



Automotive Process
Applications by Machinery
Welding Process

Automotive Process Applications by Machinery

Factory Component Applications for the Automobile Industry

WELDING PROCESS

- Spatter resistance
- IP65
- Flame resistance
- Strong magnetic field
- Accuracy
- IO-Link



CLAMP



POSITIONING



TRANSPORT



ENVIRONMENTAL RESISTANCE

RAM

SOLUTIONS, INC.

Your Leading Automation Partner

Application examples for the spot welding process

We recommend components which provide solutions for the spot welding process of automobile bodies and parts. Individual components for "clamping", "positioning", "transporting" and "cooling water" contribute to the further improvement of productivity.

Clamp

Clamp cylinder
CAC4 Series

Rotary clamp cylinder
RCC2 Series

Flat clamp cylinder
CACF Series

Cooling water

Karman vortex flow rate sensor for water
WFK2 Series

Positioning

Reference pin cylinder
WPC3 Series

Pin clamp cylinder
PCC Series

Transport

Free lock unit
FPL Series

Electric actuator
ETS Series

Application examples for the arc welding process

We recommend components which provide solutions for the arc welding process of automobile underbody parts, etc. Individual components for "environmental resistance", "press-fitting", "safety", "shield gas" and "semi-automated facilities" contribute to the further improvement of productivity.

Environmental resistance

Clamp cylinder
Anti-spatter adherence type
(G1/G4)
G1/G4 Series

Cylinder switch with connector
SW-T Series

Shield gas

Compact flow rate sensor
FSM3 Series

Press-fitting/Press

High power cylinder
SHC Series

Safety

Push-button switch
MS Series

Brake unit
JSB3 Series

Shut-off valve
V3010 Series



Clamp

Standard clamp cylinder

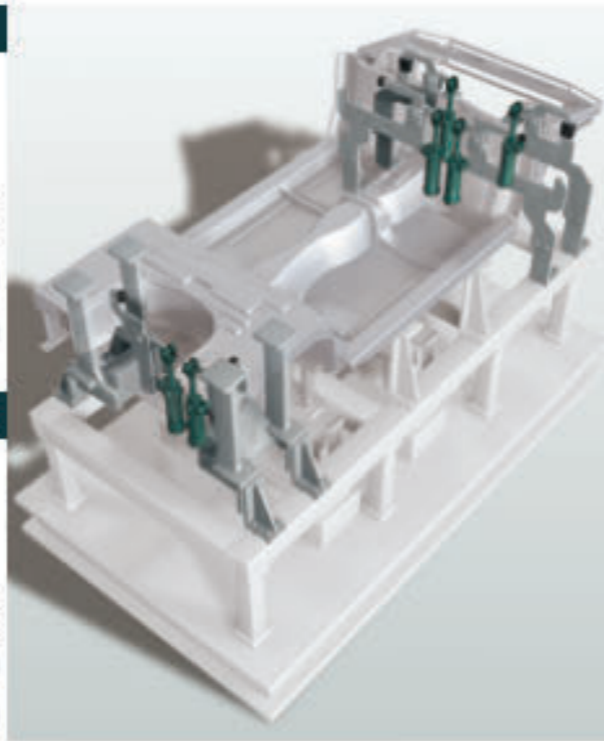
The protrusion of the needle has been minimized to achieve both easy adjustability and safety. Also available for anti-spatter adherence (S1/G4).



Clamp cylinder

CACA Series

Bore size	ø40.50.63.80 mm
Stroke	50.75.100.125.150 mm



Clamp cylinder for frame welding

Space saving and high-thrust clamp specialized for frame welding lines. Clamping force 15,000 N (Under CKD usage conditions)



Frame clamp cylinder

XCA-FCU Series

Bore size	ø100 mm
Stroke	-



Optimal lightweight type usable for transport and rotary jigs

Compact and lightweight clamp that contributes to the weight reduction of welding jigs.

Approximately 56% lighter than the conventional product. Contributes to the weight reduction of robot hand jigs.



Clamp cylinder

CAC-N Series

Bore size	ø25.40 mm
Stroke	50.75.100.125.150 mm



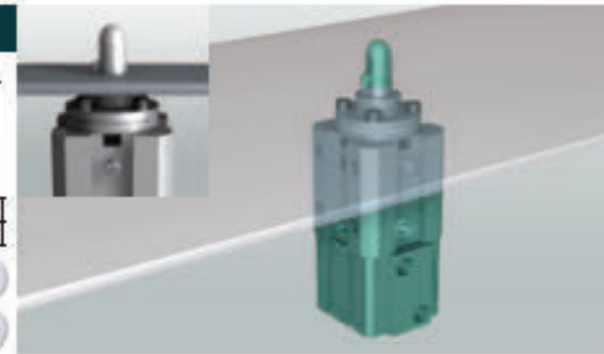
Integrated positioning and clamping

The locating pin and clamp cylinder have been integrated, contributing to jig miniaturization. Supports various pin diameters and mounting methods.



Pin clamp cylinder
PCC Series

Bore size	ø2.50 mm
Stroke	-



Rotary clamp cylinder

The rotary clamp mechanism is incorporated into a square, space saving cylinder. Two guide grooves are provided on all bore sizes to improve the wear resistance of the grooves.



Rotary clamp cylinder
RCC2 Series

Bore size	ø16.20.25.32.40.50.63 mm
Stroke	1.5.2.1.25.2.9.2.2.2.5.40.70 mm



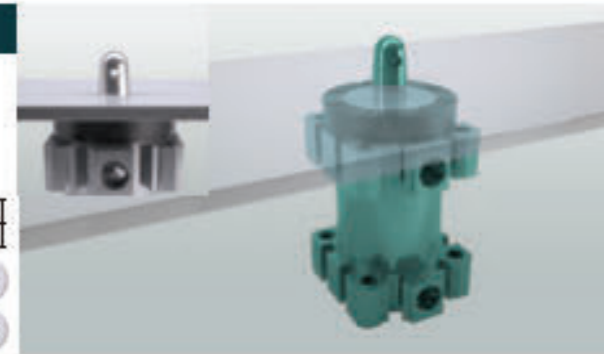
Integration of positioning and magnet suction

The integration of a positioning pin with a suction hand using magnetic force helps keep the robot hand transport jigs lightweight.



Magnet suction hand
XCAS-MHC2 Series

Suction force	60 N
Stroke	-



Space-saving rotary clamp cylinder

Total length dimension is minimized to reduce installation space. Through bolts can be used for easier mounting. WAF and square WAF can be selected for the rod end.



Rotary clamp cylinder (Single guide)
RCS Series

Bore size	ø18 mm
Stroke	17.5.27.5 mm



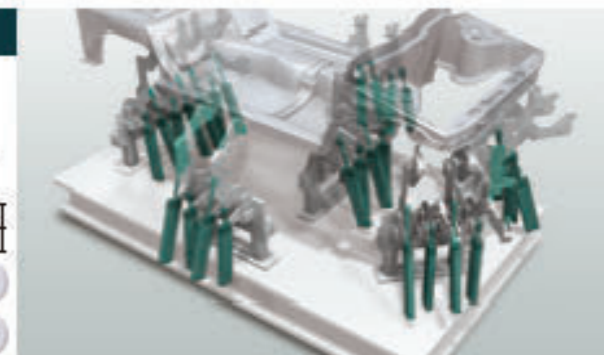
Flat type ideal for switching vehicle models

Equipped with front-to-back fittings. A space saving type that makes the most of its slim width. Ideal for using multiple units in arrays, or installing in a narrow or small space. Position locking is also available.



Flat clamp cylinder
CACF Series

Bore size	ø5.8.2.50 mm
Stroke	50.75.100.125.150 mm



High-thrust clamp cylinder

An original mechanism that saves space and provides high thrust. A slim type that contributes to jig space-saving.



Super clamp cylinder

XCAS-SCC Series

Bore size	ø50.63.80 mm
Stroke	-



Compact clamp cylinder with integrated link mechanism

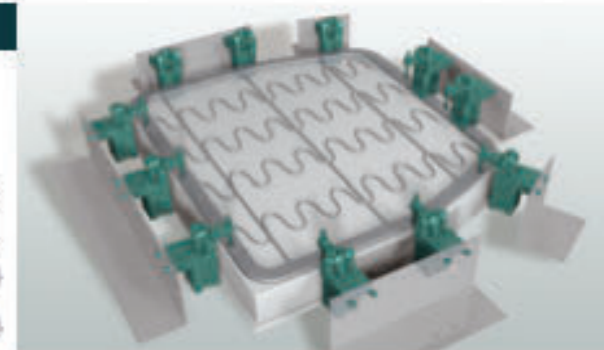
A 3-point link clamp unit ideal for clamping small parts. (With retainer arm)



Clamp cylinder with link

XCA Series

Bore size	ø20.32 mm
Stroke	-





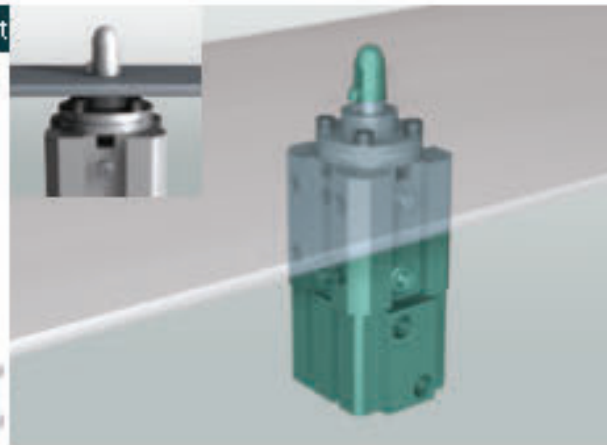
Standard type ideal for positioning and transport

The locating pin and clamp cylinder have been integrated, contributing to jig miniaturization. Supports various pin diameters and mounting methods.



Pin clamp cylinder
PCC Series

Bore size	ø2.750 mm
Stroke	



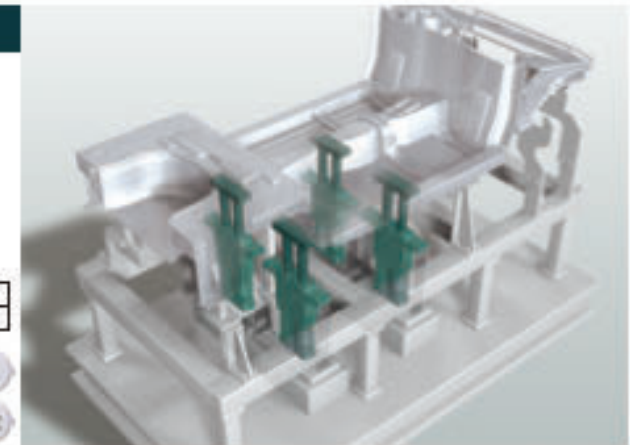
For lightweight shuttle transport

Ideal for lifter applications on a transport shuttle. Lightweight, high-precision and high-rigidity.



Jig cylinder (large)
XCA-JIG Series

Bore size	ø50 mm
Stroke	100 to 450 mm



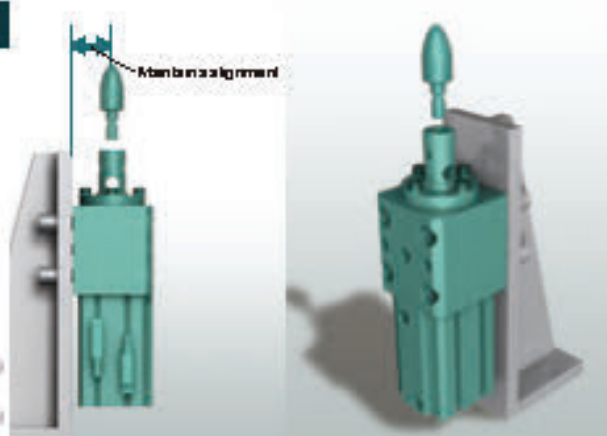
Locating pin shift cylinder ideal for switching vehicle models

A high-precision compact cylinder specialized for shifting locating pins, etc. Achieves mounting reproducibility and high projecting end accuracy.



Pin shift cylinder
SSD-FL274358 Series, etc.

Bore size	ø40/50 mm
Stroke	



Compact unit capable of tracking the θ axis

Swing locking material handling, clamp jigs and general purpose lower receiving jigs with high holding torque. Compact, yet with high holding torque (4.9 Nm to 19.6 Nm)



Free lock unit
XCAS-FPL Series

Holding torque	4.9 Nm to 19.6 Nm
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Flat type ideal for switching vehicle models

Enables highly accurate, compact switching of welding jigs. A slim flat cylinder ideal for parallel installation.



Flat jig cylinder
FCD-QG1L50-FL370096, etc.

Bore size	ø50 mm
Stroke	50/100/150/200/250/300 mm

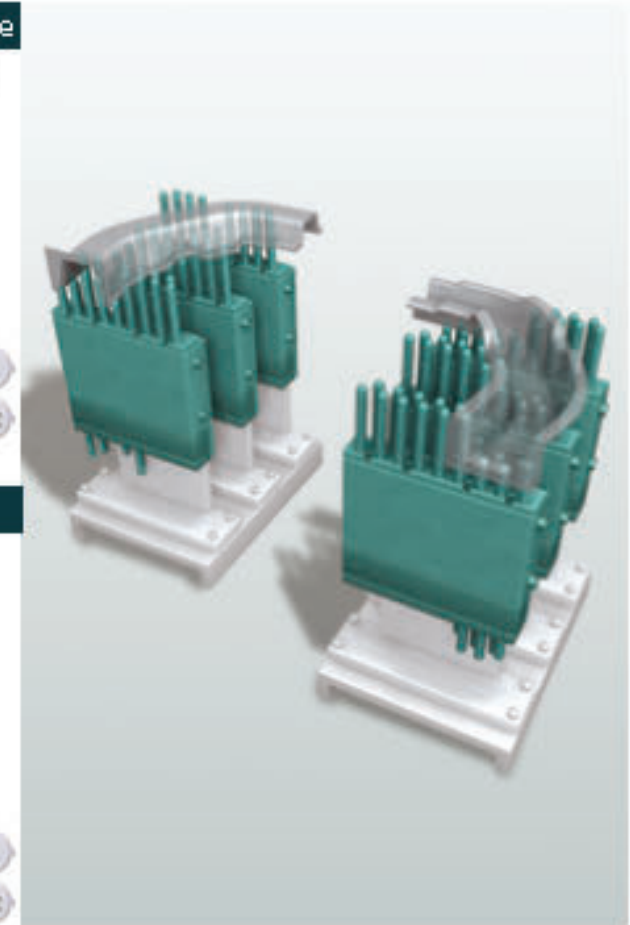


Compact unit that helps make receiving jigs more versatile

It flexibly supports the shape of various workpieces, eliminating the need for dedicated receiving jigs or changeover.



Flexible support
XCAS-FSB Series



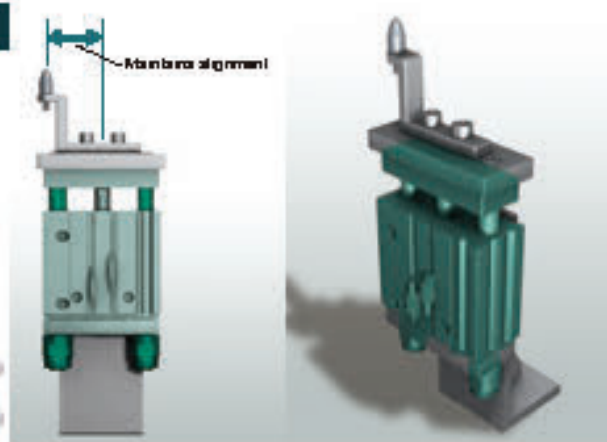
Ideal for shifting offset locating pins

Maintains alignment with 2 guide rods supported by 4 bearings. It has a guide rod of ø20, tripling the rotation resistance compared to the standard ø50 cylinder.



Reference pin cylinder
WPC3 Series

Bore size	ø50 mm
Stroke	40/63 mm



Simple general purpose jig receiving unit

Simple compact unit that helps make receiving jigs more versatile. Flexible support for workpieces of any shape, as multiple units can be linked together. Position locking is also available.



Flexible support
XCAS-FSB Series



Compact with integrated brake mechanism

Equipped with a free position locking mechanism that prevents falling at any position as long as the rod is stationary. The locking direction can be selected from forward and turnover directions. The one-way lock allows clamped workpieces to be removed from the opposite direction.



Clamp cylinder with position locking
UCAC2 Series

Bore size	ø40/50/63/80 mm
Stroke	50/75/100/125/150 mm



Compact and lightweight

Uses an original brake mechanism with high reliability. Now 55% lighter than the conventional product, specialized for transport applications and contributing to the weight reduction of robot hand jigs.



Lightweight position locking clamp cylinder
UCAC-N Series

Bore size	ø25/40 mm
Stroke	50/75/100/125/150 mm



Suction hand that uses magnetic force

Ideal for the suction of magnetic substances that cannot easily be suctioned with regular pads, or thin copper plates with many punched holes or oil adhered. Suction force is 50 N, 100 N or 200 N. No air consumption when held with suction, energy saving as compared to general vacuum pads.

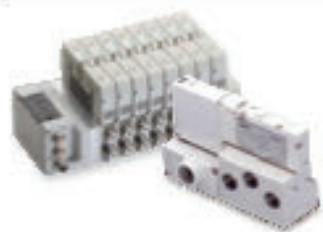


Magnet hand
XCAS-MHC2 Series

Suction force	50/100/200 N
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Manifold valve that enables the miniaturization of conveying tools



Plug-in manifold meets the needs of the times by providing excellent performance in space-saving, usability, service life and power consumption. Supports various wire connections including serial transfer and integrated I/O block.

Plug-in block manifold
W4G Series



Compatible cylinder size	to ø25 mm
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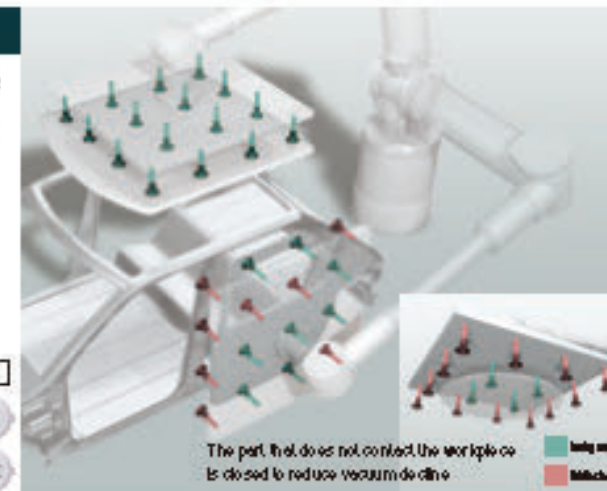
Suction transport that supports multiple work pieces

When two or more pads are used, pads that suction normally reduce the vacuum decline even if other pads are not suctioning. Thus, they prevent the normally suctioned workpiece from falling.



Position locking valve
VSECV Series

Port size	M3, M4, M5, M6, R1/8
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The part that does not contact the workpiece is closed to reduce vacuum decline

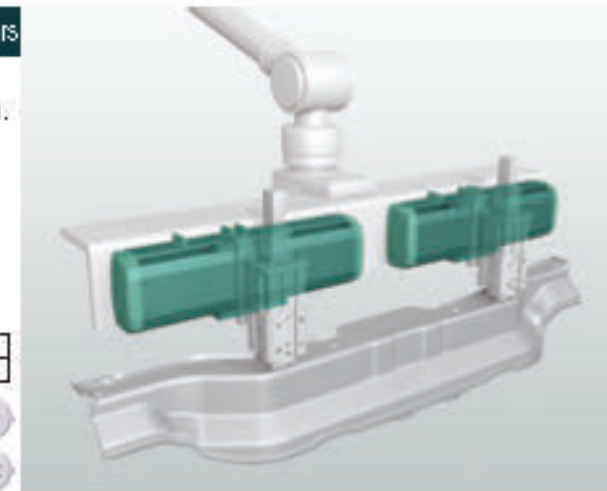
Orthogonal axis actuator that supports various servo-motor manufacturers

Mount a servo motor from any company you're familiar with. Mounting specifications for origin sensor and limit sensor can also be selected. Stroke can be selected from 50 to 1500 mm (50 mm pitch). Max. load capacity is 150 kg, max. speed is 2000 mm/s for supporting a wide range of applications. Repeatability ±0.02 mm



Electric actuator
ETS Series

Max. load capacity	5 to 120 kg
Stroke	50 to 1500 mm



Transport tool change unit

Used with the device body and adapter equipped with tools such as hands or chucks. When replacing tools, just remount the entire adapter to achieve rapid changeover. Position locking mechanism prevents falling tools even when the drive source is cut off.

Load capacity	1/5/10/20 kg
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Automatic hand changer
CHC Series



Mechanical hand/chuck that does not require either air or electricity

Unlike the conventional hand/chuck that requires air, this product performs opening and closing operation mechanically. Ideal for index tables, etc., that cannot use air piping.

Gripping power	12 to 150 N
Stroke	5 to 20 mm



Mechanical hand
BHA-FC / CKL2-FC Series





Environmental resistance

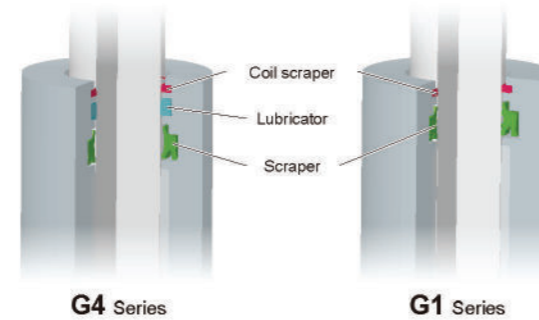
Series that prevents the adhesion of spatter

Cylinder with metal scraper and lubricator built in, handling extreme spatter environments. Contributes to longer service life.

Coil scraper	Eliminates solid material such as welding spatter deposited on rods.
Lubricator	Enables easy peeling of spatter.
Scraper	Absorbs fine powder to prevent penetration into the cylinder.
Scraper	Removes dust in general environments.



Anti-spatter adherence (G1/G4)
G1/G4 Series



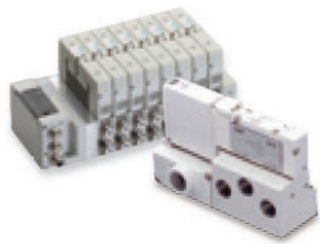
G4 Series

G1 Series

Environment-resistant compact valve that supports IP65

Plug-in manifold meets the needs of the times by providing excellent performance in space-saving, usability, service life and power consumption. Supports various wire connections including serial transfer and integrated I/O block.

Compatible cylinder size | to $\phi 125$ mm



Plug-in block manifold
W4G Series



Compact M12 connector switch that can be used for any cylinder model

M8 and M12 connectors with high versatility are used. Reduces work processes for wiring and maintenance. Cover for anti-spatter adherence is available.



Cylinder switch with connector
SW-T/SW-H Series



Flame-resistant tube and resistant to spatter

Revolutionary tube made using flame-resistant materials. A series specialized for extreme spatter environments is also available.

O.D. | $\phi 4/6/8/10/12$ mm



Flame-resistant tube
SR Series



Cooling water

Flow rate sensor with Flo-Thru structure



Capacitance electromagnetic flow sensor
WFC Series

The Flo-Thru structure allows even water of poor quality to be used. The capacitance structure eliminates detection failures caused by foreign matter deposited onto the electrode. Ensures repeatability in elbow piping.

Flow rate measured range | 0.5 to 60 L/min



Eco-friendly solenoid valve for water



Compact pilot operated solenoid valve for water
FWD Series

Achieves low power consumption (1/3 compared with conventional models). Material has been optimized to make the product lighter (Approximately one-third for both weight and capacity). Large flow rate (Compared with conventional models, 1.3x or more).

Port size | Rc1/4 to 1



Karman's vortex sensor compatible with a wide variety of output specifications



FLUEREX flow rate sensor for water
WFK2 Series

It can be switched among a selection of flow rate, temperature switch output, analog output and IO-Link communication. All models feature a water temperature measurement function as standard. The detection range of the flow rate lower limit is expanded to support a wide flow range.

Flow rate measured range | 0.4 to 250 L/min



Shield gas

Flow rate control of argon gas for welding is possible



Compact flow rate controller
FCM Series

Compatible with various gases such as air, nitrogen, argon, oxygen, hydrogen and helium. Installable in narrow spaces or on movable parts, enabling equipment downsizing and weight reduction. Controllable through parallel input.

Flow rate | 15 ml to 100 l/min



High-performance, multi-function flow rate sensor



Compact flow rate sensor
FSM3 Series

A single unit handles five types of gases including air, nitrogen, argon, carbon dioxide, and mixed gas. Integrating the needle valve helps save space. IO-Link compatibility allows parameter and event data transmission, enabling predictive maintenance.

Flow rate | 500 ml to 1000 l/min



Easily extracts nitrogen gas from compressed air



Nitrogen Gas Extraction Unit
NS Series

Generates a nitrogen-enriched gas by utilizing a hollow fiber separation membrane that easily separates oxygen. Reduced processes/space: We propose the optimum system according to the required flow rate. Oxygen concentration monitor connection: Inline oxygen monitor PNA Series can be connected.



Can measure oxygen concentrations while pressurized



Inline oxygen monitor
PNA Series

Usable at pressures from atmospheric pressure through 1.0 MPa. Easy maintenance too, with space-saving piping. Oxygen/inert gas concentration display is switchable.





Press-fitting/Press

Ideal when power is required at the end of the stroke



Enables booster (double/quad force) at the end of the stroke. Air consumption volume is 1/2 to 1/8 (Compared with conventional models). Reduced installation space (25 to 60% compared with conventional models).

Bore size	ø40 to 100 mm
Stroke	40 to 1000 mm

High power cylinder
SHC Series



Achieves thrust up to 5 t with only a pneumatic source



An environmentally considerate cylinder that allows 2t or 5t high thrust power at your desired position with a pneumatic source alone. Helps get rid of troublesome oil management.

Effective thrust	For 2 t and 5 t
Stroke	50 to 500 mm

Mechanical power cylinder
MCP Series



Semi-automated facilities

Improves operability and equipment safety



A large pushbutton switch with emphasis on safety. Contributes to work safety. Diverse range of variations.

Push-button switch
MS series



An all-air solution with electric design, no control panel required



Costs are reduced as it uses an air sequence that does not require electric wiring. Contributes to circuit design work.

Compact mechanical valve
MS Series



Safety

Series equipped with an original brake mechanism with high reliability



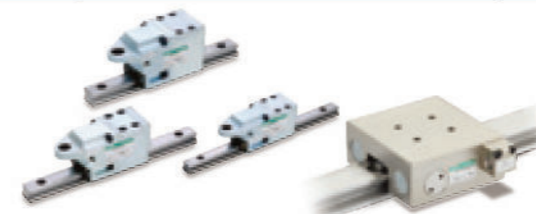
Equipped with a highly reliable mechanical brake. Helps improve facility safety when the pressure is down.

Cylinder with brake
ULK/JSK2/JSG/JSC3/ USSD/UFCD/USC Series

Bore size	ø16 to 180 mm
Stroke	to 2500 mm



Safety brake unit that uses a linear guide



When used with a system incorporating a linear guide, this product can lock the position of a workpiece after moving it to the specified position, locking it during emergency stop for safety and prevent it from falling off.

Linear guide lock
LMB/LML Series

Holding force	300 to 2450 N
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Ideal for preventing accidents due to residual pressure in pneumatic lines



Can be locked at the position where residual pressure is released during maintenance work. OSHA (Occupational Safety and Health Administration) compliant. A shut-off valve with check function.

Shut-off valve with keyhole
V3010 Series

Port size	Rc1/8 to 1
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Stops movable rods instantaneously / Powerful lock



Powerful holding force of 980 N to 20000 N is provided according to ø16 to ø45 rod diameter. Even if air source is shut off, the rod position is held.

Brake unit
JSB3 Series

Holding force	980 to 20000 N
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Slim, lightweight lock unit



Fixing mechanism which locks and unlocks linearly using air. Simple air control means remote operation is possible, enabling "fixing," "improved safety," and "position locking."

Lock unit
UB Series

Holding force	180 N, 450 N
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Compact manual valve for discharging residual pressure



A compact ball shut-off valve. Maintenance work is easy. This shut-off valve, incorporated into a cylinder control circuit using a 3-position all ports closed valve, is used to discharge residual pressure in the circuit when performing maintenance work while the power supply is OFF during emergency stops. It prevents sudden cylinder movement by discharging the residual pressure.

Manual switching valve
HSV-B Series

Port size	Rc1/4
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Engineered for Success!

In the fast-paced world of manufacturing, staying ahead of the competition requires embracing cutting-edge technologies that enhance efficiency, productivity, and profitability. Our automation applications and industrial automation solutions have emerged as indispensable tools in this quest for excellence. By harnessing the power of automation, manufacturers can streamline their processes, reduce human error, optimize resource allocation, and achieve higher levels of precision and consistency. Whether it's robotic systems, intelligent sensors, or advanced control algorithms, these solutions offer a transformative approach to manufacturing, enabling businesses to meet the demands of today's dynamic market while paving the way for future growth and innovation.

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