	4 or 8
00243..	40, 60, 80	48x67x51	12,17, 20	SV	4 or 8
00244..	40, 60, 80	48x67x51	12,17, 20	FV	4 or 8
00251..	40, 60, 80	48x67x51	12,17, 20	SH	5 or 10
00252..	40, 60, 80	48x67x51	12,17, 20	FH	5 or 10
00253..	40, 60, 80	48x67x51	12,17, 20	SV	5 or 10
00254..	40, 60, 80	48x67x51	12,17, 20	FV	5 or 10
00261..	100, 125	56x75x64	25, 30	SH	6 or 12
00262..	100, 125	56x75x64	25, 30	FH	6 or 12
00263..	100,125	56x75x64	25, 30	SV	6 or 12
00264..	100, 125	56x75x64	25, 30	FV	6 or 12
00265..	40, 60, 80	48x76x39	12,17, 20, 30	SH	0.01 - 10
00266..	40, 60, 80	48x76x39	12,17, 20, 30	FH	0.01 - 10
00267..	40, 60, 80	48x76x39	12,17, 20, 30	SV	0.01 - 10
00268..	40, 60, 80	48x76x39	12,17, 20, 30	FV	0.01 - 10

0024108

Sample ordering code: size 40, 8 mm pitch increasing horizontal.

CLAMP

Screw clamp EL / EG, DL / DS / QST/K



Black anodized aluminium, steel hand lever.

CODE	TYPE	A	B	C	D	HAND-LEVER
00291	EL/EG 30	43	50	10	6	M6
00292	EL/EG 40	58	70	10	12	M6
00293	EL/EG 60	80	80	15	17	M8
00294	EL/EG 80	100	100	20	20	M10
00295	E 100	130	130	20	25	M10
00296	E 125	-	-	-	-	-
00283	DL/DS 120	62	80	15	12	M6
00284	DL/DS 160	80	90	20	17	M8
00285	DL/DS 200 QS 100	90	99	20	25	M8
00286	QS 80	80	90	20	17	M8
00287	QS 60	62	80	15	12	M6

MODULAR LINEAR ACTUATORS

ACCESSORIES & SPARE PARTS

CLAMP (continued)

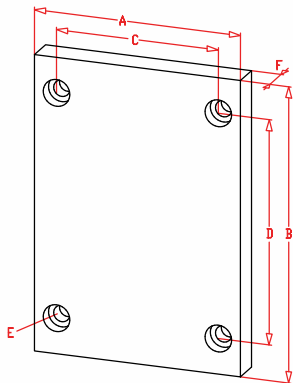
Carriage clamp EL / ML / EG



Carriage with carriage clam. Carriage length can be chosen as required. Depending on type of drive (screw or belt) the position of clamp can be different. Dimensions by inquiry.

CODE	TYPE
00311	EG 30
00312	EG 40
00313	EG 60
00314	EG 80
00301	EL 30
00302	EL 40
00303	EL/ML 60
00304	EL/ML 80
00305	EL/ML 100
00306	EL 125

ASSEMBLY PLATE



Assembly plate, anodized aluminium, enables various units to be assembled in a simple manner when combinations of linear units are to be used. Complete with screws and slide-nuts. Tapped holes can be made on request.

CODE	TYPE	A	B	C	D	E for	F
00940	EG 40	100	70	52	52	M6	12
00960	EG 60	144	100	126	80	M8	15
00980	EG 80	170	140	150	110	M10	15
00935	EL 30	70	70	56	56	M6	10
00945	EL 40	100	100	84	66	M6	12
00965	EL/ML 60	144	144	126	96	M8	15
00964	EL/ML 60 S	170	170	152	108	M8	15
00985	EL/ML 80	170	170	150	117	M10	15
00984	EL/ML 80 S	190	190	172	126	M8	15
00915	EL/ML 100	270	230	248	155	M10	20
00925	EL 125	335	295	285	200	M12	20
00966	DL/DS 120	140	120	122	96	M6	12
00986	DL/DS 160	180	160	162	130	M8	15
00916	DL/DS 200	240	200	218	160	M10	20
00967	QL 60	140	60	122	36	M6	12
00987	QL 80	180	80	162	50	M8	15
00917	QL 100	240	100	218	66	M10	20
00926	QS 60	165	60	147	36	M6	12
00928	QS 80	216	80	198	50	M8	15
00911	QS 100	248	100	226	66	M10	20



EL/EG



QL/QS

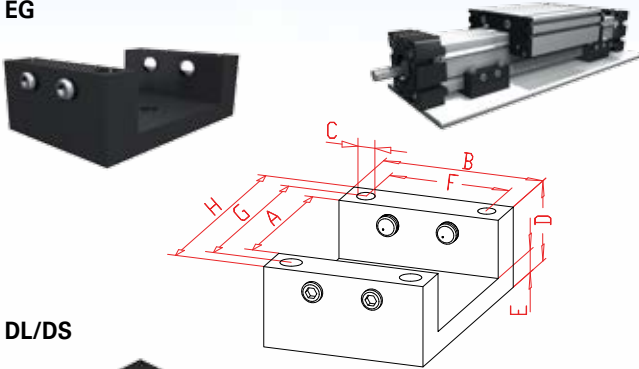


DL/DS

ACCESSORIES

MOUNTING SYSTEMS

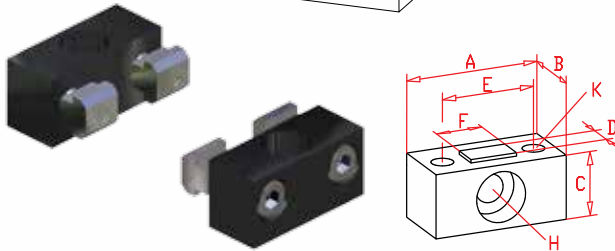
Support and mounting block EG



Black anodized aluminium, for mounting and for supporting long units. These components can be ready mounted on the units by us to customer's specification. Mounting can be clear or tapped holes and slide-nuts.

CODE	TYPE	A	B	C	D	E	F	G	H
03043	EG 40	40	40	6.5	24.0	9	-	50	60
03063	EG 60	60	60	9.0	35.0	11	-	75	90
03083	EG 80	80	80	10.5	39.0	11	60	100	120

DL/DS

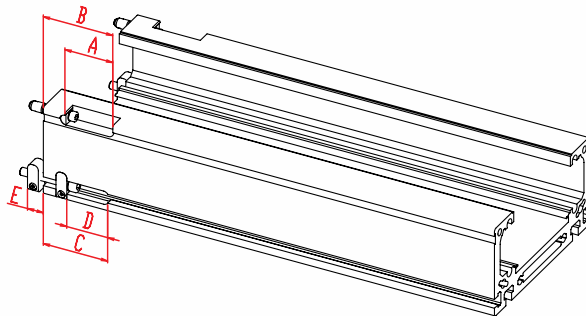


CODE	TYPE	A	B	C	D	E	F	G	H for	K for
03001	DL/DS 120	34	17	14	6	22	10	134	M6	M5
03002	DL/DS 160	40	20	19	8	28	14	179	M8	M6
03003	DL/DS 200	50	30	24	10	34	18	224	M10	M8



Connecting profiles DL / DS

Anodized aluminium. For joining body profiles longer than standard.



CODE	TYPE	A	B	C	D	E
03090	DS 120	47.5	66	78	56	12
03090_01	DL 120	47.5	66	78	56	12
03091	DS 160	39	58	78.5	56.5	12
03091_01	DL 160	39	58	78.5	56.5	12
03092	DS 200	53	77	71.3	45.3	17.55
03092_01	DL 200	53	77	71.3	45.3	17.55

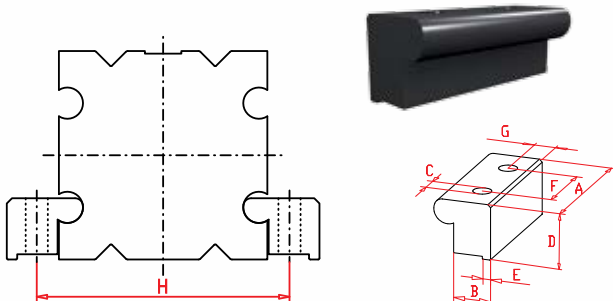


DL / DS



Mounting profile EL / ML / Q

Black anodized aluminium, for mounting. Mounting can be clear or tapped holes. Pair (without screws)

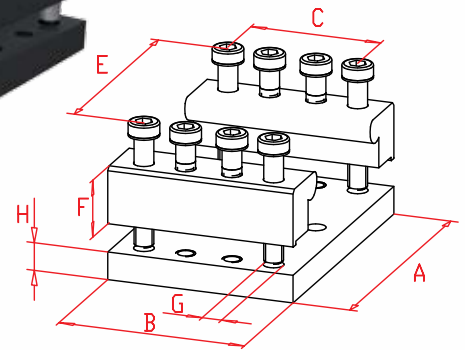
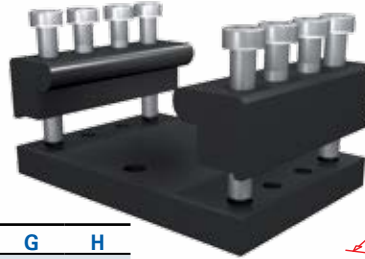


CODE	TYPE	A	B	ØC	D	E	F	G	H
03039	EL 30	24	11.5	5.5	10	3	12	6.5	41
03049	EL 40	32	15.5	6.5	13	4	16	9	54
03069	EL/ML/Q 60	48	17.5	8.5	18	4	24	9.5	77
03089	EL/ML/Q 80	64	19.5	8.5	23.5	4	32	11.5	97
03019	EL/Q100	80	21.5	10.5	30.5	4	40	12	120
03029	EL/QS125	100	27	13	40	6	50	15.5	149
03009	LLZ 60	64	19.5	8.5	23.5	4	32	11.5	76

MODULAR LINEAR ACTUATORS

ACCESSORIES & SPARE PARTS

Mounting block EL / ML / Q



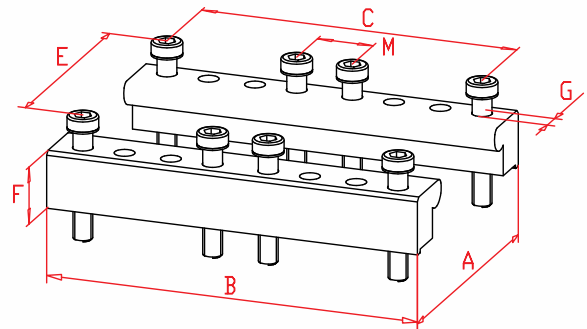
Black anodized aluminium, for mounting and for supporting long units. These components can be ready mounted on the units by us to customer's specification. Mounting can be clear or tapped holes and slide-nuts.

CODE	TYPE	A	B	C	E	F	G	H
030301	EL 30	54	30	20	38	10	4.2	6
030401	EL 40	72	40	26	50	13	6.4	9
030601	EL/ML/Q 60	96	60	40	75	18	8.5	10.8
030801	EL/ML/Q 80	120	80	60	100	23.5	10.5	10.8
030101	EL/ML/Q 100	144	100	70	120	30.5	10.5	14.8
030201	EL/QS 125	180	125	85	150	40	11	20

Joining profile EL / ML / Q



Black anodized aluminium. For joining body profiles longer than standard.



CODE	TYPE	A	B	C	E	F	G	M
030312	EL 30	54	60	50	38	10	4.2	10
030412	EL 40	72	80	66	50	13	6.4	14
030612	EL/ML/Q 60	96	120	100	75	18	8.5	20
030812	EL/ML/Q 80	120	160	140	100	23.5	10.5	20
030112	EL/ML/Q 100	144	200	170	120	30.5	10.5	30
030212	EL/QS 125	180	250	210	150	40	11	40

ACCESSORIES

MOUNTING SYSTEMS (continued)

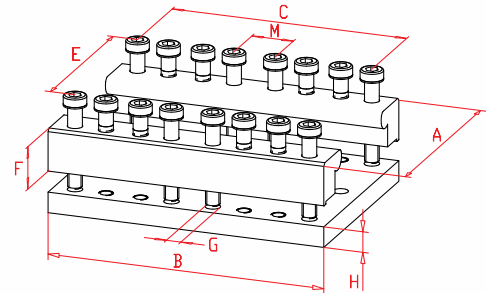
Joining block EL / ML / Q



Black anodized aluminium, for joining, mounting and supporting long units. These components can be ready mounted on the units by us to customer's specification. Mounting can be clear or tapped holes and slide-nuts.



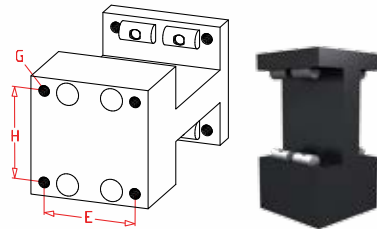
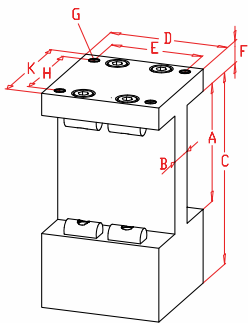
CODE	TYPE	A	B	C	E	F	G	H	M
030311	EL 30	54	60	50	38	10	4.2	6	10
030411	EL 40	72	80	66	50	13	6.4	9	14
030611	EL/ML/Q 60	96	120	100	75	18	8.5	10.8	20
030811	EL/ML/Q 80	120	160	140	100	23.5	10.5	10.8	20
030111	EL/ML/Q 100	144	200	170	120	30.5	10.5	14.8	30
030211	EL/QS 125	180	250	210	150	40	11	20	40



Parallel mounting block EL / ML



Black anodized aluminium. For parallel mounting of two units.

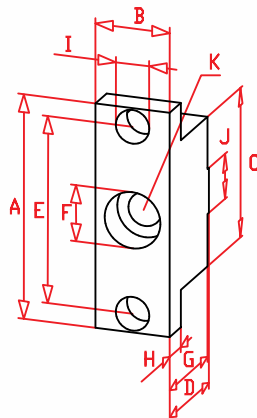


CODE	TYPE	A	B	C	D	E	F	G	H	K
03042	40	40	18	85	58	50	10	M6	50	58
03062	60	60	22	123	70	54	15	M8	54	70
03064	60S	60	22	120	70	54	15	M8	54	70
03082	80	80	22	145	80	62	15	M8	62	80
03084	80S	80	22	155	80	62	15	M8	62	80
03012	100	100	30	200	110	90	20	M10	90	110
03022	125	125	40	253	135	115	22.5	M12	115	135

Mounting block E - units



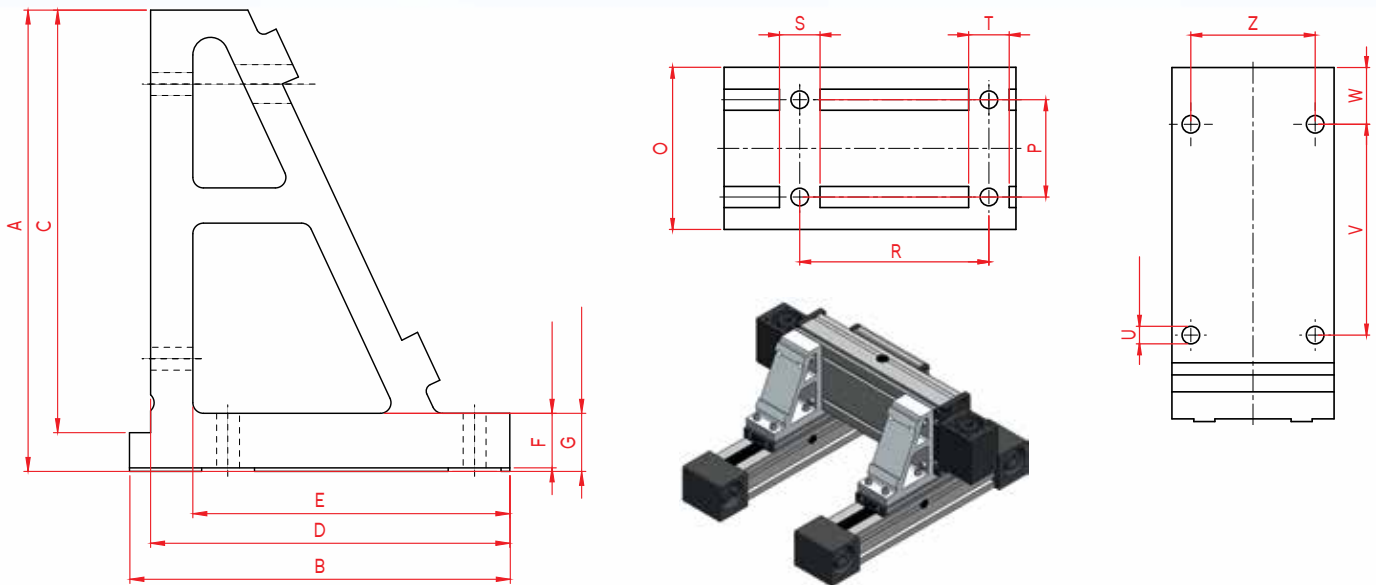
Black anodized aluminium. Support and mounting block for E40, 60, 80. By using this mounting block you will reach the same level of heights as EL-units with support. Assembling by through holes (frame) and slide-nuts (unit).



CODE	TYPE	A	B	C	D	E	ØF	G	H	ØI	J	ØK
03048	E 40	60	20	40	28	50	15	27	8	6.6	12	9
03068	E 60	90	25	59	41.7	75	15	40.7	10	9	12	9
03088	E 80	120	30	80	51.8	100	15	50.8	15	10.5	12	9

Dimensions (mm)

Angular bracket for combination of Q60 and D120

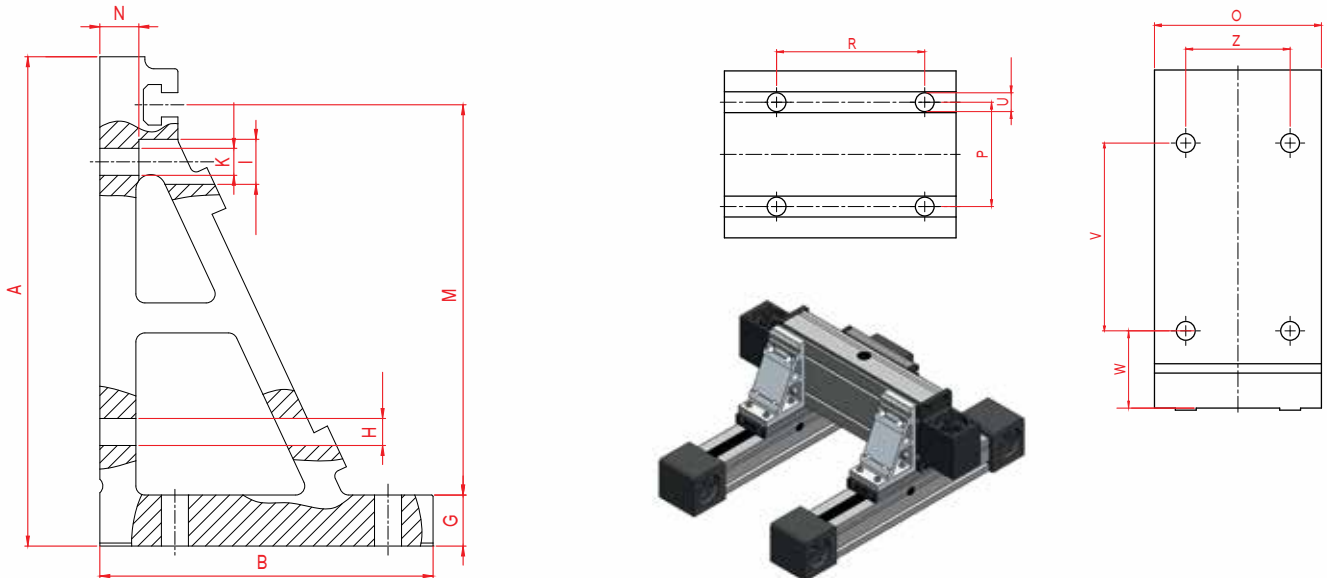


Function:

Various assemblies and axis types can be connected to the angular bracket. It can also be used to reinforce self-supporting positioning systems or to mount portals on profile frames.

CODE	A	B	C	D	E	F	G	O	P	R	S	T	U	V	W	Z	[kg/m]
038 060 120	131	108	120	102	90	15.5	16.5	60	36	70	15	15	6,5	78	21	46	0.765 kg

Angular bracket for combination of Q80 and D160



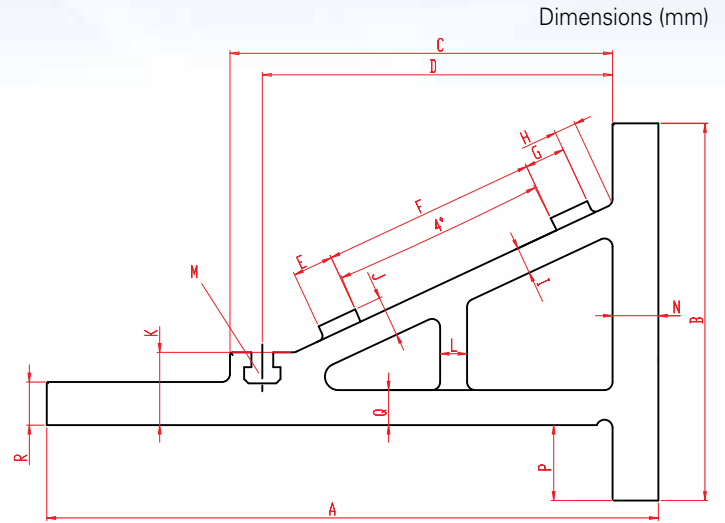
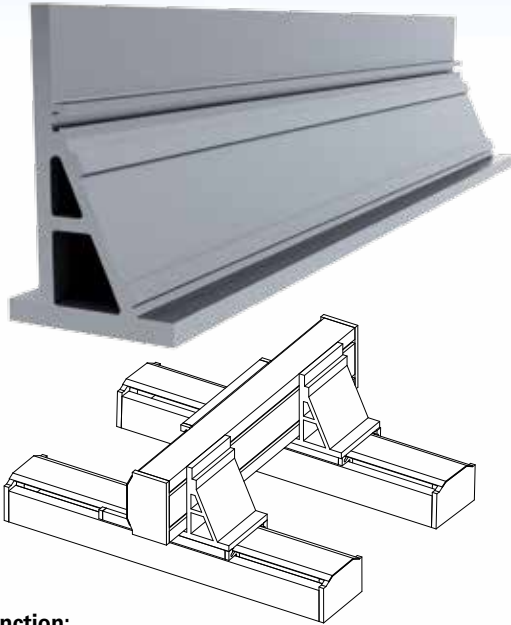
Function:

Various assemblies and axis types can be connected to the angular bracket. It can also be used to reinforce self-supporting positioning systems or to mount portals on profile frames.

CODE	A	B	G	H	I	K	M	N	R	O	P	U	V	W	Z	[kg/m]
038 080 160	163	111	17	9	15	9	130	13	71	80	50	9	90	37	50	1.174 kg

ACCESSORIES

MOUNTING SYSTEMS (continued)



- | | | | |
|---|-----------------------------|---|--------------------------|
| x | | x | |
| 0 | uncoated, without machining | 2 | uncoated, with machining |
| 1 | anodized, without machining | 3 | anodized, with machining |

Function:

Various assemblies and axis types can be connected to the angular bracket profile. It can also be used to reinforce self-supporting positioning systems or to mount portals on profile frames.

CODE	A	B	C	D	E	F	G	H	I	J	K	L	M for	N	P	Q	R	M (kg/m)	L _{max}
4200X	227	140	142	130	15	80	15	8.05	10	15	27	10	M6	17	28	13	16	19.9	6,000



Nook Modular Linear Actuators used in a plasma cutting application.

MODULAR LINEAR ACTUATORS

ACCESSORIES & SPARE PARTS

MOTOR ADAPTERS & COUPLINGS

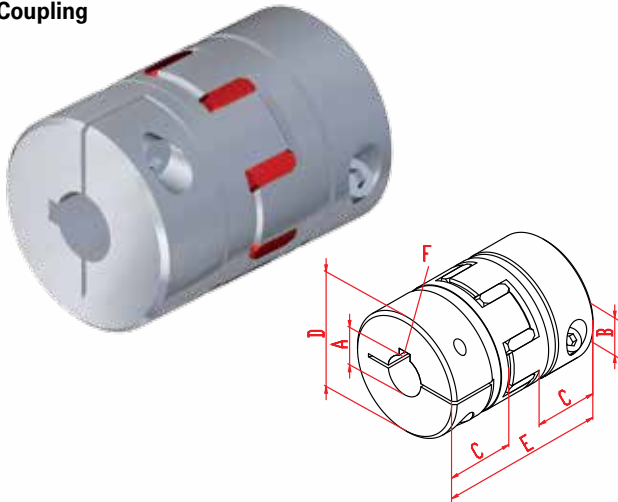
Motor adapter



Black anodized aluminium, can be designed for any motor. Simple assembly, accurate alignment.

CODE	TYPE
01531	EL/EG 30 screw
01541	EL/EG 40 screw
01561	EL/ML/EG 60 / DL/DS 120 / QS 60 screw
01581	EL/ML/EG 80 / DL/DS 160 / QS 80 screw
01511	EL/ML 100 / DL/DS 200 / QS 100 screw
01521	EL 125 screw
01831	EL 30 belt-drive
01841	EL 40 belt-drive
01861	EL/ML 60 / DL/DS 120 / QL/QS 60 belt-drive
01881	EL/ML 80 / DL/DS 160 / QL/QS 80 belt-drive
01811	EL/ML 100 / DL/DS 200 / QL/QS 100 belt-drive
01821	EL125 / QS 125 belt-drive

Coupling



Torsionally elastic coupling with keyway and clamp. Light pre-load provides backlash-free torque transmission.

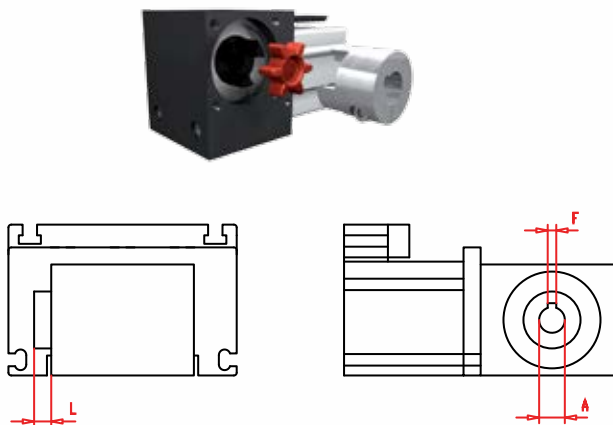
CODE	TYPE	ØA/B (min/max)	C	D	E	F	TORQUE
01400-	7	3/7	7	14	22	DIN-key	2 Nm top torque x2
01401-	9	5/12	10	20	30	DIN-key	6 Nm top torque x2
01410-	14	5/16	11	30	35	DIN-key	12 Nm top torque x2
01420-	19	6/22	25	40	66	DIN-key	17 Nm top torque x2
01430-	24	10/28	30	55	78	DIN-key	60 Nm top torque x2
01440-	28	18/38	35	65	90	DIN-key	160 Nm top torque x2
01450-	38	30/45	45	80	114	DIN-key	325 Nm top torque x2

01401- 08 10

Sample ordering code:

Coupling type 9, ØA = 8 mm, ØB = 10 mm

Coupling for toothed belt units



Torsionally elastic coupling with keyway and clamp. Light pre-load provides backlash-free torque transmission.

CODE	TYPE	ØA (min/max)	L	SIZE	F	TORQUE
03400-	7	3 / 7	7	EL 30	DIN-key	2 Nm top torque x2
03401-	9	5 / 12	10	EL 40	DIN-key	6 Nm top torque x2
03410-	14	5 / 16	11	EL/ML 60 DL 120 QL/QS 60	DIN-key	12 Nm top torque x2
03420-	19	6 / 22	25	EL/ML 80 DL/DS 160 QL/QS 80	DIN-key	17 Nm top torque x2
03430-	24	10 / 28	30	EL/ML 100 QL/QS 100 DL 200	DIN-key	60 Nm top torque x2
03440-	28	18 / 38	35	EL/QS 125	DIN-key	160 Nm top torque x2

03410- 12

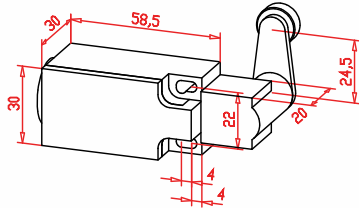
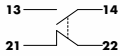
Sample ordering code:

Coupling type 14, ØA = 12 mm

ACCESSORIES

SENSING OPTIONS

Limit switch



Fully insulated thermoplastic switch with adjustable operation lever. The operation device can be turned by 90°, the lever can be turned to engage by 360°.

Max. voltage	380 V
Max. constant current	6 A
Max. current at make	16 A
Duty classification	max.6000/h
Mechanical lifetime	1 x 10 ⁷
Operating repeatability	± 0,01
Transit time/snap switch	ca. 10 ms
Protection class	IP 65 (DIN 40050)
Working temperature	-30° C to +80° C

CODE	CHOICE
01101	standard
01102	M16x1.5 connector
01101ex	Version ATEX

Proximity switch

Inductive proximity switches. Protection class IP67



CODE	TYPE	SWITCHING				FUNCTION
		DISTANCE	VOLTAGE	OUTPUT		
01003	M8	1 mm	10 - 30 V	200 mA	PNP NC	
01004	M8	1 mm	10 - 30 V	200 mA	PNP NO	
01001	M12	2 mm	10 - 30 V	200 mA	PNP NC	
01002	M12	2 mm	10 - 30 V	200 mA	PNP NO	
010014	Q 8x8	2 mm	10 - 30 V	200 mA	PNP NC	
010013	Q 8x8	2 mm	10 - 30 V	200 mA	PNP NO	

PNP NO (normally open) =

PNP NC (normally closed) =

MODULAR LINEAR ACTUATORS

ACCESSORIES & SPARE PARTS

Proximity / limit switch holder DL / DS / QL / QS

Proximity / limit switch holder for guide body profile
DL/DS/QL/QS



CODE	TYPE
01327-0	Base holder for a limit switch
01327-1	Base holder for a proximity and a limit switch
01327-4	Base holder for a sensor bracket
01328-0	Plug in holder for a proximity switch M8x1
01329-0	Plug in holder for a proximity switch M12x1
01330-0	Plug in holder for a proximity switch Q 8x8
01335-0	Sensor holder DL/DS 120 / QL/QS 60 H = 46.5mm
01335-1	Sensor holder DL/DS 160 - H = 50.5mm
01335-2	Sensor holder QL/QS 80 - H = 52.5mm
01335-3	Sensor holder DL/DS 200 - H = 48 mm
01335-4	Sensor holder QL/QS 100 - H = 57 mm

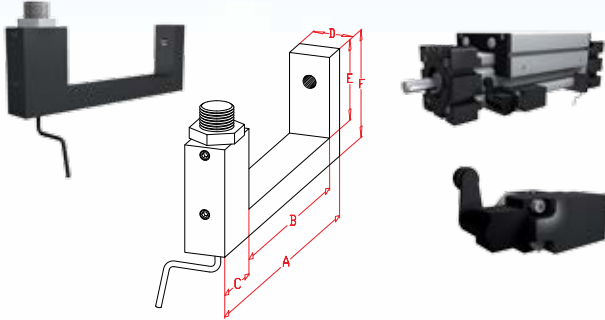
* stainless steel grub screws

ACCESSORIES & SPARE PARTS

ACCESSORIES

SENSING OPTIONS (Continued)

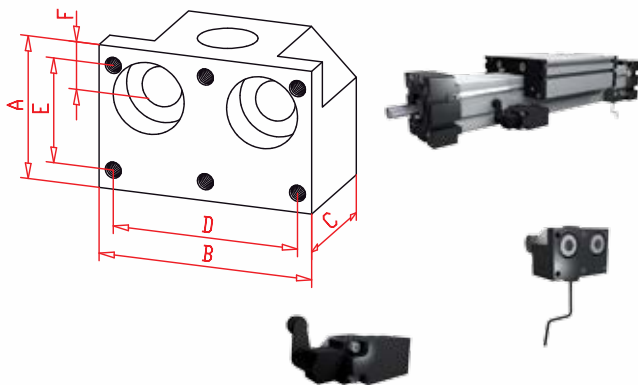
Proximity / limit switch holder EG



Black anodized aluminium bracket, fixed by grub screws. Position along the length of the units is adjustable. Fixing holes for proximity and limit switches are provided.

CODE	TYPE	A	B	C	D	E	F	DRILL HOLE
01340	EG 40	72	40	24	15	19	28	8.2
01360	EG 60	92	60	24	15	26	35	12.2
01380	EG 80	114	81	24	15	30	40	12.2

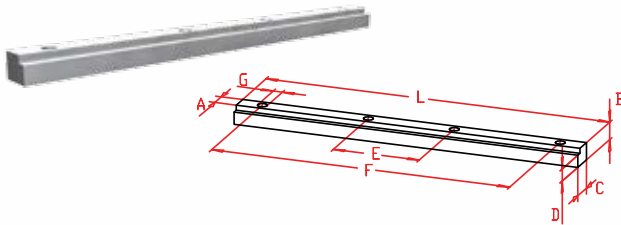
Proximity / limit switch holder EL



Black anodized aluminium bracket, fixed by screws into with half-round nuts in the body half-round-slots, hence position axially adjustable. Fixing holes for proximity and limit switches are provided. Complete with screws and half-round nuts.

CODE	TYPE	A	B	C	D	E	F	DRILL HOLE
01331	EL 30	12	30	12	-	-	6	8.2
01341	EL 40	28	32	25	26	22	8	8.2
01361	EL 60	30	40	25	32	22	11	12.2
01381	EL 80	30	45	25	39	22	10	12.2
01311	EL 100	40	55	20	49	22	12	12.2
01321	EL 125	45	60	25	52	22	12.5	12.2
01300	EL 60-125	Reducing sleeve				Ø12 to Ø8		

Activating strip DL / DS



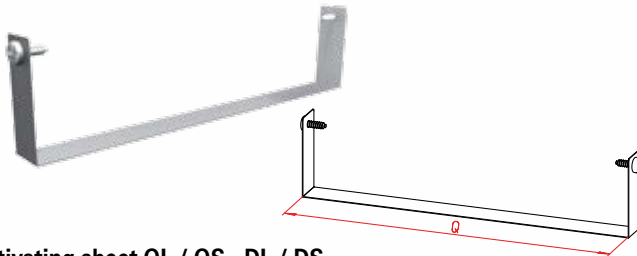
For internal proximity switches.

CODE	TYPE	A	B	C	D	E	F	G	L
04870	DL/DS 120	2.9	8.5	7	5.9	46	99	3.5	120
04871	DL/DS 160	6	6	8	4.3	30	104	3.5	120
04872	DL/DS 200								

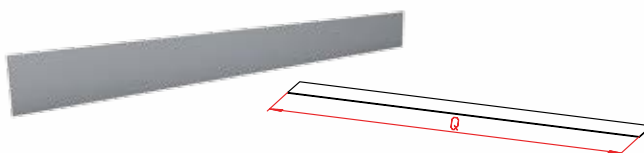
For external mounting proximity switches.

CODE	TYPE	Q
01000	EL 30	Carriage length
01005	EL 40	Carriage length
01006	EL/ML 60	Carriage length
01011	EL/ML 60S	Carriage length
01007	EL/ML 80	Carriage length
01010	EL/ML 80S	Carriage length
01008	EL/ML 100	Carriage length
01009	EL 125	Carriage length
010000	EG 30	Carriage length
010050	EG 40	Carriage length
010060	EG 60	Carriage length
010070	EG 80	Carriage length
01018	DL/DS 120	Carriage length
01017	DL/DS 160	Carriage length
01016	DL/DS 200	Carriage length
01030	QL/QS 60	Carriage length
01031	QL/QS 80	Carriage length
01032	QL/QS 100	Carriage length
01032	QS 125	Carriage length

Activating sheet EL / ML / EG



Activating sheet QL / QS - DL / DS



MODULAR LINEAR ACTUATORS

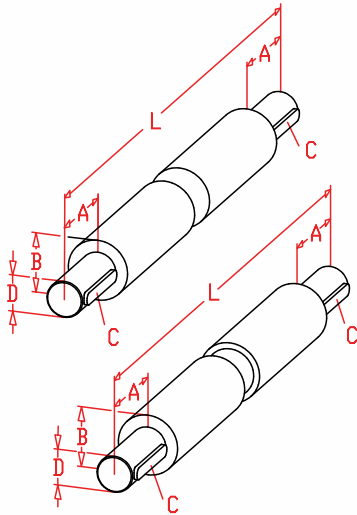
ACCESSORIES & SPARE PARTS

Splined shaft EL / ML / EG - DL / DS



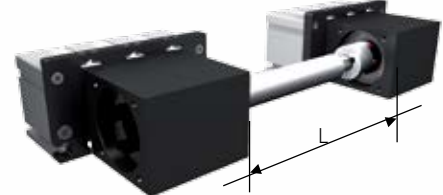
Steel splined shaft, for torque transfer between two parallel drives.
Shafts longer than 1200 mm are hollow shafts with welded journals.

CODE	TYPE	A	B	C	D	L _{max}
02230	EL/EG 30	15	12	2×2×12	6 _{h7}	1,500
02240	EL/EG 40	27	20	3×3×25	10 _{h7}	3,000
02260	EL/ML/EG 60 QL/QS 60 DL 120	35	24	5×5×28	14 _{h7}	3,000
02280	EL/ML/EG 80 QL/QS 80 DL/DS160	45	30	6×6×40	18 _{h7}	3,000
02210	EL/ML 100 QL/QS 100 DL/DS 200	55	40	6×6×50	22 _{h7}	4,500
02220	EL/QS 125	55	50	8×7×50	30 _{h7}	5,000



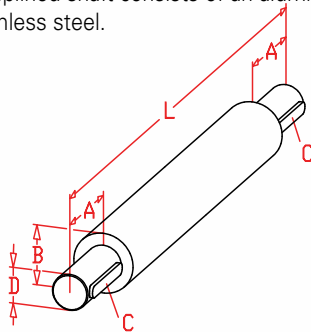
02240 0500

Sample order code:
Size 40, length L = 500 mm



Splined shafts based on an aluminium tube

Aluminum splined shaft parallel to the torque transmission with adjustment units arranged. The splined shaft consists of an aluminum hollow shaft with bonded journals of stainless steel.

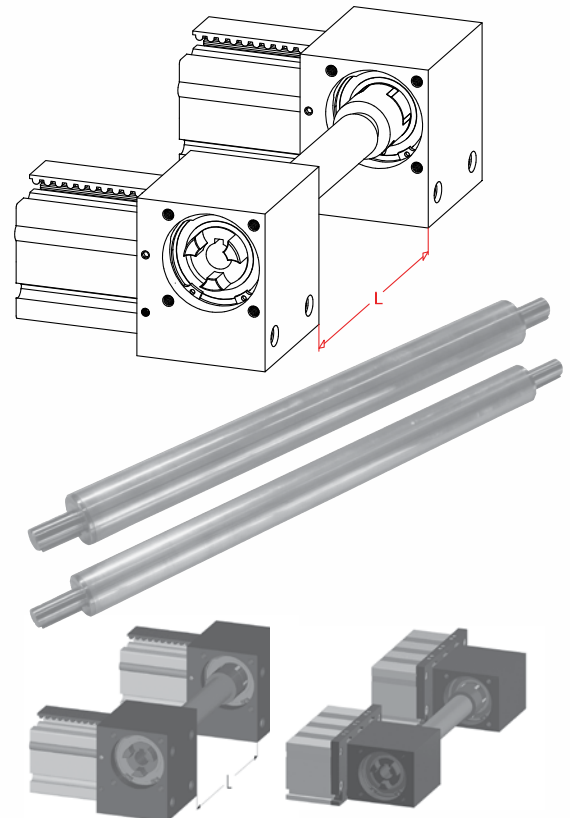


CODE	TYPE	A	B	C	D	L _{max}
02264	EL/ML/EG 60 QL/QS 60 DL 120	35	27	5×5×28	14 _{h7}	3000
02284	EL/ML/EG 80 QL/QS 80 DL/DS 160	45	40	6×6×40	18 _{h7}	3000
02214	EL/ML 100 QL/QS 100 DL/DS 200	55	50	6×6×40	22 _{h7}	4500
02224	EL/QS 125	55	60	8×7×50	30 _{h7}	5000

Sample ordering code:

Code-No. L
02214 2000

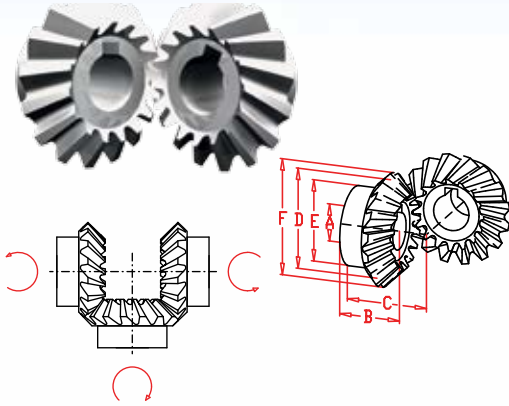
Screw shaft for EL/QL/QS 100 and DL/DS 200 with keyway, length 2000 mm



ACCESSORIES

TRANSMISSION ACCESSORIES

Bevel gear pair EL / EG

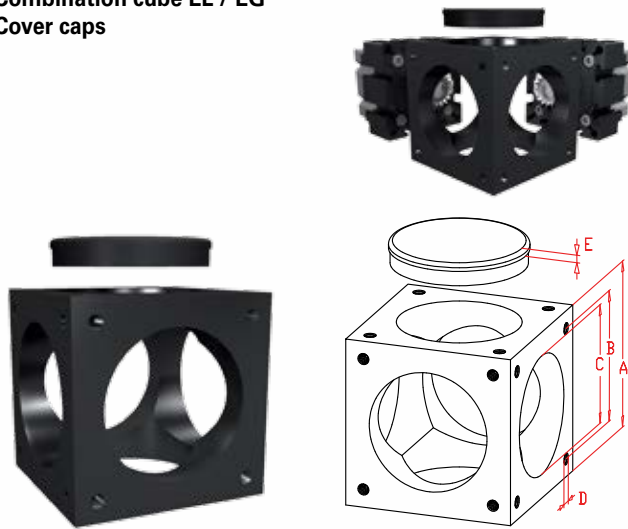


C 45 steel, helical gear, with keyway.

CODE	TYPE	NUMBER OF TEETH	I	MODULE	A _{h7}	B	C	D	E	F	MAX RPM (min ⁻¹)
00641	40	16	1:1	2	10	13	28	-	22	35	560
00642	40	16	1:1.5	1.5	10	17	30	24	20	27	560
		24	1:1.5	1.5	10	17.5	27	36	26	38	840
00661	60	16	1:1	2.5	14	18.5	33	-	30	43	750
		16	1:1.5	2	14	21	38	32	26	36	560
00662	60	24	1:1.5	2	14	23	35	48	35	51	840
		16	1:1	3	18	23	40	-	35	51.5	750
00681	80	16	1:1.5	3	18	28	54	48	40	53	560
		24	1:1.5	3	19	30	49	72	50	76	840
00611	100	16	1:1	4	22	35.5	54	-	45	69.7	750
		16	1:1.5	3	22	27.7	50	48	34	53	560
00612	100	16	1:1.5	3	22	31	44	72	38	76	840

Combination cube EL / EG

Cover caps



COMBINATION CUBE

CODE	TYPE	A	B	C	D
00830	30	52	35	40	M4
00840	40	66	47	48	M6
00860	60	92	69	62	M8
00880	80	112	88	80	M8
00810	100	148	112	110	M10

COVER CAPS

CODE	TYPE	E
01830	30	2
01840	40	5
01860	60	6
01880	80	6
01810	100	3

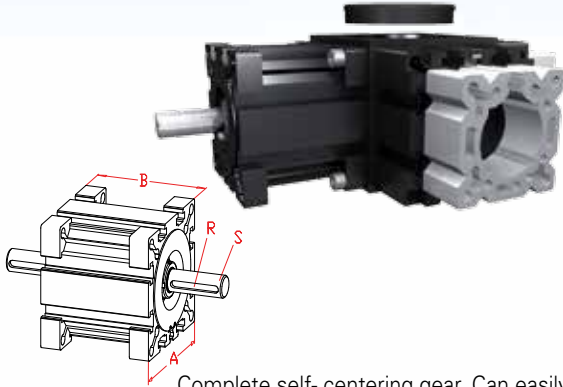
Black plastic.
To cover empty cube sides.

Black anodized aluminium.
Used for connecting modules
at right angles or in line.

MODULAR LINEAR ACTUATORS

ACCESSORIES & SPARE PARTS

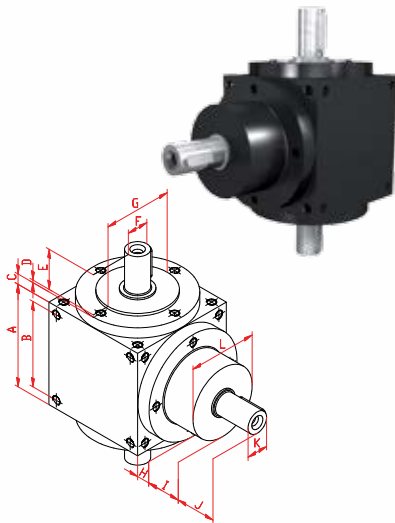
Angular gear box EL / EG



Complete self-centering gear. Can easily be retrofitted to any EG or EL unit. Packed with grease for lubrication.

CODE	TYPE	I	M	A	B	R	S	TORQUE	MAX. RPM (min-i)
00731	30	1:1	1	42	37	2x2	5x15	2 Nm	250
00741	40	1:1	2	58	50	3x3	10x27	5 Nm	560
00742	40	1:1.5	1.5	58	50	3x3	10x27	5 Nm	560 840
00761	60	1:1	2.5	82	70	5x5	14x35	15 Nm	750
00762	60	1:1.5	2	82	70	5x5	14x35	15 Nm	560 840
00781	80	1:1	3	102	90	6x6	18x45	25 Nm	750
00782	80	1:1.5	3	102	90	6x6	18x45	25 Nm	560 840
00711	100	1:1	4	130	110	6x6	22x45	30 Nm	750
00712	100	1:1.5	3	130	110	6x6	22x45	30 Nm	560 840

Bevel gear box E / D / Q - series



For driving two parallel screw units, one side with hollow shaft for the screw unit, one side with journal for splined shaft, two sides with journal for splined shaft and motor, max. 3000 rpm.

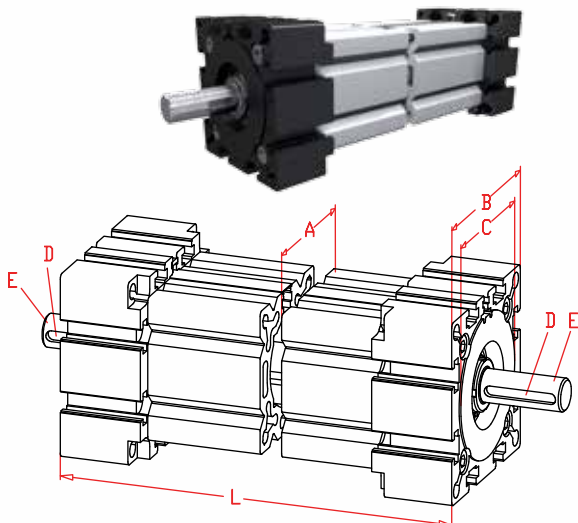
V065 = for Size E 40, 60; D 120, 160; Q 60, 80
 V090 = for Size E 60, 80(S); D 160, 200; Q 80, 100
 V120 = for Size E 80(S), 100, 125; D 160, 200; Q 80, 100

CODE	TYPE	A	B	C	D	E	F	G	H	I	J	K	L	I
00750	V065 - 1 Shaft	65	45	9.5	2	28	12 _{js}	44 ₁₇	9.5	30	28	12 _{js}	44 ₁₇	1:1 / 3:1
00751	V065 - 2 Shafts	65	45	9.5	2	28	12 _{js}	44 ₁₇	9.5	30	28	12 _{js}	44 ₁₇	1:1 / 3:1
00752	V090 - 1 Shaft	90	70	10	2	38	18 _{js}	60 ₁₇	10	30	37	18 _{js}	60 ₁₇	1:1 / 6:1
00753	V090 - 2 Shafts	90	70	10	2	38	18 _{js}	60 ₁₇	10	30	37	18 _{js}	60 ₁₇	1:1 / 6:1
00754	V120 - 1 Shaft	120	100	12	3	47	25 _{js}	80 ₁₇	15	40	47	25 _{js}	80 ₁₇	1:1 / 6:1
00755	V120 - 2 Shafts	120	100	12	3	47	25 _{js}	80 ₁₇	15	40	47	25 _{js}	80 ₁₇	1:1 / 6:1

00751

Sample order code: Angular gear box size 60 with 2 journals

Transmission unit EL / EG



A shaft carried on ball bearings in an aluminium hollow section can be used to transmit torque or as a joining element for combining parallel linear units or as an individual element in angular operation.

CODE	TYPE	A	B	C	D	E	L _{min}	L _{max}
01931	30	30	42	40x0.7	2x2	5x15	38	3,000
01932	30 no shaft	30	42	40x0.7	-	-	38	3,000
01941	40	40	58	48x1	3x3	10x27	50	6,000
01942	40 no shaft	40	58	48x1	-	-	50	6,000
01961	60	60	82	62x1	5x5	14x35	70	6,000
01962	60 no shaft	60	82	62x1	-	-	70	6,000
01981	80	80	102	80x1	6x6	18x45	90	6,000
01982	80 no shaft	80	102	80x1	-	-	90	6,000
01911	100	100	130	110x1	6x6	22x45	110	6,000
01912	100 no shaft	100	130	110x1	-	-	110	6,000

01941

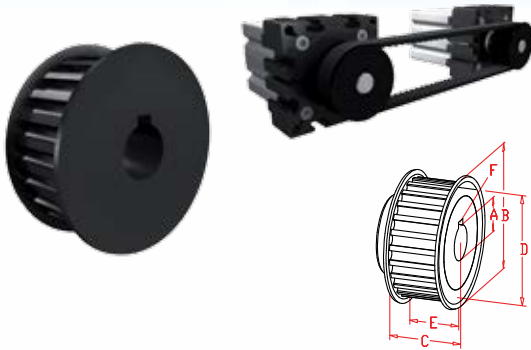
0750

Sample order code: Size 40, length L = 750 mm

ACCESSORIES

TRANSMISSION ACCESSORIES (Continued)

Toothed pulley HTD



Material St 50, secured with key.

CODE	TYPE	A	B	C	D	E	F	NUMBER OF TEETH	SPACING
00450	EL/EG 30	6	23	26	18.3	15	2x2	20	3x15
00451	EL/EG 40	10	36	26	30.7	15	3x3	20	5x15
00452	EL/EG 60 DL/DS120	14	44	38	40.2	25	5x5	26	5x25
00453	EL/EG 80 DL/DS160	18	54	38	49.8	25	6x6	32	5x25
00454	EL100	22	66	48	61.1	38	6x6	24	8x30

Toothed belt endless HTD



CODE	TYPE	BELT	TENSILE FORCE
00550	EL/EG 30	3M15	200 N
00551	EL/EG 40	5M15	390 N
00556	EL/EG 40	5M09	298 N
00552	EL/EG60	5M25	894 N
00553	EL/EG80	5M25	894 N
00554	EL100	8M30	1070 N
00555	EL100	8M20	980 N

00551 0700

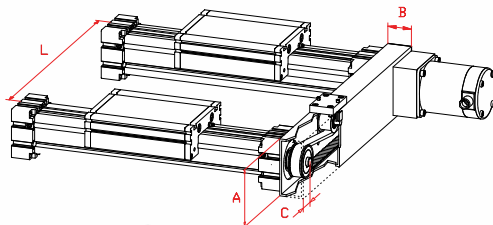
Sample order code:
Belt 5M15 perimeter: 700 mm

Parallel transfer unit for screw drives

DL / DS



EL / EG / Q



Black anodized aluminium tube with plastic end caps, pulleys fixed with keys or tension rings. Screw centers are multiples of 5 or 8 mm, according to belt pitch.

CODE	TYPE	A	B	C	L _{max}	BELT
T13030	EL/EG 30	50	25	25	1,200	5M-9
T13040	EL/EG 40	80	40	30	1,500	5M-15
T13060	EL/EG/Q 60	100	50	42	2,000	5M-25
T13061	DL/DS 120	60	50		2,000	5M-25
T13080	EL/EG/Q 80	120	50	52	2,000	5M25
T13081	DL/DS 160	80	50		2,000	5M-25
T13010	EL/Q 100	160	80	66	3,000	8M-30
T13020	EL 125					
T13011	DL/DS 200					

T13060 500

Sample ordering code: Center-distance of axis L = 500 mm
For center-distances higher than 800mm
you have to use an additional tensioning device code-number 04099.

MODULAR LINEAR ACTUATORS

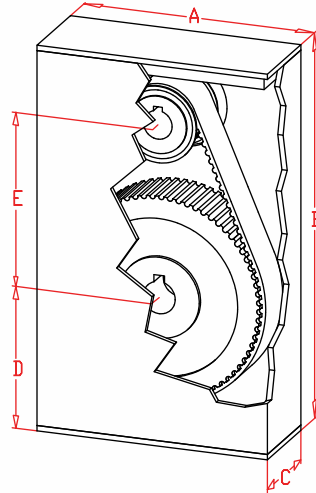
ACCESSORIES & SPARE PARTS

TOOTHED BELT GEAR



Rectangular aluminium tubular housing, ends covered with plastic end caps. Toothed pulley fitted to motor shaft with key or tension ring. Housing can be used for adapting nearly any motor.

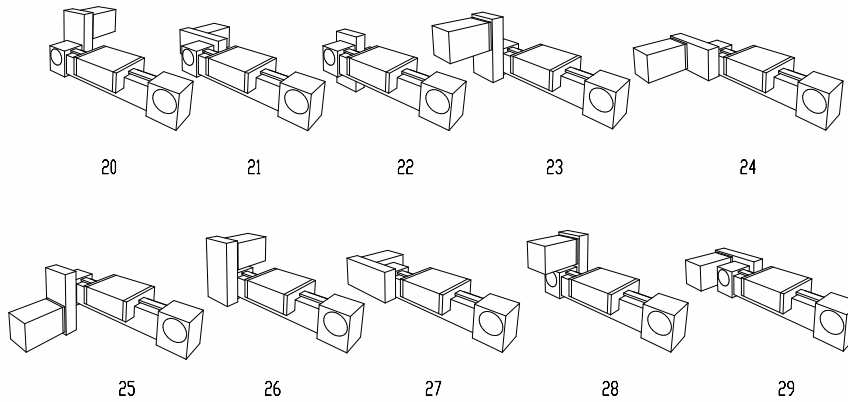
Dimensions in the table are examples. In general dimensions depend on motor-shaft, flange and ratio.



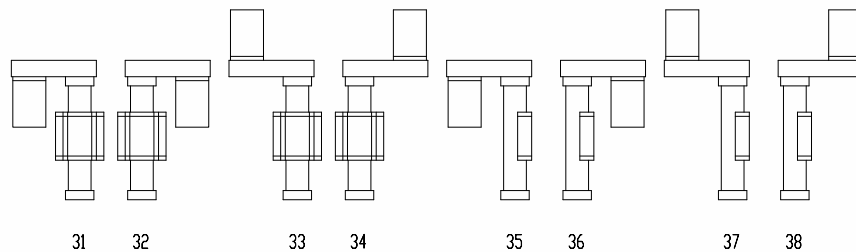
CODE-NO.	TYPE	A	B	C	D	E	BELT	DRIVING TORQUE	RATIO **	
T1-XX-30-XX	30	60	117	30	22	60*	3M15	max. 2 Nm	1:1	
T1-XX40-XX	40	100	190	40	55	87*	5M-15	max. 4 Nm	2:1	
T1-XX60-XX	60	100	190	50	55	87*	5M25	max. 8 Nm	2.4:1	
T1-XX80-XX	80	120	220	54	54	107*	5M25	max. 12 Nm	3:1	
T1-XX10-XX	100	180	340	60	80	163*	8M30	max. 20 Nm	others on request	
T1-XX12-XX	125	Contact Nook Industries for dimension information.								request

Motor mounting with belt reducing gear for belt driven units

*depends on motor size
**depends on motor shaft diameter



Motor mounting with belt reducing gear for spindle drives



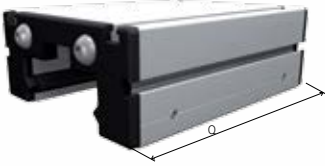
T1- 22 40- 2.4

Sample order code:
Size 40, for belt drive units, motor mounting 22, ratio 2.4:1.

SPARE PARTS

CARRIAGES

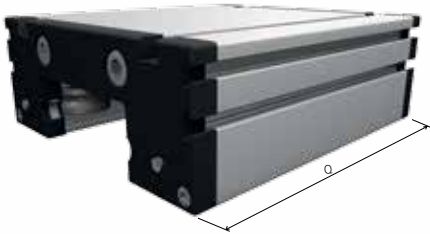
Complete carriage EG



Additional complete carriage with V-slides and end plates.

CODE	TYPE	Q _{Standard}	Q _{max}
04532	EG 30	82	1000
04542	EG 40	118	1000
04562	EG 60	164	1000
04582	EG 80	193	1000

Complete carriage EL/ML



Additional complete carriage with rollers, eccentrics and wiper end plates for free rolling. Temperature: Up to 100° C.

without Slider ²⁾

CODE	TYPE	Q _{Standard}	Q _{max}
04531	EL 30	82	3000
04541	EL 40	122	3000
04561	EL/ML 60	168	3000
04560	EL/ML 60S	194	3000
04581	EL/ML 80	194	3000
04580	EL/ML 80S	214	3000
04511	EL/ML 100	300	2000
04521	EL 125	365	2000

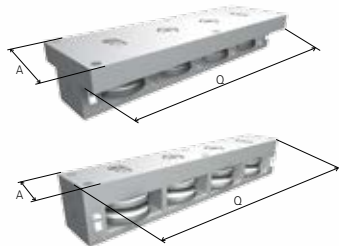
with Slider ¹⁾

CODE	TYPE	Q _{Standard}	Q _{max}
045311	EL 30	82	3000
045411	EL 40	122	3000
045611	EL 60	168	3000
045601	EL 60S	194	3000
045811	EL 80	194	3000
045801	EL 80S	214	3000
045111	EL 100	300	2000
045211	EL 125	365	2000

1) ELT/K, ELVZ, ELHZ

2) ELZ, ELZT, ELZU, ELZA, ELZO, MLZ

Complete carriage UL



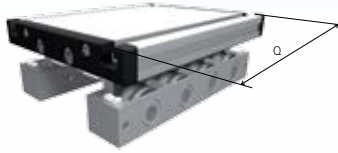
Carriage with rollers, eccentrics and end plates. Temperature: Up to 100° C.

CODE	TYPE	A	Q
045471	UL 40	40	146
045472	UL 40	20	146
045671	UL 60	60	194
045672	UL 60	29	194
045871	UL 80	80	260
045872	UL 80	42	260

MODULAR LINEAR ACTUATORS

ACCESSORIES & SPARE PARTS

Complete carriage DL



Standard carriage with 2x4 rollers, eccentrics and end plates.
Temperature: Up to 100° C.
Different versions by inquiry.

CODE	TYPE	Q _{Standard}	Q _{max}
04591	DL 120	156	3000
04590	DL 160	200	3000
04592	DL 200	270	3000

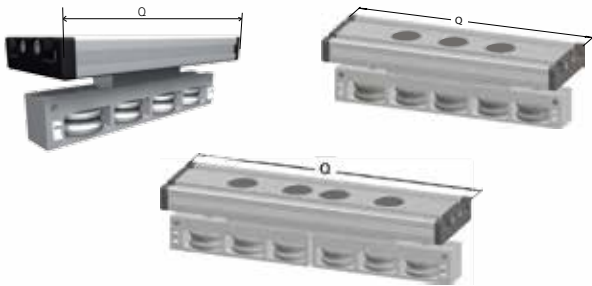
Complete carriage DS



Carriage with four runner blocks and end plates.
Temperature: Up to 100° C.
Different versions by inquiry.

CODE	TYPE	Q _{Standard}	Q _{max}
045700	DS 120	156	3000
045710	DS 160	200	3000
045720	DS 200	270	3000

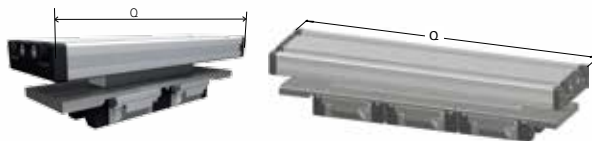
Carriage QL



Carriage with rollers, eccentrics and end plates.
Temperature: Up to 100° C. Different versions by inquiry.

CODE	TYPE	Q _{Standard}	NUMBER OF ROLLERS
04593A	QL 60	152	4
04593B	QL 60	192	5
04593C	QL 60	232	6
04594A	QL 80	196	4
04594B	QL 80	246	5
04594C	QL 80	296	6
04595A	QL 100	260	4
04595B	QL 100	320	5
04595C	QL 100	388	6

Carriage QS



Carriage with 2 runner blocks and end plates.
Temperature: Up to 100° C Different versions by inquiry.

CODE	TYPE	Q _{Standard}	NUMBER OF RUNNER-BLOCKS
045970	QS 60	177	2
045973	QS 60	242	3
045980	QS 80	232	2
045983	QS 80	312	3
045990	QS 100	268	2
045993	QS 100	362	3
04550	QS 125	300	2
045502	QS 125	365	3

Carriage QST/K



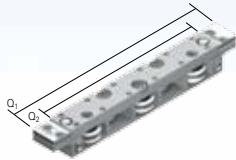
Carriage with 2 runner blocks and end plates without leading nut.
Temperature: Up to 100° C. Different versions by inquiry.

CODE	TYPE	Q _{Standard}	Q _{max}
045974	QST/K 60	188	3000
045984	QST/K 80	250	3000
045997	QST/K 100	288	3000

SPARE PARTS

CARRIAGES (Continued)

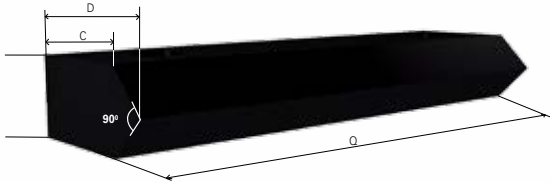
Carriage LLZ 60



Carriage with 5 runner blocks.

CODE	TYPE	Q ₁	Q ₂
04570	LLZ 60	215	175

V-slide EG



Made of low-wear plastic with good sliding characteristics.
2 pieces per carriage.

CODE	TYPE	A	B _{max.}	C	D
04233	30	9.3	1,000	-	17.6
04243	40	8	1,000	9	13
04263	60	10	1,000	16	21
04283	80	14	1,000	22	29

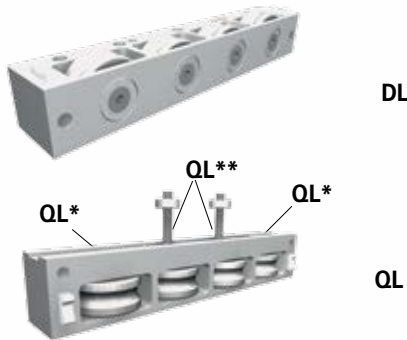
Carriage roller



Standard roller. Stainless steel upon request.

CODE	TYPE	NAME
04000	EL 30	LFR 687-2Z
04001	EL 40 / DL 120 / QL 60	LFR 608-2Z
04002	EL/ML 60 / DL 160 / QL 80	LR 10
04039	EL/ML 60S / DL 200 / QL 100	LFR 5302 KDD
04003	EL/ML 80	LR 12
04038	EL/ML 80S	LFR 5202-12 NPP
04004	EL/ML 100	LFR 5204-16 NPP
04009	EL 125	LFR 5206-20 KDD

Carriage roller block DL - QL



Made of aluminium, complete with rollers, eccentric and screws.

CODE	TYPE	STANDARD	BY INQUIRY
04100	DL 120	4 rollers	3; 5; 2x3 rollers
04110	DL 160	4 rollers	3; 5; 2x3 rollers
04115	DL 200	4 rollers	3; 5; 2x3 rollers
04116	QL 60	4 rollers	5; 2x2; 2x3 rollers
04117	QL 80	4 rollers	5; 2x2; 2x3 rollers
04119	QL 100	4 rollers	5; 2x2; 2x3 rollers

* for outside fixed roller
** for inner movable roller

Runner block for DS - QS



DS



QS

CODE	TYPE
04150	QS 60
04152	QS 80
04154	QS 100
04156	DS 120
04157	DS 160
04158	DS 200

MODULAR LINEAR ACTUATORS

ACCESSORIES & SPARE PARTS

Eccentric EL/ML

Size 40, 60



Size 30, 60S, 80, 80S, 100, 125



Eccentric made of stainless steel with mounting accessories, screw, shims and safety washer.

CODE	TYPE	FOR ROLLER
04050	EL 30	LFR 687-2Z
04051	EL 40	LFR 608-2Z
04052	EL/ML 60	LFR 5201 - KDD
040521	EL/ML 60S	LFR 5302 - KDD
04053	EL/ML 80	LFR 5201-12 - KDD
04049	EL/ML 80S	LFR 5202-12 - NPP
04054	EL 100	LFR 5204-16 - NPP
04055	EL 125	LFR 5206-20 - KDD

Eccentric DL - QL



DL



QL*



QL**

Eccentric made of stainless steel with mounting set, screw, shims and safety washer. The front side has an embossed marking to enable uniformly adjustment of rollers.

CODE	TYPE	FOR ROLLER
04057	DL 120	LFR 608-2Z
04058	DL 160	LFR 5201 - KDD
04059	DL 200	LR 5302 - KDD
06060	QL 60*	LFR 608-2Z
06061	QL 60**	LFR 608-2Z
06080	QL 80*	LFR 5201 - KDD
06081	QL 80**	LFR 5201 - KDD
06010	QL 100*	LR 5302 - KDD
06011	QL 100**	LR 5302 - KDD

* for outside fixed roller
** for inner movable roller

For arrangement of the different rollers see "carriage roller block" above.

Tool for eccentric adjustment



TYPE	FIX TOOL		ADJUST TOOL	
	CODE	DIMENSION	CODE	DIMENSION
EL 30	09019	T 10	09030	LK 9.5 Ø 1.3
EL 30	09020	SW 2	09030	LK 9.5 Ø 1.3
EL 40	09021	SW 4	09022	SW 5
EL 60	09022	SW 5	09023	SW 6
EL 60S	09023	SW 6	09036	LK 20 Ø 2
EL 80	09022	SW 5	09031	LK 15 Ø 2
EL 80S	09023	SW 6	09036	LK 20 Ø 2
EL 100	09023	SW 6	09032	LK 24 Ø 3
EL 125	09024	SW 8	09033	LK 32 Ø 4

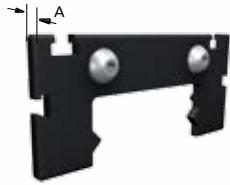
TYPE	FIX TOOL		ADJUST TOOL	
	CODE	DIMENSION	CODE	DIMENSION
DL 120	09025	SW 3	09034	LK 10.5 Ø 1.3
DL 160	09021	SW 4	09031	LK 15 Ø 2
DL 200	09023	SW 6	09036	LK 20 Ø 2
QL 60	09038	LK 8 Ø 1.5	09026	SW 2.5
	09021	SW 4	09022	SW 5
QL 80	09037	LK 10 Ø 2	09025	SW 3
	09022	SW 5	09023	SW 6
QL 100	09035	LK 13 Ø 2.5	09021	SW 4
	09023	SW 6	09036	LK 20 Ø 2

SPARE PARTS

CARRIAGES (Continued)

End plates EG

Material ABS, for temperatures up to 100°C



WITHOUT SLIDER			WITH SLIDER			WITH SLIDER AND OUTPUT FOR GREASE NIPPLE		
CODE	TYPE	A	CODE	TYPE	A	CODE	TYPE	A
04241	EG 40	5	04246	EG 40	5	042661	EG 60	6
04261	EG 60	6	04266	EG 60	6	042861	EG 80	6
04281	EG 80	6	04286	EG 80	6			

Wiper end plate complete for EL/ML

Material ABS, for temperatures up to 100°C



WITHOUT SLIDER ¹⁾			WITH SLIDER ²⁾			WITH SLIDER AND OUTPUT FOR GREASE NIPPLE ³⁾		
CODE	TYPE	A	CODE	TYPE	A	CODE	TYPE	A
04230	EL 30	6	04234	EL 30	6	042641	EL 60	12
04240	EL 40	11	04244	EL 40	11	042691	EL 60S	12
04260	EL/ML 60	12	04264	EL 60	12	042841	EL 80	12
04268	EL/ML 60S	12	04269	EL 60S	12	042891	EL 80S	12
04280	EL/ML 80	12	04284	EL 80	12	042141	EL 100	15
04288	EL/ML 80S	12	04289	EL 80S	12	042241	EL 125	15
04210	EL/ML 100	15	04214	EL100	15			
04220	EL 125	15	04224	EL125	15			

1) ELZ, ELZT, ELZU, ELZA, ELZQ, MLZ 2) ELT/K, ELVZ, ELHZ 3) ELT/K

Slider inset for ELT / ELK Slider inset for DLT / DLK

When changing the cover band, it is necessary to replace the slide.



ELT / ELK		DLT / DLK	
CODE	TYPE	CODE	TYPE
03132	EL 30	03164	DL 120
03142	EL 40	03184	DL 160
03162	EL 60	03114	DL 200

Wiper end plate DL / DS - QL / QS



DL / DS



QL / QS

CODE	TYPE	D	MATERIAL
04211	DL/DS 120	8	ABS
04212	DL/DS 160	10	ABS
04213	DL/DS 200	15	ABS
04267	QL/QS 60	6	ABS
04287	QL/QS 80	8	ABS
04217	QL/QS 100	10	ABS

MODULAR LINEAR ACTUATORS

ACCESSORIES & SPARE PARTS

GUIDE BODY PROFILE

Cover band



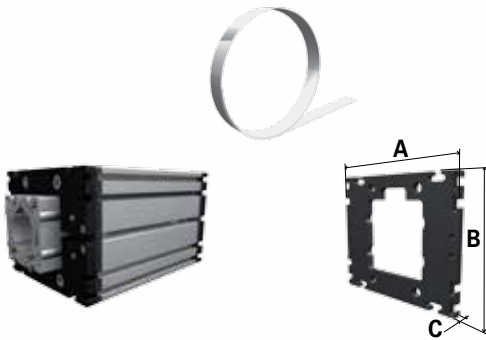
Spring steel (stainless steel)

CODE	TYPE	A X B
01020....	EL/EG 30	8 × 0.15
01021....	EL/EG 40/60/80 DL/DS 120	13.5 × 0.3
01026....	DL/DS 160	17.3 × 0.3
01022....	EL 100/125 DL/DS 200	22 × 0.3
01023	QST/K 60	24 × 0.3
01024	QST/K 80	32.3 × 0.3
01025	QST/K 100	38.5 × 0.3

Code-No. length in mm

01026	2300
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Joining plate for closed carriage



Sample ordering code:

Cover band 17.3 × 0.3 2.300 mm long.

Aluminium plate with connection bores.

CODE-NO	TYPE	A	B	C
03045	EG 40	70	70	8
03065	EG 60	100	98	8
03085	EG 80	140	140	8
03036	EL 30	70	52	6
03046	EL 40	100	70	8
03066	EL/ML 60	144	98	8
03067	EL/ML 60S	170	106	10
03086	EL/ML 80	170	140	8
03087	EL/ML 80S	190	142	10
03016	EL 100	230	180	8
03026	EL 125	295	215	12

Guide rod



CODE	TYPE	Ø	MATERIAL	HARDNESS
04131....	EL/EG 30	5 _{h6}	Cf 53	HRC 62
04132....	EL/EG 30	5 _{h6}	× 90 CrMoV18	HRC 56
04141....	EL 40 DL 120 QL 60	6 _{h6}	Cf 53	HRC 62
04142....	EL 40 DL 120 QL 60	6 _{h6}	× 90 CrMoV18	HRC 56
04161....	EL 60(S) DL 160/200 QL 80/100	10 _{h6}	Cf 53	HRC 62
04162....	EL 60(S) DL 160/200 QL 80/100	10 _{h6}	× 90 CrMoV18	HRC 56
04181....	EL 80(S)	12 _{h6}	Cf 53	HRC 62
04182....	EL 80(S)	12 _{h6}	× 90 CrMoV18	HRC 56
04111....	EL 100	16 _{h6}	Cf 53	HRC 62
04112....	EL 100	16 _{h6}	× 90 CrMoV18	HRC 56
04113....	EL 125	20 _{h6}	Cf 53	HRC 62
04114....	EL 125	20 _{h6}	× 90 CrMoV18	HRC 56

Code-No. length in mm

04131	2000
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Sample ordering code:

Guiding rod steel ø 5 2,000 mm long.

nookindustries.com

SPARE PARTS

SCREWS

Trapezoidal screw



CODE	TYPE	PITCH	UNIT LENGTH L _{max.}
04609....	EL/EG 30	10×03 R	1,500 mm
04629....	EL/EG 30	10×03 L	1,500 mm
04600....	EL/EG 40	18×04 R	3,000 mm
04620....	EL/EG 40	18×04 L	3,000 mm
04640....	DL/DS 120 / QS 60	18×04 R	3,000 mm
04650....	DL/DS 120 / QS 60	18×04 L	3,000 mm
04601....	EL/EG 40	18×08 R	3,000 mm
04621....	EL/EG 40	18×08 L	3,000 mm
04641....	DL/DS 120 / QS 60	18×08 R	3,000 mm
04651....	DL/DS 120 / QS 60	18×08 L	3,000 mm
04602....	EL/EG 60	24×05 R	4,000 mm
04622....	EL/EG 60	24×05 L	3,000 mm
04642....	DL/DS 160 QS 80	24×05 R	4,000 mm
04652....	DL/DS 160 QS 80	24×05 L	3,000 mm
04603....	EL/EG 60	24×10 R	3,000 mm

Code-No. unit length in mm

04603	1000
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Sample ordering code:

Trapezoidal screw Tr 24×10 right, unit length 1000 mm.

CODE	TYPE	PITCH	UNIT LENGTH L _{max.}
04623....	EL/EG 60	24×10 L	3,000 mm
04643....	DL/DS 160 / QS 80	24×10 R	3,000 mm
04643....	DL/DS 160 / QS 80	24×10 L	3,000 mm
04604....	EL/EG 80(S)	28×05 R	3,000 mm
04624....	EL/EG 80(S)	28×05 L	3,000 mm
04605....	EL/EG 80(S)	28×10 R	3,000 mm
04625....	EL/EG 80(S)	28×10 L	3,000 mm
04606....	EL/QS 100 DL/DS 200	32×06 R	4,500 mm
04626....	EL/QS 100 DL/DS 200	32×06 L	3,000 mm
04607....	EL/QS 100 DL/DS 200	32×12 R	3,000 mm
04627....	EL/QS 100 DL/DS 200	32×12 L	3,000 mm
04630....	EL 125	40×07 R	4,000 mm
04631....	EL 125	40×07 L	3,000 mm
04632....	EL 125	40×14 R	3,000 mm
04633....	EL 125	40×14 L	3,000 mm

Trapezoidal screw made of RG 7



CODE	TYPE	PITCH
04332	EL/EG 30	10×03 R
04333	EL/EG 30	10×03 L
04340	EL/EG 40 / DL/DS 120 / QS 60	18×04 R
04341	EL/EG 40 / DL/DS 120 / QS 60	18×04 L
04342	EL/EG 40 / DL/DS 120 / QS 60	18×08 R
04343	EL/EG 40 / DL/DS 120 / QS 60	18×08 L
04360	EL/EG 60 / DL/DS 160 QS 80	24×05 R
04361	EL/EG 60 / DL/DS 160 QS 80	24×05 L
04362	EL/EG 60 / DL/DS 160 QS 80	24×10 R
04363	EL/EG 60 / DL/DS 160 QS 80	24×10 L
04380	EL/EG 80(S)	28×05 R

CODE	TYPE	PITCH
04381	EL/EG 80(S)	28×05 L
04382	EL/EG 80(S)	28×10 R
04383	EL/EG 80(S)	28×10 L
04310	EL/QS 100 / DL/DS 200	32×06 R
04311	EL/QS 100 / DL/DS 200	32×06 L
04312	EL/QS 100 / DL/DS 200	32×12 R
04313	EL/QS 100 / DL/DS 200	32×12 L
04320	EL 125	40×07 R
04321	EL 125	40×07 L
04322	EL 125	40×14 R
04323	EL 125	40×14 L

MODULAR LINEAR ACTUATORS

ACCESSORIES & SPARE PARTS

Ballscrew



CODE	TYPE	PITCH	UNIT LENGTH L _{max}
04610....	EL/EG 30	8x2.5 R	2,000 mm
04611....	EL/EG 40	16x05 R	3,000 mm
04661....	DL/DS 120 / QS 60	16x05 R	3,000 mm
04612....	EL/EG 40	16x10 R	3,000 mm
04662....	DL/DS 120 / QS 60	16x10 R	3,000 mm
04614....	EL/EG 60	25x05 R	3,000 mm
04615....	EL/EG 60	25x10 R	3,000 mm
04613....	EL/EG 60	20x20 R	3,000 mm
04663....	DL/DS 120 / QS 80 DL/DS 160	20x20 R	3,000 mm
046151....	EL/EG 60	20x05 L	3,000 mm

Code-Nr. unit length in mm

04617	1000
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Sample ordering code:

Ballscrew screw 32x05 right, unit length 1,000 mm.

CODE	TYPE	PITCH	UNIT LENGTH L _{max}
04664....	DL/DS 120 DL/DS 160 QS 80	25x05R	3,000 mm
04665....	DL/DS 120 DL/DS 160 QS 80	25x10 R	3,000 mm
04616....	EL/EG 80(S)	25x25 R	3,000 mm
04666....	DL/DS 120 DL/DS 160	25x25 R	3,000 mm
04617....	EL/EG 80(S) EL/QS 100 DL/DS 200	32x05 R	3,000 mm
04684....	EL/EG 80(S) EL/QS 100 DL/DS 200	32x05 L	3,000 mm
04618....	EL/EG 80(S) EL/QS 100 DL/DS 200	32x10 R	3,000 mm
04683....	EL 100 DL/DS 200	32x20 R	3,000 mm
04619....	EL 100 DL/DS 200	32x32 R	3,000 mm
04634....	EL 125	40x10 R	3,000 mm
04635....	EL 125	40x20 R	3,000 mm
04636....	EL 125	40x40 R	3,000 mm

Ballscrew nut



CODE	TYPE	PITCH	FIRST GREASING	RE-GREASING*
04430	EL/EG 30	8x2.5 R	0.02 g	0.01 g
04440	EL/EG 40	16x05 R	4.0 g	1.3 g
	DL/DS 120 QS 60			
04441	EL/EG 40	16x10 R	2.5 g	0.8 g
	DL/DS 120 QS 60			
04442	DL/DS 120 QS 60	16x16 R	2.0 g	0.6 g
04460	EL/EG 60	25x05 R	6.0 g	2.0 g
	DL/DS 120			
	DL/DS 160 QS 80			
04461	EL/EG 60	25x10 R	8.0 g	2.6 g
	DL/DS 120			
	DL/DS 160 QS 80			
04462	EL/EG 60	20x20 R	8.0 g	2.6 g
	DL/DS 120			
	DL/DS 160 QS 80			

CODE	TYPE	PITCH	FIRST GREASING	RE-GREASING*
04463	EL/EG 60	20x05 L	5.0 g	2.0 g
04464	EL/EG 80(S)	25x25 R	10.0 g	3.0 g
04464-1	DL/DS 160	25x25 R	10.0 g	3.0 g
	EL/EG 80(S) EL/QS 100 DL/DS 200			
04480	EL/EG 80(S) EL/QS 100 DL/DS 200	32x05 R	8.0 g	3.0 g
04485	EL/EG 80(S) EL/QS 100 DL/DS 200	32x05 L	8.0 g	3.0 g
04481	EL/EG 80(S) EL/QS 100 DL/DS 200	32x10 R	11.0 g	4.0 g
04483	EL 100 DL/DS 200	32x20 R	11.8 g	4.0 g
04482	EL 100 DL/DS 200	32x32 R	12.6 g	4.0 g
04420	EL 125	40x10 R	25.0 g	8.3 g
04421	EL 125	40x20 R	29.0 g	9.6 g
04422	EL 125	40x40 R	34.0 g	11.3 g

* after approx. 500 hours

SPARE PARTS

LEADING NUT RECEIVER



Ballscrew EL/EG

CODE	TYPE
03130	30
03140	40
03160	60(S)
03180	80(S)
03110	100
03120	125

Trapezoidal EL/EG

CODE	TYPE
03131	30
03141	40
03161	60(S)
03181	80(S)
03111	100
03121	125

Ballscrew DL/DS

CODE	TYPE
03163	120
03183	160
03113	200

Trapezoidal DL/DS

CODE	TYPE
03168	120
03188	160
03118	200

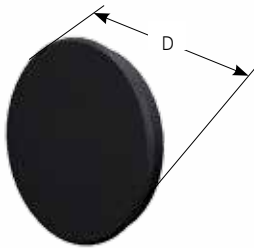
Ballscrew QS

CODE	TYPE
03167	60
03187	80
03117	100

Trapezoidal QS

CODE	TYPE
03166	60
03186	80
03116	100

COVER CAPS



CODE	TYPE	D	POSITION
04206	QL/QS 60	15	Servicing bores
	ELK 30	19	Bearing-block
04205	QL/QS 80, DL/DS 120	19	Servicing bores
	QL 60	19	Carriage
04235	ELZ 30	28	Pulley-block
	ELT/K 40, EGT/K 40	28	Bearing-block
	DL/DS 160	28	Servicing bores
04245	QL 80 - 100	28	Carriage
	ELZ 40, ELHZ 60, ELVZ 60	37	Pulley-block
04265	ELZ/MLZ 60, ELHZ 80, ELVZ80, DLZ 120, QLZ/QSZ 60	47	Pulley-block
04285	ELZ/MLZ 80, ELHZ 100, ELVZ 100, DLZ/DSZ 160, QLZ/QSZ 80	68	Pulley-block
04215	ELZ/MLZ 100, DLZ/DSZ 200, QLZ/QSZ 100	90	Pulley-block
04225	ELZ 125 / QS 125	110	Pulley-block
042650	D 120, Q 60	32	Bearing-block
042850	D 160, Q 80	40	Bearing-block
042150	D 200, Q 100	52	Bearing-block

MODULAR LINEAR ACTUATORS

ACCESSORIES & SPARE PARTS

LUBRICANTS

09001



CODE	NAME
09001	Molyduval, 1 litre
09003	Steel oil gun for carriage rollers
09010	One hand oil gun 125cm ³ (with peak and angle adapter)
09004	Steel grease gun for ballscrew
09009	regreasing adapter DLT/K 160
09012	One hand grease gun 125cm ³ (with peak and angle adapter)
09002	SKF grease LGMT 2/1 (1kg)
09006	Grease gun filling device LAGF 5 (for 5kg canister)
09007	SKF grease LGMT 2/5 (5kg)
09013	Grease gun filling device LAGF 18 (for 18kg canister)
09014	SKF grease LGMT 2/18 (18kg)
09016	Grease cartridge with cannula (5ml) for DS 120

* for from outside difficult to reach nipples

09010



09012



09006



09004



09009



09013



09014



09007



09002



09016



09003



ACCESSORIES & SPARE PARTS

SPARE PARTS

TOOTHED BELTS

Toothed belts are available by the meter. Temperature resistant from -10° C to 50° C, please call Nook Industries for applications outside this temperature range.



BELT WITH STEEL REINFORCEMENT PU HP PAZ		
CODE	TYPE	TOOTHED BELT
00531	ELZ 30	3M 12
00532	ELZ 40	5M 15
00534	ELZ/ML 60 (S)	5M 25
00536	ELZ/ML 80 (S)	8M 30
00538	ELZ/ML 100	8M 50
00540	ELZ 125	8M 70

00531	ELZG 30	3M 12
00532	ELZG 40	5M 15
00534	ELZG 60 (S)	5M 25
00536	ELZG 80 (S)	8M 30

00542	ELZZ 60 (S)	5M 09
00543	ELZZ 80 (S)	8M 12
00544	ELZZ 100	8M 20
00536	ELZZ 125	8M 30

00534	DLZ / DSZ 120	5M 25
00536	DLZ / DSZ 160	8M 30
00538	DLZ / DSZ 200	8M 50
00538	DLZ / DSZ 160 HD	8M 50
00540	DLZ / DSZ 200 HD	8M 70

00534	QLZ / QSZ 60	5M 25
00536	QLZ / QSZ 80	8M 30
00538	QLZ / QSZ 100	8M 50
00540	QSZ 125	8M 70



EX - PROTECTION ATEX PU HP PAZ PAR ANTISTATIC

CODE	TYPE	TOOTHED BELT
00532EX	ELZ 40	5M 15
00534EX	ELZ 60/60S	5M 25
00536EX	ELZ 80/80S	8M 30
00538EX	ELZ 100	8M 50
00540EX	ELZ 125	8M 70

BELT WITH STEEL REINFORCEMENT PU HP PAZ		
CODE	TYPE	TOOTHED BELT
00534	DSZPVI 120	5M 25
00536	DSZPVI 160	8M 30
00538	DSZPVI 200	8M 50
00547	LLZ 60	5M 30

BELT WITH KEVLAR-REINFORCEMENT PU PAZ		
CODE	Type	TOOTHED BELT
005341	DLVZ 120	5M 25
005341	DLVZ 160	5M 25

005341	ELHZ / ELVZ 60	5M 25
005341	ELHZ / ELVZ 80 (S)	5M 25
005451	ELHZ / ELVZ 100	8M 48
005381	ELHZ / ELVZ 125	8M 50

00531	ELZU 30	3M 12
005321	ELZU 40	5M 15
005341	ELZU 60 (S)	5M 25
005361	ELZU 80 (S)	8M 30
005381	ELZU 100	8M 50

005321	ELZI 30	5M 15
005341	ELZI 40	5M 25
005361	ELZI 60	8M 30



Code-No length in mm

00534	5000
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Sample ordering code:
Belt 5M 25, PU HP PAZ, 5m long

EX - PROTECTION ATEX PU HP PAZ PAR ANTISTATIC

CODE	TYPE	TOOTHED BELT
00536EX	ELFZ 60 S	8M 30
00538EX	ELFZ 80 S	8M 50
00540EX	ELFZ 100	8M 70
00546EX	ELFZ 125	8M 100

MODULAR LINEAR ACTUATORS

ACCESSORIES & SPARE PARTS

Toothed belts are available by the meter. Temperature resistant from -10° C to 50° C, please call Nook Industries for applications outside this temperature range.



**Ω - REDIRECTION PULLEY BLOCK
KEVLAR-REINFORCEMENT PU PAZ**

CODE	TYPE	TOOTHED BELT
005361	ELFZ 60 S	8M 30
005381	ELFZ 80 S	8M 50
005401	ELFZ 100	8M 70
005461	ELFZ 125	8M 100



**STAINLESS STEEL LINEAR UNITS
KEVLAR-REINFORCEMENT PU PAZ**

CODE:	TYPE	TOOTHED BELT
005341	QLZE / QSZE 60	5M 25
005361	QLZE / QSZE 80	8M 30
005381	QLZE / QSZE 100	8M 50
005401	QLZE 125	8M 70

00531	ELSZ 30	3M 12
005321	ELSZ 30 HD	5M 15
005321	ELSZ / ELSZ 40	5M 15
005341	ELSZ / ELSZ 40 HD	5M 25
005341	ELSZ / ELSZ 60 (S)	5M 25
005361	ELSZ / ELSZ 60 (S) HD	8M 30
005361	ELSZ / ELSZ 80 (S)	8M 30
005381	ELSZ / ELSZ 80 (S) HD	8M 50
005381	ELSZ / ELSZ 100	8M 50
005401	ELSZ / ELSZ 100 HD	8M 70
005401	ELSZ 125	8M 70
005461	ELSZ 125 HD	8M 100

005341	DSZPVIE 120	5M 25
005361	DSZPVIE 160	8M 30
005381	DSZPVIE 200	8M 50
005471	LLZE 60	5M 30

005321	QSSZ 60	5M 15
005341	QSSZ 80	5M 25

005362	DSZS 160 (PU HF PAZ)	8M 30
005361	DLSZ 120	8M 30
005381	DLSZ 160	8M 50
005401	DLSZ 200	8M 70
005361	DSSZ 120	8M 30
005381	DSSZ 160	8M 50
005401	DSSZ 200	8M 70

005341	ELZT 40	5M 25	Main belt
00532	ELZT 40	5M 15	Rotating belt
005361	ELZT 60 (S)	8M 30	Main belt
00534	ELZT 60 (S)	5M 25	Rotating belt
005381	ELZT 80 (S)	8M 50	Main belt
00536	ELZT 80 (S)	8M 30	Rotating belt
005401	ELZT 100	8M 70	Main belt
00538	ELZT 100	8M 50	Rotating belt

SPARE PARTS

TOOTHED PULLEYS



coupling claw on one side



coupling claws on both sides



shaft on one side



shaft on both sides

Pulley size 30-80 bronzed steel, size 100 hard-coated aluminium. Coupling claws compatible with Rotex GS system.

	CODE		CODE		BELT	NUMBER OF TEETH	MM/ REV.	COUPLING ROTEX
	Coupling claw on one side	Coupling claw on both sides	Shaft on one side	Shaft on both sides				
ELZ / ELSZ / MLZ WITH STANDARD BELT								
30	04010	04020	04828	04829	3M12	25	75	7
40	04011	04021	04830	04831	5M15	20	100	9
60(S)	04012	04022	04832	04833	5M25	26	130	14
80(S)	04013	04023	04834	04835	8M30	24	192	19
100	04014	04024	04836	04837	8M50	32	256	24
125	04015	04025	04838	04839	8M70	38	304	28
ELSZ WITH WIDENED BELT								
30	04011	04021	04830	04831	5M15	20	100	9
40	04012	04022	04832	04833	5M25	26	130	14
60(S)	04013	04023	04834	04835	8M30	24	192	19
80(S)	04014	04024	04836	04837	8M50	32	256	24
100	04015	04025	04838	04839	8M70	38	304	28
125	040150	-	-	-	8M100	38	304	-
ELZG								
30	04820	04821	04840	04841	3M12	40	120	7
40	04822	04823	04842	04843	5M15	32	160	9
60(S)	04824	04825	04844	04845	5M25	44	220	14
80(S)	04826	04827	04846	04847	8M30	40	320	19
ELSD WITH STANDARD BELT								
40	04011	04021	04830	04831	5M15	20	100	9
60(S)	04012	04022	04832	04833	5M25	26	130	14
80(S)	04013	04023	04834	04835	8M30	24	192	19
100	04014	04024	04836	04837	8M50	32	256	24
ELSD WITH WIDENED BELT								
40	04012	04022	04832	04833	5M25	26	130	14
60(S)	04013	04023	04834	04835	8M30	24	192	19
80(S)	04014	04024	04836	04837	8M50	32	256	24
100	04015	04025	04838	04839	8M70	38	304	28
ELZU								
30	04010	04020	04828	04829	3M12	25	75	7
40	04011	04021	04830	04831	5M15	20	100	9
60(S)	04012	04022	04832	04833	5M25	26	130	14
80(S)	04013	04023	04834	04835	8M30	24	192	19
ELZT EXTERNAL BELT								
40	04012	04022	04832	04833	5M25	26	130	14
60(S)	04013	04023	04834	04835	8M30	24	192	19
80(S)	04014	04024	04836	04837	8M50	32	256	24
100	04015	04025	04838	04839	8M70	38	304	28

MODULAR LINEAR ACTUATORS

ACCESSORIES & SPARE PARTS

	CODE		CODE					
	Coupling claw on one side	Coupling claw on both sides	Shaft on one side	Shaft on both sides	BELT	NUMBER OF TEETH	MM/REV.	COUPLING ROTEX
ELZT EXTERNAL BELT								
40	04012	04022	04832	04833	5M25	26	130	14
60(S)	04013	04023	04834	04835	8M30	24	192	19
80(S)	04014	04024	04836	04837	8M50	32	256	24
100	04015	04025	04838	04839	8M70	38	304	28
DLZ / DSZ								
DLZ/DSZ 120	04012	04022	04832	04833	5M25	26	130	14
DLZ/DSZ 160	04852	04853	04848	04849	8M30	22	176	19
DLZ/DSZ 200	04854	04855	04850	04851	8M50	28	224	24
DLZT / DSZT INTERNAL BELT								
120	04012				5M25	26	130	14
DLZT / DSZT EXTERNAL BELT								
120	04013	04023	04834	04835	8M30	24	192	19
QLZ / QSZ								
60	04012	04022	04832	04833	5M25	26	130	14
80	04852	04853	04848	04849	8M30	22	176	19
100	04854	04855	04850	04851	8M50	28	224	24
QLSZ / QSSZ								
80	04012	04022	04832	04833	5M25	26	130	14
LLZ								
60	---	04868	04869	---	5M30	26	130	14



two shafts short



one shaft long



two shafts long

	CODE							
	Two shafts short	One shaft long	Two shafts long		BELT	NUMBER OF TEETH	MM/REV.	COUPLING ROTEX
ELHZ / ELVZ								
60(S)	04026	04860	04861		5M25	16	80	14
80(S)	04027	04862	04863		5M25	22	110	19
100	04028	04864	04865		8M50	18	114	24
125	04029	04866	04867		8M50	24	192	28



Coupling claw on one side



Shaft on one side

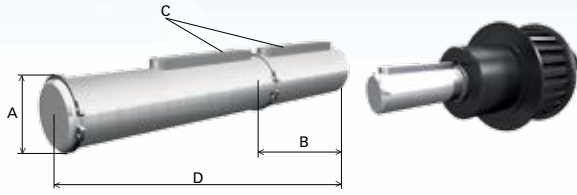


Shafts on both sides

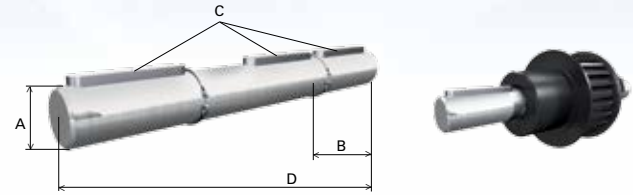
	CODE							
	Coupling claw on one side	Shaft on one side	Shaft on both sides		BELT	NUMBER OF TEETH	MM/REV.	COUPLING ROTEX
ELZZ								
60(S)	04856	048561	048562		5M09	26	130	14
80(S)	04857	048571	048572		8M12	24	192	19
100	04858	048581	048582		8M20	32	256	24
125	04859	048591	048592		8M30	38	304	28

SPARE PARTS

PULLEY PLUG IN SHAFT & TENSIONING SET



Plug-in shaft made of stainless steel, complete with key and locking rings for retrofitting.



SHAFT ON ONE SIDE

CODE	TYPE	SIZE	A ₁₇	B	C	D
04030	ELZ/ELSZ	30	6	15	2x2x12	57
04031	ELZ/ELSZ	40	10	27	3x3x25	85
04032	ELZ/ELSZ/ MLZ QLZ/QSZ	60	14	35	5x5x28	115
	DLZ/DSZ DLZT/DSZT	120	14	35	5x5x28	115
04033	ELZ/ELSZ/ MLZ QLZ/QSZ	80	18	45	6x6x40	145
	DLZ/DSZ	160	18	45	6x6x40	145
	DLSZ/DSSZ	120	18	45	6x6x40	145
04034	ELZ/ELSZ/ MLZ	100	22	45	6x6x40	175
	DLSZ	160	22	45	6x6x40	175
04035	ELZ	125	30	45	8x7x40	215

SHAFT ON BOTH SIDES

CODE	TYPE	SIZE	A ₁₇	B	C	D
04040	ELZ/ELSZ	30	6	15	2x2x12	72
04041	ELZ/ELSZ	40	10	27	3x3x25	112
04042	ELZ/ELSZ QLZ/QSZ	60	14	35	5x5x28	150
	DLZ/DSZ DLZT/DSZT	120	14	35	5x5x28	150
04043	ELZ/ELSZ QLZ/QSZ	80	18	45	6x6x40	190
	DLZ/DSZ	160	18	45	6x6x40	190
	DLSZ/DSSZ	120	18	45	6x6x40	190
04044	ELZ/ELSZ	100	22	45	6x6x40	220
	DLSZ	160	22	45	6x6x40	220
04045	ELZ	125	30	45	8x7x40	270

Tensioning set for sizes EL 100 - 125, DL/DS 200, ML / QL / QS 100



CODE	TYPE	TENSION RING
00472	EL/ML 100	22 x 32
	DL/DS 200	
	QL/QS 100	
00476	E 125	30 x 41



Nook Modular Linear Actuators are used in many beverage filling applications.

MODULAR LINEAR ACTUATORS

ACCESSORIES & SPARE PARTS

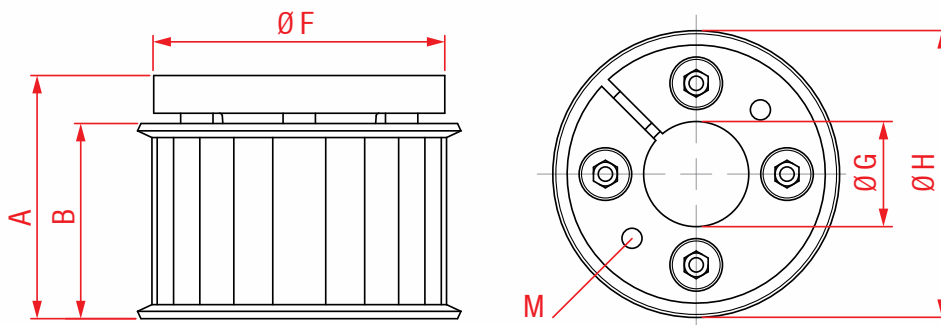
Pulley with integrated tension set D 120, 160, 200

Dimensions (mm)

120

160

200



TYPE	STANDARD		STAINLESS		A	B	ØF	ØG	ØH
	CODE	CODE	CODE	CODE					
D 120	04873	04874	04874	04874	39	30	41	16	46
D 160	04875	04876	04876	04876	45	36,2	54	22	60
D 200	04877	04878	04878	04878	67,5	57,2	62	32	79

BELT TYPE	NUMBER OF TEETH
HTD 5M 25	26
HTD 8M 30	22
HTD 8M 50	28

M = Dismounting thread

TYPE	CLAMPING SCREWS			TORQUE / AXIAL FORCE	
	M	z Number	T _A [Nm]	T [Nm]	F _{ax} [N]
D 120	M5	4	10	148	19,000
D 160	M6	4	17	244	22,000
D 200	M6	8	17	689	43,000

Function:

Pulley with integrated tension set for positioning systems DSZPVI and DSZPVIE. In order to realize a simple and fast assembling we reduced the number of parts. Each tension set has got two dismounting threads in order to disassemble the pulley easily.



Sample for pulley assembling - positioning system DSZPVI 120

SPARE PARTS

BELT ADJUSTERS

Belt adjuster ELZ / MLZ

ELZ



MLZ



CODE	TYPE	MATERIAL
04060	30	Zinc coated steel
04061	40	Zinc coated steel
04062	ELZ 60(S)	Zinc coated steel
040621	MLZ 60(S)	Zinc coated steel
04063	ELZ 80(S)	Zinc coated steel
040631	MLZ 80(S)	Zinc coated steel
04064	ELZ 100	Zinc coated steel
040641	MLZ 100	Zinc coated steel
04065	125	Zinc coated steel

Belt adjuster ELSZ



CODE	TYPE	MATERIAL
04071	30/40	Zinc coated steel
04076	30/40	Nickel faced steel
04072	60(S)	Zinc coated steel
04077	60(S)	Nickel faced steel
04073	80(S)	Zinc coated steel
04078	80(S)	Nickel faced steel
04074	100	Zinc coated steel
04079	100	Nickel faced steel
04075	125	Zinc coated steel
04070	125	Nickel faced steel



Nook Modular Linear Actuators used in an automated silkscreen device.

MODULAR LINEAR ACTUATORS

ACCESSORIES & SPARE PARTS

Belt adjuster ELHZ



CODE	TYPE	MATERIAL
04080	60(S)	Black anodized Al and zinc coated steel
04081	80(S)	Black anodized Al and zinc coated steel
04082	100	Black anodized Al and zinc coated steel
04083	125	Black anodized Al and zinc coated steel

Belt adjuster ELVZ



CODE	TYPE	MATERIAL
04090	60(S)	Black anodized Al and zinc coated steel
04091	80(S)	Black anodized Al and zinc coated steel
04092	100	Black anodized Al and zinc coated steel
04093	125	Black anodized Al and zinc coated steel

Belt adjuster

DLZ
DSZ



DLSZ
DSSZ



QLZ
QSZ



CODE	TYPE	MATERIAL
04084	DLZ/DSZ 120	Nature anodized Al and zinc coated steel
04086	DLZ/DSZ 160	Nature anodized Al and zinc coated steel
04085	DLZ/DSZ 200	Nature anodized Al and zinc coated steel
04066	DLSZ 120	Zinc coated steel
04067	DLSZ/DSSZ 160	Zinc coated steel
04087	QLZ/QSZ 60	Nature anodized Al
04088	QLZ/QSZ 80	Nature anodized Al
04089	QLZ/QSZ 100	Nature anodized Al
04094	QSZ 125	Nature anodized Al



Nook Modular Linear Actuators are frequently used in automated welding.

MODULAR LINEAR ACTUATORS

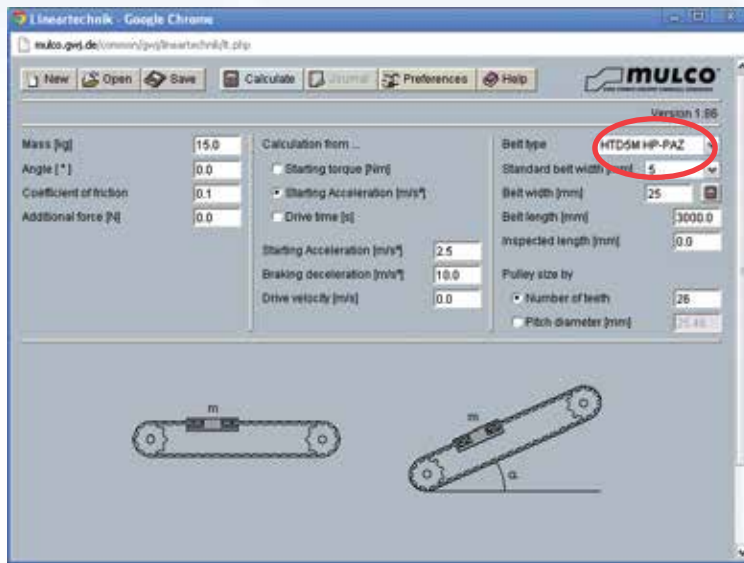




TECHNICAL DATA

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CALCULATION OF MAX. ACCELERATION (HORIZONTAL)



To calculate your horizontal load data, please use the timing belt calculation of Mulco:

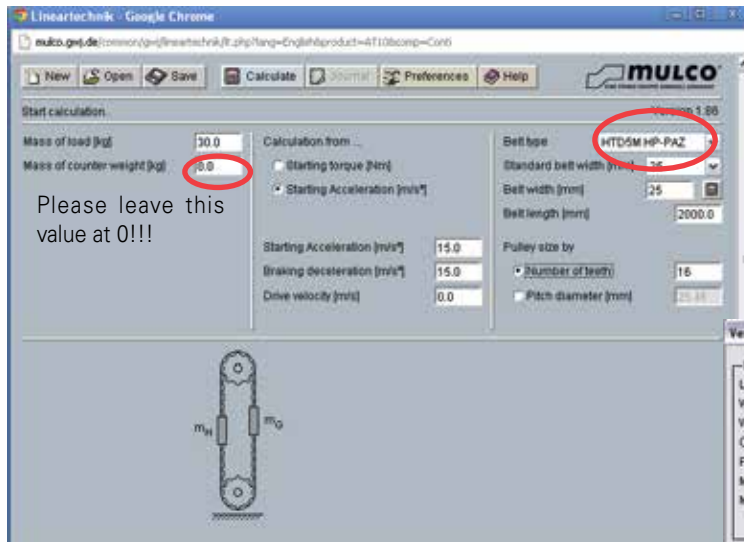
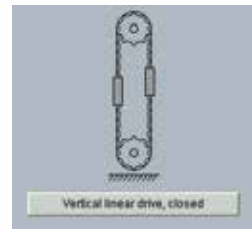
<http://mulco.gwj.de/en/index.htm>

Instructions:

- choose "Calculation" in the upper menu bar
- click "Linear technology"
- link "Linear slide"
- chosen belt type "HTDxxM HP-PAZ"
- type in your parameters
- "calculate"

Loads		Kinematic values	
vertical linear force	0,00 N	Velocity	0,00 m/s
Weight	147,15 N	Acceleration	2,50 m/s ²
Frictional force	14,715 N	max. Acceleration	10,00 m/s ² *
Acceleration force	37,50 N	Acceleration distance	0,00 m
Braking force	150,00 N	Braking distance	0,00 m
Additional force	0,00 N	Acceleration time	0,00 s
Force during start	52,215 N	Braking time [s]	0,00 s
Force during braking	135,285 N	Drive time	— s
Pretension	135,285 NTr	Traverse distance	— m
Extra force	0,00 N	R.P.M.	0,00 1/min
Total pretension	135,285 NTr	R.P.M.	0,00 1/s
Slack side belt load minima	0,00 N	Specific spring constant	406,25 N/m/mm
Belt force 1/1	202,928 N	Specific elongation	0,002462 mm/mN
Belt force max.	270,57 N	Safety factor (dimension mem)	6,006
Power	0,00 W	Allowable force	1.625,00 N
Starting torque [Nm]	1,08 Nm		
Braking torque [Nm]	2,799 Nm		

CALCULATION OF MAX. ACCELERATION (VERTICAL)



For calculating of vertical load data, follow the above instructions.

Choose "Vertical linear drive, closed".

Calculate with an acceleration due to gravity of 9.81 m/s². The mass of the counter weight has to stay on 0.0.

Load moves upwards		Load moves downwards - emergency stop	
Load acceleration force(Power)	-450,00 N	Load acceleration force(Power)	450,00 N
Weight of load	294,30 N	Weight of load	294,30 N
Weight of counterweight	0,00 N	Weight of counterweight	0,00 N
Counterweight acceleration force(Power)	0,00 N	Counterweight acceleration force(Power)	-0,00 N
Power at motor shaft	744,30 N	Power at motor shaft	744,30 N
Motor torque	9,475 Nm	Braking torque	9,475 Nm
Maximum load	744,30 N	Maximum load	744,30 N

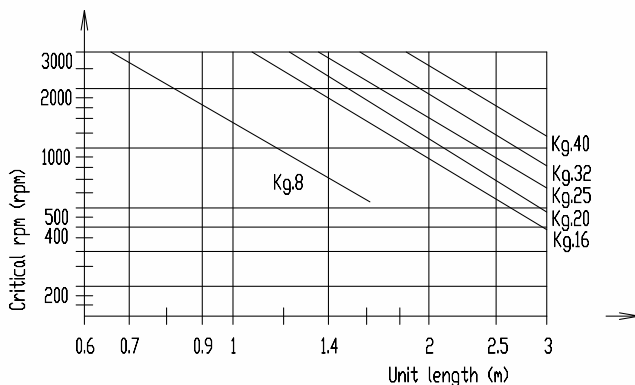
Kinematic values		Loads	
Velocity	0,00 m/s	Force during start	744,30 N
Relative starting acceleration	15,00 m/s ² *	Force during braking	744,30 N
Absolute starting acceleration	24,81 m/s ² *	Required pretension	744,30 NTr
Relative braking acceleration	15,00 m/s ² *	Bearing load on motor shaft	2.232,00 N
Absolute braking acceleration	24,81 m/s ² *	Bearing load idler	2.977,20 N
Braking distance	0,00 m	Belt load 1/1	1.116,45 N
Braking time	0,00 s	Belt force max.	1.408,60 N
R.P.M.	0,00 1/min	Allowable force	1.625,00 N

WEIGHTS

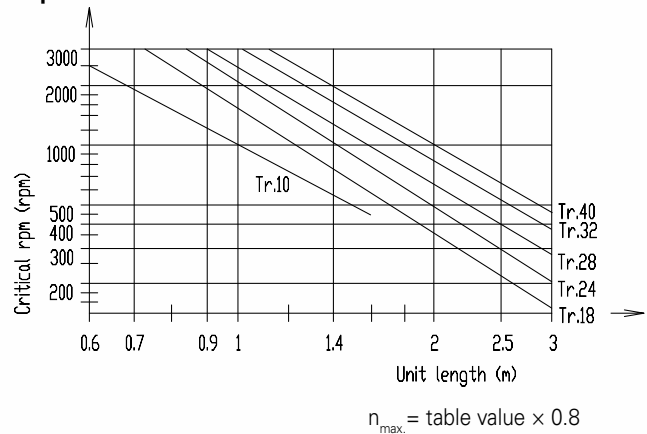
SIZES	GUIDE BODY PROFILE	INTERNAL PROFILE	GUIDE ROD	BELT	PER PULLEY	TOOTHED RACK	STANDARD CARRIAGE	CARRIAGE PROFILE	COUPLING
30	1.08 kg/m	-	0.15 kg/m	0.037 kg/m	0.06 kg	-	0.176 kg	1.78 kg/m	0.007 kg
40	1.92 kg/m	-	0.22 kg/m	0.074 kg/m	0.14 kg	0.70 kg/m	0.520 kg	3.42 kg/m	0.010 kg
60	3.86 kg/m	-	0.61 kg/m	0.123 kg/m	0.39 kg	4.30 kg/m	1.565 kg	7.66 kg/m	0.040 kg
60S	3.86 kg/m	-	0.61 kg/m	0.123 kg/m	0.39 kg	4.30 kg/m	2.420 kg	8.60 kg/m	0.040 kg
80	7.41 kg/m	-	0.88 kg/m	0.256 kg/m	1.04 kg	6.20 kg/m	2.644 kg	12.96 kg/m	0.085 kg
80S	7.41 kg/m	-	0.88 kg/m	0.256 kg/m	1.04 kg	6.20 kg/m	3.520 kg	13.80 kg/m	0.085 kg
100	11.1 kg/m	-	1.58 kg/m	0.355 kg/m	0.81 kg	6.20 kg/m	6.550 kg	19.40 kg/m	0.200 kg
125	15.91 kg/m	-	2.45 kg/m	0.480 kg/m	1.54 kg	-	12.100 kg	26.63 kg/m	0.395 kg
DL 120	5.50 kg/m	1.52 kg/m	0.22 kg/m	0.123 kg/m	0.39 kg	-	1.100 kg	4.19 kg/m	0.040 kg
DL 160	10.33 kg/m	2.66 kg/m	0.61 kg/m	0.256 kg/m	0.90 kg	-	3.280 kg	7.99 kg/m	0.085 kg
DL 200	16.08 kg/m	3.48 kg/m	0.61 kg/m	0.355 kg/m	0.688 kg	-	4.950 kg	11.05 kg/m	0.200 kg
DS 120	5.06 kg/m	1.52 kg/m	0.65 kg/m	0.123 kg/m	0.39 kg	-	0.920 kg	5.57 kg/m	0.395 kg
DS 160	10.52 kg/m	2.66 kg/m	2.21 kg/m	0.256 kg/m	0.86 kg	-	2.250 kg	10.01 kg/m	0.085 kg
DS 200	14.16 kg/m	3.48 kg/m	3.21 kg/m	0.355 kg/m	1.83 kg	-	5.345 kg	15.01 kg/m	0.200 kg
QL 60	3.29 kg/m	-	0.22 kg/m	0.123 kg/m	0.39 kg	-	0.456 kg	2.05 kg/m	0.040 kg
QL 80	7.05 kg/m	-	0.61 kg/m	0.256 kg/m	0.90 kg	-	1.229 kg	3.85 kg/m	0.085 kg
QL 100	10.48 kg/m	-	0.61 kg/m	0.355 kg/m	1.83 kg	-	2.920 kg	5.49 kg/m	0.200 kg
QS 60	3.74 kg/m	-	1.45 kg/m	0.123 kg/m	0.39 kg	-	0.860 kg	2.05 kg/m	0.040 kg
QS 80	6.82 kg/m	-	2.21 kg/m	0.256 kg/m	0.90 kg	-	2.339 kg	3.85 kg/m	0.085 kg
QS 100	10.56 kg/m	-	3.21 kg/m	0.355 kg/m	1.83 kg	-	4.320 kg	5.49 kg/m	0.200 kg
QS 125	16.08 kg/m	-	4.47 kg/m	0.480 kg/m	0.60 kg	-	5.544 kg	10.03 kg/m	0.395 kg
QST/K 60	2.77 kg/m	-	1.45 kg/m	-	-	-	0.860 kg	3.39 kg/m	0.040 kg
QST/K 80	5.47 kg/m	-	2.21 kg/m	-	-	-	2.339 kg	5.88 kg/m	0.085 kg
QST/K 100	8.48 kg/m	-	3.21 kg/m	-	-	-	4.320 kg	9.54 kg/m	0.200 kg

MAXIMUM RPM OF SCREW UNITS

ballscrew units

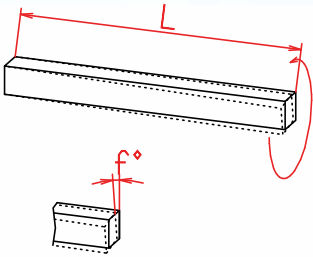


trapezoidal units



TECHNICAL DATA

TORSIONAL TWIST



$$f^\circ = L \times M_{t \max} \times I_p \quad \left[\frac{^\circ \times \text{Nm} \times \text{m}}{\text{Nm} \times \text{m}} \right]$$

f° = max. twisting angle (°)

L = unit length (m)

$M_{t \max}$ = max. torque (Nm)

I_p = see table (°/Nm²)

Aluminium profiles

Stiffness F25 (250 N/mm²)

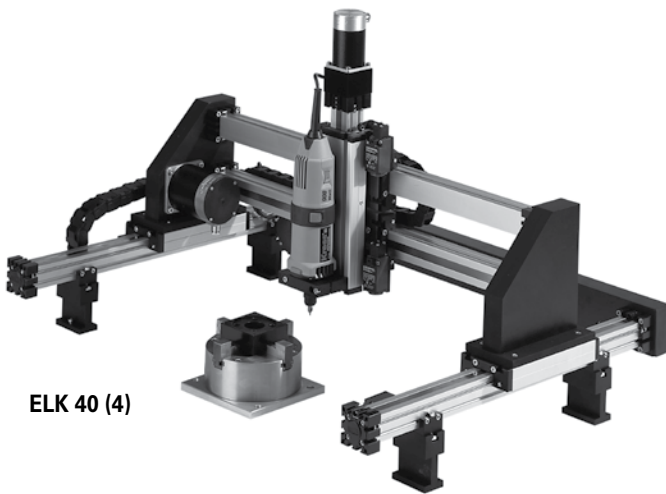
Thickness of anodizing coat 20 to 30 µm

SIZE	I_p FACTOR
EL 30	0.49000°/Nm × m
EL 40	0.18000°/Nm × m
EG 40	0.14000°/Nm × m
EL 60	0.05765°/Nm × m
EG 60	0.04387°/Nm × m
EL 80	0.01463°/Nm × m
EG 80	0.01511°/Nm × m
EL 100	0.00492°/Nm × m
EL 125	0.00616°/Nm × m

SIZE	I_p FACTOR
DL 120	0.03282°/Nm × m
DL 160	0.01286°/Nm × m
DL 200	0.00787°/Nm × m
DS 160	0.01336°/Nm × m

SIZE	I_p FACTOR
QL 60	0.02995°/Nm × m
QL 80	0.01257°/Nm × m
QL 100	0.00705°/Nm × m
QS 60	0.03797°/Nm × m
QS 80	0.01563°/Nm × m
QS 100	0.00644°/Nm × m

APPLICATIONS IN USE



ELK 40 (4)



QLZZ 60 (3)

UNIT CONVERSION CHART

ENGLISH TO METRIC		METRIC TO ENGLISH	
Length	Torque	Length	Torque
1 ft = 304.8 mm	1 ft-lb = .001356 kN-m	1 mm = .00328 ft	1 kN-m = 737.3 ft-lb
1 ft = .3048 m	1 ft-lb = 1.356 N-m	1 m = 3.28 ft	1 N-m = .737 ft-lb
1 ft = .0003048 km	1 ft-lb = 135.6 N-cm	1 km = 3821 ft	1 N-cm = .00737 ft-lb
1 in = 25400 μm	1 ft-lb = 1356 N-mm	1 m = .0000394 in	1 N-mm = .000737 ft-lb
1 in = 25.4 mm	1 ft-lb = .1383 kgf-m	1 mm = .03937 in	1 kgf-m = 7.23 ft-lb
1 in = .0254 m	1 in-lb = .000113 kN-m	1 m = 39.37 in	1 kN-m = 8847.2 in-lb
1 in = .0000254 km	1 in-lb = .113 N-m	1 km = 39370 in	1 N-m = 8.847 in-lb
	1 in-lb = .01152 kgf-m		1 kgf-m = 86.8 in-lb
Weight/Force		Weight/Force	
1 lb = .454 kg		1 kg = 2.205 lb	
1 lb = .454 kgf		1 kgf = 2.205 lb	
1 lb = 4.45 N		1 N = .225 lb	
1 lb = .00445 kN		1 kN = 224.8 lb	
Speed		Speed	
1 ft/sec = .3048 m/sec		1 m/sec = 3.28 ft/sec	
1 in/sec = .0254 m/sec		1 m/sec = 39.37 in/sec	

