



SAS
AUTOMATION

EXPERTISE + PRECISION + INNOVATION

ROBOTIC END-OF-ARM TOOLING CATALOG

Corporate Mission

SAS Automation is one of the world's largest suppliers of modular component-based robotic End-of-Arm (EOAT) and gripper systems. Providing tooling solutions that allow your robot to do more, and you to do less is our primary business. Unlike others, we are specialists when it comes to end effector gripper systems for all makes of robots used in the manufacturing, packaging and plastic injection molding industries.

Our tooling systems and automation equipment are installed throughout the world in a wide variety of applications. We take pride in presenting them to you as references.



SAS
AUTOMATION

ROBOTIC END-OF-ARM TOOLING

ISO 9001 Quality System Certified



Global

SAS continues to expand and support our customers on a worldwide basis. Our US, European, and Asian facilities have increased inventory for better component selection as well as faster delivery. Several sales agents have been added to serve customers in North America, Europe, Asia and the Pacific Rim. This translates into better service and efficiencies for our customers.

Quality Products and Services

SAS Automation meets or exceeds customer expectations by providing superior superior Robotic End-of-Arm Tooling and Automation Technology. Together with our customers and suppliers, we continuously improve our products and services to assure market leadership.

Benefits

- + ISO 9001 Quality System Certified
- + In-house Engineering, Manufacturing and Testing
- + Online purchasing at our e-commerce site
- + Delivery - next day on components
- + Custom designed End-of-Arm Tooling
- + Custom designed and manufactured components
- + Custom Automation Equipment
- + On-site Sales, Installation, Training and Service - worldwide
- + End-of-Arm Tooling for all robots
- + One-stop supplier for Robotic End-of-Arm Tools
- + Robotic Laboratory and End-of-Arm Tooling Training Facility

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End-Of-Arm Tooling

Robotergreifer (EOAT) und Greiferanwendungen

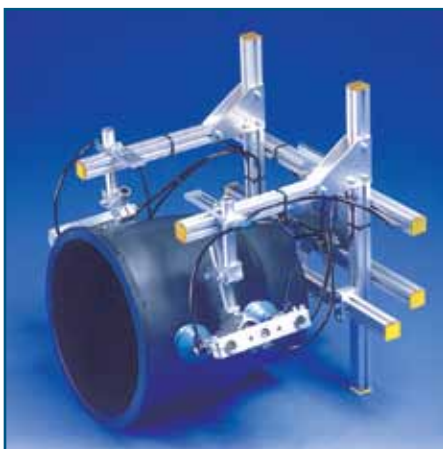
Your Robot is Only as Good as its End-of-Arm Tool.



Modular gripper components

In relation to an entire automation project, the End-of-Arm Tool (EOAT) is one of the most critical and dynamic aspects.

When it comes to building a correctly functioning robotic EOAT gripper, SAS offers can supply the information to enable you to make the most of your time, money, and effort.



Assembled modular EOAT gripper

The characteristics of an effective End-of-Arm Tool:

- Lightweight – reduces robot wear and maintenance
- Rigid – consistent in location; maintains product securely
- Durable – long life; low maintenance
- Modular – easy to adjust and to make changes
- Availability – quick delivery of components and spare parts

Build your own EOAT with SAS standard modular lightweight components or have the experienced Engineers and Technicians at SAS design and build your EOAT.

SAS provides you with everything necessary to reduce that “Small Stuff” hassle!

For ordering and technical assistance, contact one of our friendly sales staff or representatives.

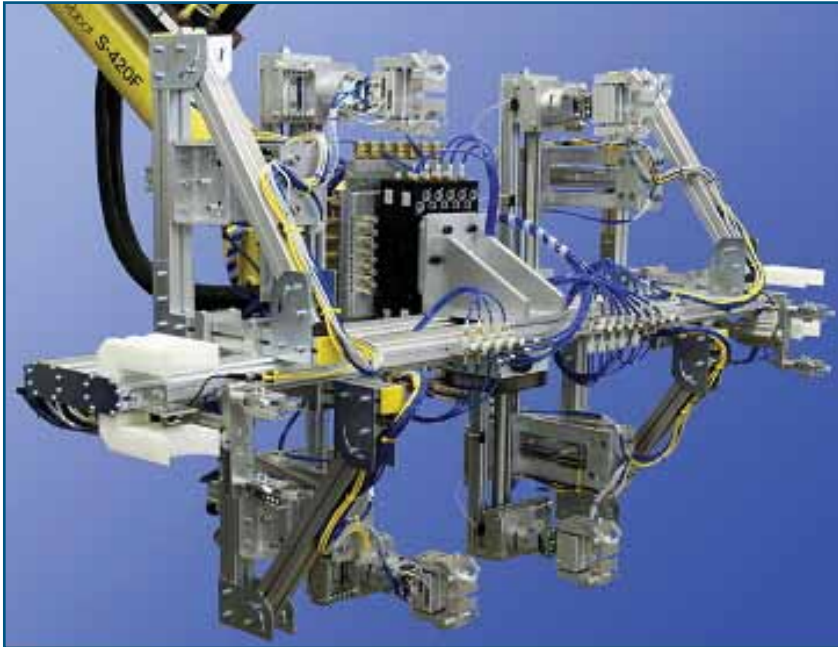
Or order anytime by shopping online at our e-commerce site.



Programmable Gripper EOAT

Custom End-of-Arm Tooling

Robotergreifer (EOAT) und Greiferanwendungen



Dual Purpose Insert Placement & Part Gripper EOAT



Miniature Part Placement Tool

Step 1... Part Application

Step 1: Teil Beschreibung

ステップ 1: 申し込み

- Specify your part to be gripped and/or application as well as robotic information, including payload and mechanical/electrical interfaces, by providing part/mold drawings, video of process, and sample parts.

Step 2... Custom CAD Design

Step 2: Entwurf & CAD

ステップ 2: デザイン及びCAD

- We custom design to your specifications and provide CAD drawings for approval.

Step 3... Gripper Assembly

Step 3: Greifer Zusammenbau

ステップ 3: 製作

- Upon approval, we will layout and assemble your EOAT with standard and/or custom machined components.

Step 4... Testing

Step 4: Funktionstest

ステップ 4: テスト

- Finally, we test the custom EOAT with your part/application to facilitate quick set-up on-site.

Step 5... Installation

Step 5: Installation

ステップ 5: 設置

- Upon request, we provide technicians for installation assistance, on-site adjustments, and robot interfacing.

Step 6... Support

Step 6: Instandhaltung

ステップ 6: サポート

- As an option, we offer a recommended spare parts kit to assure maximum production of your robotic work cell.

Custom End-of-Arm Tooling

Robotergriffe (EOAT) und Greiferanwendungen



Custom EOAT for electrical plugs utilizes parallel grippers with custom manufactured jaws and a hands free quick change chuck.



Rotary Degate Station reduces number of cutters and blades needed.

Unlike the others, SAS is a leader in the design and manufacturing of custom robotic End-of-Arm Tooling. With our engineering and manufacturing facilities in the same location, we have the expertise and materials to develop custom grippers that ensure your robot handles your part in a repeatable fashion the first time, every time. SAS builds custom grippers for any part, any robot, anywhere.



Automotive Instrument Trim Panel EOAT Gripper

Here's just one example, of how our experienced design and engineering department designed a complex tool that increased productivity in the production of an Automotive Trim Cover:

Project Objective:

Provide End-of-Arm tooling to: (1) Remove 4 parts from mold without marring any surface or deforming the parts. The parts had to be cosmetically perfect. (2) Reduce overall cycle time.

Results:

"Not only did SAS Automation design and build end of arm tooling that accomplished the objectives, but it increased my productivity by 30%. The process was easy and efficient. I contacted my local SAS representative who came to our facility, took digital photos, and obtained mold drawings and samples. The engineers at SAS performed the design and sent drawings to me for approval. After my approval, the finished product arrived over a week ahead of schedule. The product design and execution was excellent, and their field installation service was phenomenal! It has now been running flawlessly for over 6 months..... I will definitely be using SAS for future projects!"

-a direct quote from this prominent manufacturing company

Insert Molding & In-Mold Labeling (IML)



Insert Molding and In-Mold Labeling are two of the most difficult tasks for either an operator or an EOAT to perform.

Insert Molding is the process of placing small parts into a mold that then become part of the finished product. The robot must be able to assure proper placement and alignment of the inserts. Our experience designing EOAT for insert placement have made the process second nature to us, regardless of complexity or size.



IML is the process of placing labels into the mold so that they become part of the finished product. We have developed and patented a process for IML that does not require mechanical gripping of the label by the tool or in the mold, leaving a much cleaner surface on the finished part.

IML processes are increasingly popular because of their labor saving benefits. But equally important is their ability to produce a better part - with more accurately placed labels that adhere permanently.

Advantages of In-Mold Labeling

- Robot handles the process
- Accurate label placement
- Reduced waste
- Constant cycle times
- Label becomes part of the finished part - does not rely on adhesive
- No edge to peel back for fingers to remove.

The SAS patented (U.S. P at. #6,416,706) Insert Mold System can be applied to other parts including metal inserts, cloth, and vinyl. Our EOAT makes your parts better with accurate placement of a permanent label at less cost with reduced waste and labor.



Spring-loaded Docking Pins for insert molding applications (IML).

In addition to requiring precise accuracy, insert molding applications are often performing several processes at the same time. Docking pins provide the assurance required in complex and low tolerance applications.

Significant Features:

- Provides accuracy of +/- .02 inches
- Sized to fit your End-of-Arm Tool, robot and mold
- Pins can dock on existing mold locators
- Custom lengths, strokes and diameters available.

Degating and Cutting Solutions

The SAS complete line of pneumatic cutters and degating systems includes knives, nippers, blades, sprue cutters, and CNC degaters for any plastics application. Handheld and automatic cutters are available.

With the widest variety of lightweight cutting tools, you can easily select the tool that best meets your production challenges. Cutting blades can be easily rotated for left or right-handed operation, and all units are easily maintained. Many styles and sizes of blades are available to suit your application..



Work Knife

SAS Work Finisher is a safe, ceramic knife that deburs hard plastics effortlessly without fear of cutting hands/fingers. It is ideal for curved and complicated shapes.



Hand-held Pneumatic Cutter

The MR Sprue Cutters with H in the part number are hand held cutters. The SAS Nip It! line of sprue cutters are hand operated, feature safety levers, and can be fixture mounted. This line features many standard and special blades. See Nip-It! section for Type-I blade information.



Static Knife Cutter

Whether mounted to an articulating robot, statically, or directly to your End-of-Arm Tool, this economical and lightweight precision cutting tool provides accurate, low cost cutting for a multitude of fan degating applications. The SAS Static Cutter includes a standard box cutter knife, protected by a safety guard, attached to an adjustable SAS elbow arm. The knife blade can easily be replaced by a simple turn of a locking handle.

Degating and Cutting Solutions

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Fan Gate Trimmer

This Fan Gate Trimmer cuts longer and harder to cut fan / edge gates with +/- 0.4 mm vestige tolerance. The parts are held firmly in place by a custom designed part nest made to contour the part and hold it securely. The custom blade assemblies are also uniquely designed to contour the part/ gate interface.



Lift Degater

SAS Lift Degater was designed for large plastics parts. A robot transports the part to the Lift Degater and sets the part into the “part conforming nests”, located at the top of the degater. The part is then trimmed by several precisely positioned cutting tools that match the nests. Precision and speed are coupled with several simultaneous cutting actions. The waste trim is then dropped into a container and the finished product is lowered on to the lift table. Then, the product can be removed by a packer, who is protected from the lift by a safety light curtain.



Robot Beam Mounted Degaters (rotation option)

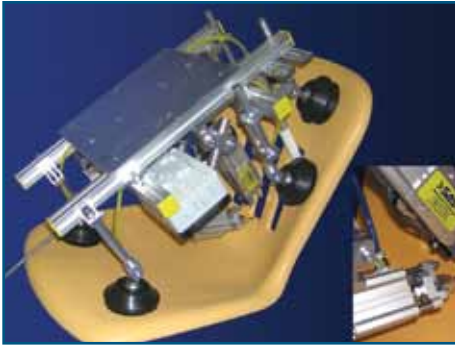
The SAS adjustable Rotational Degater can be set as desired for dual service applications around 360 degrees. This application is especially suited for cutting multiple gates on different plastic surfaces, rotating both quickly and accurately around a part. This degater can be mounted on any robot beam. For both ease of use and fast changeovers, it can also be mounted on a quick change chuck with one-touch air fittings and be fitted with a variety of pneumatic degating tools, including a MR-50A capable of cutting plastic up to ½ inch (12 mm) in diameter.



Custom Degaters

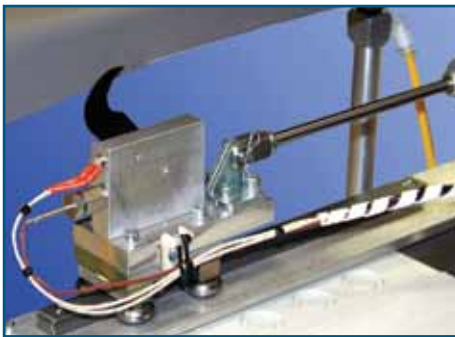
SAS engineers use 2D and 3D CAD tools to create custom equipment that will perform operations quickly and safely. Every station is designed to increase productivity, ensure the safety of the operator, and reduce operator fatigue. SAS has tremendous experience developing special degating systems for very large as well as small and delicate parts.

Degating and Cutting Solutions



EOAT mounted cutters

Get more out of your EOAT by adding the degating function to your custom tool. The SAS engineers can analyze your operation to determine the most cost efficient degating method for your part.



Rail Degaters

Compact, modular degating system for fan gates that greatly reduces finishing labor costs and provides a consistent clean cut for fan gates. Mounted on a rigid frame, this degating unit can be designed to trim either straight or curved fan gates. Radiuses as small as one inch (25.4 mm) can be cleanly degated by this system.



Punch Press Degater

Punch presses are used when the cutting vestige requirements are critical and range between 0.003 and 0.010 in. The SAS Punch Press can be operated manually or automatically and can be integrated to the robot or press. Punch press degaters uniquely provide a preferred 'flush' cut.



Thrust Cutter

This thrust cutter is designed with a razor sharp blade positioned at a 45 degree angle to precisely shear a sprue gate in narrow places. This cutter holds the blade on a special cylinder to precisely actuate the gate cutting process. The cylinder can be mounted in many angles. This style of gate cutting uniquely allows access to very hard to reach areas.

Custom Workstations & Automation Equipment

Arbeitsplatz & Automatisierung
 作カ ッ プ グ リ ッ パ / ス プ ル ー

In addition to Robotic End-of-Arm Tooling SAS Automation also produces custom workstations and automation equipment.

- Punch Press Degaters for precision cutting of fan gates.
- Degating Fixtures for cold runner degating.
- Knife Degaters for degating long edge gates.
- Rotary tables, lift tables, and shuttle tables for loading and unloading parts and inserts.
- Chute fixtures for part separation and collection.

Workstations can be designed to perform multiple functions on the part at a time.



Rotary Indexing Table



Punch Press Degater



Degater Station

Get a Grip!



Gripper Handling Solutions

If your automation cell requires a palletizing End-of-Arm Tool, our custom robotic solutions allow your robot to do more. Our EOATs are available in 4 styles:

- Bag Gripping
- Vacuum Plate
- Carton Clamping
- Fork-style for open top cartons and large bags

For more information about the ABG-25 & ABG-50, and the FBG-25 & FBG-50 Bag Grippers from SAS Automation.



Bag Grippers – Adjustable!

The SAS ABG-50 Adjustable Bag Gripper is ideal for palletizing plastic, woven cloth or paper bags containing grains, chemicals, dog food, minerals, etc. A hand wheel driven lead screw quickly changes the ABG-50 for different bag widths while the optional servo drive adjusts the width on the fly to accommodate mixed loads.

Vacuum Technology

SAS provides Vacuum Plate End-of-Arm Tools to palletize single containers and even complete pallet layers. These EOATs are powered by vacuum turbines or venturi generators and provide superior gripping capabilities by using high vacuum flow. Valved vacuum ports automatically close when there are gaps between the products or the product is not present. The vacuum plates can also be zoned for multiple pick and place.



EOAT For Packaging And Palletizing

SAS addresses the challenges faced by packaging processors providing a variety of options with our modular robotic EOAT systems.

From lifting 250 pound metal wheel hubs to inserting small electrical parts before packaging, an SAS custom EOAT can satisfy all of your manufacturing needs.

Cost effective, multipurpose End-of-Arm tools can be fabricated to pick up and locate pallets, as well as place cartons of various shapes on the pallet without changing the EOAT.

Other SAS packaging applications and benefits include:

Inserting slip sheets

Handling porous surfaces

Built-in air cylinders to stabilize loads for rapid movement



EOAT for Packaging



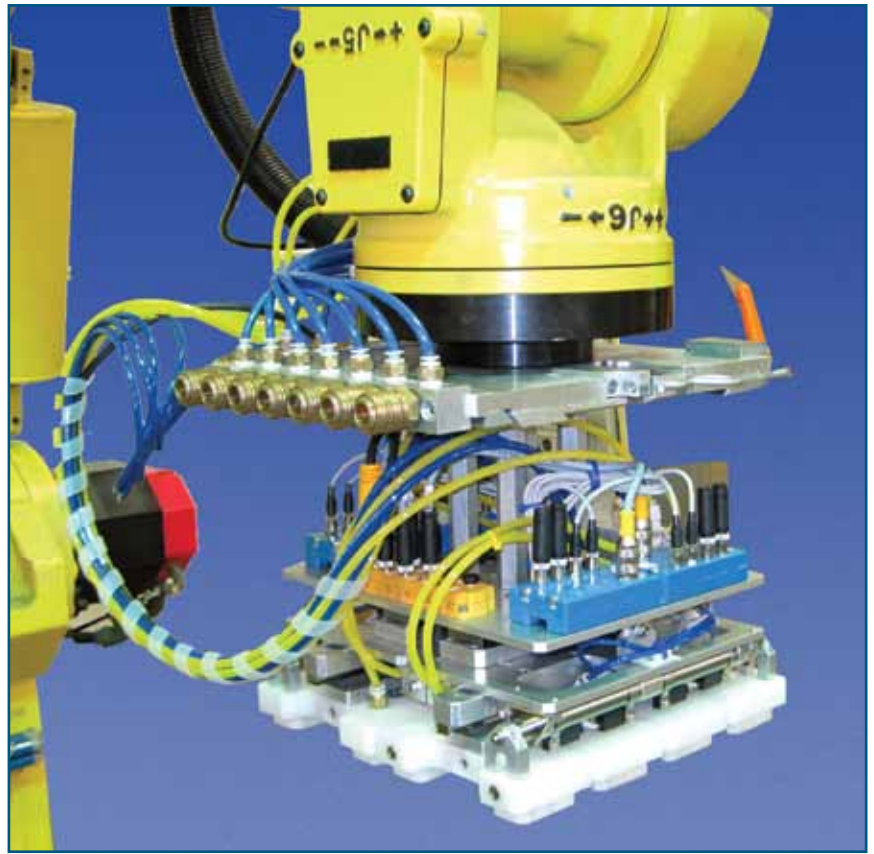
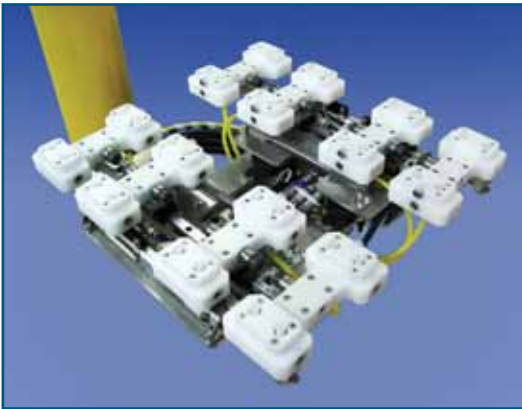
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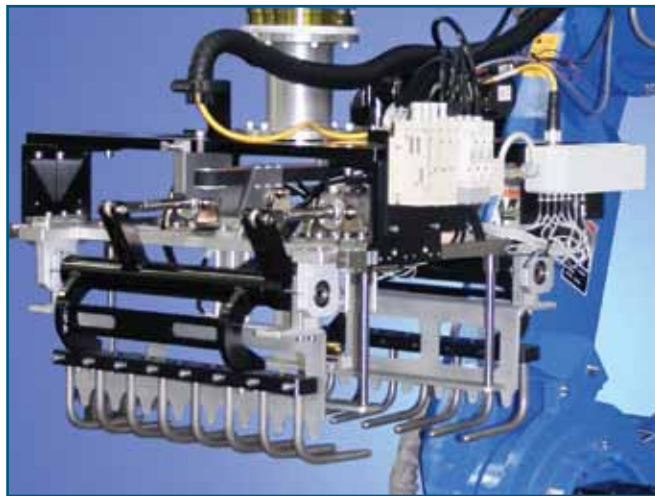




Inputs / Outputs

ABG / FBG-50				ABG / FBG-25			
		IN	OUT		IN	OUT	
Discrete I/O	STD	6	5	Discrete I/O	STD	6	5
	SS	+3	+3	Discrete I/O	SS	+3	+3
	PH	+3	+2				
DeviceNet Ethernet	STD	11	5	DeviceNet Ethernet	STD	11	5
	SS	+3	+3	DeviceNet Ethernet	SS	+3	+3
	PH	+3	+2				

STD: Standard SS: Slip Sheet PH: Pallet Hook



ABG/FBG-25

Standard ABG-25 components:

- Rugged 12.7 mm (1/2 inch) thick aluminum main mounting plate
- Heavy-duty rails and bearings with double seals and grease ports
- Hand wheel, opposing thread lead screw, bearing blocks and shaft locks
- Solid stainless steel gripper fingers, radiused ends, 11.1mm (7/16 inch) diameter
- Adjustable and independent decking plates Adjustable decking plates are independent of gripper fingers
- Top-mounted, bag clamps
- High-flow pneumatic solenoid valves
- Ultrasonic bag presence sensor
- Custom mounting plate to accommodate any robot

Slip Sheet option includes:

- 3 or 4 stroking pneumatic cylinders
- 3 or 4 corrugated rated vacuum cups
- 2 additional pneumatic solenoid valves
- 1 PIAB COAX vacuum generator with vacuum confirmation switch

Valve Package options:

- Discrete I/O
- DeviceNet
- Ethernet
- Custom

Systems Integrators: Please call us for Integrator Pricing

ABG/FBG-50

Standard ABG-50 components

- Rugged 19 mm (3/4 inch) thick aluminum main mounting plate
- Heavy-duty rails and bearings with double seals and grease ports
- Hand wheel, opposing thread lead screw, bearing blocks and shaft locks
- Solid stainless steel Gripper Fingers, radiused ends, (15.9 mm) 5/8 inch diameter
- Adjustable and independent Decking Plates
- Top-mounted, Gripper Plates
- High-flow pneumatic solenoid valves
- Ultrasonic bag presence sensor
- Custom adaptor plate to accommodate any robot

Pallet Hook option includes:

- 4 rotating pallet hooks
- 2 rotating shafts with 4 bearings
- 1 connection / timing linkage
- 1 stroking pneumatic cylinder
- 1 additional pneumatic solenoid valve
- 1 ultra-sonic pallet presence sensor

Valve Package options:

- Discrete I/O
- DeviceNet
- Ethernet
- Custom

Slip Sheet option includes:

- 3 or 4 stroking pneumatic cylinders
- 3 or 4 corrugated rated vacuum cups
- 2 additional pneumatic solenoid valves
- 1 PIAB COAX vacuum generator with vacuum confirmation switch

Systems Integrators: Please call us for Integrator Pricing



Clamping EOATs

Side clamp EOATs work particularly well for slip-top cartons as well as heavy weight applications where a topside pick is not possible; such as 40 lb. blocks of cheese in glued-up corrugated cartons. The clamping cylinders are programmable for the amount of force applied to the carton. This also allows for multiple sizes of cartons to be palletized with the same EOAT. An optional slip sheet system is also available.



Fork-style EOATs

Retracting Fork-style EOATs are particularly suited for open-top containers and over-sized bags that must be picked from the bottom. The stroking forks are designed to pick product from a roller conveyor. The forks retract through a stationary stripper plate and the product is placed on the pallet. A slip sheet option is available and the forks can also be used to pick and place a shipping pallet.

Vacuum Handling Systems

Vakuum-Handling-Systeme



This new heavy-duty vacuum handling system is a universal tooling system, designed to safely handle products, parts, pallets, packaging, and slipsheets of varying dimensions.

Like many of the modular systems from SAS – this line is easy to configure to your specific part. It easily handles parts that are often difficult for standard grippers, including porous, soft, twisted, round, flexible and other non-standard shapes, weights, and materials.

This comprehensive system is highly suitable for larger, higher capacity gripper surfaces and lower vacuum levels, allowing it to overcome many of the shortcomings of standard vacuum solutions. It is the easiest and most reliable way to handle bulky and heavy parts, while ensuring that no part is damaged. Each gripper has

one valve that is auto-regulated to open and close. Gripping power uniquely remains constant offering exceptional handling with improved lifting, and the system does not need any adjustment – thereby lowering labor and maintenance costs. It is unaffected by sawdust, humidity, or surfaces that are molded, rough, or twisted. We know of no surface that cannot be used with this system.



Significant Features:

- Easy and reliable; requires minimal maintenance
- Fast installation
- Lightweight, multi-purpose, and compact
- Independent and auto-regulated valve system
- Will not damage parts
- Handling capacity 3000kg/m² (614 lbs/ft²)
- Adjustable systems available
- Able to handle a wide variety of shapes
- Multiple heads configured in series only require one turbine
- Many options available – to handle any part

Power Consumption:

Electric Turbine – in release position, power consumption is approximately 30% of normal

Compressed air - Venturi power consumption only in pick-up mode

Industries: General Material Handling



Boom-type Robots

For boom-type mounting of robots, the tool side bayonet chucks are offered that clamp directly onto the 40 or 60mm OD. A bayonet is also offered with SAS's unique D shape frame profile, having 6 mounting surfaces and 7 nut channels.



Press Tending Applications

In some press tending applications, vacuum cups on spring compliance mounting arms are necessary, especially when gripping from a flat steel stack to load the stamping die to a formed part removal mode. In this case, simple placement of the spring loaded cups may be adequate; whereas other more complex applications may require indexing or movable end effector configurations that are different for die loading and unloading after the part is stamped and formed in the production line.



Safety Hold Down Clamps

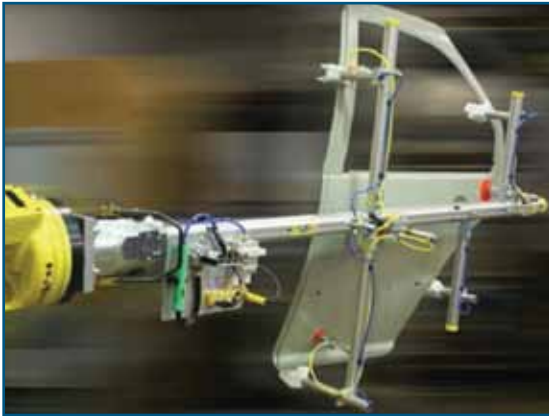
For high speed, high weight load applications, or a high level of man machine interface – where safety is an issue (an automotive assembly line), SAS's GRF Gripper Finger Clamps (safety hold down clamps) are recommended. These are available with protective guides (ZTS) as well as an adjustable back-up stop (ANF). For a fail safe operation, a check valve can be added to ensure that the hold down clamp will continue to grip the part in the event the compressed air supply drops out momentarily or completely fails.



Whatever your application, the SAS team is ready to provide superior end effector solutions in a timely, cost effective manner, assuring customers obtain ultimate value and service for your production operation.

"The HX's flexibility and adjustability is ideal where 5+ axis robots are used in multi task applications. Recent successful 5+ axis robot applications have made possible with SAS's HX Hybrid profile system which allows boom end mounting to take advantage of the greater range of applications with these types of robots such as part trimming, deflashing, and other post mold operations, including assembly and packaging," said Trent Fisher, President of SAS Automation. "Additionally, it's interchangeability with all of SAS's modular EOAT line of components makes this one of our premier profiles," he added.

Industries: General Material Handling



Hybrid "HX" End Effectors for 5+ Axis Robots

SAS Automation recently introduced new Hybrid "HX" End Effectors for 5+ Axis Robots, made exclusively with the newly developed SAS HX hybrid frame profiles and modular off the shelf gripper components.

This HX profile line is ideal for 5+ axis robots in multi-task, high-speed, heavy weight, or press tending applications.

This new HX End Effector is specifically designed for increased flexibility, offering an optimal "hybrid" design that includes the benefits of tubular frame adjustability as well as extruded

channel frame profile rigidity. Robotic production use includes long reach boom press tending applications, heavy-duty material handling, or multi-task applications.

Significant features and benefits:

1. Direct side channel mounting of standard SAS gripper component hardware, eliminating rotation or twist problems.
2. Modular design allows for side mounting or circumference component or connector clamping, offering added compatibility to other brands and types of systems.
3. Available with compliant oil resistant vacuum cups as well as safety hold down clamps to secure parts even when system fails.
4. Available in sizes of 40mm and 60mm OD, (HX-40/HX-60).
5. Center hole can be tapped to accommodate an M8 sized screw for connection of end plates/caps, connectors, etc.



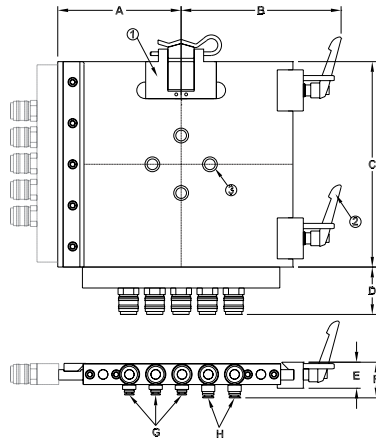
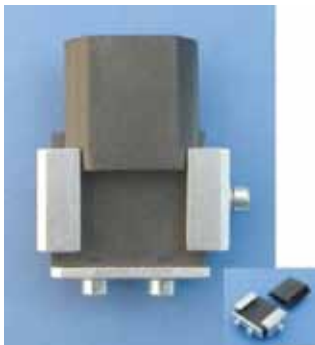
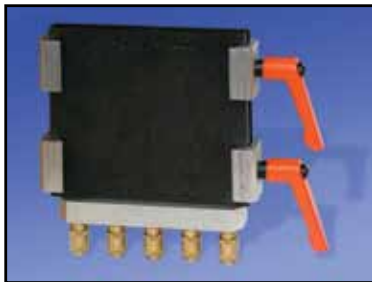
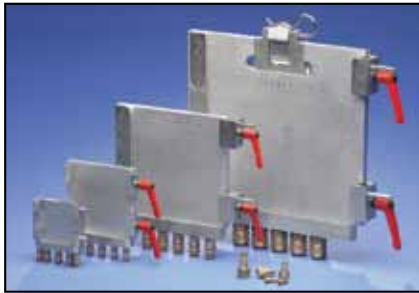
This HX line was designed to used with SAS GWP-X and PL-X channel nut profiles. The HX's flexibility and adjustability allows for better routing of pneumatic hoses and electrical sensor wires to grippers and suction cups as well as many other necessary applications.

Several connectors EVC and EVH are recommended for the HX profile when connecting in a rigid, perpendicular configuration. The EVC allows for connection of cross connections when the same frame size profile are used; whereas the EVH is used when a smaller cross connector step down in frame profile size, from the larger one.



SWM... Quick Change Mounting Chuck

SWM... Schnellwechselsystem
SWM...チャック取付クイックチェンジャー



- Adaptable to every robot
- Economical one-time investment per robot
- Makes EOAT interchangeable between robots
- Minimizes downtime during setup changes
- EOAT Gripper stays aligned & secure
- Integrated pneumatic quick disconnect system
- Lightweight aluminum base plates for standard applications
- An auxiliary manifold can be attached to the side of the chuck to provide additional pneumatic quick disconnect ports.

E-Type (Economy)

- Mounting chuck without pneumatic fittings for cost savings and weight reduction
- Best used when pneumatic connectors from robot are near to the EOAT or when EOAT may be close to the robot payload.

ST-Type (Steel)

- Steel chuck body with zinc plating for heavy duty applications
- Steel mounting plates also available

LT-Type (Light)

- Delrin chuck body for reduced weight on small size chucks
- Great for light applications and small robots
- Delrin mounting plates also available

New Quick Change Chuck SWM-NT is part of the SAS New Technology series of lightweight line of components

- The new Quick Change Chuck-Lite is adaptable to every robot, and is an economical, one-time investment per robot.
- New SWM-NT are manufactured for all ranges of part sizes. This new lightweight component offers average weight savings of 50% - 60%.

Standard	A	B	C	D	E	F	G (Tubing Size)	H (Tubing Size)	Air Coupling	Air Plug	GPM Plate	Weight (g)
SWM 0.1	27	35	40	10	19	~	~	~	~	~	GPM 0.1	130.4
SWM 0	38	43	60	32	19	32	3 tubes, 4mm	2 tubes, 4mm	92-5002	94-4902	GPM 0	323
SWM 1	58	95	102	34	19	32	3 tubes, 4mm	2 tubes, 6mm	92-5002	94-4902	GPM 1	567
SWM 2	101	132	160	50	25	40	3 tubes, 6mm	2 tubes, 8mm	92-0204	94-0104	GPM 2	2024
SWM 3	152	192	250	58	32	40	3 tubes, 6mm	2 tubes, 8mm	92-0406	94-0306	GPM 3	4559

E-Type	A	B	C	D	E	F	G (Tubing Size)	H (Tubing Size)	Air Coupling	Air Plug	GPM Plate	Weight (g)
SWM 0E	38	43	60	8	19	~	~	~	~	~	GPM 0	284
SWM 1E	58	95	102	12	20	~	~	~	~	~	GPM 1	455
SWM 2E	101	132	160	12	25	~	~	~	~	~	GPM 2	1639
SWM 3E	152	192	250	14	32	~	~	~	~	~	GPM 3	3680

ST-Type	A	B	C	D	E	F	G (Tubing Size)	H (Tubing Size)	Air Coupling	Air Plug	GPM Plate	Weight (g)
SWM 1 - Steel	58	95	102	34	19	32	3 tubes, 4mm	2 tubes, 6mm	92-5002	94-4902	GPM 1	1049
SWM 2 - Steel	101	132	160	50	25	40	3 tubes, 6mm	2 tubes, 8mm	92-0204	94-0104	GPM 2	3623
SWM 3 - Steel	152	192	250	58	32	40	3 tubes, 6mm	2 tubes, 8mm	92-0406	94-0306	GPM 3	7938

LT-Type	A	B	C	D	E	F	G (Tubing Size)	H (Tubing Size)	Air Coupling	Air Plug	GPM Plate	Weight (g)
SWM 0.1 LT	27	35	40	10	19	~	~	~	~	~	GPM 0.1	73.7
SWM 0 LT	38	43	60	32	19	32	3 tubes, 4mm	2 tubes, 4mm	92-5002	94-4902	GPM 0	205
SWM 1 LT	58	95	102	34	19	32	3 tubes, 4mm	2 tubes, 6mm	92-5002	94-4902	GPM 1	390
SWM 2 LT	101	132	160	50	25	40	3 tubes, 6mm	2 tubes, 8mm	92-0204	94-0104	GPM 2	1200



GPM... Quick Change Mounting Plates

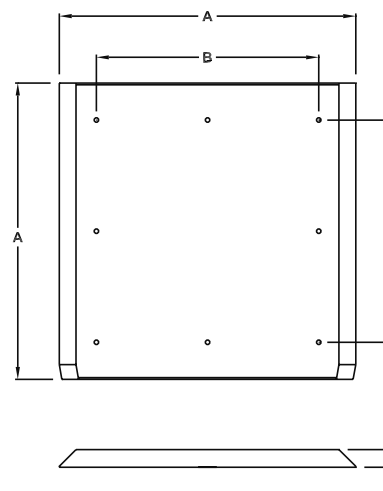
GPM... Greifergrundplatte
GPM... チャック取付プレート



Standard



T Type



- Available in standard or X-Type, as above, upon request
- Low cost dove-tail mounting plate for grippers
- Can be used with or without SWM Quick Change Chuck
- Lightweight aluminum plates for standard applications

L-Type

- Pre-drilled with M4 threaded holes
- Usually used with L-18/10 profile

X-Type

- Pre-set for mounting profile
- X plates pre-drilled for 5mm cap screws and include 6 screws, lock washers, and GWP 5X channel nuts

ST-Type (Steel)

- Recommended for use only with steel SWM plates
- Use with steel SWM plates for heavy duty applications

LT-Type (Light)

- Can be used for light tools with any SWM plate of same size
- Use with LT SWM plates for greatest weight reduction in light duty applications
- Available in C & X styles as above on request

T-Type (Tubing)

- Used with tube style framework
- Has tapped holes for KVB clamps

Standard	A	B	C	SWM Chuck	Weight (g)	Material
GPM 0.1	40	~	8	SWM 0.1	74	Aluminum
GPM 0	60	35	8	SWM 0	74	Aluminum
GPM 1	100	70	8	SWM 1	204	Aluminum
GPM 2	160	120	10	SWM 2	578	Aluminum
GPM 3	250	200	10	SWM 3	1582	Aluminum

L-Type	A	B	C	SWM Chuck	Weight (g)	Material
GPM 0 L	60	35	8	SWM 0	74	Aluminum
GPM 1 L	100	70	8	SWM 1	204	Aluminum

X-Type	A	B	C	SWM Chuck	Weight (g)	Material
GPM 1 X	100	70	8	SWM 1	232	Aluminum
GPM 2 X	160	120	10	SWM 2	669	Aluminum
GPM 3 X	250	200	10	SWM 3	1627	Aluminum

ST-Type	A	B	C	SWM Chuck	Weight (g)	Material
GPM 1 ST	100	70	8	SWM 1 Steel	596	Steel
GPM 2 ST	160	120	10	SWM 2 Steel	1690	Steel
GPM 3 ST	250	200	10	SWM 3 Steel	4627	Steel

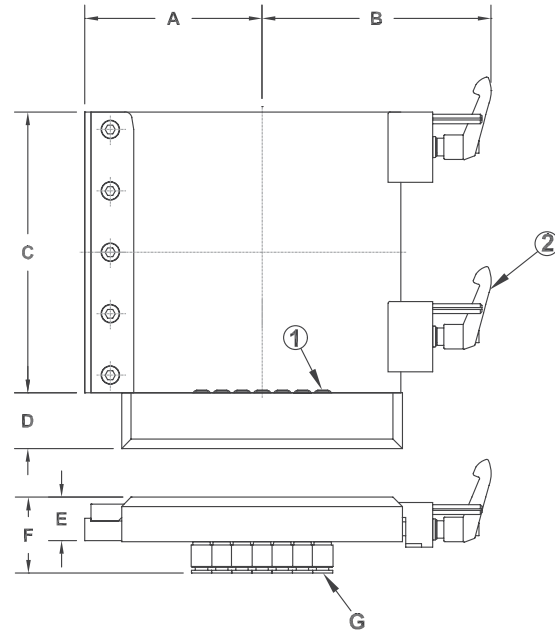
LT-Type	A	B	C	SWM Chuck	Weight (g)	Material
GPM 0.1 LT	40	~	8	SWM 0.1 LT	17	Delrin
GPM 0 LT	60	35	8	SWM 0 LT	35	Delrin
GPM 1 LT	100	70	8	SWM 1 LT	105	Delrin
GPM 2 LT	160	120	10	SWM 2 LT	329	Delrin

T-Type	A	B	C	SWM Chuck	Weight (g)	Material
GPM 1-14 T	100	22	8	SWM 1	200	Aluminum
GPM 2-14 T	160	22	10	SWM 2	560	Aluminum
GPM 2-20 T	160	28	10	SWM 2	555	Aluminum
GPM 3-20 T	250	28	10	SWM 3	1560	Aluminum
GPM 3-30 T	250	38	10	SWM 3	1555	Aluminum



SWM...SA Semi-Automatic Quick Change Mounting Chuck

SWM...SA halbbautomatische Schnellwechselfplatte
SWM...SA 半自動クイック・チェンジ取付プレート



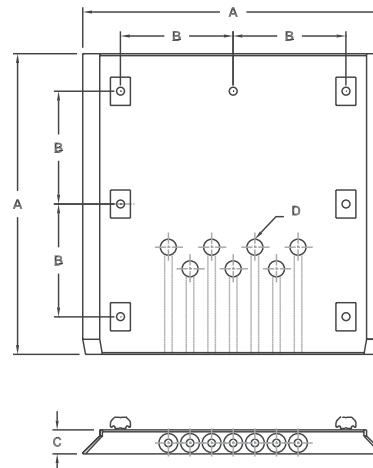
- ① - Rubber seals for pneumatic interface
- ② - Hand levers for changing EOATs without tools

- All the benefits of SWM Quick Change Mounting Chuck
- No need for hose clearance below the chuck
- Automatically couples air and vacuum lines
- Must be used with GPM SA mounting plates
- Uses "S" style fittings (not included)

	A	B	C	D	E	F	G (Tubing Size)	# of Ports	GPM Plate
SWM 1 SA	57	94	102	25	32	45	4/6mm	7	GPM 1 SA
SWM 2 SA	101	130	160	32	25	43	6	7	GPM 2 SA
SWM 3 SA	150	180	250	32	25	43	6	10	GPM 3 SA

GPM...SA Semi-Automatic Quick Change Mounting Plates

GPM...SA Halbbautomatische Greifergrundplatte
GPM...SA 半自動クイック・チェンジ取付プレート



- Automatically couples air and vacuum lines
- Prevents mixing up of air and vacuum lines during tool changes
- Must be used with a SWM SA Quick Change Chuck

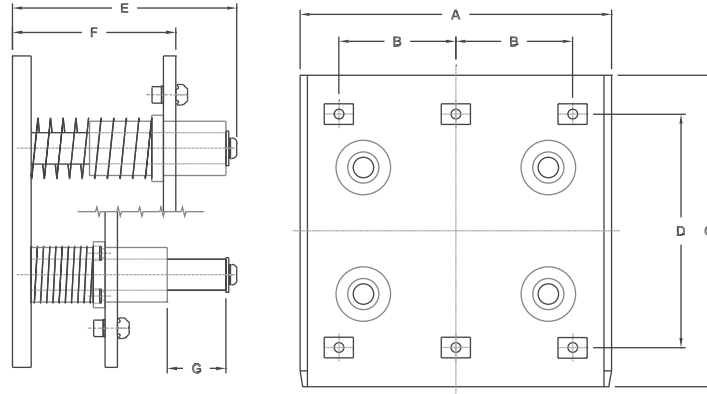
	A	B	C	D	# of Ports	SWM Chuck
GPM 1 SA	100	70	19	M5	7	SWM 1 SA
GPM 2 SA	160	60	13	G 1/8"	7	SWM 2 SA
GPM 3 SA	250	100	13	G 1/8"	10	SWM 3 SA



GPG... Spring Loaded Quick Change Mounting Plates

GPG... Greifergrundplatte
gefedert mit Kugelumlaufbuchsen

GPG... スプリング式プレート



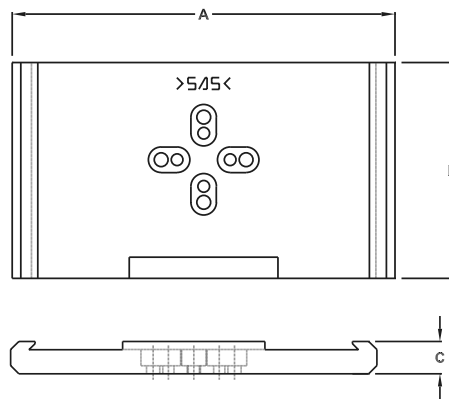
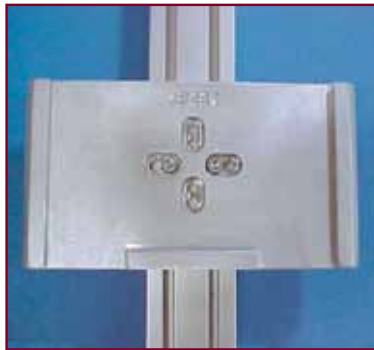
- Allows for a spring loaded compliance on our standard GPM mounting plate
- Especially useful in high speed ejection strokes and safety releases

	A	B	C	D	E	F	G (Stroke)	SWM Chuck	Profile	Weight (g)
GPG 1	100	35	102	70	91	66	20	SWM 1	L/X	601
GPG 2	160	60	160	120	115	84	30	SWM 2	X	1395
GPG 3	250	100	254	200	115	84	30	SWM 3	X	2268

GHV... Wall Mount

GHV... Greiferhaltevorrichtung

GHV... 壁掛式プレート



- Economical storage of EOAT when not in production
- Accepts EOAT built on our standard GPM mounting plates as well as our GPG Spring Loaded and new GPM-SA Semi-Automatic mounting plates

	A	B	C	Storage For	Profile
GHV 0	80	63	10	All GPM 0 Plates	L/X
GHV 1	120	76	10	All GPM 1 Plates	L/X
GHV 2	180	102	10	All GPM 2 Plates	X/JX/HX/D
GHV 3	270	152	13	All GPM 3 Plates	X/JX/HX/D

GHV... Rack for EOAT Storage

GHV... Roboter Greifer Gestell

GHV...EOAT 収納ラック



- EOAT Storage Rack can be customized to fit your needs.
- Uses GHV Wall Mounts on Heavy Duty Profile for stability.
- Available, as shown, on heavy duty casters for mobility or fixed with L-shaped legs for storing against the wall
- Multi EOAT storage capability



QSR... Semi-Automatic Tool Changer

QSR... Halbautomatischer Greiferwechsler



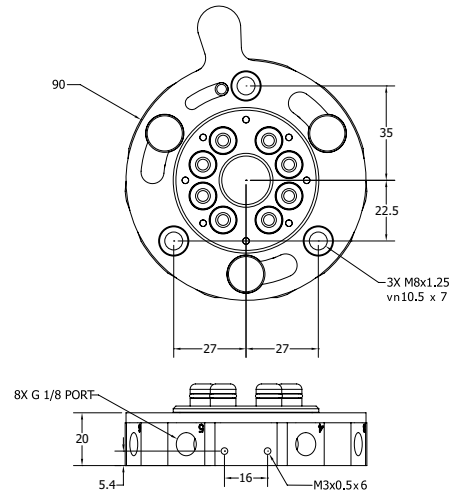
The SAS tool changer automatically connects multiple ports including air, vacuum, and electric, thereby, greatly reducing set-up time. Reliable port connection provides additional safety ensuring that all connections are aligned correctly.

Features

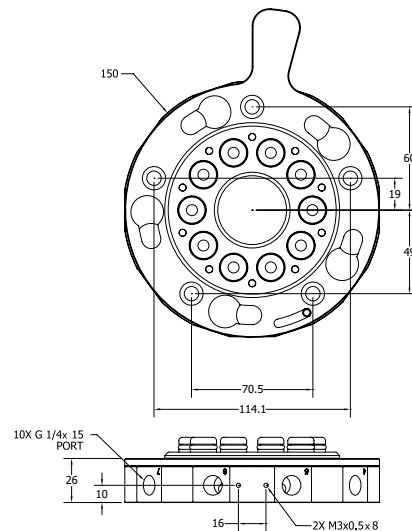
- Semi-Automatic Tool Changer for accurate, repeatable mounting of robotic end-of-arm tooling.
- Couples air and vacuum lines automatically (8/10/18).
- Made of lightweight aluminum with durable steel lock ring
- Handles typical end-of-arm tool weights up to 25/75/90 lbs

	Weight (lbs)
QSR 90-8	0.72
QSR 150-10	2.10
QSR 160-18	2.56

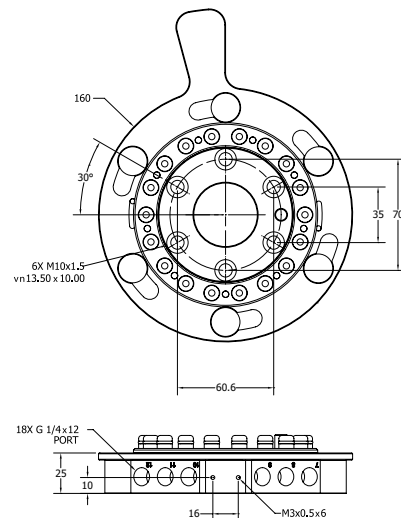
QSR 90-8



QSR 150-10



QSR 160-18



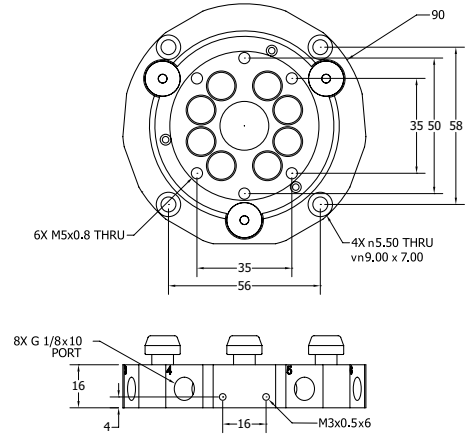


QST... Semi-Automatic Tool Changer

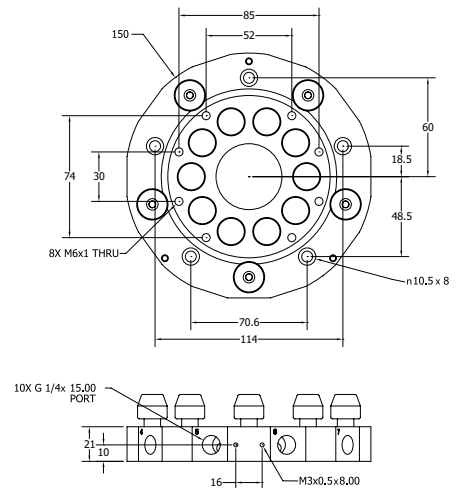
QST... Halbautomatischer Greiferwechsler



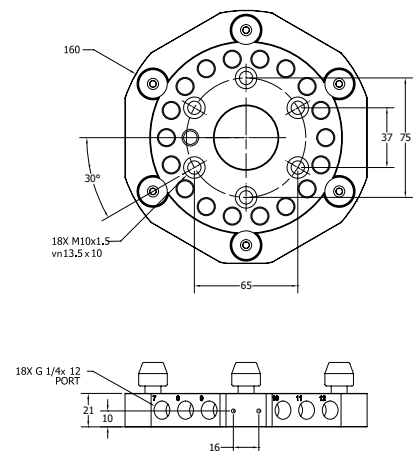
QST 90-8



QST 150-10



QST 160-18



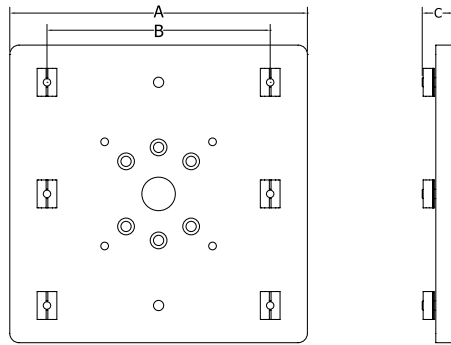
The SAS tool changer automatically connects multiple ports including air, vacuum, and electric, thereby, greatly reducing set-up time. Reliable port connection provides additional safety ensuring that all connections are aligned correctly.

- Semi-Automatic Tool Changer for accurate, repeatable mounting of robotic end-of-arm tooling.
- Couples air and vacuum lines automatically (8/10/18).
- Made of lightweight aluminum with durable steel locators
- Handles typical end-of-arm tool weights up to 25/75/90 lbs

	Weight (lbs)
QST 90-8	0.463
QST 150-10	1.8
QST 160-18	2.56



QMP... Mounting Plate

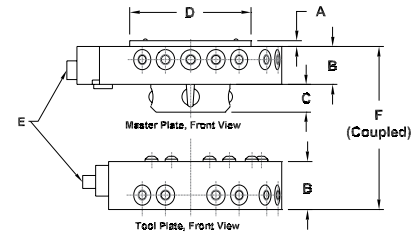
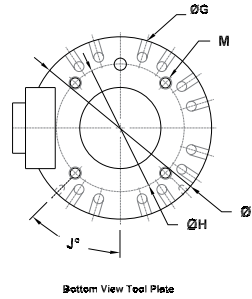
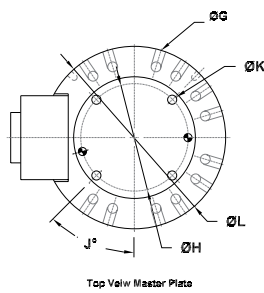


- Mounts profile straight up to the QST.
- Different size plates to mount up to the different QST sizes.

	A	B	C
QMP 1-90	100	70	15
QMP 2-90	160	120	17
QMP 2-150-160	160	120	17
QMP 3-150-160	250	200	17

QCC... Hands Free Quick Change Chuck

QCC... Schnellwechsel (Automatik)
QCC... クイックチャック交換装置



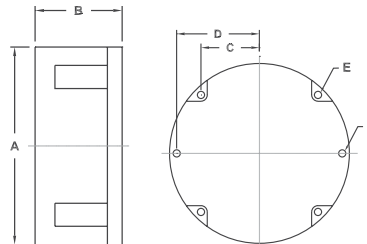
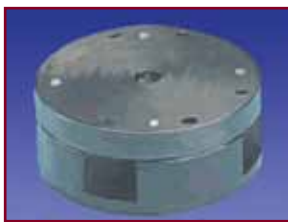
- Used in automatic robotic tool change application
- Integrated pneumatic and electrical connections
- Master plate and Tool plate sold separately
- Includes electrical connectors

Master Plate	A	B	C	D	E (Electrical)	F (Coupled)	G (#)	H (Bolt Circle)	J	K	L	M	Payload
QCC 0	5	18	19	33	10-Pin	49	M5 (6)	40	45	3.5	49	~	8kg
QCC 1	3	16	13	45	10-Pin	39	M5 (6)	40	45	3.5	50	~	16kg
QCC 2	3	19	14	60	19-Pin	45	M5 (12)	53	45	4.5	90	~	25kg
QCC 3	3	27	18	80	19-Pin	57	1/8NPT (8)	65	30	5.5	115	~	50kg

Tool Plate	A	B	C	D	E (Electrical)	F (Coupled)	G (#)	H (Bolt Circle)	J	K	L	M	Payload
QCT 0	~	26	~	~	10-Pin	49	M5 (6)	40	45	~	49	M5 x .8	8kg
QCT 1	~	21	~	~	10-Pin	39	M5 (6)	40	45	~	50	M5 x .8	16kg
QCT 2	~	24	~	~	19-Pin	45	M5 (12)	63	45	~	90	M6 x 1	25kg
QCT 3	~	27	~	~	19-Pin	57	1/8NPT (8)	80	30	~	115	M8 x 1.25	50kg

TAD... Tool Alignment Device

TAD... Werkzeugjustierungshilfe
TAD... ツール調節装置



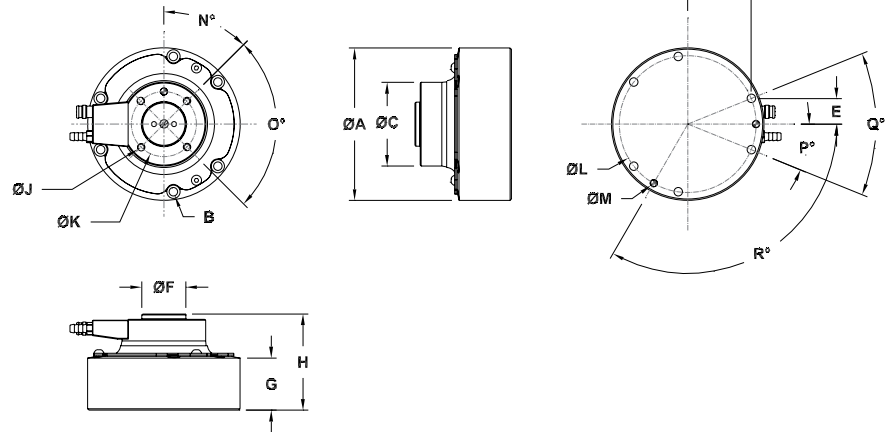
- Allows tools to shift for proper alignment with parts
- Use with locator pins or bushings to align tools with molds or other machines
- After aligned the compensator can be locked in place for proper part placement

	A	B	C	D	E (Tap)	F (Slip Fit)	Lateral Misalignment (mm)	Rotary Misalignment	Max Payload (kg)	Payload @ 4.1 Bar (kg)	Torsion Resistance (N*m)
TAD 0	76	30	23	33	#8-32	3/16"	+/- 2.5	+/- 5	18.6	8.5	11.8
TAD 1	102	41	31	45	#10-32	1/4"	+/- 2.5	+/- 5	33.6	15.3	30.7
TAD 2	133	51	42	59	1/4-20	1/4"	+/- 2.5	+/- 5	44.7	20.3	51.7
TAD 3	203	88	65	92	5/16-18	3/8"	+/- 2.5	+/- 5	99.2	45.1	157.6



TCS...Collision Sensors

TCS... Kollisionssensoren
TCS...衝突センサ

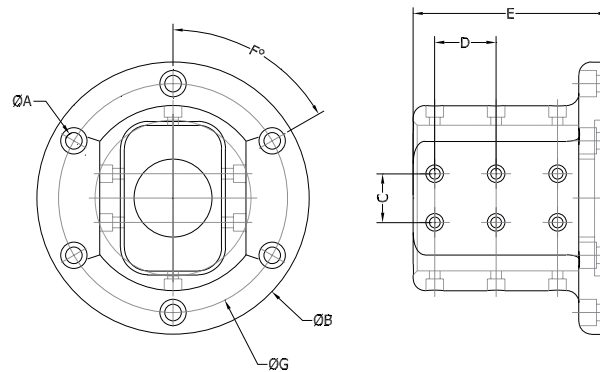


- Detects when the robot arm has encountered an obstruction
- Absorbs the crash energy
- Stops the robot to prevent costly damage to the robot arm and tooling
- Features a repeatability of 0.0005" and allows the user to adjust the amount of resistance the unit must overcome before stopping the system

	A	B (C'bore)	C	D	E	F	G	J	K	L	M (Slip Fit)	N	O	P	Q	R
TCS-0	86	M4	48	36	15	31	52	M5	37	77	4	45	4x90	22	44	120
TCS-1	114	M5	63	48	19	40	64	M6	50	103	6	45	4x90	21	42	120
TCS-2	150	M6	85	64	25	51	79	M6	63	137	6	60	6x60	21	42	120
TCS-3	203	M8	117	86	33	71	105	M10	90	184	10	45	4x90	21	42	120
TCS-4	278	M10	163	120	46	99	143	M10	125	257	10	60	6x60	21	42	120

QCI... Quick Change Interface

QCI... Kupplungsstück
QCI...クイック・チェンジ・インターフェース



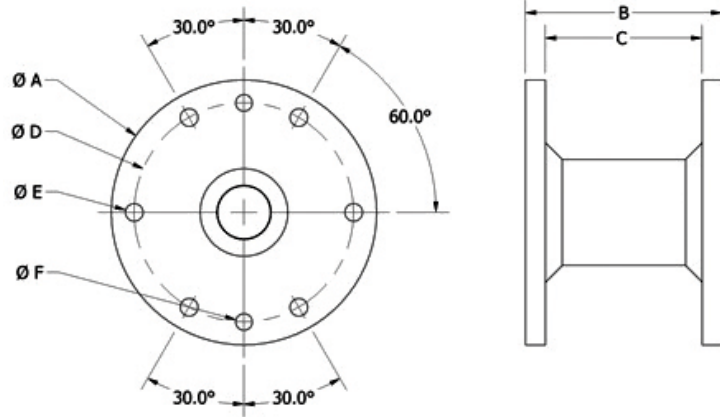
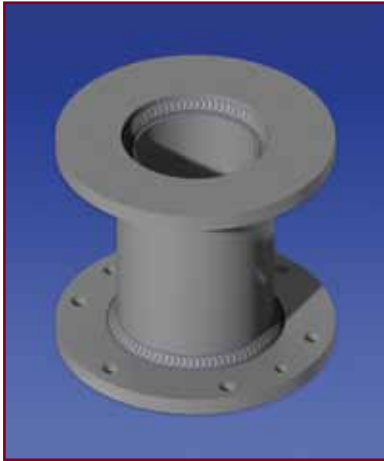
- Quick change interface for boom mounting D-Profile
- Allows for end or boom mounting commonly utilized with 5 or 6 axis robots



	A	B	C	D	E	F	G	Profile
QCI 30 T	14/9	127	~	~	100	60	100	T-30
QCI 75/50 D	14/9	140	25	32	100	60	118	D



RSM... Robot Standoff Mount



- Robust aluminum weldment.
- Machinable face making it adaptable to fit any robot.

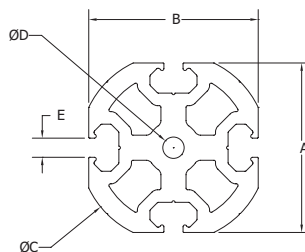
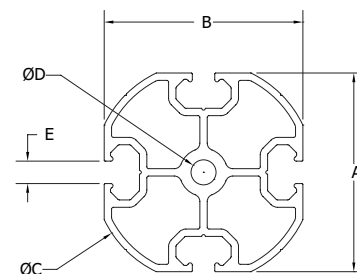
	A	B	C	D	E	F
RSM 1-75	127	94	75	105 B.C.	8.5	8
RSM 1-150	127	169	150	105 B.C.	8.5	8
RSM 2-150	165	176	150	140 B.C.	10.5	10
RSM 2-250	165	276	250	140 B.C.	10.5	10
RSM 3-150	203	176	150	175 B.C.	12.5	10
RSM 3-250	203	276	250	175 B.C.	12.5	10

L, X, D, JX & HX Profile... Aluminum Profiles

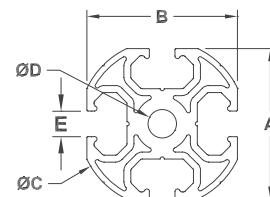
L, X, D, JX & HX... Aluminiumprofile
L, X, D, JX & HX... アルミフレーム



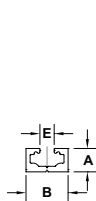
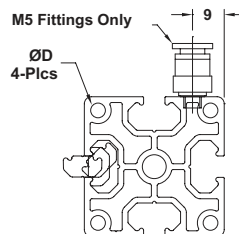
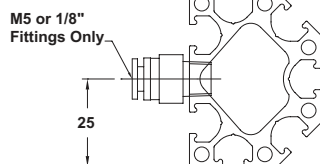
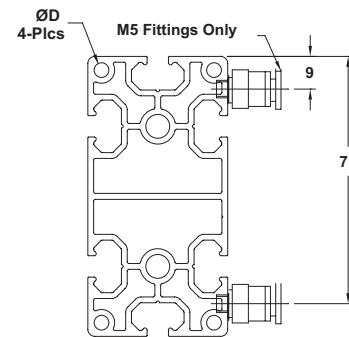
Example of Use



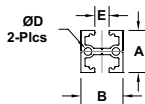
HX-60 HD



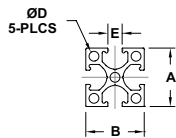
HX-40



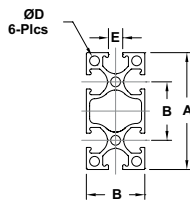
L-18/10



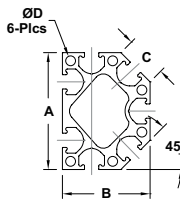
L-18/18



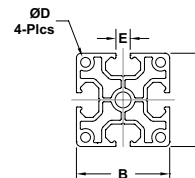
X-25/25



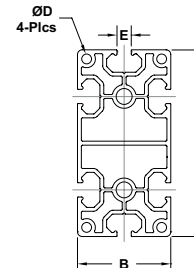
X-50/25



D-50/38



JX-40/40



JX-80/40

- Use with GWP Channel Nuts and PL-X Channel Nut profile

	A	B	C	D	E	Length	Channel Nut	Est. Part Weight
L-18/10	10	18	~	~	6.1	2000	PL-X	up to 1kg./2.2lbs.
L-18/18	18	18	~	4.2	6.1	2000	PL-X	up to 1kg./2.2lbs.
X-25/25	25	25	~	4.2	6.1	2000	PL-X	up to 1kg./2.2lbs.
X-50/25	50	25	~	4.2	6.1	2000	PL-X	<10kg./22lbs.
D-50/38	50	38	17.7	4.2	6.1	2000	PL-X	<10kg./22lbs.
JX-40/40	40	40	~	4.2	6.1	2000	PL-X	>10kg./22lbs.
JX-80/40	80	40	~	4.2	6.1	2000	PL-X	>10kg./22lbs.
HX-40	36	36	40	6.8	6.1	2000	PL-X	<10kg/22lb.
HX-60	54	54	60	6.8	6.1	2000	PL-X	>10kg/22lb.
HX-60 HD	54	54	60	6.8	6.1	2000	PL-X	>10kg/22lb.

Note: Additional freight charges may apply due to dimensional weight surcharges from carriers.

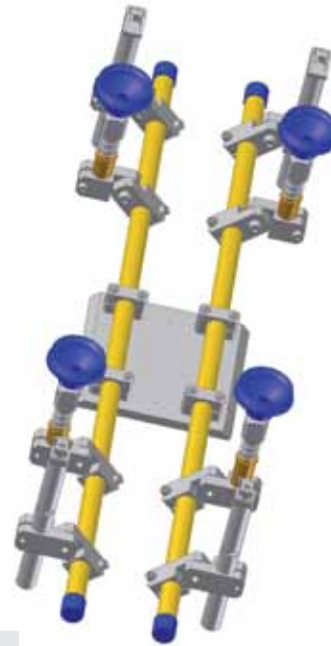


T Profile... Tube Profile

T... Rundprofile
T... チューブ状プロファイル



- Highly adjustable, lightweight profile
- For use with SAS's uniquely designed single piece Mounting Clamps



14 mm
(.551")

20 mm
(.788")

30 mm
(1.181")

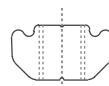
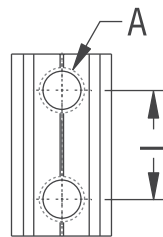
	OD	ID	Length	Material
T-14/11	14	11	1000	Aluminum
T-20/16	20	16	1000	Aluminum
T-20/10	20	10	2000	Aluminum
T-20/18 CF	20	18	2000	Carbon Fiber
T-30/25	30	25	2000	Aluminum
T-30/20	30	20	2000	Aluminum

GWP... Channel Nuts

GWP... Nutensteine
GWP... アルミチャンネルナット



- Used for replacements or for profile mounting of custom plates or brackets
- Available in 2m lengths of blank extrusion (non-plated) for custom applications
- Nuts can be easily dropped in the channel of JX Profile



GWP 5/45



	A	L	Material
GWP 4	M4	~	Steel
GWP 4-8	M4	8	Steel
GWP 4-17	M4	17	Steel
GWP 4-31	M4	31	Steel
GWP 5	M5	~	Steel
GWP 5/45 *	M5	~	Steel
GWP 5-10	M5	10	Steel
GWP 5-12	M5	12	Steel
GWP 5-14	M5	14	Steel
GWP 5-16	M5	16	Steel
GWP 5-22	M5	22	Steel
GWP 5-25	M5	25	Steel
GWP 5-28	M5	28	Steel
GWP 5-38	M5	38	Steel
GWP 5-42	M5	42	Steel
GWP 5-58	M5	58	Steel
GWP 5-63	M5	63	Steel
GWP 6	M6	~	Steel
GWP 6-12	M6	12	Steel
GWP 6-15	M6	15	Steel
GWP 6-20	M6	20	Steel
GWP 6-25	M6	25	Steel
GWP 6-30	M6	30	Steel
GWP 6-40	M6	40	Steel
GWP 6-50	M6	50	Steel
GWP 6-52	M6	52	Steel
GWP 6-60	M6	60	Steel
GWP 6-92	M6	92	Steel

Recommended Torque: (approx.)		
Fastener	Nm	Ft.-lbs.
M4	3	2
M5	5.5	4
M6	9.5	7
M8	23	17

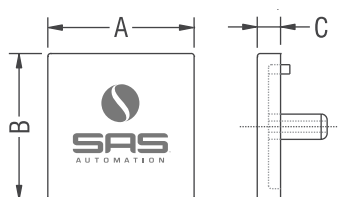
	Length	Profile	Material
PL-X	2000	L, X, D, JX, HX	Steel

*Drop-in Channel Nut



ADK... Profile End Caps

ADK... Abdeckkappen
ADK...アルミフレーム用保護キャップ



	A	B	C	Color
ADK 18/10 L	18	10	4	Black/Yellow
ADK 18/18 L	18	18	4	Black/Yellow
ADK 25/25 X	25	25	4	Black/Yellow
ADK 50/25 X	50	25	4	Black/Yellow
ADK 50/38 D	50	38	2	Black/Yellow

*Above End Caps are black. To specify yellow End Caps, add "Y" After the profile size. (ex. ADK 18/10Y L)

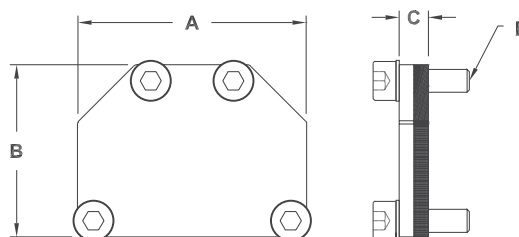
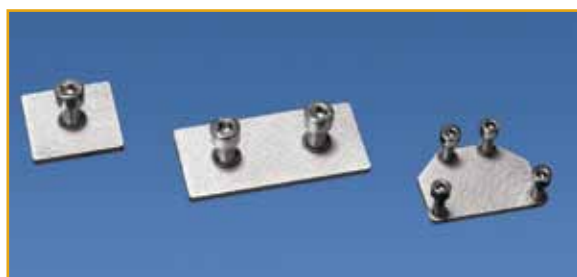
	A	B	C	Color
ADK 14Y T	ø 16	~	18	Yellow
ADK 20Y T	ø 22	~	18	Yellow
ADK 30Y T	ø 32	~	18	Yellow

ADK 40 HX	42	~	18	Yellow
ADK 60 HX	62	~	26	Yellow

- Dresses & protects profile ends
- Available in molded safety yellow or black colors

SEC... Sealed Profile End Caps

SEC... Abdichtende Abdeckkappen
SEC...アルミフレーム用保護キャップ

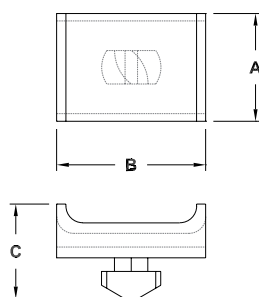


- Soft industrial rubber bonded to an aluminum backing plate
- Seals profile cavities to create internal air ducts
- For use with D and JX Profile

	A	B	C	D
SEC 50/38 D	50	38	6	M5
SEC 40/40 JX	40	40	6	M8
SEC 80/40 JX	80	40	6	M8

CTM... Cable and Hose Connection

CTM... Kabel- und Schlauchverbindung
CTM...ケーブルおよび



- Convenient wiring and tubing tie-down twists tightly into standard frame profile
- Easily moveable and removeable
- CTM-15 designed to fit into L, X, & D profiles
- CTM-25 designed to fit into JX & HX profiles

	A	B	C
CTM-15	12	15	16
CTM-25	18	25	16

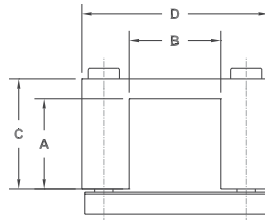
Note: Sold in packs of 10.



KBV... Cross Joint Connector

KBV... Kreuzverbindung

KBV... クロスジョイントコネクタ



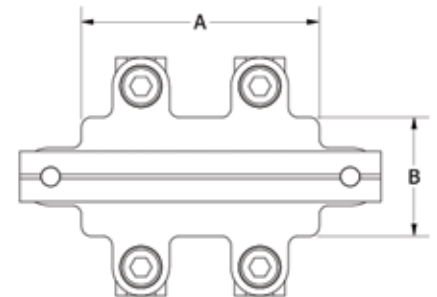
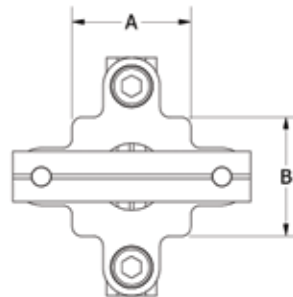
- Bridge style clamp for frame profile cross mounting
- Allows full adjustability in two dimensions simultaneously

	A	B	C	D	Profile
KBV 10-18 L	10	18	16	40	L-18/10 to L/X
KBV 18-18 L	18	18	25	40	L-18/18 to L/X
KBV 25-25 X	25	25	30	51	X-25/25 to X/D/HX
KBV 25-50 X	25	50	30	76	X-50/25 to X/D/HX
KBV 50-25 X	50	25	60	51	X-50/25 to X/D/HX
KBV 40-40 JX	40	40	56	66	JX-40/40 to X/JX/D/HX
KBV 40-80 JX	40	80	56	106	JX-80/40 to X/JX/D/HX
KBV 80-40 JX	80	40	97	76	JX-80/40 to X/JX/D/HX

KPL... Cross Joint Connector

KPL... Kreuzplatte

KPL... クロスジョイントコネクタ



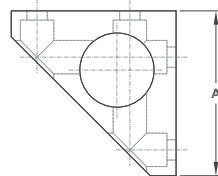
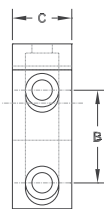
- Sandwich style bracket used for profile cross mounting
- Allows for full adjustability in 2 dimensions individually or simultaneously

	A	B	Profile
KPL 18-18 L	18	18	L to L-18/18
KPL 25-25 X	25	25	X to X
KPL 25-50 X	50	25	X-50/25 to X
KPL 50-50 X	50	50	X-50/25 to X-50/25
KPL 40-40 JX	40	40	JX to JX
KPL 80-40 JX	80	40	JX-80/40 to JX
KPL 80-80 JX	80	80	JX-80/40 to JX-80/40

WIV... Angle Joint Connector

WIV... Winkelverbinder

WIV... アングルジョイントコネクタ



- Corner bracket for squareness and stability
- Fits in corner of 2 joining frame profiles and does not interfere with parts in other channels

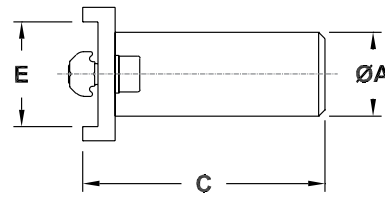
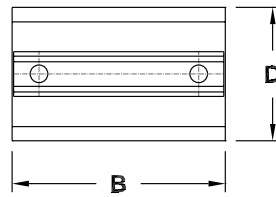
	A	B	C	Profile
WIV 25 X	25	~	16	X/D
WIV 50 X	51	20	16	X/D
WIV 40 JX	38	~	25	JX
WIV 80 JX	76	40	25	JX



DKA... Profile Extension Arm

DKA... Einstellbarer Profilverbindungsarm

DKA... プロファイル延長アーム

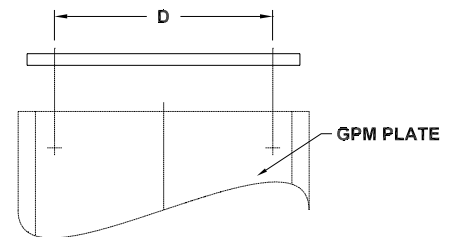
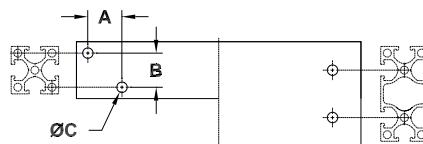


- Offsets profile connections using clamps
- Allows for clearance between profile

	A	B	C	D	E
DKA 10 L	10	38	94	22	18
DKA 14 X	14	51	128	32	25
DKA 20 X	20	51	158	32	25

EPL... End Plate

EPL... Endplatte
EPL... エンドプレート

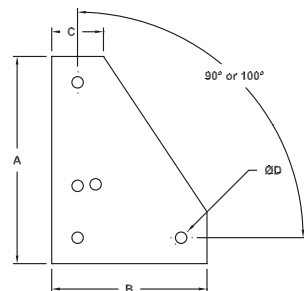


- Connects frame profile ends for added stability and strength

	A	B	C	D	Mounting Plate	Profile
EPL 2-25 X	18	18	5.5	120	GPM 2 X/ GPM 2 SA /GPG 2	X-25/25
EPL 2-50 X	~	25	5.5	120	GPM 2 X/ GPM 2 SA /GPG 2	X-50/25
EPL 3-25 X	18	18	5.5	200	GPM 2 X/ GPM 2 SA /GPG 2	X-25/25
EPL 3-50 X	~	25	5.5	200	GPM 3 X/ GPM 3 SA /GPG 3	X-50/25
EPL 3-40 JX	~	~	8.5	200	GPM 3 X	JX-40/40
EPL 3-80 JX	~	40	8.5	200	GPM 3 X	JX-80/40

EVB... Corner Joint Plate

EVB... Eckverbinder
EVB... コーナージョイントプレート



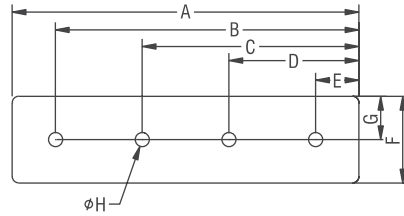
- Corner plate bracket for squareness and stability
- Joins two profiles at either a 90° or 100° fixed angle
- Forms a rigid connection

	A	B	C	D	Profile
EVB 25 X	100	75	25	5.5	X-25
EVB 50 X	100	100	50	5.5	X-50
EVB 40 JX	100	100	40	6.5	JX-40



EVG... Straight Connector Plate

EVG... Eckverbinder (Gerade)
EVG... コネクター

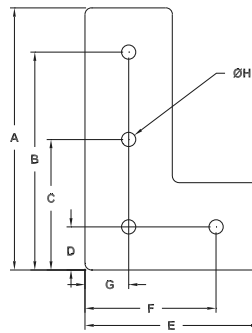


- Profile is connected end to end
- Can be used to brace L connectors on wide profile
- Forms a rigid connection

	A	B	C	D	E	F	G	H
EVG 25/50 X	50	~	~	38	13	25	13	5.5
EVG 25/75 X	75	~	63	38	13	25	13	5.5
EVG 25/100 X	100	88	63	38	13	25	13	5.5
EVG 40/160 JX	160	140	100	60	20	40	20	6.5

EVL... Connector Plate

EVL... Eckverbinder (L-Form)
EVL... L形コネクター

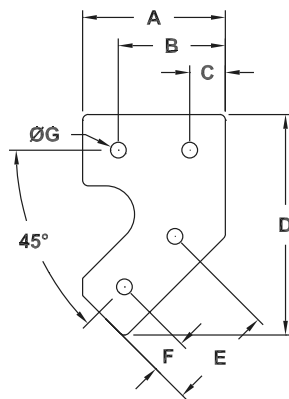


- Profile is connected perpendicular
- Forms a rigid connection

	A	B	C	D	E	F	G	H
EVL 50/50 X	50	~	38	13	50	38	13	5.5
EVL 50/75 X	75	63	38	13	50	38	13	5.5
EVL 80/120 JX	120	100	60	20	80	60	20	6.5

EVW 45... 45 Degree Connector Plate

EVW... Eckverbinder (45 Grad)
EVW... 45度コネクター



- Joins two profiles at a 45° angle
- Forms a rigid connection

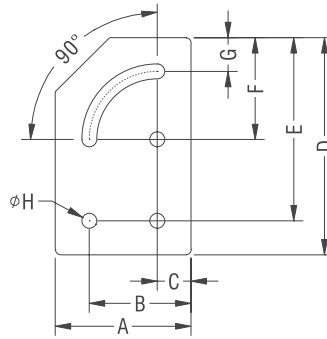


	A	B	C	D	E	F	G
EVW 45 X	50	38	13	77	38	13	5.5
EVW 45 JX	80	60	20	118	53	13	6.5



EVW 0-90... 0-90 Degree Connector Plate

EVW... Eckverbinder (0-90 Grad verstellbar)
EVW... 角度調整コネクター(0~90度)

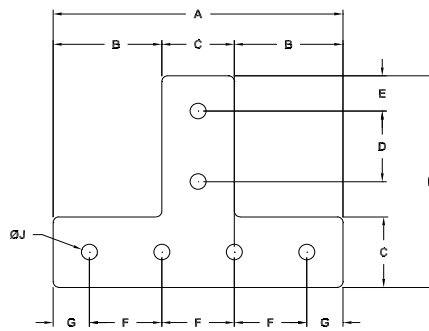


- Joins two profiles at any angle between 0 and 90°
- Angle of profile intersection can be adjusted at any time
- Forms a rigid connection

	A	B	C	D	E	F	G	H
EVW 0-90 X	50	38	13	80	68	38	13	5.5
EVW 0-90 JX	80	60	20	130	110	60	20	6.5

EVT... T Connector Plate

EVT... Eckverbinder (T-Form)
EVT... T形コネクター

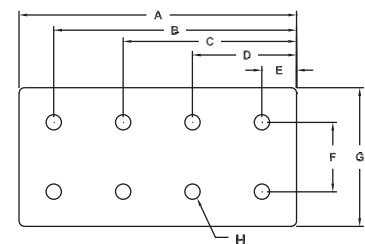


- Profile is connected perpendicular
- Forms a rigid connection

	A	B	C	D	E	F x (#Holes)	G	H	J
EVT 50/75 X	50	13	25	25 X 2	13	25 X 2	13	75	5.5
EVT 100/75 X	100	38	25	25 X 2	13	25 X 4	13	75	5.5
EVT 100/80 D	100	38	25	25 X 2	10	25 X 4	13	80	5.5
EVT 100/130 D	100	38	25	25 X 3	10	25 X 4	13	130	5.5
EVT 120/120 JX	120	40	40	40	20	40 X 3	20	120	6.5

EVD... Straight Connector Plate

EVD... Eckverbinder Doppelt (Gerade)
EVD... ストレート・コネクター・プレート



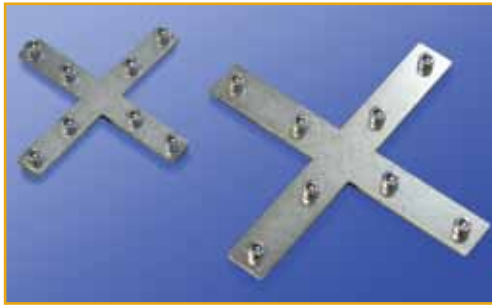
- Straight plates for side-by-side and end-to-end connections of profile
- Forms a rigid connection

	A	B	C	D	E	F	G	H
EVD 50/50 X	50	37.5	12.5	~	~	25	50	5.5
EVD 50/100 X	100	87.5	62.5	37.5	12.5	25	50	5.5

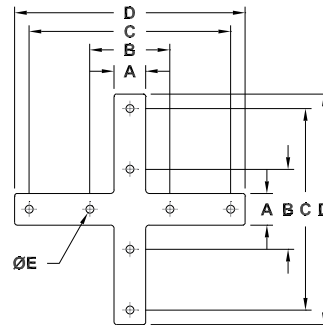


EVC... Cross Connector

EVC... Kreuzverbinder
EVC... クロスコネクタ



- Profile is connected perpendicular
- Forms a rigid connection
- For use with HX profile



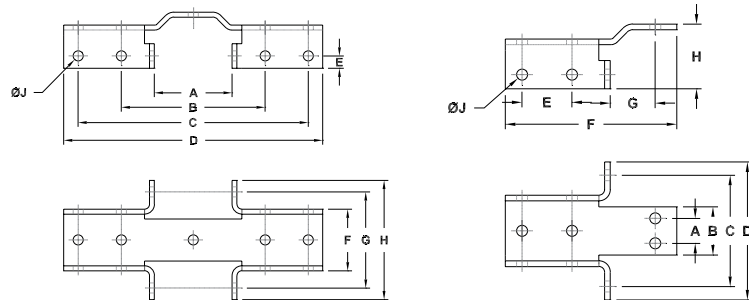
	A	B	C	D	ØE
EVC 40/40	18	56	116	130	6.5
EVC 60/60	26	66	166	190	6.5

EVH... Cross Connector

EVH... Kreuzverbinder
EVH... クロスコネクタ



- Profile is connected perpendicular
- Forms a rigid connection
- For use with HX profile



	A	B	C	D	E	F	G	H	ØJ
EVH 60/40-1	15	29	66.8	82.8	30	103	27.2	38.9	6.6
EVH 60/40-2	54	100	160	180	8.6	42.8	66.8	82.8	7

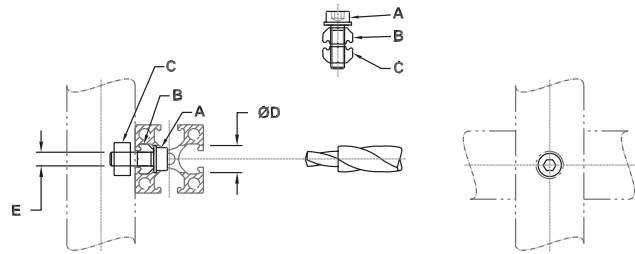


KV... Cross Connector

KV... Kreuzverbinder
KV... クロスコネクター



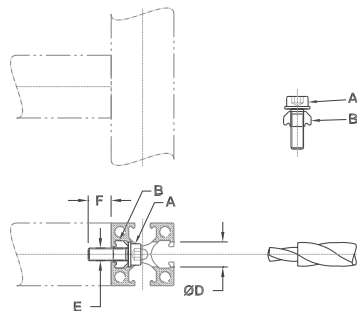
- Low cost stable cross connector for joining two similar profiles
- Will not interfere with components on either profile
- Includes cap screw, serrated lock washer, channel nut with through hole
- Drilling of one profile is required with our STB step drill



	A	B	C	D	E	Profile
KV-L	M4	ULP 4X	GWP 4	8	M4	L
KV-X	M5	ULP 5X	GWP 5	Ø10 (STB M5)	M5	X
KV-JX	M6	ULP 6X	GWP 6	15	M6	JX

SV... Butt Connector

SV... Stoßverbindung
SV... 突合せコネクター



- Low cost stable perpendicular end-butt connector for joining two profiles
- Will not interfere with components on either profile
- Includes cap screw, serrated lock washer, and channel nut with through hole
- Drilling of one profile required using our STB step drill and tapping the end of the profile

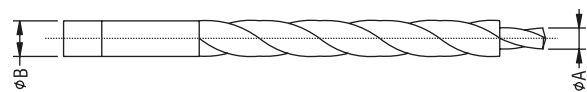
	A	B	D	E	Profile
SV-X	M5 SHCS	ULP 5X	Ø10 (STB M5)	M5	X

STB... Step Drill

STB... Stufenbohrer
STB... ドリル替刃



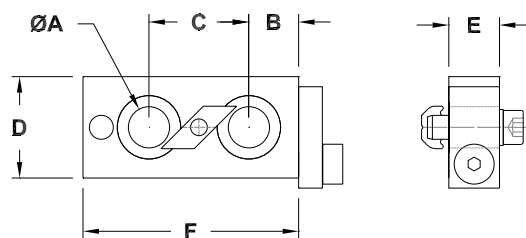
- Used for step drilling of aluminum profiles
- One drill setup for installing KV or SV connectors



	A (Drill)	B (C'Bore)	Profile
STB M5	5.5	10	X
STB M6	6.5	11	JX

PJ... Profile Jigs

PJ... Spannvorrichtung
PJ... プロファイル・ジグ



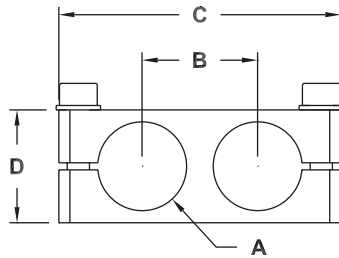
- Easily locate holes for SV & KV profile connectors
- Eliminates drill "walking" to assure square connections

	A	B	C	D	E	F	Profile
PJ-X	10	12.5	25	25	13	54	X
PJ-JX	11	20	40	32	13	80	JX



KPC... Tube Parallel Clamp

KPC... Parallelrohrklemme
KPC... チューブ状十字ジョイント・コネクタ

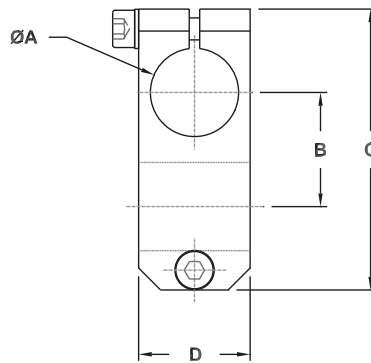


- Parallel profile clamp for new Tube (T) profile
- One piece construction for easy assembly

	A	B	C	D
KPC 10	10	14	38	16
KPC 14	14	20	52	19
KPC 20	20	26	64	25
KPC 30	30	39	90	38

KNC... Tube Cross Clamp

KNC... Verbinder für Rundrohr
KNC... チューブ状十字ジョイント・コネクタ



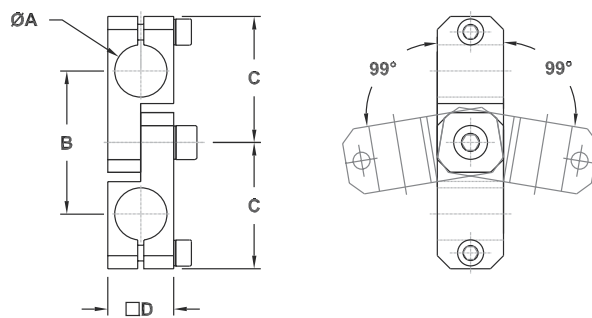
- Adjustable angle cross connection of new Tube(T) profile
- One piece construction for easy assembly



	A	B	C	D
KNC 10	10	14	38	16
KNC 14	14	20	52	19
KNC 20	20	26	64	25
KNC 30	30	39	90	38

KAC... Tube Angle Swivel Clamp

KAC... Verbinder für Rundrohr
KAC... チューブ状十字ジョイント・コネクタ



- Adjustable angle cross connection for new Tube (T) profile
- One piece construction for easy assembly

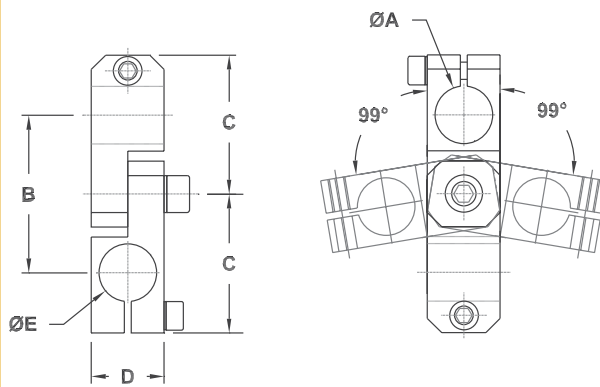
	A	B	C	D
KAC 14-14	14	55	48	25
KAC 20-20	20	55	48	25
KAC 30-30	30	77	64	38



KEC... Tube Cross Swivel Clamp

KEC... Rohrklamme gekreuzt schwenkbar

KEC... チューブ状調節可能アングル十字ジョイント・コネクタ



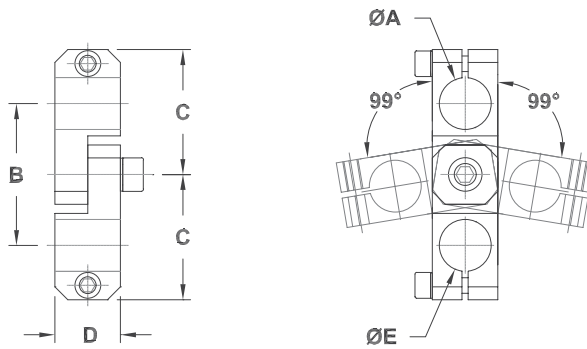
- Swivel cross connection for new Tube (T) profile
- One piece construction for easy assembly

	A	B	C	D	E
KEC 14-14	14	55	48	25	14
KEC 14-20	14	55	48	25	20
KEC 20-20	20	55	48	25	20
KEC 20-30	20	77	64	38	30
KEC 30-30	30	77	64	38	30

KIC... Tube Parallel Swivel Clamp

KIC... Rohrklamme parallel schwenkbar

KIC... チューブ状調節可能アングル十字ジョイント・コネクタ



- Parallel connector for new Tube (T) profile
- One piece construction for easy assembly

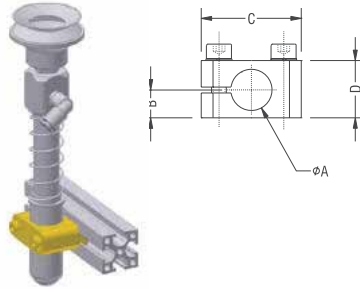
	A	B	C	D	E
KIC 14-14	14	55	48	25	14
KIC 14-20	14	55	48	25	20
KIC 20-20	20	55	48	25	20
KIC 20-30	20	77	64	38	30
KIC 30-30	30	77	64	38	30

KVB... Cross Clamp

KVB... Kreuzverbinder
KVB... クロスクランプ



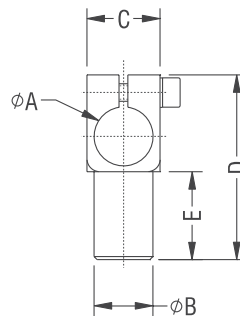
- Allows for side mounting of gripper arms to frame profiles
- Allows for mounting of new Tube (T) profiles to standard frame profiles



	A	B	C	D	Recommended Profile
KVB 10	10	8	25	16	L/X/D/HX
KVB 14	14	10	34	19	L/X/JX/D/HX
KVB 20	20	18	40	25	X/JX/D/HX
KVB 30	30	18	50.8	38	X/JX/D/HX

SKS... Insert Clamp

SKS... Steckklemmstück
SKS... インサートクランプ



- Supplies 90° mounting with rotation
- Short shaft clamp

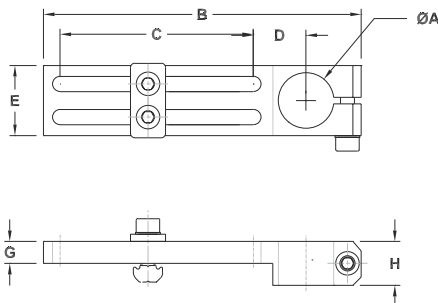
	A	B	C	D	E
SKS 20	20	20	25	63	30
SKS 20-30	30	20	38	78	34

WSL... Long Angle Clamp

WSL... Winkelklemmstück
WSL... ロングアングルクランプ



- Allows for top mounting of gripper arms and holders to frame profile
- Adjustable parallel and perpendicular to the frame
- Nylon-titanium composite clamps are less expensive and lighter weight
- Aluminum clamps are more rigid for instances where precise locating is needed such as GRF gripper fingers and ASZ cutters
- Hex head screws available upon request



Nylon Titanium	A	B	C	D	E	G	H	Profile
WSL 10 NT	10	82	45	16	18	10	10	L/X/JX/HX/D
WSL 14 NT	14	100	57	21	27	10	13	L/X/JX/HX/D
WSL 20 NT	20	119	66	24	27	12	16	X/JX/HX/D
WSL 30 NT	30	132	66	30	39	15	19	X/JX/HX/D
WSL 20 JX NT	20	135	70	34	32	16	16	X/JX/HX/D
WSL 30 JX NT	30	141	60	39	45	19	19	X/JX/HX/D

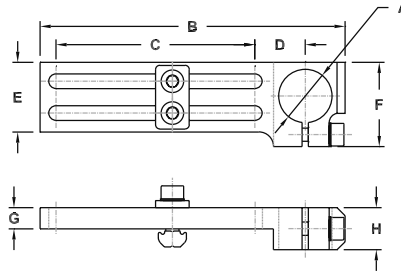
Aluminum	A	B	C	D	E	G	H	Profile
WSL 10 AL	10	80	47	14	16	6	10	L/X/JX/HX/D
WSL 14 AL	14	100	62	16	22	8	13	L/X/JX/HX/D
WSL 20 AL	20	115	70	19	25	8	16	X/JX/HX/D
WSL 30 AL	30	129	67	28	38	10	19	X/JX/HX/D
WSL 20 JX AL	20	132	74	30	32	16	16	X/JX/HX/D
WSL 30 JX AL	30	137	64	35	45	19	19	X/JX/HX/D



WSL...T Top Long Angle Clamp



- Allows for top mounting of gripper arms or holders to frame profile
- Adjustable parallel and perpendicular to the frame
- Screw head points out from profile so clamps can be mounted close together
- Allows for close mounting of clamps.



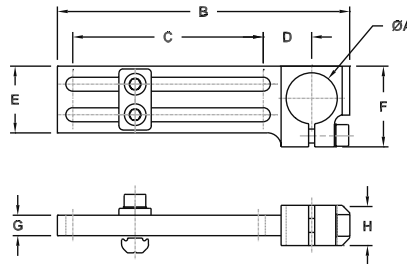
Aluminum	A	B	C	D	E	F	G	H	Profile
WSL 10 T	10	80	47	14	17	22	6	10	L/X/JX/HX/D
WSL 14 T	14	100	64	16	20	25	8	13	L/X/JX/HX/D
WSL 20 T	20	115	75	19	26	32	8	16	X/JX/HX/D
WSL 30 T	30	130	77	28	37	45	10	19	X/JX/HX/D

WSL...T Winkelklemmstück (mit Kopfschraube)
WSL...T トップ・ロング・アングル・クランプ

WSL...TR Top Reversible Long Angle Clamp



- Allows for top mounting of gripper arms or holders to frame profile
- Adjustable parallel and perpendicular to the frame
- Allows for close mounting of clamps.
- Flexible mounting allows an adjustment range of 180.



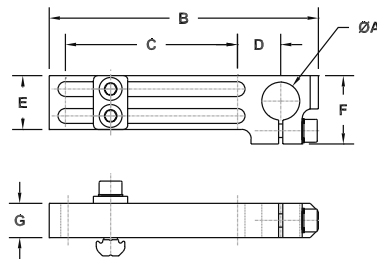
Aluminum	A	B	C	D	E	F	G	H	Profile
WSL 10 TR	10	80	42	20	17	22	6	10	L/X/JX/HX/D
WSL 14 TR	14	100	60	20	20	25	7	13	L/X/JX/HX/D
WSL 20 TR	20	115	73	21	26	32	8	16	X/JX/HX/D
WSL 30 TR	30	130	74	31	37	45	10	19	X/JX/HX/D

WSL...TR Drehbares Winkelklemmstück (mit Kopfschraube)
WSL...TR トップ可逆ロング・アングル・クランプ

WSL...TRB Long Angle Clamp



- Allows for top or bottom mounting of gripper arms or holders to frame profile
- Adjustable parallel and perpendicular to the frame
- Thick aluminum clamps are more rigid for use with extremely heavy parts and MR cutters
- Allows for close mounting of clamps.



Aluminum	A	B	C	D	E	F	G	Profile
WSL 10 TRB	10	80	47	14	17	22	10	L/X/JX/HX/D
WSL 14 TRB	14	100	64	16	20	25	13	L/X/JX/HX/D
WSL 20 TRB	20	115	75	19	26	32	16	X/JX/HX/D
WSL 30 TRB	30	130	77	28	37	45	19	X/JX/HX/D

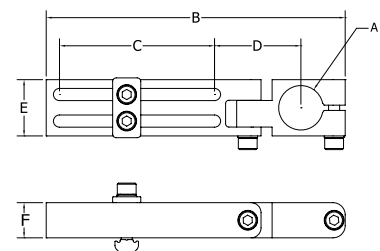
WSL...TRB Drehbares Winkelklemmstück (mit Kopfschraube)
WSL...TRB トップ可逆ロング・アングル・クランプ

WSL...SH Angle Clamp



- Allows for top mounting of gripper arms and holders to frame profile
- Adjustable parallel and perpendicular to the frame
- Clamps offers a swivel mounting

Aluminum	A	B	C	D	E	F
WSL SH 10	10	90	45	26	16	10
WSL SH 14	14	114	60	31.5	23	13
WSL SH 20	20	135	70	39	26	16
WSL SH 30	30	153	70	49	39	19

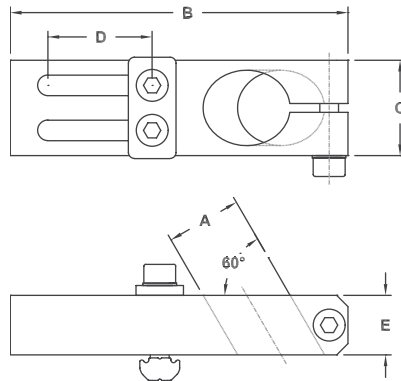




WSA... Long Angle Clamp

WSA... Winkelklemmstück 30°

WSA... ロング・アングル・クランプ



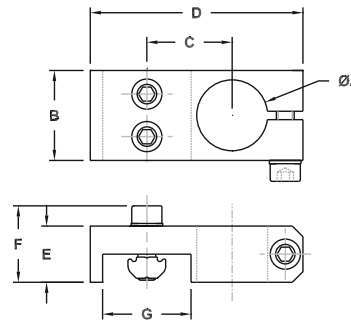
- Mounts components and extension arms at a 30° angle to profile surface
- Adjustable parallel and perpendicular to frame profile

Aluminum	A	B	C	D	E	Profile
WSA 10	10	65	16	19	10	
WSA 14	14	80	25	25	10	X/JX/HX/D
WSA 20	20	90	25	30	16	X/JX/HX/D
WSA 30	30	113	38	40	19	X/JX/HX/D

WST... Angle Clamp

WST... Winkelklemmstück

WST...アングルクランプ



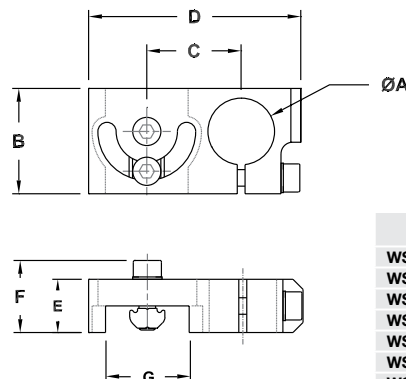
- Allows for top mounting of gripper arms or holders to frame profile
- Adjustable along the channel of the frame profile
- Hex head screws available upon request

	A	B	C	D	E	F	G	Profile
WST 10 L	10	16	16	40	10	14	18	L
WST 10 X	10	16	20	47	10	14	25	X
WST 14 X	14	25	21	52	13	19	25	X
WST 20 X	20	25	24	60	16	22	25	X
WST 30 X	30	38	30	73	19	25	25	X
WST 20 JX	20	32	34	77	16	23	40	JX
WST 30 JX	30	45	39	92	19	26	40	JX

WST...TR Reversible Top Angle Clamp

WST...TR Winkelklemmstück verstellbar

WST...TR 可逆トップ・アングル・クランプ



- Allows for top mounting of gripper arms or holders to frame profile
- Adjustable along the channel of the frame profile
- Allows for close mounting of clamps
- Reverse mounting offers 180° adjustability

	A	B	C	D	E	F	G	Profile
WST 10 L-TR	10	22	20	41	10	19	18	L
WST 10 X-TR	10	22	24	48	10	19	25	X
WST 14 X-TR	14	25	25	52	16	25	25	X
WST 20 X-TR	20	32	28	57	16	25	25	X
WST 30 X-TR	30	45	39	68	19	28	25	X
WST 20 JX-TR	20	32	35	80	16	20	40	JX
WST 30 JX-TR	30	45	39	85	19	28	40	JX

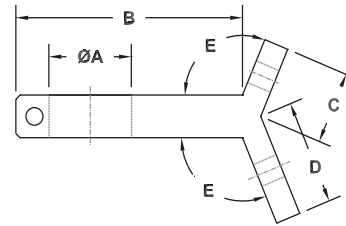


WSY... Y-Angle Clamp

WSY... Y-Klemmstück
WSY... アングル・クランプ



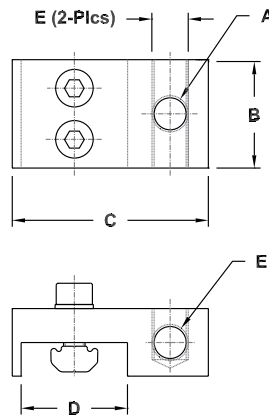
- Allows for sturdy offset mounting of extension arms and components to D profile
- Adjustable along the channel of the frame profile



Aluminum	A	B	C	D	E	Profile
WSY 20 D	20	55	17	25	113	D

WSS... Angle Connector

WSS... Winkelstück
WSS...アングル コネクタ

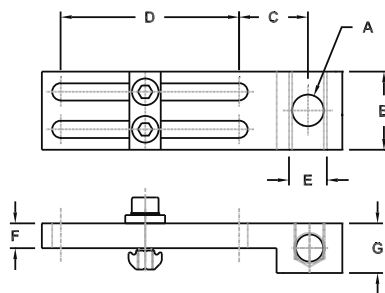


- Allows for low profile height by mounting vacuum cups directly to the frame profile
- Adjustable along the channel of the frame profile
- Extra port can connect vacuum to another cup

	A	B	C	D	E	Profile
WSS M5 L	M5	16	32	18	M5	L
WSS 1/8 X	G 1/8"	25	46	25	G 1/8"	X
WSS 1/4 X	G 1/4"	25	46	25	G 1/8"	X
WSS 1/4 JX	G 1/4"	32	65	40	G 1/8"	JX

WLS... Long Angle Connector

WLS... Winkelstück (lang)
WLS...ロングアングルコネクタ



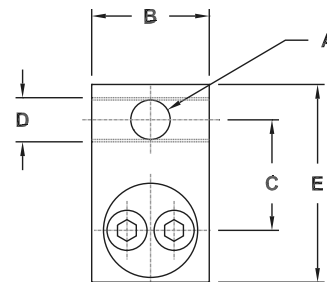
- Allows for low profile height by mounting vacuum cups directly to the frame profile
- Adjustable parallel and perpendicular to the frame profile
- Extra port can connect vacuum to another cup

	A	B	C	D	E	F	G	Profile
WLS M5	M5	16	16	45	M5	6	13	L/X
WLS 1/8	G 1/8"	25	23	57	G 1/8"	8	16	L/X/HX/D
WLS 1/4	G 1/4"	25	23	57	G 1/8"	8	16	L/X/JX/HX/D



WSD... Adjustable Angle Connector

WSD... Winkelstück 360° drehbar
WSD... 角度調整アングルコネクター

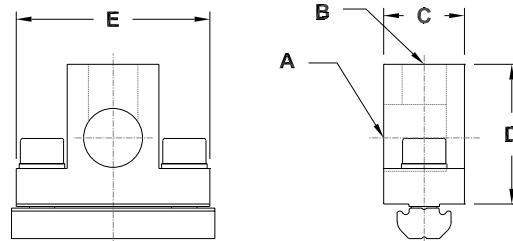


- Allows for low profile height by mounting vacuum cups directly to the frame profile
- Adjustable along the frame profile and at any rotational angle

	A	B	C	D	E	Angle	Profile
WSD M5	M5	16	16	M5	32	360	L/X
WSD 1/8	G 1/8"	25	23	G 1/8"	46	360	L/X/JX/HX/D
WSD 1/4	G 1/4"	25	23	G 1/8"	46	360	L/X/JX/HX/D

SAS... Vacuum Cup Connector

SAS... Saugeranschluss (seitlich)
SAS... 吸着パッドコネクター

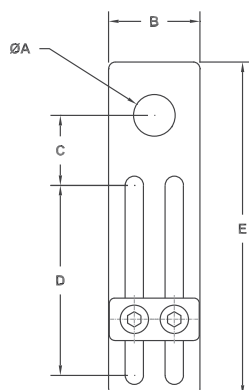


- Provides minimum profile height, allowing vacuum cups to be mounted to the side of the frame profile
- Adjustable along the channel of the frame profile

	A	B	C	D	E	Profile
SAS 1/8	G 1/8"	G 1/8"	16	25	38	L/X/D
SAS 1/4	G 1/4"	G 1/8"	16	25	38	X/JX/HX/D

WSF... Long Angle Plate

WSF... Befestigungsplatte (lang)
WSF... 長い角度版



- Mounts Grip-It! Vacuum Cup Holders to our standard frame profile

	A	B	C	D	E	Profile
WSF 10.5	11	27	21	57	100	L/X/JX/HX/D
WSF 12.5	13	27	21	57	100	L/X/JX/HX/D
WSF 16.5	17	27	21	57	100	L/X/JX/HX/D

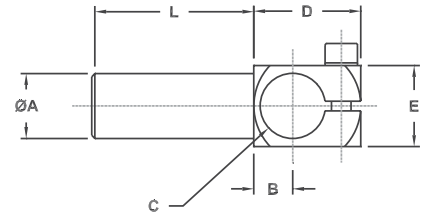


WKA... Angle Arm

WKA... Winkelarm
WKA...アングル アーム



- Extends and mounts components to mounting clamps
- Supplies 90° mounting with rotation



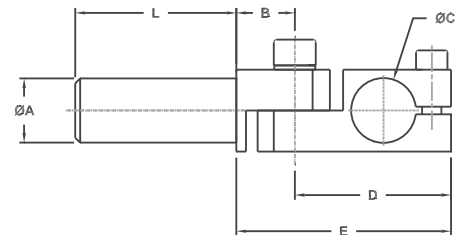
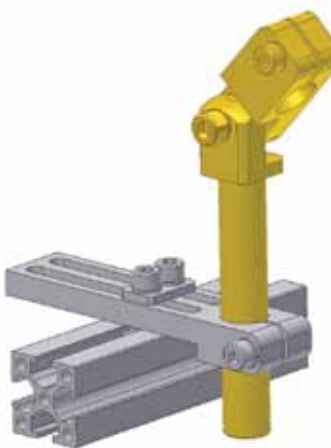
	A	B	C	D	E	L
WKA 10-90	10	13	10	20	16	90
WKA 14-120	14	9	14	25	22	120
WKA 20-150	20	21	20	33	25	150
WKA 30-200	30	30	30	48	32	200

GLA... Elbow Arm

GLA... Gelenkarm
GLA...エルボー アーム



- Angle adjustable elbow
- Useful for adjustment of GRZ gripper pliers and GRF gripper fingers



	A	B	C	D	E	L
GLA 10-90	10	11	10	27	40	90
GLA 14-120	14	16	14	43	54	120
GLA 20-150	20	18	20	46	64	150
GLA 20/30-150	20	17	30	52	77	150

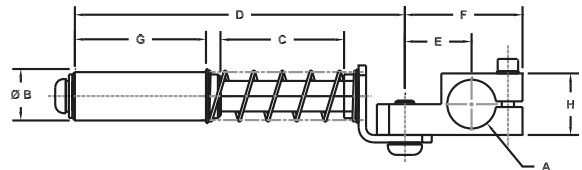


GGA... Spring Loaded Elbow Arm

GGA... Gelenkarm (gedeut)
GGA... スプリング負荷エルボ-アーム



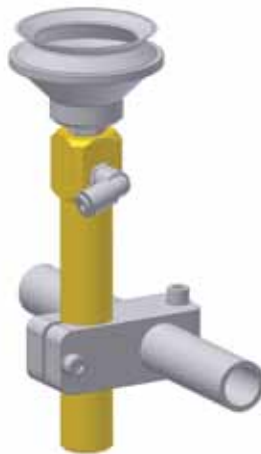
- Angle adjustable elbow arm
- Spring loaded for part compliance



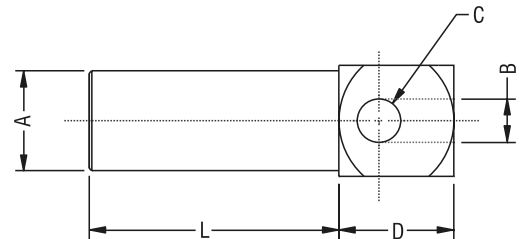
	A	B	C	D	E	F	G	H
GGA 14-C-15	14	14	15	75	23	40	32	19
GGA 14-C-40	14	14	40	100	23	40	32	19
GGA 20-C-20	20	20	20	107	28	49	55	25
GGA 20-C-50	20	20	50	137	28	49	55	25

GSE... Gripper Arm

GSE... Greifarm
GSE... ハンドアーム



- Extends and mounts vacuum cups to mounting clamps
- Side ported for quick-touch pneumatic hose connectors
- The recommended max torque is 50 in-lbs (5.6 N-m) on M5 screws when clamping on shafts.



	A	B	C	D	L
GSE 10-M5-90	10	M5	M5	10	90
GSE 10-1/8-90	10	G 1/8"	M5	10	90
GSE 14-120	14	G 1/8"	G 1/8"	22	120
GSE 20-150	20	G 1/4"	G 1/8"	30	150
GSE 30-200	30	G 1/4"	G 1/4"	30	200
GSE 30-3/8-200	30	G 3/8"	G 1/4"	30	200

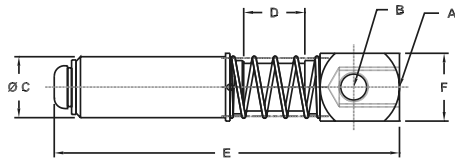


GAF... Spring Loaded Gripper Arm

GAF... Greifarm gefedert
GAF... スプリングハンドアーム



- Extends and mounts vacuum cups to mounting clamps
- Side ported for quick-touch pneumatic hose connectors
- Spring-loaded for part compliance
- Available with clampable shaft (C) and threaded shaft (M)
- Threaded shafts include jam nuts and lock washers for plate mounting



C-Type	A	B	C	D	E	F
GAF 10-C-10	M5	M5	10	10	60	13
GAF 14-C-15	G 1/8"	G 1/8"	14	15	72	16
GAF 14-C-40	G 1/8"	G 1/8"	14	40	100	16
GAF 20-C-20	G 1/4"	G 1/8"	20	20	109	22
GAF 20-C-50	G 1/4"	G 1/8"	20	50	143	22
GAF 30-C-40	G 3/8"	G 1/4"	30	80	180	32
GAF 30-C-80	G 3/8"	G 1/4"	30	80	180	32

M-Type	A	B	C	D	E	F
GAF 10-M-10	M5	M5	M10 X 1	10	60	13
GAF 14-M-15	G 1/8"	G 1/8"	M14 X 1.5	15	72	16
GAF 14-M-40	G 1/8"	G 1/8"	M14 X 1.5	40	100	16
GAF 20-M-20	G 1/4"	G 1/8"	M20 X 1.5	20	109	22
GAF 20-M-50	G 1/4"	G 1/8"	20	50	143	22
GAF 30-M-40	G 3/8"	G 1/4"	M30 X 1.5	40	152	32
GAF 30-M-80	G 3/8"	G 1/4"	M30 X 1.5	80	180	32

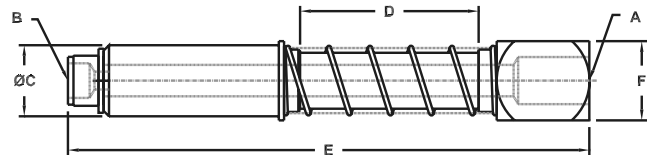


GEP... Spring Loaded Gripper Arm

GEP... Greifarm gefedert
GEP... スプリングハンドアーム



- Extends and mounts vacuum cups to mounting clamps
- End ported for quick-touch pneumatic hose connectors
- Spring-loaded for part compliance
- Available with clampable shaft (C) and threaded shaft (M)
- Threaded shafts include jam nuts and lock washers for plate mounting



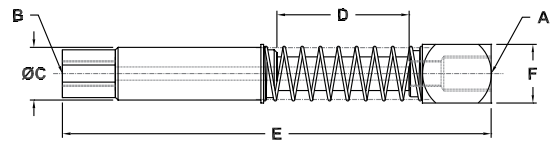
C-Type	A	B	C	D	E	F
GEP 10-C-10	M5	M5	10	10	64	13
GEP 14-C-15	G 1/8"	M5	14	15	84	16
GEP 14-C-40	G 1/8"	M5	14	40	109	16
GEP 20-C-20	G 1/4"	G 1/8"	20	20	116	22
GEP 20-C-50	G 1/4"	G 1/8"	20	50	146	22

M-Type	A	B	C	D	E	F
GEP 10-M-10	M5	M5	M10 X 1	10	64	13
GEP 14-M-15	G 1/8"	M5	M14 X 1.5	15	84	16
GEP 14-M-40	G 1/8"	M5	M14 X 1.5	40	109	16
GEP 20-M-20	G 1/4"	G 1/8"	M20 X 1.5	20	116	22
GEP 20-M-50	G 1/4"	G 1/8"	M20 X 1.5	50	146	22



GNE... Non-Rotational Gripper Arm

GNE... Greifarm verdrehgesichert
GNE... 非回転式グリップアーム



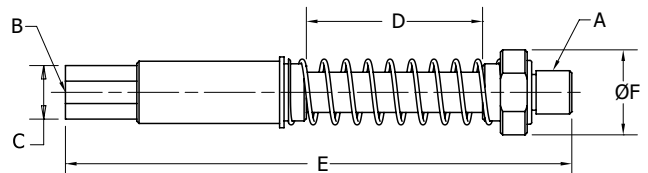
- Extends and mounts vacuum cups to mounting clamps
- End ported for quick-touch pneumatic hose connectors
- When clamping shafts, maximum recommended torque on M5 clamping screws is 50 in-lbs (5.6 N-m)
- Available with clampable shaft (C) and threaded shaft (M)
- Threaded shafts include jam nuts and lock washers for plate mounting

C-Type	A	B	ØC	D	E	F
GNE 14-C-15	G 1/8"	G 1/8"	14	15	93	16
GNE 14-C-40	G 1/8"	G 1/8"	14	40	118	16
GNE 20-C-20	G 1/4"	G 1/8"	20	20	132	22
GNE 20-C-50	G 1/4"	G 1/8"	20	50	162	22

M-Type	A	B	ØC	D	E	F
GNE 14-M-15	G 1/8"	G 1/8"	M14 x 1.5	15	93	16
GNE 14-M-40	G 1/8"	G 1/8"	M14 x 1.5	40	118	16

GSZ... Inline Spring Arm

GSZ... gefederter Angusszangenarm



Compatible with SAS GRZ 20-16... Sprue/Part Pliers, this spring loaded arm enables the GRZ to absorb the ejector stroke of the mold. Used when sprues and runner systems do not stay on the ejector pins after ejection from the mold.

Specifications:

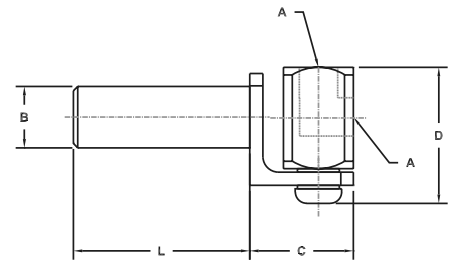
- Inline spring arm for GRZ 20-16... Part / Sprue Pliers
- End ported for quick- touch pneumatic hose connectors
- Available with clampable shafts (C) and threaded shaft (M)
- Threaded shafts include jam nut and lock washers for plate mounting

Type	A	B	C	D	E	F
GSZ 14-C-15	G 1/8	G 1/8	14	15	88	19
GSZ 14-C-40	G 1/8	G 1/8	14	15	113	19
GSZ 14-M-15	G 1/8	G 1/8	M14 x 1.5	40	88	19
GSZ 14-M-40	G 1/8	G 1/8	M14 x 1.5	40	113	19
GSZ 20-C-20	G 1/8	G 1/8	20	20	102	22
GSZ 20-M-20	G 1/8	G 1/8	M20 x 1.5	20	102	22



GGE... Elbow Gripper Arm

GGE... Gelenkgreifarm
GGE... センサー付ハンドアーム



	A	B	C	D	L
GGE 10-90	M5	10	17	24	90
GGE 14-120	G1/8"	14	24	31	120
GGE 20-150	G1/4"	20	30	40	150
GGE 30-200	G1/4"	30	33	45	200

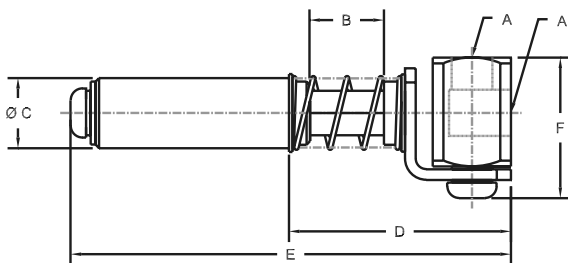
- Extends and mounts vacuum cups to mounting clamps
- Side ported for quick-touch pneumatic hose connectors
- Top bracket adjusts angle to match contour of part
- When clamping shafts, maximum recommended torque on M5 clamping screws is 50 in-lbs (5.6 N-m)
- One-piece arm for high strength applications
- "Green" EOAT application

GGS... Spring Loaded Non-Rotational Gripper Arm

GGS... Greifarm gefedert & verdrehgesichert



- Extends and mounts vacuum cups to mounting clamps
- SFX Type includes a proximity sensor for compliance and top of stack detection
- Side ported for quick-touch pneumatic hose connectors
- Top bracket adjusts angle to match contour of part
- Spring-loaded for part compliance
- Available with clampable shaft (C), threaded shaft (M), and Bearing Type (B)
- Threaded shafts include jam nuts and lock washers for plate mounting
- Bearing Type offers super smooth operation
- "Green" EOAT application



C-Type	A	B	C (Dia/Thread)	D	E	F
GGS 10-C-10	M5	10	10	34	64	22
GGS 14-C-15	G 1/8"	15	14	51	88	31
GGS 14-C-40	G 1/8"	40	14	76	113	31
GGS 14-C-40 SFX*	G 1/8"	40	14	76	113	31
GGS 20-C-20	G 1/4"	20	20	63	125	40
GGS 20-C-50	G 1/4"	50	20	93	155	40

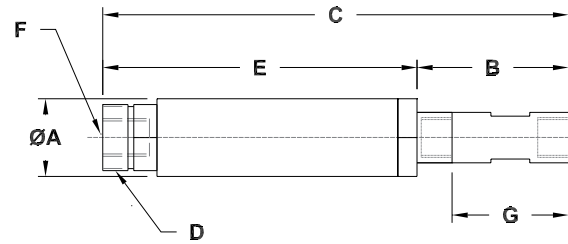
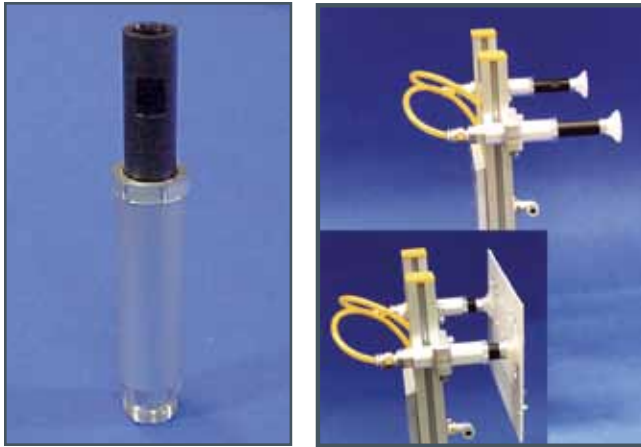
** With RRK-TL-W3MB1 Sensor
See "Sensors, Connectors, and Accessories" section* for sensor specifications and offerings.

M-Type	A	B	C (Dia/Thread)	D	E	F
GGS 10-M-10	M5	10	M10 X 1	34	64	22
GGS 14-M-15	G 1/8"	15	M14 X 1.5	51	88	31
GGS 14-M-40	G 1/8"	40	M14 X 1.5	76	113	31
GGS 20-M-20	G 1/4"	20	M20 X 1.5	63	125	40
GGS 20-M-50	G 1/4"	50	M20 X 1.5	93	155	40



RVA... Retracting Vacuum Arm

RVA... Vakuuarm, einziehbar
RVA... 吸着パッド取付伸縮アーム



- Used in conjunction with a vacuum cup to retract the work piece once vacuum is made
- Aids in insert molding, transfer molding, and short cycle molding
- Extendable for longer reach (using VLR)

	A	B	C	D	E	F	G (Stroke)
RVA 20-30	20	39	120	M17 x 1	81	G 1/8"	30
RVA 20-60	20	69	190	M17 x 1	121	G 1/8"	60
RVA 30-50	30	71	190	M27 x 1	119	G 1/8"	50



VACUUM CUP MATERIAL:

Chloroprene (C): Good wear resistance properties, O-zone resistant, -40° to 230°F (-40° to 110°C)

Polyurethane (P): Best wear resistance, super long life, oil resistant, -58° to 248°F (-50° to 120°C)

Nitril Rubber (N): Good wear resistance properties, oil resistant, -20° to 225°F (-29° to 107°C)

Silicone (S): Soft material, especially good for rough/textured surfaces, -86° to 392°F (-65° to 200°C)

Viton (V): High resistance against compression and tension, -23° to 446°F (-30° to 230°C)

Polyurethane (Pu): Soft polyurethane, best on textured surfaces, good wear resistance, oil resistant, -68° to 167°F (-55° to 75°C)

Duel Durometer Polyurethane (DDP): Soft seal with stiffer base, best on textured surfaces with high vacuum levels, good wear and oil resistance, -50° to 122°F (10° to 50°C)

LIFTING CAPACITY:

The lifting capacity of a vacuum cup can be theoretically determined at sea level by using the following formula:

$$C = \frac{.393 \times D^2 \times V}{N}$$

C = Lifting Capacity (lbs.)

D = Cup Diameter (in.)

V = Vacuum Level (in. Hg)

N = Desired Safety Factor

Safety factor for horizontal lifting applications should be at least (2). Vertical lifting applications should have a safety factor of at least (4).

SIZING VACUUM CUPS:

When sizing a vacuum cup there are three crucial factors to consider. These are vacuum level, number of cups, and the desired safety factor. Cup diameter can be determined by using the following formula:

$$D = 1.61 \times (\sqrt{M \times N} / \sqrt{V \times U})$$

D = Cup Diameter (in.)

M = Mass of lifting products (lbs.)

V = Vacuum Level (in. Hg)

N = Safety Factor

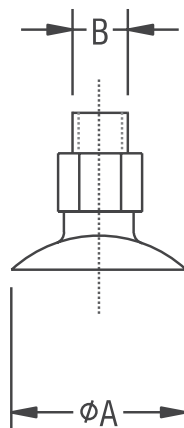
U = Number of Cups

VC 1... Flat Vacuum Cup

VC 1... Vakuumsauger (1 Kante)
VC 1... 標準パッド



- Flat cups for flat surfaces and high side loading
- Sealing ring included



CHLOROPRENE (C) CUP MATERIAL

Cup (w/ Adapter)	A	B	Price	Replacement Cup
VC 1-15-C5	15	M5	\$3.68	VCN 1-15-C
VC 1-20-C8	20	G 1/8"	\$7.40	VCN 1-20-C
VC 1-25-C8	25	G 1/8"	\$7.57	VCN 1-25-C
VC 1-30-C8	30	G 1/8"	\$7.84	VCN 1-30-C

NITRIL (N) CUP MATERIAL

Cup (w/ Adapter)	A	B	Price	Replacement Cup
VC 1-40-N4	40	G 1/4"	\$10.50	VCN 1-40-N
VC 1-50-N4	50	G 1/4"	\$12.64	VCN 1-50-N
VC 1-75-N4	75	G 1/4"	\$33.46	VCN 1-75-N
VC 1-110-N2	110	G 1/2"	\$47.08	VCN 1-110-N

SILICONE (S) CUP MATERIAL

Cup (w/ Adapter)	A	B	Price	Replacement Cup
VC 1-15-S5	15	M5	\$5.32	VCN 1-15-S
VC 1-20-S8	20	G 1/8"	\$8.94	VCN 1-20-S
VC 1-25-S8	25	G 1/8"	\$9.30	VCN 1-25-S
VC 1-30-S8	30	G 1/8"	\$9.51	VCN 1-30-S
VC 1-40-S4	40	G 1/4"	\$13.86	VCN 1-40-S
VC 1-50-S4	50	G 1/4"	\$19.16	VCN 1-50-S
VC 1-75-S4	75	G 1/4"	\$35.98	VCN 1-75-S
VC 1-110-S2	110	G 1/2"	\$70.18	VCN 1-110-S



VC 2... 1.5 BELLOWS VACUUM CUP / SUCTION CUP

VC 2... Vakuumsauger (1.5 Kanten)

VC 2... 段ジャバラパッド



- Bellow for part compliance
- Comes with sealing ring

CHLOROPRENE (C) CUP MATERIAL				
Cup (w/ Adapter)	A	B	Price	Replacement Cup
VC 2-10-C5	10	M5	\$4.72	VCN 2-10-C
VC 2-15-C5	15	M5	\$4.72	VCN 2-15-C
VC 2-20-C8	20	G 1/8"	\$9.38	VCN 2-20-C
VC 2-30-C4	30	G 1/4"	\$11.86	VCN 2-30-C
VC 2-40-C4	40	G 1/4"	\$13.64	VCN 2-40-C

NITRIL (N) CUP MATERIAL				
Cup (w/ Adapter)	A	B	Price	Replacement Cup
VC 2-50-N4	50	G 1/4"	\$15.80	VCN 2-50-N
VC 2-75-N4	75	G 1/4"	\$42.42	VCN 2-75-N
VC 2-110-N2	110	G 1/2"	\$61.26	VCN 2-110-N

SILICONE (S) CUP MATERIAL				
Cup (w/ Adapter)	A	B	Price	Replacement Cup
VC 2-10-S5	10	M5	\$7.74	VCN 2-10-S
VC 2-15-S5	15	M5	\$9.12	VCN 2-15-S
VC 2-20-S8	20	G 1/8"	\$13.62	VCN 2-20-S
VC 2-30-S8	30	G 1/8"	\$19.02	VCN 2-30-S
VC 2-40-S4	40	G 1/4"	\$21.52	VCN 2-40-S
VC 2-50-S4	50	G 1/4"	\$25.16	VCN 2-50-S
VC 2-75-S4	75	G 1/4"	\$55.86	VCN 2-75-S
VC 2-110-S2	110	G 1/2"	\$79.38	VCN 2-110-S

VC 3... 2.5 Bellows Vacuum Cup

VC 3... Vakuumsauger (2.5 Kanten)

VC 3... 段ジャバラパッド



- Multiple bellows for maximum part compliance
- Sealing ring included
- Works well on textured surfaces



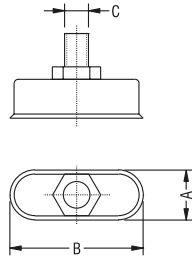
Polyurethane (DDP) Cup Material w/ Adapters				
Cup (w/ Adapter)	A	B	Price	Replacement Cup
VC 3-10-DDP5	10	M5	\$7.14	VCN 3-10-DDP
VC 3-15-DDP5	15	M5	\$8.49	VCN 3-15-DDP
VC 3-20-DDP8	20	G 1/8"	\$14.98	VCN 3-20-DDP
VC 3-25-DDP8	25	G 1/8"	\$19.96	VCN 3-25-DDP
VC 3-35-DDP4	35	G 1/4"	\$21.48	VCN 3-35-DDP
VC 3-52-DDP4	52	G 1/4"	\$25.16	VCN 3-52-DDP
VC 3-75-DDP3	75	G 3/8"	\$37.06	VCN 3-75-DDP
VC 3-110-DDP3	110	G 3/8"	\$86.54	VCN 3-110-DDP

* These cups are made of 30 Durometer Polyurethane on the bottom 1/2 bellow & 60 Durometer Polyurethane on the top two bellows.



VS 0... Oval Vacuum Cup / Suction Cup

VS 0...Vakuumsauger oval
VS 0...長円形パッド



- Oval cups for long narrow parts
- Sealing ring included

VSA Adapters

VSA 5	
VSA 10	
VSA 15	
VSA 20	
VSA 30	
VSA 40	
VSA 50	
VSA 70	
VSA 80	
VSA 90	
VSA 100	
VSA 110	
VSA 130	

Nitril (N) Cup Material						
Cup (w/ Adapter)	A	B	C	Price	Replacement Cup	Adapter
VS 0-2 x 4 N	2	4	M3	\$8.80	VN 0-2 x 4 N	VSA 5
VS 0-3.5 x 7 N	3.5	7	M3	\$8.02	VN 0-3.5 x 7 N	VSA 5
VS 0-5 x 15 N	5	15	M5	\$17.89	VN 0-5 x 15 N	VSA 15
VS 0-6 x 18 N	6	18	M5	\$19.12	VN 0-6 x 18 N	VSA 15
VS 0-8 x 24 N	8	24	G 1/8"	\$20.56	VN 0-8 x 24 N	VSA 20
VS 0-10 x 30 N	10	30	G 1/8"	\$28.17	VN 0-10 x 30 N	VSA 20
VS 0-15 x 45 N	15	45	G 1/4"	\$16.18	VN 0-15 x 45 N	VSA 130
VS 0-20 x 60 N	20	60	G 1/4"	\$32.24	VN 0-20 x 60 N	VSA 130
VS 0-25 x 75 N	25	75	G 1/4"	\$33.82	VN 0-25 x 75 N	VSA 130
VS 0-30 x 90 N	30	90	G 1/4"	\$37.86	VN 0-30 x 90 N	VSA 130

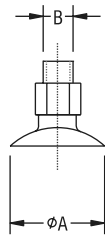
Silicone (S) Cup Material						
Cup (w/ Adapter)	A	B	C	Price	Replacement Cup	Adapter
VS 0-2 X 4 S	2	4	M3	\$10.20	VN 0-2 x 4 S	VSA 5
VS 0-3.5 x 7 S	3.5	7	M3	\$10.20	VN 0-3.5 x 7 S	VSA 5
VS 0-5 x 15 S	5	15	M5	\$16.34	VN 0-5 x 15 S	VSA 15
VS 0-6 x 18 S	6	18	M5	\$15.56	VN 0-6 x 18 S	VSA 15
VS 0-8 x 24 S	8	24	G 1/8"	\$19.69	VN 0-8 x 24 S	VSA 20
VS 0-10 x 30 S	10	30	G 1/8"	\$37.80	VN 0-10 x 30 S	VSA 20
VS 0-15 x 45 S	15	45	G 1/4"	\$18.71	VN 0-15 x 45 S	VSA 130
VS 0-20 x 60 S	20	60	G 1/4"	\$39.00	VN 0-20 x 60 S	VSA 130
VS 0-25 x 75 S	25	75	G 1/4"	\$34.42	VN 0-25 x 75 S	VSA 130
VS 0-30 x 90 S	30	90	G 1/4"	\$39.42	VN 0-30 x 90 S	VSA 130

VS 1... Flat Vacuum Cup / Suction Cup

VS 1... Vakuumsauger (1 Kante)
VS 1...標準パッド



- Flat cups for flat surfaces and high side loading
- Sealing ring included



Nitril (N) Cup Material				
Cup (w/ Adapter)	A	B	Replacement Cup	Adapter
VS 1-2-N5	2	M5	VN 1-2-N	VSA 10
VS 1-3.5-N5	3.5	M5	VN 1-3.5-N	VSA 10
VS 1-5-N5	5	M5	VN 1-5-N	VSA 30
VS 1-8-N5	8	M5	VN 1-8-N	VSA 30
VS 1-10-N5	10	M5	VN 1-10-N	VSA 30
VS 1-15-N5	15	M5	VN 1-15-N	VSA 30
VS 1-20-N8	20	G 1/8"	VN 1-20-N	VSA 50
VS 1-25-N8	25	G 1/8"	VN 1-25-N	VSA 50
VS 1-30-N8	30	G 1/8"	VN 1-30-N	VSA 50
VS 1-40-N8	40	G 1/8"	VN 1-40-N	VSA 50
VS 1-50-N8	50	G 1/8"	VN 1-50-N	VSA 80
VS 1-60-N4	60	G 1/4"	VN 1-60-N	VSA 110
VS 1-80-N4	80	G 1/4"	VN 1-80-N	VSA 110
VS 1-95-N4	95	G 1/4"	VN 1-95-N	VSA 110

Silicone (S) Cup Material				
Cup (w/ Adapter)	A	B	Replacement Cup	Adapter
VS 1-2-S5	2	M5	VN 1-2-S	VSA 10
VS 1-3.5-S5	3.5	M5	VN 1-3.5-S	VSA 10
VS 1-5-S5	5	M5	VN 1-5-S	VSA 30
VS 1-8-S5	8	M5	VN 1-8-S	VSA 30
VS 1-10-S5	10	M5	VN 1-10-S	VSA 30
VS 1-15-S5	15	M5	VN 1-15-S	VSA 30
VS 1-20-S8	20	G 1/8"	VN 1-20-S	VSA 50
VS 1-25-S8	25	G 1/8"	VN 1-25-S	VSA 50
VS 1-30-S8	30	G 1/8"	VN 1-30-S	VSA 50
VS 1-40-S8	40	G 1/8"	VN 1-40-S	VSA 50
VS 1-50-S8	50	G 1/8"	VN 1-50-S	VSA 80
VS 1-60-S4	60	G 1/4"	VN 1-60-S	VSA 110
VS 1-80-S4	80	G 1/4"	VN 1-80-S	VSA 110
VS 1-95-S4	95	G 1/4"	VN 1-95-S	VSA 110

Polyurethane (P) Cup Material					
Cup (w/ Adapter)	A	B	Replacement Cup	Adapter	Adapter
VS 1-2-P5	2	M5	VN 1-2-P		VSA 10
VS 1-3.5-P5	3.5	M5	VN 1-3.5-P		VSA 10
VS 1-5-P5	5	M5	VN 1-5-P		VSA 30
VS 1-8-P5	8	M5	VN 1-8-P		VSA 30
VS 1-10-P5	10	M5	VN 1-10-P		VSA 30
VS 1-15-P5	15	M5	VN 1-15-P		VSA 30
VS 1-20-P8	20	G 1/8"	VN 1-20-P		VSA 50
VS 1-25-P8	25	G 1/8"	VN 1-25-P		VSA 50
VS 1-30-P8	30	G 1/8"	VN 1-30-P		VSA 50
VS 1-40-P8	40	G 1/8"	VN 1-40-P		VSA 50
VS 1-50-P8	50	G 1/8"	VN 1-50-P		VSA 80
VS 1-60-P4	60	G 1/4"	VN 1-60-P		VSA 110
VS 1-80-P4	80	G 1/4"	VN 1-80-P		VSA 110
VS 1-95-P4	95	G 1/4"	VN 1-95-P		VSA 110

Viton (V) Vacuum Cups w/ adapters				
Cup (w/ Adapter)	A	B	Replacement Cup	Adaptor
VS 1-8-V5	8	M5	VN 1-8-V	VSA 30
VS 1-10-V5	10	M5	VN 1-10-V	VSA 30
VS 1-20-V8	20	G 1/8"	VN 1-20-V	VSA 50
VS 1-25-V8	25	G 1/8"	VN 1-25-V	VSA 50
VS 1-30-V8	30	G 1/8"	VN 1-30-V	VSA 50
VS 1-40-V8	40	G 1/8"	VN 1-40-V	VSA 50
VS 1-50-V8	50	G 1/8"	VN 1-50-V	VSA 80



VS 2... 1.5 Bellows Vacuum Cup / Suction Cup

VS 2... Vakuumsauger (2 Kanten)
VS 2... 段ジャバラパッド



- Bellow for part compliance
- Sealing ring included



Nitril (N) Cup Material					
Cup (w/ Adapter)	A	B	Replacement Cup	Adapter	
VS 2-10-N5	10	M5	VN 2-10-N	VSA 30	
VS 2-15-N5	15	M5	VN 2-15-N	VSA 30	
VS 2-20-N8	20	G 1/8"	VN 2-20-N	VSA 50	
VS 2-30-N8	30	G 1/8"	VN 2-30-N	VSA 50	
VS 2-40-N8	40	G 1/8"	VN 2-40-N	VSA 50	
VS 2-50-N8	50	G 1/8"	VN 2-50-N	VSA 80	
VS 2-75-N4	75	G 1/4"	VN 2-75-N	VSA 110	

Silicone (S) Cup Material					
Cup (w/ Adapter)	A	B	Replacement Cup	Adapter	
VS 2-10-S5	10	M5	VN 2-10-S	VSA 30	
VS 2-15-S5	15	M5	VN 2-15-S	VSA 30	
VS 2-20-S8	20	G 1/8"	VN 2-20-S	VSA 50	
VS 2-30-S8	30	G 1/8"	VN 2-30-S	VSA 50	
VS 2-40-S8	40	G 1/8"	VN 2-40-S	VSA 50	
VS 2-50-S8	50	G 1/8"	VN 2-50-S	VSA 80	
VS 2-75-S4	75	G 1/4"	VN 2-75-S	VSA 110	

Polyurethane (P) Cup Material					
Cup (w/ Adapter)	A	B	Replacement Cup	Adapter	
VS 2-10-P5	10	M5	VN 2-10-P	VSA 30	
VS 2-15-P5	15	M5	VN 2-15-P	VSA 30	
VS 2-20-P8	20	G 1/8"	VN 2-20-P	VSA 50	
VS 2-30-P8	30	G 1/8"	VN 2-30-P	VSA 50	
VS 2-40-P8	40	G 1/8"	VN 2-40-P	VSA 50	
VS 2-50-P8	50	G 1/8"	VN 2-50-P	VSA 80	
VS 2-75-P4	75	G 1/4"	VN 2-75-P	VSA 110	

VS 3... 2.5 Bellows Vacuum Cup / Suction Cup

VS 3... Vakuumsauger (2.5 Kanten)
VS 3... 段ジャバラパッド



- Multiple bellows for maximum compliance
- Sealing ring included



Nitril (N) Cup Material					
Cup (w/Adapter)	A	B	Replacement Cup	Adapter	
VS 3-5-N5	5	M5	VN 3-5-N	VSA 30	
VS 3-8-N5	8	M5	VN 3-8-N	VSA 30	
VS 3-10-N5	10	M5	VN 3-10-N	VSA 40	
VS 3-10-N8	10	G 1/8"	VN 3-10-N	VSA 70	
VS 3-15-N5	15	M5	VN 3-15-N	VSA 40	
VS 3-15-N8	15	G 1/8"	VN 3-15-N	VSA 70	
VS 3-18-N5	18	M5	VN 3-18-N	VSA 40	
VS 3-18-N8	18	G 1/8"	VN 3-18-N	VSA 70	
VS 3-20-N5	20	M5	VN 3-20-N	VSA 40	
VS 3-20-N8	20	G 1/8"	VN 3-20-N	VSA 70	
VS 3-30-N8	30	G 1/8"	VN 3-30-N	VSA 90	
VS 3-40-N8	40	G 1/8"	VN 3-40-N	VSA 90	
VS 3-60-N8	60	G 1/8"	VN 3-60-N	VSA 90	
VS 3-90-N4	90	G 1/4"	VN 3-90-N	VSA 100	

Cup (w/Adapter)	A	B	Price	Replacement Cup	Adapter
VS 3-5-S5	5	M5		VN 3-5-S	VSA 30
VS 3-8-S5	8	M5		VN 3-8-S	VSA 30
VS 3-10-S5	10	M5		VN 3-10-S	VSA 40
VS 3-10-S8	10	G 1/8"		VN 3-10-S	VSA 70
VS 3-15-S5	15	M5		VN 3-15-S	VSA 40
VS 3-15-S8	15	G 1/8"		VN 3-15-S	VSA 70
VS 3-18-S5	18	M5		VN 3-18-S	VSA 40
VS 3-18-S8	18	G 1/8"		VN 3-18-S	VSA 70
VS 3-20-S5	20	M5		VN 3-20-S	VSA 40
VS 3-20-S8	20	G 1/8"		VN 3-20-S	VSA 70
VS 3-30-S8	30	G 1/8"		VN 3-30-S	VSA 90
VS 3-40-S8	40	G 1/8"		VN 3-40-S	VSA 90
VS 3-60-S8	60	G 1/8"		VN 3-60-S	VSA 90
VS 3-90-S4	90	G 1/4"		VN 3-90-S	VSA 100

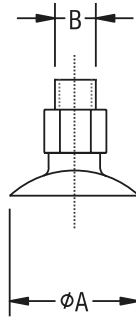
Polyurethane (P) Cup Material					
Cup (w/Adapter)	A	B	Replacement Cup	Adapter	
VS 3-5-P5	5	M5	VN 3-5-P	VSA 30	
VS 3-8-P5	8	M5	VN 3-8-P	VSA 30	
VS 3-10-P5	10	M5	VN 3-10-P	VSA 40	
VS 3-10-P8	10	G 1/8"	VN 3-10-P	VSA 70	
VS 3-15-P5	15	M5	VN 3-15-P	VSA 40	
VS 3-15-P8	15	G 1/8"	VN 3-15-P	VSA 70	
VS 3-18-P5	18	M5	VN 3-18-P	VSA 40	
VS 3-18-P8	18	G 1/8"	VN 3-18-P	VSA 70	
VS 3-20-P5	20	M5	VN 3-20-P	VSA 40	
VS 3-20-P8	20	G 1/8"	VN 3-20-P	VSA 70	
VS 3-30-P8	30	G 1/8"	VN 3-30-P	VSA 90	
VS 3-40-P8	40	G 1/8"	VN 3-40-P	VSA 90	
VS 3-60-P8	60	G 1/8"	VN 3-60-P	VSA 90	

Silicone (P) Cup Material



VCF 1... Flat Vacuum Cup / Suction Cup

VCF 1..Vakuumsauger (1 Kanten)



Polyurethane Cup Material w/ Adapters			
	A	B	
VCF 1-35-P3	35	G 3/8"	
VCF 1-50-P3	50	G 3/8"	
VCF 1-75-P3	75	G 3/8"	
VCF 1-100-P3	100	G 3/8"	
VCF 1-125-P3	125	G 3/8"	

VCF 2... Bellows Vacuum Cup / Suction Cup

VCF 2..Vakuumsauger (1.5 Kanten)



Polyurethane Cup Material w/ Adapters			
	A	B	
VCF 2-40-P3	40	G 3/8"	
VCF 2-60-P3	60	G 3/8"	
VCF 2-80-P3	80	G 3/8"	
VCF 2-110-P3	110	G 3/8"	

VAF... Bellows Vacuum Cup / Suction Cup w/Adapter

VAF... Vakuumsauger
VAF... 伸縮パッド (取付金具付)



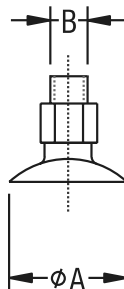
- Compression molded for long life
- Extremely reliable and durable
- 1.5 or 2.5 bellows for part compliance
- Sealing ring included

	Material	A	B
VAF 20 Pu	Polyurethane (Pu)	20	G 1/8"
VAF 30 Pu	Polyurethane (Pu)	30	G 1/8"
VAF 55 Pu C*	Polyurethane (Pu)	55	G 1/8"

*Includes clamp

VAS... Flat Vacuum Cup / Suction Cup w/Adapter

VAS... Vakuumsauger
VAS... 標準パッド (取付金具付)



- Compression molded for long life
- Extremely reliable and durable, high rigidity
- Flat cups for flat surfaces or raised cups (H) for curved surfaces
- Sealing ring included

	Material	A	B
VAS 15 Pu	Polyurethane (Pu)	15	G 1/8"
VAS 20 Pu	Polyurethane (Pu)	20	G 1/8"
VAS 30 Pu	Polyurethane (Pu)	30	G 1/8"
VAS 30 Pu/H (Curved Surface)	Polyurethane (Pu)	30	G 1/8"
VAS 50 Pu	Polyurethane (Pu)	50	G 1/8"
VAS 50 Pu/H (Curved Surface)	Polyurethane (Pu)	50	G 1/8"
VAS 70 SBR*	Buna SBR	70	G 1/4"
VAS 80 Pu	Polyurethane (Pu)	80	G 1/4"

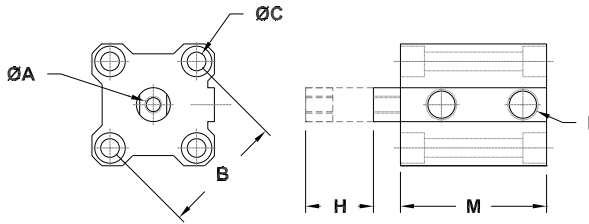
*Reference Nitril (N) for Material Properties



真空発生器、レギュレータ、および付属部品

KHZ... Short Stroke Cylinder

KHZ... Kurzhubzylinder
KHZ... ショートストロークシリンダー



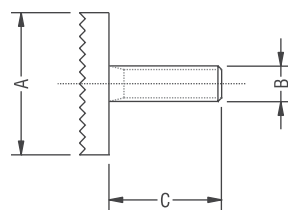
- Cylinders for applications such as applying side pressure
- Single and Double acting cylinders available
- Available with or without sensor capability

	Cyl. Bore	A	B	C	D	H (Stroke)	M	Action	Sensor Capable*
KHZ 12-5-E	12	M3x0.5	22	3.5 / 6.5 Depth 3.5	M5	5	20.5	Single	~
KHZ 12-5-D	12	M3x0.5	22	3.5 / 6.5 Depth 3.5	M5	5	20.5	Double	~
KHZ 12-5-D-A	12	M3x0.5	22	3.5 / 6.5 Depth 3.5	M5	5	31.5	Double	Yes
KHZ 12-10-E	12	M3x0.5	22	3.5 / 6.5 Depth 3.5	M5	10	20.5	Single	~
KHZ 12-10-D	12	M3x0.5	22	3.5 / 6.5 Depth 3.5	M5	10	20.5	Double	~
KHZ 12-10-D-A	12	M3x0.5	22	3.5 / 6.5 Depth 3.5	M5	10	31.5	Double	Yes
KHZ 20-5-E	20	M5x0.8	36	5.5 / 9 Depth 7	M5	5	24	Single	~
KHZ 20-5-D	20	M5x0.8	36	5.5 / 9 Depth 7	M5	5	24	Double	~
KHZ 20-5-D-A	20	M5x0.8	36	5.5 / 9 Depth 7	M5	5	36	Double	Yes
KHZ 20-10-E	20	M5x0.8	36	5.5 / 9 Depth 7	M5	10	24	Single	~
KHZ 20-10-D	20	M5x0.8	36	5.5 / 9 Depth 7	M5	10	24	Double	~
KHZ 20-10-D-A	20	M5x0.8	36	5.5 / 9 Depth 7	M5	10	36	Double	Yes
KHZ 20-20-D	20	M5x0.8	36	5.5 / 9 Depth 7	M5	20	24	Double	~
KHZ 20-20-D-A	20	M5x0.8	36	5.5 / 9 Depth 7	M5	20	36	Double	Yes
KHZ 20-30-D	20	M5x0.8	36	5.5 / 9 Depth 7	M5	30	24	Double	~
KHZ 20-30-D-A	20	M5x0.8	36	5.5 / 9 Depth 7	M5	30	36	Double	Yes
KHZ 32-5-E	32	M8x1.25	48	5.5 / 9 Depth 7	G 1/8"	5	30	Single	~
KHZ 32-5-D	32	M8x1.25	48	5.5 / 9 Depth 7	G 1/8"	5	30	Double	~
KHZ 32-5-D-A	32	M8x1.25	48	5.5 / 9 Depth 7	G 1/8"	5	40	Double	Yes
KHZ 32-10-E	32	M8x1.25	48	5.5 / 9 Depth 7	G 1/8"	10	30	Single	~
KHZ 32-10-D	32	M8x1.25	48	5.5 / 9 Depth 7	G 1/8"	10	30	Double	~
KHZ 32-10-D-A	32	M8x1.25	48	5.5 / 9 Depth 7	G 1/8"	10	40	Double	Yes
KHZ 32-20-D	32	M8x1.25	48	5.5 / 9 Depth 7	G 1/8"	20	30	Double	~
KHZ 32-20-D-A	32	M8x1.25	48	5.5 / 9 Depth 7	G 1/8"	20	40	Double	Yes
KHZ 32-30-D	32	M8x1.25	48	5.5 / 9 Depth 7	G 1/8"	30	30	Double	~
KHZ 32-30-D-A	32	M8x1.25	48	5.5 / 9 Depth 7	G 1/8"	30	40	Double	Yes

* Available sensors are RRK-93 & RRK-F9P.
See "Sensors, Connectors, and Accessories" section for sensor specifications and offerings.

DPL... Pressure Plate

DPL... Druckplatte
DPL... 圧カプレート



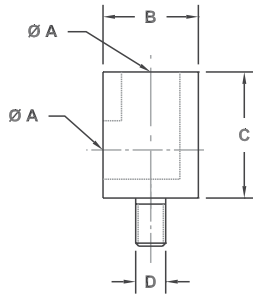
- Pad plates for KHZ cylinders or GRF gripper fingers
- DPL 25's are rubberized to protect parts

	A	B	C	Face Material
DPL 12-3	12	M3	9	Steel
DPL 25-3	25	M3	7	Rubber
DPL 25-4	25	M4	13	Rubber
DPL 25-5	25	M5	13	Rubber



AVI... Vacuum Cup Adaptor

AVI...Adapter für Vakuumsauger
AVI.... 真空カップ・アダプ

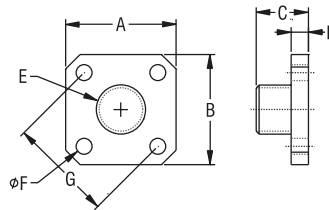


- Mounts a vacuum cup / suction cup to a KHZ short stroke cylinder
- Used to secure parts with edges perpendicular to the mold face

	A	B	C	D
AVI 5I-8-3	M5	10	12	M3 x .5
AVI 1/8I-16-5	G 1/8"	16	21	M5 x .8
AVI 1/8I-16-8	G 1/8"	16	21	M8 x 1.25
AVI 1/4I-16-8	G 1/4"	19	26	M8 x 1.25

ADZ... Short Stroke Cylinder Adapter

ADZ... Adapter für Kurzhub bzw. Sonderzylinder
ADZ... ショートストロークシリンダー用アダプター



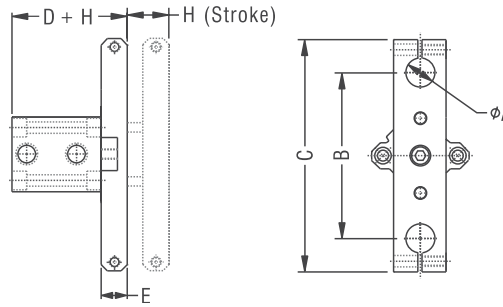
- Allows KHZ cylinders to attach to standard VLR Arm Extensions and mount in standard mounting clamps

	Cylinder	A	B	C	D	E	F	G	Extension
ADZ 14-12	KHZ 12...	25	25	18	6	M12 x 1	M3	22	VLR 14
ADZ 20-20	KHZ 20...	38	38	18	6	M17 x 1	M5	36	VLR 20
ADZ 20-32	KHZ 32...	45	45	18	6	M17 x 1	M5	48	VLR 20
ADZ 30-32	KHZ 32...	45	45	18	6	M27 x 1	M5	48	VLR 30

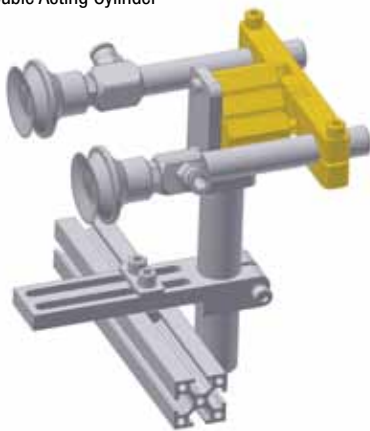


SZD... Special Cylinder

SZD... Sonderzylinder
SZD... 特殊シリンダー



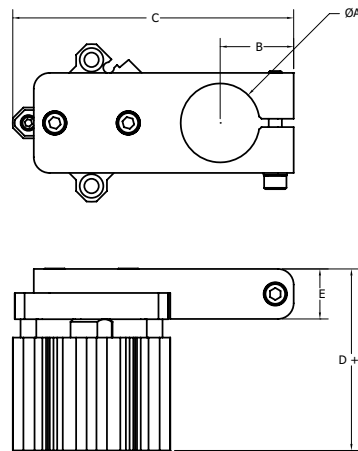
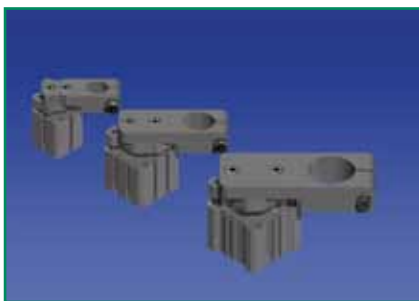
- Perfect for securing sides or flexing parts
- Usually utilized with GSE arms and vacuum cups or GRF gripper fingers (not included)
- Available with or without sensors
- Double Acting Cylinder



	Cylinder Bore	A	B	C	D	E	H (Stroke)	Sensor Capable*
SZD 12-10	12	10	55	81	30	10	10	~
SZD 12-10-A	12	10	55	81	35	10	10	Yes*
SZD 12-20	12	10	55	81	30	10	20	~
SZD 12-20-A	12	10	55	81	35	10	20	Yes*
SZD 20-10	20	14	80	112	37	13	10	~
SZD 20-10-A	20	14	80	112	47	13	10	Yes*
SZD 20-20	20	14	80	112	37	13	20	~
SZD 20-20-A	20	14	80	112	47	13	20	Yes*
SZD 20-30	20	14	80	112	37	13	30	~
SZD 20-30-A	20	14	80	112	47	13	30	Yes*
SZD 20-40	20	14	80	112	37	13	40	~
SZD 20-40-A	20	14	80	112	47	13	40	Yes*
SZD 20-50	20	14	80	112	37	13	50	~
SZD 20-50-A	20	14	80	112	47	13	50	Yes*
SZD 32-10	32	20	120	180	46	16	10	~
SZD 32-10-A	32	20	120	180	56	16	10	Yes*
SZD 32-20	32	20	120	180	46	16	20	~
SZD 32-20-A	32	20	120	180	56	16	20	Yes*
SZD 32-30	32	20	120	180	46	16	30	~
SZD 32-30-A	32	20	120	180	56	16	30	Yes*
SZD 32-40	32	20	120	180	46	16	40	~
SZD 32-40-A	32	20	120	180	56	16	40	Yes*
SZD 32-50	32	20	120	180	46	16	50	~
SZD 32-50-A	32	20	120	180	56	16	50	Yes*

* Available sensors are RRK-93 & RRK-F9P.
See "Sensors, Connectors, and Accessories" section for sensor specifications and offerings.

SZS... Special Cylinder



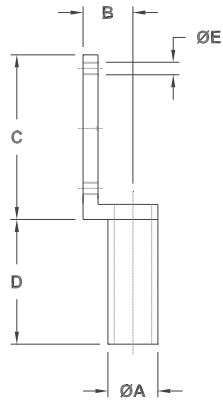
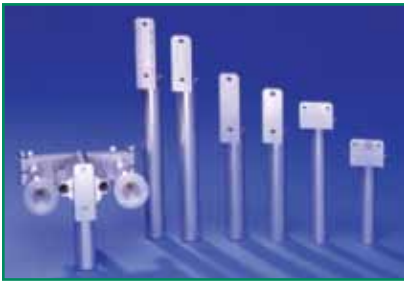
- Perfect for securing sides or flexing parts
- Usually utilized with GSE arms and vacuum cups or GRF gripper fingers (not included)
- Available with or without sensors
- Double Acting Cylinder

	A	B	C	D	E	H (Stroke)	Sensor Capable
SZS 12-10-14	14	15	56	44	13	10	~
SZS 12-10-14 A	14	15	56	49	13	10	Yes
SZS 12-20-14	14	15	56	54	13	20	~
SZS 12-20-14 A	14	15	56	59	13	20	Yes
SZS 20-10-20	20	19	79	50	16	10	~
SZS 20-10-20 A	20	19	79	60	16	10	Yes
SZS 20-20-20	20	19	79	60	16	20	~
SZS 20-20-20 A	20	19	79	70	16	20	Yes
SZS 20-30-20	20	19	79	70	16	30	~
SZS 20-30-20 A	20	19	79	80	16	30	Yes
SZS 20-40-20	20	19	79	80	16	40	~
SZS 20-40-20 A	20	19	79	90	16	40	Yes
SZS 20-50-20	20	19	79	90	16	50	~
SZS 20-50-20 A	20	19	79	100	16	50	Yes
SZS 32-10-30	30	28	107	60	19	10	~
SZS 32-10-30 A	30	28	107	70	19	10	Yes
SZS 32-20-30	30	28	107	70	19	20	~
SZS 32-20-30 A	30	28	107	80	19	20	Yes
SZS 32-30-30	30	28	107	80	19	30	~
SZS 32-30-30 A	30	28	107	90	19	30	Yes
SZS 32-40-30	30	28	107	90	19	40	~
SZS 32-40-30 A	30	28	107	100	19	40	Yes
SZS 32-50-30	30	28	107	100	19	50	~
SZS 32-50-30 A	30	28	107	110	19	50	Yes



GAZ... Special Cylinder Mounting Arm

GAZ... Greifarm für Kurzhub bzw. Sonderzylinder
GAZ... 特殊シリンダー取付アーム



	A	B	C	D	E	L	Cylinder
GAZ 12-10-90	10	15	25	90	M3	90	SZD 12 / KHZ 12
GAZ 12-14-120	14	15	25	120	M3	120	SZD 12 / KHZ 12
GAZ 20-20-150	20	13	59	150	M5	150	SZD 20 / KHZ 20
GAZ 32-20-150	20	13	64	150	M5	150	SZD 32 / KHZ 32

- Mounts SZS Special Cylinders and KHZ Short Stroke Cylinders to our Standard Mounting Clamps and Gripper Mounting Arms.



VBH... Vacuum Generator with One-Touch Fitting

VBH... Vakuumpgeneratoren mit Schnellverschlusskupplungen

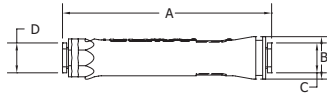
VBH... 真空発生器



- Compact lightweight vacuum generator
- Built in muffler to reduce noise
- "S" version comes with NO/NC vacuum switch
- 6mm one-touch tubing connection
- Can be used with PNP or NPN

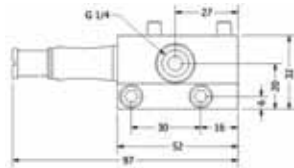
	Supply Pressure (Optimal)	Vacuum Pressure (Max.)	Air Consumption	Vacuum Flow
VBH 10-66P	5 bar (72 psi)	-0.9 bar (-13.5 psi)	28 L/min (1 scfm)	75 L/min (2.7 scfm)
VBH 10-66S				

VGI... Inline Vacuum Generator

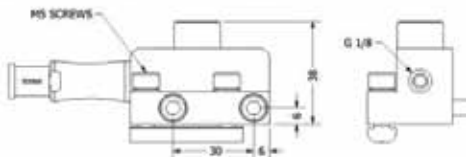


	A	B	C	D	Supply Pressure (Optimal)	Vacuum Pressure (Max.)	Air Consumption
VGI 1-6-6 SI	70	15	6	6	6 bar (87 psi)	-0.8 bar (-12 psi)	7.1 l/m (.25 scfm)
VGI 1-6-6 XI	70	15	6	6	5 bar (72.5 psi)	-0.9 bar (-13 psi)	8.6 l/m (.3 scfm)
VGI 2-6-6 SI	96	19	6	6	6 bar (87 psi)	-0.8 bar (-12 psi)	25.7 l/m (.9 scfm)
VGI 2-6-6 XI	96	19	6	6	5 bar (72.5 psi)	-0.9 bar (-13 psi)	28.6 l/m (1 scfm)
VGI 2-8-8 SI	96	19	8	8	6 bar (87 psi)	-0.8 bar (-12 psi)	25.7 l/m (.9 scfm)
VGI 2-8-8 XI	96	19	8	8	5 bar (72.5 psi)	-0.9 bar (-13 psi)	28.6 l/m (1 scfm)
VGI 3-8-12 SI	155	26	8	12	6 bar (87 psi)	-0.8 bar (-12 psi)	106 l/m (3.7 scfm)
VGI 3-8-12 XI	155	26	8	12	5 bar (72.5 psi)	-0.9 bar (-13 psi)	111 l/m (3.9 scfm)

GFD... 1/4 MINI Vacuum Manifold



		Vacuum Flow											
Feed Pressure MPa	Air Consumption NI/s	Vacuum flow (NI/s) at different vacuum levels (-kPa)									Max Vacuum (-kPa)		
0.04	0.31	0	10	20	30	40	50	60	70		60		
		1.1	0.57	0.36	0.26	0.18	0.09	-	-				
		0.05	0.38	1.23	0.65	0.46	0.29	0.23	0.15	0.08		0.01	70
		0.06	0.44	1.34	0.73	0.55	0.35	0.23	0.17	0.13		0.08	75
		Evacuation Time											
Feed Pressure MPa	Air Consumption NI/s	Vacuum flow (NI/s) at different vacuum levels (-kPa)									Max Vacuum (-kPa)		
0.04	0.31	0	10	20	30	40	50	60	70		60		
		-	0.12	0.33	0.66	1.1	1.9	-	-				
		0.05	0.38	-	0.11	0.29	0.55	0.9	1.5	2.3		4.6	70
		0.06	0.44	-	0.1	0.25	0.48	0.8	1.3	2		2.9	75



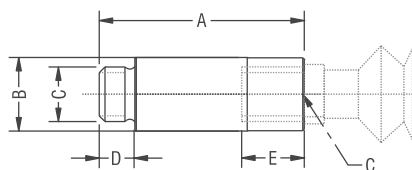
- Integrated three-stage vacuum cartridge - MINI - with extra high initial vacuum flow.
- Large vacuum flow in relation to energy consumption. Good for handling porous materials or if surface leakage is present.
- Recommended for high speed applications.
- Comes with hardware for mounting directly to SAS aluminum profiles

GFD 1/4 MINI Vacuum Manifold

VCV... Vacuum Check Valve

VCV... Strömungsventil

VCV ... チェックバルブ



	A	B	C	D	E
VCV 1/8	36	13	G 1/8"	6.5	11
VCV 1/4	38	18	G1/4"	8.5	11

- Closes automatically if attached vacuum cups fail to secure the part, thus ensuring the efficiency of the remaining cups
- Inserted between the cup and the mounting arm



RC... Compact Air Regulator

RC... Kompakter Druckluftregler
RC... ミニチュアレギュレーター

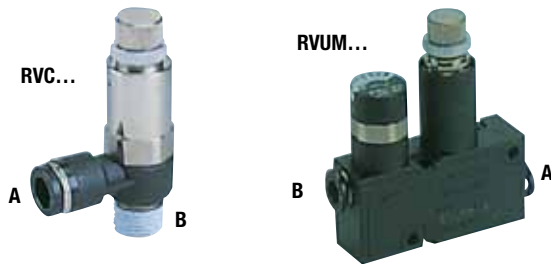


- Compact air regulator
- Maximum inlet pressure of 1.0 MPa
- Operating temperature range of 5-60°C

Model No.	Pipe size	Pressure Range (MBars)	Pressure Range (psi)
R31-100-0000	Rc 1/8"	0.2-7	2.9-102
R31-100-C000	Rc 1/8"	0.1-3.5	1.5-50.8
R31-100-B000	Rc 1/8"	0.07-0.7	1.0-10.2
R31-200-0000	Rc 1/8"	0.2-7	1-10.2
R31-200-C000	Rc 1/4"	0.1-3.5	1.5-50.8
R31-200-B000	Rc 1/4"	0.07-0.7	1-10.2

RVC & RVU... Regulator with Quick Connector

RVC & RVU... Regulator mit Schnellwechselverbindungsstücken
RVC、RVU...レギュレーター ワンタッチ継手内蔵タイプ



- Compact lightweight air regulator
- Adjustable pressure range 0.1-0.8 MPa
- Supply pressure range 0-1MPa
- Gauge accuracy $\pm 5\%$

	A (Tubing Size)	B (Male Thread)
RVC4-M5	4	M5
RVC4-01	4	R 1/8"
RVC6-M5	6	M5
RVC6-01	6	R 1/8"

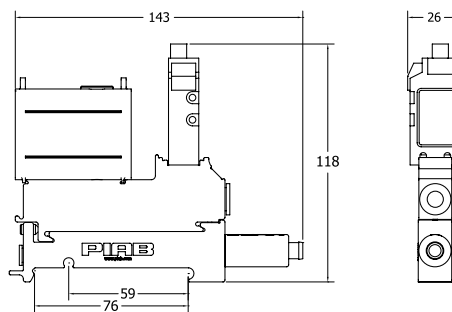
	A (Tubing Size)	B (Tubing Size)
RVUM4-4	4	4
RVUM6-4	6	4
RVUM6-6	6	6

VG-30... Vacuum Generator

VG-30... Vakuumentgeneratoren mit Schnellverschlusskupplungen
VG-30...真空発生器



	Supply Pressure (Optimal)	Vacuum Pressure (Max.)	Air Consumption	Vacuum Flow
VG-30	5 bar (72.5 psi)	-0.28 bar (-4 psi)	27.5 L/min (.97 scfm)	86 L/min (3.03 scfm)



- Compact and lightweight
- Built in muffler to reduce noise
- PNP vacuum sensing



スプルー／製品取出用チャック

GRZ... Sprue/Parts Pliers

GRZ...Greifzange (Standard einfachwirkend)
GRZ...スプルー／製品取出用チャック



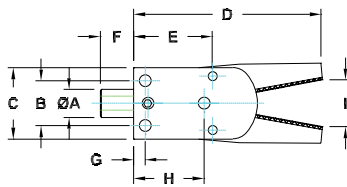
GRZ 10



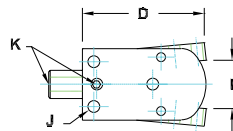
GRZ 20-22/ GRZ 20-22 C

- Single action spring return function
- Fully compatible with SAS's modular EOAT/gripper system
- Available with standard jaws, radiused jaws (KT-Type), standard mounting holes (A-Type), and sensor capable jaws (C-Type)
- In-jaw part sensor does not require adjustment (C-Type only)

GRZ 10-10 / 10-12



GRZ 10-10 A / GRZ 10-12 A

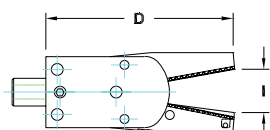


GRZ 20-22/ GRZ 20-22 C

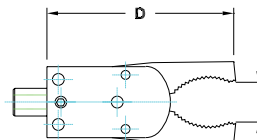


GRZ 10-6/GRZ 10-8
Micro Grippers

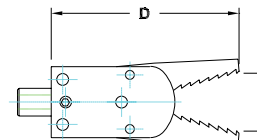
GRZ 10-10 C / GRZ 10-12 C



GRZ 10-10 KT



GRZ 10-10 ST / GRZ 10-12 ST



Buy with confidence.

Find a lower price?

We'll match that price on the spot. It's that simple.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Force (N)	Sensor (Optional)*
GRZ 10-6	10	~	15	30	~	15	~	11	6	M4	M5	~	~	~	3	~	10 (At tip)	~
GRZ 10-8 C	10	~	20	40	~	15	~	11	8	M6	M5	~	~	~	4	~	10 (At tip)	Built in sensor - PNP
GRZ 10-10	10	16	25	64	25	12	4	22	21	4.2	M5	~	~	~	6	~	10	~
GRZ 10-10 A	10	16	25	41	25	12	4	22	17	4.2	M5	8	M4	3	6	~	~	~
GRZ 10-10 A1	10	16	25	48	25	12	4	22	19	4.2	M5	8	M4	3	6	19	~	~
GRZ 10-10 C	10	16	25	64	25	12	4	22	21	4.2	M5	~	~	~	6	~	10	SP1.5/SN1.5
GRZ 10-10 KT	10	16	25	64	25	12	4	22	14	4.2	M5	~	~	~	~	~	~	~
GRZ 10-10 P	10	16	25	72	25	12	4	22	23	4.2	M5	~	~	~	8	~	~	~
GRZ 10-10 ST	10	16	25	64	25	12	4	22	20	4.2	M5	~	~	~	6	~	~	~
GRZ 10-10 STC	10	16	25	66	25	12	4	22	20	4.2	M5	~	~	~	6	~	~	SP 1.5 / SN 1.5

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Force (N)	Sensor (Optional)*
GRZ 10-12	10	16	25	67	28	12	4	25	16	4.5	M5	~	~	~	6	~	14.5	~
GRZ 10-12 A	10	16	25	44	28	12	4	25	17	4.5	M5	8	M4	3	6	~	~	~
GRZ 10-12 C	10	16	25	67	28	12	4	25	15	4.5	M5	~	~	~	8	~	14.5	SP1.5/SN1.5
GRZ 10-12 P	10	16	25	68	28	12	4	25	20	4.5	M5	~	~	~	8	~	~	~
GRZ 10-12 ST	10	16	25	64	28	12	4	25	20	4.5	M5	~	~	~	6	~	~	~
GRZ 10-12 STC	10	16	25	66	28	12	4	25	20	4.5	M5	~	~	~	6	~	~	SP 1.5 / SN 1.5

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Force (N)	Sensor (Optional)*
GRZ 20-22	20	36	51	115	50	26	7	37	33	5.5	G1/8	~	~	~	16	95	~	~
GRZ 20-22 C	20	36	51	115	50	26	7	37	33	5.5	G1/8	~	~	~	16	95	SP1.5/SN1.5	SP 1.5 / SN 1.5
GRZ 20-22 KTC	20	36	51	110	50	26	7	37	33	5.5	G1/8	~	~	~	16	95	~	SP 1.5 / SN 1.5

* See "Sensors, Connectors, and Accessories" section for sensor specifications and offerings.

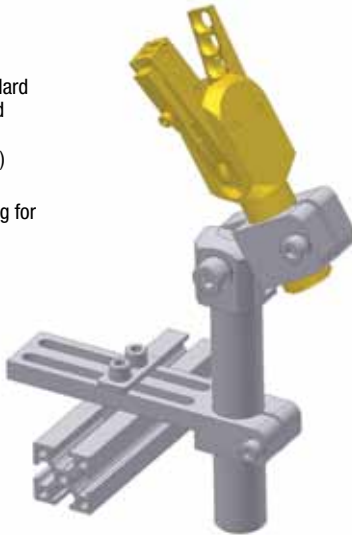


GRZ... Sprue/Parts Pliers (Continued)

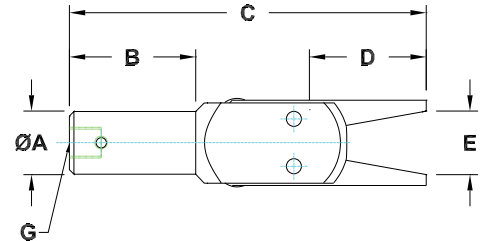
GRZ...Greifzange (Standard einfachwirkend)
GRZ...スプルー/製品取出用チャック



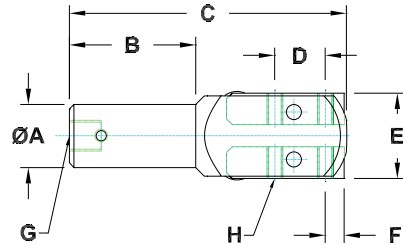
- Bullet nose design for jaw spring protection
- Single action spring return function
- Fully compatible with SAS's modular EOAT/gripper system
- Available with standard jaws, radiused jaws (KT-Type), standard mounting holes (A-Type), aggressive saw teeth (S-Type), and sensor capable jaws (C-Type)
- In-jaw part sensor does not require adjustment (C-Type only)
- T type has knurled teeth in the jaws
- RT-Type has knurled teeth in the jaws without holes, allowing for a larger gripping surface
- Now with interchangeable Jaw Kits



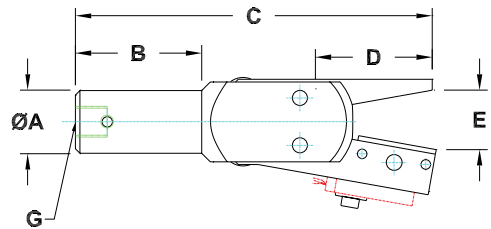
GRZ 20-16 / GRZ 20 - 16 L



GRZ 20-16 A



GRZ 20-16 C / GRZ 20-16 LC



	A	B	C	D	E	F	G	H	Force (N)	Sensor (Optional)*
GRZ 20-16	20	40	113	37	24	~	G 1/8"	~	50	~
GRZ 20-16 T	20	40	113	37	25	~	G 1/8"	~	50	~
GRZ 20-16 A	20	40	86	16	27	6	G 1/8"	M5	~	~
GRZ 20-16 C	20	40	113	37	23	~	G 1/8"	~	50	SP 1.5 / SN 1.5
GRZ 20-16 CT	20	40	113	37	23	~	G 1/8"	~	50	SP 1.5 / SN 1.5
GRZ 20-16 KT	20	40	113	42	23	~	G 1/8"	~	50	~
GRZ 20-16 L	20	40	145	69	39	~	G 1/8"	~	30	~
GRZ 20-16 LT	20	40	145	69	39	~	G 1/8"	~	30	~
GRZ 20-16 LC	20	40	145	69	37	~	G 1/8"	~	30	SP 1.5 / SN 1.5
GRZ 20-16 LCT	20	40	145	69	37	~	G 1/8"	~	30	SP 1.5 / SN 1.5
GRZ 20-16 R	20	40	113	37	25	~	G 1/8"	~	50	~
GRZ 20-16 RT	20	40	113	37	25	~	G 1/8"	~	50	~
GRZ 20-16 RTC	20	40	113	37	25	~	G 1/8"	~	50	~
GRZ 20-16 KTC	20	40	113	37	23	~	G 1/8"	~	~	SP 1.5 / SN 1.5
GRZ 20-16 LST	20	40	145	69	39	~	G 1/8"	~	~	~
GRZ 20-16 ST	20	40	113	37	23	~	G 1/8"	~	~	~
GRZ 20-16 STC	20	40	113	37	23	~	G 1/8"	~	~	SP 1.5 / SN 1.5

* See "Sensors, Connectors, and Accessories" section for sensor specifications and offerings.



GRZ... Sprue/Parts Pliers (Continued)

GRZ...Greifzange (Standard einfachwirkend)

GRZ...スプルー／製品取出用チャック

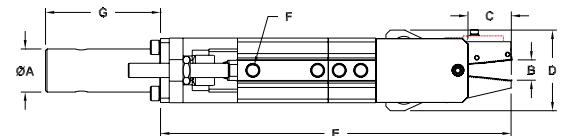
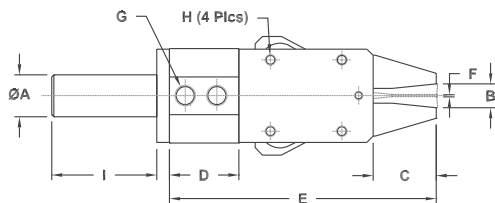


- Double action function http://www.sasgripper.com/images/SAS_Actuated_Rib_Grippe.jpg
- Fully compatible with SAS's modular EOAT/gripper system
- Available with standard jaws and sensor capable jaws (C-Type)
- In-jaw part sensor does not require adjustment (C-type)
- E-type offers 30mm slide cylinder for hard to reach sprues



GRZ 32

GRZ 32-30



	A	B	C	D	E	F	G	H	I	Force (N)	Sensor (Optional)*
GRZ 32	20	12	30	33	127	1	G 1/8"	M5	50	340	~
GRZ 32 C	20	12	30	33	127	1	G 1/8"	M5	50	340	SP 1.5 / SN 1.5

* See "Sensors, Connectors, and Accessories" section for sensor specifications and offerings.

	ØA	B	C	D	E	F	G	Force (N)	Sensor (Optional)*
GRZ 32-30 E	20	9	20	36	158	G 1/8"	52	340	~
GRZ 32-30 EC	20	9	20	36	158	G 1/8"	52	340	SP 1.5 / SN 1.5

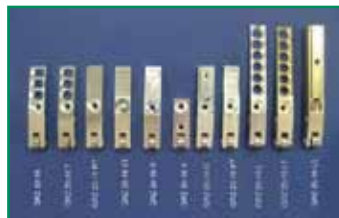
* See "Sensors, Connectors, and Accessories" section for sensor specifications and offerings.

GRZ... Jaw Kits

2-Zangenbacken



- Comprised of one jaw, one spring, and one jaw screw
- Can easily configure and interchange jaw types of the same size sprue plier, allowing easy adaptation to any gripping requirements
- MTL "Medium Thread Locker" required



Size	Description
ASC-22	22ml High-Temperature Grease with PTFE
MTL-10	10ml Medium Threadlocker

Jaw Kit
GRZ 10-10 Jaw Kit
GRZ 10-10 A Jaw Kit
GRZ 10-10 A1 Jaw Kit
GRZ 10-10 C Jaw Kit
GRZ 10-10 KT Jaw Kit
GRZ 20-16 Jaw Kit
GRZ 20-16 A Jaw Kit
GRZ 20-16 C Jaw Kit
GRZ 20-16 KT Jaw Kit
GRZ 20-16 L Jaw Kit
GRZ 20-16 LC Jaw Kit
GRZ 20-16 LT Jaw Kit
GRZ 20-16 R Jaw Kit
GRZ 20-16 RT Jaw Kit
GRZ 20-16 T Jaw Kit

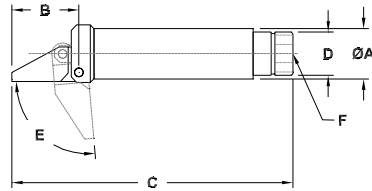


GRF... Gripper Finger (Spring Return)

GRF... Greiffinger (doppelt wirkend)
GRF...フィンガーアタッチメント(スプリングリターン方式)



GRF-95



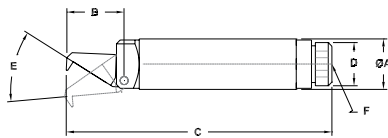
- Our popular gripper finger solution to secure difficult parts
- Normally is protected and located with our ZTS and backed-up with the ANF finger guide.
- Pneumatically single acting, spring return function
- Extendable for longer reach using VLR Arm Extensions
- Fully compatible with SAS's modular EOAT gripper system



	A	B	C	D	E (Degrees)	F	Force (N)
GRF 14-95	14	19	77	M12 x 1	95	M5	16
GRF 20-95	20	20	95	M17 x 1	95	G 1/8"	42
GRF 30-95	30	29	137	M27 x 1	95	G 1/8"	120



GRF-35

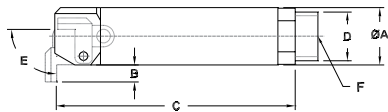


- Finger claw that securely flips & reaches around the part
- Especially designed for difficult part-removal applications
- Pneumatically single acting, spring return function
- Extendable for longer reach using VLR Arm Extensions
- Fully compatible with SAS's modular EOAT gripper system

	A	B	C	D	E (Degrees)	F	Force (N)
GRF 14-35	14	18.5	84	M12 x 1	35	M5	25
GRF 20-35	20	23	105	M17 x 1	35	G 1/8"	55
GRF 30-35	30	34	142	M27 x 1	35	G 1/8"	190



GRF-90

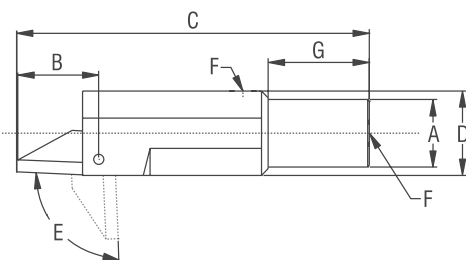


- Specially designed to flip and secure thin edges
- Normally is backed-up with our ANS finger guide
- Pneumatically single acting, spring return function
- Extendable for longer reach using VLR Arm Extensions
- Fully compatible with SAS's modular EOAT gripper system

	A	B	C	D	E (Degrees)	F	Force (N)
GRF 14-90	14	5	72	M12 x 1	90	M5	20
GRF 20-90	20	7	83	M17 x 1	90	G 1/8"	95
GRF 30-90	30	11	124	M27 x 1	90	G 1/8"	220

GRF...-D Gripper Finger (Double Acting)

GRF...-D Greiffinger (doppelt wirkend)
GRF...-D フィンガーアタッチメント(スプリングリターン方式)



- Pneumatically Double acting versions of our GRF 20-95, GRF 20-90, and GRF 20-35
- GRF 20-95 D secures difficult parts
- GRF 20-35 D finger claw flips and securely reaches around part
- GRF 20-90 D is specially designed to flip and secure thin edges
- Fully compatible with SAS's modular gripper system

	A	B	C	D	E (Degrees)	F	G
GRF 20-35 D	20	20	104	25	35	M5	30
GRF 20-90 D	20	11	92	25	90	M5	30
GRF 20-95 D	20	23	104	25	95	M5	30



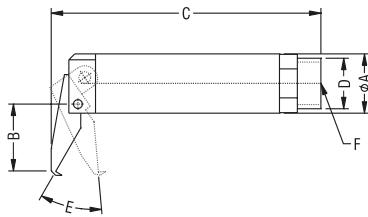
GRW... Gripper Finger (Spring Return)

GRW... Greiffinger (einfach wirkend)
GRW...フィンガーアタッチメント(スプリングリターン方式)



*Buy with confidence.
Find a lower price?
We'll match that price on
the spot. It's that simple.*

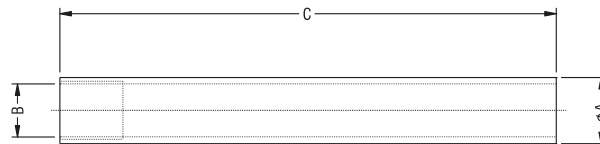
- Finger claw that flips and grips securely around the part
- Especially designed for difficult part-removal applications
- Pneumatically single acting, spring return function
- Extendable for longer reach using VLR Arm Extensions
- Fully compatible with SAS's modular EOAT gripper system



	A	B	C	D	E (Degrees)	F	Force (N)
GRW 20-35	20	20	85	M17 x 1	35	G 1/8"	50
GRW 30-35	30	34	123	M27 x 1	35	G 1/8"	160

VLR... Arm Extension

VLR... Verlängerungsrohr
VLR...フィンガー延長部品



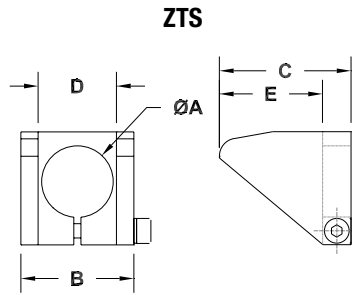
	A	B	C
VLR 10-90	10	M8 x 1	90
VLR 14-120	14	M12 x 1	120
VLR 20-150	20	M17 x 1	150
VLR 30-200	30	M27 x 1	200

- Extends GRF and GRW gripper fingers
- Attaches to ADZ and ADG cylinder adapters and to ZTB locators
- Tightening hole for securing connection to mating parts



ZTS/ANS/ANF... Delrin Finger Accessories

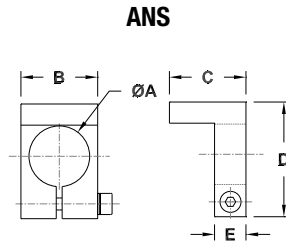
ZTS/ANS/ANF... Zentrierstück/Anschlagstück
ZTS/ANS/ANF...フィンガー アクセサリー



- Aligns part to finger
- Protects both part and finger
- Sensored Version (C-Type) detects actuation of finger

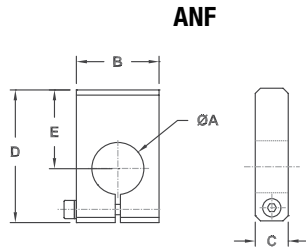
	A	B	C	D	E	Gripper Finger
ZTS 14	14	25	35	17	27	GRF 14-95
ZTS 20-95	20	32	37	22	29	GRF 20-95
ZTS 20-95 C*	20	32	37	22	29	GRF 20-95
ZTS 30-95	30	45	65	32	53	GRF 30-95

* See "Sensors, Connectors, and Accessories" section for sensor specifications and offerings.



- Used with GRF...-90 to back up the finger for a firm mechanical grip
- Made of delrin to protect part

	A	B	C	D	E	Gripper Finger
ANS 14	14	19	23	31	10	GRF 14-95
ANS 20	20	25	25	38	10	GRF 20-90
ANS 20 D	25	32	25	47	10	GRF 20-90 D
ANS 30	30	38	38	57	11	GRF 30-90

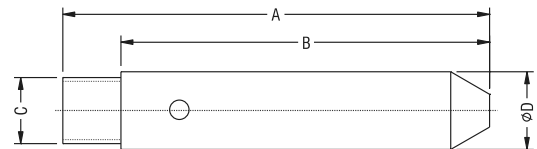


- Used as a finger backup and locator
- Made of delrin to protect part

	A	B	C	D	E	Gripper Finger
ANF 14	14	22	10	42	25	GRF 14-95
ANF 20	20	32	13	51	30	GRF 20-95 / GRW 20-35
ANF 30	30	38	19	66	42	GRF 30-95 / GRW 30-35

ZTB... Delrin Locator Pin

ZTB... Zentrierbolzen
ZTB...デルリン位置決めピン



- Aligns and locates EOAT to parts
- Clamps directly into standard mounting clamps and mates to VLR Arm Extensions
- Tightening hole for secure connection to VLR's

	A	B	C	D	Extension
ZTB 10	50	40	M8 x 1	10	VLR 10-L
ZTB 14	110	95	M12 x 1	14	VLR 14-L
ZTB 20	110	95	M17 x 1	20	VLR 20-L
ZTB 30	100	85	M27 x 1	30	VLR 30-L

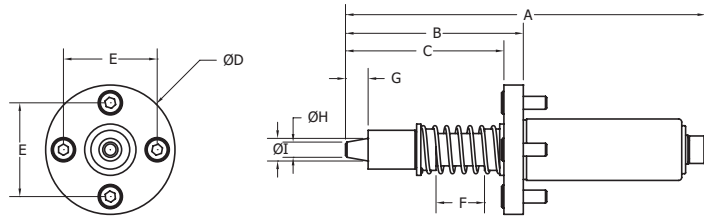


SLL... Spring Loaded Locator

SLL...Gefederter Andockstift



	A	B	C	D	E	F	G	H	I
SLL 10-15	112	44	49	40	29	15	7	4.7	7
SLL 16-30	152	80	74	48	38	30	11	9.3	13



- Provides accuracy of +/- .02mm
- Sized to fit your End-of-Arm Tool robot and mold
- Locators can dock on existing mold locators
- Custom lengths, strokes and diameters available

IDG... Internal Diameter Gripper

IDG 16...Innengreifer



The IDG grips and releases on command and is highly recommended for manipulating breakable parts as well as heavy parts. Unlike standard clamps, the IDG distributes force evenly over the entire contact area which is why they are most often used for irregular shaped parts.

The IDG is a cost effective solution when compared to bladder grippers and automated or magnetic clamps.

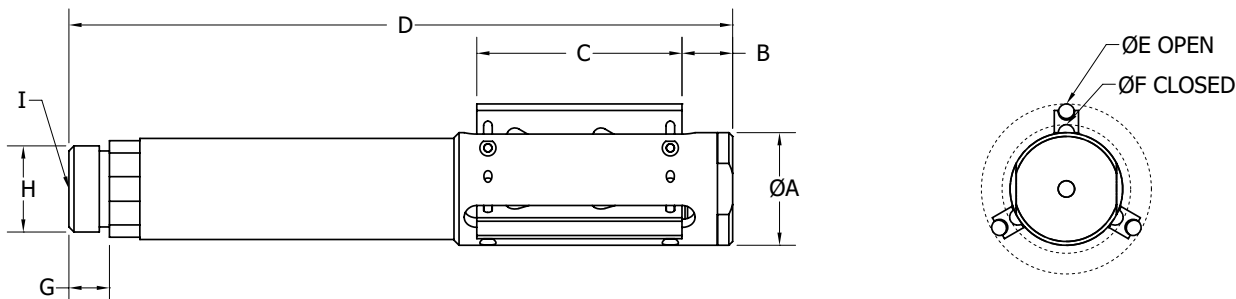
IDG 16...

Features

- Single acting spring return internal diameter gripper.
- 2 ID ranges with the same body; secures 26-32mm and 32-38mm.
- Requires one compressed air line; spring return.
- Extremely strong for its size -- jaws exert 40 N force at 6 bar.
- Ø1/8" Neoprene rubber cord stock inserts ensure a secure grip – and can be replaced at low cost. Other elastomers can be used and are commercially available.
- Nose adapter can easily be customized for locating or part stabilization.



	A	B	C	D	E	F	G	H	I	Weight Lbs.
IDG 16-26-32	22	10	40	131	34	25	8	M17x1	M5	0.250
IDG 16-32-38	22	10	40	131	40	31	8	M17x1	M5	0.318



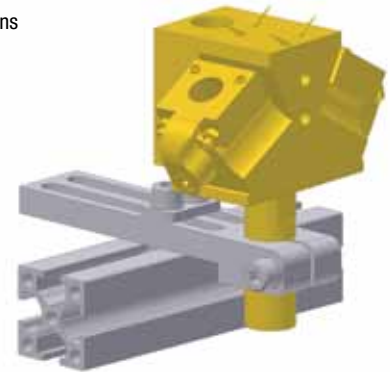


GRN... Needle Gripper

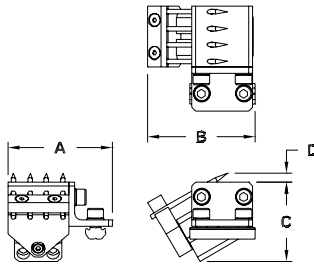
GRN... Nadelgreifer
GRN... ニードルエアチャック



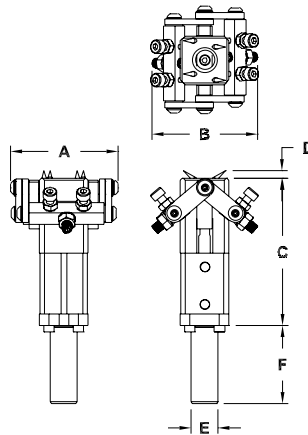
- Ideal for gripping fabric or mesh
- Normally used in insert molding applications
- Adjustable needle length
- Replacement needles also available



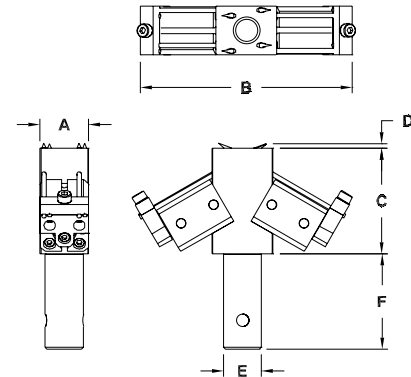
GRN 12-10 X



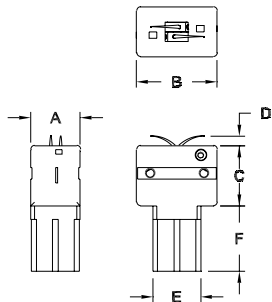
GRN 12-10-14



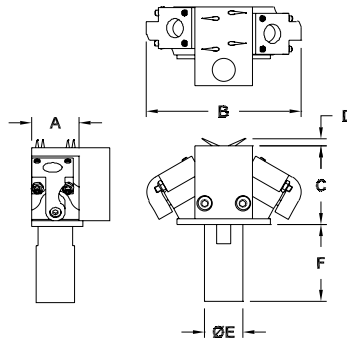
GRN 12-10-20



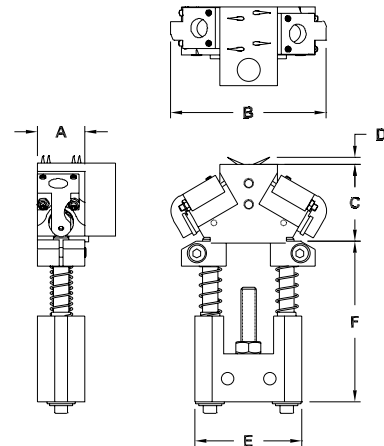
GRN 12-10 CN



GRN 12-10 -20 LP



GRN 12-10 SL



	A	B	C	D	E	F	Air Cons. (cm ³ / stroke)	Working Air Pres. (Bar)	Sensor (optional)
GRN 12-10 X	55	56	41	0-5	~	~	1.13	6 bar (90 psi)	RRK-93/RRK-F9P
GRN 12-10-14	57	55	77	0-5	14	40	1.13	6 bar (90 psi)	RRK-93/RRK-F9P
GRN 12-10-20	25	112	55	0-3	20	50	1.13	6 bar (90 psi)	RRK-93/RRK-F9P
GRN 12-10 CN	26	42	32	0-5	25	34	1.13	6 bar (90 psi)	RRK-93/RRK-F9P
GRN 12-10-20 LP	25	80	41	0-5	20	40	1.13	6 bar (90 psi)	~
GRN 12-10 SL	25	81	40	0-5	56	84	1.13	6 bar (90 psi)	~

* See "Sensors, Connectors, and Accessories" section for sensor specifications and offerings.



GRM...Magnetic Gripper

GRM...Magnetgreifer

Magnetic Grippers are ideal for use where vacuum cups and grippers are typically used for lifting and moving steel sheets, blanks, stamped parts and complete assemblies.

Applications and Benefits:

- Automated press to press transfer systems
- Robotic "Pick & Place"
- Manual and automated machine loading/unloading
- Outlasts vacuum cups in most applications
- Grasps odd shaped or perforated parts
- Increases production and reduces shop air costs
- Designed for long, maintenance-free operation
- Operates effectively in any orientation
- Will not drop parts if system air-loss occurs
- De-stacks without double-blanking when the appropriate magnet is selected for the application
- Reduces noise
- Maximum operating temperature 140°F (60°C)

Low Profile Magnetic Grippers:

The Magnetic Gripper is designed to directly replace vacuum cups with minor tooling and valving adjustments. Powerful Rare Earth magnets positively hold the parts during transfer, greatly reducing the chance of slipping and shifting of your part due to oily coatings. An optional "low-skid" boot is also available to increase grip on parts during transfer. A short burst of shop air pressure is applied in order to release parts. To pick-up or grip parts, the air pressure must be exhausted to the atmosphere.

- Powerful Rare Earth magnet positively holds parts - no dropping or shifting in the event of air loss
- Can be used with standard SAS parts and framework
- Lightweight, low-profile design for minimal die clearance
- Instantaneous pick-up and release
- Uses up to 95% less air than vacuum cups

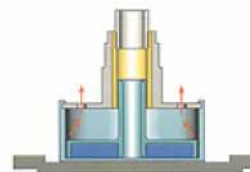
NOTE:

Supply air pressure must not exceed 60 PSI at the Magnetic Gripper inlet. Operating at pressures above 60 PSI will lead to premature failure of the unit. Air must be clean, dry and non-lubricated. Air pressure should never be applied to the Magnetic Gripper during a transfer cycle. This will cause the loss of a part. Apply air when in position to release the part. In some applications, air may need to be applied to retract the magnet before contacting the part. If the magnet "reach out" lifts the part from the guides before making contact, causing loss of part position, apply air to the Magnetic Gripper prior to lifting the part.

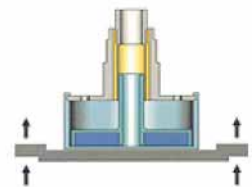


Part Secured

1. Allow The Transporter To Come To Rest On The Desired Location Of The Part

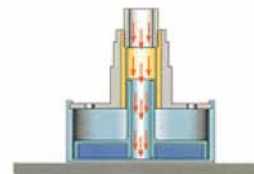


2. Lift The Part Off Of It's Nesting Area And Begin The Transfer

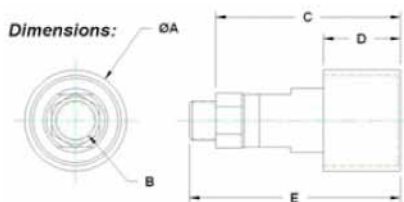
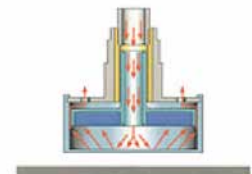


Part Released

1. Apply Positive Air Pressure Once Part Is In Nesting Position



2. Continue Applying Air Pressure Until The Transporter Is Clear Of The Released Part



Part #	A	B	C	D	E
GRM 38-3/8	38	G3/8"	74	32	85
GRM 76-3/8	76	G3/8"	76	32	85
GRM 127-3/8	127	G3/8"	111	50	122

GRB... Black Urethane Boot



Part #	Non-Skid Covers
GRB 38	Black Urethane Boot for GRM 38-3/8
GRB 76	Black Urethane Boot for GRM 76-3/8
GRB 127	Black Urethane Boot for GRM 127-3/8

Low Skid Boots protect against marring of class "A" blanks while extending the life of the magnet by protecting the face from wear. In many applications the boots and pads also assist in keeping parts from shifting under shear in transport. The boots cover the edge of the cup for complete blank protection while the pads cover the face of the cup for increased wear protection to extend the life of the magnet.

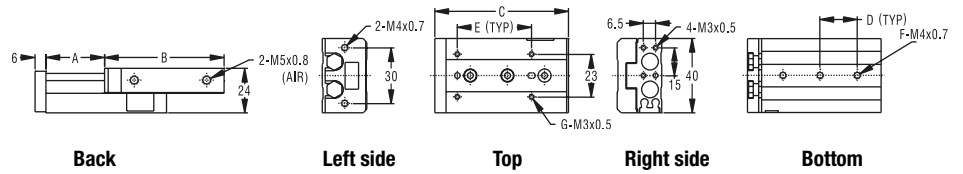


STROKING PNEUMATIC CYLINDERS AND PARALLEL GRIPPERS

Kurzhubzylinder und Parallelgreifer

ISC 8... Indexing Cylinder

ISC 8... Indexzylinder
ISC 8... スライドシリンダー

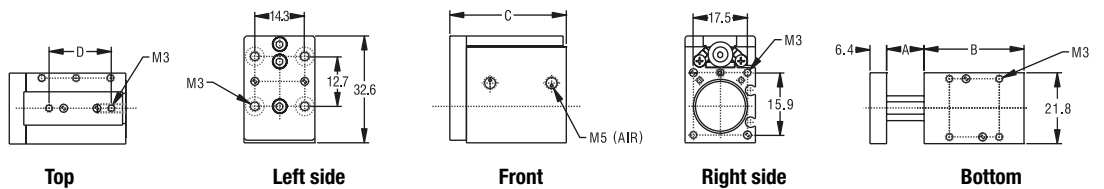


- Allows for indexing motion on linear bearings
- Sensors available
- Adjustable end stop
- Double acting

	A (Stroke)	B	C	D	E	F	G	Cylinder Bore	Sensor (Optional)*
ISC 8-10	10	49	56	28	25	2	4	8	RRK-93/ RRK-F9P
ISC 8-20	20	54	61	30	25	2	4	8	RRK-93/ RRK-F9P
ISC 8-30	30	65	72	20	40	3	4	8	RRK-93/ RRK-F9P
ISC 8-40	40	83	90	28	50	3	4	8	RRK-93/ RRK-F9P
ISC 8-50	50	101	108	23	38	4	6	8	RRK-93/ RRK-F9P

ISC MPS... Indexing Cylinder

ISC MPS... Indexzylinder
ISC MPS... スライドシリンダー

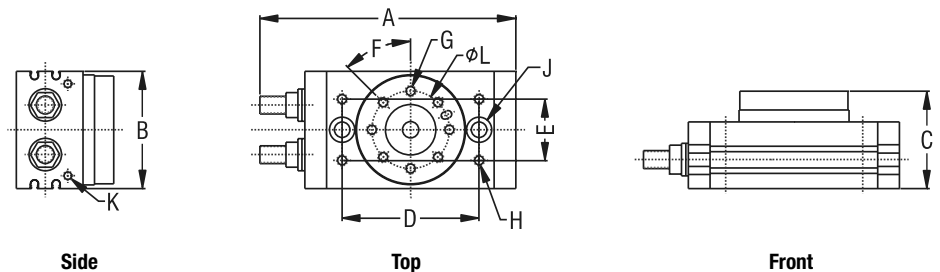


- Allows for indexing motion on linear bearings
- Sensors available
- Double acting

	A (Stroke)	B	C	D	Cylinder Bore	Sensor (Optional)*
ISC MPS-1-1	13	38	46	38	38	RRK-OHSP-006
ISC MPS-1-2	25	51	58	51	51	RRK-OHSP-006
ISC MPS-1-3	38	64	71	64	64	RRK-OHSP-006
ISC MPS-1-4	51	76	84	76	76	RRK-OHSP-006

RC...-S Rotary Cylinder

RC...-S Drehzylinder
RC...-S ローターシリンダー



- Allows for 0-180° rotational motion
- Adjustable angle with cushioned shocks
- Sensors available
- Double acting

	A	B	C	D	E	F	G	H	J	K	L	Sensor (Optional)*
RC 10-S	110	50	47	60	27	45°	M5	M5	6.8 / 11	M5	32	RRK-93/ RRK-F9P
RC 20-S	142	65	54	76	34	45°	M6	M6	8.6 / 14	M5	43	RRK-93/ RRK-F9P
RC 30-S	152	70	57	84	37	45°	M6	M6	8.6 / 14	G 1/8"	48	RRK-93/ RRK-F9P
RC 50-S	183	80	66	100	50	45°	M8	M8	10.5 / 18	G 1/8"	55	RRK-93/ RRK-F9P

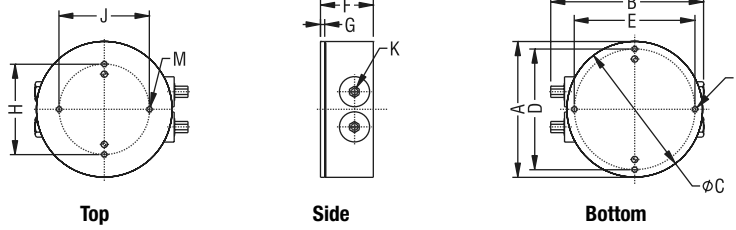


RC...-RR Rotary Cylinder

RC...-RR Drehzylinder
RC...-RR ローターシリンダー

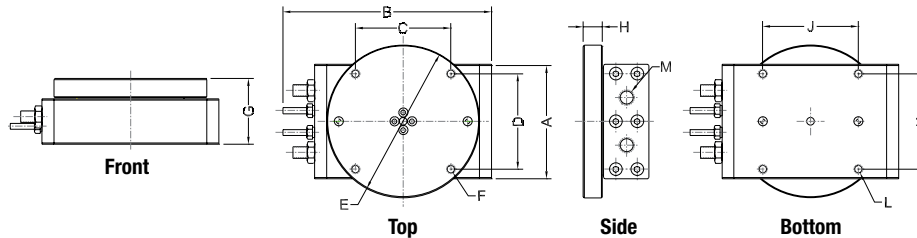


- Allows for 0-180° rotational motion
- Adjustable angle with cushioned shocks
- Sensors available
- Double acting



	Range	A	B	C	D	E	F	G	H	J	K	L	M	Sensor (Optional)*
RC 12.7-RR	0-180°	57	81	57	32	32	25	6	51	~	M5	M3	M3	RRK-OISP-015
RC 19.1-RR	0-180°	86	109	86	57	57	53	6	78	78	M5	M4	M4	RRK-OISP-015

* See "Sensors, Connectors, and Accessories" section for sensor specifications and offerings.



	Range	A	B	C	D	E	F	G	H	J	K	L	M	Sensor (Optional)*	Sensor Mounting Kit
RC 25.4-RR	0-180°	64	117	64	64	102	M6	44	13	64	64	M6	G1/8"	RRK-OISP-014	RRK-OSMK-024
RC 31.8-RR	0-180°	89	169	70	70	114	M8	54	16	76	76	M8	G1/8"	RRK-OISP-014	RRK-OSMK-024

* See "Sensors, Connectors, and Accessories" section for sensor specifications and offerings.

PGR... Parallel Gripper

PRG... Parallelgreifer (doppelt wirkend)
PGR... 平行開閉エ



- Double acting
- Sensors available
- Tapped holes in gripper arms allow for easy jaw attachment
- Compatible with standard mounting clamps when combined with the appropriate ADG and a VLR Arm Extension

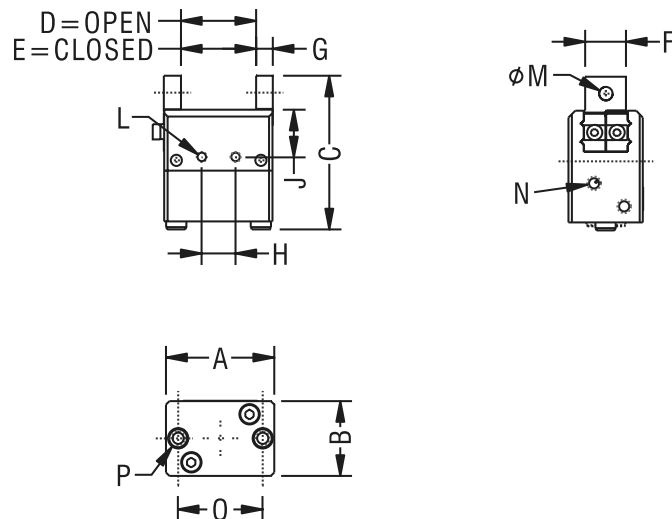


	Photo	A	B	C	D	E	F	G	H	J	L	M	N (Air)	O	P	Force (N)	Sensor (Optional)*
PGR 25	A	26	18	34	17	11	10	4	10	15	M3	M4	M3	20	M3	35	IRK 4
PGR 32	B	32	22	43	22	14	12	5	10	19	M3	M5	M5	25	M4	61	IRK 4
PGR 40	C	40	26	51	28	16	16	6	10	24	M3	M5	M5	32	M4	110	IRK 4

* See "Sensors, Connectors, and Accessories" section for sensor specifications and offerings.



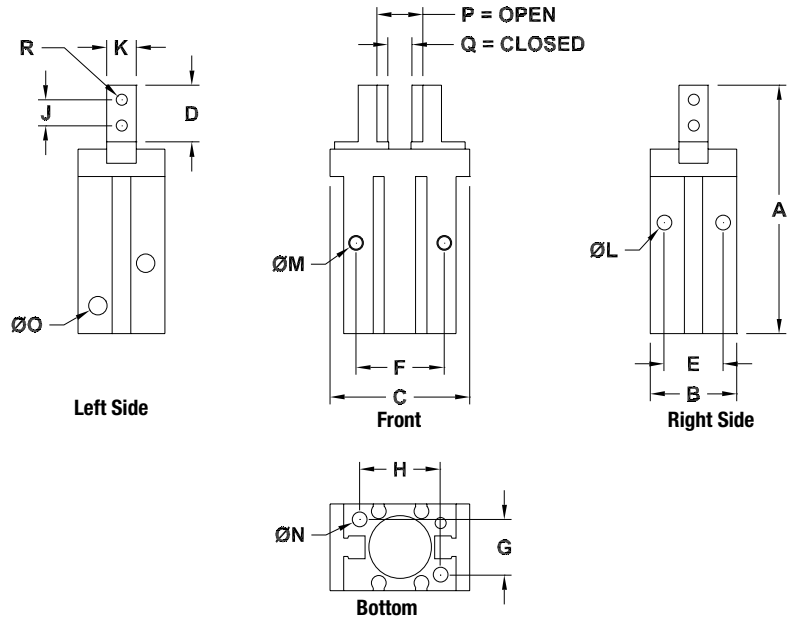
STROKING PNEUMATIC CYLINDERS AND PARALLEL GRIPPERS

PGR...S Parallel Gripper

PGR...S Parallelgreifer (doppelt wirkend)
PGR...S 平行開閉エアチャック



- Double acting
- Sensors available
- Tapped holes in gripper arms allow for easy jaw attachment
- Compatible with standard mounting clamps when combined with the appropriate ADG and a VLR Arm Extension

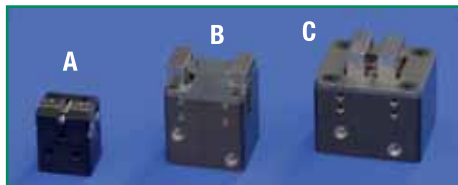


	A	B	C	D	E	F	G	H	J	K	L	M	N	O (Air)	P	Q	R	Force (N)	Sensor (Optional)*
PGR 10-S	57	16	29	12	11	16	12	18	6	5	M3	M3	M3	M3	15	11	M2.5	17	RRK-Y59B/ RRK-Y7P
PGR 16-S	67	24	38	15	16	24	15	22	7	8	M4	M4	M4	M5	21	15	M3	40	RRK-Y59B/ RRK-Y7P

* See "Sensors, Connectors, and Accessories" section for sensor specifications and offerings.

PGR...-R Parallel Gripper

PGR...-R Parallelgreifer
PGR...-R 平行開閉エアチャック



- Double acting
- Sensors available
- Tapped holes in gripper arms allow for easy jaw attachment
- Compatible with standard mounting clamps when combined with the appropriate ADG and a VLR Arm Extension

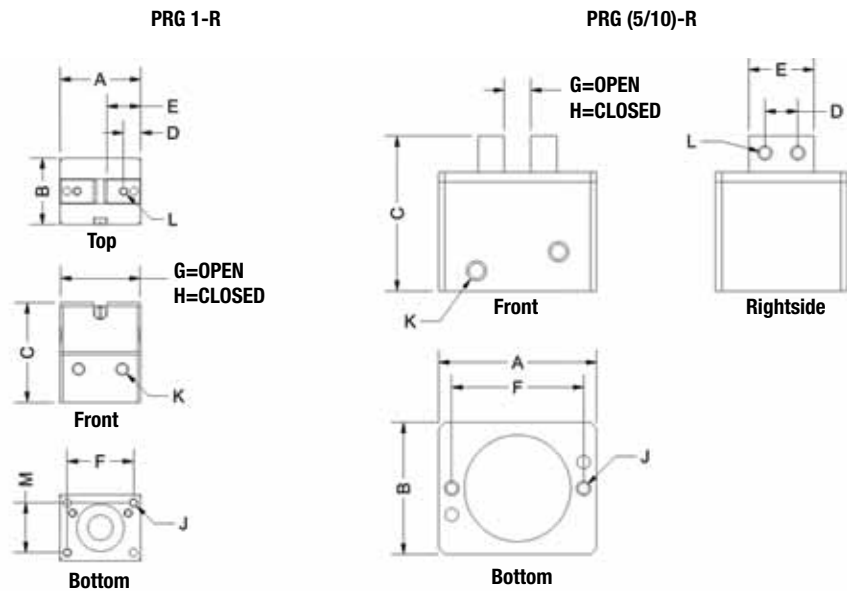


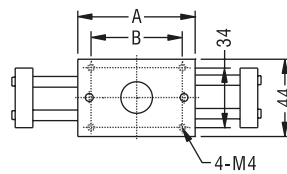
	Photo	A	B	C	D	E	F	G	H	J	K (Air)	L	M	Sensor (Optional)*	Force (N)	Sensor Mounting Kit
PGR 1-R	A	20	16	23	7	8	16	19	18	M2	M3	M2	12	~	36	~
PGR 5-R	B	29	25	37	8	14	24	28	24	M3	M5	M3	~	RRK-OISP-013	156	RRK-OSMK-001
PGR 10-R	C	38	32	37	8	16	32	19	12	M4	M5	M3	~	RRK-OISP-013	178	RRK-OSMK-002



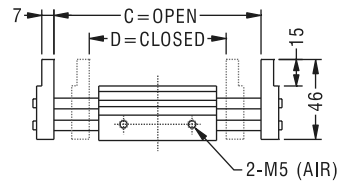
LPG... Large Parallel Gripper

LPG... Parallelgreifer, gross, doppelt wirkend

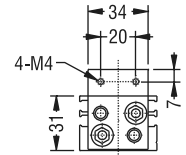
LPG... 大型並行開閉エアチャック



Top



Front

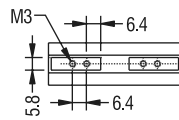


Rightside

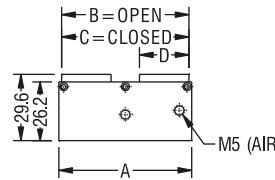
- Double acting
- Sensors available
- Tapped holes in gripper arms allow for easy jaw attachment
- Compatible with standard mounting clamps when combined with the appropriate ADG and a VLR Arm Extension

	A	B	C	D	Force (N)	Sensor (Optional)*
LPG 10-10	51	36	76	56	22	RRK-Y59B/ RRK-Y7P
LPG 10-25	67	52	118	78	22	RRK-Y59B/ RRK-Y7P
LPG 10-30	85	70	156	96	22	RRK-Y59B/ RRK-Y7P

* See "Sensors, Connectors, and Accessories" section for sensor specifications and offerings.



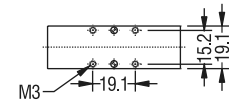
Top



Front



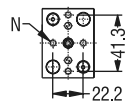
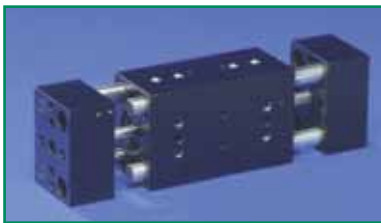
Rightside



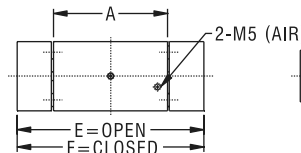
Bottom

	A	B	C	D	Force (N)	Sensor (Optional)*	Sensor Mounting Kit
LPG RPL-1	45	44	38	19	116	RRK-OHSP-006	RRK-OSMK-008
LPG RPL-2	60	57	44	22	116	RRK-OHSP-006	RRK-OSMK-008

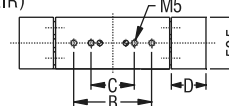
* See "Sensors, Connectors, and Accessories" section for sensor specifications and offerings.



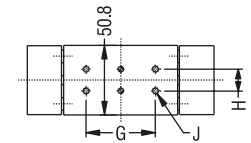
Leftside



Front



Top



Back

	A	B	C	D	E	F	G	H	J	Force (N)	Sensor (Optional)*	Sensor Mounting Kit
LPG RPW-375-1	56	32	~	19	120	95	19	19	M4	400	RRK-OISP-014	RRK-OSMK-010
LPG RPW-375-2	83	57	32	25	187	136	51	16	M5	400	RRK-OISP-014	RRK-OSMK-011

* See "Sensors, Connectors, and Accessories" section for sensor specifications and offerings.

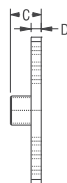
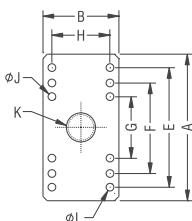
ADG... Adapters for Parallel Gripper

ADG... Adapter für Parallelgreifer

ADG... 平行開閉エアチャック用アダプター



- Allows PGR and LPG grippers to attach to standard VLR Arm Extensions and mount in standard mounting clamps

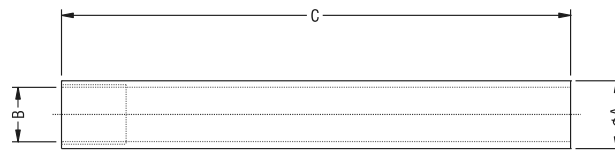


	A	B	C	D	E	F	G	H	J	K	L	Cylinder	Ext.
ADG 10-R	30	16	16	6	24	16	~	12	2.5	M8 x 1	3.5	PGR 1-R/ PGR 5-R	VLR 10...
ADG 10-S	30	19	16	6	18	~	~	12	~	M8 x 1	3.5	PGR 10-S	VLR 10...
ADG 14-R	40	19	16	6	32	~	~	~	~	M12 x 1	4.5	PGR 10-R	VLR 14...
ADG 14-RPL	25	25	16	6	19	~	~	15	~	M12 x 1	3.5	LPG RPL...	VLR 14...
ADG 14-S	32	25	16	6	22	~	~	15	~	M12 x 1	4.5	PGR 16-S	VLR 14...
ADG 14-25	25	16	16	6	20	~	~	~	~	M12 x 1	3.5	PGR 25	VLR 14...
ADG 14-32	38	19	16	6	25	~	~	~	~	M12 x 1	4.5	PGR 32	VLR 14...
ADG 20-R	66	25	16	6	57	51	32	16	~	M17 x 1	5.5	LPG RPW-375...	VLR 20...
ADG 20-S	80	51	16	6	70	52	36	34	~	M17 x 1	4.5	LPG 10-...	VLR 20...
ADG 20-40	45	19	16	6	32	~	~	~	~	M17 x 1	4.5	PGR 40	VLR 20...



VLR... Arm Extension

VLR... Verlängerungsrohr
VLR...フィンガー延長部品



- Extends GRF and GRW gripper fingers
- Attaches to ADZ and ADG cylinder adapters and to ZTB locators
- Tightening hole for securing connection to mating parts

	A	B	C
VLR 10-90	10	M8 x 1	90
VLR 14-120	14	M12 x 1	120
VLR 20-150	20	M17 x 1	150
VLR 30-200	30	M27 x 1	200

LIA 380-1... Instant Adhesive



- Strong Super Glue for the SPU 3-250
- Excellent resistance to peeling, impact, and temperature changes
- Apply to a clean dry surface

LIA 380-1	
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SPU 3-250... Polyurethane Sheet



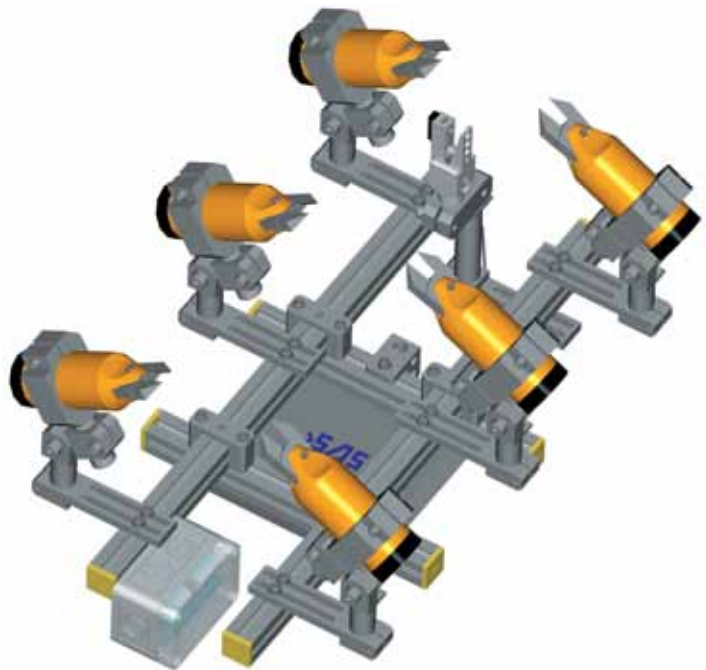
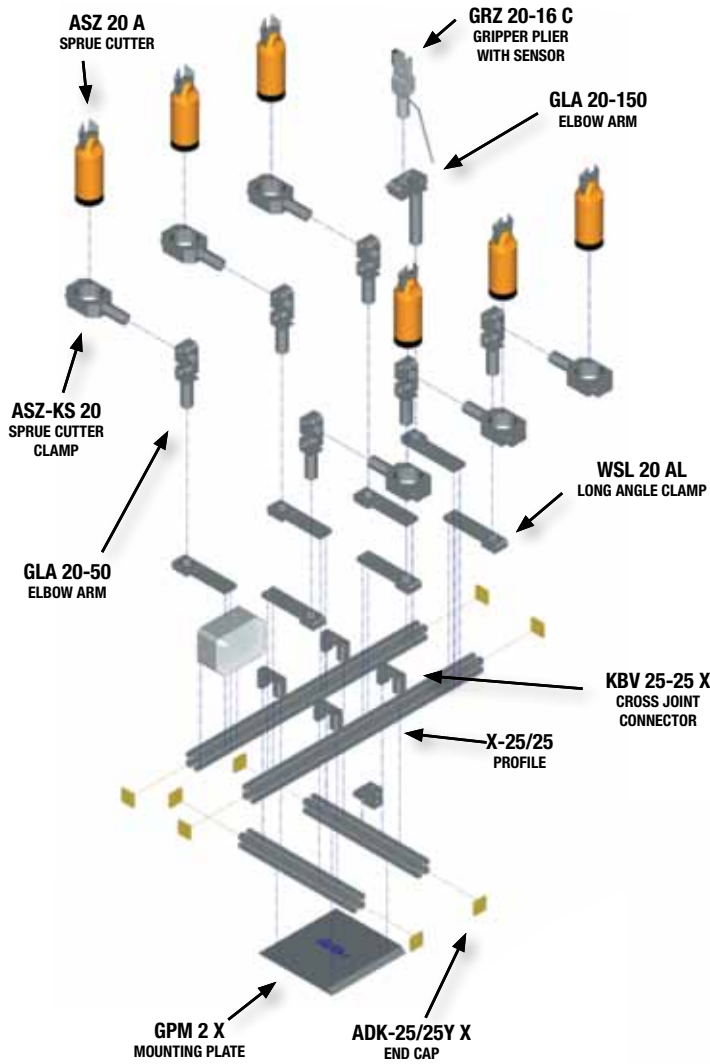
- 250x250x3 Polyurethane Sheet
- Used to adhere to custom gripper jaws to protect workpiece, cut to size
- Excellent abrasion resistance
- Durometer 40A
- Temperature Range: -29° to 85° C (-20° to +185° F)

SPU 3-250	
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DEGATING CUTTERS, BLADES AND ACCESSORIES



Filmangußschneider, Angußschneider, Schneideinsätze



*SAS Automation will match any competitor's price for stock components with proper verification.

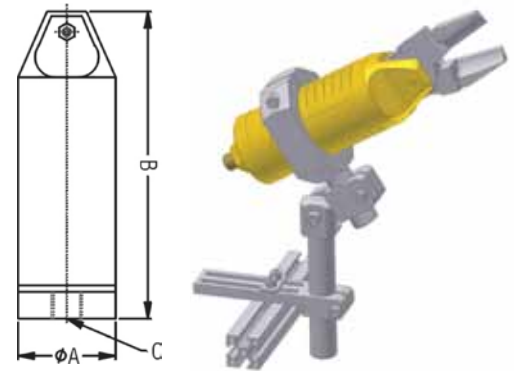


MR... Sprue Cutter

MR...Angusschneidzange
MR... エアニッパー



- Automatic (A-Type) is fixture mountable
- Hand operated (H-Type) features a safety lever
- Standard and special blades available (see Nip-It! section for Type-I blade information)

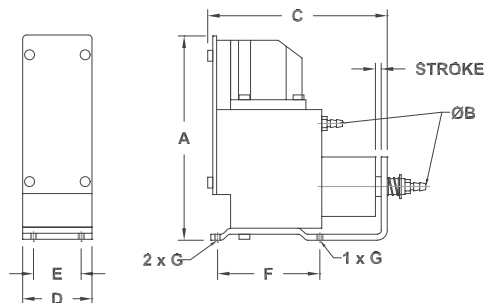


		Handheld			Weight (g)	Air Consumption (cm ³ / stroke)	Working Air Pressure (bars)	Blade Category
	Cutting Capacity	A	B	C				
MR-10H	Soft Plastic ø 5	36	124	G 1/4"	150	116	5-6	I
	Hard Plastic ø 4			G 1/4"				
MR-20H	Soft Plastic ø 7	45	140	G 1/4"	260	230	5-6	I
	Hard Plastic ø 5			G 1/4"				
MR-30H	Soft Plastic ø 10	56	176	G 1/4"	460	400	584	I
	Hard Plastic ø 6.5			G 1/4"				
MR-50H	Soft Plastic ø 12	75	197	G 1/4"	1040	956	1100	I
	Hard Plastic ø 6.5			G 1/4"				
MP-35H	Soft Plastic ø 13	56	249	G 1/4"	790	956	5-6	I
	Hard Plastic ø 6.5							I

		Automatic			Weight (g)	Air Consumption (cm ³ / stroke)	Working Air Pressure (bars)	Blade Category
	Cutting Capacity	A	B	C				
MR-3A	Soft Plastic ø 1	20	112	G 1/4"	60	35	4-5	I
MR-5A	Soft Plastic ø 2	30	103	G 1/4"	100	64	4-5	I
MR-7A	Soft Plastic ø 3	30	132	G 1/4"	110	116	4-5	I
MR-10A	Soft Plastic ø 5	36	124	G 1/4"	150	116	5-6	I
	Hard Plastic ø 4			G 1/4"				
MR-20A	Soft Plastic ø 7	45	140	G 1/4"	260	230	5-6	I
	Hard Plastic ø 5			G 1/4"				
MR-30A	Soft Plastic ø 10	56	176	G 1/4"	460	584	5-6	I
	Hard Plastic ø 6.5			G 1/4"				
MR-50A	Soft Plastic ø 12	75	197	G 1/4"	1040	1100	5-6	I
	Hard Plastic ø 6.5			G 1/4"				

ME... Sprue Cutter

ME... Angusschneidzange mit Hub (Schneideinsatz drehbar)
ME... エアニッパー



- Separate ports for cutter slide and blade activation
- Slide function moves blades flush to part

	A	B	C	D	E	F	G	Stroke	Blade Category	Max. Sprue Dia.
ME 3	77	4	71	20	14	21	M3	3	II	1
ME 5	79	4	78	29	22	29	M3	3	II	1.2
ME 10	102	4	90	35	26	36	M3	3	II	2.5
ME 20	116	4	104	44	26	36	M4	5	II	4.5
ME 30	149	4	131	56	26	50	M4	5	II	6

* Soft Plastics are PP & PE.

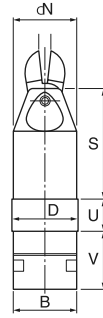


ML... Slide & Cut Type Cutter

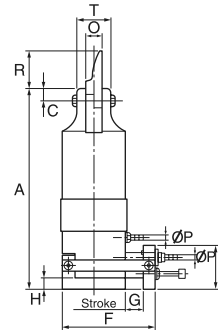
ML... Angusschneider mit Schub- & Schneidefunktion
MLタイプ (スライド式切断タイプ)



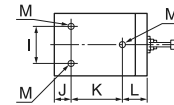
- Separate Ports for cutter slide and blade activation
- Slide function moves blades flush to part
- Utilizes a wider variety of blades than the ME cutter
- Only one air circuit is needed when Pneumatic Timing Unit (TU-01) is used



Side



Front



Bottom

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	R	S	T	U	V
ML- 10	128	35	7	36	31	63	10	8	26	11	31	17	M3	35	9	4	19	71	18	16	41
ML- 20	143	44	9	45	31	64	10	8	26	11	36	17	M4	44	12	4	26	79	24	23	41
ML- 30	184	55	15	56	33	76	10	8	26	14	38	24	M4	55	17	4	50	123	34	18	43

Cutter Body	Cutting Capacity	Weight(g)	Air Consumption (cm ³ /stroke)	Working Air Pressure (bars)	Blade Category
ML- 10	Soft Plastic ø 5 Hard Plastic ø 4	340	136	4-5	I
ML- 20	Soft Plastic ø 7 Hard Plastic ø 5	500	250	5-6	I
ML- 30	Soft Plastic ø 10 Hard Plastic ø 6.5	870	634	5-6	I

* Soft Plastics are PP & PE

** Hard Plastics are ABS, Polycarbonates, Acrylic resin, POM & PS

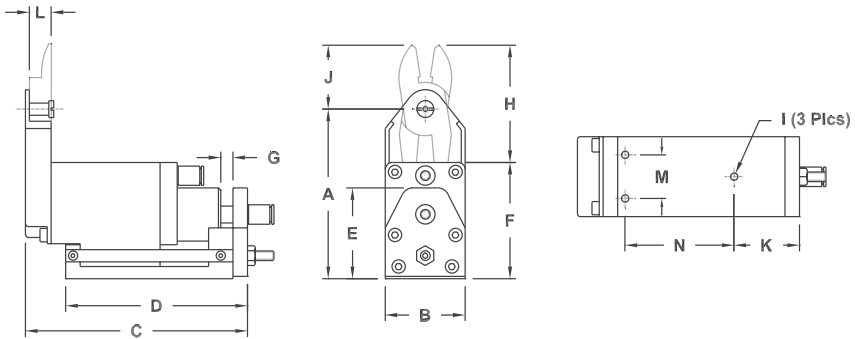


SN... Pull & Cut Type Cutter

SN... Schneidwerkzeughalter einfahrend
SN... プル & カット・タイプ・カッター



- Body Strokes In
- Blade Holder can be rotated 90° in either direction (excluding SN-3)
- Adjustable travel from 0-5mm
- Separate Ports for cutter slide and blade activation
- Only one air circuit is needed when Pneumatic Timing Unit (TU-01) is used



Cutter Body	A	B	C	D	E	F	G	H	I	J	K	L	M	N
SN- 3	59	23	80	65	31	40	5	43	M4	24	25	7	12	37
SN- 5	63	28	84	69	34	44	5	43	M4	24	26	7	14	40
SN- 10	70	33	92	75	38	48	5	49	M4	27	27	9	18	45
SN- 20	82	42	110	90	46	59	5	58	M4	35	28	12	22	58

Cutter Body	Cutting Capacity	Weight(g)	Air Consumption (cm ³ / stroke)	Working Air Pressure (bars)	Blade Category
SN- 3	Hard Plastic ø 2	170	46	4-5	V
SN- 5	Hard Plastic ø 3	220	68	5-6	V
SN- 10	Hard Plastic ø 4	300	117	4-5	V
SN- 20	Hard Plastic ø 5	595	204	5-6	V

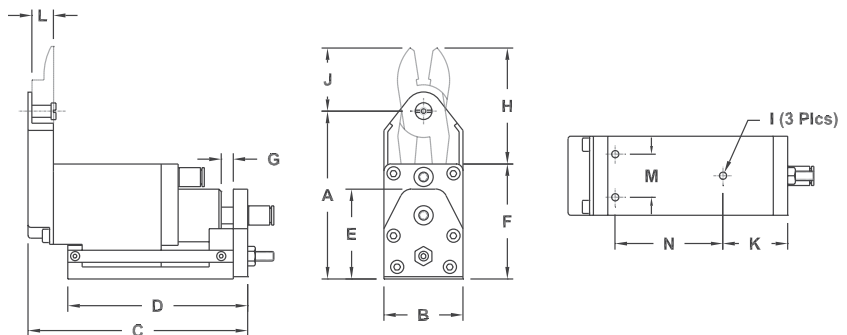
* Hard Plastics are ABS, Polycarbonates, Acrylic resin, POM & PS

SNP... Push & Cut Type Cutter

SNP...Schneidwerkzeughalter ausfahrend
SNP... プッシュ & カット・タイプ・カッター



- Body Strokes Out
- Blade Holder can be rotated 90° in either direction (excluding SN-3)
- Adjustable travel from 0-5mm
- Separate Ports for cutter slide and blade activation
- Only one air circuit is needed when Pneumatic Timing Unit (TU-01) is used



Cutter Body	A	B	C	D	E	F	G	H	I	J	K	L	M	N
SNP- 3	59	23	75	65	31	40	5	43	M4	24	25	7	12	37
SNP- 5	63	28	79	69	34	44	5	43	M4	24	26	7	14	40
SNP- 10	70	33	87	75	38	48	5	49	M4	27	27	9	18	45
SNP- 20	82	42	105	90	46	59	5	58	M4	35	28	12	22	58

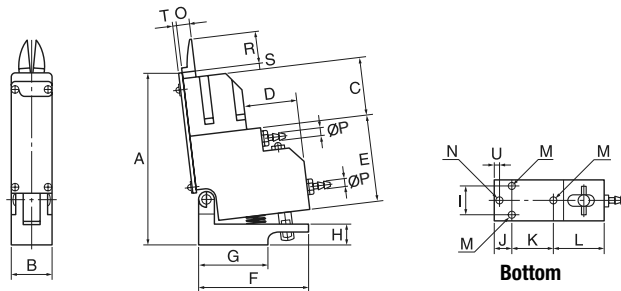
Cutter Body	Cutting Capacity	Weight(g)	Air Consumption (cm ³ / stroke)	Working Air Pressure (bars)	Blade Category
SNP- 3	Hard Plastic ø 2	170	46	4-5	VI
SNP- 5	Hard Plastic ø 3	220	68	5-6	VI
SNP- 10	Hard Plastic ø 4	300	117	4-5	VI
SNP- 20	Hard Plastic ø 5	595	204	5-6	VI

* Hard Plastics are ABS, Polycarbonates, Acrylic resin, POM & PS



MER... Tilt & Cut Type Cutter

MER... Schneidwerkzeughalter einfahrend
MERタイプ (揺動 切断タイプ)



- Cutter body tilts up to the part before the blade cuts
- Separate Ports for cutter tilt and blade activation
- Only one air circuit is needed when Pneumatic Timing Unit (TU-01) is used

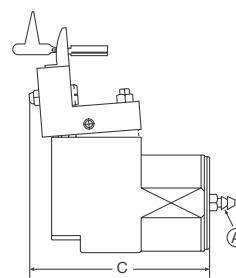
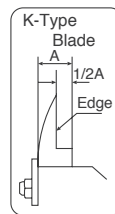
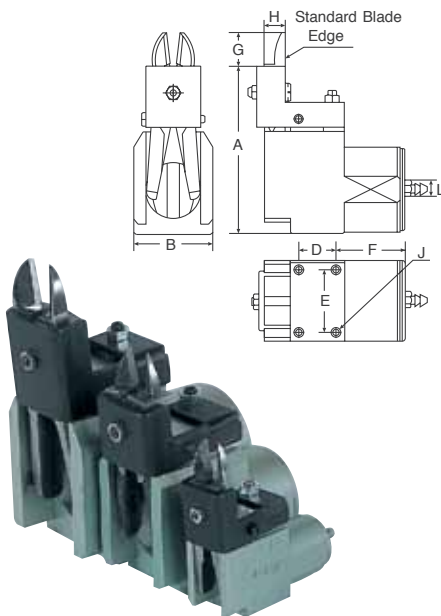
Cutter Body	Cutting Capacity	Weight(g)	Air Consumption (cm ³ / stroke)	Working Air Pressure (Bars)	Blade Category
MER-3	Soft Plastic ø 1	170	30	4-5	II
MER-5	Soft Plastic ø 1.2	260	40	4-5	II
MER-10	Soft Plastic ø 2.5	440	90	4-5	II
MER- 20	Soft Plastic ø 4.5	680	150	5-6	II
MER- 30	Soft Plastic ø 6	1440	300	5-6	II

Cutter Body	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	R	S	T	U
MER-3	83	20	28	19	41	54	34	10	9	21	25	M3	M3	7	4	13	3	2	2.5
MER-5	90	29	28	17	42	62	42	10	9	29	25	M3	M3	7	4	15	4	2	2.5
MER-10	116	35	35	21	57	73	51	12	9	36	28	M3	M3	9	4	16	5	2	3
MER-20	123	44	42	21	60	84	62	12	9	36	28	M4	M4	12	4	23	8	2	3
MER-30	160	56	47	29	71	109	70	16	11	50	48	M4	M4	17	4	50	28	3	4

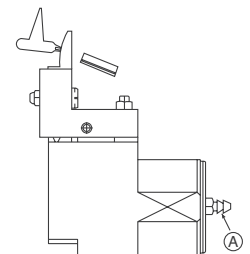
* Soft Plastics are PP & PE

MG... Slide & Cut Type Cutter

MG... Angusschneider mit Kipp- & Schneidefunktion
MGタイプ (スライ)



Fix the material between the edges of the blade.



Air is supplied to (A), then the blade touches the material, and cuts the material at the root.

Cutter Body	A	B	C	D	E	F	G	H	J	L
MG- 3	50	20	60	16	14	25	15	7	M3	4
MG-10	73	35	73	20	27	29	18	9	M3	4
MG- 20	95	46	89	21	36	39	19	12	M4	4

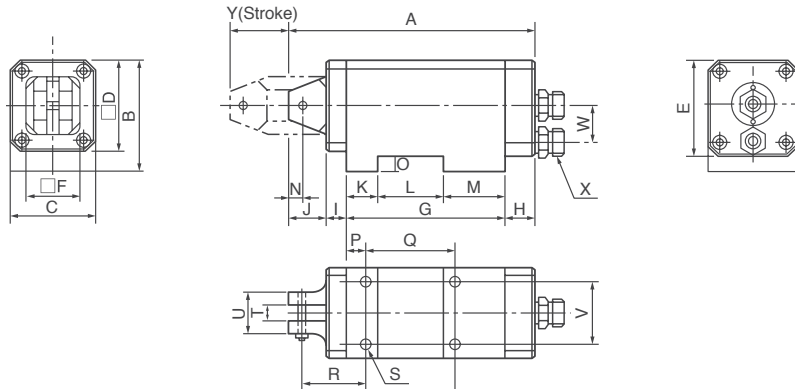
- Cutter body tilts up to the part before the blade cuts
- Separate Ports for cutter tilt and blade activation
- Only one air circuit is needed when Pneumatic Timing Unit (TU-01) is used

Cutter Body	Cutting Capacity	Weight(g)	Air Consumption (cm ³ / stroke)	Working Air Pressure (bars)	Blade Category
MG- 3	Soft Plastic ø 2	80	22	4-5	III
MG- 10	Soft Plastic ø 2	80	22	4-5	III
MG- 20	Soft Plastic ø 2	80	22	4-5	III



CF... Turtle-Neck Blade Type

CF... Schnapper Typ
CFタイプ (刃部可動・機械取付タイプ)



- Separate Ports for cutter slide and blade activation
- As air is applied to the cutter's slide port, the moveable part of the cutter body extends 30mm
- As air to the cutter's slide port is exhausted, the moveable part of the cutter body returns
- Only one air circuit is needed when Pneumatic Timing Unit (TU-01) is used

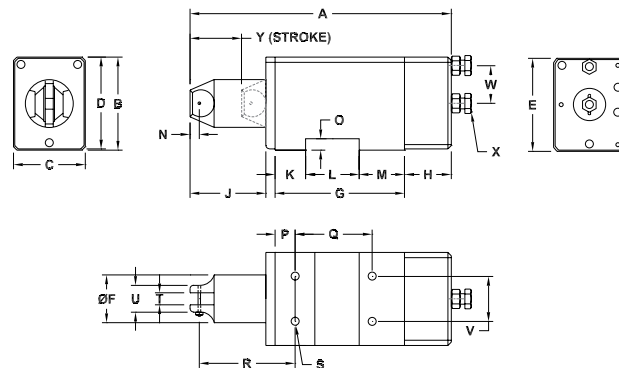
Cutter Body	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
CF-5	124	54	44	44	47	28	80	15	10	19	16	33	31	7	8	10	45	32	M6	7	20	30	18	G 1/4"	30
CF-10	146	64	54	54	54	34	100	15	10	21	26	40	34	7	8	16	60	40	M6	9	20	30	19	G 1/4"	30
CF-20	165	70	62	62	62	42	117	15	10	23	26	55	36	9	8	16	75	40	M6	12	26	34	21	G 1/4"	30

Cutter Body	Cutting Capacity	Weight(g)	Air Consumption (cm ³ / stroke)	Working Air Pressure (bars)	Blade Category
CF-5	Soft Plastic ø 2	570	490	5-6	I
CF-10	Soft Plastic ø 4 Hard Plastic ø 2.6	940	830	4-5	I
CF-20	Soft Plastic ø 7 Hard Plastic ø 5	1300	1160	5-6	I

* Soft Plastics are PP & PE

CL... Turtle Neck Blade Type

CL... Schnapper Typ
CL...タイプ (刃部可動・機械取付タイプ)



- Separate Ports for cutter slide and blade activation
- As air is applied to the cutter's slide port, the moveable part of the cutter body retracts 30mm
- As air to the cutter's slide port is exhausted, the moveable part of the cutter body returns
- Only one air circuit is needed when Pneumatic Timing Unit (TU-01) is used

Cutter Body	Cutting Capacity	Weight (g)	Air consumption (cm ³ / stroke)	Working Air Pressure (bars)	Blade Category
CL-5	Soft Plastic Ø 2	650	300	4-5	I
CL-10	Soft Plastic Ø 4 Hard Plastic Ø 2.6	1,050	590	4-5	I
CL-20	Soft Plastic Ø 7 Hard Plastic Ø 5	1,450	980	5-6	I

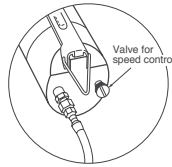
* Soft Plastics are PP & PE

** Hard Plastics are ABS, Polycarbonates, Acrylic resin, POM & PS



SC... Cutting Speed Adjustable Type

SC... Drehzahljustierungs Typ
SCタイプ(切断速度調整タイプ)



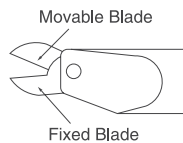
- Speed adjustable cut
- Optimizes quality of cut and reduces cracking and chipping
- Extends the life of cutter blades

Cutter Body	Cutting Capacity	Body Length	Body ø	Weight (g)	Air Consumption (cm ³ / stroke)	Working Air Pressure (bars)	Blade Category
SC-10	Soft Plastic ø 4 Hard Plastic ø 2.6	133	250	36	120	4-5	I
SC-20	Soft Plastic ø 7 Hard Plastic ø 5	149	410	45	240	5-6	I
SC-30	Soft Plastic ø 10 Hard Plastic ø 6.5	184	670	56	590	5-6	I

* Soft Plastics are PP & PE ** Hard Plastics are ABS, Polycarbonates, Acrylic resin, POM & PS

CP... Scissors Action Blade Type

CP... Scherenbewegungs Typ
CPタイプ(丸型・機械取付タイプ)



- Scissor style cutting method
- Blade has a movable and a fixed side

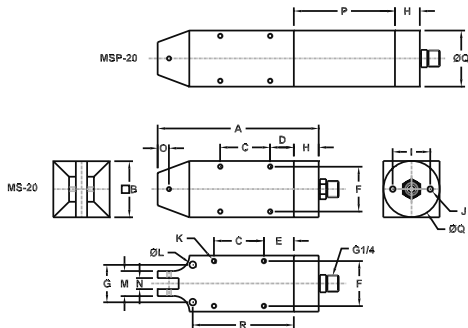
Cutter Body	Cutting Capacity	Body Length	Body ø	Weight (g)	Air Consumption (cm ³ / stroke)	Working Air Pressure (bars)	Blade Category
CP-10M	Soft Plastic ø 4 Hard Plastic ø 2.6	132	220	36	116	4-5	IV
CP-20M	Soft Plastic ø 7 Hard Plastic ø 5	155	400	45	230	5-6	IV
CP-30M	Soft Plastic ø 10 Hard Plastic ø 6.5	185	630	56	584	5-6	IV

* Soft Plastics are PP & PE ** Hard Plastics are ABS, Polycarbonates, Acrylic resin, POM & PS

MS/MSP... Standard Square Type/Pressure Booster Type

MS... Standard Typ, Quadratisch /
MSP... Druckverstärker Typ

MSタイプ(角型標準タイプ)



Cutter Body	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
MS-3	89	20	40	19	24	16	14	21	14	M3	M3	3.3	20	7	7	-	-	71
MS-5	74	30	30	14	19	24	20	20	20	M4	M3	4.3	20	7	7	-	-	55
MS-10	93	36	30	18	23	28	28	20	24	M4	M4	4.3	20	9	7	-	-	65
MS-20	109	45	40	19	24	36	36	20	30	M5	M4	5.3	26	12	9	-	-	81
MS-30	150	56	60	20	30	46	46	20	40	M6	M5	5.3	36	17	15	-	-	110
MSP-20	109	45	40	19	24	36	36	20	30	M5	M4	5.3	26	12	9	87	45	81
MSP-30	150	56	60	20	30	46	46	20	40	M6	M5	5.3	36	17	15	92	56	110

Cutter Body	Cutting Capacity	Weight (g)	Air Consumption (cm ³ / stroke)	Working Air Pressure (bars)	Blade Category
MS-3	Soft Plastic ø 1	100	35	4-5	I
MS-5	Soft Plastic ø 2	160	64	4-5	I
MS-10	Soft Plastic ø 4 Hard Plastic ø 2.6	260	116	4-5	I
MS-20	Soft Plastic ø 7 Hard Plastic ø 5	430	230	5-6	I
MS-30	Soft Plastic ø 10 Hard Plastic ø 6.5	810	584	5-6	I
MSP-20	Soft Plastic ø 7 Hard Plastic ø 5	650	400	5-6	I
MSP-30	Soft Plastic ø 10 Hard Plastic ø 6.5	1220	956	5-6	I

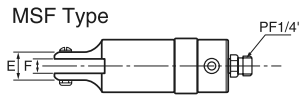
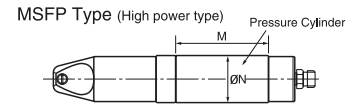
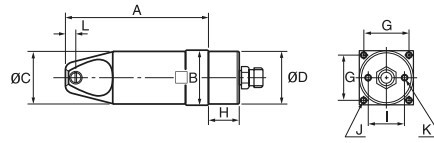
* Soft Plastics are PP & PE ** Hard Plastics are ABS, Polycarbonates, Acrylic resin, POM & PS

- Square body with mounting holes on all four sides
- MSP-Type has a pressure booster



MSF/MSFP... Lightweight Square Type/High Power Square Type

MSF... Quadratischer Typ /
MSFP... Hochleistungs Typ
MSFPタイプ (角型・増圧タイプ)



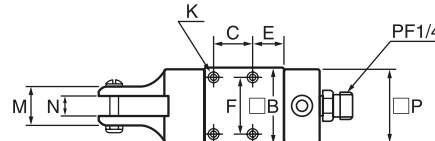
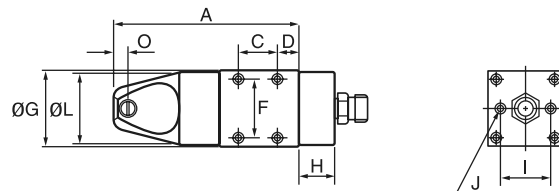
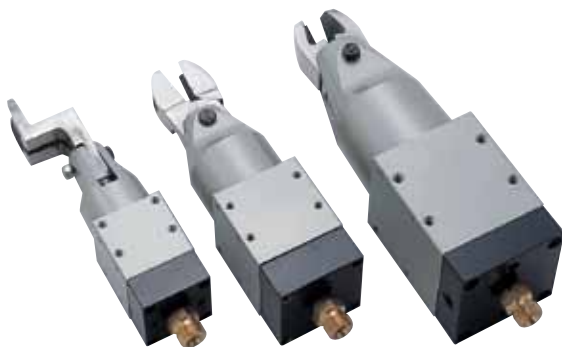
- Cylindrical body with a mounting flange
- Useful for table mounting where a low profile is necessary
- MSFP-Type has a pressure booster

Cutter Body	A	B	C	D	E	F	G	H	I	J	K	L	M	N
MSF-10	93	36	35	35	18	9	30	20	24	M3	M4	7	-	-
MSF-20	109	45	44	44	24	12	37	20	30	M4	M5	9	-	-
MSF-30	150	56	55	55	34	17	46	20	40	M4	M6	15	-	-
MSFP-10	93	36	35	35	18	9	30	20	24	M3	M4	7	71	36
MSFP-20	109	45	44	44	24	12	37	20	30	M4	M5	9	87	45
MSFP-30	150	56	55	55	34	17	46	20	40	M4	M6	15	92	56

Cutter Body	Cutting Capacity	Weight(g)	Air Consumption (cm ³ / stroke)	Working Air Pressure (bars)	Blade Category
MSF-10	Soft Plastic ø 4 Hard Plastic ø 2.6	180	116	4-5	I
MSF-20	Soft Plastic ø 7 Hard Plastic ø 5	310	230	5-6	I
MSF-30	Soft Plastic ø 10 Hard Plastic ø 6.5	560	584	5-6	I
MSFP-10	Soft Plastic ø 4 Hard Plastic ø 2.6	280	223	3-3.5	I
MSFP-20	Soft Plastic ø 7 Hard Plastic ø 5	530	508	3-3.5	I
MSFP-30	Soft Plastic ø 12 Hard Plastic ø 6.5	880	958	5-6	I

MSK... Square Type

MSK... Quadratischer Typ
MSKタイプ (角型・機械取付タイプ)



- Square body for secure mounting
- Cylindrical head fits in to tight spaces

Cutter Body	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
MSK-10	87	36	18	10	15	28	35	17	24	M4	M4	33	18	9	7	35
MSK-20	102	45	20	15	20	36	44	17	30	M5	M4	42	24	12	9	44
MSK-30	141	56	27	18	26	46	55	17	40	M6	M5	52	34	17	15	55

Cutter Body	Cutting Capacity	Weight(g)	Air Consumption (cm ³ / stroke)	Working Air Pressure (bars)	Blade Category
MSK-10	Soft Plastic ø 4 Hard Plastic ø 2.6	190	116	4-5	I
MSK-20	Soft Plastic ø 7 Hard Plastic ø 5	340	230	5-6	I
MSK-30	Soft Plastic ø 10 Hard Plastic ø 6.5	590	584	5-6	I

* Soft Plastics are PP & PE ** Hard Plastics are ABS, Polycarbonates, Acrylic resin, POM & PS

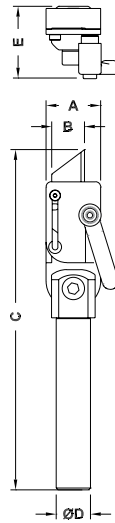


GCK... Adjustable Gate Cutting Knife

GCK... Filmanguss-Schneidmesser verstellbar
GCK... 可調節ゲート切断用ナイフ



- Easily mounts to standard mounting clamps
- Lightweight for maximum efficiency in cutting applications
- Elbow arm allows for fine adjustment of cutter blade



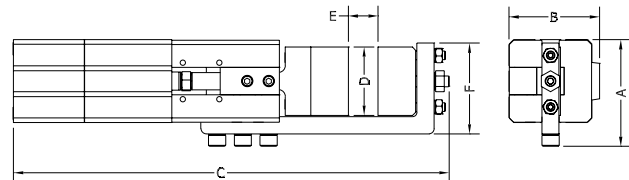
Adjustable Cutting Knife	A	B	C	D	E
GCK 20-150	32	19	198	20	42

TCN... Thrust Cutter Nipper

TCN... Druckangussschneider
TCN... スラストカッターニッパ



- Blade positioned at 45° angle
- Actuated guillotine motion allows for access to hard-to-reach areas

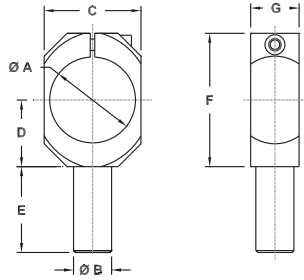


Thrust Cutter Nipper	A	B	C	D	E	F
TCN 63	99	84	405	64	28	85



MR-KS... Standard Sprue Cutter Clamp

MR-KS...Klemmstück für Angusschneidzange
MR-KS... エアニッパークランプ

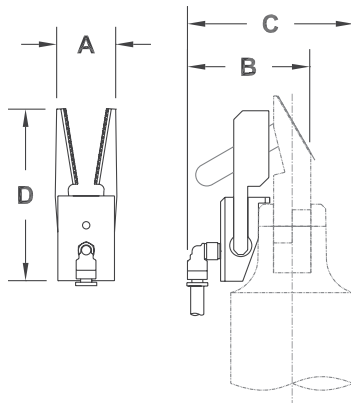


- Adjustable clamp for the cutter body
- Mounts any 20 series gripper mounting arms and mounting clamps, including GLA's, WKA's, WSL's, and WST's

	A	B	C	D	E	F	G	Sprue Cutter
MR-KS 10	36	20	45	22	45	51	25	MR-10 A
MR-KS 20	45	20	51	35	45	70	25	MR-20 A
MR-KS 30	56	20	64	40	45	80	25	MR-30 A
MR-KS 50	75	20	89	50	50	100	25	MR-50 A

MR-AH... Sprue Holder

MR-AH... Angusshalter
MR-AH... スプルーホルダー

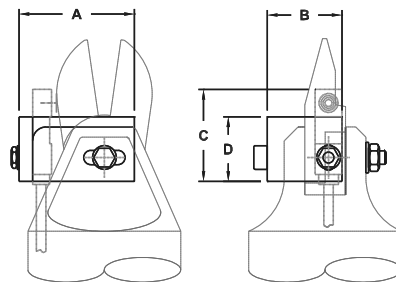


- New compact design for tight applications
- Efficiently mounts to cutter body
- Normally connected to nipper supply line for single pneumatic operation

	A	B	C	D	Sprue Cutter
MR-AH 20	18	47	81	66	MR 20 A
MR-AH 30	18	37	75	66	MR 30 A
MR-AH 50	18	37	93	67	MR 50 A

MR-SH... Sprue Cutter Sensor Kit

MR-SH... Angusshalter
MR-SH.スプルー・カッター・センサー用具一式



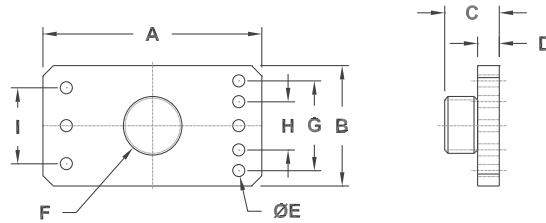
- Ensures blade is open and assures part clearance
- Adjustable for use with F5, F5A, F5S, F5U1, F5NR279, and F5XR325 blades

	A	B	C	D	Sprue Cutter	Sensor
MR-SH 20	34	22	27	19	MR 20 A	SP 1.5 / SN 1.5



ME-HP... Adapters for ASZ-ME Cutters

ME-HP... Halteplatte für Angusschneidzange
ME-HP... タイプエアニッパー用アダプター



- Allows ME sprue cutters to attach to standard VLR Arm Extensions and mount in standard mounting clamps

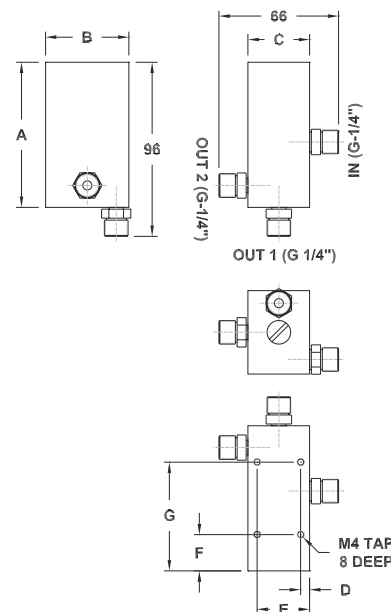
	A	B	C	D	E	F	G	H	I	Cutter	Extension
ME-HP 3/5/10	63	35	16	6	3.5	M17 X 1	26	14	22	ME 3/5/10	VLR 20-L
ME-HP 20/30	100	51	16	6	4.5	M27 X 1	34	~	40	ME 20/30	VLR 30-L

TU-01... Timing Unit

TU-01...Zeitrelais
TU-01... タイミング単位



- Out 1 Port fires first and is intended to control the slide or tilt motion of the cutter body
- Out 2 Port fires after a short delay and is intended to control the blade
- Delay between port firing is adjustable to suit specific applications
- Port Size G 1/4"



	A	B	C	D	E	F	G
TU-01	80	46	34	5	20	20	60

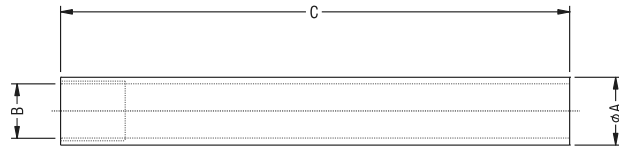


VLR... Arm Extension

VLR... Verlängerungsrohr
VLR...フィンガー延長部品



- Extends GRF and GRW gripper fingers
- Attaches to ADZ and ADG cylinder adapters, ME-HP cutter adapters, and ZTB locator pins
- Tightening hole for securing connection to mating parts



	A	B	C
VLR 10-90	10	M8 x 1	90
VLR 14-120	14	M12 x 1	120
VLR 20-150	20	M17 x 1	150
VLR 30-200	30	M27 x 1	200

WF... Work Finisher

WF... Entgratungsmesser Workfinisher aus Keramik
WF...セラミック製バリ取りハンドツール ワークフィニッシャー



- Space age ceramics make safe deburring possible with Work Finisher's unique non-blade like edge.
- Deburrs hard plastics effortlessly without cutting hands and fingers
- Ideal for curved and complicated shapes
- Excels on ultra-hard resins like glass-fiber, carbon-fiber, and talc filled plastics

	Blade Length	Overall Length	Blade Thickness
WF-1540	40	130	10
WF-620	25	105	6

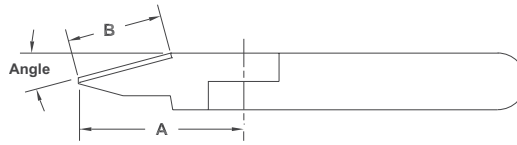


Category I Standard Blades

Schneideinsätze Typ I
ファミリー I ブレード

F* Type

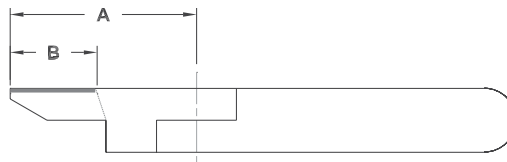
- Can be used on MR, ML, MSR, CF, MS/MSP, SC, MSF/MSFP, MSK, SMR cutters



Blade No.	A (Pivot Location)	B (Edge Length)	C (Blade Opening)	Blade Angle	Cutter Body Size
F10	24	12	2.5	15°	3
F1	24	12	3	15°	5
F3	27	12	4.5	25°	10
F5	35	15	8.5	15°	20
F9PF	65	38	15/30	15°	30/50

F*S Type

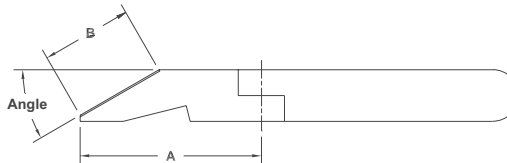
- Can be used on MR, ML, MSR, CF, MS/MSP, SC, MSF/MSFP, MSK, SMR cutters



Blade No.	A (Pivot Location)	B (Edge Length)	C (Blade Opening)	Cutter Body Size
F10S	24	12	2.5	3
F1S	24	12	3	5
F3S	27	13	4.5	10
F5S	35	16	8.5	20
F9PSF	65	37	15/30	30/50

FD* Type

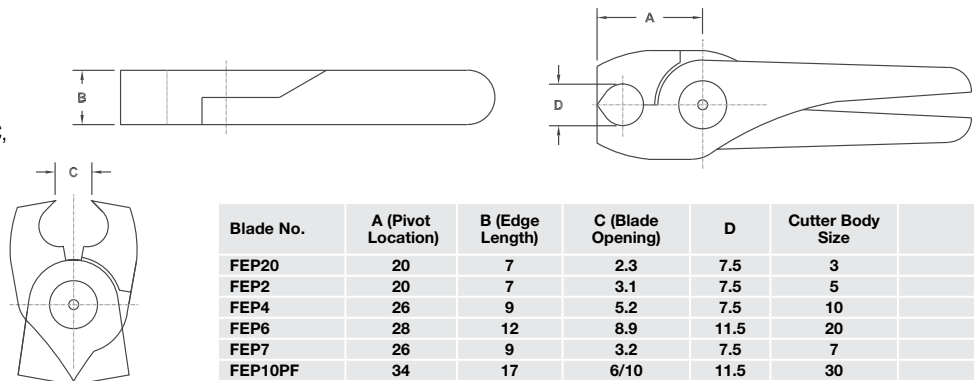
- Can be used on MR, ML, MSR, CF, MS/MSP, SC, MSF/MSFP, MSK, SMR cutters



Blade No.	A (Pivot Location)	B (Edge Length)	C (Blade Opening)	Blade Angle	Cutter Body Size
FD10	24	12	2.5	40°	3
FD1	24	12	3.0	40°	5
FD3	27	13	4.5	40°	10
FD5	35	16	8.5	40°	20
FD7	27	12	3.4	40°	7
FD9PF	65	28	15/26	30°	30/50

FEP* Type

- Can be used on MR, ML, MSR, CF, MS/MSP, SC, MSF/MSFP, MSK, SMR cutters



Blade No.	A (Pivot Location)	B (Edge Length)	C (Blade Opening)	D	Cutter Body Size
FEP20	20	7	2.3	7.5	3
FEP2	20	7	3.1	7.5	5
FEP4	26	9	5.2	7.5	10
FEP6	28	12	8.9	11.5	20
FEP7	26	9	3.2	7.5	7
FEP10PF	34	17	6/10	11.5	30

± 1mm tolerance for dimensions B & C



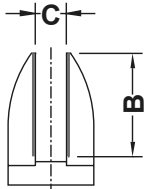
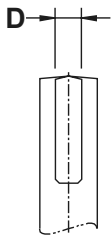
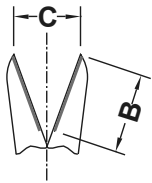
Category I Additional Blades for Size 20 Bodies

Typ I Zusätzliche Schneideinsätze für 20-er Angusschneider-Gehäuse

ファミリー I ブレード

F5, FD, EP Type

Cutting edge Highlighted



B= Blade Length

	B	Blade #	
	34	*F5U1	
	25	*F55U23	
Note Cutting Edge	33	*F5NR329	
	23	*F5NR279	
	18	*F5X62	
	16	*F5XR325	
	34	*F5XR302	
	12	*EP6UR322C	

*Call for availability

- Can be used on size 20 MR, ML, MSR, CF, CL, MS/MSP, SC, MSF/MSFP, MSK, SMR cutters.

Buy with confidence.

Find a lower price?

We'll match that price on the spot. It's that simple.

Special Category I Blades for Size 20 Cutter Bodies

Blade No.	A (Pivot Location)	B (Edge Length)	C (Blade Opening)	D (Center Gap)	Blade Angle
F5U1	62	34	17	~	15°
F55U23	44	25	12	~	20°
FD5A	35	16	5	~	40°
F5NR329	52	33	7	~	40°
F5NR279	45	23	11	~	90°
F5X62	61	18	16	~	90°
F5XR325	40	16	10	~	90°
F5XR302	50	34	10	~	90°
EP6UR322C	48	12	11	8	90°
EP6UR322	48	6	11	8	90°

± 1mm tolerance for dimensions B & C



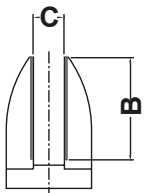
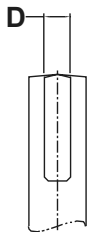
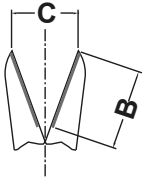
Category I Additional Blades for Size 30 & 50 Bodies

Typ I Zusätzliche Schneideinsätze für 30er und 50er Angusschneider-Gehäuse

ファミリー I ブレード

F9 Type

Cutting edge Highlighted



B= Blade Length

	B	Blade #	
	50	*F9PZXR352F	
	40	*F9VPOF	
Note Cutting Edge	40	*F9PVR48F	
	32	*F9PX60F	
	17	*F9PZXR261F	
	33	*F9PXR25F	
	40	*F9PNR322F	
	30	*F9PZXR393F	

*Call for availability

- Can be used on size 30/50 MR, ML, MSR, CF, CL, MS/MSP, SC, MSF/MSFP, MSK, SMR cutters.

Blade No.	A (Pivot Location)	B (Edge Length)	C (Blade Opening)		D (Center Gap)	Blade Angle
			30 Series	50 Series		
F9PZXR352F	100	50	16	35	~	0°
F9VPOF	60	40	15	20	~	30°
F9PVR48F	75	40	17	30	~	30°
F9PX60F	55	32	10	23	~	60°
F9PZXR261F	110	17	14	34	13.5	85°
F9PXR25F	50	33	10	19	~	90°
F9PNR322F	65	40	12	27	~	90°
F9ZXR393F	80	30	21	37	~	0° (offset)

+/- 1mm tolerance on B & C

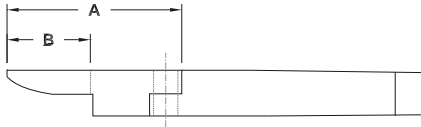
*SAS Automation will match any competitor's price for stock components with proper verification.



Category II Standard Blades

Schneideinsätze Typ II
ファミリー I ブレード

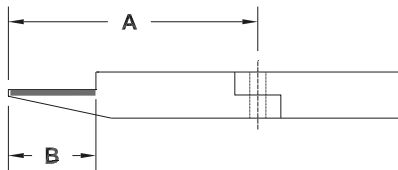
F*E Type



Blade No.	A (Pivot Location)	B (Edge Length)	C (Blade Opening)	Cutter Body Size
F10E	24	13	3.5	3
F1E	24	12	5.5	5
F3E	27	13	7	10
F5E	35	18	9	20
F9E	65	39	15	30

- Can be used on ME & MER cutters.

F*EK Type



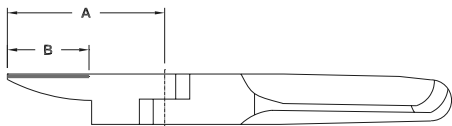
Blade No.	A (Pivot Location)	B (Edge Length)	C (Blade Opening)	Cutter Body Size
F10EK	24	13	3.5	3
F1EK	24	12	5.5	5
F3EK	27	13	7	10
F5EK	35	18	9	20
F9EK	65	39	15	30

- Can be used on ME & MER cutters.

Category III Standard Blades

Schneideinsätze Typ III
ファミリー III ブレード

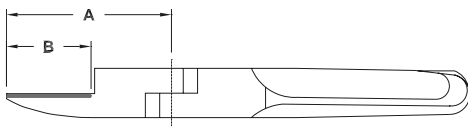
FG* Type



Blade No.	A (Pivot Location)	B (Edge Length)	C (Blade Opening)	Cutter Body Size
FG10	24	13	4	3
FG3	27	13	7	10
FG5	34	18	8	20

- Can be used on MG cutter.

FG*K Type



Blade No.	A (Pivot Location)	B (Edge Length)	C (Blade Opening)	Cutter Body Size
FG10K	24	13	4	3
FG3K	27	13	7	10
FG5K	34	18	8	20

- Can be used on MG cutter.

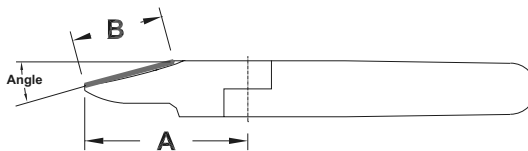


Category IV Standard Blades

Schneideinsätze Typ IV
ファミリー IV ブレード (はさみの作用)

F*** Type

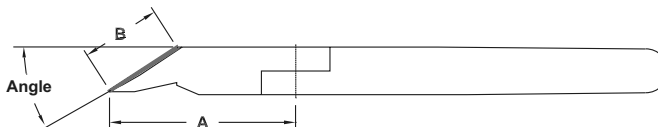
- Can be used on CP cutters
- Only one side of the blade moves, making locating cut easier



Blade No.	A (Pivot Location)	B (Edge Length)	C (Blade Opening)	Blade Angle	Cutter Body Size
F300	27	15	3	15°	10
F500	35	22	7	15°	20
F900	65	45	10	15°	30

FD*** Type

- Can be used on CP cutters
- Only one side of the blade moves, making locating cut easier



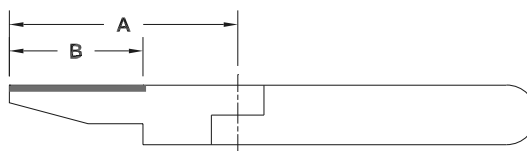
Blade No.	A (Pivot Location)	B (Edge Length)	C (Blade Opening)	Blade Angle	Cutter Body Size
FD300	27	15	3	40°	10
FD500	34	20	7	40°	20
FD900	65	27	10	40°	30

Category V Standard Blades

Schneideinsätze Typ V
ファミリー V ブレード

FN* Type

- Can be used on SN cutters
- Pushes up close to part when cutter strokes in
- Pulls cut material away from part as cutter returns



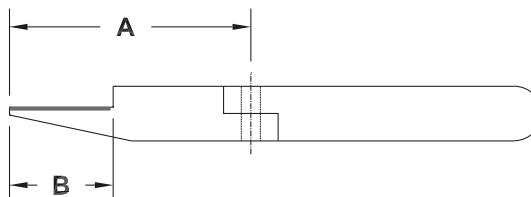
Blade No.	A (Pivot Location)	B (Edge Length)	C (Blade Opening)	Cutter Body Size
FN10	24	11	3.5	3
FN1	24	11	5.5	5
FN3	27	12	7.5	10
FN5	35	15	8.5	20

Category VI Standard Blades

Schneideinsätze Typ VI
ファミリー VI ブレード

FNP* Type

- Can be used on SNP cutters
- Pulls up close to part when cutter strokes out
- Pushes cut material away from part as cutter returns



Blade No.	A (Pivot Location)	B (Edge Length)	C (Blade Opening)	Cutter Body Size
FNP10	24	11	3.5	3
FNP1	24	11	5.5	5
FNP3	27	12	7.5	10
FNP5	35	15	8.5	20



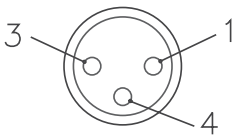
ソブシリンダおよび付属部品

IRK & RRK... Cylinder Sensor

IRK & RRK... Zylindersensoren
IRK, RRK... センサー



- Sensors with or without connectors
- 2-Wire Reed switch sensors have higher voltage resistance capability
- 3-Wire Solid State Switches have faster reaction time



Proximity Sensors without Quick Connectors						
	Sensor Type	Supply Voltage (VDC)	Applicable Component/ Cylinder	Cable Length	Wires	Output
IRK 4	Ind. Proximity	10-30	PGR...	3m	3	PNP
RRK-93	Reed Switch	24	IST / KHZ / RC B-S / SZD	3m	2	~
RRK-M9P	Solid State Switch	4.5-28	IST / KHZ / RC B-S / SZD	3m	3	PNP
RRK-Y59B	Reed Switch	24	LPG 10-.../PGR...-S	3m	3	~
RRK-Y7P	Solid State Switch	4.5-28	LPG 10-.../PGR...-S	2m	3	PNP
SN 1.5	Ind. Proximity	10-30	GRZ / MR-SH / ZTS	2m	3	NPN
SP 1.5	Ind. Proximity	10-30	GRZ / MR-SH / ZTS	2m	3	PNP

Cylinder Sensors with M8, 3 Pin Quick Connectors						
	Sensor Type	Supply Voltage (VDC)	Applicable Component/ Cylinder	Cable Length	Wires	Output
IRK 4-TP	Ind. Proximity	10-30	PGR...	0.5m	3	PNP
RRK-93-TP	Reed Switch	24	IST / KHZ / RC B-S / SZD	0.5m	2	~
RRK-M9P-TP	Solid State Switch	4.5-28	IST / KHZ / RC B-S / SZD	0.5m	3	PNP
RRK-OHSP-006	Solid State Switch	5-30	ISC MPS-.../ LPG / RPL-...	150mm	3	PNP
RRK-OISP-014	Ind. Proximity	10-30	LPG RPW-375-.../ RC-25.4-RR / RC-31.8-RR	150mm	3	PNP
RRK-OISP-015	Ind. Proximity	10-30	RC-12.7-RR / RC-19.1-RR	150mm	3	PNP
RRK-OISP-019	Ind. Proximity	10-30	PGR 5-R / PGR 10-R	150mm	3	PNP
RRK-Y59B-TP	Reed Switch	24	LPG 10-.../PGR...-S	0.5m	2	~
RRK-Y7P-TP	Solid State Switch	4.5-28	LPG 10-.../PGR...-S	0.5m	3	PNP
SN 1.5-P	Ind. Proximity	10-30	GRZ / MR-SH / ZTS	200mm	3	NPN
SP 1.5-P	Ind. Proximity	10-30	GRZ / MR-SH / ZTS	200mm	3	PNP
SP 1.5 PM1.2	Ind. Proximity	10-30	GRZ / MR-SH / ZTS	1.2m	3	PNP

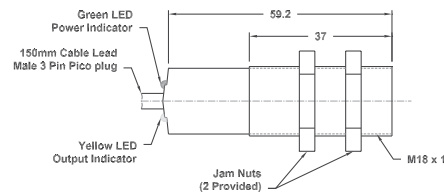
LRS & LES... Optical Sensors

LRS & LES... Teilesensoren
LRS & LES... 光学センサー

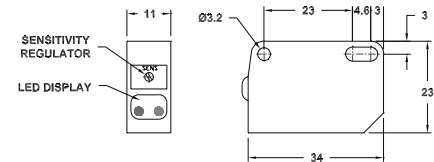


- Long sensing range
- Provides part present sensing for parts when vacuum sensors can't be used due to thin material
- LES sensor can be used with standard mounting clamps when attached to a GGE 14-80 FB
- LRS sensor has round shape and includes jam nuts for plate mounting

LRS-18P



LES-5



	Sensor Type	Supply Voltage (VDC)	Sensing Range (mm)	Cable Length	Wires	Quick Connector	Output
LES-5	Diffuse Reflective	10-30	30-300	2m	3	~	PNP
LES-5P	Diffuse Reflective	10-30	30-300	150mm	3	3-Pin Plug	PNP
LRS-18P	Diffuse Reflective	10-30	0-300	150mm	3	3-Pin Plug	PNP

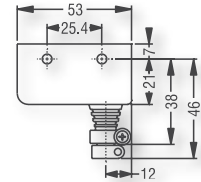
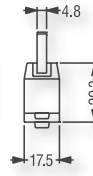
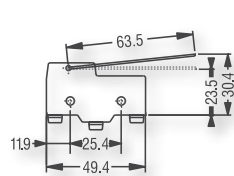
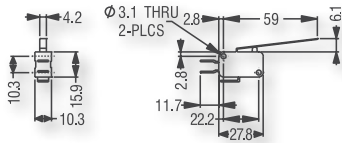


SEO & GEO... Mechanical Sensors

SEO & GEO... Teilesensoren (mechanisch)
SEO & GEO... 物理センサー



- Provides part present sensing when vacuum sensors can't be used and a short sensing range is necessary
- SEO sensor can be used with standard mounting clamps when attached to a GGE 14-80 FB
- GEO houses and protects an SEO's terminals



	Description	Max. Supply Voltage	Wires	Output
GEO-10	Terminal Enclosure for SEO 10	~	~	~
SEO-5	Mechanical Switch	125 VDC (0.1A)/125 VAC	2	~
SEO-10	Mechanical Switch	125 VDC (0.1A)/125 VAC	2	~

DSD... Double Sheet Detector



Stock Number	Part Number	Description
E18309001	DSD-36 Control Module	Controller
E18309003	DSD-36 Sensor	Sensor
E18309000	DSD-36 Mounting Bracket	Mounting Bracket
E18309002	DSD-36 C-5 Cable	Home Run Cable

- Detects the thickness of ferrous metals on the face of the sensor using pulsed electromagnetic detection.
- Permits double sheet/blank detection with minimal magnetic attraction of the sheet.
- Controller, Sensor, Mounting Bracket, and Cable sold separately.
- Can detect sheets with min thickness of .25mm to a max of 2.3mm.
- Standard SAS mounting arm mounts to standard clamps.

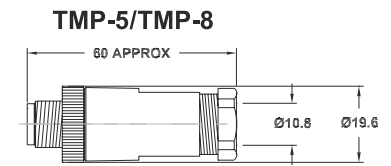
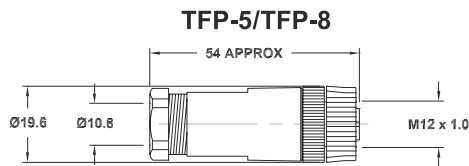
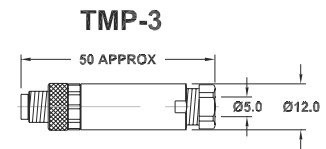
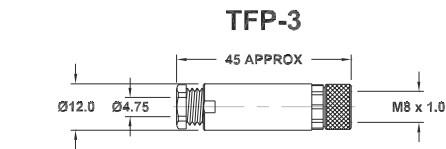


TFP & TMP... Electrical Connectors

TFP & TMP... Steckverbinder
TFP & TMP... 電気プラグ

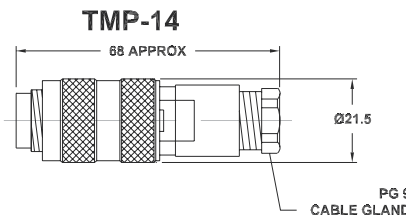
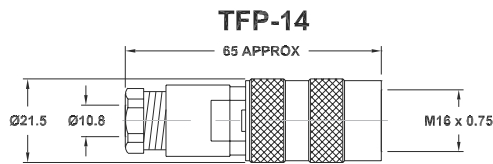


- Field wireable screw down terminal cable ends
- No soldering required



Female		
	Connector Size	Pins
TFP-3	M8	3
TFP-5	M12	5
TFP-8	M12	8
TFP-14	M16	14

Male		
	Connector Size	Pins
TMP-3	M8	3
TMP-5	M12	5
TMP-8	M12	8
TMP-14	M16	14

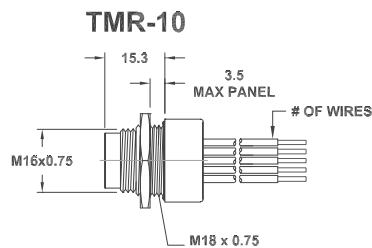
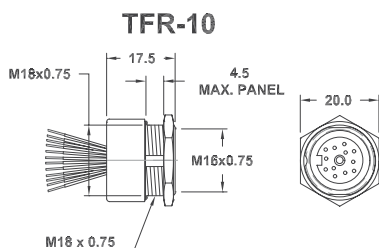
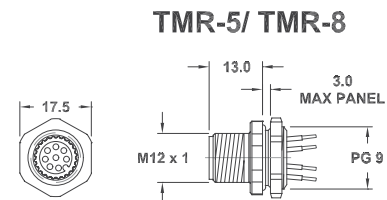
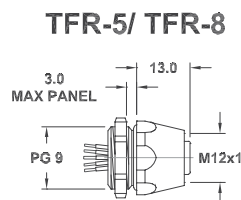
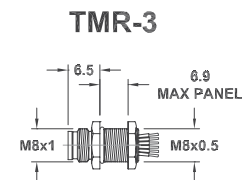
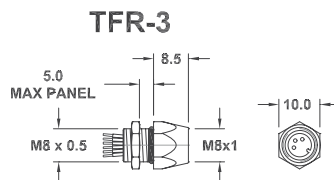


TFR & TMR... Bulkhead Electrical Receptacles

TFR & TMR... Elektronischer Schraubeinsatz
TFR & TMR... パルクヘッド電気リセプティカル



- Field wireable receptacles with wire leads
- Add a quick disconnect for home run and sensor cables to any tool
- No soldering required



Female			
	Connector Size	Pins	Lead Length
TFR-3	M8	3	500mm
TFR-5	M12	5	1m
TFR-8	M12	8	1m
TFR-10	M16	10	1m

Male			
	Connector Size	Pins	Lead Length
TMR-3	M8	3	500mm
TMR-5	M12	5	1m
TMR-8	M12	8	1m
TMR-10	M16	10	1m

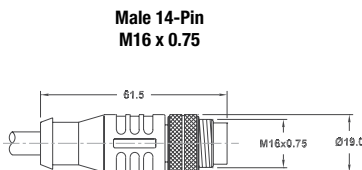
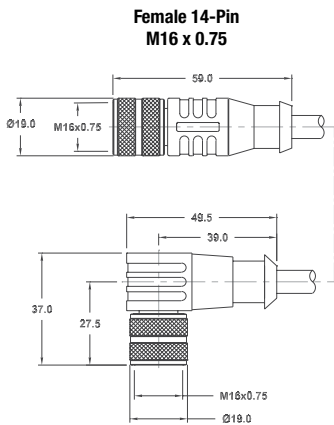
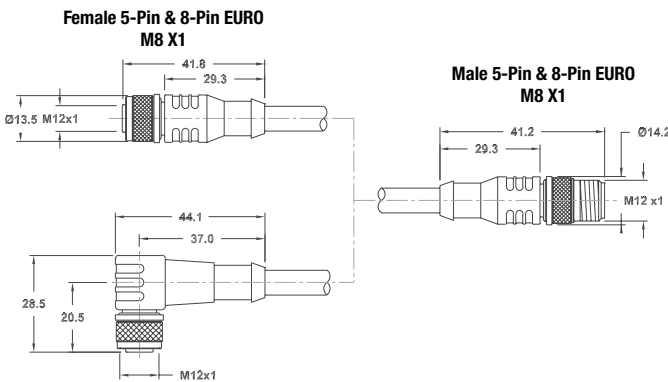
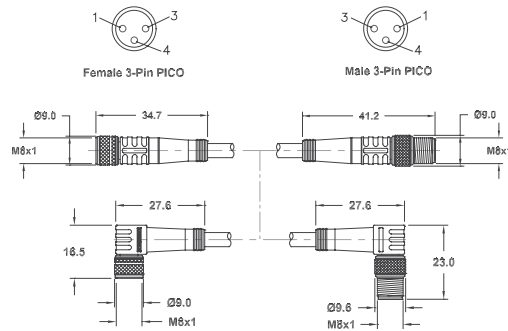


FM & FW... Cables

FM & FW... Kabel
FM & FW... ケーブル



- Threaded plug extension cables
- Types available for sensors, PJB's, AJB's, and J-Boxes
- High flexibility insulation for long cable life



3-Pin Sensor Cables

	Connector Size	Female Connector	Male Connector	# of Leads (Wires)	Length (Meters)
FM3-SS.5	M8	Straight	Straight	3	0.5
FM3-RS.5	M8	Right	Straight	3	0.5
FM3-SR.5	M8	Straight	Right	3	0.5
FM3-RR.5	M8	Right	Right	3	0.5
FM3-SS1	M8	Straight	Straight	3	1
FM3-RS1	M8	Right	Straight	3	1
FM3-SR1	M8	Straight	Right	3	1
FM3-RR1	M8	Right	Right	3	1
FM3-SS2	M8	Straight	Straight	3	2
FM3-RS2	M8	Right	Straight	3	2
FM3-SR2	M8	Straight	Right	3	2
FM3-RR2	M8	Right	Right	3	2
FW3-SW2	M8	Straight	Wireable	3	2
FW3-RW2	M8	Right	Wireable	3	2
FW3-SW4	M8	Straight	Wireable	3	4
FW3-RW4	M8	Right	Wireable	3	4

5-Pin Home Run Cables

	Connector Size	Female Connector	Male Connector	# of Leads (Wires)	Length (Meters)
FM5-SS3	M12	Straight	Straight	5	3
FM5-RS3	M12	Right	Straight	5	3
FM5-SS10	M12	Straight	Straight	5	10
FM5-RS10	M12	Right	Straight	5	10
FW5-SW3	M12				
FW5-SW5	M12	Straight	Wireable	5	5
FW5-RW5	M12	Right	Wireable	5	5
FW5-SW10	M12	Straight	Wireable	5	10
FW5-RW10	M12	Right	Wireable	5	10

8-Pin Home Run Cables

	Connector Size	Female Connector	Male Connector	# of Leads (Wires)	Length (Meters)
FM8-SS3	M12	Straight	Straight	8	3
FM8-RS3	M12	Right	Straight	8	3
FM8-SS10	M12	Straight	Straight	8	10
FM8-RS10	M12	Right	Straight	8	10
FW8-SW5	M12	Straight	Wireable	8	5
FW8-RW5	M12	Right	Wireable	8	5
FW8-SW10	M12	Straight	Wireable	8	10
FW8-RW10	M12	Right	Wireable	8	10

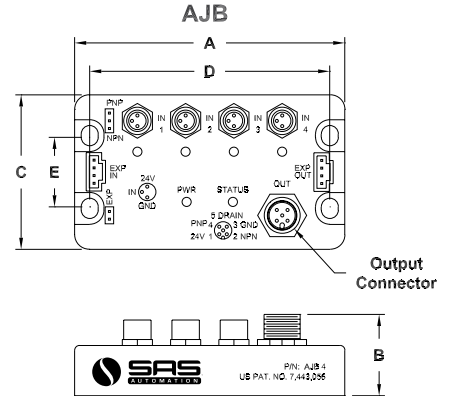
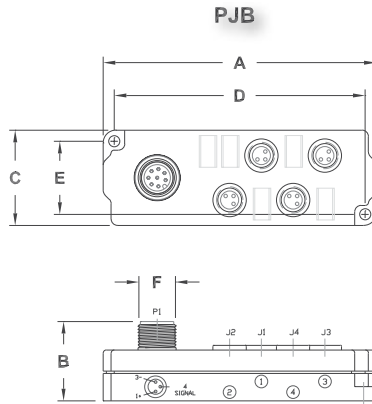
14-Pin Home Run Cables

	Connector Size	Female Connector	Male Connector	# of Leads (Wires)	Length (Meters)
FM10-SS3	M16	Straight	Straight	10	3
FM10-RS3	M16	Right	Straight	10	3
FM10-SS10	M16	Straight	Straight	10	10
FM10-RS10	M16	Right	Straight	10	10
FW10-SW5	M16	Straight	Wireable	10	5
FW10-RW5	M16	Right	Wireable	10	5
FW10-SW10	M16	Straight	Wireable	10	10
FW10-RW10	M16	Right	Wireable	10	10



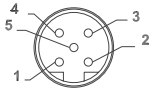
AJB / PJB... Junction Boxes

AJB / PJB... Signalmehrfachverbinder
 AJB / PJB... センサ ロジック



- AND logic (AJB) and Pass-Through (PJB) Junction Boxes with screw in terminals
- Works with PNP or NPN sensors
- Compact design for easy mounting on almost any tool
- Female input connectors
- Male output connectors
- AJB's expandable to 4 boxes, allowing up to 16 inputs to be converged into a single output
- AJB Patent #7,443,056 B2

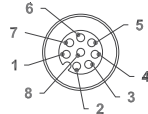
AJB 4



Male 5-Pin EURO
M12 x 1

AJB 4 Male Pinout				
Function	Pin	Wire Color (FW5-...)	Pin	
+V	2	White	1	
-V	5	Gray	3	
PNP	1	Brown		
NPN	3	Blue		

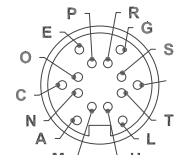
PJB 4



Male 8-PIN EURO
M12 x 1

PJB 4 Male Pinout			
Function	Pin	Wire Color (FW8-...)	
+V	5	Gray	
-V	7	Blue	
Port 1	1	White	
Port 2	2	Brown	
Port 3	3	Green	
Port 4	4	Yellow	

PJB 8



Male 14-PIN
M16 x 1

PJB 8 Male Pinout			
Function	Pin	Wire Color (FW10-...)	
+V	M	Brown	
-V	U	Blue	
Port 1	P	White	
Port 2	E	Green	
Port 3	O	Yellow	
Port 4	C	Gray	
Port 5	N	Pink	
Port 6	R	Red	
Port 7	G	Black	
Port 8	S	Violet	

PJB 4 / PJB 8 / AJB 4



Female 3-Pin PICO
M8 x 1

AJB 4 / PJB 4 / PJB 8 Female Pinout		
Function	Pin	
+V	1	
-V	3	
Signal	4	

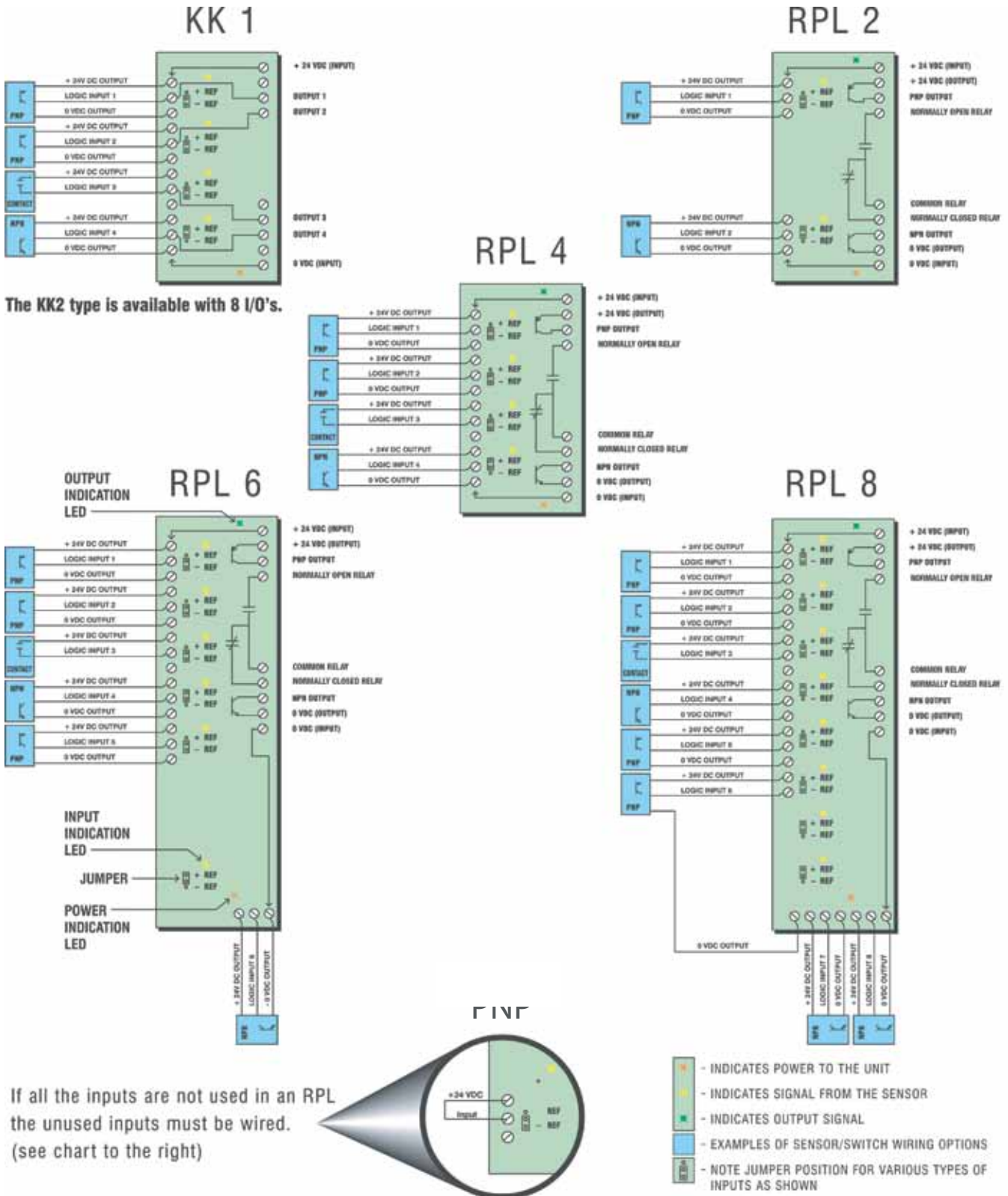
	Inputs	Logic	Supply Voltage (VDC)	Output Connector Size	Output Connector Pins	Output Conductors	Signal Output	A	B	C	D	E
AJB 4	4	AND (series)	15-35	M12	5	4	PNP/NPN	81	32	51	79	23
PJB 4	4	Pass Through	10-48	M12	8	6	PNP/NPN	86	25	30	79	23
PJB 8	8	Pass Through	10-48	M16	14	10	PNP/NPN	126	28	30	119	23





KK & RPL... Wiring Sample Diagrams

KK & RPL... Schaltungsbeispiele
KK & RPL... 配線実例図

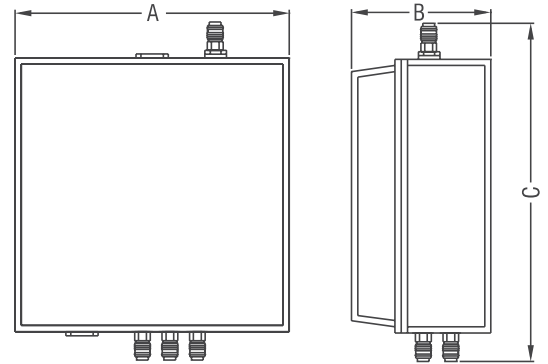




RVB... Robot Valve Box

RVB... Roboter-Ventilanschlussbox

ロボット取付用真空ボックス



- 24 VDC solenoid valves
- Vacuum ejectors & valves
- Air regulator, used to achieve maximum vacuum levels
- Innovative vacuum check valve keeps parts on the EOAT in case of temporary loss of power or air
- 24 VDC vacuum confirmation switches
- Vacuum blow-off solenoid valves control the check-valves and blow-off features
- Standard extra wiring terminals allow EOAT sensors to be wired to the robot through the Valve Box
- Smart junction boards, used for robotic interfacing and effective troubleshooting, include LED's for monitoring I/O's and power supply
- One touch pneumatic fittings and field wireable electrical connectors make the box easy to adapt to different EOAT's and robots

	Air Circuits	Vacuum Circuits	Additional Thru I/O's	A	B	C
RVB 1-1 U22	1	1	4	280	136	345
RVB 1-2 U22	1	2	4	280	136	345
RVB 2-1 U22	2	1	4	280	136	345
RVB 2-2 U22	2	2	4	280	136	345

* U22 Valve Boxes (Exp: RVB 1-1 U22), are upgradeable to 2 air and 2 vacuum circuits

RVB 2-2 U42	2	2	8	280	136	345
RVB 3-2 U42	3	2	8	280	136	345
RVB 4-2 U42	4	2	8	280	136	345

* U42 Valve Boxes (Exp: RVB 2-2 U42), are upgradeable to 4 air and 2 vacuum circuits

RVB Upgrade Kits*

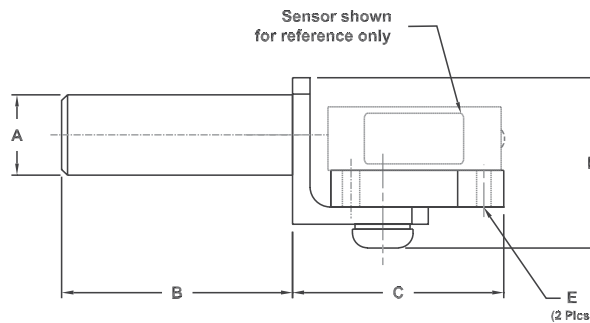
RVB A1	Allows one additional air circuit to be added to a previously purchased RVB-Valve Box
RVB V1	Allows one additional vacuum circuit to be added to a previously purchased RVB-Valve Box

* RVB Upgrade Kits include all necessary fittings and accessories.

GGE...-F Sensor Gripper Arm

GGE...-F Gelenkgreifarm für Sensor

GGE...-F エルボーハンドアーム



- Allows LES and SEO sensors to mount to standard mounting clamps

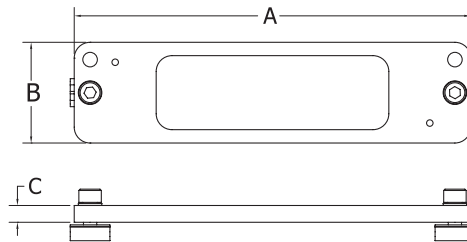
	A	B	C	D	E	Sensor (sold separately)
GGE 14-120-FB	14	120	28	25	M3	LES-5.../ SEO 10



JBM... Junction Box Mount



	A	B	C
JBM 4	118	44	7
JBM 8	150	38	7



- Gives the ability to mount PJBs to profile.

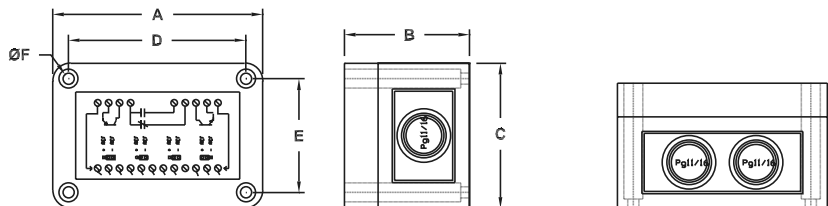
J-Box... Sensor Logic Box

J-Box... Klemmkasten für Sensorsteuerung

J-BOX... センサ ロジック/PNP-NPN コンバータジャンクション ボックス



- Minimize interface wiring and maximize utilization of controller inputs by providing termination/ power distribution points for up to 8 inputs.
- Inputs/ Outputs can be either current sourcing (PNP), sinking (NPN), or a combination of the two
- Includes enclosure and cable grips
- Accessible terminals allow for easy wiring
- May be installed into "Snap Track" on DIN mounting
- Solid State logic for long life
- KK's provide "Pass Through" functionality
- RPL's provide "AND" Logic functionality
- RPL can convert PNP signals to NPN and NPN signals to PNP
- US PAT. #6,812,593



Bottom

	Inputs	Logic	Supply Voltage (VDC)	Signal Output	Signal Output	A	B	C	D	E	F
RPL 2	2	AND (series)	15-35	PNP / NPN / RELAY 'C'	PNP / NPN / RELAY "C"	94	56	65	79	50	4.5
RPL 4	4	AND (series)	15-35	PNP / NPN / RELAY 'C'	PNP / NPN / RELAY "C"	94	56	65	79	50	4.5
RPL 6	6	AND (series)	15-35	PNP / NPN / RELAY 'C'	PNP / NPN / RELAY "C"	130	56	94	115	79	4.5
RPL 8	8	AND (series)	15-35	PNP / NPN / RELAY 'C'	PNP / NPN / RELAY "C"	130	56	94	115	79	4.5
KK 1	1-4	Pass Through / Wireable AND	15-35	(same as input)	same as input	94	56	65	79	50	4.5
KK 2	1-8	Pass Through / Wireable AND	15-35	(same as input)	same as input	130	56	94	115	79	4.5

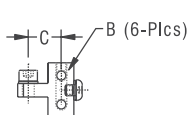


VTB... Manifold Block

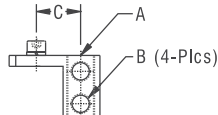


- Allows for multiple porting of pneumatic vacuum or air circuits
- Assures stable attachment to frame profile
- Aligns tubing parallel to the frame for clean plumbing

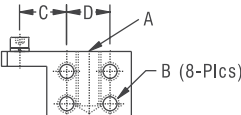
VTB M5 L
MANIFOLD BLOCK



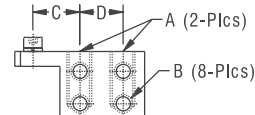
VTB 1/4...
MANIFOLD BLOCK



VTB 2-1-1/4...
MANIFOLD BLOCK



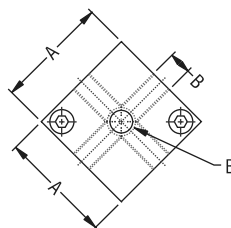
VTB 2-2-1/4...
MANIFOLD BLOCK



	A	B	C	D	Profile
VTB M5 L	~	M5	15	~	L
VTB 1/4 X	G 1/4"	G 1/8"	22	~	X/D
VTB 2-1-1/4 X	G 1/4"	G 1/8"	22	20	X/D
VTB 2-2-1/4 X	G 1/4"	G 1/8"	22	20	X/D
VTB 1/4 JX	G 1/4"	G 1/8"	30	~	JX
VTB 2-1-1/4 JX	G 1/4"	G 1/8"	30	20	JX
VTB 2-2-1/4 JX	G 1/4"	G 1/8"	30	20	JX

VTB... Luftverteiler
VTB... マニホールド ブロック

LVT... Manifold Block

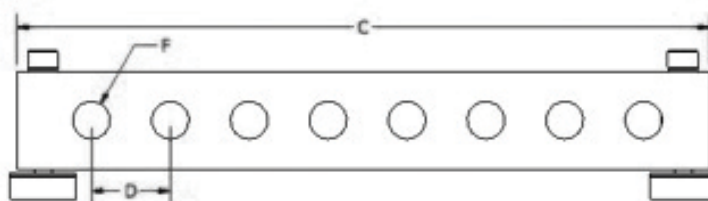
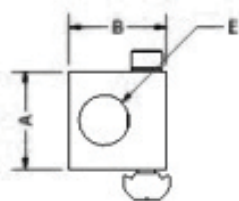


- Allows for multiple porting of pneumatic vacuum or air circuits
- Ports in 5 directions for easy distribution
- Spread out port design accomodates large fittings

	A	B (5 Places)	Profile
LVT M5	22	M5	L/X
LVT 1/8 X	32	G 1/8"	X/HX/D
LVT 1/4 X	38	G 1/4"	X/JX/HX/D

LVT... Luftverteiler
LVT... マニホールド ブロック

VPI... Manifold Block



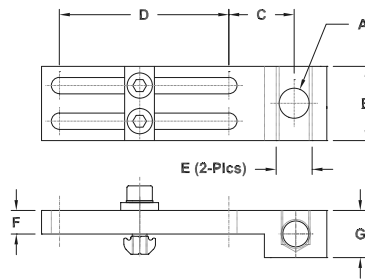
	A	B	C	D	E	F
VPI 1-2-1/4	23	23	50	20	G 1/4	G 1/8
VPI 1-2-3/8	26	26	60	20	G 3/8	G 1/4
VPI 1-4-1/4	23	23	86	20	G 1/4	G 1/8
VPI 1-4-3/8	26	26	100	20	G 3/8	G 1/4
VPI 1-6-1/4	23	23	122	20	G 1/4	G 1/8
VPI 1-6-3/8	26	26	140	20	G 3/8	G 1/4
VPI 1-8-1/4	23	23	158	20	G 1/4	G 1/8
VPI 1-8-3/8	26	26	180	20	G 3/8	G 1/4

- Can mount to SAS aluminum profile or a custom plate
- Have 1/4 and 3/8 inlets and 1/8 and 1/4 outlets
- Have outlets from 2 to 8

WLS... Long Angle Connector

WLS... Winkelstück (lang)

WLS... ロングアングルコネクター



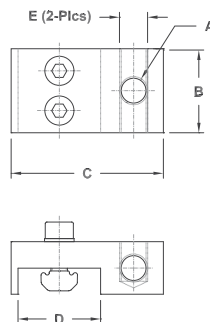
- Allows for low-profile height by mounting vacuum cups directly to the frame
- Adjusts parallel & perpendicular to the profile
- Extra port can connect vacuum to another cup

	A	B	C	D	E	F	G	Profile
WLS M5	M5	16	16	45	M5	6	13	L/X
WLS 1/8	G 1/8"	25	23	57	G 1/8"	8	16	X/HX/D
WLS 1/4	G 1/4"	25	23	57	G 1/8"	8	16	X/JX/HX/D

WSS... Angle Connector

WSS... Winkelstück

WSS... アングル コネクター



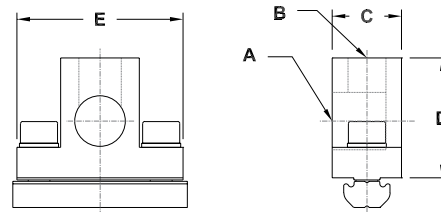
- Allows for low profile height by mounting vacuum cups directly to the frame profile
- Adjustable along the channel of the frame profile
- Extra port can connect vacuum to another cup

	A	B	C	D	E	Profile
WSS M5 L	M5	16	32	18	M5	L
WSS 1/8 X	G 1/8"	25	46	25	G 1/8"	X
WSS 1/4 X	G 1/4"	25	46	25	G 1/8"	X

SAS... Vacuum Cup Connector

SAS... Saugeranschluss (seitlich)

SAS... 吸着パッドコネクター



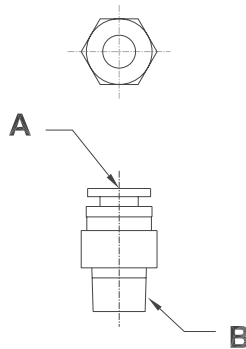
- Provides minimum profile height, allowing vacuum cups to be mounted to the side of the frame profile
- Adjustable along the channel of the frame profile

	A	B	C	D	E	Profile
SAS 1/8	G 1/8"	G 1/8"	16	25	38	L/X/D
SAS 1/4	G 1/4"	G 1/8"	16	25	38	X/JX/HX/D

H... Male Connector

H... Steckverschraubung (gerade)

H... 配管用ワンタッチ継手



- One-touch male fitting
- Fits standard female threads: BSP, BSPT, G, Rc

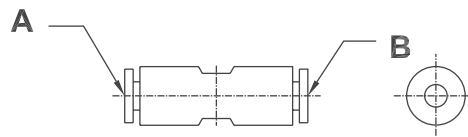
	A (Tubing Size)	B (Male Thread)
H04-M3-10	4	M3 x .5
H04-M5-10	4	M5 x .8
H04-01S-10	4	R 1/8"
H04-02S-10	4	R 1/4"
H06-M5-10	6	M5 x .8
H06-01S-10	6	R 1/8"
H06-02S-10	6	R 1/4"
H08-01S-10	8	R 1/8"
H08-02S-10	8	R 1/4"

* Sold in Packs of 10

H... Straight Unions

H... Steckverschraubung (gerade)

H-ワンタッチ・ストレート・ユニオン



- One-touch straight union fitting

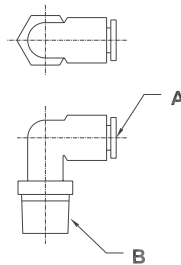
	A (Tubing Size)	B (Tubing size)
H04-00-10	4	4
H04-06-10	4	6
H06-00-10	6	6
H06-08-10	6	8
H08-00-10	8	8

* Sold in Packs of 10

L... Male Elbow

L... Steckverschraubung L

L... 配管用ワンタッチ継手



- One-touch male elbow fitting
- Fits standard female threads: BSP, BSPT, G, Rc

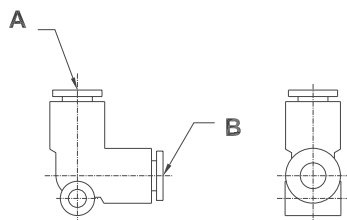
	A (Tubing Size)	B (Male Thread)
L04-M3-10	4	M3 x .5
L04-M5-10	4	M5 x .8
L04-01S-10	4	R 1/8"
L04-02S-10	4	R 1/4"
L06-M5-10	6	M5 x .8
L06-01S-10	6	R 1/8"
L06-02S-10	6	R 1/4"
L08-01S-10	8	R 1/8"
L08-02S-10	8	R 1/4"

* Sold in Packs of 10

L... Union Elbows

L... Schlauchschnellverbinder (90°)

L... ワンタッチ・エルボー・ユニオン



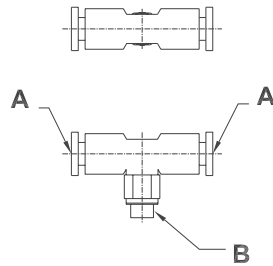
- One-touch union elbow fitting

	A (Tubing Size)	B (Tubing Size)
L04-00-10	4	4
L06-00-10	6	6
L08-00-10	8	8

* Sold in Packs of 10

T... Male Branch Tee

T... Steckverschraubung
T... チューブ状プロファイル



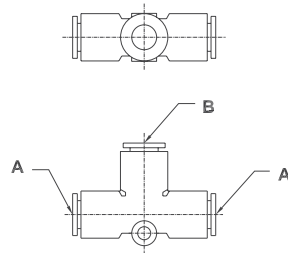
- One-touch male branch tee fitting
- Fits standard female threads: BSP, BSPT, G, Rc

	A (Tubing size)	B (Tubing size)	
T04-M5-10	4	M5 x .8	
T04-01S-10	4	R 1/8"	
T06-M5-10	6	M5 x .8	
T06-01S-10	6	R 1/8"	
T06-02S-10	6	R 1/4"	
T08-01S-10	8	R 1/8"	
T08-02S-10	8	R 1/4"	

* Sold in Packs of 10

T... Union Tee

T... Schlauchschnellverbinder
T-ワンタッチT字形ユニオン



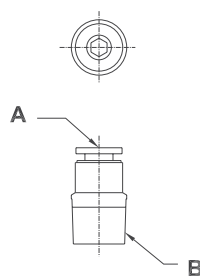
- One-touch union tee fitting

	A (Tubing Size)	B (Tubing Size)	
T04-00-10	4	4	
T04-06-10	4	6	
T06-00-10	6	6	
T06-08-10	6	8	
T08-00-10	8	8	

* Sold in Packs of 10

S... Internal Hex Male Connector

S... Steckverschraubung Innensechskant
s... 取付具

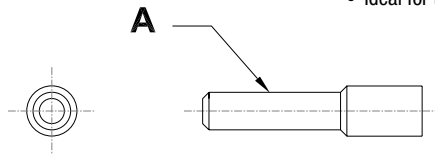


- Internal hex one-touch male connector
- Can be used in tight spaces where wrenches or sockets can't fit
- Fits standard female threads: BSP, BSPT, G, Rc

	A (Tubing Size)	B (Male Thread)	
S04-M5-10	4	M5 x .8	
S04-01S-10	4	R 1/8"	
S06-M5-10	6	M5 x .8	
S06-01S-10	6	R 1/8"	
S06-02S-10	6	R 1/4"	
S08-01S-10	8	R 1/8"	
S08-02S-10	8	R 1/4"	

* Sold in Packs of 10

P... Plug

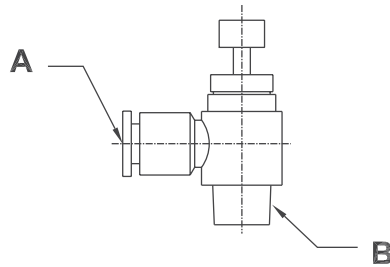
P... Schnellverschluss
P... パイプ・プラグ

- Plugs for one-touch fittings
- Ideal for testing or for blocking off unnecessary air lines

	A	
P-04-10	4	
P-06-10	6	
P-08-10	8	

* Sold in Packs of 10

AS... Flow Control

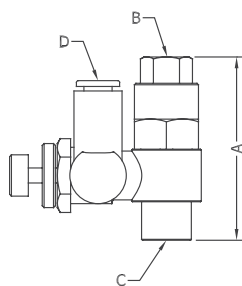
AS... Durchflussregler (90°)
AS... 流量制御ように

- One-touch flow control
- Fine control of gripper and cylinder speed without loss of clamping pressure
- Can be used on inlet or exhaust ports

	A (Tubing Size)	B (Male Thread)	Flow
AS1201F-M5-04	4	M5 x .8	Meter Out
AS1211F-M5-04	4	M5 x .8	Meter In
AS2201F-01-06S	6	R 1/8"	Meter Out
AS2211F-01-06S	6	R 1/8"	Meter In

* Sold Individually

ASP... Flow Control with Pilot Check Valve

ASP... Durchflussregler mit Rückschlagventil
ASP...パイロットチェックバルブ付き流量制御器

- One-touch flow control
- Allows for fine control of gripper and cylinder speed without loss of clamping pressure
- Can be used on inlet or exhaust ports
- Pilot Check Valve gives added security by providing a back up air supply

	A	B (Female Thread)	C (Male Thread)	D (Tubing Size)	Max Operating Pressure (bars)	Min Operating Pressure (bars)	Flow Rate (ℓ/min)
ASP330F-01-06S	40	M5	R 1/8"	6	10	1	180
ASP430F-02-06S	49	G 1/8"	R 1/4"	6	10	1	330
ASP430F-02-08S	49	G 1/8"	R 1/4"	8	10	1	350

* Sold Individually

BVC & BVU... Ball Valves with One-Touch Fitting

BVC & BVU... Mini-Schnellentlüftungsventil

BVC, BVU ボールバルブ ミニタイプ



- Compact lightweight ball valves
- Limited loss of air flow in open state
- Unique handle for air flow adjustment

Male Connector	Male Thread	Tubing Size	
BVC01-4	R 1/8"	4	
BVC01-6	R 1/8"	6	

Straight Union	Tubing Size	Tubing Size	
BVU4-4	4	4	
BVU6-6	6	6	

PC, PU, PL... Micro One-Touch Fittings

PC, PU, & PL...Schlauchschnellverbinder ultraklein

PC、PU、PL...ワンタッチ継手 ミニタイプ



- Miniature one-touch fittings
- Fits standard female threads BSP, BSPT, G, Rc

Male Connector	Tubing Size	Thread Size	
PC4-M5M	4	M5 x 0.8	
PC4-01M	4	R 1/8"	
PC6-M5M	6	M5 x 0.8	
PC6-01M	6	R 1/8"	

* Sold in Packs of 10

Straight Union	Tubing Size	Tubing Size	
PU4M	4	4	
PU6M	6	6	

* Sold in Packs of 10

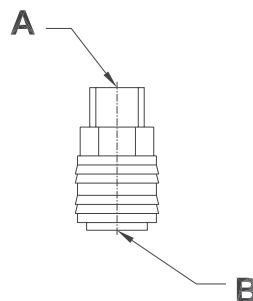
Male Elbow	Tubing Size	Thread Size	
PL4-01M	4	R 1/8"	
PL4-M5M	4	M5 x 0.8	
PL6-01M	6	R 1/8"	
PL6-M5M	6	M5 x 0.8	

* Sold in Packs of 10

Quick Release Coupling

Stecknippel weiblich

クイック・リリース・カップラー



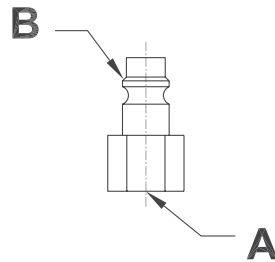
- Quick release couplings for faster tool changes
- Replacement couplings for SWM series Quick Change Mounting Chucks

	A (Male Thread)	B (Series)	
92-5002	M5 x .8	20	
92-0204	R 1/8"	21	
92-0406	R 1/4"	26	

* Sold Individually

Quick Release Plug

Stecknippel männlich
クイック・リリース・プラグ



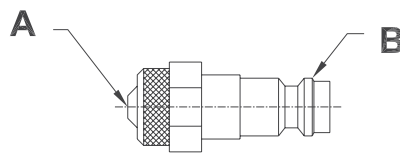
- Quick Release plugs for fast tool changes
- EOAT plugs for mating SWM couplings

	A (Female Thread)	B (Series)
94-4902-10	M5 x .8	20
94-0104-10	G 1/8"	21
94-0306-10	G 1/4"	26

* Sold in Packs of 10

Quick Release Plug w/ Hose Connector

Stecknippel mit Schlauchverschraubung
クイック・リリース・プラグとホース接続器



- Quick Release Plugs with hose connectors for fast tool changes
- EOAT plugs for mating SWM couplings

	A (Tubing Size)	B (Series)
94-0403-10	4mm	20
94-0604-10	6mm	21
94-0806-10	8mm	26

* Sold in Packs of 10

CPSE & CPPE... Micro Quick Disconnects

CPSE & CPPE... Mirco-Verbindungsstück
CPSE CPPE...ライトカップリング ミニタイプ



CPSE



CPSE-M



CPPE



CPPE-M

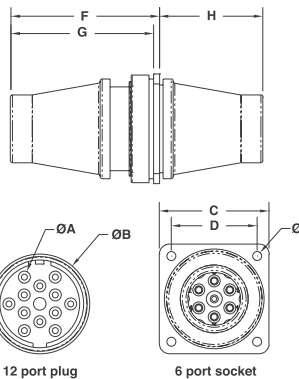
- Miniature couplings and plugs with one-touch hose connections
- Stainless Steel body for durability and chemical resistance

	Disconnect Type	Disconnect Size	Connector Type	Connector Size
CPPE3-4	Plug	3mm	One-Touch	4mm tube
CPPE7-6	Plug	7mm	One-Touch	6mm tube
CPPE3-M5	Plug	3mm	Male Thread	M5 X .8
CPPE7-M5	Plug	7mm	Male Thread	M5 X .8
CPSE3-4	Coupler	3mm	One-Touch	4mm tube
CPSE7-6	Coupler	7mm	One-Touch	6mm tube
CPSE3M-4	Coupler	3mm	One-Touch	4mm tube
CPSE7M-6	Coupler	7mm	One-Touch	6mm tube

* Sold in Packs of 10

DMC... Multi-port Tube Connector

DMC... Mehrfach Schlauchverbinder
DMC... マルチポート・チューブ接続器



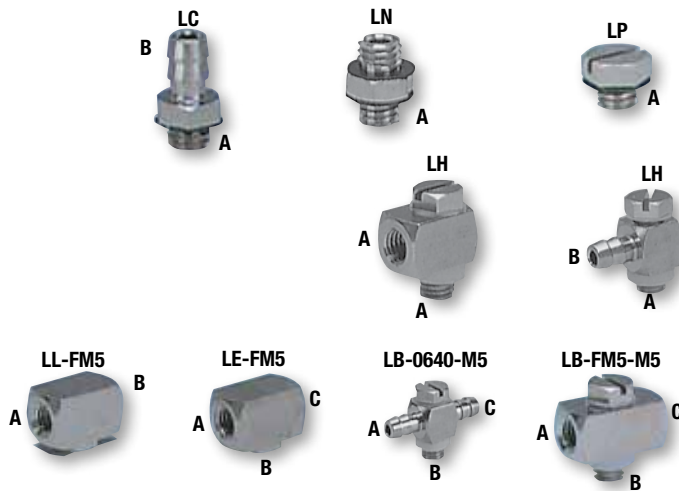
- Quick change all your hose connections with one plug
- Cover can be removed from socket side for panel mounting
- Working Pressure up to 1.0 MPa

Plugs	Ports	A	B	C	D	E	F	G	H
DMC-04-06P	6	4	37	~	~	~	60	56	~
DMC-06-06P	6	6	37	~	~	~	60	56	~
DMC-04-12P	12	4	47	~	~	~	70	56	~
DMC-06-12P	12	6	47	~	~	~	70	56	~

Sockets	Ports	A	B	C	D	E	F	G	H
DMC-04-06S	6	4	44	44	36	4.5	~	~	41
DMC-06-06S	6	6	44	44	36	4.5	~	~	41
DMC-04-12S	12	4	53	55	43	4.5	~	~	51
DMC-06-12S	12	6	53	55	43	4.5	~	~	51

LC, LH, LB, LN, LP, LL, & LE... Barbed Fittings

Adapter für Druckluftschläuche
LC, LH, LB, LN, LP, LL, LE... 継手



Straight Connectors	A (Type)	A (Size)	B (Type)	B (Size)
LC-0425-M5	Male	M5	Barbed	2.5mm
LC-0640-M5	Male	M5	Barbed	4mm
LN-M5-M5	Male	M5	~	~
LP-M5	Male	M5	~	~

* Sold in Packs of 10

Elbow Fittings	A (Type)	A (Size)	B (Type)	B (Size)
LH-0425-M5	Male	M5	Barbed	2.5mm
LH-0640-M5	Male	M5	Barbed	4mm
LH-FM5-M5	Male	M5	~	~

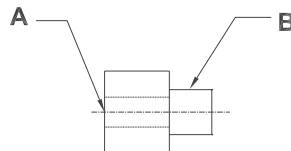
* Sold in Packs of 10

T-Fittings	A (Type)	A (Size)	B (Type)	B (Size)	C (Type)	C (Size)
LB-0640-M5	Barbed	4mm	Male	M5	Barbed	4mm
LB-FM5-M5	Female	M5	Male	M5	Female	M5
LL-FM5	Female	M5	Female	M5	~	~
LE-FM5	Female	M5	Female	M5	Female	M5

* Sold in Packs of 10

Hex Bushing

Reduziernippel
六角プッシング



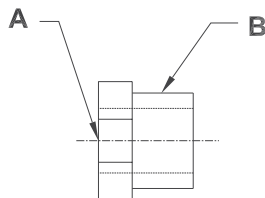
- Fits male threads BSP, BSPT, G, R
- Fits female threads BSP, BSPT, G, Rc

	A (Female Thread)	B (Male Thread)
66-0201-10	G 1/8"	R 1/8"
66-0403-10	G 1/4"	R 1/4"

* Sold in Packs of 10

Reduction Bushing

Reduziernippel
縮小プッシング



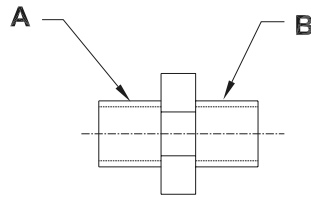
- Fits male threads BSP, BSPT, G, R
- Fits female threads BSP, BSPT, G, Rc

	A (Female Thread)	B (Male Thread)
70-5041**	M3 x .5	M5 x .8
70-0249-10	M5 x .8	R 1/8"
70-0401-10	G 1/8"	R 1/4"
66-2050-10	G 1/8"	M5 x .8
66-0401-10	G 1/4"	R 1/8"
70-0604-10	G 1/4"	R 3/8"
66-0604-10	G 3/8"	R 1/4"

Sold in packs of 10 ** Sold Individually

Hex Nipple

Doppelnippel
六角ニップル



- Fits female threads BSP, BSPT, G, Rc

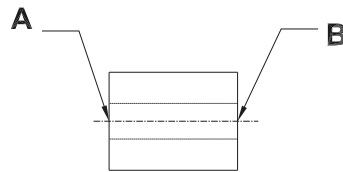
	A (Male Thread)	B (Male Thread)
41-5050-10	M5 x .8	M5 x .8
42-0202-10	R 1/8"	R 1/8"
43-0250-10	R 1/8"	M5 x .8
42-0404-10	R 1/4"	R 1/4"
43-0402-10	R 1/4"	R 1/8"

* Sold in Packs of 10

Pipe Coupling

Muffe

パイプ・カップリング



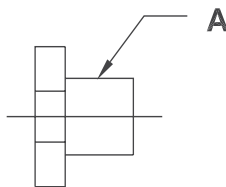
- Fits male threads BSP, BSPT, G, R

	A (Female Thread)	B (Female Thread)
60-49-10	M5 x .8	M5 x .8
59-01-10	G 1/8"	G 1/8"
59-03-10	G 1/4"	G 1/4"
60-5002-10	G 1/8"	M5 x .8
60-0204-10	G 1/4"	G 1/8"

* Sold in Packs of 10

Pipe Plug

Verschlusschraube
パイプ・プラグ



- Fits female threads BSP, BSPT, G, Rc

	A (Female Thread)
21-50-10	M5 x .8
23-02-10	R 1/8"
23-04-10	R 1/4"

* Sold in Packs of 10

Pneumatic Tubing

Druckluftschlauch
配管チューブ



- Additional colors available upon request
- Flexible pneumatic hose tubing
- Polyurethane material reduces "kinking"
- Supports pressurized air up to 0.8 Mpa (116 psi)
- Recommended pneumatic color code: blue for pressurized air, yellow for vacuum

	Outside Ø	Inside Ø	Material	Color
03-0403 - 20 meter roll	4	2.5	Polyurethane	Black
03-0403 - 100 meter roll	4	2.5	Polyurethane	Black
03-0403B - 20 meter roll	4	2.5	Polyurethane	Blue
03-0403B - 100 meter roll	4	2.5	Polyurethane	Blue
03-0403Y - 20 meter roll	4	2.5	Polyurethane	Yellow
03-0403Y - 100 meter roll	4	2.5	Polyurethane	Yellow
03-0604 - 20 meter roll	6	4	Polyurethane	Black
03-0604 - 100 meter roll	6	4	Polyurethane	Black
03-0604B - 20 meter roll	6	4	Polyurethane	Blue
03-0604B - 100 meter roll	6	4	Polyurethane	Blue
03-0604Y - 20 meter roll	6	4	Polyurethane	Yellow
03-0604Y - 100 meter roll	6	4	Polyurethane	Yellow
03-0806 - 20 meter roll	8	5	Polyurethane	Black
03-0806 - 100 meter roll	8	5	Polyurethane	Black
03-0806B - 20 meter roll	8	5	Polyurethane	Blue
03-0806B - 100 meter roll	8	5	Polyurethane	Blue
03-0806Y - 20 meter roll	8	5	Polyurethane	Yellow
03-0806Y - 100 meter roll	8	5	Polyurethane	Yellow

TC... Tubing Cutter

TC... Schlauchschneider
TC... チューブ・カッター



- 6 cutting edges on each blade insert
- One handed operation and cutter lock
- Integrated 1m tape measure

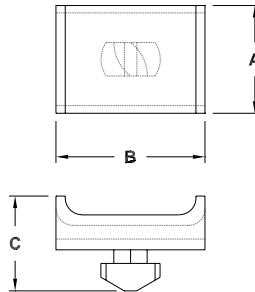
	Max Tubing Size	
TC-21	15mm / 1/2"	

CTM... Cable and Hose

CTM... Kabel- und Schlauchbock
CTM... ケーブルおよびホース継手



- Convenient wiring and tubing tie-down twists tightly into standard frame profile
- Easily moveable and removeable
- CTM-15 designed to fit into L, X, & D profiles
- CTM-25 designed to fit into JX & HX profiles



	A	B	C	
CTM-15	12	15	16	
CTM-25	18	25	16	

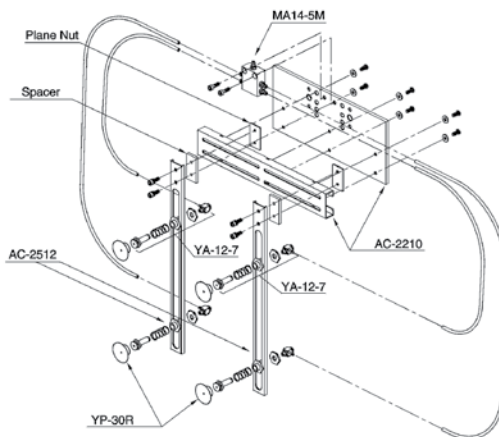
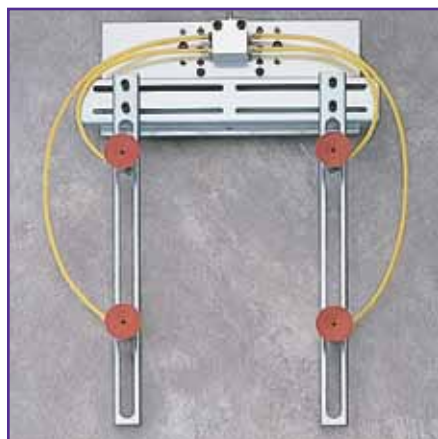
* Sold in Packs of 10



刃断用ニッパ、

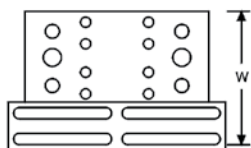
AC & MA... In-House End of Arm Tooling Kit

AC & MA... Greifer-Bausatz
AC, MA... 自在チャックパーツ



- Kits include AC-2210 mounting plate for Star, Seiki, and Yushin robots
- Kits included four reinforced silicone Vacuum cups

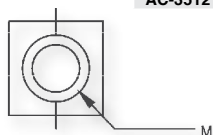
	Approx. Frame Dimensions (mm)	Vacuum Cups	Tubing Ø (O.D./I.D.)
EOAT KIT Grip-It 4-Cup	250 W x 440 L	4	6/4
EOAT KIT Grip-It 8-Cup	250 W x 440 L	8	6/4



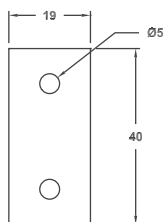
	A	B	C	Robot Mounting Pattern
AC-2210	250	100	20	Star, Seiko, Yushin
AC-2240	250	140	20	Harmo, Sailor



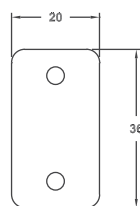
	A	B	C	D
AC-2510	250	10	20.5	4.5
AC-2512	250	12	20.5	4.5
AC-3010	300	10	20.5	4.5
AC-3012	300	12	20.5	4.5
AC-3510	350	10	20.5	4.5
AC-3512	350	12	20.5	4.5



	M
AC-10	M10 x 1
AC-12	M12 x 1



SPACER
4mm THICK



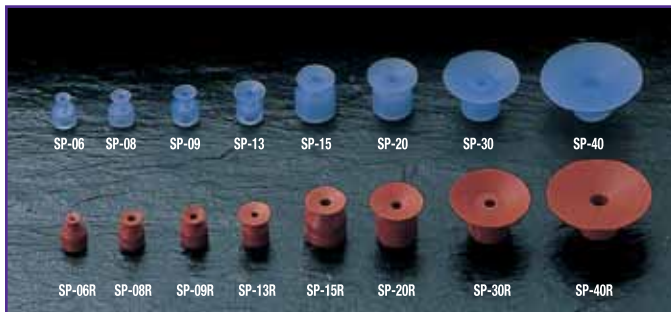
NUT
2mm THICK

	Plane Nut	Screw	Spacer
AC-1000	2	4	2



SP... S-Series Vacuum Cups

SP... Sauger, S-Serie
SP...Sシリーズ 吸着パッド



- Available in standard and reinforced silicone
- SPBS-21 is specifically designed to work well on textured surfaces

Screw Mount Type - Standard Silicone			
	Cup Ø	Cup Height	Applicable Holder
SP-13S	13	12	SA-02L-.../ SAB-02L-12-5/ SAF-02L-12-5
SP-20S	20	12	
SP-30S	30	12	
SP-80S	80	42	SA-04L-16

Screw Mount Type - Reinforced Silicone			
	Cup Ø	Cup Height	Applicable Holder
SP-13SR	13	12	SA-02L-.../ SAB-02L-12-5/ SAF-02L-12-5
SP-20SR	20	12	
SP-30SR	30	12	
SP-60SR	60	14	SA-03L-16

Bellow Type - Standard Silicone			
	Cup Ø	Cup Height	Applicable Holder
SPBS-21	21	19	SA-02L-.../ SAB-02L-12-5/ SAF-02L-12-5

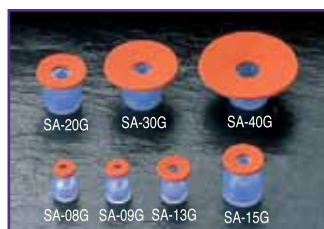
Bellow Type - Reinforced Silicone			
	Cup Ø	Cup Height	Applicable Holder
SPBE-08R	8	15	SA-01L-
SPBE-10R	10	20	
SPBE-12R	12	17	
SPBE-20R	20	25	SA-02L- SAB-02L-12-5 SAF-02L-12-5

Insert Type - Standard Silicone			
	Cup Ø	Cup Height	Applicable Holder
SP-06	6	12	SA-01L-
SP-08	8	12	
SP-09	9	12	
SP-13	13	12	
SP-15	15	16	SA-02L- SAB-02L-12-5 SAF-02L-12-5
SP-20	20	16	
SP-30	30	16	
SP-40	40	16	

Insert Type - Reinforced Silicon			
	Cup Ø	Cup Height	Applicable Holder
SP-06R	6	12	SA-01L-...
SP-08R	8	12	
SP-09R	9	12	
SP-13R	13	12	
SP-15R	15	16	SA-02L-.../ SAB-02L-12-5/ SAF-02L-12-5
SP-20R	20	16	
SP-30R	30	16	
SP-40R	40	16	

SA... S-Series Vacuum Cups with Silicone Felt

SA... Sauger mit Silikonkissen, S-Serie
SA...Sシリーズ シリコンスポンジ付パッド



- Recommended for molded parts that require vacuum metalizing or coating

Standard Silicone	Cup Ø	Cup Height	Applicable Holder
SA-08G	8	13.5	SA-01L-...
SA-09G	9	14	SA-01L-...
SA-13G	13	14	SA-01L-...
SA-15G	15	17.5	SA-02L-.../ SAB-02L-12-5/ SAF-02L-12-5
SA-20G	20	17.5	
SA-30G	30	17.5	
SA-40G	40	17.5	



SA... S-Series Anti-Static Vacuum Cups

SA... Antistatische Sauger, S-Serie

SA... Sシリーズ 導電性パッド



- Made of conductive silicone rubber
- Volume Resistivity: 0.03
- As measured with a PP vessel, experimentally eliminated 70% of static electricity

Standard Silicon	Cup Ø	Cup Height	Applicable Holder
SA-08E	8	13.5	SA-01L-...
SA-09E	9	14	SA-01L-...
SA-13E	13	14	SA-01L-...
SA-15E	15	17.5	SA-02L-.../ SAB-02L-12-5/ SAF-02L-12-5
SA-20E	20	17.5	
SA-30E	30	17.5	
SA-40E	40	17.5	

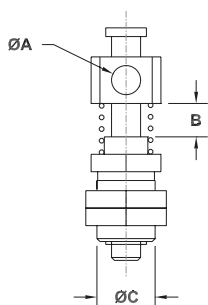
SA... Holders for S-Series Vacuum Cups

SA... Saugerhaltevorrichtung für Sauger, S-Serie

SA... Sシリーズ吸着パッド用吸着金具



- Spring-loaded for part compliance
- Side ported for quick-touch pneumatic hose connectors
- Threaded shafts include jam nuts and lock washers for plate mounting

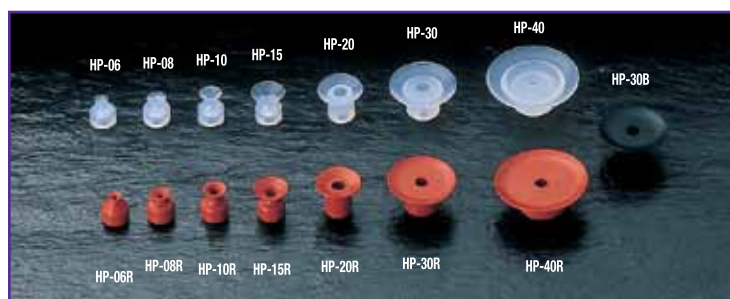


	A	B (Stroke)	C (Mounted Hole Ø)	Material	Remarks
SA-01L-10-5	M5	5	10	Aluminum	Standard
SA-01L-12-10	M5	10	12	Aluminum	Standard
SA-02L-10-5	M5	5	10	Aluminum	Standard
SA-02L-12-5	M5	5	12	Aluminum	Standard
SA-02L-12-10	M5	10	12	Stainless	Standard
SA-02L-12-30	M5	30	12	Stainless	Standard
SA-03L-16	M5	22	16	Steel	for SP-60SR
SA-04L-16	M5	22	16	Steel	for SP-80S
SAB-02L-12-5	M5	5	12	Aluminum	End Ported
SAF-02L-12-5	M5	5	12	Aluminum	Non-Rotational
SAE-02L-12-5	M5	5	12	Aluminum	For Anti-Static Vacuum Cups

HP... H-Series Vacuum Cups / Suction Cups

HP... Sauger, H-Serie

HP... Hシリーズ 吸着パッド



- Available in standard and reinforced silicone rubber
- HP-30B is made of Nitrile Butadiene Rubber (NBR)

Standard Silicone	Cup Ø	Cup Height	Applicable Holder
HP-06	6	12	HA-01J-...
HP-08	8	12.5	HA-01J-...
HP-10	10	14	HA-01J-...
HP-15	15	14.5	HA-01J-...
HP-20	20	15	HA-02J-...
HP-30	30	15	HA-02J-...
HP-40	40	15	HA-02J-...
HP-30B(NBR)	30	15	HA-02J-...

Reinforced Silicone	Cup Ø	Cup Height	Applicable Holder
HP-06R	6	12	HA-01J-...
HP-08R	8	12.5	HA-01J-...
HP-10R	10	14	HA-01J-...
HP-15R	15	14.5	HA-01J-...
HP-20R	20	15	HA-02J-...
HP-30R	30	15	HA-02J-...
HP-40R	40	15	HA-02J-...

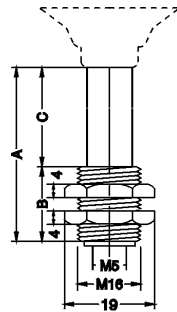


HA... Holders for H-Series Suction Cups

HA... Saugerhaltevorrichtung für Sauger, H-Serie
HA... Hシリーズ吸着パッド用吸着金具



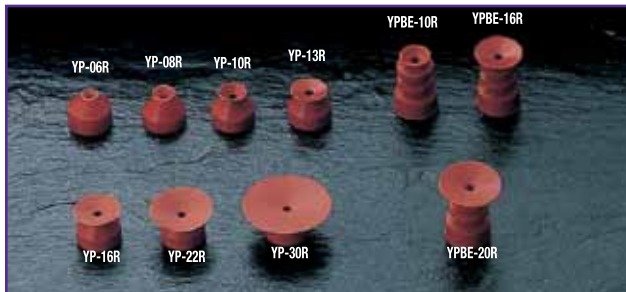
- Lightweight polyacetal design
- End ported for quick-touch pneumatic hose connectors
- Threaded shafts include jam nuts and lock washers for plate mounting



	A	B	C (Stroke)	Mounted Hole Ø	Material
HA-01J-10	30	20	10	16	Polyacetal
HA-01J-15	41	25	15	16	Polyacetal
HA-01J-20	51	31	20	16	Polyacetal
HA-01J-25	61	36	25	16	Polyacetal
HA-01J-30	71	41	30	16	Polyacetal
	A	B	C (Stroke)	Mounted Hole Ø	Material
HA-02J-10	30	20	10	16	Polyacetal
HA-02J-15	41	25	15	16	Polyacetal
HA-02J-20	51	31	20	16	Polyacetal
HA-02J-25	61	36	25	16	Polyacetal
HA-02J-30	71	41	30	16	Polyacetal

YP... Y-Series Vacuum Cups

YP... Sauger, Y-Serie
YP... Yシリーズ 吸着パッド



- Made of reinforced silicone rubber

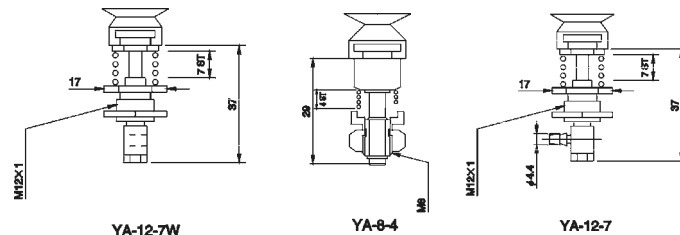
Reinforced Silicone	Cup Ø	Cup Height	Applicable Holder
YP-06R	6	12	YA-8-4/ YA-12-7/ YA-12-7W
YP-08R	8	12	
YP-10R	10	12	
YP-13R	13	12	
YP-16R	16	12	
YP-22R	20	12	
YP-30R	30	12	
YP-40R	40	12	
YPBE-10R	10	21	
YPBE-16R	16	21	
YPBE-20R	20	21	

YA... Holders for Y-Series Suction Cups

YA... Saugerhaltevorrichtung für Sauger, Y-Serie
Yシリーズ吸着パッド用吸着金具



- Spring-loaded for part compliance
- Ported for quick-touch pneumatic hose connectors

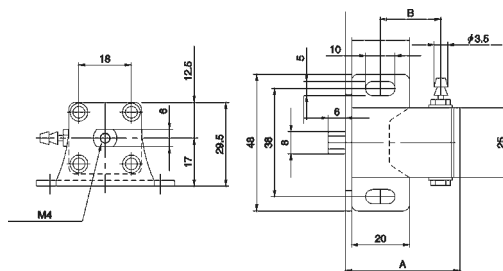


	Mounted Hole Ø	Stroke	Material	Remarks
YA-8-4	8	4	Stainless	Standard
YA-12-7	12	7	Aluminum	End Ported
YA-12-7W	12	7	Aluminum	End Ported



KMC... Mini-Cylinders

KMC... Minizylinder
GMC... ミニシリンダー



- Robust one piece construction eliminates air leaks and pressure drops
- New non-rotational shaft
- Single acting spring return

	Working Air Pres. (MPa)	Stroke	Operating Temperature (°C)	A
KMC-10	0.3-0.5	10	5~40	45
KMC-15	0.3-0.5	15	5~40	50
KMC-20	0.3-0.5	20	5~40	55
KMC-30	0.3-0.5	30	5~40	60

ACS... Container Cylinder (Double Acting)

ACS... Container Zylinder (Zweifach wirkend)
ACS... 複動型コンテナシリンダー

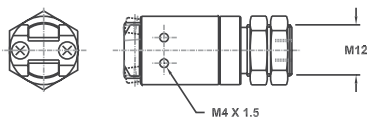


	Working Air Pre. (bars)	Stroke	Operating Temperature (°C)	Max Extend force (N)	Max Return Force (N)
ACS-20W	4~6	20	5~40	390	140
ACS-40W	4~6	40	5~40	390	140

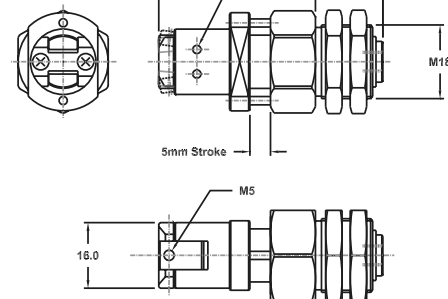
CHM... Grippers-Normally Open, Single Acting Lever Gripper

CHM... Greifer Ruhezustand: offen, einfach wirkend
CHM... エアーチャック常時開 単動タイプ

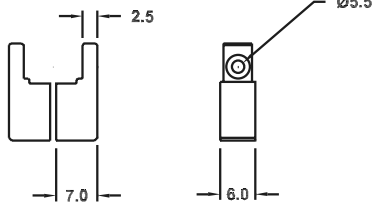
CHM11ABK



CHM11ACK



CHM11AK14



	Cylinder Ø	Working Air Pre. (bars)	Operating Temperature (°C)
CHM11ABK	11	2~7	0-60
CHM11ACK	11	2~7	0-60

- Stainless steel, lightweight, miniature air gripper
- Single acting spring return
- CHM11ACK has 5mm spring loaded buffer

	Blank Finger	Gripping Force (N)
CHM11AK14		1.1-3.8



Mini Buffer

Ministossfänger
ミニ・バッファ



- Mini Buffers or shock absorbers
- Used to reduce cycle time, protect equipment, and reduce noise

	Max Absorption Energy (N·m/Cycle)	Body Thread	Stroke
TK-21	3	M10 x 1	6.4
PRO 15	5	M12 x 1	10
OEM-0.25M	5.5	M14 x 1.5	10
PRO 25	10	M14 x 1	16
OEM-0.5M	28	M20 x 1.5	12
PRO 50	29	M20 x 1.5	22

MA & AB... Accessories

Zubehör Justierung
MA & AB ... アクセサリー及びアジャスター



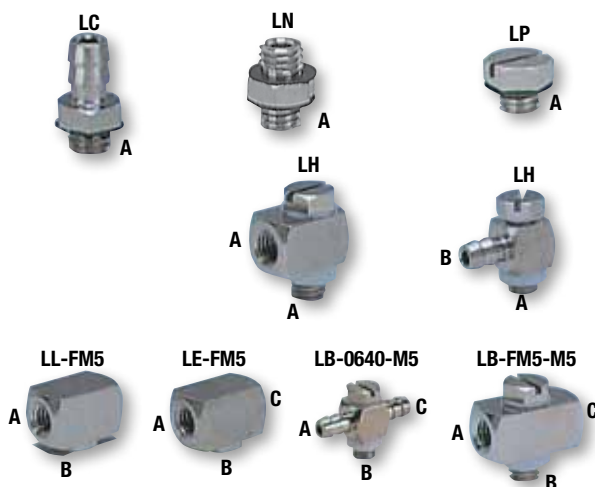
- Accessories for GRIP-IT! cylinders and grippers

	Description
MA-01	Rectangular Clamp Holder 30x50mm (NBR)
MA-01S	Rectangular Clamp Holder 30x50mm (Silicone)
MA-02	Curved Clamp Holder (R100 Degrees)
MA-03	Round Plate with rubber OD 25mm
MA-04	Round Plate with rubber OD 50mm
MA-05	Rectangular Plate with Rubber and Switch
MA-06	Serrated Metal Sprue Gripper
MA-07	Vacuum Cup Holder (SA-01L type head)
MA-08	Vacuum Cup Holder (SA-02L type head)
MA-09	Fixing Plate (steel)
MA-10	Spacer (Height 10 mm)
MA-11	Spacer (Height 15 mm)
MA-12	Extension Spacer (M10 threaded)
MA-13	Extension Spacer (M12 threaded)
AB-10	Suction Cup Angle Bracket (mounted hole dia. M10)
AB-12	Suction Cup Angle Bracket (mounted hole dia. M12)

LC, LH, LB, LN, LP, LL, & LE... Barbed Fittings

Adapter zum Gebrauch mit
pneumatischen Schläuchen

LC, LH, LB, LN, LP, LS, LL, LE... 継手



Straight Connectors	A (Type)	A (Size)	B (Type)	B (Size)
LC-0425-M5	Male	M5	Barbed	2.5mm
LC-0640-M5	Male	M5	Barbed	4mm
LN-M5-M5	Male	M5	~	~
LP-M5	Male	M5	~	~

* Sold in Packs of 10

Elbow Fittings	A (Type)	A (Size)	B (Type)	B (Size)
LH-0425-M5	Male	M5	Barbed	2.5mm
LH-0640-M5	Male	M5	Barbed	4mm
LH-FM5-M5	Male	M5	~	~

* Sold in Packs of 10

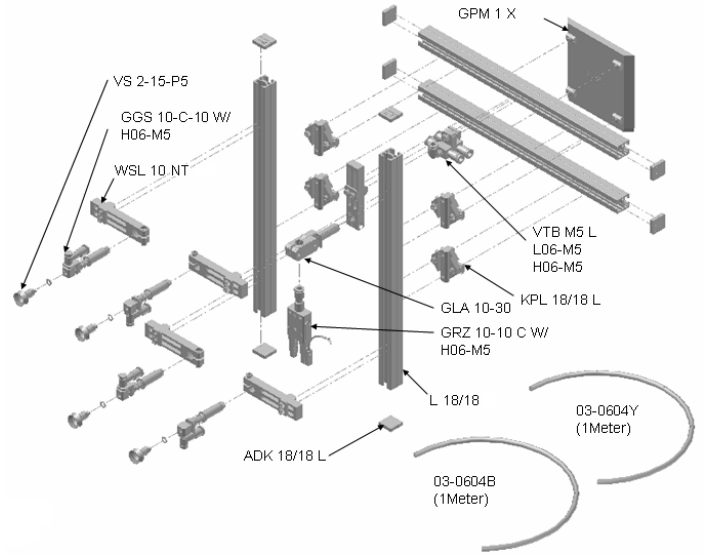
T-Fittings	A (Type)	A (Size)	B (Type)	B (Size)	C (Type)	C (Size)
LB-0640-M5	Barbed	4mm	Male	M5	Barbed	4mm
LB-FM5-M5	Female	M5	Male	M5	Female	M5
LL-FM5	Female	M5	Female	M5	~	~
LE-FM5	Female	M5	Female	M5	Female	M5

* Sold in Packs of 10



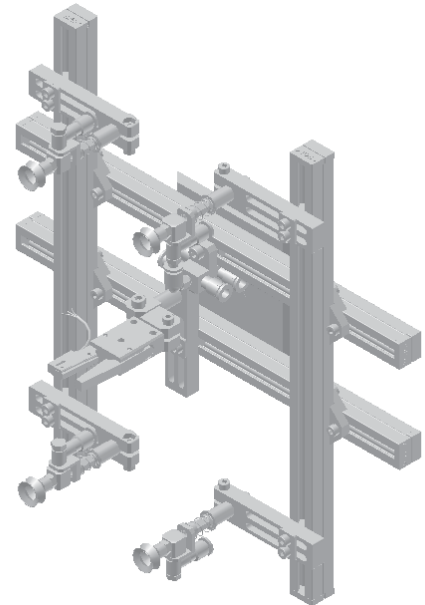
KITS... Five Varieties & Sizes

KITS..
保護 用具一式



If building your own gripper seems like an enormous puzzle, then take advantage of our gripper kits. Building your own gripper has never been easier.

- Everything you need to build your EOAT
- Includes our quick change chuck system, aluminum profile, mounting arms, vacuum cups, sprue plier, gripper fingers, pneumatic fittings, tubing, and fasteners (medium gripper kit only)
- Kits B,C,D, and E will build one specific EOAT
- See below for component details



	Quick Change System	Approx. Part Weight	Frame Profile	Shaft Diameter	Part Securing Methods
Medium Gripper Kit	SWM	<10kg (<22lbs.)	X-25/25, X-50/25	14 & 20mm	Vacuum cups, Sprue Pliers, & Fingers
	Profile Size	Approx. Frame Dimension (mm)	# of Vacuum Cups	# of Sprue Pliers	Tubing Diameter (OD/ID)
EOAT Kit L-18/18 without sprue plier	L-18/18L	250 x 350	4	0	6/4
EOAT Kit L-18/18	L-18/18L	250 x 350	4	1	6/4
EOAT Kit X-25/25 without sprue plier	X-25/25	500x650	4	0	6/4
EOAT Kit X-25/25	X-25/25	500x650	4	1	6/4

For this example: Let's assume a plastic injection molding process

Before building an EOAT, these robot questions must be determined. Robot Questions:

- 1) Robot make and Model _____
- 2) Payload: _____
- 3) Attach Mounting plate pattern.
- 4) Available movement pattern: 3 –axis _____, 6 –axis _____, other _____
- 5) Reach of all axis: _____
- 6) # of Air, vacuum and electric circuits available:

Check Molding Conditions. Mold Questions:

- 1) Mold drawings available? _____
- 2) Daylight available _____
- 3) Distance between tie bars _____
- 4) # of and stroke of ejector pins _____
- 5) Cycle time in seconds _____
- 6) Overhead/side obstructions
- 7) Temperature of ejected part: _____°C _____°F

After looking at mold conditions answer these questions:

- 1) How many cavities? _____
- 2) Does the part eject easily? _____
- 3) Can vacuum cups remove the part or will mechanical grippers be necessary? _____
- 4) What type parts surface? _____ Smooth _____ textured _____ flat
_____ curved _____ painted _____ coated

End-of-Arm Tool Questions:

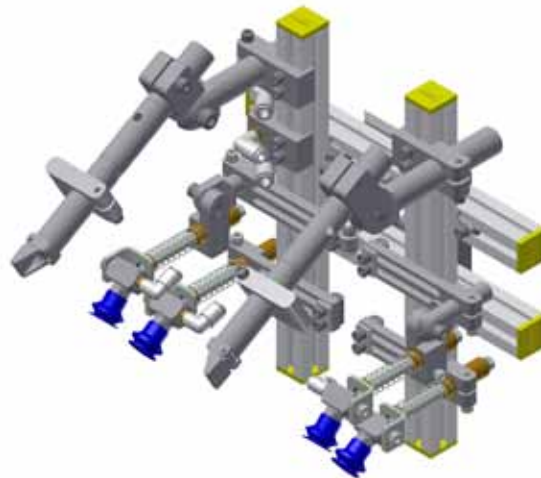
- 1) Will the tool be used on one specific robot and press or many?
- 2) Does the tool need to be switched quickly and stored?
- 3) Will the tool be adjustable and reuseable?
- 4) Is individual part detection needed?
- 5) Do the parts need to be cut, trimmed, or separated?
- 6) Can the parts be packaged straight from the press?
- 7) Do inserts or labels need to be placed in the mold for the next part?

Training

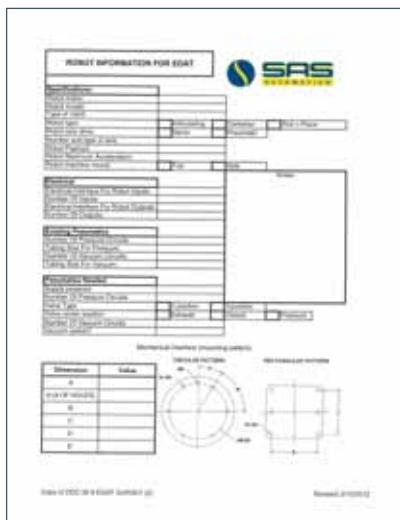
Your inquiry or order starts with superior customer service at SAS. Whether it is your first order, and you are new to End-of-Arm Tooling, or you are an experienced engineer, we will help you select the components and tooling best for your needs at a competitive price.

If you need ideas or solutions for putting tools together or setting up a manufacturing cell, just contact our experienced engineering team or technical sales staff for first class customer service.

When your situation requires that you build your own EOAT at your facility with SAS components, our skilled technicians can train you at our centrally located EOAT training site, or we will come to you.



SAS provides a compliment of robotic cells in our testing center to assist you in evaluating your EOAT requirements. This facility is also used to test End-of-Arm tools as quality assurance prior to installation.



SAS Automation continuously provides prompt, courteous service from start to finish of any automation project. SAS is the only robotic End-of-Arm Tooling company that provides this high level of service throughout every automation project.

Design & Engineering

Unlike distributors of EOAT, SAS Automation is a leading manufacturer of EOAT. The SAS difference is significant, as our design and engineering department is equipped with the latest in 3D CAD tools to custom design and build EOAT – for any robot, any part, anywhere. While others may provide basic “drawings”, only SAS provides custom engineered tools from strong, lightweight materials that increase productivity while reducing robot wear and tear. All this from the most experienced EOAT engineering team in the industry. This team includes licensed and professional engineers.

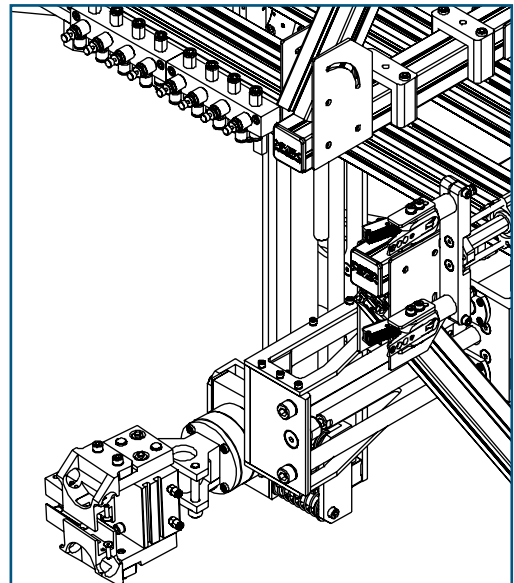
No company has more experience when it comes to designing gripper systems to make your robot grip, hold, locate, inspect, move, lift, release, and handle your part in a repeatable fashion. Whether your needs are to pick and place a part from the mold or to provide an automation cell, SAS has the technical talent to meet your needs. Our primary business is designing gripper systems that enable your robot to do more, so you can do less.



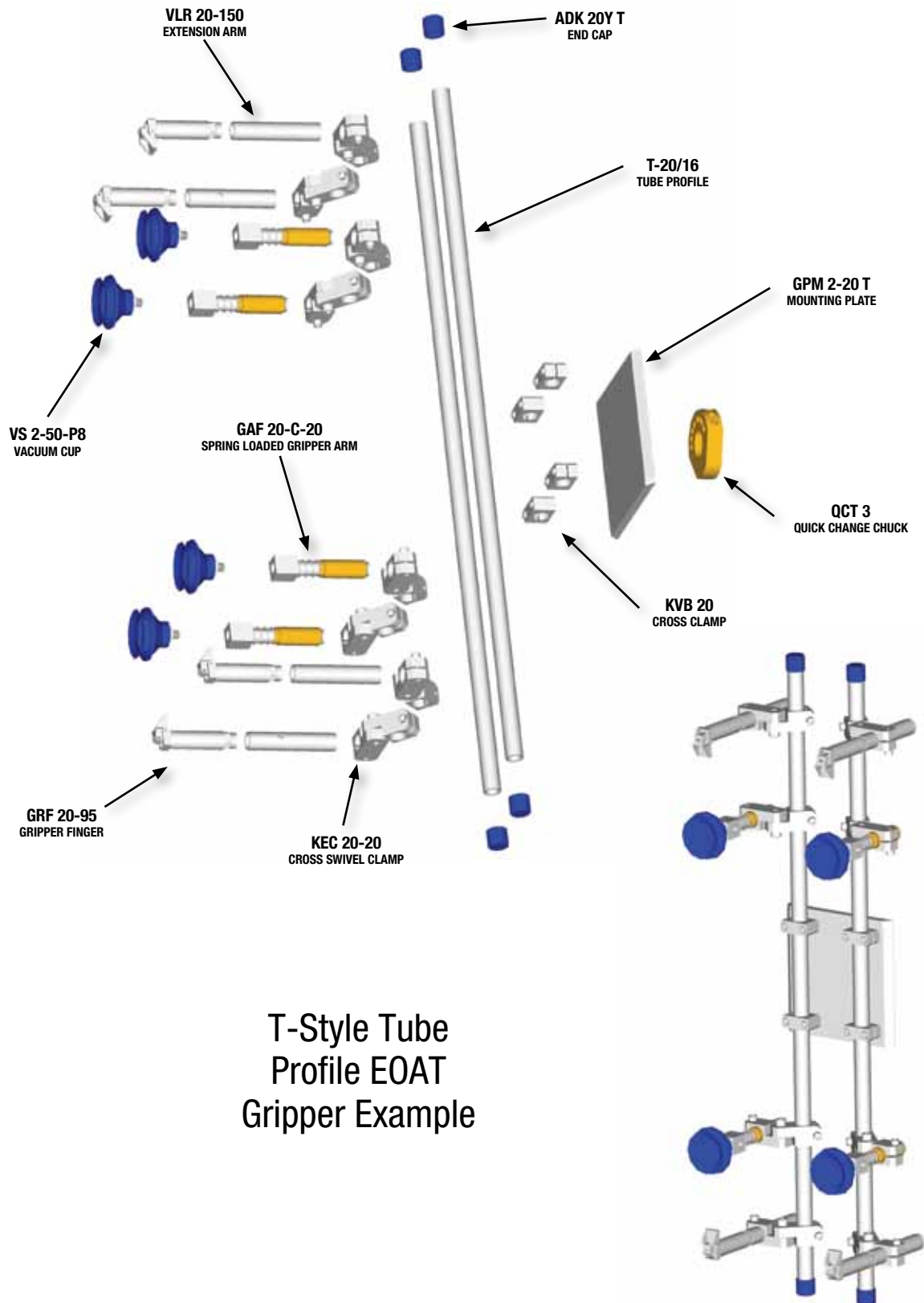
Low Profile Robust Part Gripper



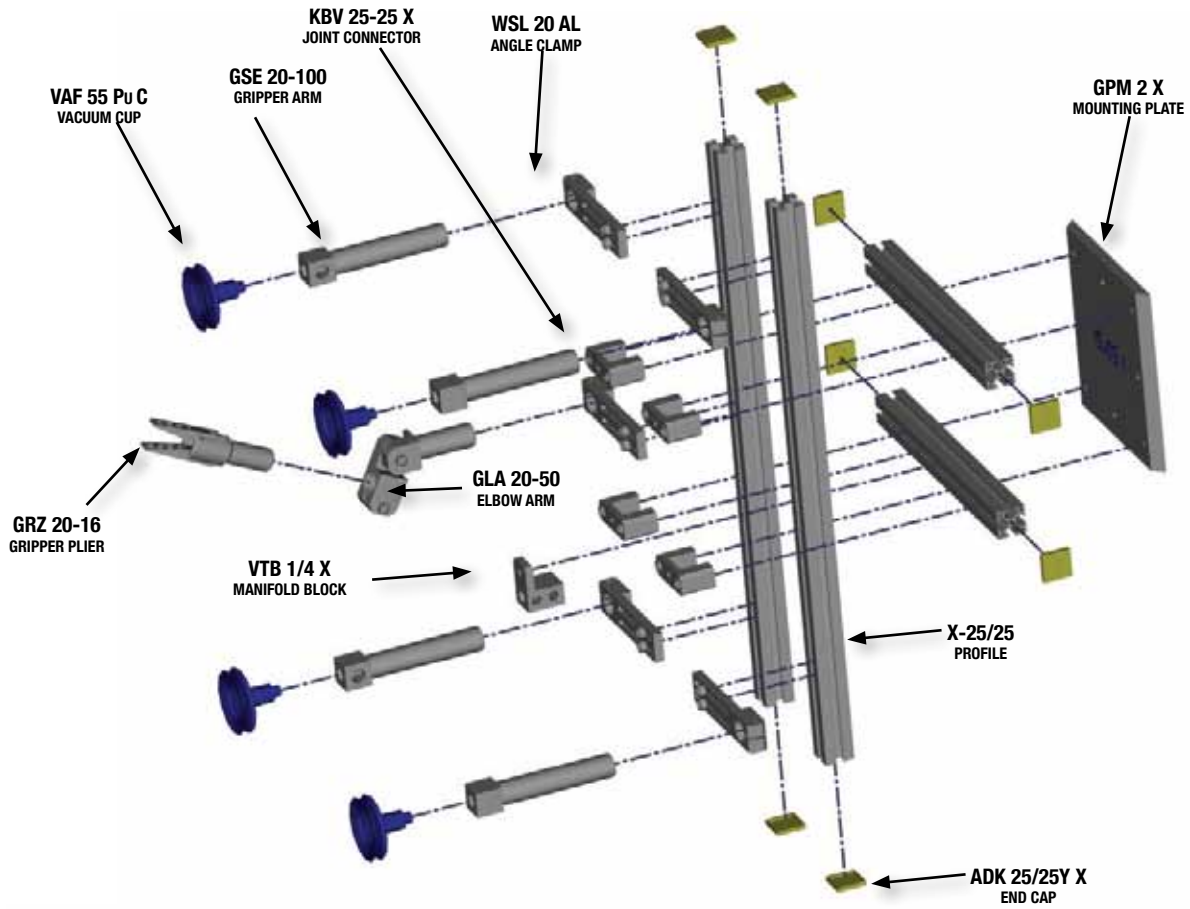
Punch Press Degater w/ Interchangeable Part Nests and Heated Cutting Steel.



3D Automation Equipment Layout



T-Style Tube
Profile EOAT
Gripper Example



X-Style Frame
Profile EOAT
Gripper Example

Integrator Support

Integration

自動ロボッ

SAS Automation is recognized as a leader in the support of integration companies providing the tooling and equipment required by the most demanding customers. SAS has experienced technicians who can provide on-going support and equipment maintenance. SAS also employs qualified designers who have the expertise to develop equipment that will meet the current and future needs of your manufacturing environment. SAS makes precision EOAT custom components and sub-assemblies using its own patented modular component-based end-of-arm tooling system.

SAS is a recognized partner with KUKA and Motoman and can integrate with virtually any make of robot, globally.

SAS Benefits:

- End-of-Arm Tooling expertise
- Automation Simulation (3D)
- Installation and operator training
- RFID technology
- On-site service
- Full warranty
- Complete documentation and maintenance manuals
- Alternative manual procedures (recovery)
- Testing
- Automatic and semi-automatic experience
- Safety
- Experience
- Spare parts and components in-stock



On-Site Service & Installation

- **In a hurry?**
 - **Need more help on-site?**
 - **Require training or installation in your plant?**
 - **Will a technical sales and review call help?**
-or maybe “all of the above”

Just call, and one of the SAS Service fleet of vehicles will come to your door with a single phone call. SAS can solve one of the most common problems associated with building End-of-Arm Tools: having what you need to build that special tool on-site and on-time.



The SAS service van is equipped with thousands of parts. You can build your own EOAT, and we can even train you to build an EOAT on site.

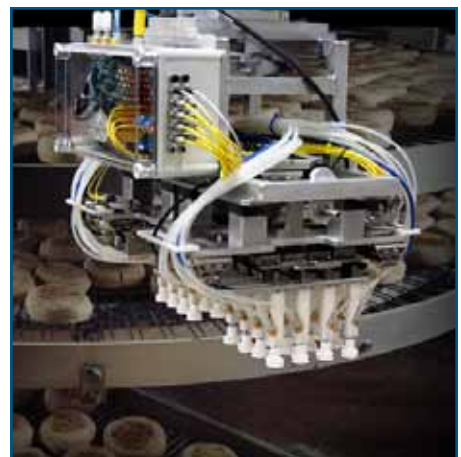
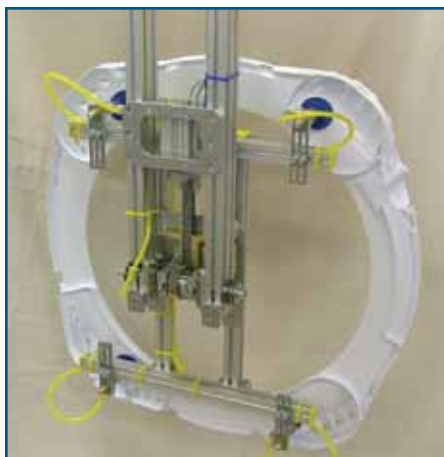
Make your start-up easier: For a “turn-key” project, SAS will design, build, transport, and install your finished EOAT in your plant.

Whether your needs are to handle automotive bumpers, electrical connectors, metal wheels, or pallets, SAS will put the necessary components on the road to service you.

Only SAS provides this comprehensive service for robotic End-of-Arm Tooling!

The following is just one example (actual quote) of how the SAS traveling service team contributed to a successful launch of multiple tools for a major automotive supplier:

“It is rare that a vendor has the foresight and flexibility to assess and then provide the necessary support during the high level of activity and emotion that often encompass a program launch..... Your placement of the SAS Installation Van directly at our plant, equipped with an array of components and the technical guidance of your sales executive so that our engineers could quickly build end-of-arm tools on-site, was brilliant and critical to a successful launch.”



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LES-5	91	MR-5A	75	QMP 2-150-160	24
LES-5P	91	MR-7A	75	QMP 2-90	24
LH-0425-M5	106	MR-AH 20	83	QMP 3-150-160	24
LH-0425-M5	114	MR-AH 30	83	QSR 150-10	22
LH-0640-M5	106	MR-AH 50	83	QSR 160-18	22
LH-0640-M5	114	MR-KS 10	83	QSR 90-8	22

QST 150-10.....	23	SA-01L-10-5.....	111	SP-20S.....	110
QST 160-18.....	23	SA-01L-12-10.....	111	SP-20SR.....	110
QST 90-8.....	23	SA-02L-10-5.....	111	SP-30.....	110
R31-100-0000.....	59	SA-02L-12-10.....	111	SP-30R.....	110
R31-100-B000.....	59	SA-02L-12-30.....	111	SP-30S.....	110
R31-100-C000.....	59	SA-02L-12-5.....	111	SP-30SR.....	110
R31-200-0000.....	59	SA-03L-16.....	111	SP-40.....	110
R31-200-B000.....	59	SA-04L-16.....	111	SP-40R.....	110
R31-200-C000.....	59	SA-08E.....	111	SP-60SR.....	110
RC 10-S.....	69	SA-08G.....	110	SP-80S.....	110
RC 12.7-RR.....	70	SA-09E.....	111	SPBE-08R.....	110
RC 19.1-RR.....	70	SA-09G.....	110	SPBE-10R.....	110
RC 20-S.....	69	SA-13E.....	111	SPBE-12R.....	110
RC 25.4-RR.....	70	SA-13G.....	110	SPBE-20R.....	110
RC 30-S.....	69	SA-15E.....	111	SPBS-21.....	110
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RPL 8.....	98	SA-40E.....	111	SWM 0 LT.....	18
RRK-93.....	91	SA-40G.....	110	SWM 0.1.....	18
RRK-93-TP.....	91	SAB-02L-12-5.....	111	SWM 0.1 LT.....	18
RRK-M9P.....	91	SAE-02L-12-5.....	111	SWM 0E.....	18
RRK-M9P-TP.....	91	SAF-02L-12-5.....	111	SWM 1.....	18
RRK-OHSP-006.....	91	SAS 1/4.....	42	SWM 1 - Steel.....	18
RRK-OISP-014.....	91	SAS 1/4.....	100	SWM 1 LT.....	18
RRK-OISP-015.....	91	SAS 1/8.....	42	SWM 1 SA.....	20
RRK-OISP-019.....	91	SAS 1/8.....	100	SWM 1E.....	18
RRK-TL-W1R5MB1.....	91	SC-10.....	80	SWM 2.....	18
RRK-TL-W1R5MC1.....	91	SC-20.....	80	SWM 2 - Steel.....	18
RRK-TL-W3MB1.....	91	SC-30.....	80	SWM 2 LT.....	18
RRK-Y47P-TP.....	91	SEC 40/40 JX.....	29	SWM 2 SA.....	20
RRK-Y59B.....	91	SEC 50/38 D.....	29	SWM 2E.....	18
RRK-Y59B-TP.....	91	SEC 80/40 JX.....	29	SWM 3.....	18
RRK-Y7P.....	91	SEO-10.....	92	SWM 3 - Steel.....	18
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RSM 1-75.....	26	SKS 20.....	38	SWM 3E.....	18
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RSM 3-150.....	26	SLL 16-30.....	66	SZD 12-20.....	56
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RVA 20-60.....	48	SN 1.5-P.....	91	SZD 20-10-A.....	56
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RVB 1-2 U22.....	97	SN-20.....	77	SZD 20-30.....	56
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S06-01S-10.....	102	SP-13SR.....	110	SZS 12-10-14 A.....	56
S06-02S-10.....	102	SP-15.....	110	SZS 12-20-14.....	56
S06-M5-10.....	102	SP-15R.....	110	SZS 12-20-14 A.....	56
S08-01S-10.....	102	SP-20.....	110	SZS 20-10-20.....	56
S08-02S-10.....	102	SP-20R.....	110	SZS 20-10-20 A.....	56

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SZS 20-20-20 A.....	56	VAS 20 Pu.....	53	VGI 3-8-12 XI.....	58
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SZS 20-40-20.....	56	VAS 50 Pu.....	53	VLR 10-90.....	85
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SZS 32-10-30 A.....	56	VBH 10-66S.....	58	VLR 20-150.....	73
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SZS 32-30-30 A.....	56	VC 1-15-S5.....	49	VLR 30-200.....	85
SZS 32-40-30.....	56	VC 1-20-C8.....	49	VPI 1-2-1/4.....	99
SZS 32-40-30 A.....	56	VC 1-20-S8.....	49	VPI 1-2-3/8.....	99
SZS 32-50-30.....	56	VC 1-25-C8.....	49	VPI 1-4-1/4.....	99
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T-20/10.....	28	VC 1-30-S8.....	49	VPI 1-6-3/8.....	99
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T-30/25.....	28	VC 1-50-S4.....	49	VS 0-10 x 30 S.....	51
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T04-01S-10.....	102	VC 1-75-S4.....	49	VS 0-15 x 45 S.....	51
T04-06-10.....	102	VC 2-10-C5.....	50	VS 0-2 x 4 N.....	51
T04-M5-10.....	102	VC 2-10-S5.....	50	VS 0-2 x 4 S.....	51
T06-00-10.....	102	VC 2-110-N2.....	50	VS 0-20 x 60 N.....	51
T06-01S-10.....	102	VC 2-110-S2.....	50	VS 0-20 x 60 S.....	51
T06-02S-10.....	102	VC 2-15-C5.....	50	VS 0-25 x 75 N.....	51
T06-08-10.....	102	VC 2-15-S5.....	50	VS 0-25 x 75 S.....	51
T06-M5-10.....	102	VC 2-20-C8.....	50	VS 0-3.5 x 7 N.....	51
T08-00-10.....	102	VC 2-20-S8.....	50	VS 0-3.5 x 7 S.....	51
T08-01S-10.....	102	VC 2-30-C4.....	50	VS 0-30 x 90 N.....	51
T08-02S-10.....	102	VC 2-30-S8.....	50	VS 0-30 x 90 S.....	51
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TFR-10.....	93	VCF 1-125-P3.....	53	VS 1-2-S5.....	51
TFR-3.....	93	VCF 1-35-P3.....	53	VS 1-20-N8.....	51
TFR-5.....	93	VCF 1-50-P3.....	53	VS 1-20-P8.....	51
TFR-8.....	93	VCF 1-75-P3.....	53	VS 1-20-S8.....	51
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TMP-3.....	93	VCF 2-60-P3.....	53	VS 1-25-P8.....	51
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VS 1-5-N5.....	51	VS 3-40-P8.....	52	WSL 20 AL.....	38
VS 1-5-P5.....	51	VS 3-40-S8.....	52	WSL 20 JX AL.....	38
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VS 1-50-N8.....	51	VS 3-5-P5.....	52	WSL 20 NT.....	38
VS 1-50-P8.....	51	VS 3-5-S5.....	52	WSL 20 T.....	39
VS 1-50-S8.....	51	VS 3-60-N8.....	52	WSL 20 TR.....	39
VS 1-50-V8.....	51	VS 3-60-P8.....	52	WSL 20 TRB.....	39
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VS 1-8-N5.....	51	VS 3-8-S5.....	52	WSL 30 NT.....	38
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VS 2-10-P5.....	52	VSA 40.....	51	WSS 1/4 X.....	41
VS 2-10-S5.....	52	VSA 5.....	51	WSS 1/4 X.....	100
VS 2-15-N5.....	52	VSA 50.....	51	WSS 1/8 X.....	41
VS 2-15-P5.....	52	VSA 70.....	51	WSS 1/8 X.....	100
VS 2-15-S5.....	52	VSA 80.....	51	WSS M5 L.....	41
VS 2-20-N8.....	52	VSA 90.....	51	WSS M5 L.....	100
VS 2-20-P8.....	52	VTB 1/4 JX.....	99	WST 10 L.....	40
VS 2-20-S8.....	52	VTB 1/4 X.....	99	WST 10 L-TR.....	40
VS 2-30-N8.....	52	VTB 2-1-1/4 JX.....	99	WST 10 X.....	40
VS 2-30-P8.....	52	VTB 2-1-1/4 X.....	99	WST 10 X-TR.....	40
VS 2-30-S8.....	52	VTB 2-2-1/4 JX.....	99	WST 14 X.....	40
VS 2-40-N8.....	52	VTB 2-2-1/4 X.....	99	WST 14 X-TR.....	40
VS 2-40-P8.....	52	VTB M5 L.....	99	WST 20 JX.....	40
VS 2-40-S8.....	52	WF-1540.....	85	WST 20 JX-TR.....	40
VS 2-50-N8.....	52	WF-620.....	85	WST 20 X.....	40
VS 2-50-P8.....	52	WIV 25 X.....	30	WST 20 X-TR.....	40
VS 2-50-S8.....	52	WIV 40 JX.....	30	WST 30 JX.....	40
VS 2-75-N4.....	52	WIV 50 X.....	30	WST 30 JX-TR.....	40
VS 2-75-P4.....	52	WIV 80 JX.....	30	WST 30 X.....	40
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VS 3-10-P5.....	52	WKA 30-200.....	43	X-50/25.....	27
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VS 3-10-S5.....	52	WLS 1/8.....	41	YA-12-7W.....	112
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VS 3-18-N8.....	52	WSF 10.5.....	42	YP-40R.....	112
VS 3-18-P5.....	52	WSF 12.5.....	42	YPBE-10R.....	112
VS 3-18-P8.....	52	WSF 16.5.....	42	YPBE-16R.....	112
VS 3-18-S5.....	52	WSL 1/4.....	100	YPBE-20R.....	112
VS 3-18-S8.....	52	WSL 1/8.....	100	ZTB 10.....	65
VS 3-20-N5.....	52	WSL 10 AL.....	38	ZTB 14.....	65
VS 3-20-N8.....	52	WSL 10 NT.....	38	ZTB 20.....	65
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VS 3-20-S8.....	52	WSL 14 AL.....	38	ZTS 20-95 C*.....	65
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SAS AUTOMATION, LLC: Standard Terms and Conditions of Sale June 2008:

All goods and services supplied by SAS Automation, LLC ("SAS") are expressly conditioned on Buyer's assent to the following Standard Terms and Conditions of Sale, including any such Terms which are additional to or different from the terms of Buyer's order or any other documents submitted by Buyer to SAS. In the event that quotations, purchase orders, order acceptances, sales forms, and/or verbal expressions are used which contain terms which are in addition to, different from or inconsistent with those in these Standard Terms of Sale, the Standard Terms and Conditions of Sale shall be controlling, and any such additional, different or inconsistent terms and conditions shall be inapplicable and are hereby objected to. Receipt and acceptance by Buyer of goods supplied by SAS shall constitute acceptance and assent by Buyer of these Terms, even though such acceptance and assent is not limited to the Standard Terms and Conditions of Sale are subject to change by SAS without notice.

1. SAS reserves the right to modify or discontinue the sale of any of its products or services and to modify prices or specifications of its products or services at any time, without notice, and without obligation to Buyer. SAS shall not be liable for any damages caused by its method of processing orders for goods or services or its failure to process orders for discontinued goods and/or services.

2. Minimum Order: SAS requires a minimum order of \$25.00.

3. Purchase Orders: Verbal purchase orders are accepted from current customers with an acceptable payment history on stock items only. Written purchase orders are required for specialty or build-to-order items, or where non-stock purchases are necessary, unless the order is being paid for in advance by credit card. Written purchase orders may be faxed or sent electronically as pdf documents to SAS. All orders are subject to acceptance by SAS.

4. Credit Limits and Credit Approval: New customers are subject to credit limits of \$5,000.00 for components and stock items, and \$10,000 for End-of-Arm Tooling (EOAT) orders, unless the order is paid for in advance by credit card. New customers must complete a SAS credit application to facilitate future purchases.

A Buyer may qualify, at SAS's sole discretion, as a SAS Credit-Approved Buyer upon satisfactory completion of a new customer form, via fax or telephone, plus faxed copy of satisfactory company credit references and bank information. A SAS Credit-Approved Buyer may have an individual credit limit higher than the amounts stated above.

5. Payments: Subject to the down payment provisions and other limitations set forth in these Standard Terms of Sale, payment for goods and/or services purchased shall be due and payable to SAS Automation, LLC in U.S. dollars thirty (30) days from the date of invoice. Buyer shall pay SAS interest on all past due amounts at the rate of 18% per annum or the highest lawful rate, whichever is lower. SAS will be entitled to recover all costs involved in collection including, but not limited to, reasonable attorney fees. If SAS reasonably deems itself insecure, payment for goods and/or services purchased by Buyer shall be due and payable prior to shipment by SAS. Buyer does hereby grant to SAS a security interest in the goods sold by SAS to Buyer as security for the payment for the goods and/or services. Buyer hereby authorizes SAS to file appropriate financing statements as may be necessary under the Uniform Commercial Code ("UCC") to perfect and continue the security interest granted SAS by Buyer in the goods until such time as SAS has received full payment for the goods and/or services. Buyer shall make certain that (i) all goods sold by SAS to Buyer retain their personal property character in order not to be characterized as fixtures and (ii) if any such goods are placed on any real property subject to any mortgage, lien or encumbrance, such goods shall be expressly excluded from the terms of such mortgage, lien or encumbrance. Within thirty (30) days from the date SAS receives payment in full for the goods and/or services, SAS shall release or cause to be released any UCC financing statement that SAS and/or any supplier of SAS has and/or have filed against SAS or Buyer covering the goods.

6. Down Payments: A down payment is required for all orders over \$10,000 for EOATs, special machines, and for all build-to-order products or equipment. Terms granted will be based on potential risk incurred by SAS Automation, LLC, client credit status, and past performance to payment terms.

7. Shipping, Handling and Taxes: All shipping and handling charges are pre-paid and added to the invoice price unless otherwise agreed between SAS and Buyer.

All prices are F.O.B. SAS Automation plant, Xenia, Ohio, USA. SAS prices do not include export boxing or crating for overseas shipment, sales, excise, use, gross receipts, turnover and value added or similar taxes, tariffs, duties, levies or charges and Buyer agrees to pay and absorb the same in full. All licenses and permits, whether federal, state or local, or those of a foreign government, shall be secured by Buyer at Buyer's expense. Additional costs to modify any products in order to comply with federal, state or other governmental laws, regulations or interpretations, adopted or published subsequent to the acceptance by SAS of any order shall be borne by Buyer.

Handling charges, in addition to freight charges are as follows: \$4.95 per order for Component Orders, \$15.00 per tool for End-of-Arm Tooling (EOAT) orders, and \$45.00 per pallet for Palletized Orders. The cost of any special packing, such as crates, or special handling deemed necessary by SAS or caused by Buyer's requirement or requests shall be added to the amount of the order.

No claim for shipment shortages will be allowed unless made in writing within twenty (20) days from the date of delivery by SAS to Buyer. Claims for delay in delivery or products lost in transit shall be made by Buyer on the carrier, as SAS's responsibility ceases, and title and risk of loss passes to Buyer on delivery to the carrier.

8. Discount Program: SAS offers customers a 5% discount on most single orders greater than \$5,000, and a 10% discount on most single orders greater than \$10,000, as determined by SAS. No discounts are offered on EOAT products or services performed at the customer's site. Key Accounts and OEM discounts may also be available, but must be approved in writing by the Accounting Manager and the General Manager of SAS.

9. Price Guarantee: SAS will match any competitor's prices for stock components with proper verification. The proper verification must contain sufficient details for SAS to determine that the competitor's goods are the equivalent of the SAS product.

10. On-Site Service and Installation: Service and installation costs will be billed at \$125/hour for on-site services and at \$55/hour for travel time. A minimum of 4 hours/day will be billed. If the total of travel and on-site hours for any particular day exceeds 8 hours, or if it includes weekend hours or holiday hours, the on-site rate will be \$155/hour for that day; the rate for travel time will remain at \$55/hour. All costs associated with travel including meals, lodging, airfare, car rental, taxi, mileage, etc. will be billed to and paid by the customer.

11. Limited Warranty: Stock SAS products are warranted against defects in workmanship and materials for a limited period of ninety (90) days from the date of delivery by SAS to Buyer, excluding consumable items, such as vacuum cups, which are warranted against defects in workmanship and materials for a limited period of thirty (30) days from the date of delivery. EOAT products and machines, and other specialty machines and build-to-order products are warranted against defects in workmanship and materials for a limited period of six (6) months from the date of delivery. SAS's liability under this warranty shall be limited to repairing or replacing, at the option of SAS, any goods found by SAS upon inspection to be defective or nonconforming. Notwithstanding the foregoing, any replacement parts for EOAT products and machines, or for other specialty machines and build-to-order products, shall be limited to parts which, in the aggregate, cost no more than twenty-five percent (25%) of the original price of the product/equipment, to a maximum of \$1,000.00 (unless otherwise negotiated at the time of sale). This Limited Warranty is void if the defect in or failure of the product is the result of accident, abuse or improper use by the Buyer, or if attributable to unauthorized maintenance or repair.

EXCEPT AS EXPRESSLY SET FORTH ABOVE, SAS PRODUCTS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, AND NO OTHER WARRANTIES, EITHER EXPRESSED OR IMPLIED ARE MADE WITH RESPECT TO THE PRODUCTS OR SERVICES PROVIDED BY SAS, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE OR NON-INFRINGEMENT OR ANY OTHER WARRANTIES THAT MAY ARISE FROM USAGE OF TRADE OR COURSE OF DEALING.

IN NO EVENT SHALL SAS BE LIABLE TO BUYER OR ANY THIRD PARTY FOR ANY INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES (SUCH AS LOST PROFITS OR SALES) ARISING FROM ANY CLAIM WHATSOEVER, INCLUDING ANY TORT, NEGLIGENCE OR STRICT LIABILITY CLAIM, THE LIABILITY OF SAS FOR ANY SUCH CLAIM BEING LIMITED TO THE PURCHASE PRICE OF THE PRODUCT IN QUESTION. BUYER WAIVES ANY CLAIM AGAINST SAS FOR PUNITIVE OR EXEMPLARY DAMAGES. UNLESS OTHERWISE EXPRESSLY PROVIDED HEREIN, ANY LEGAL ACTION ARISING FROM OR IN CONNECTION WITH ANY DEFECT OR FAILURE IN ANY GOODS PROVIDED BY SAS, OR THE PERFORMANCE OR NONPERFORMANCE OF ANY SERVICES PROVIDED BY SAS, MUST BE BROUGHT WITHIN ONE (1) YEAR AFTER THE ACCEPTANCE OF SUCH GOODS OR SERVICES BY BUYER.

The Limited Warranty discussed above does not apply to third party products sold by SAS. Such goods may be covered by the manufacturer's warranty, and Buyer acknowledges that its sole remedy with respect to any defects in such third party products and to any other claim, including but not limited to products liability claims, related to the use, performance or non-performance of such products lies with the manufacturer of those goods.

12. Warranty Returns; Returns for Replacement Goods: Buyer must receive written authorization from SAS before returning any products for repair or replacement under warranty. Buyer shall pay to ship the defective product to SAS. SAS will then repair or replace the item, and ship it back to the Buyer at SAS's expense. Should SAS inadvertently ship the wrong goods to Buyer the Buyer should contact SAS to arrange for return of those goods for replacement with the correct goods. Risk of loss for all repaired or replacement goods shall transfer to Buyer upon delivery to the carrier at the SAS Automation plant, Xenia, Ohio, USA.

If examination and testing reveals that a product returned under warranty is not defective, SAS will return the product to the Buyer at the Buyer's expense.

13. Other Returns: Unwanted stock products and products from third parties can only be returned within thirty (30) days of the date of delivery by SAS to Buyer. Returns of stock products are subject to a fifteen percent (15%) restocking charge; returns of third party products are subject to a thirty percent (30%) restocking charge. Returns will only be accepted by SAS if SAS determines, in its sole judgment, that the goods are in re-salable condition. The Buyer is responsible for any costs involved in shipping returned goods to SAS, and shall likewise be responsible for any shipping charges involved in shipping unacceptable returned goods back to the Buyer. No returns will be accepted after the thirty (30) day period has expired.

Any EOAT products, specialty machinery or build-to-order products/equipment may only be returned with approval by the General Manager or Engineering Manager of SAS. SAS Automation will inspect the returned items for reusable parts, and will credit the Buyer's account for the cost of any parts that can be restocked, less a thirty percent (30%) restocking fee.

14. Warning: All SAS products and components are designed to provide robotics system experts with options for system development. Before integrating any SAS product or component (or any third-party product resold by SAS) into any robotic system, system experts must assure user safety by determining that each product or component is compatible with the system. This determination can usually only be made through testing, training and a thorough safety evaluation. SERIOUS BODILY INJURY OR PROPERTY DAMAGE MAY RESULT FROM IMPROPER SELECTION, USE OR MAINTENANCE OF SAS PRODUCTS OR COMPONENTS (OR ANY THIRD-PARTY PRODUCT RESOLD BY SAS).

It is the Buyer's sole responsibility to ensure that: (a) adequate safety evaluations and precautions are made before any SAS product or component (or any third-party product resold by SAS) is integrated into any robotic system, (b) each system containing SAS products or components (or any third-party product resold by SAS) is safe for its intended use, and is used safely; and (c) system users are properly skilled, adequately trained, and given appropriate safety warnings.

15. Force Majeure: SAS shall not be liable to Buyer for any delay or failure in performance hereunder due to fires, strikes, other labor disputes, embargoes, requirements imposed by government regulations, civil or military authorities, acts of god, the public enemy, delay in transportation, material shortages or other causes which are beyond the reasonable control of SAS Automation, whether similar or dissimilar to any of the foregoing.

16. Buyer's Specifications Infringement. Where any product is manufactured from patterns, plans, drawings, designs or specifications furnished by Buyer, Buyer shall indemnify SAS against and save SAS harmless from all loss, damage and expense arising out of any suit or claim against SAS for infringement of any patent, trademark, copyright or other intellectual property right because of SAS's manufacture of such product or because of the use or sale of such product by any person. Upon SAS's request, Buyer shall appear in and assume the defense of any such litigation on behalf of SAS.

17. Governing Law: This document and the sale of all goods and services shall be governed by and construed in accordance with, and all claims related thereto shall be resolved under, the laws of the State of Ohio, USA exclusive of its rules on conflict of laws. By placing an order with SAS, you agree that any action or proceeding arising out of such order, the goods purchased from SAS, or otherwise from your relationship and dealings with SAS must be brought in the state or federal courts located in Montgomery County, Ohio, USA and you hereby consent to the exclusive personal jurisdiction of such courts.



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