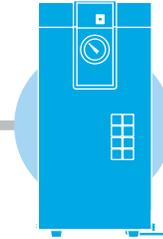
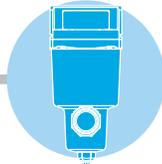
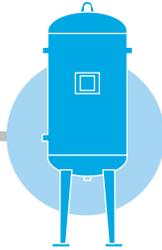
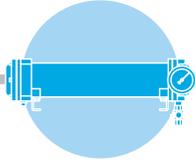
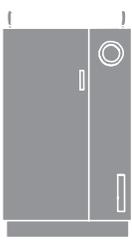




Directional Control Valves	
Air Cylinders	
Rotary Actuators/ Air Grippers	
Vacuum Equipment	
Air Preparation Equipment	
Modular F. R. L./ Pressure Control Equipment	
Lubrication Equipment	
Fittings and Tubing	
Speed Control Equipment	
Silencers/ Exhaust Cleaners/ Blow Guns/Pressure Gauges	
Switches/Sensors	
Static Electricity Elimination Equipment	
Process Valves	
Chemical Liquid Valves/ Fittings & Needle Valves/ Tubing	
Process Pumps	
Process Gas Equipment	
Industrial Filters/ Sintered Metal Elements	
Temperature Control Equipment	
Electric Actuators/ Electric Cylinders	
High Vacuum Equipment	
Hydraulic Equipment	
Pneumatic Instrumentation Equipment	
Other Derived Series	

# ALL PRODUCTS

# ALL PRODUCTS



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## Lubrication Equipment

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## Rotary Actuators/ Air Grippers

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## Fittings and Tubing

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## Silencers/ Exhaust Cleaners/ Blow Guns/ Pressure Gauges

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## Air Preparation Equipment

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## Switches/Sensors

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## Modular F. R. L./ Pressure Control Equipment

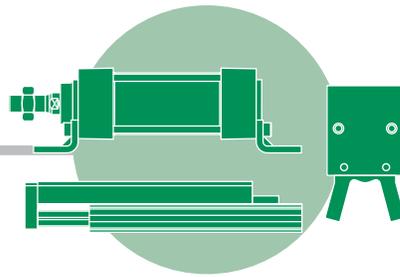
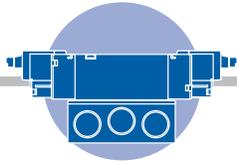
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### Chemical Liquid Valves/ Fittings & Needle Valves/ Tubing

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### Industrial Filters/ Sintered Metal Elements

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### Temperature Control Equipment

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### Electric Actuators/ Electric Cylinders

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### High Vacuum Equipment

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### Hydraulic Equipment

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### Pneumatic Instrumentation Equipment

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### Other Derived Series

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- Clean/Low-Particle Generation
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Directional Control Valves

Air Cylinders

Rotary Actuators/  
Air Grippers

Vacuum Equipment

Air Preparation Equipment

Modular F. R. L./  
Pressure Control Equipment

Lubrication Equipment

Fittings and Tubing

Speed Control Equipment

Silencers/  
Exhaust Cleaners/  
Blow Guns/Pressure Gauges

Switches/Sensors

Static Electricity Elimination  
Equipment

Process Valves

Chemical Liquid Valves/  
Fittings & Needle Valves/  
Tubing

Process Pumps

Process Gas Equipment

Industrial Filters/  
Sintered Metal Elements

Temperature Control  
Equipment

Electric Actuators/  
Electric Cylinders

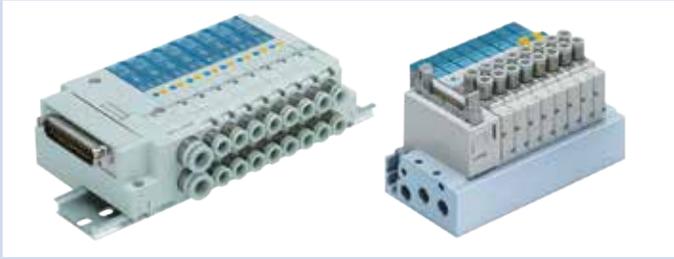
High Vacuum Equipment

Hydraulic Equipment

Pneumatic Instrumentation  
Equipment

Other Derived Series

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## Pilot Operated 4/5 Port Solenoid Valves

### 4 Port Solenoid Valve/Cassette Type Manifold **SJ**

Rubber Seal



- Low-profile cassette type with baseless structure
- Takes up minimal space with a body width of 7.5 mm (SJ2000) or 10 mm (SJ3000).
- Combination of the SJ2000 and the SJ3000 is possible.
- A multi-pin connector makes it easy to add or subtract stations or to exchange valves.
- One side solenoid
- 4 position, dual 3 port specifications available
- Manifold type No.: SS5J2, SS5J3

Model	Flow characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 3/5 (A/B → E)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
SJ2000	0.36	0.13	0.08	ø20	0.55 (Standard) 0.23 (With power saving circuit)
SJ3000	0.56	0.11	0.12	ø25	0.4 (Standard) 0.15 (With power saving circuit)

### Vacuum Release Valve with Restrictor **SJ3A6**

Rubber Seal



- 2 built-in spool valves
- Possible to control vacuum adsorption and release with a single valve unit.
- Width 10 mm (Same size as Series SJ3000)
- With a restrictor that can adjust the flow rate of the release air.
- Built-in replaceable filter on both vacuum and release sides.
- Combination of the 4 port solenoid valve SJ2000/3000 is possible. (Made to Order)
- Manifold type No.: SS3J3

### 5 Port Solenoid Valve Plug-in Type **SY**

Metal Seal  
Rubber Seal



- Thanks to the flow increase, valve size can be reduced!
- Saves energy and space.
- Power consumption: 0.1 W (With power saving circuit)/0.35 W (Standard)
- Service life: 200 million cycles (Metal seal)/70 million cycles (Rubber seal)
- Plug-in sub-plate newly added!
- Plug-in metal base (IP40)/Plug-in connector connecting base (IP67)
- Manifold type No.: SS5Y3, SS5Y5, SS5Y7

Series	Flow characteristics		Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → EA/EB)			
	C [dm <sup>3</sup> /(s·bar)]	b		
SY3000	1.6	0.19	ø50	0.35 (Standard) 0.1 (With power saving circuit)
SY5000	3.6	0.17	ø63	
SY7000	5.9	0.20	ø80	

### 5 Port Solenoid Valve **SY**

Rubber Seal



- Combined mounting of 3 port valve and 5 port valve is possible.
- Power consumption: 0.1 W (with power saving circuit)
- A wide variety of manifold options such as aluminum body manifold, DIN rail, stacking type manifold
- Manifold type No.: SS5Y3, SS5Y5, SS5Y7, SS5Y9

Model	Flow characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → EA/EB)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
SY3000	1.1	0.30	0.26	ø40	0.35 (Standard) 0.1 (With power saving circuit)
SY5000	2.8	0.29	0.66	ø63	
SY7000	4.5	0.27	1.1	ø80	
SY9000	10	0.29	2.5	ø100	

## Pilot Operated 4/5 Port Solenoid Valves

### 5 Port Solenoid Valve SV

Rubber Seal



- It is easily possible to add stations of the manifold valve or change specifications.
- One side solenoid
- 4 position, dual 3 port specifications available
- Manifold type No.: SS5V1, SS5V2, SS5V3, SS5V4

Model	Flow characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → E)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
SV1000	1.1	0.35	0.28	ø40	0.6
SV2000	2.4	0.18	0.48	ø63	0.6
SV3000	4.3	0.21	0.93	ø80	0.6
SV4000	7.0	0.18	1.6	ø100	0.6

### 4/5 Port Solenoid Valve SYJ

Rubber Seal



- Combined mounting of 3 port valve and 5 port valve is possible.
- Electricity consumption: 0.1 W (with power saving circuit)
- Manifold type No.: SS5YJ3, SS5YJ5, SS5YJ7

Model	Flow characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → EA/EB)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
SYJ3000	0.46	0.35	0.12	ø25	0.35 (Standard) 0.1 (With power saving circuit)
SYJ5000	0.83	0.32	0.21	ø40	
SYJ7000	2.9	0.35	0.74	ø50	

### 5 Port Solenoid Valve/Cassette Type Manifold SZ

Rubber Seal



- Cassette type allows easy valve exchange.
- Valve has switch attached for safe maintenance.
- Low-profile cassette type with baseless structure takes up less space.
- Manifold type No.: SS5Z3

Model	Flow characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 3 (A/B → R)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
SZ3000	0.77	0.19	0.19	ø32	0.6

### 5 Port Solenoid Valve VF

Rubber Seal



- Built-in full-wave rectifier (AC)
- Built-in strainer in the pilot valve
- Manifold type No.: VV5F1, VV5F3, VV5F5

Model	Flow characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → EA/EB)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
VF1000	0.53	0.28	0.13	ø40	1.55 (Standard) 0.55 (With power saving circuit) 0.4 (Low wattage specification)
VF3000	3.1	0.32	0.75	ø80	
VF5000	10.0	0.49	2.9	ø125	1.55 (Standard) 0.55 (With power saving circuit)

## Pilot Operated 4/5 Port Solenoid Valves

### Large Size 5 Port Solenoid Valve VP

Rubber Seal



- For driving large cylinders.
- Manifold type No.: VVP45, VVP46

Model	Flow characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → EA/EB)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
VP4□50	21	0.28	5.6	ø140	12
VP4□70	Effective area: 300 mm <sup>2</sup>			ø300	12

### 5 Port Solenoid Valve S0700

Rubber Seal



- 7 mm width compact solenoid valve manifold
- 4 position, dual 3 port valve
- A variety of common wiring methods
- Slim compact plug-in manifold: Footprint reduced by 45%\*  
Height reduced by 20 mm\*
- \* Compared with plug-in manifold stacking base
- Manifold type No.: SS0751, SS0750, SS0755

Model	Flow characteristics			Applicable cylinder size	Power consumption (W)
	1 → 4/2 (P → A/B)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
S0700	0.39	0.39	0.11	ø25	0.35

### 5 Port Solenoid Valve VQ

Metal Seal  
Rubber Seal



- Space-saving design with one side solenoid and fittings all positioned one side, allowing free three-directional mounting
- No screws, one clamp structure for reduced recombination labor
- A variety of option parts (Back pressure check valve, Dual flow fitting, etc)
- A variety of common wiring methods
- 4 position, dual 3 port valve
- Manifold type No.: VV5Q11, VV5Q21

Model	Flow characteristics			Applicable cylinder size	Power consumption (W)
	2/4 → 3/5 (A/B → R1/R2)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
VQ1000	1.0	0.30	0.25	ø40	0.4 (Standard)
VQ2000	3.2	0.30	0.80	ø63	0.4 (Standard)

### 5 Port Solenoid Valve VQ4000

Metal Seal  
Rubber Seal



- Compatible with dusttight/water-jets-proof types (equivalent to IP65).
- A variety of common wiring methods
- Compatible with a wide variety of manifold options and control units.
- Manifold type No.: VV5Q41, VV5Q45

Model	Flow characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → EA/EB)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
VQ4000	7.3	0.38	2.0	ø100	1.0 0.5 (Low wattage type)

## Pilot Operated 4/5 Port Solenoid Valves

### 5 Port Solenoid Valve VQ5000

Metal Seal  
Rubber Seal



- Compatible with dusttight/water-jets-proof types (equivalent to IP65).
- A variety of common wiring methods
- Manifold type No.: VV5Q51, VV5Q55

Model	Flow characteristics			Applicable cylinder size	Power consumption (W)
	2/4 → 3/5 (A/B → R1/R2)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
VQ5000	17	0.31	4.7	ø160	1.0 0.5 (Low wattage type)

### 5 Port Solenoid Valve VQC

Metal Seal  
Rubber Seal



- Enclosure IP67 compliant
- Flexible adaptation such as added stations and changed specifications is made possible with the use of a multi-pin connector manifold.
- Space-saving design with one side solenoid and fittings all positioned one side, allowing free mounting
- No screws, one clamp structure for reduced recombination labor
- A variety of common wiring methods
- 4 position, dual 3 port valve
- Manifold type No.: VV5QC11, VV5QC21

Model	Flow characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → R1/R2)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
VQC1000	1.0	0.30	0.25	ø40	0.4 (Standard)
VQC2000	3.2	0.30	0.80	ø63	0.4 (Standard)

### 5 Port Solenoid Valve VQC

Metal Seal  
Rubber Seal



- Enclosure IP67 compliant
- Flexible adaptation such as added stations and changed specifications is made possible with the use of a multi-pin connector manifold.
- Space-saving design with one side solenoid and fittings all positioned one side, allowing free mounting
- A variety of common wiring methods
- Manifold type No.: VV5QC41

Model	Flow characteristics			Applicable cylinder size	Power consumption (W)
	2/4 → 3/5 (A/B → R1/R2)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
VQC4000	7.3	0.38	2.0	ø100	1.0 0.5 (Low wattage type)

### 5 Port Solenoid Valve VQZ

Metal Seal  
Rubber Seal



- Combined mounting of 3 port valve and 5 port valve on manifold valve is possible.
- Allows mounting on aluminum body manifold or DIN rail.
- Manifold type No.: VV5QZ12, VV5QZ15, VV5QZ22, VV5QZ25, VV5QZ32, VV5QZ35

Model	Flow characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → EA/EB)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
VQZ1000	1.3	0.24	0.32	ø63	0.35 (Standard) 0.9 (High pressure type, High speed response type)
VQZ2000	2.3	0.29	0.53	ø80	
VQZ3000	4.6	0.26	1.2	ø100	

## Pilot Operated 4/5 Port Solenoid Valves

### 5 Port Solenoid Valve **SQ**

Metal Seal  
Rubber Seal



- Power saving: 0.4 W (Standard)
- Easy to add or decrease the number of valve stations.
- Easy valve maintenance. Mountable with one screw.
- Easy replacement of clip type One-touch fittings
- Connector entry direction can be changed with a single push.
- 4 position dual 3 port valve
- Built-in back pressure check valve (Option)
- Manifold type No.: SS5Q13, SS5Q14, SS5Q23, SS5Q24

Series	Flow characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → R1/R2)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
SQ1000	0.8	0.20	0.19	ø32	0.4 (Standard)
SQ2000	3.1	0.18	0.71	ø63	0.95 (High pressure type)

### 5 Port Solenoid Valve **VFS**

Metal Seal



- Metal seal main valve construction
- Extensive size variations
- For driving medium and large cylinders
- A wide variety of manifold options
- Compatible with control units (VFS2000/3000/4000, Base mounted type)
- Manifold type No.: VV5FS1, VV5FS2, VV5FS3, VV5FS4, VV5FS5

Model	Flow characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → R1/R2)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
VFS1000	1.8	0.19	0.40	ø50	1.8
VFS2000	3.5	0.32	0.85	ø63	1.8
VFS3000	6.8	0.12	1.6	ø80	1.8
VFS4000	12	0.22	3.1	ø140	1.8
VFS5000	20	0.13	4.7	ø160	1.8
VFS6000	38	0.10	9.0	ø200	1.8

### 5 Port Solenoid Valve **VFR**

Rubber Seal



- Rubber seal main valve construction
- Extensive size variations
- For driving medium and large cylinders
- Manifold type No.: VV5FR2, VV5FR3, VV5FR4, VV5FR5

Model	Flow characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → EA/EB)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
VFR2000	3.0	0.27	0.7	ø63	1.8
VFR3000	8.7	0.38	2.2	ø100	1.8
VFR4000	14	0.3	3.8	ø125	1.8
VFR5000	25	0.21	6.2	ø140	1.8
VFR6000	41	0.17	9.7	ø200	1.8

### NAMUR Interface 5 Port Solenoid Valve **VFN2000N**



- Compact design and large flow capacity
- Low power consumption
- NAMUR mounting interface
- Multiple electrical entry option (Grommet, Terminal, DIN terminal type)

## Pilot Operated 4/5 Port Solenoid Valves

### 5 Port Solenoid Valve/ISO Standard **VQ**

Metal Seal  
Rubber Seal



- Conforming to ISO standard
- Manifold type No.: VV71, VV72

Model	Flow characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → EA/EB)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
VQ7-6	6.0	0.11	1.4	ø100	1.0
VQ7-8	13	0.27	3.3	ø140	1.0

### Intrinsically Safe Explosion-proof System 5 Port Solenoid Valve **51-SY**

Rubber Seal



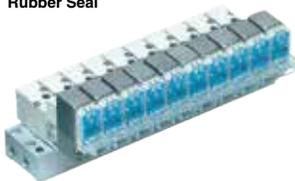
- Exia II BT4 (TIIS certified item)
- Three types of connectors can be selected.  
L-shaped plug connector, L-shaped plug connector with cover, terminal block type
- Three types of barriers can be selected.
- Manifold type No.: 51-SS5Y5, 51-SS5Y7

Model	Flow characteristics			Power consumption (W)
	4/2 → 5/3 (A/B → EA/EB)			
	C [dm <sup>3</sup> /(s·bar)]	b	Cv	
51-SY5000	2.8	0.29	0.66	0.52
51-SY7000	4.1	0.29	1.0	0.52
51-SY9000	9.6	0.43	2.6	0.52

## Pilot Operated 3 Port Solenoid Valves

### 3 Port Solenoid Valve **SYJ**

Rubber Seal



- Power consumption: 0.1 W (with power saving circuit)
- Manifold type No.: SS5YJ3, SS5YJ5, SS5YJ7

Model	Flow characteristics			Power consumption (W)	Available in vacuum applications
	2 → 3 (A → R)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
SYJ300	0.36	0.31	0.089	0.35 (Standard) 0.1 (With power saving circuit)	-14.5 psi (-100 kPa)
SYJ500	1.2	0.48	0.34		-14.5 psi (-100 kPa)
SYJ700	2.7	0.34	0.69		-14.5 psi (-100 kPa)

### 3 Port Solenoid Valve **VQZ**

Metal Seal  
Rubber Seal



- External pilot specification can be used for vacuum applications.
- Allows mounting on aluminum body manifold or DIN rail.
- Manifold type No.: VV3QZ12, VV3QZ15, VV3QZ22, VV3QZ25, VV3QZ32, VV3QZ35

Model	Flow characteristics			Power consumption (W)	Available in vacuum applications
	2 → 3 (A → R)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
VQZ100	1.0	0.35	0.25	0.35 (Standard) 0.9 (High pressure type, High speed response type)	-14.5 psi (-100 kPa)
VQZ200	3.0	0.40	0.80		-14.5 psi (-100 kPa)
VQZ300	4.1	0.36	1.0		-14.5 psi (-100 kPa)

## Pilot Operated 3 Port Solenoid Valves

### 3 Port Solenoid Valve/Pilot Operated Poppet Type **VP**

Rubber Seal



- Built-in full-wave rectifier (AC)
- Longer life expectancy: 50 million cycles or more
- Built-in strainer in the pilot valve
- External pilot type can be used for vacuum applications.
- Manifold type No.: VV3P3, VV3P5, VV3P7

Model	Flow characteristics			Power consumption (W)	Available in vacuum applications
	2 → 3 (A → R)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
VP300	4.2	0.23	1.0	1.55 (Standard) 0.55 (With power saving circuit) 0.4 (Low wattage specification)	-14.5 psi (-100 kPa)
VP500	8.9	0.20	2.1		
VP700	15.3	0.22	3.7	1.55 (Standard) 0.55 (With power saving circuit)	

### 3 Port Solenoid Valve/Pilot Operated Poppet Type **VG**

Rubber Seal



- Low power consumption
- No lubrication required
- Can be used under vacuum or low pressure.
- Easy conversion to N. C., N. O., or external pilot.
- Can be used as selector valve or divider valve. (External pilot type)

Model	Flow characteristics			Power consumption (W)	Available in vacuum applications
	2 → 3 (A → R)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
VG342	38	0.32	9.8	4 (Standard) 1.8 (Energy-saving type) 1.8 (Continuous duty type)	-14.7 psi (-101.2 kPa)

### Large Size 3 Port Solenoid Valve **VP**

Rubber Seal



- Large flow capacity, small exhaust resistance
- Easy conversion to N. C. or N. O.

Model	Flow characteristics			Power consumption (W)	Available in vacuum applications
	2 → 3 (OUT → EXH)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
VP3145	26	0.35	7.0	12	-14.7 psi (-101.2 kPa)
VP3165	Effective area: 330 mm <sup>2</sup>			12	
VP3185	Effective area: 670 mm <sup>2</sup>			12	

### NAMUR Interface 3 Port Solenoid Valve **VFN200N**

Model	Type	Flow characteristics						Power consumption (W)
		1 → 4/2 (P → A/B)			4/2 → 5/3 (A/B → EA/EB)			
		C	b	Cv	C	b	Cv	
VFN200	Single solenoid	2.68	0.04	0.72	5.41	0.31	1.38	1.8
VFN200	Double solenoid	2.68	0.04	0.72	5.41	0.31	1.38	1.8

## Direct Operated 3/4/5 Port Solenoid Valves

### 3 Port Solenoid Valve/Unit Manifold Valve **VV061**

Rubber Seal



- Valve, base plate, base, and fitting in one compact unit
- Innovative unit manifold
- Equipped with 6 mm width valve, V060 series

Model	Type	Flow characteristics			Power consumption (W)	Available in vacuum applications
		2 → 3 (A → R)				
		C [dm <sup>3</sup> /(s·bar)]	b	Cv		
VV061	Standard	Effective area: 0.11 mm <sup>2</sup>			0.55 (Standard)	-14.5 psi (-100 kPa)
	High flow	Effective area: 0.21 mm <sup>2</sup>			0.23 (With power saving circuit)	

### 3 Port Solenoid Valve/Highly Integrated Unit Manifold **VV100**

Rubber Seal



- Compact manifold with two 3-port valves on 1 station
- Connector (For plug-in connection)
- Individually wired valve can be added.

Model	Flow characteristics			Power consumption (W)	Available in vacuum applications
	2a/2b → 3 (E)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
VV100	0.05	0.29		0.4 (Standard) 0.15 (With power saving circuit)	-14.5 psi (-100 kPa)

### 3 Port Solenoid Valve **V100**

Rubber Seal



- Power consumption: 0.1 W (with power saving circuit)
- Manifold type No.: VV100-S41

Model	Type	Flow characteristics			Power consumption (W)	Available in vacuum applications
		2 → 3				
		C [dm <sup>3</sup> /(s·bar)]	b	Cv		
V100	Standard	0.037	0.11	0.008	0.35 (Standard) 0.1 (With power saving circuit)	-14.5 psi (-100 kPa)
V100	High flow	0.076	0.07	0.016	1	

### 3 Port Solenoid Valve **S070**

Rubber Seal



- 7 mm width compact solenoid valve manifold
- Weight of valve alone: 5 g
- Single unit specifications, base mounted manifold, body ported manifold can be selected.
- Manifold type No.: SS073

Model	Flow characteristics			Power consumption (W)	Max. operating pressure
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
S070	0.042	0.27	0.011	0.5	73 psi (0.5 MPa)
	0.060	0.28	0.016	0.5	44 psi (0.3 MPa)
	0.042	0.27	0.011	0.35	44 psi (0.3 MPa)
	0.060	0.28	0.016	0.35	15 psi (0.1 MPa)
	0.021	0.27	0.006	0.1 (With power saving circuit)	44 psi (0.3 MPa)
	0.042	0.28	0.011	0.1 (With power saving circuit)	15 psi (0.1 MPa)

## Pilot Operated 3/4/5 Port Solenoid Valves

### 4 Port Solenoid Valve/Direct Operated Poppet Type **VQD**

Rubber Seal



- Since the main valve has no sliding seals, non-oil specification (Made to Order) is available. No exhaust to the atmosphere.
- High speed, with stable response times
- Available in vacuum applications
- Manifold type No.: VV4QD12, VV4QD15

Model	Flow characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → EA/EB)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
VQD1000	0.27	0.28	0.07	ø25	2.0

### Vacuum/Release Unit **VQD1000-V**

Rubber Seal



- Applicable to 0603 chip
- Response speed: 13 msec (at time of 500 mm<sup>\*</sup>) /18.5 msec (at time of 1000 mm<sup>\*</sup>)
- Smooth workpiece removal, with no overshoot
- No need for timing adjustment of switchback between vacuum and positive pressure.
- No need for throttle circuit of release air.
- Suction filter: ZFC050 (Made to Order)

\* Distance from the unit to the work area

### 3 Port Solenoid Valve/Direct Operated Poppet Type **VKF**

Rubber Seal



- Universal porting
- Available in vacuum applications
- Manifold type No.: VV3KF3

Model	Flow characteristics			Power consumption (W)	Available in vacuum applications
	2 → 3 (A → R)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
VKF300	0.59	0.31	0.14	4.0	-14.7 psi (-101.2 kPa)

### 3 Port Solenoid Valve/Direct Operated Poppet Type **VK**

Rubber Seal



- Universal porting
- Combined on the VK3000 manifold is possible.
- Available in vacuum applications
- Manifold type No.: VV3K3

Model	Flow characteristics			Power consumption (W)	Available in vacuum applications
	2 → 3 (A → R)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
VK300	0.80	0.27	0.19	4	-14.7 psi (-101.2 kPa)

### 5 Port Solenoid Valve/Direct Operated Poppet Type **VK**

Rubber Seal



- Low-power consumption (2 W DC, Low wattage type)
- Possible to use with a pressure of 0 MPa or more.
- Combined mounting of the VK300 is possible.
- Manifold type No.: VV3K3

Model	Flow characteristics			Power consumption (W)	Applicable cylinder SIZE
	4/2 → 5/3 (A/B → R1/R2)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
VK3000	0.54	0.12	0.12	4.0	ø25

## Pilot Operated 3/4/5 Port Solenoid Valves

### 3 Port Solenoid Valve/Direct Operated Poppet Type VT

Rubber Seal



- Direct operated solenoid valve
- Universal porting
- Available in vacuum applications
- Manifold type No.: VV317, VVT340, VVT341

Model	Flow characteristics			Power consumption (W)	Available in vacuum applications
	2 → 3 (A → R)				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
VT307	0.71	0.25	0.17	4 (Standard) 1.8 (Energy saving type)	14.7 psi (-101.2 kPa)
VT317	2.6	0.34	0.67	6.0	
VT325	6.1	0.37	1.6	12	

### 5 Port Direct Operated Solenoid Valve VS

Metal Seal



- Direct operated solenoid valve
- Possible to use with a pressure of 0 MPa or more.
- Metal seal main valve construction
- Manifold type No.: VVS410, VVS411

Model	Flow characteristics			Applicable cylinder size	Power consumption (W)
	A/B → EA/EB				
	C [dm <sup>3</sup> /(s·bar)]	b	Cv		
VS4□10	3.9	0.35	1.0	ø80	5.5

### 3 Port Direct Operated Solenoid Valve VS

Metal Seal



- Direct operated solenoid valve
- Metal seal main valve construction
- Possible to use with a pressure of 0 MPa or more.
- Multiple pressure supply is possible.
- Manifold type No.: VVS310, VVS311

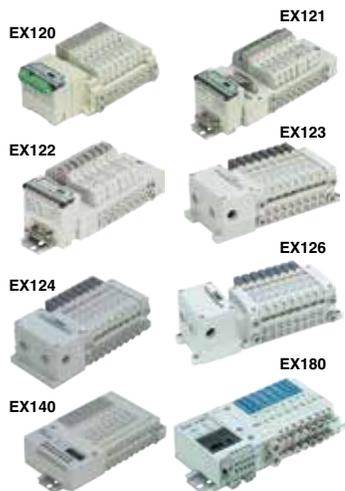
Model	Flow characteristics			Power consumption (W)
	A → E			
	C [dm <sup>3</sup> /(s·bar)]	b	Cv	
VS3115	3.6	0.34	0.88	5.5
VS3110	3.6	0.18	0.82	5.5
VS3135	9.0	0.3	2.4	13.2
VS3145	15	0.46	4.5	24.0

## Reduced-wiring Fieldbus System (Serial Transmission System)

### Serial Transmission System EX

For Output

\* The applicable protocols differ depending on the series.  
Refer to the WEB catalog for details.



Series	Enclosure	Communication protocol*	Applicable valve
EX120	IP20	DeviceNet™ CC-Link CompoNet™ CompoBus/S	SY3000, 5000, 7000 (Plug-in) VQ1000, 2000 SV1000, 2000, 3000, 4000
EX121	IP20	S-LINK	SY3000, 5000
EX122	IP20	NKE (Wiring saving system)	SY3000, 5000
EX123	IP65	S-LINK NKE (Wiring saving system)	VQ2000, 4000, 5000
EX124	IP65	DeviceNet™ CC-Link CompoBus/S	VQ2000, 4000, 5000
EX126	IP67	CC-Link	SY3000, 5000, 7000 (Plug-in) VQC1000, 2000, 4000 SV1000, 2000, 3000
EX140	IP20	DeviceNet™ CC-Link CompoBus/S S-LINK NKE (Wiring saving system)	SQ1000, 2000 SZ3000
EX180	IP20	DeviceNet™ CC-Link	SJ2000, 3000 S0700

### Serial Transmission System EX260

For Output

\* The applicable protocols differ depending on the series.  
Refer to the WEB catalog for details.



Series	Enclosure	Communication protocol*	Applicable valve
EX260	IP67	DeviceNet™ PROFIBUS DP CC-Link PROFINET EtherCAT EtherNet/IP™	SY3000, 5000, 7000 (Plug-in) VQC1000, 2000, 4000 SV1000, 2000, 3000 S0700 (IP40)

### Serial Transmission System EX250

For Input/Output

\* The applicable protocols differ depending on the series.  
Refer to the WEB catalog for details.



Series	Enclosure	Communication protocol*	Applicable valve
EX250	IP67	DeviceNet™ PROFIBUS DP CC-Link EtherNet/IP™ AS-Interface CANopen	SY3000, 5000, 7000 (Plug-in) VQC1000, 2000, 4000 SV1000, 2000, 3000 S0700 (IP40)

# Reduced-wiring Fieldbus System (Serial Transmission System)

## Serial Transmission System EX600



For Input/Output

\* The applicable protocols differ depending on the series.  
Refer to the WEB catalog for details.

Series	Enclosure	Communication protocol*	Applicable valve
EX600	IP67	DeviceNet™ PROFIBUS DP CC-Link EtherNet/IP™ EtherCAT PROFINET	SY3000, 5000, 7000 (Plug-in) VQC1000, 2000, 4000 SV1000, 2000, 3000 S0700 (IP40)

## Serial Transmission System EX500



For Input/Output, Gateway Type

\* The applicable protocols differ depending on the series.  
Refer to the WEB catalog for details.

Series	Enclosure	Communication protocol*	Applicable valve
EX500	IP67	DeviceNet™ PROFIBUS DP EtherNet/IP™	SY3000, 5000, 7000 (Plug-in) VQC1000, 2000, 4000 SV1000, 2000, 3000, 4000 S0700 (IP40)

## Serial Transmission System EX510



For Input/Output, Gateway Type

\* The applicable protocols differ depending on the series.  
Refer to the WEB catalog for details.

Series	Enclosure	Communication protocol*	Applicable valve
EX510	IP20	DeviceNet™ PROFIBUS DP CC-Link	SJ2000, 3000 SY3000, 5000, 7000 (Plug-in) SY3000, 5000, 7000 SYJ3000, 5000, 7000 SQ1000, 2000 SZ3000 VQ1000, 2000 VQZ1000, 2000, 3000 S0700

## M8/M12 Connector PCA/EX9/EX500



- Communication Cable/Connector: CC-Link, DeviceNet™, PROFIBUS DP
- Conforming to IEC61076-2-101 and IEC60947-5-2
- IP67 (IEC60529)
- Fieldwireable connectors: No exclusive tools, reduction in wiring time
- SPEEDCON: Just insert the connector and make 1/2 rotation.

## Reduced-wiring Fieldbus System (Serial Transmission System)

### PC Wiring System **PCW**



- The PC wiring system simplifies wiring between a PLC and all types of connected equipment.

## Air Operated Valves

### 5 Port Air Operated Valve **SYA**

Rubber Seal



- Same manifolds as Series SY3000/5000/7000 non plug-in type manifolds are prepared.

Model	Flow characteristics			Applicable cylinder size
	4/2 → 5/3 (A/B → EA/EB)			
	C [dm <sup>3</sup> /(s·bar)]	b	Cv	
SYA3000	1.1	0.30	0.26	ø40
SYA5000	2.8	0.29	0.66	ø63
SYA7000	4.5	0.27	1.1	ø80

### 4/5 Port Air Operated Valve **SYJA**

Rubber Seal



- Same manifolds as Series SYJ3000/5000/7000 are prepared.

Model	Flow characteristics			Applicable cylinder size
	4/2 → 5/3 (A/B → EA/EB)			
	C [dm <sup>3</sup> /(s·bar)]	b	Cv	
SYJA3000	0.46	0.35	0.12	ø25
SYJA5000	0.83	0.32	0.21	ø40
SYJA7000	2.9	0.35	0.74	ø50

### 5 Port Air Operated Valve **VZA**

Metal Seal



- Same manifolds as Series VZ2000/4000 are prepared.
- Mounted on VQZ2000/3000 manifolds is possible.

Model	Flow characteristics			Applicable cylinder size
	4/2 → 5/3 (A/B → EA/EB)			
	C [dm <sup>3</sup> /(s·bar)]	b	Cv	
VZA2000	0.90	0.25	0.21	ø40
VZA4000	2.2	0.19	0.54	ø50

### 5 Port Air Operated Valve **VFA**

Rubber Seal



- Same manifolds as Series VF1000/3000/5000 are prepared.

Model	Flow characteristics			Applicable cylinder size
	4/2 → 5/3 (A/B → EA/EB)			
	C [dm <sup>3</sup> /(s·bar)]	b	Cv	
VFA1000	0.53	0.28	0.13	ø40
VFA3000	3.1	0.32	0.75	ø80
VFA5000	10.0	0.49	2.9	ø125

## Air Operated Valves

### 5 Port Air Operated Valve VFRA

Rubber Seal



- Same manifolds as Series VFR3000/4000 non plug-in type manifolds are prepared.

Model	Flow characteristics			Applicable cylinder size
	4/2 → 5/3 (A/B → EA/EB)			
	C [dm <sup>3</sup> /(s·bar)]	b	Cv	
VFRA3000	8.6	0.37	2.2	ø100
VFRA4000	14	0.30	3.7	ø125

### 5 Port Air Operated Valve VPA

Rubber Seal



- Same manifolds as Series VP4□50 are prepared.

Model	Flow characteristics			Applicable cylinder size
	4/2 → 5/3 (A/B → EA/EB)			
	C [dm <sup>3</sup> /(s·bar)]	b	Cv	
VPA4□50	21	0.28	5.6	ø140
VPA4□70	Effective area: 300 mm <sup>2</sup>			ø300

### 4/5 Port Air Operated Valve VSA

Metal Seal



- Metal seal main valve construction

Model	Flow characteristics			Applicable cylinder size
	A/B → EA/EB			
	C [dm <sup>3</sup> /(s·bar)]	b	Cv	
VSA4□20	5.6	0.51	1.4	ø80
VSA4□30	9.6	0.17	2.4	ø100
VSA4□40	16	0.32	4.2	ø140

### 3 Port Air Operated Valve SYJA

Rubber Seal



- Same manifolds as Series SYJ300/500/700 are prepared.
- Manual override is possible.

Model	Flow characteristics		
	2 → 3 (A → R)		
	C [dm <sup>3</sup> /(s·bar)]	b	Cv
SYJA300	0.36	0.31	0.089
SYJA500	1.2	0.48	0.34
SYJA700	2.7	0.34	0.69

### 3 Port Air Operated Valve VZA

Metal Seal



- Metal seal main valve construction

Model	Flow characteristics		
	4/2 → 5/3 (A/B → EA/EB)		
	C [dm <sup>3</sup> /(s·bar)]	b	Cv
VZA200	0.85	0.35	0.22
VZA400	2.2	0.17	0.53

## Air Operated Valves

### 3 Port Air Operated Valve VTA

Rubber Seal



- Universal porting
- Possible to use with a pressure of 0 MPa or more.

Model	Flow characteristics		
	2 → 3 (A → R)		
	C [dm <sup>3</sup> /(s·bar)]	b	Cv
VTA301	0.60	0.29	0.15
VTA315	1.7	0.39	0.45

### 3 Port Air Operated Valve VGA

Rubber Seal



- Easy conversion to N. C. or N. O.

Model	Flow characteristics		
	2 → 3 (A → R)		
	C [dm <sup>3</sup> /(s·bar)]	b	Cv
VGA342	38	0.32	9.8

### 3 Port Air Operated Valve VPA

Rubber Seal



- Same manifolds as Series VP300/500/700 internal pilot manifolds are prepared.
- Easy conversion to N. C. or N. O.

Model	Flow characteristics		
	2 → 3 (A → R)		
	C [dm <sup>3</sup> /(s·bar)]	b	Cv
VPA300	4.2	0.26	1.0
VPA500	8.9	0.20	2.1
VPA700	15.3	0.22	3.7

### 3 Port Air Operated Valve VPA

Rubber Seal



- High flow capacity, small exhaust resistance

Model	Flow characteristics		
	2 → 3 (OUT → EXH)		
	C [dm <sup>3</sup> /(s·bar)]	b	Cv
VPA3145	42	0.39	10
VPA3165	Effective area: 330 mm <sup>2</sup>		
VPA3185	Effective area: 670 mm <sup>2</sup>		

## Mechanical Valves/Hand Valves

### 2/3 Port Mechanical Valve VM-A



- Lightweight VM100: 60 g (Conventional model: 95 g), VM200: 90 g (Conventional model: 111 g)
  - Mounting interchangeable with the conventional model
  - Available in vacuum applications (VM100) : -14.5 to 145 psi (-100 kPa to 1 MPa) (VM200: 0 to 145 psi (1 MPa))
  - Mounting: Bracket mounting (New), Bottom mounting (New), Side mounting, Panel mounting
  - With miniature indicator
- Possible to check if air is output to the secondly port.

Series	Number of ports	Valve construction	Piping direction	Port size
VM100-A	2/3 port	Poppet	Side ported/ Bottom ported	1/8 (Side ported) M5 x 0.8 (Bottom ported)
VM200-A	2/3 port	Poppet	Side ported	1/4

### Mechanical Valve VM, VZM, VFM



- A wide variety of valves are available for all types of air systems.
- Small mounting space with a compact body.

Description	Series	Number of ports
Mechanical valve	VM1000	2/3 ports
	VM100-A, VM200-A	2/3 ports
	VM400	3 ports
	VZM500, VZM400	5 ports
	VFM300, VFM200	5 ports
	VM800	3 ports

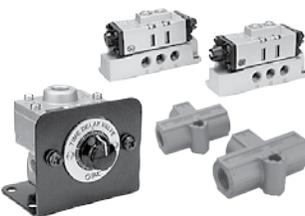
### Blow Gun VMG



- Reduction of 2,000 m<sup>3</sup> per annum is possible. (Energy saving)
  - Pressure loss 1% or less (Nozzle diameter: ø2.5)
  - Applicable nozzle
- Nozzle with male thread, high efficient nozzle with male thread, low noise nozzle with male thread, long steel pipe nozzle.

Series	Port size	Operating pressure range	Effective area (mm <sup>2</sup> )	Nozzle port size
VMG	Rc, NPT, G 1/4, 3/8	0 to 145 psi (0 to 1.0 MPa)	30	Rc1/4

### Transmitters VR



- Air transmitters used for a variety of All Air System

Description	Model
Relay valve	VR4151, 4152
Shuttle valve	VR1210, 1220 VR1210F, VR1220F
AND valve	VR1211F
Time delay valve	VR2110
Pneumatic Indicator	VR3100, 3110
Pneumatic-electric relay	VR3200, 3201

## Mechanical Valves/Hand Valves

### Two Hand Control Valve VR51



- Equipment having a safety circuit
- When starting an operation, accidents such as fingers being caught can be prevented, by requiring both hands to start these push button operated valves.
- An output is available through synchronized, two-handed operation (within 0.5 s).

Model	Sonic conductance: C	Port size Metric size	Port size Inch size	Applicable tubing material
VR51	0.3 dm <sup>3</sup> /(s·bar)	ø6	ø1/4	Nylon Soft nylon Polyurethane FR soft nylon FR double layer FR double layer polyurethane

### Finger Valve VHK

2 or 3 port valve selectable



- The valve direction clearly indicates whether the valve is open or closed.
- Small knob operating force [(0.03 to 0.10 lbf·ft) 0.04 to 0.14 N·m]

Description	Model	Type	Port size
Finger valve	VHK2	2 port valve	ø4 to ø12 M5, 1/8 to 1/2
	VHK3	3 port valve	

### Hand Valve VH



- The direction of air flow can be verified at a glance by the orientation of the handle.

Description	Model	Max. operating pressure	Port size
Hand valve	VH200	145 psi (1.0 MPa)	1/4
	VH300		1/4, 3/8
	VH400		1/4, 3/8, 1/2, 3/4
	VH600	102 psi (0.7 MPa)	3/4, 1

### Conforming to OSHA Standard/Pressure Relief 3 Port Valve with Locking Holes VHS

For pressure relief



- Conforming to OSHA standard (Occupational Safety and Health Administration Department of Labor).
- Manually operated valve can be used to prevent accidents caused by residual pressure in pneumatic lines.
- Possible to verify the supply and exhaust status of air flow at a glance.
- When in the exhaust position, the valve may be padlock secured. Prevents accidental start-ups while personnel are cleaning or servicing equipment.
- Push the handle and then turn, 2-step action prevents malfunction.

Series	Description	Handle operation	Port size
VHS20	Pressure relief 3 port valve with locking holes	Single action	1/8, 1/4
VHS30			1/4, 3/8
VHS40			1/4, 3/8, 1/2, 3/4
VHS50			3/4, 1
VHS2510		Double action	1/8, 1/4
VHS3510			1/4, 3/8
VHS4510			1/4, 3/8, 1/2, 3/4
VHS5510			3/4, 1

## Mechanical Valves/Hand Valves

### Residual Relief 3 Port Valve **VHS**

For pressure relief



- Easy to operate
- The direction of air flow can be verified at a glance by the orientation of the handle.

Description	Model	Port size
Residual Relief 3 Port Valve	VHS400	1/4, 3/8, 1/2
	VHS500	3/4

## Power Valves

### Power Valve **VEX**



- Extensive size variations, port sizes 1/8 to 2.
- VEX1: Large capacity exhaust regulator
- VEX3: 3 port, 3 position valve
- VEX5: Three functions (pressure regulator, directional control valve, and speed controller) are provided by a single valve.

Description	Model	Function
Regulator valve	VEX1	Regulator + Directional control valve
3 position valve	VEX3	Directional control valve
Economy valve	VEX5	Reduced pressure supply + ON/OFF exhaust + Speed control

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## Standard Air Cylinder (Round Type)

### Air Cylinder CJ1



- For the double acting type, the piping direction of the fitting on the rod cover side varies within a range of 90°.

Type	Series	Action	Bore size (mm)
Standard	CJ1	Double acting single rod	4
Standard	CJ1	Single acting (Spring return)	2.5, 4

### Pin Cylinder CJP2/CDJP2/CJP



- Two auto switches can be mounted even for  $\phi 4$ , 5 st.
- Possible to connect a  $\phi 2$  One-touch fitting and a speed controller.
- With auto switch (Series CDJP2: CDJP2)

Type	Series	Action	Bore size (mm)
Standard	CJP2	Double acting single rod	4, 6, 10, 16
Standard	CJPB	Single acting (Panel mount)	4, 6, 10, 15
Standard	CJPS	Single acting (Plug mount)	4, 6, 10, 15

### Air Cylinder CJ2/CDJ2-Z/NCJ2



- Double foot, head flange are added to the mounting types.
- Easy fine adjustment of auto switch position
- The auto switch mounting type, band or rail can be selected with the model number.
- Part numbers with rod end bracket and/or pivot bracket available (Not necessary to order a bracket for the applicable cylinder separately.)
- With auto switch (Series CDJ2-Z: CDJ2, CDJ2W, CDJ2K, CDJ2Z, CDJ2ZW, CDJ2RA, CDJ2RK, CDBJ2)

Type	Series	Action	Bore size (mm)
Standard	CJ2/CJ2-Z/NCJ2	Double acting single rod	6, 10, 16
Standard	CJ2/CJ2-Z/NCJ2	Single acting (Spring return/extend)	6, 10, 16
Standard	CJ2W/CJ2W-Z/NCJ2	Double acting double rod	6, 10, 16
Non-rotating piston rod	CJ2K-Z/NCJ2	Double acting single rod	10, 16
Non-rotating piston rod	CJ2K-Z/NCJ2	Single acting (Spring return/extend)	10, 16
Built-in speed controller	CJ2Z-Z/NCJ2	Double acting single rod	10, 16
Built-in speed controller	CJ2ZW-Z/NCJ2	Double acting double rod	10, 16
Direct mount	CJ2RA-Z/NCJ2	Double acting single rod	10, 16
Direct mount	CJ2RA-Z/NCJ2	Single acting (Spring return/extend)	10, 16
Non-rotating rod/ Direct mount	CJ2RK-Z/NCJ2	Double acting single rod	10, 16
Non-rotating rod/ Direct mount	CJ2RK-Z/NCJ2	Single acting (Spring return/extend)	10, 16
End lock	CBJ2	Double acting single rod	16

## Standard Air Cylinder (Round Type)

### Air Cylinder CM2/CDM2-Z



- Female rod end available as standard
- Easy fine adjustment of auto switch position
- Single clevis and trunnion pivot brackets are available.
- Part numbers with rod end bracket and/or pivot bracket available  
(Not necessary to order a bracket for the applicable cylinder separately)
- With auto switch (Series CDM2-Z: CDM2, CDM2W, CDM2K, CDM2KW, CDM2R, CDM2RK, CDM2□□P, CDBM2)

Type	Series	Action	Bore size (mm)
Standard	CM2-Z	Double acting single rod	20, 25, 32, 40
Standard	CM2-Z	Single acting (Spring return/extend)	20, 25, 32, 40
Standard	CM2W-Z	Double acting double rod	20, 25, 32, 40
Non-rotating piston rod	CM2K-Z	Double acting single rod	20, 25, 32, 40
Non-rotating piston rod	CM2K	Single acting (Spring return/extend)	20, 25, 32, 40
Non-rotating piston rod	CM2KW-Z	Double acting double rod	20, 25, 32, 40
Direct mount	CM2R-Z	Double acting single rod	20, 25, 32, 40
Non-rotating rod/ Direct mount	CM2RK-Z	Double acting single rod	20, 25, 32, 40
Centralized piping	CM2□□P	Double acting single rod	20, 25, 32, 40
End lock	CBM2	Double acting single rod	20, 25, 32, 40

### Air Cylinder CG1/CDG1-Z/NCG (Inch thread)



- Female rod end available as standard
- Easy fine adjustment of auto switch position
- No trunnion mounting female thread added to basic type variation
- Part numbers with rod end bracket and/or pivot bracket available  
(Not necessary to order a bracket for the applicable cylinder separately)
- With auto switch (Series CDG1-Z: CDG1, CDG1W, CDG1K, CDG1KW, CDG1R, CDG1KR, CDBG1, NCDG)

Type	Series	Action	Bore size (mm)
Standard	CG1-Z	Double acting single rod	20, 25, 32, 40, 50, 63, 80, 100
	NCG		3/4", 1", 1-1/4", 1-1/2", 2", 2-1/2"
Standard	CG1-Z	Single acting (Spring return/extend)	20, 25, 32, 40
Standard	CG1W-Z	Double acting double rod	20, 25, 32, 40, 50, 63, 80, 100
Non-rotating piston rod	CG1K-Z	Double acting single rod	20, 25, 32, 40, 50, 63
Non-rotating piston rod	CG1KW-Z	Double acting double rod	20, 25, 32, 40, 50, 63
Direct mount	CG1R-Z	Double acting single rod	20, 25, 32, 40, 50, 63
Direct mount/ Non-rotating rod	CG1KR	Double acting single rod	20, 25, 32, 40, 50, 63
End lock	CBG1	Double acting single rod	20, 25, 32, 40, 50, 63, 80, 100

### Air Cylinder/Short Type CG3/CDG3



- Up to 51 mm shorter, up to 24% lighter (comparison with the CG1 series)
- Female rod end available as standard
- With auto switch (Series CDG3: CDG3)

Type	Series	Action	Bore size (mm)
Standard	CG3	Double acting single rod	20, 25, 32, 40, 50, 63, 80, 100

## Standard Air Cylinder (Round Type)

### ISO Standard Air Cylinder C85/CD85



- Standard No.: ISO 6432
- With auto switch (Series CD85: CD85, CD85W, CD85K, CD85R)

Type	Series	Action	Bore size (mm)
Standard	C85	Double acting single rod	8, 10, 12, 16, 20, 25
Standard	C85W	Double acting double rod	8, 10, 12, 16, 20, 25
Standard	C85	Single acting (Spring return/extend)	8, 10, 12, 16, 20, 25
Non-rotating piston rod	C85K	Double acting single rod	8, 10, 12, 16, 20, 25
Direct mount	C85R	Double acting single rod	8, 10, 12, 16, 20, 25

### Air Cylinder NCM Standard non repairable round body



Type	Series	Action	Bore size (mm)
Standard	NCM	Double acting single/double rod	7/16", 9/16", 3/4", 7/8", 1-1/16", 1-1/4", 1-1/2", 2"
Standard	NCM	Single acting (Spring return/extend)	3/4", 7/8", 1-1/16", 1-1/4", 1-1/2"
Non-rotating Rod	NCMK	Double acting single/double rod	3/4", 7/8", 1-1/16", 1-1/4", 1-1/2"
Non-rotating Rod	NCMK	Single acting (Spring return)	3/4", 7/8", 1-1/16", 1-1/4", 1-1/2"

## Standard Air Cylinders (Square Cover)

### Air Cylinder MB/MBW-Z



- Reduced weight by changing the shape of the rod cover and head cover. Max. 16% lighter
- Part numbers with rod end bracket and/or pivot bracket available (Not necessary to order a bracket for the applicable cylinder separately)
- With auto switch (Series MDB-Z: MDB, MDBW, MDBK, MDBKW, MDBB)

Type	Series	Action	Bore size (mm)
Standard	MB/MB-Z	Double acting single rod	32, 40, 50, 63, 80, 100, 125
Standard	MBW/MBW-Z	Double acting double rod	32, 40, 50, 63, 80, 100, 125
Non-rotating piston rod	MBK	Double acting single rod	32, 40, 50, 63, 80, 100
Non-rotating piston rod	MBKW	Double acting double rod	32, 40, 50, 63, 80, 100
End lock	MBB	Double acting single rod	32, 40, 50, 63, 80, 100

### Square Tube Type Air Cylinder MB1/MDB1



- Prevents dust from entering and accumulating by using a square tube with a tie-rod and covering the auto switch installation groove (option).
- With auto switch (Series MDB1: MDB1, MDB1W, MDB1K)

Type	Series	Action	Bore size (mm)
Standard	MB1	Double acting single rod	32, 40, 50, 63, 80, 100, 125
Standard	MB1W	Double acting double rod	32, 40, 50, 63, 80, 100, 125
Non-rotating piston rod	MB1K	Double acting single rod	32, 40, 50, 63, 80, 100

## Standard Air Cylinders (Square Cover)

### Air Cylinder CA2/CDA2-Z



- Weight reduced by up to 15% lighter
- Easy air cushion control
- Various switches such as compact auto switches and magnetic field resistant auto switches can be mounted.
- Part numbers with rod end bracket and/or pivot bracket available  
(Not necessary to order a bracket for the applicable cylinder separately)
- With auto switch (Series CDA2: CDA2, CDA2W, CDA2K, CDA2KW, CDBA2, CDA2□H, CDA2W□H)

Type	Series	Action	Bore size (mm)
Standard	CA2-Z	Double acting single rod	40, 50, 63, 80, 100
Standard	CA2W-Z	Double acting double rod	40, 50, 63, 80, 100
Non-rotating piston rod	CA2K	Double acting single rod	40, 50, 63
Non-rotating piston rod	CA2KW	Double acting double rod	40, 50, 63
End lock	CBA2	Double acting single rod	40, 50, 63, 80, 100
Air-hydro cylinder	CA2□H	Double acting single rod	40, 50, 63, 80, 100
Air-hydro cylinder	CA2W□H	Double acting double rod	40, 50, 63, 80, 100

### Air Cylinder CS1/CDS1



- Large bore air cylinder of the square cover, tie-rod type.
- With auto switch (Series CDS1: CDS1, CDS1W, CDS1□Q)

\* The air hydro type is only available in  $\phi 125$ ,  $\phi 140$  and  $\phi 160$ .

Type	Series	Action	Bore size (mm)
Standard	CS1	Double acting single rod	125, 140, 160, 180, 200, 250, 300
Standard	CS1W	Double acting double rod	125, 140, 160, 180, 200, 250, 300
Low friction	CS1□Q	Double acting single rod	125, 140, 160

### Air Cylinder CS2/CDS2



- Reduces the weight by maximum of 58% compared to the CS1 series.
- With auto switch (Series CDS2: CDS2)

Type	Series	Action	Bore size (mm)
Standard	CS2	Double acting single rod	125, 140, 160
Standard	CS2W	Double acting double rod	125, 140, 160

### ISO Standard Air Cylinder CP96/CP96SD



- Standard No.: ISO 15552
- Cushion valve can easily be adjusted.
- Grooves arranged on 4 surfaces for CNOMO, D-M9□ and A9□
- With auto switch (Series CP96SD: CP96SD, CP96KD)

Type	Series	Action	Bore size (mm)
Standard	CP96	Double acting single rod	32, 40, 50, 63, 80, 100, 125
Non-rotating piston rod	CP96K	Double acting double rod	32, 40, 50, 63, 80, 100

## Standard Air Cylinders (Square Cover)

### ISO Standard Air Cylinder C96/C96SD



- Standard No.: ISO 15552
- Cushion valve can easily be adjusted.
- With auto switch (Series C96SD: C96SD, C96KD, C96YD)

Type	Series	Action	Bore size (mm)
Standard	C96	Double acting single rod	32, 40, 50, 63, 80, 100, 125
Non-rotating piston rod	C96K	Double acting double rod	32, 40, 50, 63, 80, 100
Smooth cylinder	C96Y	Double acting single rod	32, 40, 50, 63, 80, 100, 125

### NFPA Cylinder NCA1



Type	Series	Action	Bore size (in)
Standard	NCA1	Double acting single rod	1.5", 2", 2.5", 3.25", 4"
Standard	NCA1W	Double acting double rod	1.5", 2", 2.5", 3.25", 4"
Non-rotating rod	NCA1K	Double acting single rod	1.5", 2", 2.5"

## Compact Air Cylinders

### Mini Free Mount Cylinder CUJ/CDUJ



- Space-saving cylinder reduces the total length by 64% and capacity by 70% compared to the CU series.
- With auto switch (Series CDUJ: CDUJ)

Type	Series	Action	Bore size (mm)
Standard	CUJ	Double acting single rod	4, 6, 8, 10, 12, 16, 20
Standard	CUJ	Single acting (Spring return)	4, 6, 8, 10, 12, 16, 20

### Free Mount Cylinder CU/CDU



- Space-saving cylinder enables cylinders to mount directly on multiple sides.
- With auto switch (Series CDU: CDU, CDUW, CDUK, CDUKW, CDU-A, ZCDUK)

Type	Series	Action	Bore size (mm)
Standard	CU	Double acting single rod	6, 10, 16, 20, 25, 32
Standard	CU	Single acting (Spring return/extend)	6, 10, 16, 20, 25, 32
Standard	CUW	Double acting double rod	6, 10, 16, 20, 25, 32
Non-rotating piston rod	CUK	Double acting single rod	6, 10, 16, 20, 25, 32
Non-rotating piston rod	CUK	Single acting (Spring return/extend)	6, 10, 16, 20, 25, 32
Non-rotating piston rod	CUKW	Double acting double rod	6, 10, 16, 20, 25, 32
Long stroke/Standard	CU	Double acting single rod	6, 10, 16, 20, 25, 32
Long stroke/ Non-rotating rod	CUK	Double acting single rod	6, 10, 16, 20, 25, 32
With air cushion	CU-A	Double acting single rod	20, 25, 32
For vacuum	ZCUK	Double acting single rod	10, 16, 20, 25, 32

## Compact Air Cylinders

### Compact Cylinder/Compact Type **CQS/CDQS**



- With this compact square type, auto switch mounting on three or four sides is possible. This compact cylinder does not protrude from the body when mounting an auto switch.
- Added compact type foot brackets and double clevis pivot bracket.
- With auto switch (Series CDQS: CDQS, CDQSW, CDQSK, CDQSKW, CDQS□S)

Type	Series	Action	Bore size (mm)
Standard	CQS	Double acting single rod	12, 16, 20, 25
Standard	CQS	Single acting (Spring return/extend)	12, 16, 20, 25
Standard	CQSW	Double acting double rod	12, 16, 20, 25
Non-rotating piston rod	CQSK	Double acting single rod	12, 16, 20, 25
Non-rotating piston rod	CQSKW	Double acting double rod	12, 16, 20, 25
Anti-lateral load	CQS□S	Double acting single rod	12, 16, 20, 25

### Compact Cylinder **CQ2/CDQ2-Z**



- Space-saving cylinder designed with a compact body.
- It is possible to mount small auto switches on 4 surfaces. (2 surfaces for  $\phi 12$  to  $\phi 25$ )
- No projection of auto switch
- Lighter weight: Reduced by 5 to 13% (compared with the existing CQ2 series)
- Added compact type foot brackets and double clevis pivot bracket.
- Part numbers with rod end bracket and/or mounting bolt available (Not necessary to order a bracket for the applicable cylinder separately.)
- With auto switch (Series CDQ2: CDQ2, CDQ2W, CDQ2K, CDQ2KW, CDQP2, CDQ2□S, CDBQ2)

Type	Series	Action	Bore size (mm)
Standard	CQ2-Z	Double acting single rod	12, 16, 20, 25, 32, 40, 50, 63, 80, 100
Standard	CQ2W-Z	Double acting double rod	12, 16, 20, 25, 32, 40, 50, 63, 80, 100
Standard	CQ2-Z	Single acting (Spring return/extend)	12, 16, 20, 25, 32, 40, 50
Large bore size	CQ2-Z	Double acting single rod	125, 140, 160, 180, 200
Large bore size	CQ2W-Z	Double acting double rod	125, 140, 160, 180, 200
Long stroke	CQ2-Z	Double acting single rod	32, 40, 50, 63, 80, 100
Non-rotating piston rod	CQ2K-Z	Double acting single rod	12, 16, 20, 25, 32, 40, 50, 63
Non-rotating piston rod	CQ2KW-Z	Double acting double rod	12, 16, 20, 25, 32, 40, 50, 63
Axial piping (common piping)	CQP2	Double acting single rod	12, 16, 20, 25, 32, 40, 50, 63, 80, 100
Axial piping (common piping)	CQP2	Single acting (Spring return/extend)	12, 16, 20, 25, 32, 40, 50
Anti-lateral load	CQ2□S-Z	Double acting single rod	32, 40, 50, 63, 80, 100
End lock	CBQ2	Double acting single rod	20, 25, 32, 40, 50, 63, 80, 100

### Compact Cylinder with Air Cushion **RQ/RDQ**



- Adds the air cushion mechanism to the CQS and CQ2 series compact cylinders, extending the body length only +2.5 mm to 13 mm.
- Nearly triple absorbable, allowable kinetic energy. (Compared to the rubber bumper of Series CQS and CQ2)
- Added compact type foot brackets.
- With auto switch (Series RDQ: RDQ)

Type	Series	Action	Bore size (mm)
Standard	RQ	Double acting single rod	20, 25, 32, 40, 50, 63, 80, 100

## Compact Air Cylinders

### Compact Cylinder/Guide Rod Type **CQM/CDQM**



- Built-in guide rod in the CQS and CQ2 series compact cylinders.
- Non-rotating accuracy:  $\pm 0.2^\circ$  or less
- Lateral load resisting 2 to 4 times
  - \* Compared to compact cylinder Series CQ
- Load can be directly mounted.
- Mounting dimensions compatible with the CQS and CQ2 series.
- With auto switch (Series CDQM: CDQM)

Type	Series	Action	Bore size (mm)
Standard	CQM	Double acting	12, 16, 20, 25, 32, 40, 50, 63, 80, 100

### Compact Cylinder/Plate Type **CQU**



- Reduces the width by maximum 40% with oval piston design. (compared with the CQ2 series)
- Weight: Reduced by up to 36% (compared with the MU series)
- A small type of auto switch can be mounted from 4 directions.
- No protrusion of auto switch from the mounting slot

Type	Series	Action	Bore size (mm)
Standard	CQU	Double acting single rod	20, 25, 32, 40

### Plate Cylinder **MU/MDU-Z**



- Oval piston design for space saving. Possible to mount a cylinder from multiple directions.
- It is possible to mount small auto switches in 4 directions.
- No protrusion of auto switch from the mounting slot
- Available with a stroke up to 300 mm
- With auto switch (Series MDU: MDU, MDUW)

Type	Series	Action	Bore size (mm)
Standard	MU-Z	Double acting single rod	25, 32, 40, 50, 63
Standard	MU-Z	Single acting (Spring return/extend)	25, 32, 40, 50, 63
Standard	MUW-Z	Double acting double rod	25, 32, 40, 50, 63

### Compact Cylinder ISO Standards **C55/CD55**



- Standard No.: ISO 21287
- It is possible to mount small auto switches on 4 surfaces.
- With auto switch (Series CD55: CD55)

Type	Series	Action	Bore size (mm)
Standard	C55	Double acting single rod	20, 25, 32, 40, 50, 63, 80, 100

### Compact Cylinder **NCQ8** Flat type style



Type	Series	Action	Bore size (in)
Standard	NCQ8	Double acting single/double rod	9/16", 3/4", 1-1/16", 1-1/2", 2", 2-1/2", 3", 4"
Standard	NCQ8	Single acting single rod	9/16", 3/4", 1-1/16", 1-1/2", 2", 2-1/2"
Super compact	NCDQ8xZ	Double acting double rod	9/16", 3/4", 1-1/16", 1-1/2", 2", 2-1/2", 3", 4"
Super compact	NCDQ8xZ	Single acting single rod	9/16", 3/4", 1-1/16", 1-1/2", 2", 2-1/2"

## Water Resistant Cylinders

### Stainless Steel Cylinder **CJ5-S/CDJ5-S/CG5-S/CDG5-S**



- Applicable for use in an environment with water splashing
- With auto switch (Series CDJ5-S: CDJ5-S, Series CDG5-S: CDG5-S)

Type	Series	Action	Bore size (mm)
Standard	CJ5-S	Double acting	10, 16
Standard	CG5-S	Double acting	20, 25, 32, 40, 50, 63, 80, 100

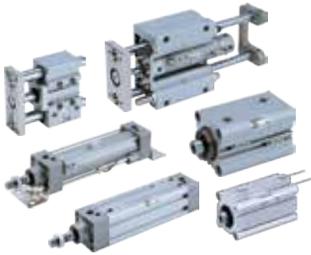
### Hygienic Design Cylinder **HY□/HYD□**



- Easily washable configuration, improved water resistant air cylinder
- Five times the lifespan of improved water resistant cylinder (SMC comparison)
- With auto switch (Series HYDB: HYDB, Series HYDQB: HYDQB, Series HYDC: HYDC, Series HYDG: HYDG)

Type	Series	Action	Bore size (mm)
Basic	HYB	Double acting	20, 25, 32, 40, 50, 63, 80, 100
Basic	HYQ	Double acting	20, 25, 32, 40, 50, 63
ISO standard	HYC	Double acting	32, 40, 50, 63
With guide	HYG	Double acting	20, 25, 32, 40, 50, 63

### Water Resistant Cylinder



- Can be used in environments where contact with water or coolant occurs.
- With water-resistant 2-color indication auto switch
- Suitable for factory machinery, food manufacturing machinery, car washes, etc.

Type	Series	Action	Bore size (mm)
Air cylinder	CM2-Z	Double acting	20, 25, 32, 40
Air cylinder	CG1-Z	Double acting	32, 40, 50, 63, 80, 100
Air cylinder	MB-Z	Double acting	32, 40, 50, 63, 80, 100
Square tube type air cylinder	MB1	Double acting	32, 40, 50, 63, 80, 100
Compact cylinder	CQ2-Z	Double acting	20, 25, 32, 40, 50, 63, 80, 100
Air cylinder	CA2-Z	Double acting	40, 50, 63, 80, 100
Compact guide cylinder	MGP-Z	Double acting	20, 25, 32, 40, 50, 63, 80, 100
Guide cylinder	MGG	Double acting	32, 40, 50, 63, 80, 100
Compact hydraulic cylinder conforming to JIS/1450 psi (10 MPa)	CHKDB	Double acting	20, 25, 32, 40, 50, 63, 80, 100
Hydraulic cylinder conforming to JIS/1015 psi (7 MPa)	CH2F	Double acting	32, 40, 50, 63, 80, 100

## Cylinder with Stable Lubrication Function

### ● Cylinder with Stable Lubrication Function (Lube-retainer)



- Applicable to operation in micro-powder (10 to 100 μm) /general environments.
- Durability is 4 times stronger than the standard model in micro-powder environments.
- The overall length and mounting are the same as those of the standard model. (Except for some models)
- Grease film is formed on the piston rod surface to improve the durability.
- Entry of dust and foreign matter is prevented.
- The number of operating cycles can be improved even in general environments.

Type	Series	Action	Bore size (mm)
Air Cylinder	CM2-Z	Double Acting	20, 25, 32, 40
Air Cylinder	CG1-Z	Double Acting	20, 25, 32, 40, 50, 63, 80, 100
Air Cylinder	CA2-Z	Double Acting	40, 50, 63, 80, 100
Compact Cylinder	CQS	Double Acting	20, 25
Compact Cylinder	CQ2	Double Acting	32, 40, 50, 63, 80, 100
Air Slide Table	MXQ□A	Double Acting	6, 8, 12, 16, 20, 25
Compact Guide Cylinder	MGP-Z	Double Acting	20, 25, 32, 40, 50, 63, 80, 100
Dual Rod Cylinder	CXS	Double Acting	6, 10, 15, 20, 25, 32

## Floating Joints

### ● Floating Joint J



- The floating joint can absorb any off-centering or loss of parallel accuracy of the double acting cylinder, so centering is unnecessary.

Type	Series	Applicable cylinder bore size (mm)
Light weight	JC	20, 25, 32, 40, 50, 63
Standard	JA, JAF, JAL	6, 10, 15, 20, 25, 30, 40, 50, 63, 80, 100, 125, 140, 160
Heavy load	JAH, JAHF, JAHL	40, 50, 63, 80, 100
For compact cylinders	JB	12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 140, 160
Stainless steel	JS	10, 15, 16, 20, 25, 32, 40, 50, 63

## Air-hydro Units

### ● Air-hydro Unit CC



- By converting air pressure into hydraulic pressure, the same function of a hydraulic unit can be obtained while using pneumatic equipment.

Type	Series	Nominal size (mm)
Air-hydro unit	CC	63, 100, 160
Converter	CCT	40, 63, 100, 160
Valve unit	CCV	—

## Magnetically Jointed Rodless Cylinders

### Mechanically Jointed Rodless Cylinder MY1



- Four standard models are available.
- A variety of applications are available based on the load mass and required accuracy.

Type	Series	Action	Bore size (mm)
Basic	MY1B/MY1B-Z	Double acting	10, 16, 20, 25, 32, 40, 50, 63, 80, 100
Slide bearing	MY1M	Double acting	16, 20, 25, 32, 40, 50, 63
Cam follower guide	MY1C	Double acting	16, 20, 25, 32, 40, 50, 63
Linear guide	MY1H/MY1H-Z	Double acting	10, 16, 20, 25, 32, 40
Linear guide	MY1HT	Double acting	50, 63

### Mechanically Jointed Rodless Cylinder with Protective Cover MY1□W



- Improves dustproof and water resistance with a protective cover, and also prevents dust and water from entering from the side with a side seal.

Type	Series	Action	Bore size (mm)
Slide bearing	MY1MW	Double acting	16, 20, 25, 32, 40, 50, 63
Cam follower guide	MY1CW	Double acting	16, 20, 25, 32, 40, 50, 63

### Mechanically Jointed Rodless Cylinder MY2



- Reduces the height by maximum of 30% compared to the mechanically jointed rodless cylinder, series MY1H. Furthermore, possible to replace the cylinder for the drive unit while the workpiece is mounted.

Type	Series	Action	Bore size (mm)
Cam follower guide	MY2C	Double acting	16, 25, 40
Linear guide	MY2H	Double acting	16, 25, 40
Linear guide	MY2HT	Double acting	16, 25, 40

### Mechanically Jointed Rodless Cylinder MY3



- This space-saving cylinder reduces the height by maximum of 36% and length by maximum of 140 mm compared to the mechanically jointed rodless cylinder, series MY1B.

Type	Series	Action	Bore size (mm)
Basic, Short (Rubber bumper)	MY3A	Double acting	16, 20, 25, 32, 40, 50, 63
Basic, Standard (Air cushion)	MY3B	Double acting	16, 20, 25, 32, 40, 50, 63
Slide bearing guide (Air cushion)	MY3M	Double acting	16, 25, 40, 63

## Magnetically Coupled Rodless Cylinders

### Magnetically Coupled Rodless Cylinder CY3



- Further improvement on Series CY1
- Same mounting dimensions as those of Series CY1. Upgraded bearing performance and reduction of sliding resistance.
- NPT thread and G thread as standard

Type	Series	Action	Bore size (mm)
Basic	CY3B	Double acting	6, 10, 15, 20, 25, 32, 40, 50, 63
Direct mount	CY3R	Double acting	6, 10, 15, 20, 25, 32, 40, 50, 63

## Magnetically Coupled Rodless Cylinders

### Magnetically Coupled Rodless Cylinder **CY1**



- Magnetically coupled, space-saving cylinder permits a wide range of applications.
- With auto switch (Series CDY1S: CDY1S)

Type	Series	Action	Bore size (mm)
Slider (Slide bearing)	CY1S-Z	Double acting	6, 10, 15, 20, 25, 32, 40
Slider (Ball bushing bearing)	CY1L	Double acting	6, 10, 15, 20, 25, 32, 40
Linear guide	CY1H	Double acting	10, 15, 20, 25
Linear guide	CY1HT	Double acting	25, 32

### Magnetically Coupled Rodless Cylinder/Low Profile Guide **CY1F**



- Low profile, short body, lightweight
- The cylinder and guide are integrated.

Type	Series	Action	Bore size (mm)
Standard	CY1F	Double acting	10, 15, 25

### Clean Rodless Cylinder **CYP**



- Low particle generation transfer in clean environments

Type	Series	Action	Bore size (mm)
Standard	CYP	Double acting	15, 32

## Table Cylinders

### Compact Slide **MXH**



- Integration of the high rigidity linear guide and the worktable
- A table cylinder with excellent linear movement and non-rotating accuracy
- Improved allowable moment up to 6 times or more. (Compared with existing MXU series)
- Piping is possible from 3 directions.

Type	Series	Action	Bore size (mm)
Standard	MXH	Double acting	6, 10, 16, 20

## Table Cylinders

### Air Slide Table **MXS**



- Integrated with a worktable in a compact manner.
- An air slide table that is ideal for precision assembly work.
- High rigidity and high accuracy
- A smooth movement without looseness has been achieved through the adoption of a cross roller guide.
- Compact and lightweight
- Provides twice the output of a conventional cylinder through the adoption of the dual rod function.

Type	Series	Action	Bore size (mm)
Standard	MXS	Double acting	6, 8, 12, 16, 20, 25
Symmetric	MXS□L	Double acting	6, 8, 12, 16, 20, 25

### Air Slide Table **MXQ**



- Reduced in height: 10% reduction (27 mm: Existing model 30 mm)
- Product weight: 22% reduction (298 g: Existing model 380 g)
- Allowable kinetic energy: 64% improvement (0.09 J: Existing model 0.055 J)

Type	Series	Action	Bore size (mm)
Double ported type	MXQ□A	Double acting	6, 8, 12, 16, 20, 25
Low thrust with high rigidity type	MXQ□B	Double acting	6, 8, 12, 16, 20
Single side ported type	MXQ□C	Double acting	8, 12
Height interchangeable type	MXQ	Double acting	6, 8, 12, 16, 20, 25

### Air Slide Table **MXQ**



- Integrated guide rail and table
- Adoption of recirculating linear guide realized high rigidity and high accuracy

Type	Series	Action	Bore size (mm)
Standard	MXQ	Double acting	6, 8, 12, 16, 20, 25
Symmetric	MXQ□L	Double acting	6, 8, 12, 16, 20, 25

### Air Slide Table/Reversible Type **MXQR**



- Integrated guide rail and table
- Adoption of recirculating linear guide realized high rigidity and high accuracy
- Position of the piping and adjusters can be changed on site according to the installation conditions.
- Installation compatibility with the series MXQ
- Shock absorber also available for  $\phi 6$
- Soft type/short stroke type shock absorber (RJ) can be mounted.

Type	Series	Action	Bore size (mm)
Reversible	MXQR	Double acting	6, 8, 12, 16, 20, 25

### Low Profile Slide Table **MXF**



- Parallel design of guide and cylinder creates a slim and compact slide.

Type	Series	Action	Bore size (mm)
Standard	MXF	Double acting	8, 12, 16, 20

## Table Cylinders

### Air Slide Table **MXW**



- This table unit is compatible with a long stroke using a linear guide.
- Table rigidity is constant throughout entire stroke.

Type	Series	Action	Bore size (mm)
Standard	MXW	Double acting	8, 12, 16, 20, 25

### Air Slide Table **MXJ**



- Integrated front mounting part and table result in a highly accurate and rigid top and front mounting surface.
- Traveling parallelism: 0.005 mm
- Height: 10 mm/Width: 20 mm/Length: 43 mm (MXJ4)

Type	Series	Action	Bore size (mm)
Standard	MXJ	Double acting	4, 6, 8

### Air Slide Table **MXP**



- Cylinder with built-in linear guide
- Compact air slide table

Type	Series	Action	Bore size (mm)
Standard	MXPJ	Double acting	6
Standard	MXP	Double acting	6, 8, 10, 12, 16

### Air Slide Table/Long Stroke Type **MXY**



- High rigidity and high accuracy
- Maximum of 400 strokes

Type	Series	Action	Bore size (mm)
Standard	MXY	Double acting	6, 10, 12

### Precision Cylinder **MTS**



- Precision cylinder with internal guide function

Type	Series	Action	Bore size (mm)
Standard	MTS	Double acting	8, 12, 16, 20, 25, 32, 40

## Guide Cylinders (Series MG)

### Miniature Guide Rod Cylinder **MGJ**



- Overall length: 23 + Stroke mm/Width: 29 mm/Height: 14.5 mm (MGJ6)
- Two auto switches can be mounted even for 5 strokes.
- Integral wiring/piping to one direction
- Non-rotating accuracy:  $\pm 0.1^\circ$

Type	Series	Action	Bore size (mm)
Standard	MGJ	Double acting	6, 10

### Compact Guide Cylinder **MGP-Z**



- Weight reduced by up to 17% with a shorter guide rod and thinner plate.
- Space required between the bottom of the cylinder body and your equipment is reduced because of guide rod shortened max. 22 mm.
- Round type and magnetic field resistant auto switches can be mounted directly without spacer.

Type	Bearing	Series	Action	Bore size (mm)
Basic type	Slide bearing	MGPM-Z	Double acting	12, 16, 20, 25, 32, 40, 50, 63, 80, 100
Basic type	Ball bushing	MGPL-Z	Double acting	
Basic type	High precision ball bushing	MGPA-Z	Double acting	
Air cushion	Slide bearing	MGPM-AZ	Double acting	16, 20, 25, 32, 40, 50, 63, 80, 100
	Ball bushing	MGPL-AZ	Double acting	
	High precision ball bushing	MGPA-AZ	Double acting	
Water resistant	Slide bearing	MGPMPR-Z	Double acting	20, 25, 32, 40, 50, 63, 80, 100
End lock	Slide bearing/Ball bushing	MGP	Double acting	20, 25, 32, 40, 50, 63, 80, 100
Strong guide rod	Slide bearing	MGPS	Double acting	50, 80

### Compact Guide Cylinder/Wide Type **MGPW**



- Doubling the guide pitch
- The allowable rotational torque of the plate improved.  
Non-rotating accuracy of the plate improved.
- Equivalent weight to the basic type

Type	Bearing	Series	Action	Bore size (mm)
Basic type	Slide bearing/Ball bushing/High precision ball bushing	MGPW	Double acting	20, 25, 32, 40, 50, 63

### Compact Guide Cylinder **MGQ**



- Air cylinder with an integrated guide achieves lateral load resistance and high non-rotating accuracy.
- Suitable for stopper and lifter in the conveyor line.

Type	Bearing	Series	Action	Bore size (mm)
Standard	Slide bearing	MGQM	Double acting	12, 16, 20, 25, 32, 40, 50, 63, 80, 100
Standard	Ball bushing	MGQL	Double acting	

### Guide Cylinder **MGG**



- Basic cylinder with integrated guide rods in a compact configuration
- A linear transfer unit that achieves lateral load resistance and high non-rotating accuracy

Type	Bearing	Series	Action	Bore size (mm)
Standard	Slide bearing/ball bushing	MGG	Double acting	20, 25, 32, 40, 50, 63, 80, 100
With End Lock		MGG	Double acting	

## Guide Cylinders (Series MG)

### Guide Cylinder/Compact Type **MGC**



- Linear transfer unit with compact guide body and front plate
- Compact, lightweight and space saving

Type	Series	Action	Bore size (mm)
Standard	MGC	Double acting	20, 25, 32, 40, 50

### Guide Table **MGF**



- Low profile compact cylinder
- Cylinder with a large concentric guiding sleeve provides excellent eccentric load resistance.

Type	Series	Action	Bore size (mm)
Standard	MGF	Double acting	40, 63, 100

### Non-rotating Double Power Cylinder/Double Power Cylinder **MGZ/MGZR**



- Doubles the output in the extending direction with a unique structure. A built-in non-rotating mechanism using slide keys allows loads to be mounted directly.

Type	Series	Action	Bore size (mm)
Standard	MGZ	Double acting	20, 25, 32, 40, 50, 63, 80
End lock	MGZ	Double acting	40, 50, 63
Without non-rotating mechanism	MGZR	Double acting	20, 25, 32, 40, 50, 63, 80

### Cylinder with Turntable **MGT**



- Integration of the compact guide cylinder (Series MGP) and a manual turntable.
- High precision bearings for smooth turning return movement
- Table unit has positioning mechanisms for each 90° and 180° of rotation.

Type	Bearing	Series	Action	Bore size (mm)
Standard	Slide bearing	MGTM	Double acting	63, 80, 100
Standard	Ball bushing	MGTL	Double acting	63, 80, 100

## Guide Cylinders (Series CX)

### Slide Unit **CX2/CDBX2/CDPX2**



- Possible to install a shock absorber that absorbs impact and noise as desired. Ideal for workpiece transfers requiring positional accuracy.
- With auto switch (Series CDBX2: CDBX2, Series CDPX2: CDPX2)

Type	Series	Action	Bore size (mm)
Standard	CX2	Double acting	10, 15, 25

## Guide Cylinders (Series CX)

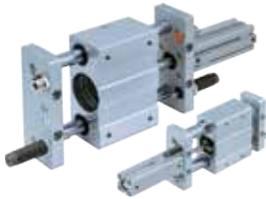
### Slide Unit **CXW/CDBXW/CDPXW**



- Built-in shock absorber that absorbs impact
- Can be mounted on the housing or on the plate.  
Highly precise parallelism of cylinders and workpieces.
- With auto switch (Series CDBXW: CDBXWM, CDBXWL, Series CDPXW: CDPXWM, CDPXWL)

Type	Bearing	Series	Action	Bore size (mm)
Standard	Slide bearing	CXWM	Double acting	10, 16, 20, 25, 32
Standard	Ball bushing	CXWL	Double acting	10, 16, 20, 25, 32

### Platform Cylinder **CXT**



- Integrated worktable with actuator
- Highly rigid and accurate slide table

Type	Bearing	Series	Action	Bore size (mm)
Standard	Slide bearing	CXTM	Double acting	12, 16, 20, 25, 32, 40
Standard	Ball bushing	CXTL	Double acting	12, 16, 20, 25, 32, 40

### Dual Rod Cylinder **CXSJ**



- More compact body compared to the dual rod cylinder series CXS.  
Auto switches can be confirmed from four directions. Axial piping is also available. (Bore size: 6 and 10)

Type	Bearing	Series	Action	Bore size (mm)
Standard	Slide bearing	CXSJM	Double acting	6, 10, 15, 20, 25, 32
Standard	Ball bushing	CXSJL	Double acting	6, 10, 15, 20, 25, 32

### Dual Rod Cylinder **CXS**



- Compact cylinder with high-precision guide function for pick & place applications

Type	Bearing	Series	Action	Bore size (mm)
Basic type	Slide/Ball bushing	CXS	Double acting	6, 10, 15, 20, 25, 32
With air cushion		CXS	Double acting	20, 25, 32
With end lock		CXS	Double acting	6, 10, 15, 20, 25, 32
Double rod type		CXSW	Double acting	6, 10, 15, 20, 25, 32

## Fine Lock Cylinders

### Fine Lock/Lock-up Cylinder **CL□/CDL□**



- Locking cylinder ideal for intermediate stops, emergency stops and drop prevention. (Bi-directional lock)  
\* CL1: Single-directional lock
- With auto switch (Series CDL□: CDLJ2, CDLM2, CDLG1, CDL1)

Type	Series	Action	Bore size (mm)	Lock mechanism
Fine lock cylinder	CLJ2	Double acting single rod	16	Spring lock, Air pressure lock, Spring/Air pressure lock
Fine lock cylinder	CLM2	Double acting single rod	20, 25, 32, 40	
Fine lock cylinder	CLG1	Double acting single rod	20, 25, 32, 40	
Lock-up cylinder	CL1	Double acting single rod	40, 50, 63, 80, 100, 125, 140, 160	Spring lock

## Lock Cylinders

### Guide Cylinder/Built-in Fine Lock Cylinder Compact Type **MLGC**



- Linear transfer unit integrates a locking cylinder (Ideal for intermediate stops, emergency stops and drop prevention) with a guide. (Bi-directional lock)

Type	Bearing	Series	Action	Bore size (mm)	Lock mechanism
Standard	Slide bearing	MLGCM	Double acting single rod	20, 25, 32, 40	Spring lock, Spring/Air pressure lock, Air pressure lock
Standard	Ball bushing	MLGCL	Double acting single rod	20, 25, 32, 40	

### Cylinder with Lock **CNG/CDNG**



- Locking cylinder ideal for intermediate stops, emergency stops and drop prevention. (Bi-directional lock)
- With auto switch (Series CDNG: CDNG)

Type	Series	Action	Bore size (mm)	Lock mechanism
Standard	CNG	Double acting single rod	20, 25, 32, 40	Spring lock

### Cylinder with Lock **MNB/MDNB**



- Locking cylinder ideal for intermediate stops, emergency stops and drop prevention. (Bi-directional lock)
- With auto switch (Series MDNB: MDNB, MDNBW)

Type	Series	Action	Bore size (mm)	Lock mechanism
Standard	MNB	Double acting single rod	32, 40, 50, 63, 80, 100	Spring lock
Standard	MNBW	Double acting double rod	32, 40, 50, 63, 80, 100	Spring lock

### Cylinder with Lock **CNA2/CDNA2**



- Locking cylinder ideal for intermediate stops, emergency stops and drop prevention. (Bi-directional lock)
- Magnetic field resistant 2-color indication solid state auto switch D-P3DW□ series mountable
- With auto switch (Series CDNA2: CDNA2, CDNA2W)

Type	Series	Action	Bore size (mm)	Lock mechanism
Standard	CNA2	Double acting single rod	40, 50, 63, 80, 100	Spring lock
Standard	CNA2W	Double acting double rod	40, 50, 63, 80, 100	Spring lock

### Cylinder with Lock **CNS/CDNS**



- Locking cylinder ideal for intermediate stops, emergency stops and drop prevention. (Bi-directional lock)
- With auto switch (Series CDNS: CDNS)

Type	Series	Action	Bore size (mm)	Lock mechanism
Standard	CNS	Double acting single rod	125, 140, 160	Spring lock

## Lock Cylinders

### Cylinder with Lock **CLS/CDLS**



- Locking cylinder ideal for intermediate stops, emergency stops and drop prevention. (Bi-directional lock)
- With auto switch (Series CDLS: CDLS)

Type	Series	Action	Bore size (mm)	Lock mechanism
Standard	CLS	Double acting single rod	125, 140, 160, 180, 200, 250	Spring lock

### Compact Cylinder with Lock **CLQ/CDLQ**



- Locking cylinder ideal for drop prevention when the air supply is shut off. (Single-directional lock)
- With auto switch (Series CDLQ: CDLQ)

Type	Series	Action	Bore size (mm)	Lock mechanism
Standard	CLQ	Double acting single rod	20, 25, 32, 40, 50, 63, 80, 100	Spring lock

### Compact Cylinder with Air Cushion and Lock **RLQ/RDLQ**



- Locking cylinder ideal for drop prevention when the air supply is shut off.
- Compact cylinder built-in air cushion and lock unit. (Single-directional lock)
- With auto switch (Series RDLQ: RDLQ)

Type	Series	Action	Bore size (mm)	Lock mechanism
Standard	RLQ	Double acting single rod	32, 40, 50, 63	Spring lock

### Plate Cylinder with Lock **MLU/MDLU**



- Locking cylinder ideal for drop prevention when the air supply is shut off. (Single-directional lock)
- With auto switch (Series MDLU: MDLU)

Type	Series	Action	Bore size (mm)	Lock mechanism
Standard	MLU	Double acting single rod	25, 32, 40, 50	Spring lock

### Compact Guide Cylinder with Lock **MLGP**



- Compact guide cylinder with a built-in lock mechanism ideal for drop prevention when the air supply is shut off. (Single-directional lock)

Type	Bearing	Series	Action	Bore size (mm)	Lock mechanism
Standard	Slide bearing	MLGPM	Double acting single rod	20, 25, 32, 40, 50, 63, 80, 100	Spring lock
Standard	Ball bushing	MLGPL	Double acting single rod	20, 25, 32, 40, 50, 63, 80, 100	Spring lock

## Lock Cylinders

### Mechanically Jointed Hy-rodless Cylinder with Brake **ML1C**

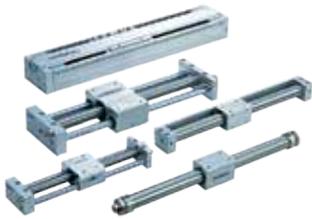


- Brake mechanism has been compactly integrated into the slide table.
- Enables intermediate stops.

Type	Series	Action	Bore size (mm)
Cam follower guide	ML1C	Double acting	25, 32, 40

## Specialty Cylinders

### Sine Rodless Cylinder **REA**



- Allows high-speed transfer of a workpiece which must avoid shock/impact.
- Maximum speed: 300 mm/s

Type	Series	Action	Bore size (mm)
Basic	REA	Double acting	25, 32, 40, 50, 63
Direct mount	REAR	Double acting	10, 15, 20, 25, 32, 40
Slider (Slide bearing)	REAS	Double acting	10, 15, 20, 25, 32, 40
Slider (Ball bushing bearing)	REAL	Double acting	10, 15, 20, 25, 32, 40
Linear guide (Single axis)	REAH	Double acting	10, 15, 20, 25
Linear guide (Double axis)	REATH	Double acting	25, 32

### Sine Rodless Cylinder **REB**



- Allows high-speed transfer of a workpiece which must avoid shock/impact.
- Maximum speed: 600 mm/s

Type	Series	Action	Bore size (mm)
Direct mount	REBR	Double acting	15, 25, 32
Linear guide (Single axis)	REBH	Double acting	15, 25
Linear guide (Double axis)	REBHT	Double acting	25, 32

### Sine Cylinder **REC**



- Allows high-speed transfer of a workpiece which must avoid shock/impact.

Type	Series	Action	Bore size (mm)
Standard	REC	Double acting	20, 25, 32, 40

## Specialty Cylinders

### Smooth Cylinder **CJ2Y-Z/CM2Y-Z/CG1Y-Z/MBY-Z/CA2Y-Z/CS2Y/CQSY/CQ2Y-Z**



- Reducing stick-slip in a low speed range
- Stable operation possible even at a low speed of 5 mm/s (Measurement based on JIS B 8377)
- Low sliding possible even in bi-directional operation
- Lightweight/Improved functions (New structure equivalent to the standard models)
- Interchangeable with the standard models
- With auto switch(Series CDJ2Y-Z:CDJ2Y, Series CDM2Y-Z:CDM2Y-Z, Series CDG1Y-Z:CDG1Y, Series MDBY-Z:MDBY, Series CDA2Y-Z:CDA2Y, Series CDS2Y:CDS2Y, Series CDQSY:CDQSY, Series CDQ2Y-Z:CDQ2Y)

Type	Series	Action	Bore size (mm)	Min. operating pressure psi (MPa)
Air cylinder	CJ2Y-Z	Double acting	10, 16	8.7 (0.06)
Air cylinder	CM2Y-Z	Double acting	20, 25, 32, 40	2.9 (0.02)
Air cylinder	CG1Y-Z	Double acting	20, 25, 32, 40	2.9 (0.02)
Air cylinder	CG1Y-Z	Double acting	50, 63, 80, 100	1.5 (0.01)
Air cylinder	MBY-Z	Double acting	32, 40	2.9 (0.02)
Air cylinder	MBY-Z	Double acting	50, 63, 80, 100	1.5 (0.01)
Air cylinder	CA2Y-Z	Double acting	40	2.9 (0.02)
Air cylinder	CA2Y-Z	Double acting	50, 63, 80, 100	1.5 (0.01)
Air cylinder	CS2Y	Double acting	125, 140, 160	0.7 (0.005)
Compact cylinder	CQSY	Double acting	12, 16	4.4 (0.03)
Compact cylinder	CQSY	Double acting	20, 25	2.9 (0.02)
Compact cylinder	CQ2Y-Z	Double acting	32, 40	2.9 (0.02)
Compact cylinder	CQ2Y-Z	Double acting	50, 63, 80, 100	1.5 (0.01)

### Low Speed Cylinder **CJ2X-Z/CM2X-Z/CQSX/CQ2X/CUX**



- Reducing adhesion/quick extension
- Smooth operation possible even at 0.5 mm/s (1 mm/s for ø16 or smaller)
- Minimum operating pressure is reduced in half. (Compared to previous version)
- Improved functions (New structure equivalent to the standard models)
- Interchangeable with the standard models
- With auto switch(Series CDJ2X-Z:CDJ2X-Z, Series CDM2X-Z:CDM2X, Series CDQSX:CDQSX, Series CDQ2X:CDQ2X, Series CDUX:CDUX)

Type	Series	Action	Bore size (mm)	Min. piston speed (mm/s)
Air cylinder	CJ2X-Z	Double acting	10, 16	1
Air cylinder	CM2X-Z	Double acting	20, 25, 32, 40	0.5
Compact cylinder	CQSX	Double acting	12, 16	1
Compact cylinder	CQSX	Double acting	20, 25	0.5
Compact cylinder	CQ2X	Double acting	32, 40, 50, 63, 80, 100	0.5
Free mount cylinder	CUX	Double acting	10, 16	1
Free mount cylinder	CUX	Double acting	20, 25, 32	0.5

### Low Friction Cylinder/Metal Seal **MQQ/MQM/MQP**



- Covers a range of driving speeds and output controls not possible with standard cylinders thanks to the metal seal structure with minimal sliding resistance.

Type	Series	Bore size (mm)	Pressure range psi (MPa)	Driving speed (mm/s)
Standard	MQQT	10, 16, 20, 25, 30, 40	0.73 to 7.3 (0.005 to 0.5)	0.3 to 300
Anti-lateral load	MQQL	10, 16, 20, 25, 30, 40	0.73 to 102 (0.005 to 0.7)	0.5 to 500
Anti-lateral load	MQML	6	2.9 to 102 (0.02 to 0.7)	0.5 to 1000
Anti-lateral load	MQML	10, 16, 20, 25	0.73 to 102 (0.005 to 0.7)	0.5 to 1000
High speed/High frequency	MQML□□H	10, 16, 20, 25	1.5 to 102 (0.01 to 0.7)	5 to 3000
Single acting	MQP	4, 6, 10, 16, 20	0.15 to 102 (0.001 to 0.7)	—

## Specialty Cylinders

### High Power Cylinder **RHC**



- Provides 10 to 20 times the energy absorption capacity of general purpose cylinder (Series CG1).
- Smooth cushioning from high speed operation (3000 mm/s) with light loads and low/medium speed operation with heavy loads.
- XC93 : With greater water resistance + stable lubrication function  
5 times stronger against water (liquids) than the standard model (Series RHC)

Type	Series	Action	Bore size (mm)
Standard	RHC	Double acting	20, 25, 32, 40, 50, 63, 80, 100
Standard	RHC-XC93	Double acting	32, 40

### 3 Position Cylinder **RZQ**



- Equipped with intermediate stop mechanism
- Two-stage stroke possible with just a minute extension

Type	Series	Action	Bore size (mm)
Standard	RZQ	Double acting	32, 40, 50, 63

## Clamp Cylinders

### Rotary Clamp Cylinder **MK-Z**



- Allowable moment of inertia 3 times higher. (The same as the heavy-duty MK2 series.)
- Possible to mount small auto switches on 4 surfaces.
- Mounting dimensions are interchangeable with the MK series.
- Consolidated to the New MK series and renewed.

Type	Series	Action	Bore size (mm)
Standard	MK-Z	Double acting	12, 16, 20, 25, 32, 40, 50, 63

### Rotary Clamp Cylinder **MK2T**



- Double guide type is with improved non-rotating accuracy using a guide roller in the rotating mechanism.

Type	Series	Action	Bore size (mm)
Double guide	MK2T	Double acting	20, 25, 32, 40, 50, 63

## Clamp Cylinders

### Pin Clamp Cylinder C (L) KQG/C (L) KQP



- Positioning and clamping at one time.
- Compatible with a broad range of workpiece configurations. (55 types of guide pins)
- 4 body types for a broad range of installation conditions.
- The height of clamping position according to a workpiece is selectable.

Type	Series	Guide pin shape	Bore size (mm)
Standard (Built-in standard magnet)	CKQG	Round Diamond	50
Standard (Built-in strong magnet)	CKQP	Round Diamond	50
With lock (Built-in standard magnet)	CLKQG	Round Diamond	50
With lock (Built-in strong magnet)	CLKQP	Round Diamond	50

### Pin Clamp Cylinder C (L) KQG32/C (L) KU32



- 2 types of clamping heights can be selected.: 30 mm, 100 mm
- Plate cylinder type: 29 mm width
- All types with lock
- Plate cylinder type with small auto switch
- Newly added guide pins and a diamond shape option (available for  $\phi 10$  or more) for workpieces with  $\phi 9$ ,  $\phi 11$  and  $\phi 13$  hole diameters.

Type	Series	Guide pin shape	Bore size (mm)
Compact cylinder Magnetic field resistant auto switch mounting type	CKQG32-X2081/X2082	Round Diamond	32
Compact cylinder with lock Magnetic field resistant auto switch mounting type	CLKQG32-X2081/X2082	Round Diamond	32
Plate cylinder Magnetic field resistant auto switch mounting type	CKU32-X2091/X2092	Round Diamond	32
Plate cylinder with lock Magnetic field resistant auto switch mounting type	CLKU32-X2091/X2092	Round Diamond	32
Plate cylinder Small auto switch mounting type	CKU32-X2321/X2322	Round Diamond	32
Plate cylinder with lock Small auto switch mounting type	CLKU32-X2321/X2322	Round Diamond	32
Pin plate cylinder	CKU32-X2359	Round Diamond	32
Pin plate cylinder with lock Magnetic field resistant auto switch mounting type	CLKU32-X2359	Round Diamond	32

### Clamp Cylinder CK□1-Z



- Total tube length reduced by 7 mm (For CKP1□40)
- Easy fine speed adjustment with screw adjustment construction
- Speed controller valve has no projection from the tube external surface
- Possible to mount magnetic field resistant auto switch from 3 directions.  
D-P3DW type, D-P4DW type (CKG1), D-P79WSE type, D-P74L/Z type

Type	Series	Action	Clevis width (mm)	Bore size (mm)
Standard	CK1-Z	Double acting	12.5, 16.5, 19.5	40, 50, 63
Built-in standard magnet type (With magnetic field resistant auto switch)	CKG1-Z	Double acting	12.5, 16.5, 19.5	40, 50, 63
Built-in strong magnet type (Applicable to magnetic field resistant auto switches)	CKP1-Z	Double acting	12.5, 16.5, 19.5	40, 50, 63

## Clamp Cylinders

### Clamp Cylinder/Slim Style **C (L) KG/C (L) KP-X2095**



- The smallest class of clamp cylinder in the world.
- ø25 is available.  
Weight: 380 g, Length: 186.7 mm (ø25-50 stroke without speed controller or auto switch.)
- Weight reduced by up to 48%, total length reduced by 18%

Type	Series	Action	Clevis width (mm)	Bore size (mm)
Standard (Built-in standard magnet)	CKG-X2095	Double acting	9, 12	25, 32, 40
Standard (Built-in strong magnet)	CKP-X2095	Double acting	9, 12	25, 32, 40
With lock (Built-in standard magnet)	CLKG-X2095	Double acting	9, 12	32, 40
With lock (Built-in strong magnet)	CLKP-X2095	Double acting	9, 12	32, 40

### Clamp Cylinder with Lock **CLK2**



- Clamp cylinder makes it possible to maintain a clamped or unclamped state when air supply pressure drops or residual pressure is released.  
(Single-directional lock)
- Increases the operation efficiency by eliminating an overhang from the tube cover with built-in cushion valve and plug.

Type	Series	Action	Clevis width (mm)	Bore size (mm)
Built-in standard magnet	CLK2G	Double acting	12, 16.5, 19.5	32, 40, 50, 63
Built-in strong magnet	CLK2P	Double acting	16.5, 19.5	40, 50, 63

### Slim-line Power Clamp Cylinder **CKZ2N-X2346**



- Distance accuracy from the reference hole to the lower surface of the clamp arm is  $\pm 0.1$  mm.
- Easy setup with a scale  
The guide of the appropriate position can be checked visually when adjusting the shim.
- Reduced width  
Easy torch entry for spot welding, arc welding and etc.

Type	Arm opening angle	Bore size (mm)
CKZ2N-X2346	30°, 45°, 60°, 75°, 90°, 105°, 120°, 135°	50, 63, 80

### For North America/Europe Power Clamp Cylinder **CKZ3**



- Weight reduced by up to 39% with aluminum body
- Standardized unclamp opening to 15°
- Complies with NAAMS Standard (CKZ3N).
- 75 types of arm variations (CKZ3N), 12 types for each size (CKZ3T)

Type	Series	Arm opening angle	Switch	Bore size (mm)
For North America	CKZ3N	15°, 30°, 45°, 60°, 75°, 90°, 105°, 120°, 135°	TURCK/P&F	50, 63
For Europe	CKZ3T		TURCK/P&F	50, 63

### For North America Power Clamp Cylinder **CKZ2N**



- Complies with the new NAAMS (North America Automotive Metric Standard).
- 138 types of arm variations
- Spatter resistant and water resistant structure

Series	Arm opening angle	Switch	Bore size (mm)
CKZ2N	30°, 45°, 60°, 75°, 90°, 105°, 120°, 135°	TURCK/P&F	50, 63, 80

## Clamp Cylinders

### For Europe Power Clamp Cylinder **CKZT**



- 3 types of arm variations for each size
- Spatter resistant and water resistant structure

Series	Arm opening angle	Switch	Bore size (mm)
CKZT	30°, 45°, 60°, 75°, 90°, 105°, 120°, 135°	TURCK/P&F	40, 50, 63, 80

### For France Power Clamp Cylinder **CLKZ1R**



- Complies with CNOMO Standard.
- Constant clamping force irrespective of workpiece thickness
- End lock on unclamp side
- Rubber cushion on unclamp side

Series	Arm opening angle	Bore size (mm)
CLKZ1R	15°, 30°, 45°, 60°, 75°, 90°, 105°	40, 50, 57

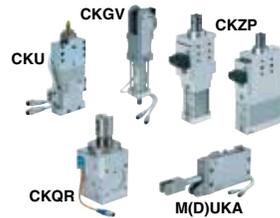
### Frame Clamp Cylinder **WRF100**



- High output 4,496 lbf (20,000 N) (at 73 psi (0.5 MPa))

Series	Bore size (mm)	Stroke (mm)
WRF100	100	48

### Other Clamp Cylinders



Description	Series
Pin Clamp Cylinder (Compact body type)	CKU
Pin Shift Cylinder	CKQR
Plate Clamp Cylinder	M (D) UKA
Clamp Cylinder	CKGV
Pin Shift Cylinder	CKZP

## Stopper Cylinders

### Stopper Cylinder **RSQ/RSDQ/RSG/RSDG**



- Possible to select a cylinder corresponding to needs from a wide range of models. Realizes the labor saving and automation of conveyor lines.
- With auto switch (Series RSDQ: RSDQ, Series RSDG: RSDG)

Type	Series	Action	Bore size (mm)
Fixed mounting height	RSQ	Double acting	12, 16, 20, 32, 40, 50
		Double acting with spring	
		Single acting, spring extend	
Adjustable mounting height	RSG	Double acting	40, 50
		Double acting with spring	
		Single acting, spring extend	

### Heavy Duty Stopper Cylinder **RS2H**



- Weight: Reduced by up to 22% (with conventional RS1H series)
- Cylinder tube: Shortened by up to 9 mm (RS2H63-30 stroke)
- Capable of stopping pallet softly.
- Stopper cylinder with shock absorber

Type	Series	Action	Bore size (mm)
Flange	RS2H	Double acting	50, 63, 80
		Double acting with spring	
		Single acting, spring extend	

## Stopper Cylinders

### ● Heavy Duty Stopper Cylinder **RSH**



- Capable of stopping pallet softly.
- Stopper cylinder with shock absorber

Type	Series	Action	Bore size (mm)
Flange	RSH	Double acting Double acting with spring Single acting, spring extend	20, 32

### ● Escapements **MIW/MIS**



- Ideal for separating workpieces continuously moving on conveyors, etc.

Type	Series	Action	Bore size (mm)
Two finger type	MIW	Double acting	8, 12, 20, 25, 32
One finger type	MIS	Double acting	8, 12, 20, 25, 32

## Stroke Reading Cylinders

### ● High Precision Stroke Reading Cylinder **CEP1**



- Movable scale cylinder

Series	Action	Bore size (mm)	Applicable counter
CEP1	Double acting	12, 20	CEU5/CEU1

### ● Stroke Reading Cylinder **CE1**



- Movable scale cylinder

Series	Action	Bore size (mm)	Applicable counter
CE1	Double acting	12, 20, 30, 40, 50, 63	CEU5/CEU1

### ● Counter for Stroke Reading Cylinder **CEU5**



Type	Series	Applicable cylinder (Stroke reading cylinder)
Multi-counter	CEU5	CEP1/CE1 CE2/ML2B

## Stroke Reading Cylinders

### Stroke Reading Cylinder with Brake **CE2**



- Brake mechanism added to a movable scale cylinder.

Series	Action	Bore size (mm)	Applicable counter/controller
CE2	Double acting	40, 50, 63, 80, 100	CEU5/CEU1 CEU2

### Controller for Stroke Reading Cylinder **CEU2**



Type	Series	Applicable counter
Controller	CEU2	CE2/ML2B

### Stroke Reading Rodless Cylinder with Brake **ML2B**



- Mechanically jointed rodless cylinder incorporated with brake mechanism and stroke sensor.

Type	Series	Action	Bore size (mm)
Standard	ML2B	Double acting (Cylinder)	25, 32, 40

## Valve Mounted Cylinders

### Valve Mounted Compact Cylinder **CVQ**



- Integration of a valve and a compact cylinder
- Saves manpower, space and energy.

Type	Series	Action	Bore size (mm)	Component Cylinder	Component Valve
Standard	CVQ	Double acting	32, 40, 50, 63	CQ2	SY3000

### Compact Cylinder with Solenoid Valve/Guide Rod Type **CVQM**



- Integration of guide rod and solenoid valve in the CQ2 series compact cylinder.
- Non-rotating accuracy  $\pm 0.2^\circ$  or less
- Lateral load resisting 2 to 4 times (Compared to the CDQ2 series compact cylinder)
- Load can be directly mounted.
- Mounting pitch is interchangeable with the CQ2 series.
- Saves manpower, space and energy.

Type	Series	Action	Bore size (mm)	Component Cylinder	Component Valve
Standard	CVQM	Double acting	32, 40, 50, 63	CQM	SY3000

## Valve Mounted Cylinders

### Valve Mounted Air Cylinder CV□/CDV□



- Valve is mounted on a round cylinder.
- Built-in speed controller for some models.
- Cylinder with a valve makes it easy to adjust speed.
- With auto switch (Series CDVJ: CDVJ5, CDVJ3, Series CDVM: CDVM5, CDVM5K, CDVM3, CDVM3K, Series CDV3: CDV3, CDV3K, Series CDVS1: CDVS1, CDVS1K)

Type	Series	Action	Bore size (mm)	Component Cylinder	Component Valve
Standard	CVJ5	Double acting	10, 16	CJ2	SYJ3190
Standard	CVJ3	Single acting (Return/Extend)	10, 16	CJ2	SYJ319
Standard	CVM5	Double acting	20, 25, 32, 40	CM2	VZ3□90
Standard	CVM3	Single acting (Return/Extend)	20, 25, 32, 40	CM2	VZ319
Standard	CV3	Double acting	40, 50, 63, 80, 100	CA1	V3□08
Standard	CVS1	Double acting	40, 50, 63, 80, 100	CS1	VS4□24
Non-rotating rod	CVM5K	Double acting	20, 25, 32, 40	CM2K	VZ3□90
Non-rotating rod	CVM3K	Single acting (Return/Extend)	20, 25, 32, 40	CM2K	VZ319
Non-rotating rod	CV3K	Double acting	40, 50, 63	CA1K	V3□08
Non-rotating rod	CVS1K	Double acting	40, 50, 63	CS1K	VS4□24

### Valve Mounted Guide Cylinder MVGQ



- Valve, speed controller and cylinder combined in one unit.

Type	Series	Bore size (mm)	Applicable valve
Slide bearing	MVGQM	12, 16, 20	SYJ3000
Slide bearing	MVGQM	25, 32, 40, 50, 63	VZ3000 VZ5000
Ball bushing	MVGQL	25, 32, 40, 50, 63	VZ3000 VZ5000
Ball bushing	MVGQL	80, 100	VF3000

## Shock Absorbers

### Shock Absorber RJ



- Maximum operating cycles: 10 million cycles
  - Stops transferred objects gently.
  - Lineup M6 to M27
  - Compatible with Series RB in terms of mounting.
  - Applicable models can be selected depending on the operating speed.
- L type: 0.05 to 1 m/s  
H type: 0.05 to 2 m/s  
Short stroke type: 0.05 to 1m/s

Type	Series	Absorbed energy lbf-ft (J)	Absorption stroke (mm)	O. D. thread
Soft type	RJ	0.4 to 52 (0.5 to 70)	4 to 25	M6 to M27
Short stroke type	RJ	0.4 to 3 (0.5 to 3.7)	5 to 10	M6 to M14

### Shock Absorber RB



- Automatic adjustment to the most appropriate absorption performance

Type	Series	Absorbed energy lbf-ft (J)	Absorption stroke (mm)	O. D. thread
Standard	RB	0.4 to 108 (0.5 to 147)	4 to 25	M6 to M27
Coolant resistant	RBL	3 to 108 (3.92 to 147)	6 to 25	M10 to M27
Short	RBQ	1.5 to 36 (1.96 to 49)	4 to 13	M16 to M32

## Auto Switches

### Auto Switch D



Series	Type	Features
Series D	Reed auto switch	General purpose, 2-color indication
Series D	Solid state auto switch	General purpose, 2-color indication With diagnostic output (2-color indication) Water resistant (2-color indication) With timer Normally closed (N. C.)

### Magnetic Field Resistant 2-Color Display Solid State Auto Switch D-P3DW□



- Possible to use in an environment which generates a magnetic field disturbance (AC magnetic field).
- For use with AC spot welders, which generate strong magnetic field.
- The switch can be used, even if the distance between the welding conductor and the cylinder/actuator or auto switch is 0 mm.
- Volume is reduced by 70% (compared to existing switches)
- Can be mounted on bore size  $\varnothing 25$  or  $\varnothing 32$  cylinder/actuator.
- RoHS compliant

Series	Electrical entry	Type	Feature
D-P3DWSC/E	Pre-wired connector	Solid state auto switch	Magnetic field resistant 2-color display
D-P3DW	Grommet	Solid state auto switch	Magnetic field resistant 2-color display
D-P3DWASC/E	Pre-wired connector	Solid state auto switch	Magnetic field resistant 2-color display (Direct mounting style)
D-P3DWA	Grommet	Solid state auto switch	Magnetic field resistant 2-color display (Direct mounting style)

### Trimmer Auto Switch D



- One auto switch allows workpieces to be distinguished easily.
- Minimum width to detect 0.5 mm
- OUT1 and OUT2 are adjustable separately.

Series	Type
D-M9K/D-□7K	Sensor unit
D-R□K	Amplifier unit

## Rotary Actuators/Vane Type



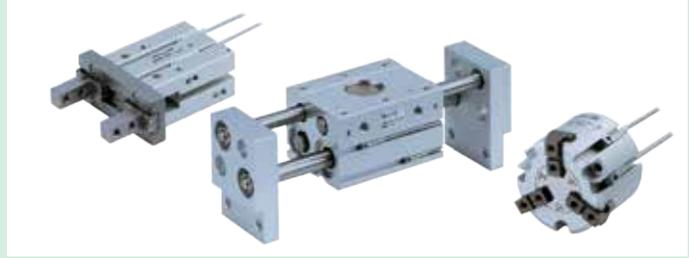
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## Parallel Style Air Grippers



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## Angular Style Air Grippers



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AHC System/ Auto Hand Changing System/ <b>MA</b> .....	P.61

## Rorary Actuators/Vane Type

### Rotary Actuator **CRB2/CDRB2-Z**



- Possible to move the auto switch mounting position as desired
- Direct mounting
- Connection port position: Side ported and axial ported selectable (When a switch and angle adjuster are installed, side ported only.)
- Low pressure operation: 29psi (0.2 MPa) (Size 10), 22 psi (0.15 MPa) (Sizes 15 to 40)
- Possible to adjust the angle as desired
- With auto switch (Series CDRB2: CDRB2□W, CDRB2□WU)

Type	Series	Vane type	Size	Rotating angle Single	Rotating angle Double
Standard	CRB2-Z	Single Double	10, 15, 20, 30, 40	90°, 180°, 270°	90°, 100°
With angle adjuster	CRB2□WU-Z			90°, 180°, 270°	90°, 100°

### Rotary Actuator/Free Mount Type **CRBU2/CDRBU2-Z**



- Possible to change the starting position freely according to the installation condition.
- Lightweight: weight reduced by 12%
- Can be directly installed in one of six ways.
- Possible to adjust the angle as desired
- Possible to set the auto switch mounting position freely
- With auto switch (Series CDRBU2: CDRBU2-Z, CDRBU2WU-Z)

Type	Series	Vane type	Size	Rotating angle Single	Rotating angle Double
Standard	CRBU2-Z	Single Double	10, 15, 20, 30, 40	90°, 180°, 270°	90°, 100°
With angle adjuster	CRBU2WU-Z			90°, 180°, 270°	90°, 100°

### Rotary Actuator **CRB1/CDRB1**



- Possible to move the auto switch mounting position as desired
- Direct mounting
- Connection port position: Side ported and axial ported selectable
- Low pressure operation: 22 psi (0.15 MPa) (Sizes 50 to 100)
- With auto switch (Series CDRB1: CDRB1, CDVRB1)

Type	Series	Vane type	Size	Rotating angle Single	Rotating angle Double
Standard	CRB1	Single Double	50, 63, 80, 100	90°, 100°, 180°, 190°	90°, 100°
With solenoid valve	CVRB1			270°, 280°	90°, 100°

### Rotary Table **MSU/MDSU**



- Integration of a table and rotary actuator
- Angle adjustable,  $\pm 5^\circ$  at each rotation end (Double:  $\pm 2.5^\circ$ )
- Table deflection accuracy: 0.03 mm or less (MSUA)
- Connection port position: Side ported and axial ported selectable (When a switch is installed, side ported only.)
- Possible to move the auto switch mounting position as desired
- With auto switch (Series MDSU: MDSUA, MDSUB)

Type	Series	Vane type	Size	Rotating angle Single	Rotating angle Double
High precision	MSUA	Single Double	1, 3, 7, 20	90°, 180°	—
Basic type	MDSUB			90°, 180°	90°

## Rorary Actuators/Rack & Pinion Type

### Mini Rotary Actuator **CRJ**



- Compact, lightweight
- Flexible mounting. Top, bottom and side mounting possible
- Front or side ported selectable

Series	Rack type	Size	Rotating angle Basic type	Rotating angle With external stopper
CRJ	Single	05, 1	90°, 100°, 180°, 190°	90°, 180°

### Rotary Actuator **CRA1/CDRA1-Z**



- Compact auto switches (D-M9□ type) are mountable on 2 surfaces.  
Auto switch can be mounted from the front.
- Weight is reduced by up to 14%.
- With air cushion  
Easy adjustment of cushion valve
- With auto switch (Series CRA1: CDRA1)

Type	Series	Rack type	Size	Rotating angle
Standard	CRA1-Z	Single	30, 50, 63, 80, 100	30: 90°, 180° 50 to 100: 90°, 100°, 180°, 190°
Angle adjustable	CRA1□□U-Z	Single	50, 63, 80, 100	90°, 100°, 180°, 190°

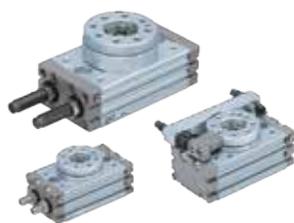
### Compact Rotary Actuator **CRQ2/CDRQ2**



- With cushion
- Equipped with an angle adjustment mechanism
- Single or double axis selectable
- With auto switch (Series CDRQ2: CDRQ2)

Series	Rack type	Size	Rotating angle
CRQ2	Double	10, 15, 20, 30, 40	90°, 180°, 360°

### Rotary Table **MSQ**



- Integration of a table and a rotary actuator
- Equipped with an angle adjustment mechanism
- Easy alignment when mounting the load and the body
- Built-in shock absorber type or external absorber type selectable

Type	Series	Rack type	Size	Rotating angle
High precision type	MSQA	Double	1, 2, 3, 7, 10, 20, 30, 50	0 to 190°
Basic type	MSQB	Double	1, 2, 3, 7, 10, 20, 30, 50, 70, 100, 200	0 to 190°
With external absorber	MSQ□□L	Double	10, 20, 30, 50	90°, 180°
With external absorber	MSQ□□H	Double	10, 20, 30, 50	90°, 180°

### 3-Position Rotary Table **MSZ**



- Three-point-stop possible
- Suitable for applications such as positioning a workpiece at left, right or center
- Can be operated with one valve.

Type	Series	Rack type	Size	Stop position adjustment range
High precision type	MSZA	Double	10, 20, 30, 50	Intermediate position: ±10° Rotating end: Left/right, both 0 to 95° using intermediate position as a basis
Basic type	MSZB	Double	10, 20, 30, 50	Intermediate position: ±10° Rotating end: Left/right, both 0 to 95° using intermediate position as a basis

## Rorary Actuators/Rack & Pinion Type

### Low-Speed Rotary Actuator **CRQ2X/CDRQ2X/MSQX**



- Possible to transfer a workpiece at lower speeds. (5 s/90°)
- With auto switch (Series CDRQ2X: CDRQ2X)

Series	Rack type	Size	Rotating angle
CRQ2X	Double	10, 15, 20, 30, 40	80° to 100°, 170° to 190°
MSQX	Double	10, 20, 30, 50	0° to 190°

### Rotary Cylinder **MRQ**



- Rectilinear rotation unit that integrates a slim cylinder and a rotary actuator
- Possible to select types with an air cushion on the linear motion parts
- Angle adjustable

Series	Size	Rotating angle	Linear motion parts standard stroke
MRQ	32, 40	90°, 180°	5, 10, 15, 20, 25, 30, 40, 50, 75, 100

## Parallel Style Air Grippers

### Linear Guide Parallel Style Air Gripper **MHZ□2**



- Linear guide improves rigidity and accuracy.
- Dustproof and dripproof construction
- Dust cover material selectable

Type	Series	Cylinder bore size (mm)
Compact	MHZA2-6	6
Compact, with dust cover	MHZAJ2-6	6
Standard	MHZ2	6, 10, 16, 20, 25, 32, 40
Long stroke	MHZL2	10, 16, 20, 25
With dust cover	MHZJ2	6, 10, 16, 20, 25, 32, 40

### Cross Roller Guide Parallel Style Air Gripper **MHQ□2**



Type	Series	Cylinder bore size (mm)
High rigidity type	MHQG2	32, 40
With dust cover	MHQJ2	10, 16, 20, 25

### Low Profile Air Gripper **MHF2**



- Reduces the height to approx. 1/3 of the standard gripper.
- Reduces the moment generation with its low profile design.
- Short, middle and long strokes are available.
- Compact, but a strong gripping force with the double piston mechanism

Series	Cylinder bore size (mm)
MHF2	8, 12, 16, 20

## Parallel Style Air Grippers

### Wide Type Air Gripper **MHL2**



- Long strokes
- Ideal for holding large-size workpieces that have dimensional variances.
- The double pistons provide a large amount of gripping force.
- Built-in dust-protection mechanism

Series	Cylinder bore size (mm)
MHL2	10, 16, 20, 25, 32, 40

### Rotary Actuated Air Gripper 2-Finger Type **MHR2/MDHR2**



- A vertically compact configuration has been achieved through the use of a rotary actuator as the drive force source.
- Repeatability:  $\pm 0.01$  mm
- Supports class 10 clean room.
- With auto switch (Series MDHR2: MDHR2)

Series	Cylinder bore size (mm)
MHR2	Nominal size 10, 15, 20, 30
MDHR2	Nominal size 10, 15, 20, 30

### Rotary Actuated Air Gripper 3-Finger Type **MHR3/MDHR3**



- A vertically compact configuration has been achieved through the use of a rotary actuator as the drive force source.
- Repeatability:  $\pm 0.01$  mm
- Supports class 10 clean room.
- With auto switch (Series MDHR3: MDHR3)

Series	Cylinder bore size (mm)
MHR3	Nominal size 10, 15
MDHR3	Nominal size 10, 15

### Wedge Cam Operation Slide Guide Air Gripper **MHK2**



- Wedge shaped cam driving mechanism
- High rigidity with a slide type guide
- A dust-proof, drip-proof, external force resistant, and environmental resistant type that can be used for a variety of applications.
- To suit the environment, a selection of dust cover materials (chloroprene rubber, fluororubber, silicone rubber) or stainless steel (SUS304) fingers is available.
- Long strokes selectable.

Series	Cylinder bore size (mm)
MHK2	12, 16, 20, 25
MHKL2	12, 16, 20, 25

### Slide Guide Round Body Air Gripper 2-Finger Type **MHS2**

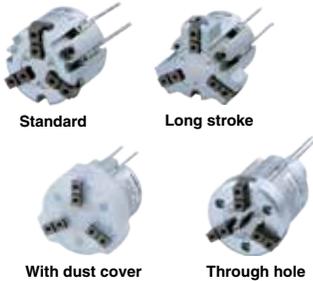


- Vertically compact, lightweight due to the wedge shaped cam construction.
- Ideal for operations which external force is applied to, such as press fitting operations.
- Repeatability:  $\pm 0.01$  mm

Series	Cylinder bore size (mm)
MHS2	16, 20, 25, 32, 40, 50, 63

## Parallel Style Air Grippers

### Slide Guide Round Body Air Gripper 3-Finger Type **MHS3**



- Vertically compact, lightweight due to the wedge shaped cam construction.
- Ideal for operations which external force is applied to, such as press fitting operations.
- Repeatability:  $\pm 0.01$  mm
- Long stroke type: Strokes two times longer than the standard type
- Gripping of cylindrical workpieces
- Reliable removal of the workpiece with through-holes and a center pusher.

Type	Series	Cylinder bore size (mm)
Standard	MHS3	16, 20, 25, 32, 40, 50, 63, 80, 100, 125
With dust cover	MHSJ3	16, 20, 25, 32, 40, 50, 63, 80
Through hole	MHSH3	16, 20, 25, 32, 40, 50, 63, 80
With dust cover + Through hole	MHSHJ	16, 20, 25, 32, 40, 50, 63, 80
Long stroke	MHSL3	16, 20, 25, 32, 40, 50, 63, 80, 100, 125

### Slide Guide Round Body Air Gripper 4-Finger Type **MHS4**



- Vertically compact due to its wedge shaped cam construction.
- Optimally holds rectangular workpieces for positioning operations.
- Repeatability:  $\pm 0.01$  mm
- Positioning of rectangular workpieces.

Series	Cylinder bore size (mm)
MHS4	16, 20, 25, 32, 40, 50, 63

## Angular Style Air Grippers

### Angular Style Air Gripper Compact Type **MHC2**



- MHC2-6: Auto switch mountable
- MHCA2-6: Short body
- MHCM2-7: Compact, lightweight

Series	Cylinder bore size (mm)
MHC2-6	6
MHCA2-6	6
MHCM2-7	7

### Angular Style Air Gripper Standard Type **MHC2**



- A large holding moment is achieved through a double piston construction.
- Integral variable throttle

Series	Cylinder bore size (mm)
MHC2	10, 16, 20, 25

## Angular Style Air Grippers

### Toggle Type Air Gripper **MHT2-Z**



- New cylinder body allows small auto switches to be mounted on 4 surfaces.
- Strong and stable gripping force can be obtained through the toggle mechanism.
- Holds workpiece even when the air is shut down. (Safety measures)

Series	Cylinder bore size (mm)
MHT2-Z	32, 40, 50, 63

### 180° Angular Style Air Gripper Cam Style **MHY2**



- Lightweight and compact through the use of a cam mechanism.

Series	Cylinder bore size (mm)
MHY2	10, 16, 20, 25

### 180° Angular Style Air Gripper Rack & Pinion Style **MHW2**



- A unique seal construction resulting in shortened overall length and dust proofing countermeasures allow it to be used for removing workpieces from machine tools or for holding workpieces.

Series	Cylinder bore size (mm)
MHW2	20, 25, 32, 40, 50

### Rotary Gripper **MRHQ**



- The gripper function and the rotation function have been integrated in a compact package.
- Possible to grip and reverse the workpiece in conveyor lines with a single unit.
- Rotation range and angle adjustable.

Series	Cylinder bore size (mm)
MRHQ	10, 16, 20, 25

### AHC System/Auto Hand Changing System **MA**



- The robot hand tools change automatically to accommodate workpieces of different shapes, thus making it possible to adopt the FMS (flexible manufacturing system) in the assembly line.

Series	Positioning	Action
MA210	Ball coupling	Single acting
MA310	Ball coupling	Single acting
MA311	Ball coupling	Double acting
MA320	Curved coupling	Single acting
MA321	Curved coupling	Double acting

## Vacuum Ejectors/Vacuum Pump System



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## Vacuum Saving Valves



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## Vacuum Flow



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## Vacuum Regulators



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## Related Equipment for Vacuum System



Adsorption Plate/ <b>SP</b> .....	P.69
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Drain Separator for Vacuum/ <b>AMJ</b> .....	P.70
Exhaust Cleaner for Vacuum/ <b>AMV</b> .....	P.70

## Vacuum Ejector/Vacuum Pump System

### Vacuum Unit ZK2



- Compatible with ejector systems and the vacuum pump systems
- Digital pressure switch for vacuum with energy saving function cuts supply air when the pressure reached the desired vacuum. Air consumption: 90% reduced
- More efficient ejector  
Suction flow: 50% increased  
Air consumption: 30% reduced (Compared to other SMC single stage ejectors)
- Compact/Lightweight  
Volume 88 cm<sup>3</sup> 28% reduced  
Weight 81 g 59% reduced

Ejector series	Nozzle diameter (mm)	Max. suction flow scfm [L/min (ANR)]	Air consumption scfm [L/min (ANR)]	Guidelines for applicable pad (mm)	Vacuum pump system series
ZK2□07	0.7	1.0 (29)	0.9 (24)	2 to 40	ZK2□00
ZK2□10	1.0	1.6 (44)	1.4 (40)	2 to 50	
ZK2□12	1.2	2.2 (61)	2.1 (58)	2 to 125	
ZK2□15	1.5	2.4 (67)	3.2 (90)	2 to 150	

### Space Saving Vacuum Ejector/Pump System ZQ



- Compatible with ejector systems and the vacuum pump systems
- Width: 10 mm, Weight: 109 g (single unit, with vacuum pressure switch and suction filter)
- Digital vacuum pressure switch
- With LED display function
- Adaptable for a manifold application

Ejector series	Nozzle diameter (mm)	Max. suction flow scfm [L/min (ANR)]	Air consumption scfm [L/min (ANR)]	Guidelines for applicable pad (mm)	Vacuum pump system series
ZQ105	0.5	0.2 (5)	0.5 (14)	2 to 13	ZQ1000
ZQ107	0.7	0.4 (10)	0.8 (23)	2 to 20	
ZQ110	1.0	0.8 (22)	1.6 (46)	2 to 32	

### Large Size Vacuum Module ZR



- Compatible with ejector systems and the vacuum pump systems
- Necessary functions can be combined through a modular design.
- Double solenoids provide a selfholding function
- Adaptable for manifold application
- Functions such as a digital vacuum switch or a solenoid valve can be selected.

Series	Nozzle diameter (mm)	Max. suction flow scfm [L/min (ANR)]	Air consumption scfm [L/min (ANR)]	Guidelines for applicable pad (mm)	Vacuum pump system series
ZR110	1.0	0.8 (22)	1.6 (46)	2 to 32	ZR100
ZR113	1.3	1.3 (38)	2.8 (78)	2 to 50	
ZR115	1.5	1.9 (54)	3.4 (95)	2 to 100	
ZR118	1.8	2.2 (62)	5.3 (150)	2 to 125	
ZR120	2.0	3.0 (84)	6.5 (185)	2 to 150	

### Compact Vacuum Unit ZB



With vacuum pressure switch

- Compatible with ejector systems and the vacuum pump systems
- Quick response: Response time of the valve 5 ms, vacuum response time 28 ms
- Energy-saving: Air consumption 17% reduced, vacuum pressure reached 21% increased
- Compact/Lightweight: 46 g
- With vacuum pressure switch
- Can copy to up to 10 switches simultaneously.

Ejector series	Nozzle diameter (mm)	Max. suction flow scfm [L/min (ANR)]	Air consumption scfm [L/min (ANR)]	Guidelines for applicable pad (mm)	Vacuum pump system series
ZB03	0.3	0.07 (2)	0.12 (3.5)	2 to 8	ZB00
ZB04	0.4	0.12 (3.5)	0.23 (6.5)	2 to 10	
ZB05	0.5	0.16 (4.5)	0.35 (10)	2 to 13	
ZB06	0.6	0.25 (7)	0.64 (18)	2 to 20	

## Vacuum Ejector/Vacuum Pump System

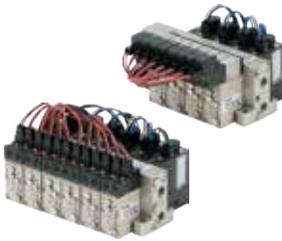
### Compact Vacuum Ejector ZA



- Total width: 9.9 mm, Total length: 72.9 mm, Total height: 52.5 mm, Weight: 50 g
- Can be installed on moving parts
- Improved response through shortening of the length of the tube to the pad
- Adaptable for manifold application

Series	Nozzle diameter (mm)	Max. suction flow scfm [L/min (ANR)]	Air consumption scfm [L/min (ANR)]	Guidelines for applicable pad (mm)
ZA105	0.5	0.14 (4)	0.42 (12)	2 to 13
ZA107	0.7	0.28 (8)	0.99 (28)	2 to 20

### Vacuum Module ZX



- Compatible with ejector systems and the vacuum pump systems
- Necessary functions can be combined through a modular design.
- Ideal for electronic parts or small precision parts weighing up to 100 g
- Compatible with ejector systems and the vacuum pump systems
- Adaptable for manifold application

Series	Nozzle diameter (mm)	Max. suction flow scfm [L/min (ANR)]	Air consumption scfm [L/min (ANR)]	Guidelines for applicable pad (mm)	Vacuum pump system series
ZX105	0.5	0.18 (5)	0.46 (13)	2 to 13	ZX100
ZX107	0.7	0.35 (10)	0.81 (23)	2 to 20	
ZX110	1.0	0.78 (22)	1.62 (46)	2 to 25	

### Vacuum Ejector ZM



- Valves and switches are unitized.
- Adaptable for manifold application
- Maximum absorption flow rate is increased by 40%.
- Maximum vacuum pressure -12 psi (-84 kPa)

Series	Nozzle diameter (mm)	Max. suction flow scfm [L/min (ANR)]	Air consumption scfm [L/min (ANR)]	Guidelines for applicable pad (mm)
ZM05	0.5	0.53 (15)	0.60 (17)	2 to 16
ZM07	0.7	0.81 (23)	1.17 (33)	2 to 25
ZM10	1.0	1.34 (38)	2.12 (60)	2 to 32
ZM13	1.3	1.55 (44)	3.00 (85)	2 to 40
ZM15	1.5	1.59 (45)	3.88 (110)	2 to 50

### Multistage Ejector ZL



- Suction flow rate increased by a 3 stage diffuser construction
- Functions such as a digital vacuum switch or a vacuum pressure gauge can be selected.

Series	Nozzle diameter (mm)	Max. suction flow scfm [L/min (ANR)]	Air consumption scfm [L/min (ANR)]	Guidelines for applicable pad (mm)
ZL112	1.2	3.53 (100)	2.22 (63)	2 to 250
ZL212	1.2 x 2	7.06 (200)	4.45 (126)	2 to 250

## Vacuum Ejector/Vacuum Pump System

### Vacuum Ejector ZH



- Nozzle diameters:  $\phi 0.5$ ,  $\phi 0.7$ ,  $\phi 1.0$ ,  $\phi 1.3$ ,  $\phi 1.5$ ,  $\phi 1.8$ ,  $\phi 2.0$
- Composite formed resin nozzle and body
- Available in series of 2 types: Box type (built-in silencer), Body ported type

Series	Nozzle diameter (mm)	Max. suction flow scfm [L/min (ANR)]	Air consumption scfm [L/min (ANR)]	Guidelines for applicable pad (mm)
ZH05	0.5	0.18 (5)	0.46 (13)	2 to 13
ZH07	0.7	0.42 (12)	0.81 (23)	2 to 20
ZH10	1.0	0.85 (24)	1.62 (46)	2 to 32
ZH13	1.3	1.41 (40)	2.75 (78)	2 to 50
ZH15	1.5	1.94 (55)	3.35 (95)	2 to 100
ZH18	1.8	2.30 (65)	5.30 (150)	2 to 125
ZH20	2.0	3.00 (85)	6.53 (185)	2 to 150

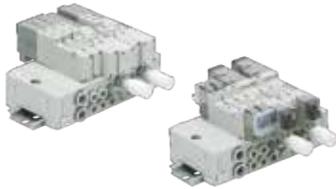
### Vacuum Ejector/In-line Type ZU



- Vacuum port and supply port are located collinearly to facilitate piping.
- A lightweight construction is achieved through the use of the resin body.
- Nozzle diameter  $\phi 0.5$ : 6.5 g  
 $\phi 0.7$ : 7.0 g
- Built-in One-touch fittings (copper-free countermeasures taken)

Series	Nozzle diameter (mm)	Max. suction flow scfm [L/min (ANR)]	Air consumption scfm [L/min (ANR)]	Guidelines for applicable pad (mm)
ZU05	0.5	0.25 (7)	0.34 (9.5)	2 to 13
ZU07	0.7	0.42 (12)	0.67 (19)	2 to 20

### Ejector Valve Unit ZYY/ZYX



- Ejector valve unit suitable for vacuum adsorption system
- Can be combined with valve for cylinder drive.

### Vacuum/Release Unit VQD1000-V

Rubber Seal



- Applicable to 0603 chip
- Response speed: 13 msec (at time of 500 mm<sup>\*</sup>) / 18.5 msec (at time of 1000 mm<sup>\*</sup>)
- Smooth workpiece removal, with no overshoot
- No need for timing adjustment of switchback between vacuum and positive pressure.
- No need for throttle circuit of release air.
- Compact suction filter that can be directly mounted is available: ZFC050-M5X50

\* Distance from the unit to the work area

### Vacuum Release Valve with Restrictor SJ3A6

Rubber Seal



- 2 built-in spool valves
- Possible to control vacuum adsorption and release with a single valve unit.
- Width 10 mm (Same size as Series SJ3000)
- With a restrictor that can adjust the flow rate of the release air.
- Built-in replacement filter on both vacuum and release sides.
- Combination of the 4 port solenoid valve SJ2000/3000 is possible. (Made to Order).

## Air Suction Filters

### Air Suction Filter ZFA



- Prevents problems related to vacuum circuits or airborne contaminants.
- Provides a large filter element surface.

Series	Port size	Air flow capacity scfm [L/min (ANR)]	Filtration (μm)
ZFA10	1/8	1.77 (50)	30
ZFA20	1/4	7.06 (200)	30

### Air Suction Filter with One-touch Fittings ZFB



- Prevents problems related to vacuum circuits or airborne contaminants.
- Vacuum tubes can be connected and removed by a one-touch operation.

Series	Applicable tubing O.D.		Air flow capacity scfm [L/min (ANR)]	Filtration (μm)
	Metric	Inch		
ZFB10	ø4, ø6	ø3/16, ø1/4	0.35 to 0.71 [10 to 20]	30
ZFB20	ø6, ø8	ø1/4	1.06 to 1.77 [30 to 50]	30
ZFB30	ø8, ø10	ø3/8	2.65 [75]	30
ZFB40	—	ø1/2	3.53 [100]	30

### In-line Air Filter ZFC



- Operating pressure range: –15 to –145 psi (–100 kPa to 1.0 MPa)  
Both positive pressure and vacuum pressure can be used with one unit.
- With lock mechanism  
During positive pressure, prevents components from being scattered when they are loosened.
- 2 types of transparent case materials are available.  
Polycarbonate (standard), Nylon (Made to Order)

Note 1) Supply pressure 15 psi (0.1 MPa), Differential pressure 4.4 psi (30 kPa)

Note 2) Made to Order

Series	Applicable tubing O.D.		Air flow capacity scfm [L/min (ANR)] Positive pressure	Air flow capacity scfm [L/min (ANR)] Vacuum pressure	Filtration (μm)
	Metric	Inch			
ZFC5□	ø4, ø6	ø5/32", ø1/4"	1.6 [45]/3.5 [100]	0.4 [10]/0.7 [20]	5, 10 <sup>Note 2)</sup>
ZFC7□	ø6, ø8, ø10, ø12	ø1/4", ø5/16", ø3/8"	4.2 [120]/8.8[250] /11 [300]/12 [350]	1.1 [30]/2.5 [70] /2.8 [80]/3.5 [100]	5, 10 <sup>Note 2)</sup>

### Suction Filter ZFC050



- Small suction filter which can be installed directly

Series	Model	Port size		Filtration (μm)
		IN side	OUT side	
ZFC050	MFC050-M5X50	M5 x 0.8	M5 x 0.8	20 (Nominal)
ZFC050	MFC050-M5X68	M5 x 0.8	M5 x 0.8	3 (Nominal)
ZFC050	MFC050-AUX68	M5 x 0.8	M5 x 0.8	3 (Nominal)

## Vacuum Pads

### Vacuum Pad ZP3

- Pad diameter  $\phi 1.5$  to  $\phi 16$
- Compact, Space-saving, Overall length is shortened.
- One-touch fitting and barb fitting for  $\phi 2$  are available.



Series	Type
ZP3	Flat
ZP3	Flat with groove
ZP3	Bellows

### Compact/Short/Nozzle Pad ZP2

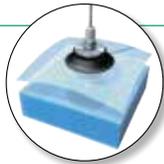
- Compact, space-saving
- Pad diameter:  $\phi 0.8$  to  $\phi 15$



Series	Type
ZP2	Compact
ZP2	Short-type
ZP2	Nozzle

### Thin Flat/Flat Pad ZP2

- For sheets or vinyl
- Pad diameter:  $\phi 5$  to  $\phi 30$



Series	Type
ZP2	Thin flat
ZP2	Flat

### Bellows Pad ZP2

- For spherical workpieces or workpieces with inclined surface
- Pad diameter:  $\phi 2$  to  $\phi 46$



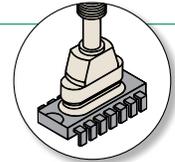
### 4.5-Stage Bellows Pad ZP2

- For adsorbing workpieces flowing at high speeds
- Follows various shapes of workpieces.
- Pad material: Silicone rubber (Rubber hardness: A40, A50, A60)
- Pad diameter:  $\phi 15$ ,  $\phi 20$ ,  $\phi 30$ ,  $\phi 40$ ,  $\phi 46$



### Oval Pad ZP2

- For rectangular workpieces
- Pad diameter:  $3.5 \times 7$  to  $8 \times 30$



### Ball Spline Buffer Pad ZP2

- Ball spline guide is used to the buffer.
- Pad diameter:  $\phi 2$  to  $\phi 8$



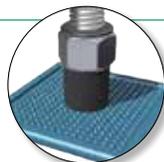
### Mark-free Pad ZP2

- For use where adsorption marks must not be left on workpieces.
- Pad diameter:  $\phi 4$  to  $\phi 125$



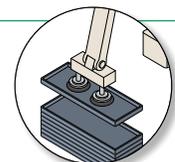
### Sponge Pad ZP2

- For workpieces with bumps
- Pad diameter:  $\phi 4$  to  $\phi 15$



### Heavy-duty Pad ZP2

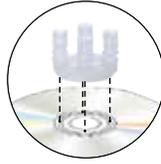
- For heavy or large workpieces
- Pad diameter:  $\phi 32$  to  $\phi 340$



## Vacuum Pads

### Special Configuration Pad ZP2

- For stage setting of disks (CD, DVD) or glass substrates



Series	Type
ZP2	For transferring disks
ZP2	For fixing panels

### Vacuum Pad ZP

- A variety of models accommodate a wide range of applications.
- Pad shapes: Flat, Flat with ribs, Thin flat, Thin flat with ribs, Deep, and Bellows shape
- Pad diameters:  $\phi 2$  to  $\phi 50$



### Vacuum Pad/Large/Heavy Duty Type ZPT/ZPX

- Ideal for heavy or large workpieces such as CRT tubes and automobile bodies
- Pad diameter:  $\phi 40$  to  $\phi 125$



### Vacuum Pad/Large Size Bellows Type ZPT/ZPX

- Ideal for workpieces with a curved picking surface, heavy mass, or large size
- Pad diameter:  $\phi 40$  to  $\phi 125$



### Vacuum Pad/Ball Joint Type ZPT/ZPR

- Ball joint type ideal for adsorption on slanted work surfaces
- Pad diameter:  $\phi 10$  to  $\phi 50$



### Non-contact Gripper XT661

- Assist in non-contact workpiece transfer.
- Max workpiece suction distance: 10 mm
- Two types are available.  
Cyclone type: High lift: Max. 9.9 lbf (44 N)  
Bernoulli type: Amplitude of the workpiece during gripping:  $\pm 0.01$  mm or less



## Vacuum Saving Valves

### Vacuum Saving Valve ZP2V



- Can restrict the reduction of vacuum pressure even when there is no workpiece.
- No need for switching operation when changing workpieces
- Built-in filter (40  $\mu\text{m}$ )
- With One-touch fittings

## Vacuum Pads

### Vacuum Flow ZH□-□-X185



- By supplying compressed air, large blow and vacuum flow rate available
- A blow flow rate 4 times the supply air
- A vacuum flow rate 3 times the supply air
- Large passage diameter available for suction of machining chips, particles, etc.
- Maintenance free
- Mounting bracket available
- Application examples  
Blow: Blowing away water droplets and machining chips.  
Vacuum: Vacuuming the smoke during soldering. Transferring materials such as pellets or fine particles.

## Vacuum Regulators

### Vacuum Regulator IRV



- Allows adjustment of vacuum line pressure.
- Single sided connections series
- Weight reduced by 20% (Compared with the existing IRV2000 with IRV20 fitting)
- Built-in One-touch fittings
- Easy to attach/detach the pressure gauge or digital pressure switch due to attachment by clip.
- Mounting direction of the pressure gauge or digital pressure switch can be changed. (Standard connections only)
- Mounting angle of the pressure gauge or digital pressure switch can be changed easily (in 60 degree increments).

Series	Port size	Set pressure range psi (kPa)
IRV10	ø6, ø8, ø1/4, ø5/16	-14.5 to -0.19 (-100 to -1.3)
IRV20	ø6, ø8, ø10, ø1/4, ø5/16, ø3/8	-14.5 to -0.19 (-100 to -1.3)

### Electronic Vacuum Regulator ITV

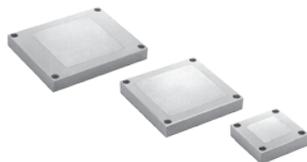


- Stepless control of vacuum pressure in proportion to electric signals
- Communication:CC-Link, DeviceNet™, PROFIBUS DP, RS-232C

Series	Port size	Set pressure psi (kPa)
ITV209□	1/4	-0.19 to 11.6 (-1.3 to -80)
ITV009□	ø4, ø5/32" One-touch Fittings	-0.15 to -14.5 (-1 to -100)

## Related Equipment for Vacuum System

### Adsorption Plate SP



- Ideal for adsorption and fixing in place of thin sheets, glass panels, and soft workpieces.  
Workpieces do not deform since they are adsorbed with multiple micro air vents on the adsorption surface.
- A high level of machining accuracy.
- Strong adsorption force.

Series	Shape	Adsorption surface size	Sintered metallic element particle dia.	Suction port
SP	Rectangular, Square	□50 x 50 mm, □100 x 100 mm, □150 x 150 mm, □200 x 200 mm, □250 x 250 mm, □300 x 300 mm	ø0.3 (Sphere)	1/8

## Related Equipment for Vacuum System

### Free Mount Cylinder for Vacuum ZCUK



- In the rectangular, compact cylinder series CU which has a high level of mounting precision, a vacuum passage is provided in the rod to facilitate the mounting of a vacuum pad and to save space.
- Standard vacuum pads (ø2 to ø50) can be mounted.

Series	Bore size: (mm)	Vacuum pad diameter	Stroke (mm)
ZCUK	10, 16, 20, 25, 30	ø2 to ø50	5 to 50

### Drain Separator for Vacuum AMJ



- Removes water droplets from air by simply installing in vacuum equipment connection lines.
- Effective for removing water droplets from the air sucked into vacuum pumps and ejectors, etc.

Series	Port size	Recommended flow rate scfm [(L/min) (ANR)]	Max. operating pressure	Water drop removal ratio
AMJ	1/4, 3/8, 1/2, 3/4, 1	7.1 [200], 10.6 [300], 17.7 [500]	145 psi (1.0 MPa)	90%

### Exhaust Cleaner for Vacuum AMV



- Captures and separates 99.5% of highly concentrated oil mist with a low flow rate.
- Creates a comfortable working environment without oil mist.
- No need for exhaust ducts from the vacuum pump.

Series	Port size	Max. air flow scfm [L/min (ANR)]	Oil mist removal	Filtration (µm)
AMV	1, 1 1/2, 2, 3BJIS 10K FF flange 4BJIS 10K FF flange	12.7 to 565 [360 to 16000]	99.5% or more	0.3 (Trapping efficiency: 95%)

## Aftercoolers/Air Tanks



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## Air Dryers



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## Related Equipment



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Differential Pressure Gauge/ <b>GD40</b> .....	P.78

## Aftercoolers/Air Tanks

### Air Cooled Aftercooler HAA



- Can cool high temperature compressed air from compressors down to 40°C or less and efficiently remove moisture from the air.
- Cooling equipment is not required for this air cooled type.
- Maintenance is easy and the running cost is reasonable since this is free from concerns such as water supply cut-off or freezing.

Series	Applicable compressor (kW)	Air flow capacity scfm [L/min (ANR)]
HAA	7.5 to 37	35.3 to 201 [1000 to 5700]

### Water Cooled Aftercooler HAW



- Can cool high temperature compressed air from compressors down to 40°C or less and efficiently remove moisture from the air.
- Stable operation is possible even in an environment with a high temperature, high moisture and heavy foreign particles for this water cooled type.

Series	Applicable compressor (kW)	Air flow capacity scfm [L/min (ANR)]
HAW	2.2 to 110	10.6 to 636 [300 to 18000]

### Air Tank AT



- Accumulates the compressed air from compressors, also prevents it from being pulsated, and cools it.

Series	Port size	Tank capacity (L)
AT	1/2 to 4 <sup>th</sup> flange	100 to 3000

### Air Tank VBAT



- Compact air tank that can be directly connected with a regulator.
- Can be used as an independent tank.
- With a safety valve port. (Option)

Series	Port size	Tank capacity (L)
VBAT	3/8, 1/2, 3/4	5, 10, 20, 38

### China Pressure Vessel Regulations Compliant Product - Air Tank for Regulators VBAT-X104



- Complies with China Pressure Vessel Regulations  
Technical specification for safety regulation: TSG R0003-2007  
Simple Pressure Vessels Safety and Technical Supervision Regulation
- Regulation Compliant Product  
Safety Technical Supervision Regulations for Safety Valves TSG ZF001-2006
- Compact air tank that can be directly connected with a regulator.

Series	Port size	Tank capacity (L)
VBAT-X104	3/8, 1/2, 3/4	5, 10, 22, 38

## Air Dryers

### Refrigerated Air Dryer **IDF□E/F/D**



Series	Rated inlet condition	Air flow capacity scfm (m <sup>3</sup> /min [ANR])		Applicable air compressor (kW)	Refrigerant	Port size	
		50Hz	60Hz				
IDF1E	95°F (35°C) 100psi (0.7 MPa)	3.5 (0.1)	4.2 (0.12)	0.75	R134a (HFC)	Rc3/8	
IDF2E		7.1 (0.2)	8.3 (0.235)	1.5		Rc3/8	
IDF3E		11.3 (0.32)	13.1 (0.37)	2.2		Rc3/8	
IDF4E		18.4 (0.52)	20.1 (0.57)	3.7		Rc1/2	
IDF6E		26.5 (0.75)	29.0 (0.82)	5.5		Rc3/4	
IDF8E		43.1 (1.22)	46.6 (1.32)	7.5		Rc3/4	
IDF11E		58.3 (1.65)	64.3 (1.82)	11		Rc3/4	
IDF15E1		98.9 (2.8)	109 (3.1)	15		Rc1	
IDF22E		138 (3.9)	152 (4.3)	22		R1	
IDF37E		201 (5.7)	215 (6.1)	37		R1 1/2	
IDF55E	104°F (40°C) 100 psi (0.7 MPa)	297 (8.4)	346 (9.8)	55	R407C (HFC)	R2	
IDF75E		388 (11.0)	438 (12.4)	75		R2	
IDF100F		565 (16.0)	664 (18.8)	100		R2	
IDF125F		710 (20.1)	837 (23.7)	125		65 (2 1/2B) flange	
IDF150F		883 (25.0)	1059 (30.0)	150		80 (3B) flange	
IDF190D		1130 (32.0)	1342 (38.0)	190		80 (3B) flange	
IDF240D		1519 (43.0)	1766 (50.0)	240		100 (4B) flange	
IDF370D		95°F (35°C) 100psi (0.7 MPa)	1907 (54.0)	2295 (65.0)		370	150 (6B) flange

### Refrigerated Air Dryer/Double Energy Saving Function Series **IDF100FS/125FS/150FS**



- Energy saving design (Second reheater & digital scroll refrigerator)
- Power consumption: Reduced by 76% max
- Exhaust heat: Reduced by 25% max
- Robust in high temperature environments.
- Ambient temperature: Up to 104°F (45°C) max; Inlet air temperature: Up to 140°F (60°C)

Series	Applicable air compressor (kW)	Air flow capacity scfm (m <sup>3</sup> /min [ANR])	
		50Hz	60Hz
IDF100FS	100	565 (16)	664 (18.8)
IDF125FS	125	710 (20.1)	837 (23.7)
IDF150FS	150	883 (25)	953 (27)

### Refrigerated Air Dryer **IDU□E**



Series	Rated inlet condition	Air flow capacity scfm (m <sup>3</sup> /min [ANR])		Applicable air compressor (kW)	Refrigerant	Port size
		50Hz	60Hz			
IDU3E	95°F (35°C) 100psi (0.7 MPa)	11.3 (0.32)	13.1 (0.37)	2.2	R134a (HFC)	Rc3/8
IDU4E		18.4 (0.52)	20.1 (0.57)	3.7		Rc1/2
IDU6E		26.5 (0.75)	29.0 (0.82)	5.5		Rc3/4
IDU8E		38.8 (1.1)	42.3 (1.2)	7.5		Rc3/4
IDU11E		53.0 (1.5)	60.0 (1.7)	11		Rc3/4
IDU15E1		91.8 (2.6)	99.0 (2.8)	15		Rc1
IDU22E		138 (3.9)	192 (4.3)	22		R1
IDU37E		201 (5.7)	215 (6.1)	37		R1 1/2
IDU55E		297 (8.4)	346 (9.8)	55		R2
IDU75E		388 (11.0)	441 (12.5)	75		R2

## Air Dryers

### Refrigerated Air Dryer/For Use in Europe, Asia, and Oceania IDFA□E/F

- EC Directive compliant product (with CE mark)
- Power supply voltage: Single-phase 230 VAC (50 Hz)



Series	Rated inlet condition	Air flow capacity scfm (m <sup>3</sup> /min [ANR])			Refrigerant	Port size
		Outlet air pressure dew point				
		37°F (2.8°C)	45°F (7.2°C)	50°F (10°C)		
IDFA3E	95°F (35°C) 100psi (0.7 MPa)	7.1 (12)	8.8 (15)	10 (17)	R134a (HFC)	Rc3/8
IDFA4E		14 (24)	18 (31)	20 (34)		Rc1/2
IDFA6E		21 (36)	27 (46)	29 (50)		Rc3/4
IDFA8E		38 (65)	49 (83)	54 (91)		Rc3/4
IDFA11E		47 (80)	59 (101)	66 (112)		Rc3/4
IDFA15E		71 (120)	89 (152)	99 (168)		Rc1
IDFA22E		107 (182)	136 (231)	149 (254)		R1
IDFA37E		161 (273)	204 (347)	225 (382)		R1 1/2
IDFA55E		230 (390)	254 (432)	300 (510)		R2
IDFA75E		388 (660)	424 (720)	484 (822)		R2
IDFA100F-38	104°F (40°C) 100psi (0.7 MPa)	—	—	565 (960)	R407C (HFC)	R2
IDFA125F-38		—	—	712 (1210)		R2 1/2
IDFA150F-38		—	—	883 (1500)		DIN flange 80
IDFA100F-40	95°F (35°C) 100psi (0.7 MPa)	506 (860)	—	—	R2	R2
IDFA125F-40		647 (1100)	—	—		R2 1/2
IDFA150F-40		789 (1340)	—	—		DIN flange 80

### Refrigerated Air Dryer/For Use in North, Central and South America IDFB□E



- UL certified product
- Power supply voltage: Single-phase 115 VAC (60 Hz), 230 VAC (60 Hz), Three-phase 460 VAC (60 Hz)

Note) Air flow capacity for each dew point is indicated.

Series	Rated inlet condition	Air flow capacity (m <sup>3</sup> /h [ANR])			Refrigerant	Port size	
		Outlet air pressure dew point <sup>Note)</sup>					
		37°F (2.8°C)	45°F (7.2°C)	50°F (10°C)			
IDFB3E	100°F (37.8°C) 100 psi (0.7 MPa)	10 (17)	11 (19)	12 (20)	R134a (HFC)	NPT3/8	
IDFB4E		15 (25)	16 (27)	17 (28)		NPT1/2	
IDFB6E		25 (43)	26 (45)	28 (47)		NPT3/4	
IDFB8E		41 (70)	43 (74)	45 (77)		NPT3/4	
IDFB11E		59 (100)	62 (106)	65 (110)		NPT3/4	
IDFB15E		71 (120)	80 (136)	86 (147)		NPT1	
IDFB22E		107 (182)	120 (205)	130 (221)		NPT1	
IDFB37E		161 (273)	173 (294)	181 (308)		NPT1 1/2	
IDFB55E		226 (384)	258 (438)	297 (504)		R407C (HFC)	NPT2
IDFB75E		300 (510)	353 (600)	406 (690)			NPT2

## Air Dryers

### Thermo-dryer with Air Temperature Adjustment Function IDH□



- Stable supply of temperature and pressure controlled dry clean air.  
Possible to supply compressed air with the same conditions and quality regardless of the season.
- Application example: Supplying compressed air with constant conditions to air bearings mounted on the tool.
- Built-in filter  
Nominal filtration: 0.01 μm (99.9% filtration efficiency)  
Outlet oil mist concentration: Max. 0.01 mg/m<sup>3</sup> (ANR)  
Outlet cleanliness: Particles of 0.3 μm or more: 3.5 particles/L (ANR) or less
- Power supply available all over the world  
Single-phase 100 VAC, 200 VAC, 230 VAC (50/60 Hz)

Series	Air flow capacity scfm [L/min (ANR)]	Outlet air temperature adjustment range	Outlet air set pressure range	Outlet air temperature stability	Temperature control method
IDH□4	3.53 to 17.7 (100 to 500)	59 to 86°F (15 to 30°C)	22 to 123 psi (0.15 to 0.85 MPa)	±0.1	Heater operation, PID control
IDH□6	7.06 to 28.3 (200 to 800)	59 to 86°F (15 to 30°C)	22 to 123 psi (0.15 to 0.85 MPa)	±0.1	Heater operation, PID control

### Heatless Air Dryer ID



- Supply dry air with a low dew point below -30°C.
- Compact and lightweight without a heater or an electric control board.
- Possible to check the outlet dew point with the indicator.  
(Self-regenerative style allows for easy maintenance.)

Series	Outlet flow scfm [L/min (ANR)]	Inlet flow scfm [L/min (ANR)]
ID	2.82 to 27.5 (80 to 780)	3.53 to 34.4 (100 to 975)

### Membrane Air Dryer IDG□A/IDG



- Possible to easily supply dry air using the hollow fiber membrane.
- Non-fluorocarbon
- Power supply not required
- Compatible with low dew point [-76°F (-60°C)]
- No vibration or heat discharge
- With a dew point indicator

Series	Outlet flow scfm [L/min (ANR)]	Standard dew point
IDG□A/IDG	0.35 to 35.3 [10 to 1000]	5, -4, -40, -76°F (-15, -20, -40, -60°C)

### Moisture Control Tube IDK



- Prevents condensation in piping for small cylinders/air grippers.
- Diffuses water vapor in the piping to the outside.
- All you have to do is install the moisture control tube. Additional power supply and works are not necessary.

Series	O. D. / I. D. (mm)	Effective length (mm)	Applicable fittings
IDK02	2/1.2	100 200	KQ2
IDK04	4/2.5		
IDK06	6/4		

### Motor Operated Auto Drain ADM



- Reliably discharges even highly viscous drainage.

Series	Power consumption (W)	Port size
ADM200	4	IN 3/8, 1/2 OUT 3/8

## Air Dryers

### Heavy Duty Auto Drain **ADH**



- Easy maintenance.  
Possible to maintain easily without removing pipes.
- No need for electric power and no waste of air.  
Float style drain allows automatic draining without electric power.

Series	Port size	Auto drain
ADH4000	1/2	Float type

## Air Preparation Filters

### Water Separator **AMG**



- Compressed air without water can be obtained.
- Water drop removal ratio: 99%

Series	Air flow capacity scfm [L/min (ANR)]	Port size
AMG	10.6 to 424 [300 to 12000]	1/8 to 2

### Main Line Filter **AFF**



- Can remove impurities such as oil, water and foreign matter in compressed air and can improve the function of a dryer in the downstream, extend the life of precision filter, and prevent trouble with the equipment.

Series	Filtration (μm)	Air flow scfm [L/min (ANR)]	Port size
AFF	3 (Filtration efficiency 99%)	10.6 to 1483 [300 to 42000]	1/8 to 4 <sup>B</sup> flange

### Mist Separator **AM**



- Can separate and remove oil mist and remove solid particles such as rust or carbon of 0.3 μm or larger.

Series	Filtration (μm)	Air flow scfm [L/min (ANR)]	Port size
AM	0.3 (Filtration efficiency 99.9%)	10.6 to 424 [300 to 12000]	1/8 to 2

### Micro Mist Separator **AMD**



- Can separate and remove aerosol state oil mist and remove carbon or dust of 0.01 μm or larger.
- Should be used as a prefilter of compressed air for precision instruments or clean room requiring high levels of clean air.

Series	Filtration (μm)	Air flow scfm [L/min (ANR)]	Port size
AMD	0.01 (Filtration efficiency 99.9%)	7.1 to 1412 [200 to 40000]	1/8 to 6 <sup>B</sup> flange

## Air Preparation Filters

### Micro Mist Separator with Pre-filter **AMH**



- Integrates Series AM and Series AMD to achieve a reduction in installation space and to reduce piping installation labor and costs.
- Can separate and remove aerosol state oil mist and remove carbon or dust of 0.01 μm or larger.
- Should be used as a prefilter of compressed air for precision instruments or clean room requiring high levels of clean air.

Series	Filtration (μm)	Air flow scfm [L/min (ANR)]	Port size
AMH	0.01 (Filtration efficiency 99.9%)	7.1 to 424 [200 to 12000]	1/8 to 2

### Super Mist Separator **AME**



- Can separate and absorb aerosol state fine oil particles and change the oil lubricating compressed air to oilless equivalent air.
- Should be applied for filtration of compressed air requiring a high degree cleanliness such as the compressed air for coating lines, for clean rooms and for equipment that must avoid oils.

Series	Filtration (μm)	Air flow scfm [L/min (ANR)]	Port size
AME	0.01 (Filtration efficiency 99.9%)	7.1 to 424 [200 to 12000]	1/8 to 2

### Odor Removal Filter **AMF**



- Efficiently removes odors in compressed air with an activated carbon element. The unit is designed for clean rooms where odors must be removed.
- Activated carbon element with large filtration area.
- Easy replacement and installation of elements

Series	Filtration (μm)	Air flow scfm [L/min (ANR)]	Port size
AMF	0.01 (Filtration efficiency 99.9%)	7.1 to 1412 [200 to 40000]	1/8 to 2

### In-line Air Filter **ZFC**



- Operating pressure range: -14.5 to 145 psi (-100 kPa to 1.0 MPa)  
Both positive pressure and vacuum pressure can be used with one unit.
- Filtration: 5 μm, 10 μm (Made to Order)
- With lock mechanism  
During positive pressure, prevents components from being scattered when they are loosened.
- 2 types of transparent case materials are available.  
Polycarbonate (standard), Nylon (Made to Order)

Series	Applicable tubing O.D.		Air flow capacity scfm [L/min (ANR)]	
	Metric	Inch	Positive pressure	Vacuum pressure
ZFC5	ø4, ø6	ø5/32", ø1/4"	1.6 to 3.5 [45 to 100]	0.35 to 0.71 [10 to 20]
ZFC7	ø6, ø8, ø10, ø12	ø1/4", ø5/16", ø3/8"	4.2 to 12.4 [120 to 350]	1.1 to 3.5 [30 to 100]

### Clean Gas Filter **SF**



- Cartridge type allows element replacement. (SFA100/200/300, SFB100)
- Compact disposable type for semiconductor industry (SFB300, SFC100)

Type	Series	Operating pressure	Filtration (μm)
Cartridge type Disc	SFA100/200/300	Max. 0.99 MPa (Vacuum: 1.3 x 10 <sup>-6</sup> kPa)	0.01 (Filtration efficiency 99.99%)
Cartridge type Straight	SFB100	Max. 0.99 MPa (Vacuum: 1.3 x 10 <sup>-6</sup> kPa)	0.01 (Filtration efficiency 99.99%)
Disposable type Straight	SFB300	Max. 0.99 MPa (Vacuum: 1.3 x 10 <sup>-6</sup> kPa)	0.01 (Filtration efficiency 99.99%)
Disposable type Multiple disc	SFC100	Max. 0.99 MPa (Vacuum: 1.3 x 10 <sup>-6</sup> kPa)	0.01 (Filtration efficiency 99.99%)

## Air Preparation Filters

### Clean Gas Strainer SFB200



Type	Series	Operating pressure	Filtration (μm)
Cartridge type Straight	SFB200	Max. 144 psi (0.99 MPa) (Vacuum: 1.3 x 10 <sup>-6</sup> kPa)	120

### Clean Air Filter/Hollow Fiber Element SFD



- Built-in hollow fiber element
- Pressure drop: 4.4 psi (0.03 MPa) (Inlet pressure 102 psi (0.7 MPa), Max. flow rate)
- Conforms to RoHS reduction of environmentally detrimental chemicals.

Series	Type	Operating pressure	Filtration (μm)
SFD100	Disposable type (Irreplaceable element)	MAX. 145 psi (1.0 MPa)	0.01 (Filtration efficiency 99.99%)
SFD200	Cartridge type (Replaceable element)	MAX. 145 psi (1.0 MPa)	0.01 (Filtration efficiency 99.99%)

### Clean Air Module LLB



- Clean equipment modularized (Reduction of piping labor/Space-saving)  
Clean air is easily available.
- Nominal filtration rating: 0.01 μm (Filtration efficiency 99.99%)
- Wetted parts: Grease-free, Silicone-free
- Assembled in a clean room, shipped and packed in a duplicate package
- 24 combinations available

Note) Inlet air conditions ISO 8573-1 Quality grade: Equivalent to 1.4.1 to 1.6.1

Series	Fluid	Set pressure	Flow range scfm [L/min (ANR)]
LLB3	Clean air, N <sub>2</sub> gas <small>Note)</small>	7.3 to 58 psi (0.05 to 0.4 MPa)	0.18 to 3.53 (5 to 100)
LLB4	Clean air, N <sub>2</sub> gas <small>Note)</small>	7.3 to 58 psi (0.05 to 0.4 MPa)	1.77 to 17.7 (50 to 500)

### Air-blow Module LLB1



- Reduced piping man-hours/Space-saving
- Integration of devices in compact space
- Short-pitch mounting is possible.  
Centralized pressure control is achieved with compact design.
- Parts in contact with fluid: Grease-free

Series	Fluid	Set pressure	Flow range scfm [L/min (ANR)]
LLB1	Air, N <sub>2</sub> gas	7.3 to 87 psi [0.05 to 0.6 MPa] 7.3 to 51 psi [0.05 to 0.35 MPa]	Up to 3.53 [Up to 100]

## Related Equipment

### Auto Drain Valve AD



- Drainage is automatically discharged.

Model	Port size	Drain discharge port size
AD402	1/4, 3/8, 1/2	3/8
AD600	3/4, 1	3/4, 1

### Differential Pressure Gauge GD40



- The pressure differential at the inlet and the outlet of compressed air equipment can be viewed at a glance on the pressure differential gauge. It is ideal for the maintenance control of filters.
- Can be installed easily by merely providing a bypass circuit.
- Provided with a protective cover to prevent hazards.

Model	Accuracy	Scale range
GD40	±0.87 psi (± 0.006 MPa)	0 to 29 psi (0 to 0.2 MPa)

## Modular F.R.L. Units



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## Modular F.R.L. Units

### Modular Type F.R.L. Unit AC-A



- Easy replacement of the element  
The element and the bowl are in one piece. Replacement can be done in hand.
- Energy saving regulator  
Pressure drop: Max. 50% improvement
- Reduced required maintenance space: Max. 46% reduction
- Better visibility & safer  
The bowl is covered with a transparent bowl guard.
- Attachment  
Spacer: Y200-A, Y300-A, Y400-A, Y500-A  
Spacer with bracket: Y200T-A, Y300T-A, Y400T-A, Y500T-A

Combination equipment	Series	Port size	Set pressure psi (MPa)
Air filter, Regulator, Lubricator	AC, AC-A	M5, 1/8, 1/4, 3/8, 1/2, 3/4, 1	7.3 to 102 (0.05 to 0.7), 7.3 to 123 (0.05 to 0.85)
Filter regulator, Lubricator	AC□A, AC□A-A		
Air filter, Regulator	AC□B, AC□B-A		
Air filter, Mist separator, Regulator	AC□C, AC□C-A		
Filter regulator, Mist separator	AC□D, AC□D-A		

### Air Filter AF-A



- Easy replacement of the element  
The element and the bowl are in one piece. Replacement can be done in hand.
- Reduced required maintenance space: Max. 46% reduction
- Better visibility & safer  
The bowl is covered with a transparent bowl guard.

Series	Port size	Filtration (μm)
AF, AF-A	M5, 1/8, 1/4, 3/8, 1/2, 3/4, 1	5

### Mist Separator AFM-A



- Easy replacement of the element  
The element and the bowl are in one piece. Replacement can be done in hand.
- Reduced required maintenance space: Max. 46% reduction
- Better visibility & safer  
The bowl is covered with a transparent bowl guard.

Series	Port size	Filtration (μm)
AFM-A	1/8, 1/4, 3/8, 1/2, 3/4	0.3

### Micro Mist Separator AFD-A



- Easy replacement of the element  
The element and the bowl are in one piece. Replacement can be done in hand.
- Reduced required maintenance space: Max. 46% reduction
- Better visibility & safer  
The bowl is covered with a transparent bowl guard.

Series	Port size	Filtration (μm)
AFD-A	1/8, 1/4, 3/8, 1/2, 3/4	0.01

### Regulator AR-A



- Energy saving regulator Pressure drop: Max. 50% improvement

Series	Port size	Set pressure psi (MPa)
AR, AR-A	M5, 1/8, 1/4, 3/8, 1/2, 3/4, 1	7.3 to 102 (0.05 to 0.7), 7.3 to 123 (0.05 to 0.85)

## Modular F.R.L.

### Lubricator AL-A



- Better visibility & safer  
The bowl is covered with a transparent bowl guard.

Series	Port size	Bowl capacity (cm <sup>3</sup> )
AL, AL-A	M5, 1/8, 1/4, 3/8, 1/2, 3/4, 1	7 to 135

### Filter Regulator AW-A



- Easy replacement of the element  
The element and the bowl are in one piece. Replacement can be done in hand.
- Energy saving regulator  
Pressure drop: Max. 50% improvement
- Reduced required maintenance space: Max. 46% reduction
- Better visibility & safer  
The bowl is covered with a transparent bowl guard.

Series	Port size	Set pressure psi (MPa)	Filtration (μm)
AW, AW-A	M5, 1/8, 1/4, 3/8, 1/2, 3/4, 1	7.3 to 102 (0.05 to 0.7), 7.3 to 123 (0.05 to 0.85)	5

### Filter Regulator AW30/40-X2622



- Stainless Steel 316 and special temperature environment (−40°F [−40°C]) specifications
- External parts material: Stainless steel 316
- Ambient and fluid temperature: −40 to 176°F(−40 to 80°C)
- NACE International Standards compliant

Series	Port size	Set pressure psi (MPa)	Filtration (μm)
AW30/40-X2622	1/4, 3/8, 1/2	7.3 to 123 (0.05 to 0.85)	5

### Mist Separator Regulator AWM



Series	Port size	Set pressure psi (MPa)	Filtration (μm)
AWM	1/8, 1/4, 3/8, 1/2	7.3 to 123 (0.05 to 0.85)	0.3

### Micro Mist Separator Regulator AWD



Series	Port size	Set pressure psi (MPa)	Filtration (μm)
AWD	1/8, 1/4, 3/8, 1/2	7.3 to 123 (0.05 to 0.85)	0.01

## Modular F.R.L. Units

### Modular Type F.R.L. Unit **ACG**



- Improves visibility of pressure gauges located in various locations.

Combination equipment	Series	Port size	Set pressure psi (MPa)
Air filter, Regulator with built-in pressure gauge, Lubricator	ACG20 to 40	1/8, 1/4, 3/8, 1/2	7.3 to 123 (0.05 to 0.85)
Filter regulator with built-in pressure gauge, Lubricator	ACG20A to 40A	1/8, 1/4, 3/8, 1/2	
Air filter, Regulator with built-in pressure gauge	ACG20B to 40B	1/8, 1/4, 3/8, 1/2	
Air filter, Mist separator, Regulator with built-in pressure gauge	ACG20C to 40C	1/8, 1/4, 3/8, 1/2	
Filter regulator with built-in pressure gauge, Mist separator	ACG20D to 40D	1/8, 1/4, 3/8, 1/2	

### Regulator with Built-in Pressure Gauge **ARG**



- Improves visibility of pressure gauges located in various locations.

Series	Port size	Set pressure psi (MPa)
ARG20 to 40	1/8, 1/4, 3/8, 1/2	7.3 to 123 (0.05 to 0.85)

### Regulator with Built-in Pressure Gauge with Backflow Function **ARG□K**



- Improves visibility of pressure gauges located in various locations.

Series	Port size	Set pressure psi (MPa)
ARG20K to 40K	1/8, 1/4, 3/8, 1/2	7.3 to 123 (0.05 to 0.85)

### Filter Regulator with Built-in Pressure Gauge **AWG**



- Improves visibility of pressure gauges located in various locations.

Series	Port size	Set pressure psi (MPa)	Filtration (μm)
AWG20 to 40	1/8, 1/4, 3/8, 1/2	7.3 to 123 (0.05 to 0.85)	5

### Filter Regulator with Built-in Pressure Gauge with Backflow Function **AWG□K**

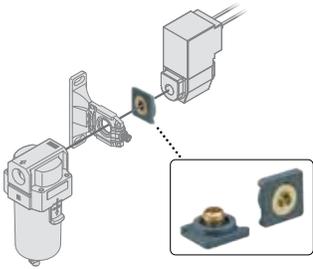


- Improves visibility of pressure gauges located in various locations.

Series	Port size	Set pressure psi (MPa)	Filtration (μm)
AWG20K to 40K	1/8, 1/4, 3/8, 1/2	7.3 to 123 (0.05 to 0.85)	5

## Air Preparation Filters

### Modular Adapter **E210/310/410**



- Easy connection to existing products.
- Can be freely rotated, thus allowing a wide selection of mounting directions.
- Can be connected to existing products of different size.
- Reduced space/piping maintenance cost

Series	Port size	Applicable products
E210	1/8, 1/4	Modular F.R.L. equipment (Filters, regulators, lubricators, etc.) 2 port solenoid valve 3 port solenoid valve
E310	1/4, 3/8	
E410	1/4, 3/8, 1/2	

### Soft Start-up Valve **AV**



- A starting valve that can supply air at a low speed and exhaust it at a high speed by blocking the air supply.

Series	Port size	Operating pressure psi (MPa)
AV2000 to 5000	1/4, 3/8, 1/2	15 to 145 (0.1 to 1)

### Large Flow Air Filter **AF**



Series	Port size	Filtration (μm)
AF800/900	1 1/4, 1 1/2, 2	5

## Regulators

### Miniature Regulator **ARJ1020F**



- Compact and lightweight (16 g)
- Low cracking pressure: 2.9 psi (0.02 MPa)
- Standard model equipped with backflow function
- Manifold base (Option)

Series	Features	Port size	Set pressure psi (MPa)
ARJ1020F	Direct operated relieving style with backflow function	M5	15 to 102 (0.1 to 0.7)

### Miniature Regulator **ARJ210**



- Lightweight with an aluminum body (60 g)

Series	Features	Port size	Set pressure psi (MPa)
ARJ210	Direct operated relieving type	Male thread: 1/8 Female thread: M5 x 0.8	29 to 102 (0.2 to 0.7)

# Regulators

## Miniature Regulator **ARJ310**



- Compact and lightweight (body 65 g)
- Short pitch mounting is possible: Mounting pitch 18.5 mm
- Series with One-touch fittings

Series	Features	Port size	Set pressure psi (MPa)
ARJ310	Direct operated relieving type	IN: 1/8 (Male thread), M5 x 0.8 (Female thread) OUT: 1/8 (Female thread)	29 to 102 (0.2 to 0.7)

## Pilot Operated Regulator **AR**



- Internal pilot operated style relieving type

Series	Port size	Set pressure psi (MPa)
AR425 to 925	1/4, 3/8, 1/2, 3/4, 1 1/4, 1 1/2, 2	7.3 to 120 (0.05 to 0.83)
AR435 to 935	1/4, 3/8, 1/2, 3/4, 1 1/4, 1 1/2, 2	2.9 to 29 (0.02 to 0.2)

## Compact Regulator **ARX**



- Compatible with inlet supply pressure of 290 psi (2.0 MPa)
- Ideal for discharge pressure adjustment on a small compressor
- Piston type
- Ideal for the pressure adjustment of air blowing applications

Series	Port size	Set pressure psi (MPa)
ARX20	1/4, 1/8	7.3 to 123 (0.05 to 0.85)

## MR Unit (Regulator with Mist Separator) **AMR**



- Combined with mist separator and regulator.
- Filtration: 0.3 μm

Series	Port size	Set pressure psi (MPa)
AMR	1/4, 3/8, 1/2, 3/4, 1	7.3 to 123 (0.05 to 0.85)

## Compact Manifold Regulator **ARM5**



- Width: 14 mm
- Can select two kinds of mountings. Direct mounting and DIN rail mounting
- Standard model equipped with backflow function
- Can select a variety of One-touch fitting sizes.

Series	Model	Features	Applicable tubing bore size		Set pressure psi (MPa)
			Metric size	Inch size	
ARM5A	Manifold specifications	Common air supply	ø4, ø6, ø8	ø5/32, ø1/4, ø5/16	7.3 to 102 (0.05 to 0.7)
ARM5B	Manifold specifications	Individual air supply	ø4, ø6	ø5/32, ø1/4	7.3 to 102 (0.05 to 0.7)
ARM5S	Single unit specifications	Individual air supply	ø4, ø6	ø5/32, ø1/4	7.3 to 102 (0.05 to 0.7)

## Regulators

### Compact Manifold Regulator **ARM10/11**



- Free selection in response to positioning conditions  
Knob positions: Top/Front/Bottom  
Piping directions: Up/Down  
One-touch fitting varieties: Straight/Elbow
- Varieties and sizes of One-touch fittings can be changed.
- Standard model equipped with backflow function
- Compatible with digital pressure switch

Series	Model	Features	Applicable tubing bore size		Set pressure psi (MPa)
			Metric size	Inch size	
ARM11A	Manifold specifications	Common air supply	ø4 to ø10	ø5/32 to ø3/8	7.3 to 102 (0.05 to 0.7)
ARM11B	Manifold specifications	Individual air supply	ø4, ø6	ø5/32, ø1/4	
ARM10	Single unit specifications	Standard	ø4, ø6	ø5/32, ø1/4	
ARM10F	Single unit specifications	Knob front face	ø4, ø6	ø5/32, ø1/4	

### Manifold Regulator **ARM1000/2000**



- With a ø15 compact pressure gauge (Option)
- Standard model equipped with backflow function

Series	Features	Port size	Set pressure psi (MPa)
ARM1000, 2000	Manifold (Common IN, Individual IN) Direct operated relieving style With backflow function	1/8	7.3 to 102 (0.05 to 0.7)

### Manifold Regulator **ARM2500/3000**



- A modular type that can be freely mounted on a manifold station.
- Optimal for central pressure control.
- Uses a one-touch lock handle.

Series	Features	Port size	Set pressure
ARM2500, 3000	Manifold (Common IN, Individual IN) Modular type	1/4, 3/8	7.3 to 123 psi (0.05 to 0.85 MPa)

### Direct Operated Precision Regulator **ARP**



- Setting sensitivity: 0.2% F.S. or less
- Energy saving, reduces air consumption 80% (SMC comparison)
- Repeatability: ±1% F.S. or less (or ±3 kPa or less)
- With backflow function (ARP20K/30K/40K)  
Can be mounted between a solenoid valve and a cylinder.

Series	Port size	Set pressure
ARP20 (K)	1/8, 1/4	0.73 to 58 psi (0.005 to 0.4 MPa) 0.73 to 29 psi (0.005 to 0.2 MPa) 0.73 to 87 psi (0.005 to 0.6 MPa)
ARP30 (K)	1/4, 3/8	
ARP40 (K)	1/4, 3/8, 1/2	

# Regulators

## Precision Regulator IR



- Tension control
- Contact pressure control
- Setting sensitivity: 0.2% F.S. or less
- Repeatability: ±0.5% F.S. or less

Series	Port size	Set pressure psi (MPa)
IR1000	1/8	0.73 to 29 (0.005 to 0.2)
IR2000	1/4	1.5 to 58 (0.01 to 0.4) 1.5 to 116 (0.01 to 0.8)
IR3000	1/4, 3/8, 1/2	1.5 to 29 (0.01 to 0.2) 15 to 58 (0.01 to 0.4) 15 to 116 (0.01 to 0.8)

## Vacuum Regulator IRV



- Allows adjustment of vacuum line pressure.
- Single sided connections series
- Weight reduced by 20% (Compared with the existing IRV2000 with IRV20 fitting)
- Built-in One-touch fittings
- Easy to attach/detach the pressure gauge or digital pressure switch due to attachment by clip.
- Mounting direction of the pressure gauge or digital pressure switch can be changed. (Standard connections only)
- Mounting angle of the pressure gauge or digital pressure switch can be changed easily (in 60 degree increments).

Series	Port size	Set pressure range psi (kPa)
IRV10	ø6, ø8, ø1/4, ø5/16	-15 to -0.19 (-100 to -1.3)
IRV20	ø6, ø8, ø10, ø1/4, ø5/16, ø3/8	-15 to -0.19 (-100 to -1.3)

## Power Valve Precision Regulator VEX



- Large capacity exhaust regulator
- Setting sensitivity: 0.2% F.S. or less
- Repeatability: ±0.5% F.S. or less

Series	Port size	Set pressure psi (MPa)
VEX1A33, 1B33	M5, 1/8	1.5 to 102 (0.01 to 0.7)
VEX1□30, 1□33	1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2, 2	7.3 to 102 (0.05 to 0.7)

## Clean Regulator SRH



- Contamination controlled stainless steel regulator
- Oil-free
- Two types of diaphragm materials: PTFE, Fluororubber

Series	Relief mechanism	Port size	Set pressure psi (MPa)
SRH	Non-relief	Rc1/8, 1/4, 3/8, 1/2 9/16-18UNF, 7/8-14UNF	Low pressure type: 2.9 to 29 (0.02 to 0.2)
SRH	Relief	Rc1/8, 1/4, 3/8, 1/2	High pressure type: 2.9 to 102 (0.05 to 0.7)

## Precision Clean Regulator SRP



- High precision low flow consumption stainless steel regulator
- Bleed air flow 0.02 scfm [0.5 L/min (ANR)] or less (29 psi [0.2 MPa] at outlet pressure)
- Setting sensitivity: 0.3% F.S.
- Repeatability: 1% F.S.

Series	Port size	Set pressure psi (MPa)
SRP	M5, 1/8	Low pressure type: 0.73 to 29 (0.005 to 0.2) High pressure type: 1.5 to 58 (0.01 to 0.4)

## Regulators

### Clean Regulator/Fluororesin Type **SRF**



- Wetted parts Body: New PFA, Diaphragm: PTFE
- Recommended maximum flow rate: 5.3 gal/min (20 L/min) (SRF50), [44 psi (0.3 MPa) at inlet pressure, fluidization]

Series	Model	Applicable tubing O.D.		Set pressure psi (MPa)
		Metric size	Inch size	
SRF	Integrated with fitting	ø4 to ø19	ø1/8 to ø3/4	2.9 to 58 (0.02 to 0.4)
SRF	With nut	Fitting size: 2 to 6	Fitting size: 2 to 6	
SRF	Tube extension	—	Tubing O.D.: ø1/4 to ø3/4	

### Direct Operated Regulator for 6.0 MPa (Relieving Type) **VCHR**



- Service life: 10 million times
- Improved durability in high pressure environments using a polyurethane elastomer poppet.
- Uses NSF-H1 approved grease at guide rings (sliding parts).
- Improved durability using a metal seal type relief valve
- Uses special fluororesin seal for sliding parts. Stable unattached response, and not easily affected by pressure.

Series	Model	Type	Port size	Set pressure psi (MPa)
VCHR	VCHR30/40	Direct operated regulator (Relieving type)	G3/4, 1, 1 1/2	73 to 725 (0.5 to 5.0) (Max. operating pressure 870 psi [6.0 MPa])

## Electro-Pneumatic Regulators

### Electro-Pneumatic Regulator **ITV**



- Stepless control of air pressure in proportion to electric signals
- Sensitivity: 0.029 psi (0.2 kPa) [14.5 psi (100 kPa) specification]
- Linearity: ±1% or less (F.S.)
- Hysteresis: 0.5% or less (F.S.)
- Communication: CC-Link, DeviceNet™, PROFIBUS DP, RS-232C

Series	Port size	Set pressure psi (MPa)
ITV0000	Built-in One-touch fitting ø4, ø5/32	0.15 to 15 (0.001 to 0.1)
		0.15 to 73 (0.001 to 0.5)
		0.15 to 131 (0.001 to 0.9)
		-0.145 to -14.5 (-1 to -100 kPa)
ITV1000	1/8, 1/4	0.73 to 15 (0.005 to 0.1)
ITV2000	1/4, 3/8	0.73 to 73 (0.005 to 0.5)
ITV3000	1/4, 3/8, 1/2	0.73 to 131 (0.005 to 0.9)

### Electronic Vacuum Regulator **ITV**



- Stepless control of vacuum pressure in proportion to electric signals
- Communication: CC-Link, DeviceNet™, PROFIBUS DP, RS-232C

Series	Port size	Set pressure psi (MPa)
ITV009□	ø4, ø5/32 One-touch fitting	-145 to -14503 (-1 to -100)
ITV209□	1/4	-184 to -11603 (-1.3 to -80)

### Controller for Electro-Pneumatic Regulator **IC**



- Can be mainly used integrated with the ITV0000 series without a display function.
- Converts digital input signal into analog output signal
- 10 bit parallel input signal (maximum)
- Pressure setting of 210 = 1024 points possible.
- 4 point preset output
- Applicable in the programming function with up to 20 steps.

## Electro-Pneumatic Regulators

### 5.0 MPa Maximum Supply Pressure High Pressure Electro-Pneumatic Regulator **ITVX**



- Stepless control of air pressure proportional to an electrical signal
- Maximum supply pressure: 725 psi (5.0 MPa)
- Set pressure range: 1.45 to 435 psi (0.01 to 3.0 MPa)
- Maximum flow rate: 106 scfm (3000 L/min [ANR])
- Fluid: Air, N<sub>2</sub>, O<sub>2</sub>, Ar
- Wetted parts: Fluorine grease

Series	Port size	Set pressure psi (MPa)
ITVX	3/8	1.45 to 435 (0.01 to 3.0)

## Proportional Valves

### Compact Proportional Solenoid Valve **PVQ**



- Stepless control of flow rate in proportion to current
- Repeatability: 3% or less
- Hysteresis: 10% or less

Series	Flow control range scfm (L/min)	Fluid
PVQ	0 to 0.18 (0 to 5) 0 to 0.21 (0 to 6) 0 to 2.65 (0 to 75) 0 to 3.53 (0 to 100)	Air, Inert gas

### Electro-Pneumatic Proportional Valve **VEF/VEP**



- Stepless control of air flow or pressure by use of electric signals
- Press-die cushions
- Pressure control of welding machine and low pressure casting
- Multi-stage speed control of air cylinder and rotation control of air motor

Series	Port size
VEF/VEP	1/4, 3/8, 1/2

### 5 Port Electro-Pneumatic Proportional Valve **VER**



- Stepless control of cylinder and applied pressure
- Applicable cylinder: ø25 to ø125
- Available for exhaust throttle and B port pressure regulation.

Series	Port size	Set pressure psi (MPa)
VER2000/4000	1/4, 3/8, 1/2	15 to 131 psi (0.1 to 0.9)

### Power Amplifier for Electro-Pneumatic Proportional Valve **VEA**



- Dedicated amplifier for driving an electro-pneumatic proportional valve
- Low current command signal
- High dither effect
- Stabilizing the performance of the electro-pneumatic proportional valve

Series
VEA250
VEA251
VEA252

## Proportional Valves

### E-P HYREG® VY1



- Stepless control of pressure by use of electric signals
- Thrust control of cylinder
- Flow control of nozzle
- Pressure control of tank

Series	Port size	Set pressure psi (MPa)
VY1	M5 x 8 1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2, 2	7.3 (0.05) to supply pressure

## Boosters

### Booster Regulator VBA



- Can increase the factory air a maximum of 200%, power supply not required.
- Possible to get a maximum of double pressure by connecting air with a factory line. (VBA11A: maximum 4 times)
- Space-saving type that directly connects air tanks and booster regulators.

Series	Port size	Set pressure psi (MPa)
VBA	1/4, 3/8, 1/2	VBA1□A: 29 to 290 (0.2 to 2.0) VBA2□A: 29 to 145 (0.2 to 1.0) VBA4□A: 29 to 145 (0.2 to 1.0) VBA43A: 29 to 226 (0.2 to 1.6)

### Air Tank VBAT



- Compact air tank that can be directly connected with a booster regulator.
- Can be used as an independent tank.
- With a safety valve port. (Option)

Series	Port size	Tank capacity gal (L)
VBAT	3/8, 1/2, 3/4	1.3, 2.6, 5.8, 10 (5, 10, 20, 38)

### China Pressure Vessel Regulations Compliant Product - Air Tank for Regulators VBAT-X104



- Compliant with Chinese pressure vessel regulations  
Technical specification for safety regulation: TSG R0003-2007  
Simple Pressure Vessels Safety and Technical Supervision Regulation
- Regulation Compliant Product  
Safety Technical Supervision Regulations for Safety valves TSG ZF001-2006
- Compact air tank that can be directly connected with booster regulators.

Series	Port size	Tank capacity gal (L)
VBAT-X104	3/8, 1/2, 3/4	1.3, 2.6, 5.8, 10 (5, 10, 20, 38)

### Pressure Control Valve (Relief Valve) AP100



- Releases pressure over the set range into an atmosphere and constantly maintains the pressure in a pipe.

Series	Port size	Set pressure psi (MPa)
AP100	1/8, 1/4	7.3 to 100 (0.05 to 0.69)

## Lubrication Equipment

### Large Flow Lubricator AL



- Individual lubrication
- Large capacity type

Series	Port size	Bowl capacity (cm <sup>3</sup> )
AL800/900	1-1/4, 1-1/2, 2	440, 1000

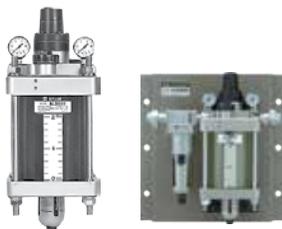
### Auto Feed Lube, Auto Feed Tank ALF/ALT



- Reduces maintenance labor with an auto lubrication function.

Series	Type	Port size	Bowl capacity (cm <sup>3</sup> )
ALF400 to 900	—	1/4, 3/8, 1/2, 3/4, 1, 1-1/4, 1-1/2, 2	5000, 9000
ALT	Tank	Air: 1/4 Oil: 3/8	5000, 9000
VA, VB	Oil distributor	ø6	Number of distribution ports: 4, 6, 8, 10, 16

### D. P. Lube ALD



- Centralized control of multi-point lubrication
- Less lubricant consumption
- Simplified oil feeding volume setting in which only the pressure differential is adjusted.
- Oil can be replenished by merely opening and closing the oil filler plug without stopping the air line.
- Micromist generation can be checked from the oil filler port.

Series	Type	Port size	Bowl capacity (cm <sup>3</sup> )
ALD600/900	Single product	3/4, 1, 1-1/4, 1-1/2, 2	2000, 5000
ALDU600/900	Unit	3/4, 1, 1-1/4, 1-1/2, 2	2000, 5000

### Booster Lube ALB



- Centralized control of multi-point lubrication
- Stable oil feeding with a micromist
- Through the use of a booster, a pressure that is higher than that of the main air passage can be supplied. This difference is used as the mist generating pressure differential. Thus, the pressure drop in the main air passage is minimized.
- Micromist can be constantly supplied by merely adjusting the mist generating pressure differential.
- Oil can be replenished by merely opening and closing the oil filler plug without stopping the air line.
- Micromist generation can be checked from the oil filler port.

Series	Type	Port size	Bowl capacity (cm <sup>3</sup> )
ALB900	Booster lube	1, 2, 3	5000
ALBA90	Bypass lubrication adapter	1/4, 1/2	—

### Mist Spray Unit LMU



Series	Type
LMU	Mist spray unit
LMV	Mixing valve
LMH	Magnet holder
LMD	Branch pipe

## Lubrication Equipment

### Impulse Lubricator **ALIP**



- Supplies a set volume of oil just before the lubrication point. Possible to lubricate a constant volume of oil to circuits that are difficult for oil to reach, or a places with little air consumption.

Series	Type	Port size	Feeding volume/cycle (cm <sup>3</sup> )
ALIP	Pressure type	1/8	0 to 0.04
ALT10	Oil tank	Air: 1/8 Oil: 1/4	Tank capacity: 160 cm <sup>3</sup>
ALT20	Oil tank		Tank capacity: 1000 cm <sup>3</sup>

### Liquid Collector/Exhaust Pressure Type **AEP100**



- Collect and reuse the leaked lubricating oil or hydraulic fluid using exhaust pressure.
- Collect it using the exhausted air released from the switching valve into the atmosphere, realizing energy saving.
- Efficient operation eliminating collection and wiping by hand.

### Liquid Collector/Ejector Type **HEP500**



- Collects the leakage of expensive cutting and grinding oil.
- No need to collect the leaked liquid by hand.
- Possible to use the equipped pump, special driving force is not required.

## Fittings for General Purposes



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## Fittings for General Purposes

### One-touch Fittings **KQ2**

Applicable tubing: Metric size



Applicable tubing: Inch size



- Possible to use in vacuum to -14.5 psi (-100 kPa).
- Improved tube insertion/removal  
Insertion force: Max. 30% reduction  
Removal force: Max. 20% reduction
- Compact and lightweight  
Dimensions height direction 24% shorter  
Dimensions horizontal direction 23% shorter, Weight 57% lighter
- Body type: Totalled 51 models
- Thread material/Surface treatment (Treated or Non-treated): 2 types
- Selectable surface treatment: Brass (No plating), Brass + Electroless nickel plated

Series	Seal method	size	Applicable tubing O.D.	Connection thread
KQ2	Sealant Gasket seal	Metric	ø2, ø3.2, ø4, ø6, ø8, ø10, ø12, ø16	M3 x 0.5, M5 x 0.8, M6 x 1.0 R, Rc 1/8, 1/4, 3/8, 1/2
KQ2	Sealant Gasket seal	Inch	ø1/8", ø5/32", ø3/16", ø1/4", ø5/16", ø3/8", ø1/2"	10-32UNF NPT 1/16, 1/8, 1/4, 3/8, 1/2
KQ2	Sealant Gasket seal	Inch	ø1/8", ø3/16", ø1/4", ø5/16", ø3/8", ø1/2"	M5 x 0.8 R, Rc 1/8, 1/4, 3/8, 1/2
KQ2	Face seal	Metric	ø4, ø6, ø8, ø10, ø12, ø16	G1/8, 1/4, 3/8, 1/2
KQ2	Face seal	Metric	ø3.2, ø4, ø6, ø8, ø10, ø12, ø16	R, Rc 1/8, 1/4, 3/8, 1/2
KQ2	Face seal	Inch	ø1/8", ø5/32", ø3/16", ø1/4", ø5/16", ø3/8", ø1/2"	NPT 1/16, 1/8, 1/4, 3/8, 1/2
KQ2	Face seal	Inch	ø1/8", ø5/32", ø3/16", ø1/4", ø5/16", ø3/8", ø1/2"	R1/8, 1/4, 3/8, 1/2
KQ2	Gasket seal	Metric	ø4, ø6, ø8, ø10, ø12, ø16	Uni 1/8, 1/4, 3/8, 1/2
KQ2	Gasket seal	Inch	ø1/8", ø5/32", ø3/16", ø1/4", ø5/16", ø3/8", ø1/2"	Uni 1/8, 1/4, 3/8, 1/2

### Metal One-touch Fittings **KQB2**



- Compact and light
- Fluid temperature: 23 to 302°F (-5 to 150°C)
- Brass parts: Electroless nickel plated
- Grease-free

Series	size	Applicable tubing O.D.	Connection thread
KQB2	Metric	ø3.2, ø4, ø6, ø8, ø10, ø12, ø16	M5 R-Rc-G 1/8, 1/4, 3/8, 1/2
KQB2	Inch	ø1/8", ø5/32", ø1/4", ø5/16" ø3/8", ø1/2"	UNF10-32 NPT1/8, 1/4, 3/8, 1/2

### Rotary One-touch Fittings **KS/KX**

Applicable tubing: Metric size

KS

KX



- Applicable to use for oscillating and rotating sections in robots.
- Low torque rotation style rotary One-touch fittings.
- Copper-free (Electroless nickel plated)

Series	size	Applicable tubing O.D.	Connection thread
KS	Metric	ø4, ø6, ø8, ø10, ø12	M5 x 0.8, M6 x 1.0 1/8, 1/4, 3/8, 1/2
KX (High speed type)	Metric	ø4, ø6, ø8, ø10, ø12	M5 x 0.8, M6 x 1.0 1/8, 1/4, 3/8, 1/2

### Rotary One-touch Fittings **KS**

Applicable tubing: Inch size



- Applicable to use for oscillating and rotating sections in robots.
- Low torque rotation style rotary One-touch fittings.
- Copper-free (Electroless nickel plated)

Series	size	Applicable tubing O.D.	Connection thread
KS	Inch	ø5/32, ø1/4, ø5/16, ø3/8	10-32UNF, 1/8, 1/4, 3/8

## Fittings for General Purposes

### One-touch Fittings Manifold **KM**

Applicable tubing: Metric size



Applicable tubing: Inch size



- Compact manifold piping possible

Series	size	Applicable tubing O.D.	Connection thread
KM	Metric	ø4, ø6, ø8, ø10, ø12	1/8, 1/4, 3/8, 1/2
KM	Inch	ø5/32", ø1/4", ø5/16", ø3/8", ø1/2"	1/4, 3/8

### Insert Fittings **KF**



- Vacuum  $1.3 \times 10^{-2}$  kPa applicable
- Piping can be done without removing nut.
- Fluid temperature: 23 to 302°F (-5 to 150°C) (Brass sleeve) 23 to 140°F (-5 to 60°C) (Resin sleeve)
- Steam can be used.
- Grease-free

Series	Applicable tubing O.D.	Connection thread
KF	ø4, ø6, ø8, ø10, ø12	1/8, 1/4, 3/8, 1/2

### Miniature Fittings **M**



- Compact and non-tool connection
- Compact piping space
- Hose nipple, Hose elbow, Barb

Series	Applicable tubing O.D.	Connection thread
M-□□-2	ø2	M3, M5
M	ø3.2, ø4, ø6	M3, M5, 1/8

### Self-align Fittings **H/DL/L/LL**



- Applicable for use on soft copper steel pipe.
- Flared ridge metal ferrule.

Series	Applicable tubing O.D.	Connection thread
H	ø4, ø6, ø8, ø10, ø12	1/8, 1/4, 3/8, 1/2
DL	ø4, ø6, ø8, ø10, ø12	1/8, 1/4, 3/8, 1/2
L	ø4, ø6, ø8, ø10, ø12	1/8, 1/4, 3/8, 1/2
LL	ø4, ø6, ø8, ø10, ø12	1/8, 1/4, 3/8, 1/2

## Fittings for General Purposes

### Self-seal Fittings **KC**



- One-touch installation and removal.
- Built-in self-seal mechanism.
- Air does not exhaust after removal of tubing.
- Copper-free (Electroless nickel plated)

Series	Applicable tubing O.D.	Connection thread
KC	ø4, ø6, ø8, ø10, ø12	M5 x 0.8, 1/8, 1/4, 3/8, 1/2

### S Couplers **KK/KKH**



- One-touch fitting type standardized. (KK)
- Use of ultra high-impact PBT resin. (KKH)

Series	Applicable tubing O.D.	Connection thread
KK	ø3.2, ø4, ø6, ø8 ø10, ø12, ø16	M5 x 0.8, 1/8, 1/4, 3/8, 1/2, 3/4
KKH	—	1/8, 1/4, 3/8, 1/2

### S Couplers **KK130**



- Cv factor: increased by 34%\*
  - Plug insertion force: reduced by 22% (20 N)\*
  - Lightweight: reduced by 14% (12 g)\*
- \* Compared to the existing model

Series	Applicable tubing O.D.	Connection thread (R, NPT)
KK130	ø6, ø8, ø10, ø12 ø1/4", ø5/16", ø3/8", ø1/2"	1/8, 1/4, 3/8, 1/2

### Multi-connector **DM**



- One-touch installation and removal of multi-tubes.
- Prevents installation mistakes.

Series	No. of connecting tubes	Applicable tubing O.D.
DM	6, 12	ø4, ø6

### Multi-connector with One-touch Fittings **DMK**



- One-touch installation and removal of multi-tubes.
- Prevents installation mistakes.

Series	No. of connecting tubes	Applicable tubing O.D.
DMK	6, 12	ø3.2, ø4

## Fittings for General Purposes

### Rectangular Multi-connector **KDM**

Applicable tubing: Metric size



Applicable tubing: Inch size



- One-touch installation and removal of multi-tubes.
- Prevents installation mistakes.
- Built-in One-touch fittings.

Series	No. of connecting tubes	Size	Applicable tubing O.D.
KDM	10, 20	Metric	ø3.2, ø4, ø6, ø8
KDM	10, 20	Inch	ø1/8, ø5/32, ø1/4, ø5/16

### Rectangular Multi-connector with ø2 One-touch Fittings **KDM6-02-X955-1**



- Multiple pipes can be collectively connected/ disconnected in one-touch operation.
- Secure mounting  
A single panel side opening for full access.

Series	No. of connecting tubes	Size	Tubing O.D.
KDM6-02-X955-1	6	Metric	ø2

### Piping Module **KB**



- Centralized distribution of supply air.
- One-touch fitting installation without the use of tools.
- Air output direction possible through 360°.

Series	Applicable tubing O.D.	Connection thread
KB	ø4, ø6, ø8, ø10, ø12, ø16	1/8, 1/4, 3/8, 1/2

## Fittings for Special Environments

### FR One-touch Fittings **KR-W2**



- For use where weld spatter is generated. /Flame resistant (Equivalent to UL-94 Standard V-0)

Series	Applicable tubing O.D.	Connection thread
KR-W2	ø6, ø8, ø10, ø12	1/8, 1/4, 3/8, 1/2

## Fittings for Special Environments

### FR One-touch Fittings Manifold **KRM**



- For use where weld spatter is generated. /Flame resistant (Equivalent to UL-94 Standard V-0)

Series	Applicable tubing O.D.	Connection thread
KRM	ø6, ø8, ø10, ø12	1/4, 3/8

### Antistatic One-touch Fittings **KA**



- Surface resistance:  $10^4 \Omega$  to  $10^7 \Omega$
- For preventing static electricity
- Body: Conductive resin used for seal parts
- Copper-free (Electroless nickel plated)
- UNI thread

Series	Applicable tubing O.D.	Connection thread
KA	ø3.2, ø4, ø6, ø8, ø10, ø12	M5 x 0.8, M6 x 1.0, standard UNI thread 1/8, 1/4, 3/8, 1/2

### Stainless Steel 316 One-touch Fittings **KQG2**



- Compact and lightweight
  - Fluid temperature: 23 to 302°F (-5 to 150°C)
  - Material: Metal parts stainless steel 316, seal parts special FKM
  - Grease-free/Can be used with steam.
- Certified to meet current Food Sanitation Law standards.

Series	size	Applicable tubing O.D.	Connection thread
KQG2	Metric	ø3.2, ø4, ø6, ø8, ø10, ø12, ø16	M5 R-Rc 1/8, 1/4, 3/8, 1/2
KQG2	Inch	ø1/8", ø5/32", ø1/4", ø5/16", ø3/8", ø1/2"	UNF10-32 NPT1/8, 1/4, 3/8, 1/2

### Stainless One-touch Fittings **KG**



- Possible to use in corrosive conditions.
- Metal parts: Stainless steel 303

Series	Applicable tubing O.D.	Connection thread
KG	ø4, ø6, ø8, ø10, ø12, ø16	M5 x 0.8, M6 x 1.0 1/8, 1/4, 3/8, 1/2

### Stainless Steel 316 One-touch Fittings **KFG2**



- Compact and lightweight
  - Fluid temperature: -85 to 500°F (-65 to 260°C) (Swivel elbow: 23 to 302°F (-5 to 150°C))
  - Material: Stainless steel 316. Rubber material is not used. (Except swivel elbow)
  - Grease-free/Can be used with steam.
- Certified to meet current Food Sanitation Law standards.

Series	size	Applicable tubing O.D.	Connection thread
KFG2	Metric	ø4, ø6, ø8, ø10, ø12, ø16	R-Rc 1/8, 1/4, 3/8, 1/2
KFG2	Inch	ø1/8", ø5/32", ø1/4", ø5/16", ø3/8", ø1/2"	NPT1/8, 1/4, 3/8, 1/2

## Fittings for Special Environments

### Miniature Fittings Stainless Steel 316 MS



- Possible to use in corrosive conditions.
- Compact piping space
- Hose nipple, Hose elbow, Barb

Series	Applicable tubing O.D.	Connection thread
MS	ø3.2, ø4, ø6	M5

### S Couplers Stainless Steel Type KKA



- Body material: Stainless steel 304
- Seal material: Fluoropolymer (Special FKM) is employed.
- Grease-free
- Both plug and socket have an integral check valve.

Series	Connection thread
KKA	1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2

### Clean One-touch Fittings for Blowing KP



- One-touch fittings for clean room blowing systems
- Completely oil-free (Fluoro coated rubber portions)
- Wetted parts are non-metallic.
- Parts washed and assembled in a clean room, packed in a duplicate package.
- Can be used in a vacuum [-14.5 psi (-100 kPa)].

Series	Applicable tubing O.D.	Connection thread
KP	ø4, ø6, ø8, ø10, ø12	1/8, 1/4, 3/8, 1/2

### Clean One-touch Fittings for Driving Air Piping KPQ/KPG

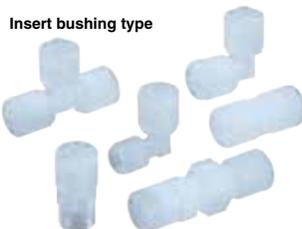


- One-touch fittings suitable for drive air systems in clean room environments
- Resin parts: Polypropylene
- All metal portions: Brass (Electroless nickel plated) KPQ  
Stainless steel (Stainless steel 304) KPG

Series	Applicable tubing O.D.	Connection thread
KPQ	ø4, ø6, ø8, ø10, ø12	M5, 1/8, 1/4, 3/8, 1/2
KPG	ø4, ø6, ø8, ø10, ø12	M5, 1/8, 1/4, 3/8, 1/2

### Fluoropolymer Fittings Hyper Fitting LQ1

Insert bushing type



- Material: New PFA
- 4-layer seal construction
- Reducer enables tube size changeability with no change of body required.

Series	Maximum operating pressure	Operating temperature
LQ1	145 psi (1.0 MPa)	32 to 392°F (0 to 200°C)

## Fittings for Special Environments

### Fluoropolymer Fittings Hyper Fitting LQ3

Flare type



- Material: New PFA
- 3-layer sealed structure
- Excellent and easy installation

Series	Maximum operating pressure	Operating temperature
LQ3	145 psi (1.0 MPa)	Nut material PVDF: 32 to 302°F (0 to 150°C) Nut material PFA: 32 to 392°F (0 to 200°C)

### Fluoropolymer Bore Through Connector LQHB



- Freely choose tube positioning  
As the tube runs through the fitting itself, a setting is available for any optional position.
- Can be used in pressure feed of chemical liquids, etc., during the production process of semiconductors.
- Applicable to chemical liquids such as acid, alkali and deionized water.
- Material: New PFA (Body, nut), PTFE (Collet)

Series	Applicable tubing O.D.		Operating temperature
	Metric size	Inch size	
LQHB	ø3 to ø25	ø1/8" to ø1"	32 to 392°F (0 to 200°C)

### Low Torque Rotary Joint MQR



- Metal seal type
- Air supply to rotary/pivot shafts of turntables and robot arms
- Low rotational torque: 0.002 to 0.37 lbf-ft (0.003 to 0.50 N·m) or less
- Operating temperature: 14 to 176°F (-10 to 80°C)
- Allowable RPM: 200 to 3000 min<sup>-1</sup>(r. p. m)

Series	No. of circuits	Port size	Operating pressure
MQR	1, 2, 4, 8, 12, 16	M5 x 0.8	-14.5 to 145 psi (-100 kPa to 1 MPa)

## Tubing

### Nylon Tubing T



- For general pneumatic tubing
- Max. operating pressure: 435 psi (3.0 MPa) (T0604: at 68°F (20°C))

Series	Tubing O.D.		Color	Fluid
	Metric size	Inch size		
T/TIA	ø4, ø6, ø8, ø10 ø12, ø16	ø1/8", ø3/16", ø1/4" ø3/8", ø1/2"	Black, White, Red, Blue, Yellow, Green	Air, Water

### Soft Nylon Tubing TS



- Max. operating pressure: 145 psi (1.0 MPa (at 68°F (20°C))

Series	Tubing O.D.		Color	Fluid
	Metric size	Inch size		
TS/TISA	ø4, ø6, ø8, ø10 ø12, ø16	ø1/8", ø3/16", ø1/4" ø3/8", ø1/2"	Black, White, Red, Blue, Yellow, Green	Air, Water

# Tubing

## Polyurethane Tubing TU

- Max. operating pressure: 116 psi [0.8 MPa] (at 68°F [20°C])



Series	Tubing O.D.		Color	Fluid
	Metric size	Inch size		
TU/TIUB	ø2, ø4, ø6, ø8 ø10, ø12, ø16	ø1/8", ø3/16", ø1/4" ø3/8", ø1/2"	Black, White, Red, Blue, Yellow, Green, Clear, Orange, and Others Total 29 colors	Air, Water

## Soft Polyurethane Tubing TUS

- Max. operating pressure: 87 psi (0.8 MPa) (at 68°F [20°C])



Series	Tubing O.D.	Color	Fluid
TUS	ø4, ø6, ø8, ø10, ø12	Black, White, Red, Blue, Yellow, Green, Translucent, Yellow brown	Air

## Hard Polyurethane Tubing TUH

- Superior restoring compared to the nylon tubing.



Series	type	Max. operating pressure	Tubing O.D.	Color	Fluid
TUH	Standard type	116 psi (0.8 MPa) (at 68°F (20°C))	ø4, ø6, ø8 ø10, ø12	Black, White, Blue, Translucent	Air
TUH	High pressure type	145 psi (1.0 MPa) (at 68°F (20°C))	ø4, ø6, ø8 ø10, ø12	Black, White, Blue, Translucent	Air

## Wear Resistant Tubing TUZ

- Abrasion: Approx. 1/3 (Compared with SMC polyurethane tubing TU series)



Series	Tubing O.D.		Color	Fluid
	Metric size			
TUZ	ø4, ø6, ø8, ø10, ø12		Black, White, Red, Blue, Yellow, Green	Air

## Polyurethane Coil Tubing TCU

- Flexible
- Max. operating pressure: 116 psi (0.8 MPa) (at 68°F [20°C])
- For moving applications



Note) Colors other than black are available as Made-to-Order specifications.

Series	Tubing O.D.	Color	Number of cores	Fluid
TCU	ø4, ø6, ø8	Black	1, 2, 3	Air

## Tubing

### Polyurethane Flat Tubing **TFU**



- Max. operating pressure: 116 psi (0.8 MPa) (at 68°F [20°C])
- Compact piping

Series	Tubing O.D.	Color	Number of cores	Fluid
TFU	ø4, ø6, ø8	Black	2, 3	Air

### FR Soft Nylon Tubing **TRS**



- Max. operating pressure: 174 psi (1.2 MPa) (at 68°F [20°C])
- Use in spatter generating atmosphere. /Flame resistant (Equivalent to UL-94 Standard V-0)

Series	Tubing O.D.	Color	Fluid
TRS	ø6, ø8, ø10, ø12	Black, White, Red, Blue, Green	Air, Water

### FR Double layer Tubing **TRB**



- Max. operating pressure: 145 psi (1.0 MPa) (at 68°F [20°C])
- Use in spatter generating atmosphere. /Flame resistant (Equivalent to UL-94 Standard V-0)

Series	Tubing O.D.	Color	Fluid
TRB	ø6, ø8, ø10, ø12	Black, White, Red, Blue, Yellow, Green	Air, Water

### FR Double Layer Polyurethane Tubing **TRBU**



- Max. operating pressure: 116 psi (0.8 MPa) (at 68°F [20°C])
- Superior restoring compared to the nylon tubing.

Series	Tubing O.D.	Color	Fluid
TRBU	ø6, ø8, ø10, ø12	Black, White, Red, Blue, Yellow, Green	Air, Water

### Double Layer Tube Stripper **TKS**



- Allows easy stripping of the outer layer from double layer tubes.

Series	Tubing O.D.	Color
TKS	ø6, ø8, ø10, ø12	Orange, Yellow, Blue, Green

## Tubing

### ● FR Three-layer Polyurethane Tubing **TRTU**



- Spatter resistance is improved by installing an aluminum layer between the outer layer and inner tube. (It is twice that of FR double layer polyurethane tubing TRBU series.)
- For general pneumatic and water piping in environments exposed to sparks from arc welding, etc.

Series	Tubing O.D.	Color	Fluid
TRTU	ø6, ø8, ø10, ø12	Black, White, Red, Blue, Yellow, Green	Air, Water

### ● 2-Layer Soft Fluoropolymer Tubing **TQ**



- Carries fluid such as solvent with a soft and abrasion resistant tube.
- 2-layer structure  
Outer layer: Special nylon resin  
Inner layer: Special fluoropolymer
- Internal smoothness: Equivalent to Ra 0.02 μm

Series	Tubing O.D.	Color	Fluid
	Metric size		
TQ	ø4, ø6, ø8, ø10, ø12	Translucent (Material color)	Air, Water, Inert gas, Solvent

### ● Antistatic Soft Nylon Tubing **TAS**



- Max. operating pressure: 174 psi (1.2 MPa) (at 68°F [20°C])
- For preventing static electricity.

Series	Tubing O.D.	Color	Fluid
	Metric size		
TAS	ø3.2, ø4, ø6, ø8, ø10, ø12	Black	Air

### ● Antistatic Polyurethane Tubing **TAU**



- Max. operating pressure: 131 psi (0.9 MPa) (at 68°F [20°C])
- For preventing static electricity.

Series	Tubing O.D.	Color	Fluid
	Metric size		
TAU	ø3.2, ø4, ø6, ø8, ø10, ø12	Black	Air

### ● Fluoropolymer Tubing **TL/TIL**



- Max. operating pressure: 145 psi (1.0 MPa) (at 68°F [20°C])
- Maximum operating temperature: 260°C (This can vary according to operating pressure.)

Series	Tubing O.D.		Color
	Metric size	Inch size	
TL/TIL	ø4, ø6, ø8, ø10 ø12, ø19	ø1/8", ø3/16", ø1/4" ø3/8", ø1/2", ø3/4", ø1"	Translucent

## Tubing

### Fluoropolymer Tubing (PFA) TLM/TILM



- Maximum operating temperature: 500°F (260°C) (This can vary according to operating pressure.)
- Compatible with the Food Sanitation Law
- Complies with FDA (Food and Drug Administration) § 177-1550 dissolution test.

Series	Tubing O.D.		Color
	Metric	Inch	
TLM/TILM	ø2, ø3, ø4, ø6, ø8, ø10 ø12, ø16, ø19, ø25	ø1/8", ø3/16", ø1/4", ø3/8" ø1/2", ø3/4", ø1", ø1 1/4"	Translucent, Black, Red, Blue

### FEP Tubing (Fluoropolymer) TH/THI



- Max. operating pressure 334 psi (2.3 MPa) or less (at 68°F (20°C)\*)
- Compatible with the Food Sanitation Law
- Complies with FDA (Food and Drug Administration) § 177-1550 dissolution test.
- Maximum operating temperature: 392°F [200°C] (This can vary according to operating pressure.)
- \* It varies according to each size.

Series	Tubing O.D.		Color
	Metric size	Inch size	
TH/THI	ø4, ø6, ø8, ø10, ø12	ø1/8", ø3/16", ø1/4", ø3/8", ø1/2", ø3/4"	Translucent, Black, Red, Blue

### Soft Fluoropolymer Tubing TD/TID



- Max. operating pressure: 232 psi (1.6 MPa) (at 68°F (20°C)\*)
- Compatible with the Food Sanitation Law
- Complies with FDA (Food and Drug Administration) § 177-1550 dissolution test.
- Maximum operating temperature: 500°F [260°C] (This can vary according to operating pressure.)
- \* This can vary according to size.

Series	Tubing O.D.		Color
	Metric size	Inch size	
TD/TID	ø4, ø6, ø8, ø10, ø12	ø1/8", ø3/16", ø1/4", ø3/8", ø1/2"	Translucent

### Polyolefin Tubing TPH



- Max. operating pressure (at 68°F [20°C]): 145 psi [1.0 MPa] (ø4, ø6), 102 psi [0.7 MPa] (ø8, ø10, ø12)

Series	Applicable tubing O.D.	Color	Fluid
TPH	ø4, ø6, ø8, ø10, ø12	Black, White, Red, Blue, Yellow, Green	Air, Water, etc.

### Soft Polyolefin Tubing TPS



- Max. operating pressure (at 68°F [20°C]): 102 psi [0.7 MPa] (ø4 to ø12)

Series	Applicable tubing O.D.	Color	Fluid
TPS	ø4, ø6, ø8, ø10, ø12	Black, White, Red, Blue, Yellow, Green	Air, Water, etc.

## Tubing

### Moisture Control Tube **IDK**



- Prevents condensation in piping for small cylinders/air grippers.
- Diffuses water vapor in the piping to the outside.
- All you have to do is install the moisture control tube. Additional power supply and works are not necessary.

Series	O. D. / I. D. (mm)	Effective length (mm)	Applicable fittings
IDK02	2/1.2	100 200	KQ2
IDK04	4/2.5		KQ2
IDK06	6/4		KQ2

## Related Equipment

### Multi-tube Holder **TM**

- Easy arrangement of tubing.



### Multi-holder **TMA**

- Possible to secure an exhaust valve with One-touch fitting and One-touch fittings



### Tube Cutter **TK**



Series	Applicable tubing O.D.	Applicable tubing material
TK-1	13 mm or less	Nylon, Soft nylon, Polyurethane, and other soft plastic tubing
TK-2	18 mm or less	
TK-3	12 mm or less	
TK-6	16 mm or less	

### Tube Releasing Tool **TG**



Series	Applicable tubing size	Applicable tubing material
TG-1	Metric size $\phi 4, \phi 6$	Nylon, Soft nylon, Polyurethane
TG-2	Inch size $\phi 1/8", \phi 1/4"$	Nylon, Soft nylon, Polyurethane

### Tube Stand & Tube Reel **TB/TBR**



- Compact size without taking up space.
- Easy installment just by putting tube reel.

## Speed Controllers



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## Related Equipment



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## Speed Controllers

### Elbow Type/Push-lock Type AS



- Easy to lock with push-lock type
- Larger handle
- Improved tube insertion/removal  
Insertion force: Max. 30% (8 N) reduction  
Removal force: Max. 20% (5 N) reduction\*
- \* Tube pulling out strength is ensured to be equivalent to existing model.
- Electroless nickel plated type is standard.

Type	Series	Port size in the cylinder side	Applicable tubing O.D.	
			Metric size	Inch size
Elbow type	AS12□1F to 42□1F	M5 x 0.8 10-32UNF R, NPT, G 1/8 to 1/2	ø2 to ø16	ø1/8" to ø1/2"
Elbow type Stainless steel type	AS12□1FG to 42□1FG		ø2 to ø16	ø1/8" to ø1/2"
Elbow type Uni thread	AS22□1F to 42□1F	Uni 1/8 to 1/2	ø3.2 to ø16	ø1/8" to ø1/2"

### Speed Controller with Scale AS-FS



- Contributes to the "reduction of man-hours" and "reduction of setting errors" by controlling the flow rate value.  
The value can be controlled with the scale window.
- Larger push-lock type handle
- Adoption of full-contact type stopper improves repeatability of the flow rate
- Improved insertion/removal of tube
- Electroless nickel plated type is standard.

Type	Series	Port size in the cylinder side	Applicable tubing O.D.	
			Metric size	Inch size
Elbow type	AS-FS	M5 x 0.8 10-32UNF 1/8 to 1/2	ø2 to ø16	ø1/8" to 1/2"

### Elbow Type/Universal Type AS



Type	Series	Port size in the cylinder side	Applicable tubing O.D.	
			Metric size	Inch size
Elbow type	AS12□1F to 42□1F	M3 to 1/2	ø2 to ø12	ø1/8" to ø1/2"
Universal type	AS13□1F to 43□1F	M3 to 1/2	ø2 to ø12	ø1/8" to ø1/2"
Fixed orifice type	AS1201F to 22□1F-X250	M3 to 1/4	ø4, ø6	—

### Flame Resistant Elbow Type AS



- Flame resistant (Equivalent to UL94 Standard V-0)

Type	Series	Port size in the cylinder side	Applicable tubing O.D.
Elbow type	AS22□1F-W2 to AS42□1F-W2	1/8 to 1/2	ø6 to ø12

## Speed Controllers

### ● Plug-in Type AS



- Can be mounted directly to the One-touch fitting!
- No need for tools, reducing time required for mounting.

Type	Series	Port size in the cylinder side	Applicable tubing O.D.
Elbow type	AS10□0P to AS30□0P	ø4 to ø10	ø4 to ø10

### ● Elbow Type (Metal Body) AS



- Uses flame resistant resin as standard. (Equivalent to UL94 Standard V-0)

Type	Series	Port size in the cylinder side	Applicable tubing O.D.	
			Metric size	Inch size
Elbow type (Metal body)	AS12□1 to 42□1F	M5 to 1/2	ø4 to ø12	—

### ● In-line Type AS



- 4 types of mounting variations: Direct mounting, L-bracket mounting, DIN rail mounting, Holder mounting
- With index plate
- Lightweight: Reduced by 30% compared with the existing product (AS2002F-04)

Type	Series	Port size in the cylinder side	Applicable tubing O.D.	
			Metric size	Inch size
In-line type	AS1002F to AS4002F	—	ø2 to ø12	ø1/8" to ø1/2"

### ● In-line Panel Mount Type AS



- Panel mount thickness: 35 mm at the maximum

Type	Series	Applicable tubing O.D.	
		Metric size	Inch size
Panel mount type	AS□□□1F-3	ø3.2 to ø12	ø1/8" to ø1/2"
Centralized piping type	AS-DPP00092/00093	ø4, ø6	—

### ● Speed Controller with Uni One-touch Fittings AS



- New thread for piping that reduces the screw-in time by 1/3 thanks to the gasket sealing.
- Compatible with Rc, G, NPT and NPTF.

Type	Series	Port size in the cylinder side	Applicable tubing O.D.	
			Metric size	Inch size
With Uni One-touch fittings	AS□□□1F-U□	1/8 to 1/2	ø3.2 to ø12	ø1/8" to ø1/2"

## Speed Controllers

### ● Dual Speed Controller **ASD**



- Enables bi-directional flow control with a speed controller (Meter-in and meter-out).
- Prevents cylinders from lurching.
- Speed control of single acting cylinders.

Type	Series	Port size in the cylinder side	Applicable tubing O.D.	
			Metric size	Inch size
Dual speed controller	ASD	M5 to 1/2	ø4 to ø12	ø1/8" to ø3/8"

### ● Elbow Type (Metal Body) **AS**



Type	Series	Port size in the cylinder side
Elbow type (Metal body)	AS12□0 to AS42□0	M3 to 1/2

### ● In-line Type **AS**



Type	Series	Port size in the cylinder side
In-line type	AS1000 to 5000	M3 to 1/2

### ● Large Flow In-line Type **AS**



Type	Series	Port size in the cylinder side
Large flow in-line type	AS420 to 900	1/4 to 1/2

### ● In-line Push Locking Type **AS**

- One-touch locking of the needle.



Type	Series	Port size in the cylinder side
In-line push locking type	AS3500	1/4, 3/8

## Speed Controllers

### Speed Controller with Residual Pressure Release Valve AS



- Integrates a speed controller and a residual pressure release valve.
- Residual pressure can be easily released with one push of button.
- Eye-catching red color release button.

Type	Series	Port size in the cylinder side	Applicable tubing O.D.
With One-touch fittings, Elbow/Universal type	AS□□□1FE	1/8 to 1/2	ø4 to ø12
Metal body, In-line type	AS□000E	1/8 to 1/2	—

### Speed Controller Stainless Steel Series AS



- Stainless specifications for use in corrosive environments.
- Stainless steel 303 used for metal parts.

Type	Series	Port size in the cylinder side	Applicable tubing O.D.	
			Metric size	Inch size
With One-touch fittings Elbow/Universal type	AS□□□1FG Elbow/Universal type	M5 to 1/2	ø3.2 to ø12	ø1/8" to ø1/2"
With One-touch fittings In-line type	AS□□□1FG In-line type	M5 to 1/2	ø3.2 to ø12	ø1/8" to ø1/2"
With One-touch fittings Dual speed controller	ASD□□□FG Dual speed controller	M5 to 1/2	ø3.2 to ø12	ø1/8" to ø1/2"

### Clean Speed Controller with One-touch Fittings AS-FPQ/FPG



- Low particle generation type speed controller suitable for use in clean rooms.
- AS-FPQ: Brass (Electroless nickel plated)
- AS-FPG: Stainless steel 304
- AS-FPQ AS-FPG: Resin parts: Polypropylene resin

Series	Port size	Applicable tubing O.D.
AS-FPQ	M5 x 0.8, R1/8, 1/4, 3/8, 1/2	ø4 to ø12
AS-FPG	M5 x 0.8, R1/8, 1/4, 3/8, 1/2	ø4 to ø12

### Speed Controller for Low Speed Control AS



- Ideal for low-speed control (from 10 to 50 mm/sec)
- Number of needle rotations: 10 turns

Type	Series	Port size in the cylinder side	Applicable tubing O.D.	
			Metric size	Inch size
With One-touch fittings Elbow/Universal type	AS□□□1FM	M5 to 1/4	ø3.2 to ø10	ø1/8" to ø3/8"
With One-touch fittings In-line type	AS□001FM	—	ø3.2 to ø10	ø1/8" to ø3/8"
With One-touch fittings Dual speed controller	ASD□30FM	M5 to 1/4	ø3.2 to ø10	ø1/8" to ø3/8"
Standard type (Metal body)	AS□□□0M	M5 to 1/4	ø3.2 to ø10	ø1/8" to ø3/8"

## Speed Controllers

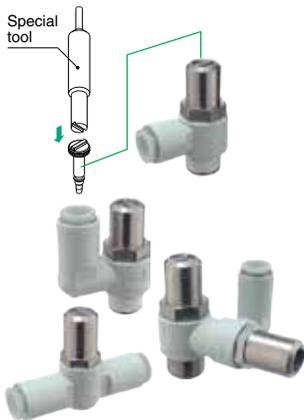
### Speed Controller Adjustable by Flat Head Screwdriver AS



- Flow adjustable by flat head screwdriver.
- Prevention of an unnecessary manual operation.

Type	Series	Port size in the cylinder side	Applicable tubing O.D.	
			Metric size	Inch size
With One-touch fittings Elbow/Universal type	AS□□□1F-D	M5 to 1/2	ø3.2 to ø12	ø1/8" to ø1/2"
With One-touch fittings In-line type	AS□□□1F-D	—	ø3.2 to ø12	ø1/8" to ø1/2"
With One-touch fittings Dual speed controller	ASD□□□F-D	M5 to 1/2	ø3.2 to ø12	ø1/8" to ø1/2"
Metal body	AS□2□0-D	M5 to 1/2	ø3.2 to ø12	ø1/8" to ø1/2"

### Tamper Proof Speed Controller AS



- Able to adjust flow by a special tool.
- Prevention of an unnecessary manual operation.

Type	Series	Port size in the cylinder side	Applicable tubing O.D.	
			Metric size	Inch size
With One-touch fittings Elbow/Universal type	AS□□□1F-T	M5 to 1/2	ø3.2 to ø12	ø1/8" to ø1/2"
With One-touch fittings In-line type	AS□□□1F-T	—	ø3.2 to ø12	ø1/8" to ø1/2"
With One-touch fittings Dual speed controller	ASD□□□F-T	M5 to 1/2	ø3.2 to ø12	ø1/8" to ø1/2"
Metal body	AS□2□0-T	M5 to 1/2	ø3.2 to ø12	ø1/8" to ø1/2"

### Speed Controller with Pilot Check Valve ASP



- Pilot check valve and speed controller are combined.
- Realizes momentary intermediate stoppage of a cylinder and is able to adjust its speed control.

Type	Series	Port size in the cylinder side	Applicable tubing O.D.	
			Metric size	Inch size
Speed controller with pilot check valve	ASP	1/8 to 1/2	ø6 to ø12	ø1/4" to ø1/2"

## Related Equipment

### Metering Valve with Silencer ASN2



- Superior sound reducing performance (Over 20 dB at max. flow rate)
- Can be directly mounted on the exhaust port of the solenoid valve.

Type	Series	Port size
Metering valve with silencer	ASN2	M5 to 1/2

## Related Equipment

### Quick Exhaust Valve **AQ**



- A wide selection of models.

Type	Series	Port size	Applicable tubing O.D.
Lip	AQ1500/AQ1510	M5, 1/8	—
Diaphragm	AQ2000 to AQ5000	1/8 to 3/4	—
Built-in One-touch fittings	AQ240F/AQ340F	—	ø4 to ø6, ø1/4"

### Speed Exhaust Controller **ASV**



- Integrates a quick exhaust valve and an exhaust throttle valve.
- Supports the high speed operation of cylinders.

Type	Series	Port size
Speed exhaust controller	ASV120F/220F	M3, M5
Speed exhaust controller	ASV310F/410F/510F	1/8 to 1/2

### Check Valve **AK**



Type	Series	Port size	Applicable tubing O.D.	
			Metric size	Inch size
In-line type	AK2000/AK4000 AK6000	1/8 to 1	—	—
Straight type	AKH	—	ø4 to ø12	ø5/32" to ø1/2"
Male connector type	AKH	M5 to 1/2	ø4 to ø12	ø5/32" to ø1/2"
Bushing type	AKB	1/8 to 1/2	—	—
Made to Order for air/water	<ul style="list-style-type: none"> <li>• Body material: Brass, Stainless steel</li> <li>• Rubber material: NBR, FKM, CR</li> <li>• High temperature, low temperature</li> <li>• Low cracking</li> </ul>	1/8 to 1/2	—	—

### 5.0 MPa Check Valve **VCHC40**



- Improve durability in high-pressure environments by using a polyurethane elastomer poppet.

Type	Series	Port size	Operating pressure
5.0 MPa	VCHC40	3/4, 1	7.3 to 73 psi (0.05 to 5.0 MPa)

### Extension Prevention System **ASS**



- Prevents accidents caused by sudden cylinder rod extensions.

Type	Series	Port size
Meter-out control	ASS100 to ASS600	1/8 to 1
Meter-in control	ASS110 to ASS310	1/8 to 3/8

## Related Equipment

### ● Air Saving Valve **ASR/ASQ**



- 40% reduction in air consumption.
- Cuts air consumption by operating the return stroke at a reduced pressure.

Type	Series	Port size	Applicable tubing O.D.
Pressure valve	ASR	1/4 to 1/2	ø6 to ø12
Flow valve	ASQ	1/4 to 1/2	ø6 to ø12

### ● Residual Pressure Release Valve with One-touch Fittings **KE□**



- Residual pressure in the cylinder can be easily released with one push of button.

Type	Series	Applicable tubing O.D.
With One-touch fittings without a push button guard	KEA	ø6 to ø12
With One-touch fittings with a push button guard	KEB	ø6 to ø12
Rc thread with a push button guard	KEC	Connection thread: Rc1/4, 3/8

### ● Holder for Speed Controller **TMH**



- A holder for securing a speed controller (In-line type) with One-touch fittings.
- Universal mounting.

Type	Series
Holder	TMH

## Silencers/Exhaust Cleaners



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Exhaust Cleaner for Vacuum/ <b>AMV</b> .....	P.114
Exhaust Cleaner for Clean Room/ <b>AMP</b> .....	P.114
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## Blow Guns



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## Pressure Gauges



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# Silencers/Exhaust Cleaners

## Silencers AN



Series	Features
AN05 to 40	<ul style="list-style-type: none"> <li>• Compact/lightweight</li> <li>• Noise reduction: 30 dB (A)</li> </ul>
AN10 to 30-C	<ul style="list-style-type: none"> <li>• Can connect with One-touch fitting directly.</li> <li>• Noise reduction: 30 dB (A)</li> </ul>

## Silencers AN



Series	Features
AN□00	<ul style="list-style-type: none"> <li>• Metal body type</li> <li>• Noise reduction: 30 dB (A)</li> </ul>
25□□	<ul style="list-style-type: none"> <li>• Metal case type</li> <li>• Noise reduction: 19 dB (A)</li> </ul>
AN	<ul style="list-style-type: none"> <li>• BC sintered body</li> <li>• Noise reduction: 13, 16, 18, 21 dB (A)</li> </ul>
AN□02 AN□1	<ul style="list-style-type: none"> <li>• High noise reduction type</li> <li>• Noise reduction: 35, 38, 40 dB (A)</li> </ul>

## 5.0 MPa Silencer VCHN



- Reduces clogging with the double-layer structure.
- Noise reduction: 35 dB (A)

## Exhaust Cleaner AMC



- Noise reduction: 35 dB (A)
- Over 99.9% oil mist removal.

## Exhaust Cleaner for Vacuum AMV



- Captures 99.5% of greasy fumes exhausted from the vacuum pump.
- Realizes a comfortable working environment without greasy fumes.
- Captures and cuts off 99.5% of even low-flow and highly concentrated greasy fumes.
- Exhaust ducts from a vacuum pump is not necessary.

## Exhaust Cleaner for Clean Room AMP



- An exhaust cleaner that can be used inside a clean room

Series	Nominal filtration rating (μm)	Maximum flow capacity scfm [L/min (ANR)]	Port size
AMP	0.01 (Collection efficiency: 95%)	7.06 to 35.3 [200 to 1000]	1/4, 3/8, 1/2, 3/4

## Clean Exhaust Filter SFE



- This filter enables direct exhaust of air in a clean room! (Cleanliness class 4: ISO14644-1)
- Air can be directly exhausted in a clean room only by mounting this product to the pneumatic equipment in the clean room.
- No need for piping for exhaust air and relief air. Reduces piping installation work and space.
- Noise reduction: 30 dB (A) or more

Series	Nominal filtration rating (μm)	Maximum flow capacity scfm [L/min (ANR)]	Port size
SFE	0.01 (Filtration efficiency 99.99%)	0.11, 1.06, 2.30, 4.59, 7.06 [3, 30, 65, 130, 200]	M5 x 0.8, R1/8, R1/4 ø4, ø6, ø8, ø10

## Blow Guns

### Blow Gun VMG



- Reduction of 2,000 m<sup>3</sup> per annum is possible. (Energy saving)
- Pressure loss 1% or less (Nozzle diameter:  $\phi 2.5$ )
- Applicable nozzle  
Nozzle with male thread, high efficient nozzle with male thread, low noise nozzle with male thread, long steel pipe nozzle.

Series	Port size	Operating pressure range	Effective area (mm <sup>2</sup> )	Nozzle port size
VMG	Rc, NPT, G 1/4, 3/8	0 to 145 psi (0 to 1.0 MPa)	30	Rc1/4

### Nozzles for Blowing KN



Series	Type	Nozzle size
KN	Nozzle with male thread	$\phi 1$ to $\phi 8$
	High efficiency nozzle	$\phi 1$ to $\phi 2$
	Low noise nozzle with male thread	$\phi 0.75 \times 4$ to $\phi 1.1 \times 8$
	Copper extension nozzle	$\phi 1.5$ to $\phi 3$
	Pivoting nozzle	$\phi 4$ , $\phi 6$
	Nozzle with self-align fitting	$\phi 1$ to $\phi 6$
	Nozzle for One-touch fitting	$\phi 1$ to $\phi 3$

## Pressure Gauges

### Pressure Gauge for General Purposes G□



- Available with a limit indicator and color zones.

Series	Size (O.D.)	Connection thread
G15	$\phi 15$	R1/8, M5 (Female thread)
G27	$\phi 27$	R1/8, 1/16
G36	$\phi 37.5$	R1/8, M5 (Female thread)
GA36	$\phi 37.5$	R1/8
G46	$\phi 42.5$	R1/8, 1/4, M5 (Female thread)
GA46	$\phi 42.5$	R1/8, 1/4
G33	$\phi 30$	R1/8
GA33	$\phi 30$	R1/8
G43	$\phi 43$	R1/8, 1/4
G36-L	$\phi 37.5$	R1/8
G46-L	$\phi 42.5$	R1/8, 1/4

### Oil-free/External Parts Copper-free Pressure Gauge G46E



- Oil-free, external parts copper-free
- With limit indicator

Series	Size (O.D.)	Connection thread
G46E	42.5	R1/8, 1/4

# Pressure Gauges

## ● Pressure Gauge for Clean Series (Series 10-) **G49**



- For clean series (Series 10-).

Series	Size (O.D.)	Connection thread
G49	ø44	R1/4

## ● Pressure Gauge for Clean Regulator **G46-□-□-SRA, B**



- For clean regulators
- With limit indicator

Series	Size (O.D.)	Connection thread
G46-□-□-SRA, B	ø42.5	R1/8, 1/4

## ● Pressure Gauge with Switch **GP46**



- A pressure switch function has been added to the gauge.

Series	Size (O.D.)	Connection thread
GP46	ø42.5	R1/8, 1/4

## ● Pressure Gauge for Vacuum **GZ46**



- Pressure gauge for vacuum
- Pressure range: -14.5 to 29 psi (-100 to 200 kPa)

Series	Size (O.D.)	Connection thread
GZ46	ø42.5	R1/8, 1/4

## ● Digital Pressure Sensor **GS40**



- A pressure switch function added to the gauge with digital display.

Series	Set pressure
GS40	0 to 142 psi (0 to 0.98 MPa)

## ● Compact Manometer **PPA**



- Pressure measurements can easily be taken any time, anywhere.

Series	Set pressure	Applicable tubing size	Type
PPA100	-14.5 to 145 psi (-0.1 to 1 MPa)	ø4, ø6	For high pressure
PPA101	-14.6 to 1.45 psi (-101 to 10 kPa)	ø4, ø6	For vacuum
PPA102	-1.45 to 14.5 psi (-10 to 100 kPa)	ø4, ø6	For low pressure

# Switches/Sensors/Static Electricity Elimination Equipment

## Electronic Pressure Switches/Sensors (Sensor/Amplifier Integrated Type)



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## Electronic Pressure Switches/Sensors (Sensor/Amplifier Remote Type)



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## Mechanical Pressure Switches



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## Electronic Flow Switches



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## Mechanical Flow Switches



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## Static Electricity Elimination Equipment



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# Electronic Pressure Switch/Sensors (Sensor/Amplifier Integrated Type)

## 2-Color Display High-Precision Digital Pressure Switch ZSE30A (F) /ISE30A



- With one-touch fitting (Straight, Elbow)
- Space-saving, capable of vertical and horizontal contact mounting
- With display calibration function
- Simultaneous copying is possible for maximum 10 units.

Series	Type	Rated pressure range
ZSE30AF	Compound pressure	-14.5 to 14.5 psi (-100.0 to 100.0 kPa)
ZSE30A	Vacuum pressure	0 to -14.6 psi (0.0 to -101.0 kPa)
ISE30A	Positive pressure	-0.00145 to 145 psi (-0.100 to 1.000 MPa)

## 2-Color Display High-Precision Digital Pressure Switch ZSE40A (F) /ISE40A



- IP65
- Applicable fluid: Air, Non-corrosive gas, Non-flammable gas
- Simultaneous copying is possible for maximum 10 units.
- 3-step setting
- With One-touch fitting

Series	Type	Rated pressure range
ZSE40AF	Compound pressure	-14.5 to 14.5 psi (-100.0 to 100.0 kPa)
ZSE40A	Vacuum pressure	0 to 14.7 psi (0.0 to -101.3 kPa)
ISE40A	Positive pressure	-0.00145 to 145 psi (-0.100 to 1.000 MPa)

## Compact Digital Pressure Switch ZSE10 (F) /ISE10



- Low profile 9.8 mm
- Vertical mounting space reduced to approx. 1/2 (Compared to ZSE/ISE30A series)
- Simultaneous copying is possible for maximum 10 units.
- 3-step setting

Series	Type	Rated pressure range
ZSE10F	Compound pressure	-14.5 to 14.5 psi (-100.0 to 100.0 kPa)
ZSE10	Vacuum pressure	0 to -14.6 psi (0.0 to -101.0 kPa)
ISE10	Positive pressure	-0.00145 to 145 psi (-0.100 to 1.000 MPa)

## 2-Color Display Digital Pressure Switch ISE70/75 (H)



- Metal body type (Aluminum die-casted)
- IP67
- With M12 connector

Series	Type	Rated pressure range
ISE70	Positive pressure (For air)	0 to 145 psi (0 to 1 MPa)
ISE75	Positive pressure (For general purpose fluids)	0 to 1450 psi (0 to 10 MPa)
ISE75H	Positive pressure (For general purpose fluids)	0 to 2175 psi (0 to 15 MPa)

## 2-Color Display Digital Pressure Switch ZSE/ISE80



- Suitable for a wide variety of fluids with stainless diaphragm
- IP65
- RoHS compatible
- Low leakage. VCR®, Swagelok® compatible fittings can be selected.
- Back piping, underside piping

Series	Type	Rated pressure range
ZSE80F	Compound pressure	-14.5 to 14.5 psi (-100.0 to 100.0 kPa)
ZSE80	Vacuum pressure	0 to -14.6 psi (0.0 to -101.0 kPa)
ISE80	Positive pressure	-0.00145 to 145 psi (-0.100 to 1.000 MPa)
ISE80H	Positive pressure	-0.00145 to 290 psi (-0.100 to 2.000 MPa)

## Electronic Pressure Switch/Sensors (Sensor/Amplifier Integrated Type)

### LCD Readout Digital Pressure Switch ZSE/ISE3



- Built-in failure prediction output function.
- Can be integrated with a vacuum unit, Series ZX.
- Suction filter comes as standard.

Series	Type	Set pressure range
ZSE3	Vacuum pressure	0 to -14.6 psi (0 to -101 kPa)
ISE3L	Positive pressure	0 to 14.2 psi (0 to 98 kPa)
ISE3	Positive pressure	0 to 142 psi (0 to 0.98 MPa)

### Compact Pressure Switch ZSE/ISE1



- Can be integrated with ZM ejector system.

Series	Type	Set pressure range
ZSE1	Vacuum pressure	0 to -14.6 (0 to -101 kPa)
ISE1L	Positive pressure	0 to 14.5 psi (0 to 100 kPa)
ISE1	Positive pressure	0 to 145 psi (0 to 1 MPa)

### Compact Pressure Switch ZSE/ISE2



- Can be integrated with ZX or ZR ejector system.
- Suction filter comes as standard.

Series	Type	Set pressure range
ZSE2	Vacuum pressure	0 to -14.6 (0 to -101 kPa)
ISE2L	Positive pressure	0 to 14.5 psi (0 to 100 kPa)
ISE2	Positive pressure	0 to 145 psi (0 to 1 MPa)

### Adsorption Confirmation Switch ZSP1



- Can be integrated with ZX ejector system.
- Suction filter comes as standard.

Series	Type	Set pressure range
ZSP1	Vacuum pressure	-2.9 to -14.6 psi (-20 to -101 kPa)

### Air Checker: Electronic Pressure Switch PS1000/1100/1200



- Plug-in port for One-touch fittings.
- With LED light.

Series	Type	Set pressure range
PS1000	Positive pressure	-0.145 to 0.065 psi (-0.1 to 0.45 MPa)
PS1100	For vacuum/residual pressure	-0.145 to 0.058 psi (-0.1 to 0.4 MPa)
PS1200	For vacuum	-1.45 to 0 psi (-100 to 0 kPa)

## Electronic Pressure Switch/Sensors (Sensor/Amplifier Integrated Type)

### 3-Color Display Digital Gap Checker **ISA3**



- Check at a glance if the workpiece is placed or not.
- The clearance distance between the detection surface and the workpiece can be found intuitively.
- Simple Setting: Setting is possible while checking the displayed value
- Energy Saving: Air consumption 60% reduction
- Improved drainage resistance: 10 times or more

Series	Rated distance range	Piping specification Supply side	Piping specification Detection side
ISA3-G	0.02 to 0.15 mm	Rc, G 1/8	ø6 One-touch fitting, G 1/8
ISA3-H	0.05 to 0.30 mm	Rc, G 1/8	ø6 One-touch fitting, G 1/8

### Non-Contact Sensor for Workpiece Placement Confirmation/Air Catch Sensor **ISA2**



- Gap detection
- Can be configured with a regulator and 2 port solenoid valve.
- With LED level meter
- Plug connector. Easy to add and remove manifold stations.

Series	Detection range	Recommended nozzle dia.
ISA2	0.01 to 0.25 mm	ø1.5
ISA2	0.03 to 0.50 mm	ø2.0

### Digital Pressure Switch (Built-in Regulator Type) **ISE35**



- Modular type mountable
- Series ARM10/11 mountable
- Selectable pressure unit
- With anti-chattering function
- Power-saving mode

Series	Type	Recommended nozzle dia.
ISE35	Positive pressure	-14.5 to 145 psi (-0.1 to 1 MPa)

## Electronic Pressure Switches/Sensors (Sensor/Amplifier Remote Type)

### Compact Pneumatic Pressure Sensor **PSE53** □



- Connector
- Analog output (voltage)

Series	Type	Rated pressure range
PSE531	Vacuum pressure	0 to -14.6 psi (0 to -101 kPa)
PSE533	Compound pressure	-14.6 to 146 (-101 to 101 kPa)
PSE532	Positive pressure	0 to 146 psi (0 to 101 kPa)
PSE530	Positive pressure	0 to 145 psi (0 to 1 MPa)

### Compact Pneumatic Pressure Sensor **PSE54** □



- Analog output (voltage)

Series	Type	Rated pressure range
PSE541	Vacuum pressure	0 to -14.6 psi (0 to -101 kPa)
PSE543	Compound pressure	-145 to 14.5 (-100 to 100 kPa)
PSE540	Positive pressure	0 to 145 psi (0 to 1 MPa)

## Electronic Pressure Switch/Sensors (Sensor/Amplifier Remote Type)

### Low Differential Pressure Sensor PSE55



- Suitable for applications such as air current volume maintenance, filter blockage, and liquid surface detection
- Analog output (voltage/current)

Series	Type	Set pressure range
PSE550	Vacuum pressure	0 to 0.29 psi (0 to 2 kPa)

### Pressure Sensor for General Fluids PSE56



- Wetted parts: Stainless steel 316L
- IP65
- Suitable for a wide variety of fluids
- Analog output (voltage/current)
- Low leakage. VCR®, Swagelok® compatible fittings can be selected.

Series	Type	Rated pressure range
PSE561	Vacuum pressure	0 to -14.6 psi (0 to -101 kPa)
PSE563	Compound pressure	-14.5 to 14.5 psi (-100 to 100 kPa)
PSE564	Positive pressure	0 to 72.5 psi (0 to 500 kPa)
PSE560	Positive pressure	0 to 145 psi (0 to 1 MPa)

### Multi-Channel Digital Pressure Sensor Controller PSE200



- Four sensors can be connected.
- Applicable sensors: PSE53, 54, 56
- Capable of controlling various different applications from one controller
- 4 inputs, 5 outputs

Series	Set pressure range
PSE200	-14.6 to 14.6 psi (-101 to 101 kPa)
	1.45 to -14.6 psi (10 to -101 kPa)
	-1.45 to 14.6 psi (-10 to 101 kPa)
	-14.5 to 145 psi (-0.1 to 1 MPa)

### 2-Color Display Digital Pressure Sensor Controller PSE300



- Applicable sensors: PSE53, 54, 550, 56
- Compatible with voltage input and current input
- Response time: 1 ms
- Space-saving, capable of vertical and horizontal contact mounting
- Panel mounting, Bracket mounting, DIN rail mounting

Series	Set pressure range
PSE300	-14.6 to 14.6 psi (-101 to 101 kPa)
	1.45 to -14.6 psi (10 to -101 kPa)
	-1.45 to 14.6 psi (-10 to 101 kPa)
	-14.5 to 145 psi (-0.1 to 1 MPa)
	-7.25 to 72.5 psi (-50 to 500 kPa)
	-0.029 to 0.29 psi (-0.2 to 2 kPa)

## Mechanical Pressure Switches

### Pressure Switch/Reed Switch Type IS10



- 16% lighter, 11% smaller (Compared with IS1000)
- Service life: 5 million cycles
- Can be connected to modular type F.R.L. units.

Series	Type	Set pressure range
IS10	Positive pressure	14.5 to 58 psi (0.1 to 0.4 MPa) 14.5 to 87 psi (0.1 to 0.6 MPa)

### Pressure Switch/Micro Switch Type IS3000



- Can be used for micro load, around 10 mA e.g.
- With neon light.

Series	Type	Set pressure range
IS3000	Positive pressure	14.5 to 102 psi (0.1 to 0.7 MPa)

### General Purpose Pressure Switch/Snap Switch Type ISG



- For general fluids.
- Equivalent to IP44.
- With neon light.

Series	Type	Set pressure range
ISG11□, 21□	Positive pressure	2.9 to 44 psi (0.02 to 0.3 MPa)
ISG12□, 22□	Positive pressure	7.3 to 102 psi (0.05 to 0.7 MPa)
ISG13□, 23□	Positive pressure	14.5 to 145 psi (0.1 to 1.0 MPa)
IS2761	Positive pressure	14.5 to 145 psi (0.1 to 1.0 MPa)
ISG19□, 29□	Vacuum pressure	-1.45 to -14.5 psi (-10 to -100 kPa)

### Vacuum Switch/Reed Switch Type ZSM1



- Can be integrated with ZM ejector system.

Series	Type	Set pressure range
ZSM1	Vacuum pressure	-3.9 to -11.6 psi (-27 to -80 kPa)

## Electronic Flow Switches

### 2-Color Display Digital Flow Switch PFM



- Air, N<sub>2</sub>, Ar, CO<sub>2</sub>
- Grease-free
- Integrated flow adjustment valve
- Compact, lightweight, space-saving

Series	Rated flow range
PFM	0.01 to 0.35 scfm [0.2 to 10 L/min] (0.01 to 0.18 scfm (0.2 to 5 L/min)) 0.02 to 0.88 scfm [0.5 to 25 L/min] (0.02 to 0.44 scfm (0.5 to 12.5 L/min)) 0.04 to 1.77 scfm [1 to 50 L/min] (0.04 to 0.88 scfm (1 to 25 L/min)) 0.07 to 3.53 scfm [2 to 100 L/min] (0.07 to 1.77 scfm (2 to 50 L/min)) ( ) : For CO <sub>2</sub>

## Electronic Flow Switches

### 2-Color Display Digital Flow Switch **PFMB**



- Air, N<sub>2</sub>
- Grease-free
- Integrated flow adjustment valve
- Compact and space-saving

Series	Rated flow range scfm (L/min)
PFMB	0.07 to 7.06 (2 to 200)
	0.18 to 17.7 (5 to 500)
	0.35 to 35.3 (10 to 1000)

### Flow Sensor **PFMV**



- Adsorption confirmation of minute workpieces
- Repeatability:  $\pm 2\%$  F.S. or less
- Response speed: 5 ms or less, withstand pressure: 72.5 psi (500 kPa)
- Grease-free, RoHS compatible
- Covers total range with one voltage monitor
- Related equipment: Suction filter series ZFC050

Series	Rated flow range scfm (L/min)
PFMV	0 to 0.02 (0 to 0.5)
	0 to 0.04 (0 to 1)
	0 to .11 (0 to 3)
	-0.02 to 0.02 (-0.5 to 0.5)
	-0.04 to 0.04 (-1 to 1)
	-0.11 to 0.11 (-3 to 3)

### Digital Flow Switch for Air **PF2A**



- Integrated type and separate monitor type are available.
- Switch output, accumulated pulse output, analog output
- Capable of switching back and forth between cumulative and instantaneous flow
- IP65

Series	Rated flow range scfm (L/min)
PF2A	0.04 to 0.35 (1 to 10)
	0.18 to 1.77 (5 to 50)
	0.35 to 3.53 (10 to 100)
	0.71 to 7.06 (20 to 200)
	1.77 to 17.7 (50 to 500)
	5.30 to 106 (150 to 3000)
	10.6 to 212 (300 to 6000)
	21.2 to 424 (600 to 12000)

### 3-Color Display Digital Flow Switch for Water **PF3W**



- 3-color/2-screen display
- Integrated temperature sensor
- 40% smaller than existing product
- IP65 compliant, non-grease type
- Fluid temperature: 32 to 194°F (0 to 90°C)
- PVC piping type: Applicable to deionized water and chemical liquids, etc

Series	Rated flow range scfm (L/min)
PF3W	0.02 to 0.14 (0.5 to 4)
	0.07 to 0.56 (2 to 16)
	0.18 to 1.14 (5 to 40)
	0.35 to 3.53 (10 to 100)
	1.77 to 8.83 (50 to 250)

## Electronic Flow Switches

### 3-Color Display Digital Flow Switch for PVC Piping **PF3W**



- Applicable fluid: Deionized water and chemical liquids, etc
- 3-color/2-screen display
- IP65 compliant, non-grease type
- Fluid temperature: 32 to 158°F (0 to 70°C)
- PVC pipe O.D.: 25A, 30A

Series	Rated flow range gal/min (L/min)
PF3W	2.64 to 26.4 (10 to 100)
	7.93 to 66.0 (30 to 250)

### 3-Color Display Digital Flow Switch **LFE□**



- Compact and lightweight  
56 mm x 40 mm x 90 mm (H x W x D)  
Weight: 340 g (In the case of LFE1□3)
- Backflow can be detected
- Fluid temperature: 32 to 185°F (0 to 85°C)
- Current consumption: 45 mA
- Applicable fluid: Water, water-soluble coolants

Series	Rated flow range gal/min (L/min)
LFE□	0.13 to 5.28 (0.5 to 20)
	0.66 to 26.4 (2.5 to 100)
	1.32 to 52.8 (5 to 200)

### Digital Flow Switch for Water **PF2W**

Integrated Type



Separate Type



Monitor



Sensor

- Integrated type and separate monitor type are available.
- Switch output, accumulated pulse output, analog output
- Capable of switching back and forth between cumulative and instantaneous flow
- Compatible to high temperatures up to 90°C
- IP65

Series	Rated flow range gal/min (L/min)
PF2W	0.13 to 1.06 (0.5 to 4)
	0.53 to 4.23 (2 to 16)
	1.32 to 10.6 (5 to 40)
	2.64 to 26.4 (10 to 100)

### Digital Flow Switch for Deionized Water and Chemical Liquids **PF2D**



- Body sensor: New PFA, tube: Super PFA
- Low-particle generation, excellent flow-through characteristics

Series	Rated flow range gal/min (L/min)
PF2D	0.10 to 1.06 (0.4 to 4)
	0.48 to 5.28 (1.8 to 20)
	1.06 to 10.6 (4.0 to 40)

## Electronic Flow Switches

### 4-Channel Flow Monitor PF2□200



- One controller can handle four units' worth of flow volume maintenance.
- Four different flow ranges can be connected to one controller.

Series	Applicable sensor	Set flow range gal/min (L/min)
PF2A200/201	For air PF2A5	0.13 to 2.77 (0.5 to 10.5)
		0.66 to 13.9 (2.5 to 52.5)
		1.32 to 27.7 (5 to 105)
		2.64 to 55.5 (10 to 210)
		6.60 to 139 (25 to 525)
PF2D200/201	For pure water/chemical liquids PF2D5	0.07 to 1.19 (0.25 to 4.50)
		0.34 to 5.55 (1.3 to 21.0)
		0.66 to 11.9 (2.5 to 45.0)

## Mechanical Flow Switches

### Flow Switch/Diaphragm Style IFW5



- Used as a general relaying device when water stoppage or water volume reduction occurs during the use of a cooling water system, etc.
- With neon light.

Series	Rated flow range gal/min (L/min)
IFW5	0.26 to 2.64 (1 to 10)
	2.64 to 5.28 (10 to 20)
	5.28 to 13.2 (20 to 50)

### Flow Switch/Paddle Style IF3



- Used as a general relaying device when water stoppage or water volume reduction occurs during the use of a cooling water system, etc.
- Piping sizes ranges from 3/4B to 6B.
- Equivalent to IP42 and IP44.

Series	Rated flow range gal/min (L/min)
IF3	3.70 to 15.9 (14 to 60)
	5.28 to 396 (20 to 1500)
	9.51 to 687 (36 to 2600)

# Static Electricity Elimination Equipment

## Ionizer/Bar Type IZS40/41/42



- Potential amplitude is reduced with Dual AC type. 25 V or less (at the installation height of 300 mm)
- Rapid elimination of static electricity by a feedback sensor.
- Reduction of adjustment and maintenance labor by auto balance sensor.
- Simple operation: Can be controlled by powering the ionizer ON. (Standard type)
- Setting ionizer with remote controller.
- Transition wiring may be used.
- High speed static electricity elimination cartridges and energy saving static electricity elimination cartridges are available.

Series	Type	Ion generation method	Ion balance
IZS42	Dual AC type	Corona discharge type	±30 V
IZS41	Feedback sensor type	Corona discharge type	±30 V
IZS40	Standard type	Corona discharge type	±30 V

## Ionizer IZS31



- Static electricity elimination time: 0.3 sec
- Sensors can be selected from 3 types.
- Rapid elimination of static electricity by a feedback sensor.
- Ion balance control by an auto balance sensor.
- High precision type: Accurately controls the ion balance of the work position.
- Body attachment type: Can be used while attached to the ionizer body by detecting the earth return current.
- The electrode cartridge can be selected according to the application.
- The high-speed static electricity elimination type focuses on the speed of static electricity elimination.
- Low maintenance type which improves the maintenance cycle.

Series	Ion generation method	Ion balance
IZS31	Corona discharge type	±30 V (Stainless steel electrode needle : ±100 V)

## Ionizer/Nozzle Type IZN10



- Nozzle type: Dust removal and static electricity elimination by air blow
- Spot type static electricity elimination
- Slim design: Thickness dimension 16 mm
- RoHS compliant
- Nozzle type can be selected according to applications.
- Energy saving static electricity elimination nozzle (Short range static electricity elimination, design focuses on ion balance)
- High flow static electricity elimination nozzle (Long range static electricity elimination and dust removal)

Series	Ion generation method	Ion balance
IZN10	Corona discharge type	Energy saving static electricity elimination nozzle: ±10V or less High flow static electricity elimination nozzle: ±15V or less

## Ionizer/Nozzle Type: Made to Order Products



Series	Description	Features
IZE110-X238	Intermittent control timer	A digital timer that can control ON/OFF switches of valves etc.
IZN10-G-□-X216	Bar nozzle for ionizer (straight type)	Enables same usage as bar type ionizers.
IZN10-G-X198, X199	Diffusion nozzle for nozzle type Ionizer	Nozzle options for air purge and diffusion according to applications

## Static Electronic Elimination Equipment

### ● Ionizer/Fan Type IZF10



- Compact design: 80 mm x 110 mm x 39 mm
- Weight: 280 g
- Static electricity elimination time: 1.5 seconds
- With alarm function
- High-voltage error, electrode needle contamination detector

Series	Ion generation method	Ion balance
IZF10	Corona discharge type (DC)	±13 V

### ● Electrostatic Sensor IZD10



- Detects electrostatic potential of the workpiece, and is capable of switch output, analog output or output of current.

Series	Measurement potential	Output voltage	Effective detection distance
IZD10-110	±0.4 kV (At detection distance 25 mm)	1 to 5 V (Output impedance: Approx. 100 Ω)	10 to 50 mm
IZD10-510	±20 kV (At detection distance 50 mm)	1 to 5 V (Output impedance: Approx. 100 Ω)	25 to 75 mm

### ● Electrostatic Sensor IZE11



- Detects electrostatic potential of the workpiece, and is capable of switch output, analog output or output of current.

Series	Rated measurement range	Minimum unit setting	Output
IZE11	-0.4 kV to +0.4 kV -20 kV to +20 kV	0.001 kV (at ±0.4 kV) 0.1 kV (at ±20 kV)	Switch output x 2 + Analog output (1 to 5 V, 4 to 20 mA)

### ● Handheld Electrostatic Meter IZH10



- Easy-to-use handheld electrostatic meter

Series	Rated charge amount range	Minimum display unit
IZH10	±20.0 kV	0.1 kV (±1.0 to ±20.0 kV) 0.01 kV (0 to ±0.99 kV)

## 2/3 Port Solenoid Valves/ Air Operated Valves for Fluid Control



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Zero Differential Pressure Type/ Pilot Operated 2 Port Solenoid Valve/ <b>VXZ</b> .....	P.129
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Energy Saving Type 2 Port Solenoid Valve/ <b>VXE</b> .....	P.130
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## 2/3 Port Solenoid Valves for Fluid Control (For Special Purposes)



5.0 MPa Pilot Operated 2/3 Port Solenoid Valve and Check Valve/ <b>VCH41/42/410, VCHC40</b> .....	P.131
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## 2/3 Port Valves for General Purpose Fluid Control



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2-Layer Soft Fluoropolymer Tubing/ <b>TQ</b> .....	P.134

## 2/3 Port Solenoid Valves/Air Operated Valves for Fluid Control

### Direct Operated 2 Port Solenoid Valve **VX2**



- For air, medium vacuum, water, oil, steam (can be used with heated water.)
- Flow rate : 20% more flow\*
- Height : 10% smaller\*
- Lightweight: 30% lighter\*
- Body material: Aluminum, resin, C37, Stainless steel
- Available with One-touch fittings (resin body)
- \* Comparison with SMC conventional model
- Manifold type No.: VVX21, VVX22, VVX23

Series	Actuation	Port size	Orifice diameter (mm $\phi$ )
VX21/22/23	N.C./N.O.	1/8 to 1/2 $\phi$ 6 to $\phi$ 12	2 to 10

### 2 Port Solenoid Valve with Built-in Y-strainer **VXK**



- For air, water, oil, steam
- Space saving and reduced piping labor
- Built-in strainer enabling the removal of contaminants

Series	Actuation	Port size	Orifice diameter (mm $\phi$ )
VXK21/22/23	N.C./N.O.	1/8 to 3/8	2 to 8

### Pilot Operated 2 Port Solenoid Valve **VXD**



- For air, water, oil, heated water, high temperature oil
- Body material: Aluminum, resin, C37, Stainless steel and CAC407
- With One-touch fittings (resin body) type is available.
- IP65

Series	Actuation	Port size	Orifice diameter (mm $\phi$ )
VXD	N.C./N.O.	$\phi$ 10, $\phi$ 12, $\phi$ 3/8" 1/4 to 1 32A to 50A	10 to 50

### Zero Differential Pressure Type/Pilot Operated 2 Port Solenoid Valve **VXZ**



- For air, water, oil, heated water, high temperature oil
- Body material: Aluminum, resin, C37, Stainless steel
- With One-touch fittings (resin body) type is available.
- IP65

Series	Actuation	Port size	Orifice diameter (mm $\phi$ )
VXZ	N.C./N.O.	$\phi$ 10, $\phi$ 12, $\phi$ 3/8" 1/4 to 1	10 to 25

### Zero Differential Pressure Type/Pilot Operated 2 Port Solenoid Valve **VXS**



- For steam
- Long service life: 3 million cycles (Based on SMC's test condition)
- Improved air filtration
- Reduced apparent power: 18 VA  $\rightarrow$  12 VA, 20 VA  $\rightarrow$  15 VA
- Reduced coil temperature rise: 248°F (120°C)  $\rightarrow$  212°F (100°C)
- IP65

Series	Actuation	Port size	Orifice diameter (mm $\phi$ )
VXS	N.C.	1/4 to 1	10 to 25

## 2/3 Port Solenoid Valves/Air Operated Valves for Fluid Control

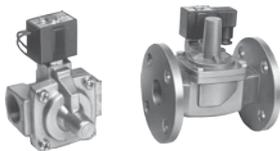
### Energy Saving Type 2 Port Solenoid Valve **VXE**



- Power consumption 1/3 (SMC comparison)
- For air, water, oil

Series	Actuation	Port size	Orifice diameter (mm $\phi$ )
VXE2	N.C.	1/8 to 1/2	2 to 10
VXED2	N.C.	1/4 to 1 32A to 50A	10 to 50
VXEZ2	N.C.	1/4 to 1	10 to 25

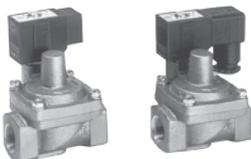
### Pilot Operated 2 Port Solenoid Valve **VXP**



- For air, gas, steam, water, oil

Series	Actuation	Port size	Orifice diameter (mm $\phi$ )
VXP21/22/23	N.C./N.O.	1/4 to 2 32A to 50A	10 to 50

### Water Hammer Relief/Pilot Operated 2 Port Solenoid Valve **VXR**



- For water, oil

Series	Actuation	Port size	Orifice diameter (mm $\phi$ )
VXR21/22/23	N.C./N.O.	1/2 to 2	20 to 50

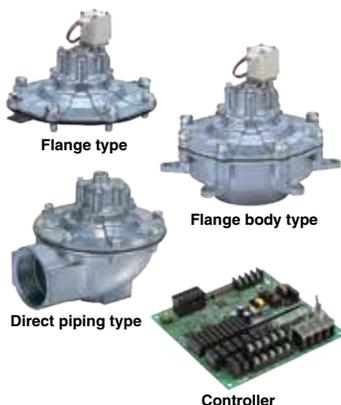
### Diaphragm Type Pilot Operated 2 Port Solenoid Valve for High Pressure **VXH**



- Maximum operating pressure differential of 2 MPa with orifice diameter  $\phi$ 10.

Series	Actuation	Port size	Orifice diameter (mm $\phi$ )
VXH	N.C.	1/4 to 1/2	10

### 2 Port Solenoid Valve/Air Operated Valve for Dust Collector **VXF2/VXFA2**



- Piping: Flange type, flange body type, direct piping type
- Orifice machining on the outlet is not necessary, so piping man hour is reduced. (Flange body type)
- Power consumption: 4.5 W
- Enclosure: IP65\*
- \* Electrical entry "Faston" type terminal is IP40.
- Faston terminal type added.
- Controller dedicated for operation series VXFC

Series	Actuation	Port size	Orifice diameter (mm $\phi$ )
VXF2	N.C.	20A to 100A	22 to 100
VXFA2	N.C.	20A to 100A	22 to 100

## 2/3 Port Solenoid Valves/Air Operated Valves for Fluid Control

### Direct Operated 3 Port Solenoid Valve **VX3**



- For air, water, oil, steam
- Manifold type No.: VVX31, VVX32, VVX33

Series	Actuation	Port size	Orifice diameter (mm $\emptyset$ )
VX31/32/33	N.C./N.O./COM.	1/8 to 3/8	1.5 to 4

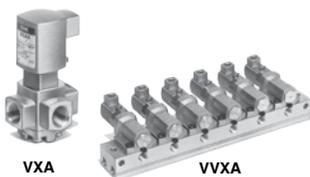
### Direct Air Operated 2 Port Valve **VXA**



- For air, water, oil
- Manifold type No.: VVXA21, VVXA22

Series	Actuation	Port size	Orifice diameter (mm $\emptyset$ )
VXA21/22	N.C./N.O.	1/8 to 1/2	3 to 10

### Direct Air Operated 3 Port Valve **VXA3**



- For air, vacuum, water, oil
- Manifold type No.: VVXA31, VVXA32

Series	Actuation	Port size	Orifice diameter (mm $\emptyset$ )
VXA31/32	C.O.	1/8 to 3/8	1.5 to 4

## 2/3 Port Solenoid Valves for Fluid Control (For Special Purposes)

### 5.0 MPa Pilot Operated 2/3 Port Solenoid Valve and Check Valve **VCH/VCHC**



- Service life: 10 million times
- Uses the polyurethane elastomer poppet for valve parts.
- Improves durability at high pressure.

Model	Type	Port size	Orifice diameter (mm $\emptyset$ )
VCH41	2 port valve N.C.	G3/4, 1	$\emptyset$ 16
VCH42	2 port valve N.O.	G3/4, 1	$\emptyset$ 17.5
VCH410	3 port valve	G1/2 to 1	$\emptyset$ 18
VCHC40	Check valve	G3/4, 1	$\emptyset$ 16

### Compact Direct Operated 2 Port Solenoid Valve **VDW**



- For air, medium vacuum, water
- Body material: Aluminum, resin (PPS), C37, Stainless steel
- With One-touch fittings (resin body)
- IP65

Series	Actuation	Port size	Orifice diameter
VDW10/20	N.C.	$\emptyset$ 3.2, $\emptyset$ 4, $\emptyset$ 6, M5, 1/8	$\emptyset$ 1 to $\emptyset$ 3.2

## 2/3 Port Solenoid Valves for Fluid Control (For Special Purposes)

### Compact Direct Operated 3 Port Solenoid Valve for Water and Air **VDW**



Series	Actuation	Port size	Orifice diameter (mm $\phi$ )
VDW200/300	C.O.	M5 to 1/4 (8A)	1 to 4

### Compact/Lightweight 2 Port Solenoid Valve For Air/Water **VDW-XF**



- Compact/Lightweight resin body (PPS)
- IP65
- Power consumption 3 W (Standard), 0.5 W (With power-saving circuit)

Series	Actuation	Port size	Orifice diameter (mm $\phi$ )
VDW30/40-XF	N.C.	P7, P8 (Quick fastener) $\phi$ 4, $\phi$ 6, $\phi$ 8, $\phi$ 10	1 to 6

### High Speed 2 Port Valve **SX10**



- High speed response: ON/0.45 ms, OFF/0.4 ms ( $\pm$ 0.05 ms)
- Long service life: 5 billion cycles or more
- High frequency: 1200 Hz
- Width: 9 mm
- Low power consumption: 4 W

Series	Flow rate	Power consumption (W)	Max. operating frequency (Hz)
SX10	50	80	1200
		40	1000
		10	550
		4	350
SX10	100	80	650
		40	550
		10	300
		4	200
SX10	150	80	600
		40	500
		10	250
		4	150

### Pilot Operated 2 Port Solenoid Valve for Dry Air **VQ**



- High frequency operation: High speed response 7 ms or less (VQ20), 20 ms or less (VQ30)
- Easy piping with built-in One-touch fittings
- DIN connector type, dust tight low jetproof enclosure (IP65) compliant
- Air-blow and blow-off of workpiece
- Manifold type No.: VV2Q22, VV2Q32

Series	Actuation	Port size	Orifice diameter (mm $\phi$ )
VQ20	N.C.	$\phi$ 6 to $\phi$ 12	3.4
VQ30	N.C.	$\phi$ 6 to $\phi$ 12	4.8

### Compact Direct Operated 2/3 Port Solenoid Valve for Chemical Liquids **LVM**



- Wetted parts Body/plate: PEEK  
Diaphragm: EPDM, FKM, Kalrez<sup>®</sup> can be selected.
- Life expectancy: 10 million times or more (under test conditions used by SMC)

Series	Valve structure	Actuation	Orifice diameter (mm $\phi$ )
LVM09/090	Diaphragm type directly operated poppet (Rocker type)	N.C./N.O./Universal	1.1
LVM11	Diaphragm type directly operated poppet	N.C.	1.5
LVM10/100	Diaphragm type directly operated poppet	N.C./N.O./Universal	1.4
LVM15/150	Diaphragm type directly operated poppet (Rocker type)	N.C./N.O./Universal	1.6
LVM20/200	Diaphragm type directly operated poppet	N.C./N.O./Universal	2

## 2/3 Port Valves for General Purpose Fluid Control

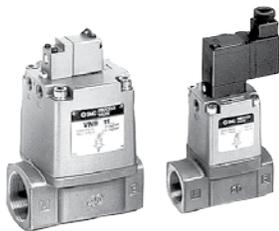
### Process Valve/2 Port Valve for Compressed Air and Air-hydro Circuit Control **VNA**



- Exclusively for pneumatic system and air-hydro circuit control.
- The balance poppet permits normal and reverse flow.
- Air operated, external pilot solenoid

Series	Actuation	Port size	Orifice diameter (mm $\varnothing$ )
VNA	N.C./N.O./C.O.	1/8 to 2	10 to 50

### Process Valve/2 Port Valve for Fluid Control **VNB**



- For controlling various fluids
- Can operate with a wide range of fluids, such as air, water, oil, gas, vacuum, etc., by selecting the body and seal materials.
- Air operated, external pilot solenoid

Series	Actuation	Port size	Orifice diameter (mm $\varnothing$ )
VNB	N.C./N.O./C.O.	1/8 to 2 1 1/4B to 2B	7 to 50

### Coolant Valve/Low Power Consumption, High Flow Type **SGC**



- High flow type to control coolants (cutting fluid) in machine tools.
- Low power consumption: 0.35 W (at 24 VDC)
- Maximum operating pressure: 73 psi (0.5 MPa), 145 psi (1 MPa), 232 psi (1.6 MPa)
- Service life: 5 million cycles or more (Based on SMC's test condition)
- CE-compliant.
- Compatible with G thread (ISO1179-1) as standard.
- Air operated, external pilot solenoid

Series	Actuation	Port size	Orifice diameter (mm $\varnothing$ )
SGC	N.C./N.O.	3/8 to 1	9 to 25

### High Pressure Coolant Valve/Low Power Consumption, High Flow Type **SGH**



- Maximum operating pressure: 435 psi (3 MPa), 1015 psi (7 MPa)
- Corresponding to high speed grinding and long drilling processes
- Coolant valve for high pressure coolant liquid that is ideal for lubrication, dust blowing and cooling.
- Low power consumption: 0.35 W (at 24 VDC)
- Service life: 3 million cycles or more (Based on SMC's test condition)
- CE-compliant
- Water hammer: Reduced by 20%
- Compatible with G thread (ISO1179-1) as standard.
- Air operated, external pilot solenoid

Series	Actuation	Port size	Orifice diameter (mm $\varnothing$ )
SGH	N.C./N.O.	3/8 to 1	9 to 25

### Coolant Valve **VNC**



- For controlling coolants (cutting fluid) used in machine tools.
- Maximum operating pressure: 73 psi (0.5 MPa), 145 psi (1 MPa)
- Air operated, external pilot solenoid

Series	Actuation	Port size	Orifice diameter (mm $\varnothing$ )
VNC	N.C./N.O.	1/8 to 2 1 1/4B to 3B	7 to 80

## 2/3 Port Valves for General Purpose Fluid Control

### High Pressure Coolant Valve **VNH**



- For controlling coolants (cutting fluid) used in machine tools.
- Maximum operating pressure: 508 psi (3.5 MPa), 1015 psi (7 MPa)
- Air operated, external pilot solenoid

Series	Actuation	Port size	Orifice diameter (mm $\phi$ )
VNH	N.C.	3/8 to 1	3.9 to 15.7

### Steam Valve/2 Port Valve for Steam **VND**



- For steam control
- Adopting PTFE seals
- With indicator light (option)
- Air operated type

Series	Actuation	Port size	Orifice diameter (mm $\phi$ )
VND	N.C./N.O.	1/8 to 2 1 1/4B to 2B	7 to 50

### Valve for Water and Chemical Base Fluids (2/3 Port Air Operated Valve) **VCC**



- Applicable for 2 liquid paint (VCC12D)  
PTFE diaphragm structure = Sliding part eliminated  
Less paint adhesion
- Mountable on a robot arm (Space-saving, lightweight)  
2 valves per station (30 mm pitch)  
2/3 port valves mixed  
Resin manifold block

Series	Orifice diameter	Fluid
VCC	$\phi$ 3.8	Water/chemical base paint, Ink, Cleaning fluid (Water, butyl acetate), Air

### SUS316L Stainless Steel Fitting **VCK**



- Since sealing tape is not required, there is no concern of insulation.  
(Applicable for painting with high voltage)
- Easy attachment/removal of piping in narrow spaces

Series	Material/Description	Port size
VCK	Stainless steel fitting (316L SS)	G1/4

### 2-Layer Soft Fluoropolymer Tubing **TQ**



- Carries fluid such as solvent with a soft and abrasion resistant tube.
- 2-layer structure  
Outer layer: Special nylon resin  
Inner layer: Special fluoropolymer
- Internal smoothness: Equivalent to Ra 0.02  $\mu$ m

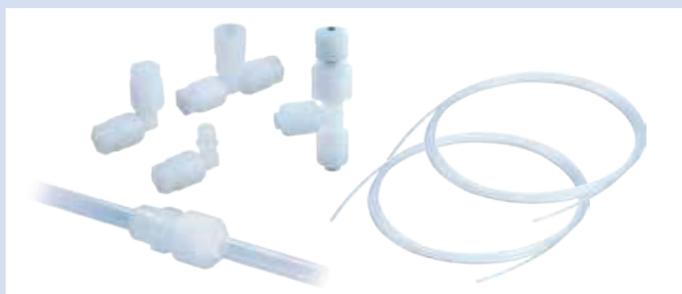
Series	Tubing O.D. Metric size	Color	Fluid
TQ	$\phi$ 4, $\phi$ 6, $\phi$ 8, $\phi$ 10, $\phi$ 12	Translucent (Material color)	Air, Water, Inert gas, Solvent

## Chemical Liquid Valves



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Air Operated Chemical Liquid Valve/ Threaded Type/ <b>LVA</b> .....	P.136
Air Operated Chemical Liquid Valve/ Organic Solvents Available/ <b>LVA</b> .....	P.136
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Manually Operated Chemical Liquid Valve/ Organic Solvents Available/ <b>LVH</b> .....	P.136
Air Operated Chemical Liquid Valve/ Compact Type/ <b>LVD</b> .....	P.137
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## Fittings & Needle Valves/Tubing



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## Process Pumps



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## Process Gas Equipment



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Regulator/Back Pressure Regulator for General Applications/ <b>AK/BP</b> .....	P.142
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Check Valve/Vacuum Generator/Flow Switch/ <b>AP</b> .....	P.143

## Chemical Liquid Valves

### Air Operated Chemical Liquid Valve/Integral Fitting Type LVC



- Body material: New PFA
- Same configuration N.C./N.O./double-acting
- Able to handle fluid temperatures up to 212°F (100°C)
- Manifold type No.: LLC2, LLC3, LLC4, LLC5

Series	Type	Actuation	Applicable tubing O.D.	Orifice diameter (mmø)
LVC2□ to 6□	Integral fitting	N.C./N.O./Double acting	Metric size: 3 to 25 Inch size: 1/8 to 1	4 to 22
LVC80	Integral fitting	N.C.	Inch size: 1 1/4", 1 1/2"	34

### Air Operated Chemical Liquid Valve/Threaded Type LVA



- Body material: New PFA/Stainless steel/PPS
- Diaphragm material: PTFE, EPDM, NBR can be selected.
- Manifold type No.: LLA2, LLA3, LLA4, LLA5

Series	Type	Actuation	Port size	Orifice diameter (mmø)
LVA1□ to 6□	Threaded type	N.C./N.O./Double acting	1/8 to 1	2 to 22

### Air Operated Chemical Liquid Valve/Organic Solvents Available LVA



- Body: Stainless steel, Actuator section: ADC, Buffer: FKM/EPDM (selectable)
- Electro polishing can be specified. (Made to Order)
- Type of fitting: Double ferrule fittings, Metal gasket seal fittings, Integral tubing
- Export Trade Control Order Not applicable for list control

Series	Type	Actuation	Applicable tubing O.D.	Orifice diameter (mmø)
LVA2□ to 6□	Integral fitting (Double ferrule fittings/ Metal gasket seal fittings)	N.C./N.O./ Double acting	Inch size: 1/4" to 1"	4 to 22

### Manually Operated Chemical Liquid Valve/Integral Fitting/Threaded Type LVH



- Body material: New PFA/Stainless steel/PPS
- Compatible with locking and non-locking types
- Manifold type No.: LLH2, LLH3, LLH4

Series	Type	Actuation	Port size (Applicable tubing O.D.)	Orifice diameter (mmø)
LVH20 to 40	Manual type (Integral fitting/ Threaded type)	N.C.	Threaded type: 1/8 to 1/2 Integral fitting: Metric size: ø3 to ø12 Inch size: 1/8 to 1/2	4 to 12
LVH80M	Manual type (Integral fitting)	N.C.	Inch size: 1 1/4", 1 1/2"	34

### Manually Operated Chemical Liquid Valve/Organic Solvents Available LVH



LVH20M-D07-AD  
Double ferrule fittings

- Body: Stainless steel, Actuator section: ADC, Buffer: FKM/EPDM (selectable)
- Electro polishing can be specified. (Made to Order)
- Type of fitting: Double ferrule fittings, Metal gasket seal fittings, Integral tubing
- Export Trade Control Order Not applicable for list control

Series	Type	Actuation	Applicable tubing O.D.	Orifice diameter (mmø)
LVH20M to 60M	Integral fitting (Double ferrule fittings/ Metal gasket seal fittings)	N.C.	Inch size: 1/4" to 1"	4 to 22

## Chemical Liquid Valves

### ● Air Operated Chemical Liquid Valve/Compact Type **LVD**



- Lineup of compact and space-saving types  
Up to 29% reduction in dimensions on piping side
- Body material: New PFA
- Diaphragm material: PTFE
- Actuator material: PPS

Note) Tubing O.D. for tube extension type.

Series	Type	Actuation	Applicable tubing O.D. <sup>Note)</sup>		Orifice diameter (mmø)
			Metric size	Inch size	
LVD1□ to 5□	Integral fitting	N.C./N.O./Double acting	3 to 19	1/8 to 3/4	2 to 16
LVD2□ to 5□	Tube extension	N.C./N.O./Double acting	6 to 19	1/4 to 3/4	4 to 16

### ● Air Operated Chemical Liquid Valve/Hydrofluoric Acid Compatible **LVD**



LVD40-Z13-F

LVD40-Z13-F1  
Flow rate adjustment

Series	Type	Actuation	Applicable tubing O.D.		Orifice diameter (mmø)
			Metric size	Inch size	
LVD2□ to 6□	Integral fitting	N.C./N.O./Double acting	6 to 25	1/4" to 1"	4 to 22

### ● Manually Operated Chemical Liquid Valve/Hydrofluoric Acid Compatible **LVDH**



LVDH40-Z13-F

Series	Type	Actuation	Applicable tubing O.D.		Orifice diameter (mmø)
			Metric size	Inch size	
LVDH20 to 60	Integral fitting	N.C.	6 to 25	1/4" to 1"	4 to 20

### ● Chemical Liquid Valve/Non-Metallic Exterior/Insert Bushing, Integral Fitting Type **LVQ**



- Screwless construction.  
Non-metallic construction without using metal screws to fasten the body of the actuator.
- Body: New PFA
- Diaphragm: PTFE
- Actuator: PVDF
- Space saving/Space saving connection (LVQS, LVQHS)
- Back pressure (73 psi [0.5 MPa]) tolerant (LVQ□□H)

Series	Type	Applicable tubing O.D.	Orifice diameter (mmø)
LVQ/LVQS	Air Operated	Metric size: 3 to 25	4 to 22
LVQH/LVQHS	Manually Operated	Inch size: 1/8" to 1"	

# Chemical Liquid Valves

## Chemical Liquid Valve/Non-Metallic Exterior/Flare, Integral Fitting Type LVQ



- Screwless construction.  
Non-metallic construction without using metal screws to fasten the body of the actuator.
- Body: New PFA
- Diaphragm: PTFE
- Actuator: PVDF
- Space saving/Space saving connection (LVQS-Z, LVQHS-Z)
- Back pressure (0.5 MPa) tolerant (LVQ□□H-Z)

Series	Type	Applicable tubing O.D.	Orifice diameter (mmø)
LVQ-Z/LVQS-Z	Air Operated	Metric size: 3 to 25	4 to 22
LVQH-Z/LVQHS-Z	Manually Operated	Inch size: 1/8" to 1"	

## Chemical Liquid Valve/Non-Metallic Exterior/Tube Extensions LVQ



- Screwless construction.  
Non-metallic construction without using metal screws to fasten the body of the actuator.
- Body: New PFA
- Diaphragm: PTFE
- Actuator: PVDF

Series	Type	Applicable tubing O.D.	Orifice diameter (mmø)
LVQ-T	Air Operated	Metric size: 6 to 25	4 to 22
LVQH-T	Manually Operated	Inch size: 1/4" to 1"	

## Vinyl Chloride Air Operated Valve LVP



- Applicable to rigid vinyl chloride tube: Union type with PVC unfixed union
- Body material: CPVC, Diaphragm material: PTFE
- O-ring material: FKM, EPDM (selectable)
- Applicable fluids: Deionized water, Chemical liquids

Model	Applicable tubing O.D.	Orifice diameter (mmø)	Actuation	Option
LVP5□	O.D. ø22 (Nominal dia. 16A)	16	N.C./N.O./Double acting	With flow rate adjustment
LVP6□	O.D. ø26 (Nominal dia. 20A)	22	N.C./N.O./Double acting	With flow rate adjustment
LVP6□	O.D. ø32 (Nominal dia. 25A)	22	N.C./N.O./Double acting	With flow rate adjustment

## PVC Quick Drain Valve LVW



- Complies to JIS standard for polyvinyl chloride piping (JIS K 6742).
- Applicable fluids: Deionized water, Chemical liquids
- Fluid contact materials: PVC (Body)  
PTFE (Poppet)  
FKM (O-ring: Standard)  
EPDM (O-ring: Option)
- Flow-rate characteristics: Cv factor 10 to 198
- Easy piping with union connection

Series	Applicable tubing O.D.	Orifice diameter	Actuation
LVW60	ø32 (Nominal dia. 25A)	ø25	N.C.
LVW80	ø38 (Nominal dia. 32A)	ø40	N.C.
LVW80	ø48 (Nominal dia. 40A)	ø40	N.C.
LVW90	ø60 (Nominal dia. 50A)	ø65	N.C.
LVW90	ø75 (Nominal dia. 65A)	ø65	N.C.
LVW90	ø89 (Nominal dia. 80A)	ø80	N.C.

## Fitting Needle Valves/Tubing

### ● Fluoropolymer Fittings/Hyper Fittings/Insert Bushing Type **LQ1**



- Material: New PFA
- 4-layer seal construction
- Reducer enables tube size changeability with no change of body required.

Series	Max. operating pressure	Operating temperature F° (°C)
LQ1	145 psi (1.0 MPa)	32 to 392 (0 to 200)

### ● Fluoropolymer Fittings/Hyper Fittings/Flare Type **LQ3**



- Material: New PFA
- 3-layer seal construction
- Excellent and easy installation

Series	Max. operating pressure	Operating temperature F° (°C)
LQ3	145 psi (1.0 MPa)	Nut material PVDF: 32 to 302 (0 to 150) Nut material PFA: 32 to 392 (0 to 200)

### ● Fluoropolymer Needle Valve **LVN**



- Material: New PFA
- Fitting integrated, all-in-one structure
- Hyper fitting/LQ2 series used
- Triple seal structure

Series	Applicable tubing O.D.		Flow adjustment range gal/ min (L/min)	Orifice diameter (mmø)
	Metric size	Inch size		
LVN	4 to 12	1/8" to 1/2"	0 to 3.2 (0 to 12)	4.4 to 10

### ● Fluoropolymer Bore Through Connector **LQHB**

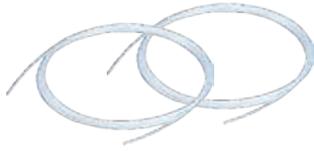


- Freely choose tube positioning  
As the tube runs through the fitting itself, a setting is available for any optional position.
- Can be used in pressure feed of chemical liquids, etc., during the production process of semiconductors.
- Applicable to chemical liquids such as acid, alkali and deionized water.
- Material: New PFA (Body, nut), PTFE (Collet)

Series	Applicable tubing O.D.		Operating temperature F° (°C)
	Metric size	Inch size	
LQHB	ø3 to ø25	ø 1/8" to ø 1"	32 to 392 (0 to 200)

# Tubing

## Fluoropolymer Tubing TL/TIL



- Material: Super PFA
- Maximum operating temperature: 500°F (260°C)  
(This can vary according to operating conditions.)

\* Made to Order

Series	Tubing O.D.		Color
	Metric size	Inch size	
TL/TIL	4, 6, 8, 10, 12, 19	1/8", 3/16", 1/4", 3/8" 1/2", 3/4", 1", 1 1/2" *	Translucent

## Fluoropolymer Tubing (PFA) TLM/TILM



- Max. operating temperature: 500°F (260°C)  
(This can vary according to operating condition.)
- Compatible with the Food Sanitation Law
- Complies with FDA (Food and Drug Administration) § 177-1550 dissolution test.

Series	Tubing O.D.		Color
	Metric size	Inch size	
TLM/TILM	ø2, ø3, ø4, ø6, ø8, ø10, ø12, ø16, ø19, ø25	ø1/8", ø3/16", ø1/4", ø3/8", ø1/2", ø3/4", ø1", ø1 1/4"	Translucent, Black, Red, Blue

## Soft Fluoropolymer Tubing TD/TID



- Max. operating pressure 232 psi (1.6 MPa) or less [at 68°F (20°C)]\*
- Compatible with the Food Sanitation Law
- Complies with FDA (Food and Drug Administration) § 177-1550 dissolution test.
- Maximum operating temperature: 500°F (260°C)  
(This can vary according to operating pressure.)

\* It varies according to each size.

Series	Tubing O.D.		Color
	Metric size	Inch size	
TD/TID	ø4, ø6, ø8, ø10, ø12	ø1/8", ø3/16", ø1/4", ø3/8", ø1/2"	Translucent

## FEP Tubing (Fluoropolymer) TH/TH



- Max. operating pressure 334 psi (2.3 MPa) or less [at 68°F (20°C)]\*
- Compatible with the Food Sanitation Law
- Complies with FDA (Food and Drug Administration) § 177-1550 dissolution test.
- Maximum operating temperature: 392°F (200°C)  
(This can vary according to operating pressure.)

\* It varies according to each size.

Series	Tubing O.D.		Color
	Metric size	Inch size	
TH/TH	ø4, ø6, ø8, ø10, ø12	ø1/8", ø3/16", ø1/4", ø3/8", ø1/2", ø3/4"	Translucent, Black, Red, Blue

## Process Pumps

### Process Pump/Double Acting Pump PA/PAP/PAX



Model	Action	Discharge rate scfm (L/min)	Wetted part material
PA□□□	Automatically operated type	0.04 to 0.71 (1 to 20)	ADC12 (Aluminum) SCS14 (Stainless steel)
PA3□13	Air operated type	0 to 0.42 (0.1 to 12)	ADC12 (Aluminum) SCS14 (Stainless steel)
PA5□□□	Automatically operated type	0.18 to 1.59 (5 to 45)	ADC12 (Aluminum) SCS14 (Stainless steel)
PA5□13	Air operated type	0.04 to 0.46 (1 to 24)	ADC12 (Aluminum) SCS14 (Stainless steel)
PAP3310	Automatically operated type	0.04 to 0.46 (1 to 13)	New PFA (Fluororesin)
PAP3313	Air operated type	0 to 0.32 (0.1 to 9)	New PFA (Fluororesin)
PAX1□12	Automatically operated type Built-in pulsation attenuator	0.02 to 0.35 (0.5 to 10)	ADC12 (Aluminum) SCS14 (Stainless steel)

### Process Pump/Single Acting Pump PB



Model	Action	Discharge rate (mL/min)	Wetted part material
PB1011A	Built-in solenoid valve	8 to 2000	Polypropylene Stainless Steel 316
PB1013A	Air operated type	8 to 1000	Polypropylene Stainless Steel 316
PB1313A	Air operated type	8 to 1000	New PFA (Fluororesin)

### Non-Metallic Pump/Double Acting Pump PAF



\* Tightening bolt, Air switching valve: Stainless steel  
Use the PAF series standard products when metal-free pump is necessary for hydrofluoric acid, etc.

Model	Action	Discharge rate scfm (L/min)	Wetted part material
PAF3410	Automatically operated type	0.04 to 0.71 (1 to 20)	New PFA (Fluororesin)
PAF3413	Air operated type	0.04 to 0.53 (1 to 15)	New PFA (Fluororesin)
PAF3410-X68*	Automatically operated type	0.04 to 0.71 (1 to 20)	New PFA (Fluororesin)
PAF5410	Automatically operated type	0.18 to 1.59 (5 to 45)	New PFA (Fluororesin)
PAF5413	Air operated type	0.18 to 1.34 (5 to 38)	New PFA (Fluororesin)

## Process Gas Equipment

### Regulators for Ultra High Purity (UHP) AP/SL/AP/AZ



- For UHP gas delivery in semiconductor and other clean industries.
- Body material: 316L SS secondary remelt or 316L SS
- Electropolished wetted parts
- Metal seal to atmosphere

Series	Actuation	Application	Body material	Connection type	Connection size
AP/SL	Single stage	Distribution (Compact)	316L SS secondary remelt	Face seal Tube weld	1/4", 3/8"
AP/SL	Single stage	Distribution			1/4", 3/8", 1/2", 3/4"
AP/SL	Single stage	Bulk gas	316L SS		1/2", 3/4", 1"
AP/SL	Single stage	Source			1/4", 3/8", 1/2", 3/4"
AP/SL	Single stage	Sub-atmospheric pressure	316L SS secondary remelt		1/4", 3/8", 1/2", 3/4"
AP	Two stage	Source	316L SS		1/4", 3/8"
AZ	Single stage	Distribution			1/4", 3/8", 1/2"
AZ	Single stage	Source			1/4", 3/8", 1/2"
AZ	Single stage	Sub-atmospheric pressure		1/4", 3/8", 1/2"	

### Regulator/Back Pressure Regulator for General Applications AK/BP



- For wide variety of applications from semiconductor to general.
- Body material 316 SS or brass available depending on gas.

Series	Actuation	Application	Body material	Connection type	Connection size
AK	Single stage	Distribution	316 SS or Brass	NPT female, Compression	1/4", 3/8", 1/2"
AK	Single stage	Source			1/4", 3/8", 1/2"
AK	Single stage	Sub-atmospheric pressure			1/4", 3/8", 1/2"
AK	Two stage	Source			1/4"
BP	Back pressure regulator	—			1/4"

### Diaphragm Valve for Ultra High Purity AP



- For UHP gas delivery in semiconductor and other clean industries.
- Used as gas shutoff valve.
- No spring is used for the wetted parts and drive part is also separated from the diaphragm. Dead space in the flow path is small to suppress the particle generation.

Series	Type	Body material	Connection type	Connection size
AP	Air operated	316L SS secondary remelt	Face seal	1/4", 3/8", 1/2", 3/4"
AP	Manual		Tube weld	1/4", 3/8", 1/2", 3/4"

### Diaphragm Valve for Ultra High Purity AZ



- Cleanroom assembled and He leaked tested.
- Valve meets dimensional requirements of SEMI F36-0299, Option!
- User-friendly forged body.

Series	Type	Body material	Connection type	Connection size
AZ	Air operated	316L SS	Face seal	1/4", 3/8", 1/2"
AZ	Manual		Tube weld	1/4", 3/8", 1/2"

## Process Gas Equipment

### Diaphragm Valve for General Applications **AK**



- Rc, R and NPT connections are added to series.
- For wide variety of applications from semiconductor to general.
- Cleaned for O<sub>2</sub> service
- Compact and lightweight by making the actuator shorter (AK3542/4542)
- M5 actuation port (AK3542/4542)
- Compact and lightweight by modifying the knob design (AK3652/4652)
- The knob is a unique design that combines a scalloped round knob with a raised rectangular section to provide two choices of gripping. (AK3652/4652)

Series	Type	Body material	Connection type	Connection size
AK	Air operated	316 SS	Compression Rc, R, NPT	1/4", 3/8"
AK	Manual			1/4", 3/8"

### Check Valve/Vacuum Generator/Flow Switch **AP**



[Check valve]

- Fluid back-flow is prevented by back pressure.
- Unique design with only one moving part in the gas stream, an O-ring.
- Springless structure suppresses particle generation by vibration or chattering or pressure fluctuation on downstream side.

[Vacuum generator]

- Vacuum generation equipment.
- Applicable to emission of unnecessary gas remaining inside the piping during gas cylinder replacement.

[Flow switch]

- Detects excess flow above a given flow rate, caused by pipe breakage, etc.

Series	Type	Body material	Connection type	Connection size
AP	Check valve	316L SS secondary remelt	Face seal Tube weld	1/4", 3/8"
AP	Vacuum generator	316L SS		1/4", 3/8"
AP	Flow switch	316L SS secondary remelt 316L SS		1/2", 3/4"

## Industrial Filters



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Industrial Filter/Vessel Series/ <b>FGG</b> .....	P.145
Industrial Filter/Vessel Series (Made to Order)/ <b>FGA</b> .....	P.145
Industrial Filter/Vessel Series (Made to Order)/ <b>FGB</b> .....	P.145
Industrial Filter/Vessel Series (Made to Order)/ <b>FGC</b> .....	P.145
Bag Filter/ <b>FGF</b> .....	P.146
High Precision Filter for Liquids/ <b>FGH</b> .....	P.146
Quick Change Filter/For Cleaning Fluid/ <b>FQ1</b> .....	P.146
Low Maintenance Filter/ <b>FN</b> .....	P.146

## Sintered Metal Elements



Sintered Metal Element/ <b>EB/ES</b> .....	P.146
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## Industrial Filters

### Industrial Filter/Vessel Series FGD



- Ideal for low flow filtration (Max. 16gal/min [60 L/min]).
- Possible to select the antistatic specification (FGDE, FGDF).

Series	Port size	Max. operating pressure	Operating temperature
FGD	Rc3/8, 1/2, 3/4	102, 145 psi (0.7, 1 MPa)	Max. 176°F (80°C)

### Industrial Filter/Vessel Series FGE



- Ideal for medium flow filtration (Max. 61gal/min [230 L/min]).
- Easy element replacement for V-band type  
(With cover anti-scattering mechanism)

Series	Port size	Max. operating pressure	Operating temperature
FGE	R1, 2	102 psi (0.7 MPa)	Max. 176°F (80°C)

### Industrial Filter/Vessel Series FGG



- Ideal for high flow filtration (Max. 92 gal/min [350 L/min]).
- Easy element replacement for V-band type  
(With cover anti-scattering mechanism)

Series	Port size	Max. operating pressure	Operating temperature
FGG	Rc2	102 psi (0.7 MPa)	Max. 176°F (80°C)

### Industrial Filter/Vessel Series (Made to Order) FGA



- Ideal for high flow filtration (Max. 845 gal/min [3200 L/min]).

Series	Port size	Max. operating pressure	Operating temperature
FGA	25 to 150 (1B to 6B) JIS 10KFF	145psi (1 MPa)	Max. 176°F (80°C)

### Industrial Filter/Vessel Series (Made to Order) FGB



- Ideal for high flow filtration (Max. 1004 gal/min [3800 L/min]).

Series	Port size	Max. operating pressure	Operating temperature
FGB	25 to 150 (1B to 6B) JIS 10KFF	145psi (1 MPa)	Max. 176°F (80°C)

### Industrial Filter/Vessel Series (Made to Order) FGC



- Ideal for low flow filtration (Max. 21 gal/min [80 L/min]).

Series	Port size	Max. operating pressure	Operating temperature
FGC	15 to 25 (1/2B to 1B) JIS 10KFF	174, 580 psi (1.2, 4 MPa)	Max. 176°F (80°C)

## Industrial Filters

### ● Bag Filter FGF



- Highly effective for filtration of high temperature and high viscosity fluids.
- Ideal for high flow filtration (Max. 528 gal/min [2000 L/min]).
- Easy handling of filtered impurities.

Series	Port size	Max. operating pressure	Operating temperature
FGF	100 (4B), 150 (6B) JIS 10KFF	73 psi (0.5 MPa)	Max. 176°F (80°C)

### ● High Precision Filter for Liquids FGH



- Filtration efficiency: 99% or more

Series	Port size	Max. operating pressure	Operating temperature
FGH	Rc3/8 to 1	145 psi (1 MPa)	Max. 176°F (80°C)

### ● Quick Change Filter/For Cleaning Fluid FQ1



- Ideal for low flow filtration (Max. 7.9 gal/min [30 L/min]).
- No tools required.
- Takes only 60 seconds for element replacement.

Series	Port size	Max. operating pressure	Operating temperature
FQ1	Rc1/2, 3/4, 1	145 psi (1 MPa)	Max. 176°F (80°C)

### ● Low Maintenance Filter FN



- Element replacement is not required.
- System circuit allows the automatic cleaning of element when clogged.

Series	Port size	Max. operating pressure	Operating temperature
FN1	Rc1	145 psi (1 MPa)	Max. 176°F (80°C)
FN4	Rc2	145 psi (1 MPa)	Max. 176°F (80°C)

## Sintered Metal Elements

### ● Sintered Metal Element EB/ES



- Large mechanical strength and withstand pressure, anti-corrosive
- Mechanical process, caulking, brazing, soldering, welding, and simultaneous sintering are possible.
- Can be used repeatedly by cleaning.

Series	Material	Nominal filtration accuracy
EB	Bronze	(1)*, 2, 5, 10, 20, 40, 70, 100, 120 μm * ( ) : Semi-standard
ES	Stainless steel	(1)*, 2, 5, 10, 20, 40, 70, 100, 120 μm * ( ) : Semi-standard

# Temperature Control Equipment

## Chillers (Circulating Fluid Temperature Controller)



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Thermo-chiller/ <b>HRSE</b> .....	P.148
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## Thermoelectric Baths



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## Temperature Control System for Chemical Liquids



Peltier-type Chemical Thermo-con/ <b>HED</b> .....	P.150
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## Air Temperature Controller



Peltier-type Air-Thermo/ <b>HEA</b> .....	P.150
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# Chillers (Circulating Fluid Temperature Controller)

## Refrigerated Thermo-cooler HRG

Economy type  
(Three-phase power supply)



- Air-cooled models provide cooling water wherever needed thanks to easy mounting and easy operation.
- Proven performance with a wide range of applications such as lasers/analysis equipment/LCD manufacturing equipment/mold temperature regulators, etc.

Series	Set temperature range	Cooling capacity	Temperature stability	Cooling method	Circulating liquid
HRG	41 to 95°F (5 to 35°C)	15 kW	±1.8°F (±1.0°C)	Air-cooled refrigeration/ Water-cooled refrigeration	Clear water, Deionized water, Ethylene glycol aqueous solution

## Refrigerated Thermo-chiller HRS

Compact type



- Air-cooled models provide cooling water wherever needed thanks to easy mounting and easy operation.
- Proven performance with a wide range of applications such as lasers/analysis equipment/LCD manufacturing equipment/mold temperature regulators, etc.
- Compact W377 x H615 x D500, 40 kg
- Timer operation function, Power failure auto-restart function, Low level in tank detecting function, Anti-freezing function
- Self diagnosis function
- Ideal for overseas models (single-phase 200 to 230 VAC, single-phase 100 and 115 VAC)
- Conforms to UL specifications, CE marking.

Series	Set temperature range	Cooling capacity	Temperature stability	Cooling method	Circulating liquid
HRS	41 to 104°F (5 to 40°C)	5.9 kW	±1.8°F (±1.0°C)	Air-cooled refrigeration/ Water-cooled refrigeration	Clear water Ethylene glycol aqueous solution

## Thermo-chiller HRSE

Small basic type



- Large energy saving by triple control!
- Power consumption: 33% Energy saving
- Compact/Lightweight 32 kg (100 VAC)
- Maintenance free: Magnet pump
- Low-noise design: 55 dB (A)

Series	Set temperature range	Cooling capacity	Temperature stability	Cooling method	Circulating liquid
HRSE	50 to 86°F (10 to 30°C)	2.2 kW	±3.6°F (±2.0°C)	Air-cooled refrigeration	Clear water Ethylene glycol aqueous solution

## Refrigerated Thermo-chiller HRSH

Large type



- Outstanding energy saving effect with triple inverter !
- Outdoor installation: Splashproof type (IPX4)
- Maximum ambient temperature 113°F (45°C)
- Temperature stability±1.8°F (±1.0°C) (with stabilized load)
- Space-saving and lightweight 280 kg (25 kW type)

Series	Set temperature range	Cooling capacity	Temperature stability	Cooling method	Circulating liquid
HRSH	41 to 95°F (5 to 35°C)	25 kW	±1.8°F (±1.0°C)	Air-cooled refrigeration/ Water-cooled refrigeration	Clear water, Deionized water, Ethylene glycol aqueous solution

## Refrigerated Thermo-chiller HRZ

High-performance chiller



- Proven performance with semiconductor process equipment, with a wide range of features such as high temperature stability, wide temperature range, failure testing, external signal.
- All models conform to safety standards.
- Conforms to UL and SEMI specifications, CE marking.

Series	Set temperature range °F (°C)	Cooling capacity	Temperature stability	Cooling method	Circulating liquid
HRZ	-4 to 104 (-20 to 40) 68 to 194 (20 to 90) -4 to 194 (-20 to 90)	15 kW	±1.8°F (±1.0°C)	Water-cooled refrigeration	Fluorinated liquid, Clear water, Deionized water, Ethylene glycol aqueous solution

## Chillers (Circulating Fluid Temperature Controller)

### Refrigerated Thermo-chiller HRZ

High-performance chiller  
(Built-in inverter)



- In addition to the state-of-the-art functions of the HRZ series, these models employ a DC inverter compressor to achieve better energy efficiency.
- Wide temperature range and cooling capacity range covered by one unit
- Suited to the short innovation cycle of semiconductor equipment, and capable of responding flexibly to changes in the process conditions.
- Conforms to UL and SEMI specifications, CE marking.

Series	Set temperature range	Cooling capacity	Temperature stability	Cooling method	Circulating liquid
HRZ	-4 to 194°F (-20 to 90°C)	10 kW	±0.18°F (±0.1°C)	Water-cooled refrigeration	Fluorinated liquid, Clear water, Deionized water, Ethylene glycol aqueous solution

### Refrigerated Dual Thermo-chiller HRZD

(Double inverter type)



- Temperature for two systems can be controlled separately by one chiller.
- Double inverter type: Substantially more energy is saved by using a DC inverter refrigerator and inverter pump.
- Space saving: Footprint reduced by 23%
- Reduced wiring, piping and labor: Single power cable, single facility-water piping system
- CE marking

Series	Set temperature range	Cooling capacity	Temperature stability	Cooling method	Circulating liquid
HRZD	-22 to 194°F (-30 to 90°C)	9.5 kW x 2	±0.18°F (±0.1°C)	Water-cooled refrigeration	Fluorinated liquid, Ethylene glycol aqueous solution

### Water-cooled Thermo-chiller HRW

High-performance chiller  
(Water-cooled type)



- Direct heat exchanger for water circulated within a plant
- For temperature regulation within the temperature range where no freezer is needed
- Proven performance with semiconductor process equipment, with a wide range of features such as high temperature stability, wide temperature range, failure testing, external signal.
- Conforms to UL and SEMI specifications, CE marking.
- Possible to select the inverter type.

Series	Set temperature range	Cooling capacity	Temperature stability	Cooling method	Circulating liquid
HRW	68 to 194°F (20 to 90°F)	30 kW	±0.54°F (±0.3°C)	Water-cooled type	Fluorinated liquid, Clear water, Deionized water, Ethylene glycol aqueous solution

### Peltier-type Thermo-con HEC

High-precision chiller



- For applications requiring high-precision temperature control
- High-precision, refrigerant-free temperature control equipment employing Peltier elements
- Simple structure and high reliability
- Can easily be built into equipments with compact and low-vibration design.
- Compatible with wide range of power supply voltages.
- Conforms to UL specifications, CE marking.

Series	Set temperature range	Cooling capacity	Temperature stability	Cooling method	Circulating liquid
HEC	50 to 140°F (10 to 60°C)	600 W	±0.018 to 0.054°F (±0.01 to 0.03°C)	Peltier-type air-cooled	Clear water
HEC		1.2 kW		Peltier-type water-cooled	Clear water, Fluorinated aqueous liquid

## Thermoelectric Baths

### Peltier-type Thermoelectric Bath HEB

High-precision thermoelectric bath



- High-precision temperature-regulation thermostatic chamber that employs Peltier elements
- Compact and low vibration
- Unique agitation method keeps up-down temperature distribution to a minimum.

Series	Set temperature range	Cooling capacity	Temperature stability	Cooling method	Circulating liquid
HEB	5 to 140°F (-15 to 60°C)	140 W	0.018°F (0.01°C)	Peltier-type water-cooled	Clear water, Fluorinated aqueous liquid

## Thermoelectric Baths

### Peltier-type Thermoelectric Bath **INR**



- High-precision temperature-regulation thermostatic chamber that employs Peltier elements
- Compact and low vibration
- Unique agitation method keeps up-down temperature distribution to a minimum.

Series	Set temperature range	Cooling capacity	Temperature stability	Cooling method	Circulating liquid
INR-244-696A	5 to 140°F (-15 to 60°C)	280 W	±0.036°F (±0.02°C)	Peltier-type water-cooled	Water, Ethylene glycol aqueous solution, Fluorinated liquid (Square type can only be used at room temperature)
INR-244-745	32 to 140°F (0 to 60°C)	140 W	±0.054°F (±0.03°C)	Peltier-type water-cooled	
INR-244-733		140 W		Peltier-type water-cooled	
INR-244-747		320 W		Peltier-type water-cooled	
INR-244-736		320 W		Peltier-type water-cooled	
INR-244-746		320 W		Peltier-type water-cooled	
INR-244-734		320 W		Peltier-type water-cooled	
INR-244-749		320 W		Peltier-type water-cooled	
INR-244-748		320 W		Peltier-type water-cooled	
INR-244-757		220 W		Peltier-type air-cooled	

## Temperature Control System for Chemical Liquids

### Peltier-type Chemical Thermo-con **HED**

Fluoropolymer temperature control equipment for chemical liquids



- Heat exchanger employs Peltier elements for direct temperature control of chemical liquids.
- Fluoropolymer heat exchanger is suitable for a wide range of chemical liquids.
- Conforms to UL specifications, CE marking.

Series	Set temperature range	Cooling capacity	Temperature stability	Cooling method	Circulating liquid
HED	50 to 140°F (10 to 60°C)	750 W	±0.18°F (±0.1°C)	Peltier-type water-cooled	Deionized water, Chemical liquids

## Air Temperature Controller

### Peltier-type Air-Thermo **HEA**



- High precision, compact temperature control equipment using Peltier elements.
- Compatible with localized and small-volume temperature control.

Series	Set temperature range	Cooling capacity	Temperature stability	Cooling method	Fluid
HEA	32 to 122°F (0 to 50°C)	22 W	±0.18°F (±0.1°C)	Peltier-type air-cooled	Air

### Thermo-dryer with Air Temperature Adjustment Function **IDH□**



- Stable supply of temperature and pressure controlled dry clean air.  
Possible to supply compressed air with the same conditions and quality regardless of the season.
- Application example: Supplying compressed air with constant conditions to air bearings mounted on the tool.
- Built-in filter  
Nominal filtration: 0.01 μm (99.9% filtration efficiency)  
Outlet oil mist concentration: Max. 0.01 mg/m<sup>3</sup> (ANR)  
Outlet cleanliness: Particles of 0.3 μm or more: 3.5 particles/L (ANR) or less
- Power supply available all over the world  
Single-phase 100 VAC, 200 VAC, 230 VAC (50/60 Hz)

Series	Air flow capacity scfm L/min (ANR)	Outlet air temperature adjustment range	Outlet air set pressure range	Outlet air temperature stability	Temperature control method
IDH□4	3.5 to 18 (100 to 500)	59 to 86°F (15 to 30°C)	22 to 123 psi (0.15 to 0.85 MPa)	±0.18°F (±0.1°C)	Heater operation PID control
IDH□6	7.1 to 28 (200 to 800)				

## Card Motor



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## Slider Type



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- Electric Actuator/High Rigidity Slider Type/  
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## Rod Type/Guide Rod Type



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## Miniature



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## Card Motor

### Card Motor LAT3



- The transportation, pushing and length measurement systems have been miniaturized through the use of a linear motor.
- Thickness 9 mm, Weight 130 g (at stroke 10 mm)
- Moving magnetic type linear motor
- Linear guide with circulating balls
- Positioning repeatability:  $\pm 5 \mu\text{m}$
- Pushing measurement accuracy:  $\pm 10 \mu\text{m}$
- Easy programming (Cycle time entry)  
Just input 3 parameters: Positioning time, Target position, Load mass.

Model	Stroke	Sensor (Optical linear encoder)	Pushing	Maximum load mass		Maximum speed
		Resolution	Maximum instantaneous thrust	Horizontal	Vertical	
LAT3F	10	1.25 $\mu\text{m}$	1.17 lbf (5.2 N)	500 g	100 g	400 mm/s
	20	1.25 $\mu\text{m}$	1.35 lbf (6 N)	500 g	100 g	400 mm/s
	30	1.25 $\mu\text{m}$	1.24 lbf (5.5 N)	500 g	100 g	400 mm/s
LAT3	10	30 $\mu\text{m}$	1.17 lbf (5.2 N)	500 g	50 g	400 mm/s
	20	30 $\mu\text{m}$	1.35 lbf (6 N)	500 g	50 g	400 mm/s
	30	30 $\mu\text{m}$	1.24 lbf (5.5 N)	500 g	50 g	400 mm/s

### Card Motor Controller LATC4

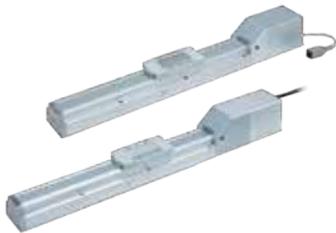


- Easy programming (Cycle time entry)  
Just input 3 parameters: Positioning time, Target position, Load mass.

Type	Series	Power supply voltage	Parallel input	
			Input	Output
Controller	LATC4	24 VDC $\pm 10\%$	6 inputs (Optically isolated)	4 outputs (Optically isolated, open collector output)

## Slider Type

### Electric Actuator/Slider Type LEFS



#### Series LEFS Step Motor (Servo/24 VDC) Servo Motor (24 VDC)

- Max. work load: 60 kg
- Positioning repeatability:  $\pm 0.02 \text{ mm}$
- Clean specification: Complies with ISO Class 4 (ISO14644-1) (11-LEFS)
- Compatible controllers: LECP6, LECA6, LECP1, LECPA, LECPMJ

#### Series LEFS AC Servo Motor

- High output motor (100/200/400 W)
- Improved high speed transfer ability
- High acceleration/deceleration (20000  $\text{mm/s}^2$ )
- Pulse input type
- With internal absolute encoder
- Positioning repeatability:  $\pm 0.02 \text{ mm}$
- Clean specification: Complies with ISO Class 4 (ISO14644-1) (11-LEFS)
- Compatible controllers: LECSA, LECSB, LECSA, LECSA

Motorless compatible

Clean room compatible

Spec.	Model	Stroke (mm)	Work load (kg) Horizontal Vertical	Speed (mm/s)	Screw lead (mm)
Step motor (Servo/24 VDC)	LEFS16	50 to 500	MAX. 10	MAX. 500	5, 10
	LEFS25	50 to 600	MAX. 20	MAX. 1000	6, 12, 20
	LEFS32	50 to 800	MAX. 45	MAX. 1200	8, 16, 24
	LEFS40	150 to 1000	MAX. 60	MAX. 1200	10, 20, 30
Servo motor (24 VDC)	LEFS16A	50 to 500	MAX. 10	MAX. 500	5, 10
	LEFS25A	50 to 600	MAX. 18	MAX. 800	6, 12, 20
AC servo motor (100/200/400 W)	LEFS25S	50 to 600	MAX. 20	MAX. 1500	6, 12, 20
	LEFS32S	50 to 800	MAX. 45	MAX. 1500	8, 16, 24
	LEFS40S	150 to 1000	MAX. 60	MAX. 1500	10, 20, 30

## Slider Type

### Electric Actuator/Slider Type/Belt Drive **LEFB**

Motorless compatible



#### Series LEFB Step Motor (Servo/24 VDC) Servo Motor (24 VDC)

- Max. stroke: 2000 mm
- Max. speed: 2000 mm/s
- Positioning repeatability:  $\pm 0.08$  mm
- Compatible controllers: LECP6, LECA6, LECP1, LECPA, LECPMJ

#### Series LEFB AC Servo Motor

- Max. speed: 2000 mm/s
- Max. stroke: 3000 mm
- Max. acceleration/deceleration: 20000 mm/s<sup>2</sup>
- Pulse input type
- With internal absolute encoder
- Positioning repeatability:  $\pm 0.06$  mm
- Compatible drivers: LECSA, LECSB, LECS, LECS
- Motorless specification available

Spec.	Model	Stroke (mm)	Work load (kg) Horizontal	Speed (mm/s)	Screw lead (mm)
Step motor (Servo/24 VDC)	LEFB16	300 to 1000	1	48 to 1100	48
	LEFB25	300 to 2000	5	48 to 1400	48
	LEFB32	300 to 2000	14	48 to 1500	48
Servo motor (24 VDC)	LEFB16A	300 to 1000	1	48 to 2000	48
	LEFB25A	300 to 2000	2	48 to 2000	48
AC servo motor	LEFB25S	300 to 2000	5	MAX. 2000	54
	LEFB32S	300 to 2500	15	MAX. 2000	54
	LEFB40S	300 to 3000	25	MAX. 2000	54

### Electric Actuator/High Rigidity Slider Type/Ball Screw Drive **LEJS**

Motorless compatible

Clean room compatible



- Low-profile/low center of gravity: Height dimension reduced by approx. 36% (Reduced by 32 mm)
- Max. work load: 85 kg
- Positioning repeatability:  $\pm 0.02$  mm
- Max. acceleration/deceleration: 20000 mm/s<sup>2</sup>
- Clean specification: Complies with ISO Class 4 (Class 10) (11-LEFS)
- Compatible controllers: LECSA, LECSB, LECS, LECS

Spec.	Model	Stroke (mm)	Work load (kg) Horizontal	Speed (mm/s)	Screw lead (mm)
AC servo motor	LEJS40	200 to 1200	Max. 55	Max. 1800	8, 16, 24
	LEJS63	300 to 1500	Max. 85	Max. 1800	10, 20, 30

### Electric Actuator/High Rigidity Slider Type/Belt Drive **LEJB**



- Max. stroke: 3000 mm
- Max. speed: 3000 mm/s
- Max. acceleration/deceleration: 20000 mm/s<sup>2</sup>
- Compatible drivers: LECSA, LECSB, LECS, LECS
- Motorless specification available

Spec.	Model	Stroke (mm)	Work load (kg) Horizontal	Speed (mm/s)	Screw lead (mm)
AC servo motor	LEJB40	200 to 2000	Max. 20	Max. 2000	27
	LEJB63	300 to 3000	Max. 30	Max. 3000	42

## Slider Type

### Electric Actuator/Compact Slider Type **LEM**



- Low profile, low center of gravity  
Table height: 28 mm (in the case of LEMC/H/HT size 25)
- Can be combined with various guides
- High maintainability
- Motor mounting position: Above or below, right or left selectable
- Solid state auto switch can be mounted for limit confirmation and intermediate signal confirmation
- Selectable controllability (Controller)  
Complete control like an air cylinder (allows for 12 point intermediate stop)  
Easy position setting by value input
- Compatible controllers: LECP2, LECP6, LECP1

Guide type	Model	Stroke (mm)	Work load (kg)	Speed (mm/s)	Equivalent lead (mm)
Basic	LEMB	100 to 2000	6, 11	1000	48
Cam follower guide	LEMC	100 to 2000	10, 20	1000	48
Linear guide (Single axis)	LEMH	100 to 1500	10, 20	2000	48
Linear guide (Double axis)	LEMHT	100 to 1500	10, 20	2000	48

### Electric Actuator/Guide Rod Slider **LEL**



- Low-profile/Flat Height: 48 mm
- Profile reduced by side mounting of motor  
No interference with motor, even with large workpieces.
- Auto switch mountable (Made to Order)
- Max. stroke: 1000 mm
- Transfer speed: 1000 mm/s
- Positioning repeatability:  $\pm 0.1$  mm
- Compatible controllers: LECP6, LECP1, LECPMJ

Spec.	Model	Bearing	Stroke (mm)	Work load (kg)	Speed (mm/s)
Step motor (Servo/24 VDC)	LEL25M	Sliding bearing	100 to 1000	3	Up to 500
	LEL25L	Ball bushing bearing	100 to 1000	5	Up to 1000

## Rod Type/Guide Rod Type

### Electric Actuator/Rod Type **LEY**



#### Series LEY

#### Step Motor (Servo/24 VDC)

- Long stroke: Max. 500 mm
- Direct mounting: 3 directions, Bracket mounting: 3 types
- Auto switch can be mounted.
- Speed control/Positioning: Max. 64 points
- Either positioning or pushing control can be selected.  
Possible to hold the actuator with the rod pushing to a workpiece, etc.
- Positioning repeatability:  $\pm 0.02$  mm or less
- Dust/Drip proof (IP65) specification
- Compatible controllers: LECP6, LECA6, LECP1, LECPA, LECPMJ

#### Series LEY

#### AC Servo Motor

- High output motor (100/200/400 W)
- Improved high speed transfer ability
- High acceleration compatible (5,000 mm/s<sup>2</sup>)
- Pulse input type
- With internal absolute encoder
- Positioning repeatability:  $\pm 0.02$  mm or less
- Dust/Drip proof (IP65) specification
- Compatible drivers: LECSA, LECSB, LECSA, LECSC, LECSS

Motorless compatible

Dust/Drip proof compatible

Spec.	Model	Stroke (mm)	Pushing force lbf (N)	Speed (mm/s)	Screw lead (mm)
Step motor (Servo/24 VDC)	LEY16□	30 to 300	Max. 31.7 (141)	Max. 500	2.5, 5, 10
	LEY25□	30 to 400	Max. 102 (452)	Max. 500	3, 6, 12
	LEY32□	30 to 500	Max. 159 (707)	Max. 500	4, 8, 16
	LEY40□	30 to 500	Max. 238 (1058)	Max. 300	4, 8, 16
Servo motor (24 VDC)	LEY16□A	50 to 300	Max. 25.0(111)	Max. 500	2.5, 5, 10
	LEY25□A	50 to 400	Max. 29.2 (130)	Max. 500	3, 6, 12
AC servo motor	LEY25□S	30 to 400	Max. 109 (485)	Max. 900	3, 6, 12
	LEY32□S	30 to 500	Max. 132 (588)	Max. 1200	5, 10, 20
	LEY63□S	100 to 800	Max. 752 (3343)	Max. 1000	5 (2.86), 5, 10, 20



## Rod Type/Guide Rod Type

### Electric Actuator/Guide Rod Type LEYG□D

Motorless compatible



#### Series LEYG Step Motor (Servo/24 VDC) Servo Motor (24 VDC)

- Compact integration of guide rods  
Achieves lateral load resistance and high non-rotating accuracy.
- Lateral end load: 5 times more (compared with rod type, size 25 and 100 stroke)
- Compatible with sliding bearing and ball bushing bearing.  
Compatible with moment load and stopper (sliding bearing).
- Speed control/Positioning: Max. 64 points
- Positioning and pushing control can be selected.  
Possible to hold the actuator when pushing the rod to a workpiece, etc.
- Positioning repeatability:  $\pm 0.02$  mm or less
- Compatible controllers: LECP6, LECA6, LECP1, LECPA, LECPMJ

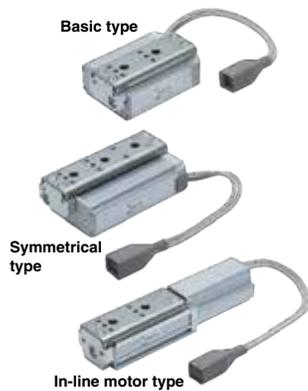
#### Series LEY AC Servo Motor

- High output motor (100/200 W)
- Improved high speed transfer ability
- High acceleration/deceleration compatible (5,000 mm/s<sup>2</sup>)
- Pulse input type
- With internal absolute encoder
- Compatible drivers: LECSA, LECSB, LECSA, LECSA

Spec.	Model	Stroke (mm)	Pushing force lbf [N]	Speed (mm/s)	Screw lead (mm)
Step motor (Servo/24 VDC)	LEYG16D	30 to 200	Max. 31.7 (141)	Max. 500	2.5, 5, 10
	LEYG25D	30 to 300	Max. 102 (452)	Max. 500	3, 6, 12
	LEYG32D	30 to 300	Max. 159 (707)	Max. 500	4, 8, 16
	LEYG40D	30 to 300	Max. 238 (1058)	Max. 300	4, 8, 16
Servo motor (24 VDC)	LEYG16DA	30 to 200	Max. 25.0 (111)	Max. 500	2.5, 5, 10
	LEYG25DA	30 to 300	Max. 29.2 (130)	Max. 500	3, 6, 12
AC servo motor	LEYG25DS	30 to 300	Max. 109 (485)	Max. 900	3, 6, 12
	LEYG32DS	30 to 300	Max. 165 (736)	Max. 1000	4, 8, 16

## Slide Tables

### Electric Slide Table/Compact Type LES

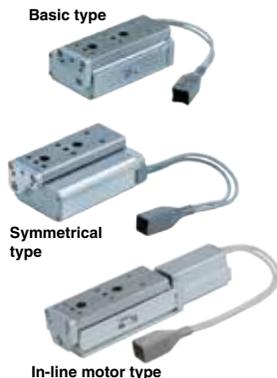


- Compact: Compared with the LESH, Workpiece mounting surface height: Reduced by up to 12%.
- Vertical work load: Increased by up to 50%
- Lightweight: Reduced by up to 29%
- Max. pushing force: 40.5 lbf (180 N)
- Positioning repeatability:  $\pm 0.05$  mm
- Possible to reduce cycle time  
Max. acceleration/deceleration: 5,000 mm/s<sup>2</sup>  
Max. speed: 400 mm/s
- Compatible controllers: LECP6, LECA6, LECP1, LECPA, LECPMJ

Spec.	Model	Stroke (mm)	Work load (kg) Horizontal	Work load (kg) Vertical	Speed (mm/s)	Screw lead (mm)
Step motor (Servo/24 VDC)	LES8□	30, 50, 75	Max.. 1	Max. 0.5	Max. 400	4, 8
	LES16□	30, 50, 75, 100	Max.. 3	Max. 3	Max. 400	5, 10
	LES25□	30, 50, 75, 100, 125, 150	Max.. 5	Max. 5	Max. 400	8, 16
Servo motor (24 VDC)	LES8□A	30, 50, 75	Max.. 1	Max. 1	Max. 400	4, 8
	LES16□A	30, 50, 75, 100	Max.. 3	Max. 3	Max. 400	5, 10
	LES25□A	30, 50, 75, 100, 125, 150	Max.. 5	Max. 4	Max. 400	8, 16

## Slide Tables

### Electric Slide Table/High Rigidity Type **LESH**



- Easy setting: Data can be set with only 2 items, position and speed. The controller is already set with the data of the actuator. (The actuator and controller are sold as a package.)
- Integration of the guide rail and the table. Uses a recirculating linear guide for high rigidity and high precision.
- Reduced cycle time  
Max. acceleration and deceleration: 5,000 mm/s<sup>2</sup>  
Max. speed: 400 mm/s
- Maximum pushing force: 40.5 lbf (180 N)
- Positioning repeatability: ±0.05 mm
- Compatible controllers: LECP6, LECA6, LECP1, LECPA, LECPMJ

Spec.	Model	Stroke (mm)	Work load (kg) Horizontal	Work load (kg) Vertical	Speed (mm/s)	Screw lead (mm)
Step motor (Servo/24 VDC)	LESH8□	50, 75	Max. 2	Max. 0.5	Max. 400	4, 8
	LESH16□	50, 100	Max. 6	Max. 2	Max. 400	5, 10
	LESH25□	50, 100, 150	Max. 9	Max. 4	Max. 400	8, 16
Servo motor (24 VDC)	LESH8□A	50, 75	Max. 2	Max. 0.5	Max. 400	4, 8
	LESH16□A	50, 100	Max. 5	Max. 2	Max. 400	5, 10
	LESH25□A	50, 100, 150	Max. 6	Max. 2.5	Max. 400	8, 16

## Miniature

### Electric Actuator/Miniature Rod Type **LEPY**



- Compact and lightweight  
W 20.5 mm x H 30 mm x L 125.6 mm, weight 240 g
- Max. pushing force: 11.2 lbf (50 N)
- Positioning repeatability: ±0.05 mm
- Possible to set position, speed and force (64 points)
- Max. speed (Horizontal): 350 mm/s
- Compatible controllers: LECP6, LECP1, LECPA, LECPMJ

Spec.	Series	Stroke (mm)	Pushing force lbf [N]		Max. work load [kg] (Horizontal)		Screw lead
			Basic	Compact	Basic	Compact	
Step motor (Servo/24 VDC)	LEPY6	25, 50, 75	Max. 4.5 (20)	—	Max. 1.0	—	4.8
	LEPY10	25, 50, 75	Max.11.2 (50)	Max. 9.0 (40)	Max. 2.0	Max. 2.0	5, 10

### Electric Actuator/Miniature Slide Table Type **LEPS**



- Compact and lightweight  
W 21 mm x H 41 mm x L 138.6 mm, weight 290 g
- Max. pushing force: 11.2 lbf (50 N)
- Positioning repeatability: ±0.05 mm
- Possible to set position, speed and force (64 points)
- Max. speed (Horizontal): 350 mm/s
- Compatible controllers: LECP6, LECP1, LECPA, LECPMJ

Spec.	Series	Stroke (mm)	Pushing force lbf [N]		Max. work load [kg] (Horizontal)		Screw lead
			Basic	Compact	Basic	Compact	
Step motor (Servo/24 VDC)	LEPS6	25, 50	Max. 4.5 (20)	—	Max. 1.0	—	4.8
	LEPS10	25, 50	Max.11.2 (50)	Max. 9.0 (40)	Max. 2.0	Max. 2.0	5, 10

## Rotary Tables

### Electric Rotary Table LER



- Rotation angle: 320° (310°), 180°, 90°  
( ) The value indicated in brackets shows the value for the LER10.
- Low profile: Height 42 mm (LER10)
- Space-saving: Built-in step motor
- Shock-less/high speed actuation  
Max. speed: 420°/sec (7.33 rad/sec)  
Max. acceleration/deceleration: 3,000°/sec<sup>2</sup> (52.36 rad/sec<sup>2</sup>)
- Possible to set speed, acceleration/deceleration, and position. Max. 64 points
- Energy-saving: Automatic 40% power reduction after the table has stopped.
- Easy setting: Data can be set with only 2 items, position and speed.  
The controller is already set with the data of the actuator. (The actuator and controller are provided as a set.)
- Compatible controllers: LECP6, LECP1, LECPA, LECPMJ

\* Value when an external stopper is mounted.

Model	Rotating torque lbf-in [N·m]		Max. speed [°/s]		Positioning repeatability [°]	
	Basic	High torque	Basic	High torque	Basic	High torque
LER10	1.8 (0.2)	2.7 (0.3)	420	280	±0.05 (End: ±0.01) *	±0.05 (End: ±0.01) *
LER30	7.1 (0.8)	10.6 (1.2)	420	280		
LER50	58.4 (6.6)	88.5 (100)	420	280		

## Grippers

### Electric Gripper/2 Fingers/Z Type LEHZ



- Easy setting: Data can be set 2 items, position and force.  
The controller is already set with the data of the actuator. (The actuator and controller are sold as a package.)
- Drop prevention function is provided. (Self-lock mechanism is provided for all series.)
- Power consumption reduced by self-lock mechanism.
- Gripping check function is provided.
- Possible to set position, speed and force. (64 points)
- Compatible controllers: LECP6, LECP1, LECPA, LECPMJ

Model	Body size	Stroke/ both sides (mm)	Gripping force lbf [N]		Opening and closing speed (mm/s)
			Basic	Compact	
LEHZ	10	4	1.3 to 3.1 (6 to 14)	0.45 to 1.35 (2 to 6)	5 to 80
	16	6	1.3 to 3.1 (6 to 14)	0.67 to 1.80 (3 to 8)	5 to 80
	20	10	3.6 to 9.0 (16 to 40)	2.47 to 6.29 (11 to 28)	5 to 100
	25	14	3.6 to 9.0 (16 to 40)	2.47 to 6.29 (11 to 28)	5 to 100
	32	22	11.7 to 29.2 (52 to 130)	—	5 to 120
	40	30	18.9 to 47.2 (84 to 210)	—	5 to 120

### Electric Gripper/2 Fingers/With Dust Cover/ZJ Type LEHZJ



- Easy setting: Data can be set 2 items, position and force.  
The controller is already set with the data of the actuator. (The actuator and controller are sold as a package.)
- Drop prevention function is provided. (Self-lock mechanism is provided for all series.)
- Power consumption reduced by self-lock mechanism.
- Gripping check function is provided.
- Possible to set position, speed and force. (64 points)
- Compatible controllers: LECP6, LECP1, LECPA, LECPMJ

Model	Body size	Stroke/ both sides (mm)	Gripping force lbf [N]		Opening and closing speed (mm/s)
			Basic	Compact	
LEHZJ	10	4	1.3 to 3.1 (6 to 14)	0.7 to 1.3 (3 to 6)	5 to 80
	16	6	1.3 to 3.1 (6 to 14)	0.9 to 1.8 (4 to 8)	5 to 80
	20	10	3.6 to 9.0 (16 to 40)	2.5 to 6.3 (11 to 28)	5 to 100
	25	14	3.6 to 9.0 (16 to 40)	2.5 to 6.3 (11 to 28)	5 to 100

## Grippers

### Electric Gripper/2 Fingers/F Type **LEHF**



- Easy setting: Data can be set 2 items, position and force.  
The controller is already set with the data of the actuator. (The actuator and controller are sold as a package.)
- Drop prevention function is provided. (Self-lock mechanism is provided for all series.)
- Power consumption reduced by self-lock mechanism.
- Gripping check function is provided.
- Possible to set position, speed and force. (64 points)
- Compatible controllers: LECP6, LECP1, LECPA, LECPMJ

Note) ( ): For long stroke

Model	Body size	Stroke/ both sides (mm)	Gripping force lbf (N)		Opening and closing speed (mm/s)
			Basic	Compact	
LEHF	10	16 (32) Note)	0.7 to 1.6 (3 to 7)	0.7 to 1.6 (3 to 7)	5 to 80
	20	24 (48) Note)	2.5 to 6.3 (11 to 28)	2.5 to 6.3 (11 to 28)	5 to 100
	32	32 (64) Note)	10.8 to 27.0 (48 to 120)	10.8 to 27.0 (48 to 120)	5 to 100
	40	40 (80) Note)	16.2 to 40.5 (72 to 180)	16.2 to 40.5 (72 to 180)	5 to 100

### Electric Gripper/3 Fingers/S type **LEHS**



- Easy setting: Data can be set 2 items, position and force.  
The controller is already set with the data of the actuator. (The actuator and controller are sold as a package.)
- Drop prevention function is provided. (Self-lock mechanism is provided for all series.)
- Power consumption reduced by self-lock mechanism.
- Gripping check function is provided.
- Possible to set position, speed and force. (64 points)
- Compatible controllers: LECP6, LECP1, LECPA, LECPMJ

Model	Body size	Stroke/ both sides (mm)	Gripping force lbf (N)		Opening and closing speed (mm/s)
			Basic	Compact	
LEHS	10	4	0.5 to 1.2 (2.2 to 5.5)	0.3 to 0.8 (1.4 to 3.5)	5 to 70
	20	6	2.0 to 5.0 (9 to 22)	1.6 to 3.8 (7 to 17)	5 to 80
	32	8	8.09 to 20.2 (36 to 90)	—	5 to 100
	40	12	11.7 to 29.2 (52 to 130)	—	5 to 120

## Made to Order

### Electric Stopper Cylinder (Made to Order) **LEBQ**

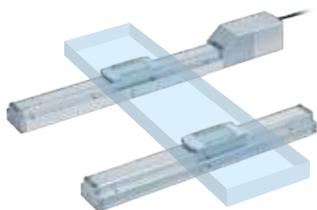


- Suitable for conveyer lines without an air supply.
- Rod end shape  
Chamfered type, roller type and lever type are available.
- Energy-saving  
Power consumption at rod stoppage is reduced by 60%.
- Height and mounting method are compatible with the stopper cylinder Series RSQ.
- Easy setting  
Easy adjustment on site with programless controller  
Applicable to controller/Series LEC which allows detailed settings
- Compatible controllers: LECP6, LECP1

Series	Stroke (mm)	Pushing force lbf (N)	Speed (mm/s)	Screw lead (mm)
LEBQ32	20	6.7 (30)	80	5
LEBQ50	30	33.7 (150)	135	8

## Made to Order

### ● Electric Actuator/Series LEF Support Guide **LEFG**



- A support guide is designed to support work pieces with significant overhang.
- Easy installation with the same outer dimensions as Series LEF body, contributes to reductions in man-hour for design and assembly
- Standardly equipped sealing band prevents the scattering of grease and entry of foreign matter from outside.

Description	Type	Stroke (mm)	Rated load lbf (N)	
			Basic dynamic load rating	Basic static load rating
Ball screw drive	LEFG16-S	50 to 500	1405 (6250)	1877 (8350)
	LEFG25-S	50 to 600	2012 (8950)	3125 (13900)
	LEFG32-S	50 to 800	3709 (16500)	4946 (22000)
	LEFG40-S	150 to 1000	5103 (22700)	7756 (34500)
Belt drive	LEFG16-BT	300 to 1000	1405 (6250)	1877 (8350)
	LEFG25-BT	300 to 2000	2012 (8950)	3125 (13900)
	LEFG32-BT	300 to 2000	3709 (16500)	4946 (22000)
Belt drive	LEFG25-BS	300 to 2000	1405 (6250)	1877 (8350)
	LEFG32-BS	300 to 2500	2012 (8950)	3125 (13900)
	LEFG40-BS	300 to 3000	3709 (16500)	4946 (22000)

## Controllers/Drivers

### ● Step Data Input Type **LECP6/LECA6**



- The controller is already set with the data of the actuator. (The actuator and controller are sold as a package.)
- Easy operation and simple setting: Easy mode, Detail setting: Normal mode
- Teaching box, controller setting software

Type	Series	Compatible motor	Power supply voltage	Parallel input/output		Number of step data
				Input	Output	
Step data input type	LECP6	Step motor (Servo/24 VDC)	24 VDC ±10%	11 (Photo-coupler isolation)	13 (Photo-coupler isolation)	64 points
	LECA6	Servo motor (24 VDC)	24 VDC ±10%			64 points

### ● Programless Type (With Stroke Study) **LECP2**



- End to end operation similar to an air cylinder
- 2 stroke end points + 12 intermediate points positioning
- Control panel setting
- Wire-saving design

Type	Series	Compatible motor	Power supply voltage	Parallel input/output		Number of step data
				Input	Output	
Programless type (With stroke study)	LECP2	Step motor (Servo/24 VDC)	24 VDC ±10%	6 (Photo-coupler isolation)	6 (Photo-coupler isolation)	14 (2 stroke end points, 12 intermediate points)

### ● Programless Controller **LECP1**



- No programming  
Capable of setting up an electric actuator operation without using a PC or teaching box
- Speed/acceleration 16-level adjustment
- Compatible with actuators with locks
- Setting 3-level pushing force

Type	Series	Compatible motor	Power supply voltage	Parallel input/output		Number of step data
				Input	Output	
Programless type	LECP1	Step motor (Servo/24 VDC)	24 VDC ±10%	6 (Photo-coupler isolation)	6 (Photo-coupler isolation)	14 points

## Controllers/Drivers

### Step Motor Driver (Pulse Input Type) **LECPA**



- A driver that uses pulse signals to allow positioning at any position. The actuator can be controlled from the customers' positioning unit.
- Return-to-origin command signal
- With force limit function (Pushing force/Gripping force operation available)

Type	Series	Compatible motor	Power supply voltage	Parallel input/output		Number of step data
				Input	Output	
Pulse input type	LECPA	Step motor (Servo/24 VDC)	24 VDC ±10%	5 (Photo-coupler isolation)	9 (Photo-coupler isolation)	—

### Step Motor Controller/CC-Link Direct Input Type **LECPMJ**



- CC-Link Ver. 1.10 compatible
- External data import function
- Position and speed can be monitored by the PLC touch panel (display).
- Step data can be edited from the PLC touch panel (display).

Type	Series	Compatible motor	Power supply voltage	Fieldbus
CC-Link direct input type	LECPMJ	Step motor (Servo/24 VDC)	24 VDC ±10%	CC-Link Ver. 1.10

### Fieldbus-compatible Gateway (GW) Unit **LEC-G**



- The LE series electric actuators are applicable to Fieldbus protocols.
- Conversion unit for Fieldbus network and LEC serial communication
- Two methods of operation  
Step data input, numerical data input
- Position, speed, etc. values can be checked on the PLC.

Series	Applicable Fieldbus	Power supply voltage	Applicable controllers
LEC-G	CC-Link DeviceNet™ PROFIBUS DP EtherNet/IP™	24 VDC ±10%	Series LECP6 Series LECA6

### AC Servo Motor Controller (Pulse Input Type) **LECS**



- Pulse input type motor driver
- Compatible motor capacity: 100 W, 200 W, 400 W
- Compatible encoder: Incremental type  
Absolute type
- Servo adjustment using auto gain tuning
- With display setting function

Type	Series	Compatible motor	Power supply voltage	Parallel input/output		Number of step data
				Input	Output	
Pulse input type (For incremental encoder)	LECSA	AC servo motor (100/200/400 W)	100 to 120 VAC (50/60 Hz) 200 to 230 VAC (50/60 Hz)	6 (Photo-coupler isolation)	4 (Photo-coupler isolation)	7 points
Pulse input type (For absolute encoder)	LECSB			10 (Photo-coupler isolation)	6 (Photo-coupler isolation)	—
CC-Link direct input type (For absolute encoder)	LECS			4 (Photo-coupler isolation)	3 (Photo-coupler isolation)	255 points
SSCNET#type (For absolute encoder)	LECSA			4 (Photo-coupler isolation)	3 (Photo-coupler isolation)	—

## Electric Cylinders

### ● Electric Cylinder **LZB/LDZB/LZC/LDZC**



- It can be operated like an air cylinder.
- With auto switch (Series LDZB: LDZB, Series LDZC: LDZC)

Series	Max. thrust	Max. speed	Lead screw type	Stroke (mm)
LZB	44.1 lbf (196 N) or more	200 mm/s or more	Slide screw: ø8, ø12 Lead: 2 mm, 6 mm, 12 mm	25, 40, 50, 100, 200
LZC	44.1 lbf (196 N) or more	200 mm/s or more		25, 40, 50, 100, 200

### ● Directional Control Driver for Electric Cylinder **LC3F**



- Directional control driver like a solenoid valve.
- Command for transfer with ON/OFF signal, possible to set thrust.
- Driver and motor burnout protection with current control.

Series	Applicable model
LC3F2	LZB, LZC

## High Vacuum Valves



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## Rodless Cylinder for Vacuum



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## Hydraulic Cylinders



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## High Vacuum Valves

### Aluminum High Vacuum Angle Valve XL□



- Strong against fluorine
- Minimal gas emissions
- Minimal heavy metal contamination

Series	Actuation	Shaft seal system	Valve type	Material	Flange size	
XLA	Air operated	Bellows seal	Single acting (N.C.)	Body: Aluminum alloy Bellows: Stainless steel 316L	16 to 80	
XLAV (With solenoid valve)		Bellows seal	Single acting (N.C.)		16 to 80	
XLC		Bellows seal	Double acting		16 to 80	
XLCV (With solenoid valve)		Bellows seal	Double acting		16 to 80	
XLF		O-ring seal	Single acting (N.C.)	Body: Aluminum alloy	16 to 160	
XLFV (With solenoid valve)		O-ring seal	Single acting (N.C.)		16 to 160	
XLG		O-ring seal	Double acting		16 to 80	
XLGV (With solenoid valve)		O-ring seal	Double acting		16 to 80	
XLD		Air operated	Bellows/O-ring seal	Single acting (N.C.)	Body: Aluminum alloy Bellows: Stainless steel 316L	25 to 80
XLDV (With solenoid valve)			Bellows/O-ring seal	Single acting (N.C.)		25 to 80
XLH	Manual	Bellows seal	Manual		16 to 50	
XLS	Electromagnetic	Pressure balanced bellow seal	Single acting (N.C.)		16, 25	

### Aluminum One-touch Connection and Release High Vacuum Angle Valve XLAQ/XLDQ



- One-touch connection and release (no tool)

Series	Actuation	Shaft seal system	Valve type	Material	Flange size
XLAQ	Air operated	Bellows seal	Single acting (N.C.)	Body: Aluminum Bellows: Stainless steel 316L	16 to 50
XLDQ		Bellows seal O-ring seal			40, 50

### Stainless Steel High Vacuum Angle/In-line Valve XM/XY



- A precision casting, unified composition prevents accumulation of gas.
- Mounting interchangeable with Aluminum High Vacuum Angle Valve Series XL (Series XM)

Note) Size 16 is not available for In-line type.

Series	Actuation	Shaft seal system	Valve type	Material	Flange size
XMA/XYA	Air operated	Bellows seal	Single acting (N.C.)	Body: SCS13 (equivalent to stainless steel 304) Bellows: Stainless steel 316L	16 to 80 <small>Note)</small>
XMC/XYC		Bellows seal	Double acting		16 to 80 <small>Note)</small>
XMD/XYD		Bellows/O-ring seal	Single acting (N.C.)		25 to 80
XMH/XYH	Manual	Bellows seal	Manual		16 to 50 <small>Note)</small>

## High Vacuum Valves

### High Vacuum Straight Solenoid Valve **XSA**



- Solenoid valve with metal seal fittings (VCR®/Swagelok®)
- Dust reduction has been achieved through the use of non-rotating metal parts.
- Improved back pressure performance

Series	Valve type	Fluid	Piping	Port size
XSA	Normally closed direct acting 2 port solenoid valve	Inert gas which protects the Stainless steel (equivalent to SUS405) from corrosion	VCR® Swagelok®	1/4B, 3/8B

### Smooth Vent Valve **XVD**



- With the valve and needle valve all in one unit, takes up 1/4 the space of conventional models
- Major reduction in particles through the use of a metal diaphragm in the sheet portion
- The flow rate of both initial air supply and main air supply can be adjusted.

Series	Valve type	Fluid	Piping	Port size
XVD	Normally closed (Open when pressured, Spring seal)	Nitrogen, Air, Inert gas, etc.	VCR® Swagelok®	1/4B

## Slit Valves

### Slit Valve **XGT**



- Suitable for use as a block disk between the load lock chamber and transfer chamber, or the transfer chamber and process chamber, of semiconductor equipment

Series	Operating pressure range (Pa)	Fluid	Gate size (Height x Width) (mm)	Operating pressure
XGT	Atmospheric pressure to $1 \times 10^{-6}$	Inert gas type vacuum	32 x 222 46 x 236 50 x 336	65 to 87 psi (0.45 to 0.6 MPa)

### Slit Valve/Door Valve **XGT/XGD**



- For 450 mm wafer gate valve
- Top accessible
- Replaceable bellows
- Adopted a two-stage operating structure
- With end lock mechanism

Series	Operating pressure range (Pa)	Fluid	Gate size (Height x Width)	Operating pressure psi (MPa)
XGT/Slit Valve	Atmospheric pressure to $1 \times 10^{-6}$	Inert gas	56 x 496 mm	65 to 87 (0.45 to 0.6)
XGD/Door Valve	Atmospheric pressure to $1 \times 10^{-6}$	Inert gas	56 x 496 mm	58 to 87 (0.4 to 0.6)

## Rodless Cylinder for Vacuum

### Rodless Cylinder for Vacuum **CYV**



- Air cylinder for transfer in vacuum environments ( $1.3 \times 10^{-4}$  Pa)

Series	Operating environment pressure [Pa (ABS)]	Bore size (mm)
CYV	Atmosphere to $1.3 \times 10^{-4}$	15, 32

## Hydraulic Cylinders

### Compact Hydraulic Cylinder CHQ/CHDQ



- Lightweight, compact aluminum body
- Possible to mount auto switches.
- Same longitudinal dimensions for cylinders with/without auto switches.
- With auto switch (Series CHDQ: CHDQ, CHDQW)

Series	Nominal pressure psi (MPa)	Body material	Operation	Tube bore size (mm)
CHQ	508 (3.5)	Aluminum	Double acting single rod	20, 32, 40, 50, 63, 80, 100
CHQW	508 (3.5)	Aluminum	Double acting double rod	20, 32, 40, 50, 63, 80, 100

### JIS Standard Compact Hydraulic Cylinder CHK□/CHDK□



CHKD

CHKG

- Lightweight, compact aluminum body
- Possible to mount auto switches.
- Same longitudinal dimensions for cylinders with/without auto switches.
- Conforming to JIS Standard (Series CHKD).
- With auto switch (Series CHDK□: CHDKD, CHDKG)

Series	Nominal pressure psi (MPa)	Body material	Operation	Tube bore size (mm)
CHKD	1450 (10)	Aluminum	Double acting single rod	20, 25, 32, 40, 50, 63, 80, 100
CHKG	2320 (16)	Aluminum	Double acting single rod	20, 25, 32, 40, 50, 63, 80, 100

### Small Bore Hydraulic Cylinder CHN



- Lightweight with a stainless steel tube and aluminum cover
- Uses the cushion seal system mechanism, reduces impact at the stroke end, and improves durability.
- Compact section dimension of the cover compared to tie-rod cylinders.

Series	Nominal pressure psi (MPa)	Tube material	Operation	Tube bore size (mm)
CHN	1015 (7)	Stainless steel	Double acting single rod	20, 25, 32, 40

### Round Type Hydraulic Cylinder CHM/CHDM



- Lightweight with an aluminum tube and cover
- With auto switch (Series CHDM: CHDM)

Series	Nominal pressure psi (MPa)	Tube material	Operation	Tube bore size (mm)
CHM	508 (3.5)	Aluminum	Double acting single rod	20, 25, 32, 40

### ISO Standard Hydraulic Cylinder CHS□/CHDS□



CHSD

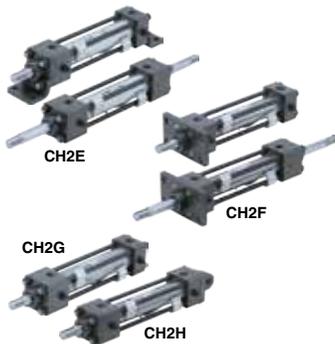
CHSG

- Cylinder with built-in cover and mounting bracket allows easy disassembly and assembly.
- Compact section dimension of the cover compared to tie-rod cylinders.
- Reduced overall length (Compared to Series CH2)
- With auto switch (Series CHDS□: CHSD, CHDSG)

Series	Nominal pressure psi (MPa)	Tube material	Operation	Tube bore size (mm)
CHSD	1450 (10)	Stainless steel	Double acting single rod	40, 50, 63, 80, 100
CHSG	2320 (16)	Stainless steel	Double acting single rod	32, 40, 50, 63, 80, 100

## Hydraulic Cylinders

### JIS Standard Hydraulic Cylinder CH2/CHD2



- Uses the cushion seal type cushion mechanism, reduces impact at the stroke end, and improves durability.
- Rod cover with block construction for easy disassembly and assembly.
- With auto switch (Series CHD2: CHD2E, CHD2EW, CHD2F, CHD2FW, CHD2G, CHD2H)

Series	Nominal pressure psi (MPa)	Tube material	Operation	Tube bore size (mm)
CH2E	508 (3.5)	Aluminum	Double acting single rod	32, 40, 50, 63, 80, 100
CH2EW	508 (3.5)	Aluminum	Double acting double rod	32, 40, 50, 63, 80, 100
CH2F	1015 (7)	Stainless steel	Double acting single rod	32, 40, 50, 63, 80, 100
CH2FW	1015 (7)	Stainless steel	Double acting double rod	32, 40, 50, 63, 80, 100
CH2G	2031 (14)	Iron	Double acting single rod	32, 40, 50, 63, 80, 100
CH2H	2031 (14)	Stainless steel	Double acting single rod	32, 40, 50, 63, 80, 100

### Tie-rod Type Hydraulic Cylinder CHA/CHDA



- With auto switch (Series CHDA: CHDA, CHDAW)

Series	Nominal pressure psi (MPa)	Tube material	Operation	Tube bore size (mm)
CHA	508 (3.5)	Aluminum	Double acting single rod	40, 50, 63, 80, 100
CHAW	508 (3.5)	Aluminum	Double acting double rod	40, 50, 63, 80, 100
CHA□F	508 (3.5)	Iron	Double acting single rod	40, 50, 63, 80, 100, 125, 160
CHAW□F	508 (3.5)	Iron	Double acting double rod	40, 50, 63, 80, 100, 125, 160

### Air-Hydro Booster CQ2



- Converts air pressure to hydraulic pressure for high pressure hydraulic cylinder actuation.
- No hydraulic pump is required. High hydraulic pressure can easily be obtained.
- Applications:  
For lifting workpieces  
For automatic clamping devices  
Hydraulic pressure source for low profile hydraulic cylinders

Series	Pneumatic cylinder dia. (mm)	Generated hydraulic pressure (with 0.5 MPa)	Amount of discharged oil (cm <sup>3</sup> )
CQ2	100, 140, 160	3.5 to 14	17 to 105

## Hydraulic Equipment

### Vertical Suction Filter FHIA



- Vertical suction filters are designed for installation between the pump and reservoir tank. Their main function is to protect the pump.
- Possible to detect clogging with the differential pressure indicator and differential pressure indication switch (CB-□□H).

Series	Port size	Flow range gal/min (L/min)	Operating pressure	Element μm (Nominal filtration)
FHIA	1/2B to 4B	7.9 to 343 (30 to 1300)	Negative pressure	Micromesh: 74, 105, 149

## Hydraulic Equipment

### Suction Filter with Case FH99



- Compact, lightweight. Cover and case material: Aluminum casting
- Prevents the pump cavitation.
- Easy element maintenance.
- Possible to detect clogging with the differential pressure indicator and differential pressure indication switch (CB-□□H).

Series	Port size	Flow range	Operating pressure	Element $\mu\text{m}$ (Nominal filtration)
FH99	INLET: 1B to 4B	5.3 to 238 gal/min (20 to 900 L/min)	Negative pressure	Micromesh: 74, 105, 149

### Suction Guard FHG



- Prevents collected dust from falling into the tank.
- No need to replace flushing oil.
- Easy maintenance and no air mixing.
- Integrates a lubrication port strainer, suction filter, and air breather.
- Possible to detect clogging with the differential pressure indicator and differential pressure indication switch (CB-□□H).

Series	Port size	Flow range	Operating pressure	Element $\mu\text{m}$ (Nominal filtration)
FHG	1/2B to 3B	4.8 to 119 gal/min (18 to 450 L/min)	Negative pressure	Micromesh: 74, 105, 149

### Line Filter FH



- Compact, solid, and safe design
- Easy element replacement.
- Easy fluid flow direction reversal.
- Possible to detect clogging with the differential pressure indicator and differential pressure indication switch (CB-□□H).

Series	Port size	Flow range	Operating pressure psi (MPa)	Element $\mu\text{m}$ (Nominal filtration)
FH34	Threaded (Rc) 3/8 to 1 1/2 Flange SSA 15 (1/2B) to 80 (3B)	2.6 to 159 gal/min (10 to 600 L/min)	508, 1015, 2031, 3046 (3.5, 7, 14, 21)	Paper: 5, 10, 20
FH44				
FH54				
FH64				

### Vertical Return Filter FHBA



- Vertical return filters are designed for mounting directly on top of oil tanks for hydraulic systems. They prevent dust generated within the circuit from entering the tank and help keep the oil clean. This efficient configuration reduces the total number of filters required.
- Possible to detect clogging with the differential pressure indicator and differential pressure indication switch (CB-□□H).

Series	Port size (Rc)	Max. flow range gal/min (L/min)	Element $\mu\text{m}$ (Nominal filtration)
FHBA	3/4 to 1 1/2	40, 79, 106 (150, 300, 400)	Paper: 5, 10, 20 Micromesh: 5, 10, 20

### Return Filter FH100



- Easy maintenance
- Possible to detect clogging with the differential pressure indicator and differential pressure indication switch (CB-□□H).

Series	Port size (Rc)	Rated flow range gal/min (L/min)	Element $\mu\text{m}$ (Nominal filtration)
FH100	3/4 to 3	Paper: 13 to 159 (50 to 600) Micromesh: 16 to 185 (60 to 700)	Paper: 5, 10, 20 Micromesh: 74, 105

# Hydraulic Equipment

## Oil Filter FH150



- Compact, lightweight. Cover material: Aluminum die-casted
- Easy maintenance
- Possible to detect clogging with the differential pressure indicator and differential pressure indication switch (CB-□□H).

Series	Port size (Rc)	Rated flow range gal/min (L/min)	Element $\mu\text{m}$ (Nominal filtration)
FH150	1/4 to 1/2	1.3 to 5.3 (5 to 20)	Paper: 5, 10, 20

## Magnetic Separator FHM



- Magnetic separators protect machinery from malfunctions, reduced precision, and burnout by adsorbing and eliminating contaminants in the fluid by means of magnetism. This helps extend the service life of hydraulic equipment.

Series	Applicable fluid storage volume (L/unit)	Flow speed	Fluid
FHM	20 to 200	3 m/min or less	FHMN: Petroleum, Water glycol, Cutting oil, Emulsion FHMV: Phosphoric ester

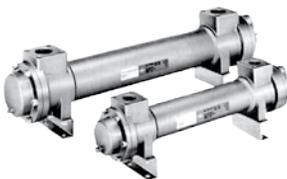
## Fixed Pipe Type Oil Cooler: Water Cooled/Iron Particle Type HOWF



- High heat transfer coefficient through the effects of turbulence.
- Compact design requiring less installation space.  
1/2 to 1/5 the size of conventional oil coolers.
- Flexible installation orientation.
- Minimal pressure drop.

Series	Heat transfer area (Inside pipe) $\text{m}^2$	Heat exchange volume (kW)	Flow rate gal/min (L/min) Oil side	Flow rate gal/min (L/min) Cooling water side
HOWF	0.077 to 1.28	5.2 to 73	5.3 to 211 (20 to 800)	11 to 33 (40 to 125)

## Floating Pipe Type Oil Cooler: Water Cooled/Copper Particle Type HOW



- High heat transfer coefficient
- High heat conductivity
- Compact design requiring less installation space.  
1/2 to 1/5 the size of conventional oil coolers.
- High heat transfer coefficient through the effects of turbulence.
- Minimal pressure drop.

Series	Heat transfer area (Inside pipe) $\text{m}^2$	Heat exchange volume (kW)	Flow rate gal/min (L/min) Oil side	Flow rate gal/min (L/min) Cooling water side
HOW	0.084 to 0.75	6 to 52	5.3 to 106 (20 to 400)	6.6 to 26 (25 to 100)

## Pneumatic Instrumentation Equipment

### Regulators



- Filter Regulator/**1301/IW** ..... P.172
- Filter Regulator/**AW30/40-X2622** ..... P.172

### Positioners



- Electro-Pneumatic Positioner/Smart Positioner/  
**IP8100/IP8101** ..... P.172
- Cylinder Positioner/**IP200** ..... P.172

### Relay/Valve



- Booster Relay/**IL100** ..... P.173
- Lock-Up Valve/**IL201/211**..... P.173

### Related Products



- Electro-Pneumatic Transducer/**IT600/601** ..... P.173
- Pressure Switch/**IS100** ..... P.173

## Other Derived Series

### Clean/Low-Particle Generation 10-/11-/12-/13-/21-/22-



- Clean/Low-Particle Generation/  
10-/11-/12-/13-/21-/22- ..... P.174

### Series Compatible with Secondary Batteries 25A-



- Series Compatible with Secondary Batteries/25A- ..... P.174

## Regulators

### Filter Regulator 1301/IW



Series	Port size	Set pressure psi (MPa)	Filtration (μm)
1301	Rc1/4	2.9 to 29 (0.02 to 0.2)	5
IW		2.9 to 44 (0.02 to 0.3) 2.9 to 73 (0.02 to 0.5)	

### Filter Regulator AW30/40-X2622



- Stainless steel 316 and special temperature environment (−40°F (−40°C)) specifications
- External parts material: Stainless steel 316
- Ambient and fluid temperature: −40 to 176°F (−40 to 80°C)
- NACE International Standards compliant

Series	Port size	Set pressure psi (MPa)	Filtration (μm)
AW30/40-X2622	1/4, 3/8, 1/2	7.3 to 123 (0.05 to 0.85)	5

## Positioners

### Electro-Pneumatic Positioner/Smart Positioner IP8□00/IP8□01



IP8001(Lever Type)



IP8101(Rotary Type)

- Enclosure: JISF8007 IP65 (IEC 60529)
- Monitoring function
- Explosion proof structure  
Electro-pneumatic positioner: TIIIS withstand pressure explosion proof construction (Exd @ BT5)  
ATEX intrinsically safe explosion proof structure (@ 2G Ex ia @ CT5/T6)
- Smart positioner: ATEX intrinsically safe explosion proof structure (@ 1G Ex ia @ CT4/T5/T6)
- HART communication function (Smart positioner)

Description	Series	Type	Port size (Rc, NPT, G)	Supply air pressure psi (MPa)	Input current
Electro-pneumatic positioner	IP8000	Lever Type	1/4	20 to 102 (0.14 to 0.7)	4 to 20 mA DC
Electro-pneumatic positioner	IP8100	Rotary Type	1/4	44 to 102 (0.3 to 0.7)	4 to 20 mA DC
Smart positioner	IP8001	Lever Type	1/4	44 to 102 (0.3 to 0.7)	4 to 20 mA DC
Smart positioner	IP8101	Rotary Type	1/4	44 to 102 (0.3 to 0.7)	4 to 20 mA DC

### Cylinder Positioner IP200



- For precise and stable position control of small bore cylinder
- Can be used as cylinder position control unit for process control, servo mechanism, and general industrial machines.

Series	Port size	Supply air pressure psi (MPa)	Input pressure psi (MPa)
IP200	Rc1/4	44 to 102 (0.3 to 0.7)	2.9 to 14.5 (0.02 to 0.1)

## Relay/Valve

### ● Booster Relay **IL**



- Used when the piping distance between instrumentation and operational area is long, or when operational area has large capacity.
- Can help accelerate actuation speed considerably.

Series	Port size	Ratio	Input and output pressure
IL100	Rc1/4, 3/8	1:1	102 psi (0.7 MPa)

### ● Lock-Up Valve **IL**



- When accident takes place on air operated process control line due to air source or air supply piping line failure, lock up valve retains pressure at the operating area until restored to normal condition.

Series	Port size	Set pressure psi (MPa)	To shut-off pneumatic circuit pressure
IL201/211	Rc1/4	20 to 102 (0.14 to 0.7)	102 psi (0.7 MPa)

## Related Products

### ● Electro-Pneumatic Transducer **IT**



- Converting current for signal to pneumatic
- Withstand pressure explosion proof construction d2G4.

Series	Port size	Supply air pressure psi (MPa)	Input current
IT600	Rc1/4	20 to 35 (0.14 to 0.24)	4 to 20 mADC
IT601	Rc1/4	35 to 102 (0.24 to 0.7)	4 to 20 mADC

### ● Pressure Switch **IS**



Series	Port size	Supply air pressure psi (MPa)	Contact
IS100	Rc1/4	2.9 to 15 (0.02 to 0.1)	Using micro-switch A, B 2 contacts

Other Derived Series

● **Clean/Low-Particle Generation 10-/11-/12-/13-/21-/22-**



Description	Model	Features/Specifications
Clean series	10-/11- 12-/13-	<ul style="list-style-type: none"> <li>Prevents particle generation in a clean room.</li> <li>Particle generation from the equipment is leveled from Grade 1 to 4. Can be selected based on the cleanliness class of the clean room.</li> <li>Fluorine grease is used.</li> <li>Products are sealed and shipped in anti-static double bags.</li> </ul>
Copper, Fluorine, Silicone-free, Low-particle generation	21-/22-	<ul style="list-style-type: none"> <li>Suitable for environments where the presence of copper, fluorine or silicone materials is restricted.</li> <li>Lithium soap base grease is used.</li> <li>Construction is the same as the clean series.</li> <li>Standard packaging (Duplicate packaging is not used.)</li> </ul>

● **Series Compatible with Secondary Batteries 25A-**



Description	Model	Features/Specifications
Series compatible with secondary batteries	25A-	<ul style="list-style-type: none"> <li>Copper (Cu) and Zinc (Zn) Free</li> <li>Compatible with a low dew point <math>-94^{\circ}\text{F}</math> (<math>-70^{\circ}\text{C}</math>)</li> <li>Using grease compatible with a low dew point longer life</li> </ul>

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