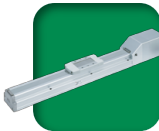




Best Pneumatics

Product Selection Guide

General Contents/Product Guide/Model Index



Ver.6



Best Pneumatics

Product Selection Guide

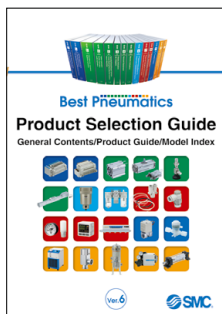
Products can be selected in accordance with the operating conditions and applications.

This guide provides an overview of the major pneumatic equipment.

Products can be selected systematically, from the principle products for piping to terminal units.

This guide corresponds to Best Pneumatics. Use this as a comprehensive index.

Tentatively select
using this guide.



Confirm details
with **Best Pneumatics**.



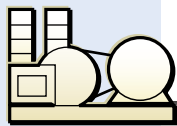
Air Preparation Equipment

► P. 71 to 94

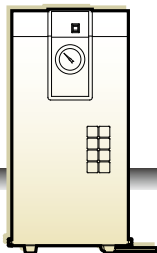
Air dryers, Compressed air cleaning filters

Produce clean air through dehumidification and filtration, remove water, oil and foreign matters in air pressure lines and deodorize them.

Also improve the service life of terminal units such as cylinders, solenoid valves, etc.



Compressor



- Air tanks P. 75
- Aftercoolers P. 76
- Air dryers P. 78
- Air preparation filters P. 86
- Clean gas filters P. 90
- Clean air filters P. 92

Refer to **Best Pneumatics No. 6** for details.



Air Combination

Pressure Control Equipment

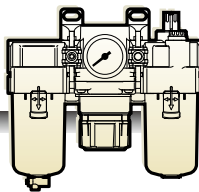
► P. 95 to 129

Air filters, Regulators, Lubricators

Modularize the removal of water and foreign matters, depressurize and lubricate.

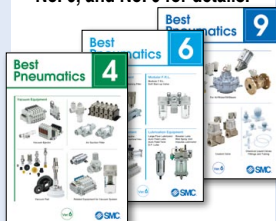
Regulators

Reduce the air and water pressure and adjust vacuum pressure.



- Air combination P. 95
- For general purposes P. 114, 116, 124
- High-pressure P. 114, 118, 126
- Precision P. 115, 118, 126
- Vacuum P. 115, 119, 128
- Special fluid/Deionized water P. 115, 119, 128

Refer to **Best Pneumatics No. 4**, **No. 6**, and **No. 9** for details.



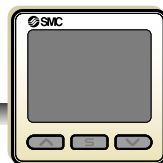
Pressure Detection Equipment

Flow Rate Detection Equipment

► P. 131 to 160

Pressure sensors

Detect the pressure of gases such as air and nitrogen and fluids such as water and oil, and also detect the vacuum pressure by confirming adsorption.



- For gas and liquid P. 134
- Controller P. 137
- Self-contained Type P. 150
- Remote Type P. 152

Refer to **Best Pneumatics No. 7** for details.

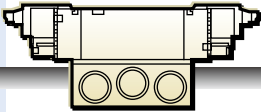
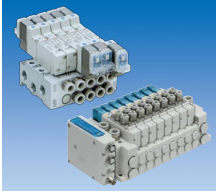


Directional Control Valves

► P. 1 to 23

Solenoid valves

Used to switch the flow of compressed air that is supplied to cylinders, etc.



4/5 port solenoid valves P. 1
Fieldbus system variations
..... P. 22

Refer to **Best Pneumatics No. 1-1 and No. 1-2** for details.

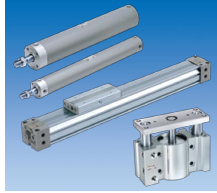


Actuators

► P. 25 to 69

Air cylinders

Used to operate linear, rotational or grip actuations using compressed air that is switched by a directional control valve.



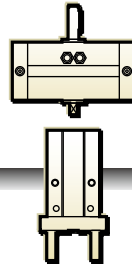
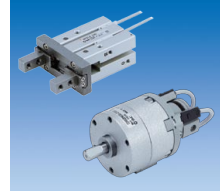
Basic P. 30
Rodless cylinders P. 44
With guide P. 52

Refer to **Best Pneumatics No. 2-1, No. 2-2 and No. 2-3** for details.



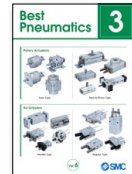
► P. 25 to 69

Rotary actuators, Air grippers



Rotary actuators P. 60
Air grippers P. 64

Refer to **Best Pneumatics No. 3** for details.



Selection Guide Format and Features

[Actuators]

Actuators

Rodless Cylinders

Rotary Actuators

With Guide

Air Grippers

INDEX

SMC Actuator Variations	P.26	Basic Characteristics of Cylinders with Guide	P.50
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Basic Air Cylinders	P.30	Cylinders with Guide: Option	P.56
Basic: Option	P.38	Rotary Actuators	P.62
Basic Characteristics of Rodless Cylinders	P.42	Rotary Actuators: Option	P.62
Rodless Cylinders	P.44	Air Grippers: Option	P.64
Rodless Cylinders: Option	P.46	Air Grippers: Option	P.66
		Special Actuators: Specific Functions	P.68

General Specifications

Operating fluid	Air
Asbestos seal	With seal except -10 to 80°C (+10 to 120°C)
Operating temperature	Without seal except -10 to 80°C (+10 to 120°C)
Lubrication	None
Minimum operating pressure	0.05 MPa (0.5 kgf/cm ²) (0.1 MPa)
Maximum operating pressure	0.5 MPa
Proof pressure	1.5 MPa
Minimum operating speed	50 mm/s (max. 0.1 mm/s)
Maximum operating speed	500 to 1000 mm/s (2000 mm/s)

* Refer to the manufacturing inspection or maximum values.

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Contains the overall information (variations) and an overview of specifications.

Shows broad classifications of actuators (categories).

General specifications

Contains the model and size variations. Models, sizes (bore sizes), strokes, torques and gripping force are shown by category.

SMC Actuator Variations

Basic

Round

Model	Stroke	Max. Thrust	Max. Torque
ARP	10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 150, 180, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000	1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 6000, 7000, 8000, 9000, 10000, 12000, 15000, 18000, 20000, 25000, 30000, 35000, 40000, 45000, 50000, 60000, 70000, 80000, 90000, 100000	1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 6000, 7000, 8000, 9000, 10000, 12000, 15000, 18000, 20000, 25000, 30000, 35000, 40000, 45000, 50000, 60000, 70000, 80000, 90000, 100000

Square

Model	Stroke	Max. Thrust	Max. Torque
ASQ	10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 150, 180, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000	1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 6000, 7000, 8000, 9000, 10000, 12000, 15000, 18000, 20000, 25000, 30000, 35000, 40000, 45000, 50000, 60000, 70000, 80000, 90000, 100000	1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 6000, 7000, 8000, 9000, 10000, 12000, 15000, 18000, 20000, 25000, 30000, 35000, 40000, 45000, 50000, 60000, 70000, 80000, 90000, 100000

Rodless Cylinders

Magnet type

Model	Stroke	Max. Thrust	Max. Torque
ARL	10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 150, 180, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000	1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 6000, 7000, 8000, 9000, 10000, 12000, 15000, 18000, 20000, 25000, 30000, 35000, 40000, 45000, 50000, 60000, 70000, 80000, 90000, 100000	1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 6000, 7000, 8000, 9000, 10000, 12000, 15000, 18000, 20000, 25000, 30000, 35000, 40000, 45000, 50000, 60000, 70000, 80000, 90000, 100000

Mechanical joint type

Model	Stroke	Max. Thrust	Max. Torque
ARL	10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 150, 180, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000	1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 6000, 7000, 8000, 9000, 10000, 12000, 15000, 18000, 20000, 25000, 30000, 35000, 40000, 45000, 50000, 60000, 70000, 80000, 90000, 100000	1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 6000, 7000, 8000, 9000, 10000, 12000, 15000, 18000, 20000, 25000, 30000, 35000, 40000, 45000, 50000, 60000, 70000, 80000, 90000, 100000

With Guide

Shaft guide

Model	Stroke	Max. Thrust	Max. Torque
AGP	10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 150, 180, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000	1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 6000, 7000, 8000, 9000, 10000, 12000, 15000, 18000, 20000, 25000, 30000, 35000, 40000, 45000, 50000, 60000, 70000, 80000, 90000, 100000	1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 6000, 7000, 8000, 9000, 10000, 12000, 15000, 18000, 20000, 25000, 30000, 35000, 40000, 45000, 50000, 60000, 70000, 80000, 90000, 100000

Linear guide

Model	Stroke	Max. Thrust	Max. Torque
AGL	10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 150, 180, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000	1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 6000, 7000, 8000, 9000, 10000, 12000, 15000, 18000, 20000, 25000, 30000, 35000, 40000, 45000, 50000, 60000, 70000, 80000, 90000, 100000	1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 6000, 7000, 8000, 9000, 10000, 12000, 15000, 18000, 20000, 25000, 30000, 35000, 40000, 45000, 50000, 60000, 70000, 80000, 90000, 100000

Rotary Actuators

Vane

Model	Stroke	Max. Thrust	Max. Torque
CMV	10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 150, 180, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000	1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 6000, 7000, 8000, 9000, 10000, 12000, 15000, 18000, 20000, 25000, 30000, 35000, 40000, 45000, 50000, 60000, 70000, 80000, 90000, 100000	1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 6000, 7000, 8000, 9000, 10000, 12000, 15000, 18000, 20000, 25000, 30000, 35000, 40000, 45000, 50000, 60000, 70000, 80000, 90000, 100000

Rack & Pinion

Model	Stroke	Max. Thrust	Max. Torque
CRP	10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 150, 180, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000	1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 6000, 7000, 8000, 9000, 10000, 12000, 15000, 18000, 20000, 25000, 30000, 35000, 40000, 45000, 50000, 60000, 70000, 80000, 90000, 100000	1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 6000, 7000, 8000, 9000, 10000, 12000, 15000, 18000, 20000, 25000, 30000, 35000, 40000, 45000, 50000, 60000, 70000, 80000, 90000, 100000

Air Grippers

Model	Stroke	Max. Thrust	Max. Torque
AGP	10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 150, 180, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000	1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 6000, 7000, 8000, 9000, 10000, 12000, 15000, 18000, 20000, 25000, 30000, 35000, 40000, 45000, 50000, 60000, 70000, 80000, 90000, 100000	1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 6000, 7000, 8000, 9000, 10000, 12000, 15000, 18000, 20000, 25000, 30000, 35000, 40000, 45000, 50000, 60000, 70000, 80000, 90000, 100000

Parallel Opening

Model	Stroke	Max. Thrust	Max. Torque
APV	10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 150, 180, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000	1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 6000, 7000, 8000, 9000, 10000, 12000, 15000, 18000, 20000, 25000, 30000, 35000, 40000, 45000, 50000, 60000, 70000, 80000, 90000, 100000	1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 6000, 7000, 8000, 9000, 10000, 12000, 15000, 18000, 20000, 25000, 30000, 35000, 40000, 45000, 50000, 60000, 70000, 80000, 90000, 100000

Fulcrum Opening

Model	Stroke	Max. Thrust	Max. Torque
APV	10, 15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 150, 180, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000	1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 6000, 7000, 8000, 9000, 10000, 12000, 15000, 18000, 20000, 25000, 30000, 35000, 40000, 45000, 50000, 60000, 70000, 80000, 90000, 100000	1000, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 6000, 7000, 8000, 9000, 10000, 12000, 15000, 18000, 20000, 25000, 30000, 35000, 40000, 45000, 50000, 60000, 70000, 80000, 90000, 100000

26 27

Broad classification (category)

Torque

Gripping force

Model Size Stroke Broad classification (category) Model

Basic Characteristics of Air Cylinders

The basic characteristics of air cylinders are as shown below.

See the figures in the next page as a guide to model selection since they may be different depending on a model or bore size. For details, refer to the individual actuator's catalog.

1 Bore Size Selection

Use the table below as a guide for selecting a bore size.

Bore size (mm)	Maximum stroke (mm)	Transfer load (kg)				Allowable rod and lateral load (N)	
		0.2	0.5	1	2	With rod extension	With max. rod extension
2.5	10 to 100	0.2	0.5	1	2	—	—
4	10 to 20	0.5	1	2	4	—	—
6	10 to 60	1	2	4	8	0.2	0.05
8	—	2	4	8	16	0.4	0.05
10	—	3	6	12	24	0.7	0.08
12	10 to 100	5	10	20	40	1.2	0.15
16	—	8	16	32	64	2.0	0.2
20	—	15	30	60	120	5.0	1.0
25	—	24	48	96	192	7.0	1.5
32	—	39	78	156	312	10	2
40	—	52	104	208	416	18	3
50	3 to 150	75	150	300	600	30	4
63	—	113	226	452	904	45	5
80	—	146	292	584	1168	70	8
100	—	185	370	740	1480	100	10
125	—	251	502	1004	2008	250	25
160	—	366	732	1464	2928	400	40
180	—	426	852	1704	3408	500	45
200	—	539	1078	2156	4312	600	55
250	—	744	1488	2976	5952	1000	100
300	—	962	1924	3848	7696	1200	150

2 Minimum Operating Pressure

Bore size (mm)	Operating pressure (MPa)														
	6	10	16	20	25	32	40	50	63	80	100	125	160	180	200
Standard cylinder	0.12	0.08	—	—	—	—	—	—	—	—	—	—	—	—	—
Low friction cylinder	—	0.03	—	—	—	—	—	—	—	—	—	—	—	—	—
Micro-cylinder (fit used feature)	0.03	—	0.005	—	—	—	—	—	—	—	—	—	—	—	—

* Consult with SMC for special cases that have these values or the like.

Sliding resistance of a cylinder varies depending on the operating pressure.

Sliding resistance values at 0.5 MPa are shown in the table below.

Operating pressure (MPa)	Standard cylinder	Low friction cylinder	Metal seal cylinder
0.1	18 to 102N (4.3 to 23.0)	8 to 40N (1.8 to 9.0)	0.05 to 0.25 (1.1 to 4.4)

* Consult SMC regarding the bore size which do not have a resistance value shown.

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Contains **basic characteristics**.

This shows air cylinders' capabilities with basic specifications.

Shows transferable workpiece loads by bore size.

Shows the minimum operating pressure that air cylinders can operate.

Basic

Model	Bore size (mm)	Piston size (mm)	Stroke (mm)	Speed (mm/s)	Pressure (MPa)	Activation force (N)	Sealless Air	Mounting
CJP	4	M3 x 0.5	—	0.3 to 0.7	0.2 to 0.7	—	—	Panel
	6	M3 x 0.5	10 to 15	0.2 to 0.7	0.2 to 0.7	—	—	
	10	M3 x 0.5	10 to 100	0.2 to 0.7	0.2 to 0.7	—	—	
CJP2	4	M3 x 0.5	10 to 15	0.3 to 0.7	0.2 to 0.7	—	—	Foot
	6	M3 x 0.5	10 to 15	0.3 to 0.7	0.2 to 0.7	—	—	
	10	M3 x 0.5	10 to 100	0.3 to 0.7	0.2 to 0.7	—	—	
CJ1	2.5	M3 x 0.5	10 to 15	0.3 to 0.7	0.2 to 0.7	—	—	Rod Range
	4	M3 x 0.5	10 to 15	0.3 to 0.7	0.2 to 0.7	—	—	
	6	M3 x 0.5	10 to 100	0.3 to 0.7	0.2 to 0.7	—	—	
CJ2	10	M5 x 0.8	10 to 100	0.12 to 0.7	0.12 to 0.7	0.012 to 0.001	0.01 to 0.001	Head Range
	16	M5 x 0.8	10 to 100	0.12 to 0.7	0.12 to 0.7	0.012 to 0.001	0.01 to 0.001	
	20	M5 x 0.8	10 to 100	0.12 to 0.7	0.12 to 0.7	0.012 to 0.001	0.01 to 0.001	
CM2	20	1.6#	10 to 100	0.05 to 1.0	0.05 to 1.0	0.272 to 0.4	0.012 to 0.001	Head Range
	32	1.6#	10 to 100	0.05 to 1.0	0.05 to 1.0	0.440 to 0.612	0.012 to 0.001	
	40	1.4#	10 to 100	0.05 to 1.0	0.05 to 1.0	0.651 to 0.918	0.012 to 0.001	
CG1	20	1.6#	10 to 100	0.05 to 1.0	0.05 to 1.0	0.29	0.012 to 0.001	Head Range
	32	1.6#	10 to 100	0.05 to 1.0	0.05 to 1.0	0.41	0.012 to 0.001	
	40	1.4#	10 to 100	0.05 to 1.0	0.05 to 1.0	0.59	0.012 to 0.001	
	50	1.4#	10 to 100	0.05 to 1.0	0.05 to 1.0	0.660 to 0.91	0.012 to 0.001	
	80	1.2#	10 to 100	0.05 to 1.0	0.05 to 1.0	1.2	0.012 to 0.001	
CA2	40	1.4#	10 to 80	0.05 to 1.0	0.05 to 1.0	2.0	0.012 to 0.001	Clevis
	50	1.4#	10 to 80	0.05 to 1.0	0.05 to 1.0	2.4	0.012 to 0.001	
	63	1.4#	10 to 80	0.05 to 1.0	0.05 to 1.0	3.4	0.012 to 0.001	
	80	1.2#	10 to 140	0.05 to 1.0	0.05 to 1.0	5.9	0.012 to 0.001	
	100	1.2#	10 to 140	0.05 to 1.0	0.05 to 1.0	9.9	0.012 to 0.001	

* The stroke, speed, and pressure values show those of the basic products. For details, refer to the individual product catalog.

* Some transfer mounting methods are not supported depending on the product. For details, refer to the individual product catalog.

Note 1) For products with the rubber bumper.

Note 2) Not available for CM2 and CG1 series.

Note 3) Not available for CA2 series.

Contains **features, photos (appearance) and specifications**.

Simple features, specifications and mounting types are shown by each model.

Mounting type

30

Selection Guide Format and Features

Basic: Option

Round	CJP	CJP2	CJ1	CJ2	CM2	CG1	CA2
Model							
Bore size (mm)	6 10 15 4 6 10 15 4 6 10 15 20 25 32 40 50 63 80 100 125 160 200						
Rod							
Double rod	▲	▲	—	CJ2W	CM2W	CG1W	CA2W
Non-rotating rod	▲	▲	—	CJ2K	CM2K	CG1K	CA2K
Combination							
With rod	—	—	—	b2	CLM2	CNG/C/LG1	CNA/CA/CL1
With end lock	—	—	—	3a	CBM2	CBG1	CBA2
With guide rod	▲	▲	▲	—	—	MSG	—
With valve	▲	▲	▲	A	CV3B/CV3S	—	CV3/CV31
Actuation							
Single acting	●	—	●	—	●	○	○
Low speed	—	—	—	M	CJ2X	MGM	CM2X
High speed	—	—	—	MGM	MGM	▲	RHC
Low friction	▲	—	—	M	CJ2Q	CM2Y (Smooth)	CG1Y (Smooth)
Extremely resistant	—	—	—	—	—	—	—
Heat resistant	▲	○	▲	○	○	○	○
Cold resistant	—	—	—	—	—	—	—
Improved water and oil resistance	▲	—	—	CJ5	●	▲	●
Clean	▲	—	—	—	—	—	—
Copperless fluztech	—	—	—	—	—	—	—
Stroke/Speed							
External parts	—	—	—	A	CJ5	-XB12	CG5
Rod, Bracket	▲	▲	▲	▲	▲	▲	▲
Others							
Air-hydro	▲	▲	—	▲	●	—	—
Tandem	—	—	—	—	—	—	—
Dual stroke	—	—	—	—	—	—	—
Adjustable stroke	—	—	—	—	—	—	—
Inch size ¹⁾	—	—	—	—	—	NCM	WCU
	—	—	—	—	—	—	NCA

¹⁾ In the case of being available with stroke change, compared with standard.
²⁾ This is technically possible, but correct SMC part designations, costs and delivery. → 3 For the United States of America (Bore size, Thread size, Inch) only.
 28

Contains options and functions clearly.
Representative options and optional functions are shown.

Options and functions

Possible to check if options and functions are standard, are available upon request, or if options are manufacturable by model.

Fulcrum Opening	Series	Stroke	Speed	Pressure	Position	Mounting
Series	MHS3	MHS2	MHS1	MHT2	MHT1	MHW2
Stroke	10	15	20	25	30	35
Speed	10	15	20	25	30	35
Pressure	10	15	20	25	30	35
Position	10	15	20	25	30	35
Mounting	10	15	20	25	30	35

Series included in these two pages are as follows:
 Basic (Series CJK, CJK, CJK, NCM and CG1) P.351
 Fulcrum cylinders (MHT only) P.352
 With guide (MHT only) P.353
 With guide (CG1 only) P.354
 Bore adjustment P.355
 Air grippers P.356

Shows corresponding pages in Best Pneumatics.

2-2 P.355

Best No.

Basic Round

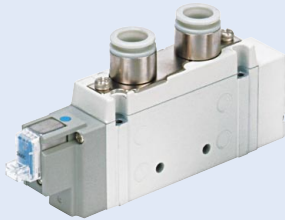
Model	Bore size (mm)	Stroke (mm)	Speed (mm/s)	Pressure (MPa)	Actuation Position	Mounting
CJP	4, 6, 8, 10	10 to 500	0.3 to 0.7	0.2 to 0.7	Panel	
CJP2	4, 6, 8, 10, 15, 16	10 to 500	0.3 to 0.7	0.2 to 0.7	Foot	
CJ1	2.5, 4, 6, 8, 10	10 to 500	0.3 to 0.7	0.2 to 0.7	Rod flange	
CJ2	4, 6, 8, 10	10 to 500	0.3 to 0.7	0.2 to 0.7	Head flange	



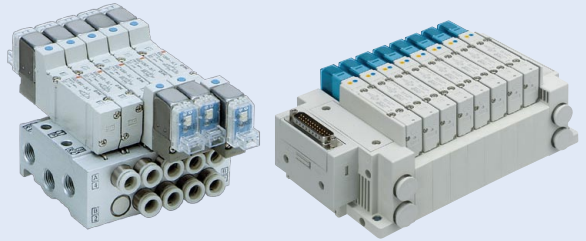
Directional Control Valves

4/5 Port Solenoid Valves for Pneumatics

Solenoid valves



Manifolds



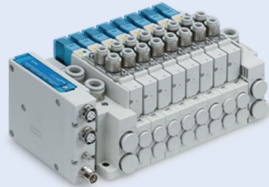
Environment



Clean

Exhaust for the main valve and the pilot valve is common and released out of a clean room.

Serial Transmission



INDEX

Solenoid valves/Optimum size for driving air cylinders	P.2
Solenoid valves	P.8
Manifold/Piping specifications	P.12
Manifold/Wiring specifications with external device	P.13
Manifold/Body ported, Base mounted	P.14
Manifold/Points for selection	P.16
Features of manifold	P.18
Solenoid valves/Operating environment	P.20
Fieldbus system variations	P.22

General Specifications

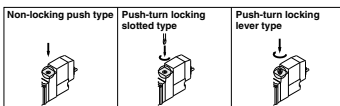
Fluid	Air
Ambient and operating fluid temperature	Max. 50°C
Actuation*	Internal pilot type
Max. operating pressure	0.7 or 0.9 MPa
Manual override*	Non-locking push type
Lubrication	Not required
Piping thread	Rc, G, NPT, NPTF
Mounting	Free
Type of actuation*	Single (S), Double (D), 3 position (3P)
Enclosure*	Dusttight (IP40) (IP65, IP67 are also available.)
Range of allowable voltage fluctuation	-10 (or -15) to +10% of rated voltage
Lead wire length (Standard)	300 mm (or 600 mm)

Respective value in the above table is the representative value for the general solenoid valves for pneumatics and isn't always applicable to all the solenoid valves. For details, check the specification of the respective valve because those values are different depending on a type. See below for * mark

Operating Method

- Internal pilot (Standard)**
Allows supply pressure to run through the inside of a solenoid valve to act on pilot valve.
- External pilot**
Separating from supply pressure, the another pressure for pilot valve is obtained from external. Used when the main pressure is less than the minimum operating pressure or vacuum application.
- Direct operated**
Drives the main valve by acting force of a solenoid.

Manual Override



Type of Actuation

Single (S)	Double (D)	3 position (3P)		
(A)(B) 4 2 1 1 (R)(P)(R)	(A)(B) 4 2 1 1 (R)(P)(R)	(A)(B) 4 2 1 1 (R)(P)(R)	(A)(B) 4 2 1 1 (R)(P)(R)	(A)(B) 4 2 1 1 (R)(P)(R)
2 position single	2 position double	3 position closed center	3 position pressure center	3 position exhaust center

Enclosure

Enclosure for the electrical equipment against an external solid foreign object or water ingress.

- Enclosure**
IEC (International Electrical Committee) standards (IEC60529) define the protection degree against the ingress of a solid foreign object as the 1st characteristics and against the ingress of water as the 2nd characteristics. With both of these characteristics, IP number is defined to show the protection degree.

IP 4 0



* For IP65 or more, see pages 20 and 21 on operating environment.

Seal Method

Rubber seal

Air leakage is small because it has the spool valve with seal to slide.

Metal seal

Long service life because the metal spool slides.

Pneumatics 4/5 Port Solenoid Valves

■ Optimum Size for Driving Air Cylinders

Main valve seal method	Series	Flow characteristics A, B→E (2 position/Single) C [dm ³ /(s·bar)] (Cv factor)	Applicable cylinder Speed: 100 mm/s or less																			
			ø6	ø10	ø16	ø20	ø25	ø32	ø40	ø50	ø63	ø80	ø100	ø125	ø140	ø160	ø180	ø200	ø250	ø300		
Rubber seal	SJ	0.13 to 0.56 (0.04 to 0.12)				SJ2000	SJ3000															
	SY	1.1 to 6.6 (0.27 to 1.6)																				
	SY	1.0 to 8.0 (0.26 to 2.5)																				
	SV	1.1 to 7.0 (0.28 to 1.6)																				
	SYJ	0.46 to 2.9 (0.12 to 0.74)																				
	SZ	0.77 (0.19)																				
	VP4	16 to 60 (5.6 to 16.7)																				
	S0700	0.33 to 0.37 (0.08 to 0.10)																				
	VQ	1.0 to 17 (0.21 to 4.4)																				
	VQC	1.0 to 17 (0.21 to 4.4)																				
	VQZ	1.3 to 4.6 (0.32 to 1.2)																				
	SQ	0.79 to 3.1 (0.19 to 0.71)																				
	VFR	2.5 to 40 (0.7 to 10.6)																				
	VQ7	6.0 to 13 (1.4 to 3.3)																				
	VQD	0.28 (0.07)																				
	VK*1	0.38 to 0.84 (0.09 to 0.19)																				
	Metal seal	SY	1.0 to 4.7 (0.24 to 1.1)																			
VQ		0.72 to 14 (0.18 to 3.4)																				
VQC		0.72 to 14 (0.18 to 3.4)																				
VQZ		0.7 to 3.0 (0.17 to 0.74)																				
SQ		0.62 to 2.4 (0.14 to 0.57)																				
VFS		1.8 to 38 (0.4 to 9)																				
VQ7		5.2 to 12 (1.1 to 3)																				

* 1: Available with single solenoid (S) only.

* 2: Can be used even below the optimum size of a cylinder.

* 3: () stands for power saving circuit, the values when holding. Refer to Specific Product Precautions for details.

SJ 1.1 P.13
VP4 1.2 P.353

SY^{Connector type} 1.1 P.123
S0700 1.1 P.645
VFR 1.2 P.1015

SY 1.1 P.397
VQ 1.2 P.365
VQ7 1.2 P.1115

SV 1.2 P.13
VQC 1.2 P.537
VQD 1.2 P.1389

SYJ 1.2 P.145
VQZ 1.2 P.683
VK 1.2 P.1419

SZ 1.2 P.249
SQ 1.2 P.759
VFS 1.2 P.883

Power consumption W	Connection size	
	Thread piping (Rc)	One-touch fittings (ø) Applicable tubing size (mm)
0.55/0.4 (0.23/0.15)*3	M3, M5	2, 4, 6
0.35 (0.1)*3	M5, 1/8, 1/4, 1/2	2, 3, 2, 4, 6, 8, 10, 12
0.35 (0.1)*3	M5, 1/8, 1/4, 3/8, 1/2	4, 6, 8, 10, 12
0.6	1/8, 1/4, 3/8, 1/2	3, 2, 4, 6, 8, 10, 12
0.35 (0.1)*3	M3, M5, 1/8, 1/4	4, 6, 8
0.6	M5	4, 6
12	3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2	—
0.35	M3, M5	2, 3, 2, 4
0.95, 0.4	M5, 1/4, 3/8, 1/2	3, 2, 4, 6, 8, 10, 12
0.95, 0.4	M5, 1/4, 3/8, 1/2	3, 2, 4, 6, 8, 10, 12
0.9, 0.35	M5, 1/8, 1/4, 3/8	3, 2, 4, 6, 8, 10
0.95, 0.4	M5	3, 2, 4, 6, 8
1.8	1/8, 1/4, 3/8, 1/2, 3/4, 1	—
1	1/4, 3/8, 1/2, 3/4	6, 8, 10, 12
3.2 (2.4)*3	M5	4
4	M5, 1/8	—
0.35 (0.1)*3	M5, 1/8, 1/4, 1/2	2, 3, 2, 4, 6, 8, 10, 12
0.95, 0.4	M5, 1/4, 3/8, 1/2	3, 2, 4, 6, 8, 10, 12
0.95, 0.4	M5, 1/4, 3/8, 1/2	3, 2, 4, 6, 8, 10, 12
0.9, 0.35	M5, 1/8, 1/4, 3/8	3, 2, 4, 6, 8, 10
0.95, 0.4	M5	3, 2, 4, 6, 8
1.8	1/8, 1/4, 3/8, 1/2, 3/4, 1	—
1	1/4, 3/8, 1/2, 3/4	6, 8, 10, 12

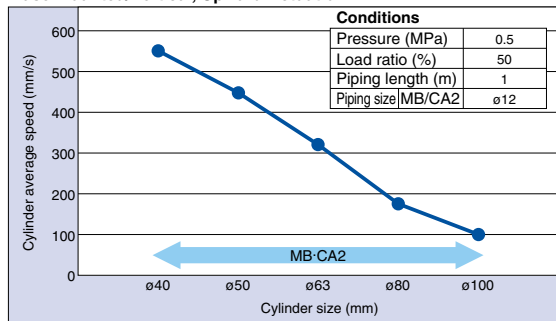
Conditions

- Pressure: 0.5 MPa
- Piping length: 1 m
- Load ratio: 50%
- Stroke: 200 mm
- Speed: 100 mm/s or less

Size of Air Cylinder and Its Speed

Example 1) Using the SY9000 series (Cv 2.5), the average speed of air cylinder is obtained under the below condition for driving cylinders ranged ø40 to ø100.

Base Mounted/Vertical, Upward Actuation



For details about the respective condition, make use of the SMC's Model Selection Program for air cylinder driving system for your reference.

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination Equipment

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Pneumatics 4/5 Port Solenoid Valves

■ Optimum Size for Driving Air Cylinders

Main valve seal method	Series	Flow characteristics A, B→E (2 position/ Single) C[dm ³ /(s·bar)] (Cv factor)	Applicable cylinder Speed: 300 mm/s or less																			
			ø6	ø10	ø16	ø20	ø25	ø32	ø40	ø50	ø63	ø80	ø100	ø125	ø140	ø160	ø180	ø200	ø250	ø300		
Rubber seal	SJ	0.13 to 0.56 (0.04 to 0.12)	SJ2000		SJ3000																	
	SY	1.1 to 6.6 (0.27 to 1.6)	SY3000															SY5000 SY7000				
	SY	1.0 to 8.0 (0.26 to 2.5)	SY3000				SY5000		SY7000		SY9000 Example 1)											
	SV	1.1 to 7.0 (0.28 to 1.6)	SV1000			SV2000		SV3000 SV4000														
	SYJ	0.46 to 2.9 (0.12 to 0.74)	SYJ3000		SYJ5000		SYJ7000															
	SZ	0.77 (0.19)	SZ3000																			
	VP4	16 to 60 (5.6 to 16.7)											VP4□50			VP4□70						
	S0700	0.33 to 0.37 (0.08 to 0.10)	S0700																			
	VQ	1.0 to 17 (0.21 to 4.4)	VQ1000		VQ2000		VQ4000		VQ5000													
	VQC	1.0 to 17 (0.21 to 4.4)	VQC1000		VQC2000		VQC4000		VQC5000													
	VQZ	1.3 to 4.6 (0.32 to 1.2)	VQZ1000		VQZ2000		VQZ3000															
	SQ	0.79 to 3.1 (0.19 to 0.71)	SQ1000		SQ2000																	
	VFR	2.5 to 40 (0.7 to 10.6)	VFR2000			VFR3000		VFR4000 VFR5000		VFR6000												
	VQ7	6.0 to 13 (1.4 to 3.3)											VQ7-6		VQ7-8							
	VQD	0.28 (0.07)	VQD1000																			
VK*1	0.38 to 0.84 (0.09 to 0.19)	VK3000																				
Metal seal	SY	1.0 to 4.7 (0.24 to 1.1)	SY3000															SY5000 SY7000				
	VQ	0.72 to 14 (0.18 to 3.4)	VQ1000		VQ2000		VQ4000		VQ5000													
	VQC	0.72 to 14 (0.18 to 3.4)	VQC1000		VQC2000		VQC4000		VQC5000													
	VQZ	0.7 to 3.0 (0.17 to 0.74)	VQZ1000		VQZ2000		VQZ3000															
	SQ	0.62 to 2.4 (0.14 to 0.57)	SQ1000		SQ2000																	
	VFS	1.8 to 38 (0.4 to 9)	VFS1000		VFS2000 VFS3000		VFS4000		VFS6000													
VQ7	5.2 to 12 (1.1 to 3)											VQ7-6		VQ7-8								

*1: Available with single solenoid (S) only.

*2: Can be used even below the optimum size of a cylinder.

*3: () stands for power saving circuit, the values when holding. Refer to Specific Product Precautions for details.

SJ 1.1 P.13
VP4 1.2 P.353

SY^{Connector type} 1.1 P.123
S0700 1.1 P.645
VFR 1.2 P.1015

SY 1.1 P.397
VQ 1.2 P.365
VQ7 1.2 P.1115

SV 1.2 P.13
VQC 1.2 P.537
VQD 1.2 P.1389

SYJ 1.2 P.145
VQZ 1.2 P.683
VK 1.2 P.1419

SZ 1.2 P.249
SQ 1.2 P.759
VFS 1.2 P.883

Power consumption W	Connection size	
	Thread piping (Rc)	One-touch fittings (ø) Applicable tubing size (mm)
0.55/0.4 (0.23/0.15) ^{*3}	M3, M5	2, 4, 6
0.35 (0.1) ^{*3}	M5, 1/8, 1/4, 1/2	2, 3, 2, 4, 6, 8, 10, 12
0.35 (0.1) ^{*3}	M5, 1/8, 1/4, 3/8, 1/2	4, 6, 8, 10, 12
0.6	1/8, 1/4, 3/8, 1/2	3, 2, 4, 6, 8, 10, 12
0.35 (0.1) ^{*3}	M3, M5, 1/8, 1/4	4, 6, 8
0.6	M5	4, 6
12	3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2	—
0.35	M3, M5	2, 3, 2, 4
0.95, 0.4	M5, 1/4, 3/8, 1/2	3, 2, 4, 6, 8, 10, 12
0.95, 0.4	M5, 1/4, 3/8, 1/2	3, 2, 4, 6, 8, 10, 12
0.9, 0.35	M5, 1/8, 1/4, 3/8	3, 2, 4, 6, 8, 10
0.95, 0.4	M5	3, 2, 4, 6, 8
1.8	1/8, 1/4, 3/8, 1/2, 3/4, 1	—
1	1/4, 3/8, 1/2, 3/4	6, 8, 10, 12
3.2 (2.4) ^{*3}	M5	4
4	M5, 1/8	—
0.35 (0.1) ^{*3}	M5, 1/8, 1/4, 1/2	2, 3, 2, 4, 6, 8, 10, 12
0.95, 0.4	M5, 1/4, 3/8, 1/2	3, 2, 4, 6, 8, 10, 12
0.95, 0.4	M5, 1/4, 3/8, 1/2	3, 2, 4, 6, 8, 10, 12
0.9, 0.35	M5, 1/8, 1/4, 3/8	3, 2, 4, 6, 8, 10
0.95, 0.4	M5	3, 2, 4, 6, 8
1.8	1/8, 1/4, 3/8, 1/2, 3/4, 1	—
1	1/4, 3/8, 1/2, 3/4	6, 8, 10, 12

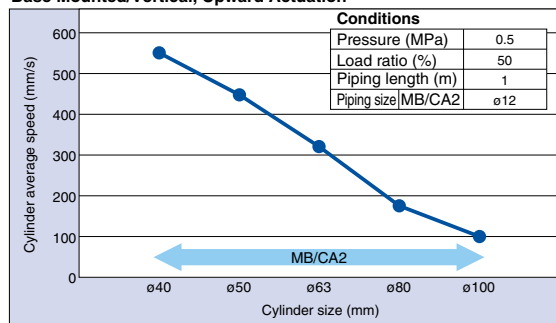
Conditions

- Pressure: 0.5 MPa
- Piping length: 1 m
- Load ratio: 50%
- Stroke: 200 mm
- Speed: 300 mm/s or less

Size of Air Cylinder and Its Speed

Example 1) Using the SY9000 series (Cv 2.5), the average speed of air cylinder is obtained under the below condition for driving cylinders ranged ø40 to ø100.

Base Mounted/Vertical, Upward Actuation



For details about the respective condition, make use of the SMC's Model Selection Program for air cylinder driving system for your reference.

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Pneumatics 4/5 Port Solenoid Valves

■ Optimum Size for Driving Air Cylinders

Main valve seal method	Series	Flow characteristics A, B → E (2 position/ Single) C[dm ³ /(s·bar)] (Cv factor)	Applicable cylinder																		
			Speed: 500 mm/s or less	ø6	ø10	ø16	ø20	ø25	ø32	ø40	ø50	ø63	ø80	ø100	ø125	ø140	ø160	ø180	ø200	ø250	ø300
Rubber seal	SJ	0.13 to 0.56 (0.04 to 0.12)	● SJ3000																		
	SY	1.1 to 6.6 (0.27 to 1.6)	● SY3000 ● SY5000 ● SY7000																		
	SY	1.0 to 8.0 (0.26 to 2.5)	● SY3000 ● SY5000 ● SY7000 ● SY9000 Example 1)																		
	SV	1.1 to 7.0 (0.28 to 1.6)	● SV1000 ● SV2000 ● SV3000 ● SV4000																		
	SYJ	0.46 to 2.9 (0.12 to 0.74)	● SYJ3000 ● SYJ5000 ● SYJ7000																		
	SZ	0.77 (0.19)	● SZ3000																		
	VP4	16 to 60 (5.6 to 16.7)	● VP4□50 ● VP4□70																		
	S0700	0.33 to 0.37 (0.08 to 0.10)	● S0700																		
	VQ	1.0 to 17 (0.21 to 4.4)	● VQ1000 ● VQ2000 ● VQ4000 ● VQ5000																		
	VQC	1.0 to 17 (0.21 to 4.4)	● VQC1000 ● VQC2000 ● VQC4000 ● VQC5000																		
	VQZ	1.3 to 4.6 (0.32 to 1.2)	● VQZ1000 ● VQZ2000 ● VQZ3000																		
	SQ	0.79 to 3.1 (0.19 to 0.71)	● SQ1000 ● SQ2000																		
	VFR	2.5 to 40 (0.7 to 10.6)	● VFR2000 ● VFR3000 ● VFR4000 ● VFR5000 ● VFR6000																		
	VQ7	6.0 to 13 (1.4 to 3.3)	● VQ7-6 ● VQ7-8																		
	VQD	0.28 (0.07)	● VQD1000																		
	VK*1	0.38 to 0.84 (0.09 to 0.19)	● VK3000																		
Metal seal	SY	1.0 to 4.7 (0.24 to 1.1)	● SY3000 ● SY5000 ● SY7000																		
	VQ	0.72 to 14 (0.18 to 3.4)	● VQ1000 ● VQ2000 ● VQ4000 ● VQ5000																		
	VQC	0.72 to 14 (0.18 to 3.4)	● VQC1000 ● VQC2000 ● VQC4000 ● VQC5000																		
	VQZ	0.7 to 3.0 (0.17 to 0.74)	● VQZ1000 ● VQZ2000 ● VQZ3000																		
	SQ	0.62 to 2.4 (0.14 to 0.57)	● SQ1000 ● SQ2000																		
	VFS	1.8 to 38 (0.4 to 9)	● VFS1000 ● VFS2000 ● VFS3000 ● VFS4000 ● VFS5000 ● VFS6000																		
	VQ7	5.2 to 12 (1.1 to 3)	● VQ7-6 ● VQ7-8																		

*1: Available with single solenoid (S) only.

*2: Can be used even below the optimum size of a cylinder.

*3: () stands for power saving circuit, the values when holding. Refer to Specific Product Precautions for details.

SJ 1.1 P.13
VP4 1.2 P.353

SV^{Connector type} 1.1 P.123
S0700 1.1 P.645
VFR 1.2 P.1015

SY 1.1 P.397
VQ 1.2 P.365
VQ7 1.2 P.1115

SV 1.2 P.13
VQC 1.2 P.537
VQD 1.2 P.1389

SYJ 1.2 P.145
VQZ 1.2 P.683
VK 1.2 P.1419

SZ 1.2 P.249
SQ 1.2 P.759
VFS 1.2 P.883

Power consumption W	Connection size	
	Thread piping (Rc)	One-touch fittings (ø) Applicable tubing size (mm)
0.55/0.4 (0.23/0.15)*3	M3, M5	2, 4, 6
0.35 (0.1)*3	M5, 1/8, 1/4, 1/2	2,3,2,4,6,8,10,12
0.35 (0.1)*3	M5, 1/8, 1/4, 3/8, 1/2	6, 8, 10, 12
0.6	1/8, 1/4, 3/8, 1/2	3,2,4,6,8,10,12
0.35 (0.1)*3	M3, M5, 1/8, 1/4	4, 6, 8
0.6	M5	4, 6
12	3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2	—
0.35	M3, M5	2, 3, 2, 4
0.95, 0.4	M5, 1/4, 3/8, 1/2	3,2,4,6,8,10,12
0.95, 0.4	M5, 1/4, 3/8, 1/2	3,2,4,6,8,10,12
0.9,0.35	M5, 1/8, 1/4, 3/8	3,2,4,6,8,10
0.95, 0.4	M5	3,2,4,6,8
1.8	1/8, 1/4, 3/8, 1/2, 3/4, 1	—
1	1/4, 3/8, 1/2, 3/4	6, 8, 10, 12
3.2 (2.4)*3	M5	4
4	M5, 1/8	—
0.35 (0.1)*3	M5, 1/8, 1/4, 1/2	2,3,2,4,6,8,10,12
0.95, 0.4	M5, 1/4, 3/8, 1/2	3,2,4,6,8,10,12
0.95, 0.4	M5, 1/4, 3/8, 1/2	3,2,4,6,8,10,12
0.9,0.35	M5, 1/8, 1/4, 3/8	3,2,4,6,8,10
0.95, 0.4	M5	3,2,4,6,8
1.8	1/8, 1/4, 3/8, 1/2, 3/4, 1	—
1	1/4, 3/8, 1/2, 3/4	6, 8, 10, 12

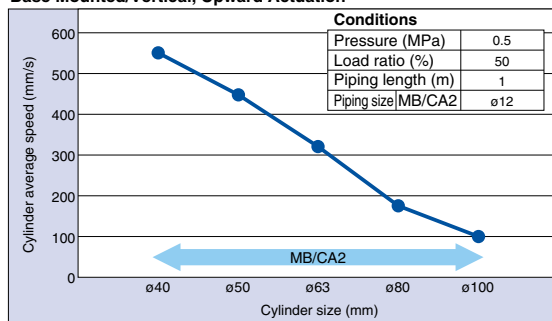
Conditions

- Pressure: 0.5 MPa
- Piping length: 1 m
- Load ratio: 50%
- Stroke: 200 mm
- Speed: 500 mm/s or less

Size of Air Cylinder and Its Speed

Example 1) Using the SY9000 series (Cv 2.5), the average speed of air cylinder is obtained under the below condition for driving cylinders ranged ø40 to ø100.

Base Mounted/Vertical, Upward Actuation



For details about the respective condition, make use of the SMC's Model Selection Program for air cylinder driving system for your reference.

Directional Control Valves

Actuators

Air Preparation Equipment

















Air Combination

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Pneumatics 4/5 Port Solenoid Valves

Series	① Power consumption (W)		Operating pressure range	② Operating method		③ Type of valve body			④ Replacing pilot valves	⑤ Exchanging piping (A, B port)
	Standard	With*1 power saving circuit		Internal pilot	External pilot	Direct ported	Base mounted	Cassette		
SJ2000 	0.55	0.23	Max. 0.7 MPa	●	●	—	—	●	—	●
SJ3000 	0.4	0.15		●	●	—	—	●	—	●
SY Connector type 	0.35	0.1	Max. 1.0 MPa	○	○	○	○	—	○	○
SY 	0.35	0.1	Max. 0.7 MPa	●	●	●	●	●	●	●
SV 	0.65	—		●	●	—	●	—	—	●
SYJ 	0.35	0.1		●	▲	●	●	—	●	—
SZ 	0.65	—		●	●	—	—	●	—	●
VP4 	12	—		Max. 0.9 MPa	●	▲	—	●	—	●
S0700 	0.35	—	Max. 0.7 MPa	●	●	—	●	—	○	●
VQ 	0.4 (0.95)*2	—	Max. 1.0 MPa	●	●	—	●	—	●	●
VQC 	0.4 (0.95)*2	—		●	●	—	●	—	●	●
VQZ 	0.35	—		●	○	●	●	—	●	●
SQ 	0.4	—		●	●	●	—	●	●	●
VFS 	1.8	—		●	●	●	●	—	●	—
VFR 	1.8	—	Max. 0.9 MPa	●	●	—	●	—	●	—
VQ7 	1	—	Max. 1.0 MPa	●	▲	—	●	—	●	○

*1 The values when holding. Refer to Specific Product Precautions for details. ●: Available with standard products ○: Available depending on a model ▲: Made-to-Order —: Not available
*2 The value in () shows the value for 4000 and 5000.

SJ	1.1 P.13	SV ^{Connector type}	1.1 P.123	SY	1.1 P.397	SV	1.2 P.13	SYJ	1.2 P.145	SZ	1.2 P.249
VP4	1.2 P.353	S0700	1.1 P.645	VQ	1.2 P.365	VQC	1.2 P.537	VQZ	1.2 P.683	SQ	1.2 P.759
						VFS	1.2 P.883	VFR	1.2 P.1015	VQ7	1.2 P.1115

⑥	Piping specification				Electrical specification		⑨	⑦	Option		⑪ Nominal service life (million cycles) Single/double solenoid	
	Plug-in	Individual wiring							⑧	⑩		
		Grommet	Plug connector	DIN connector	DC	AC					Lead wire length 1 m or longer	Bracket
●	—	●	—	●	—	●	○	●	—	50	—	
○	—	—	—	○	—	○	○	—	—	70	200	
●	●	●	○	●	●	▲	▲	●	●	50	—	
	M8 connector type is also available.					Available as a special order depending on the model.						
●	—	—	—	●	—	○	○	●	—	50	—	
	M12 connector type is also available.											
—	●	●	○	●	●	—	—	●	●	30	—	
	M8 connector type is also available.											
●	—	●	—	●	—	●	○	●	—	50	—	
—	●	—	●	●	●	—	—	▲	—	10	—	
●	●	●	—	●	—	●	○	●	—	50	—	
●	—	—	—	●	●	●	●	●	—	50	200	
●	—	—	—	●	—	●	●	●	—	50	200	
—	●	●	●	●	●	—	—	●	●	50	200	
●	—	●	—	●	—	●	●	●	—	50	200	
●	●	—	●	●	●	—	—	▲	●	—	30	
●	●	—	●	●	●	—	—	▲	—	20	—	
—	—	—	●	●	●	—	●	—	—	50	100	

* Refer to pages 10 and 11 for details of ① to ⑪.

Directional Control Valves

Actuators

Air Preparation Equipment



Air Combination

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Pneumatics 4/5 Port Solenoid Valves

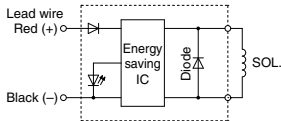
Series	① Power consumption (W)		Operating pressure range	② Operating method		③ Type of valve body			④ Replacing pilot valves	⑤ Exchanging piping (A, B port)
	Standard	With* power saving circuit		Internal pilot	External pilot	Direct ported	Base mounted	Cassette		
VQD 	2.0	3.2/1.0 <small>(Large flow) Note 1)</small>	Max. 0.7 MPa	Direct operated	Direct operated	●	●	—	—	—
VK 	4.3/ 2.3	—		Direct operated	Direct operated	●	●	—	—	—

* The values when holding. Refer to Specific Product Precautions for details. ●: Available with standard products ○: Available depending on a model ▲: Made-to-Order —: Not available

① Power Consumption

Electrical power needed to drive a circuit.

Note 1) Large flow type with power saving circuit
Power consumption is decreased by 1/3 reducing the wattage required to hold the valve in an energized state.
After a maximum of 25 msec after applying current, the power saving circuit starts to operate and power is reduced.



② Operating Method

Internal pilot (Standard)

Allows supply pressure to run through the inside of a solenoid valve to act on pilot valve.



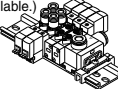
External pilot

Separating from supply pressure, the another pressure for pilot valve is obtained from external. Used when the main pressure is less than the minimum operating pressure or vacuum application.

Direct operated

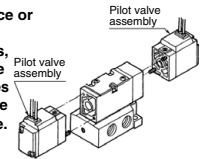
Drives the main valve by acting force of a solenoid.

③ Type of Body

Direct ported	Port is available on the valve body for piping directly. 
Base mounted	No port is available on the valve body. Used with the manifold base or sub-plate. Easy maintenance. 
Cassette type (SMC original)	Air passage of the valve body is connected directly and mounted on DIN rail. (No single unit is available.) Baseless and low profile. 

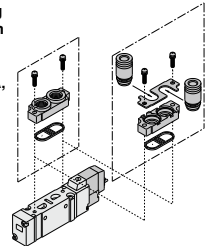
④ Replacing Pilot Valves

In maintenance or changing specifications, the pilot valve which switches the main valve is replaceable.



⑤ Changing Piping (A, B port)

When piping specification is needed to change, fittings for A, B port are replaceable.



⑥ Piping specification				Electrical specification		⑨ Dual 3 port valve	⑦ With back pressure check valve	Option		⑪ Nominal service life (million cycles) (Single/double solenoid)	
Plug-in	Individual wiring			DC	AC			⑧ Lead wire length 1 m or longer	⑩ Bracket	Rubber seal	Metal seal
	Grommet	Plug connector	DIN connector								
—	—	●	—	●	—	—	—	●	—	50	—
—	●	—	●	●	●	—	—	▲	●	20	—

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

⑥ Wiring Specification

• Plug-in

Insert a valve into connector in the base side to integrate the wiring parts.

Easy maintenance.

• Individual wiring (Non-plug in)

Electrical wiring is all done in the valve side.



Grommet	Plug connector	DIN connector

⑦ With Back Pressure Check Valve

Valve exhaust released from the same base cannot be returned to the cylinder ports. Prevention of malfunction of a cylinder by back pressure.



⑧ Lead Wire Length

- Standard: 300 mm, 600 mm
- Option: 1000 mm, 1500 mm, 2000 mm, 2500 mm, 3000 mm, 5000 mm

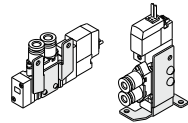
⑨ Dual 3 Port Valve

2 pcs of 3 port valve are integrated in one body. If used as a 3 port valve, half the number of stations are only needed, compared with the current model and ideal for space saving.

A side	B side	Symbol
N.C.	N.C.	
N.O.	N.O.	
N.C.	N.O.	

* Symbols are compatible with the VOC series.

⑩ Bracket/Mounting Bracket



⑪ Nominal Service Life

Endurance was tested under SMC condition.

Number of service life of solenoid valve is based on our test results and no guarantee is assured for everything.

SMC Test Condition

Supply pressure	0.5 MPa
Quality of air	Dryer (Figure 1)
Place	In life test room

Figure 1

Piping in the life test room

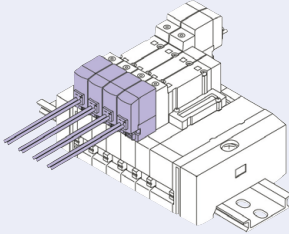


Pneumatics 4/5 Port Manifold

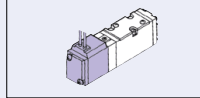
Piping Specifications

Direct Wiring (for individual wiring)

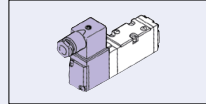
Individual wiring type (grommet, connector, etc.) It requires to wire a valve individually.



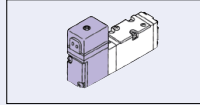
Grommet



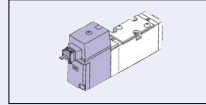
DIN terminal



Grommet terminal

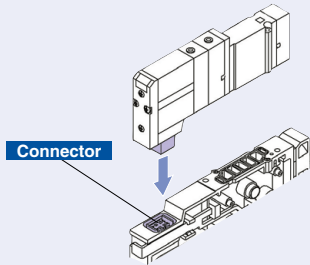


Connector



Plug-in (for centralized wiring)

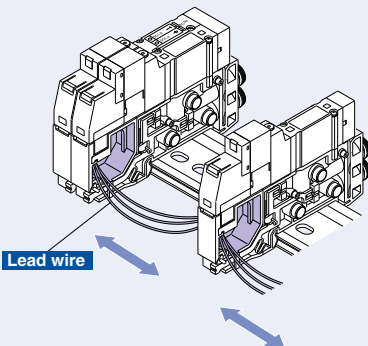
Manifold in which valve and manifold are connected with an electrical connector.



Manifold Internal Wiring

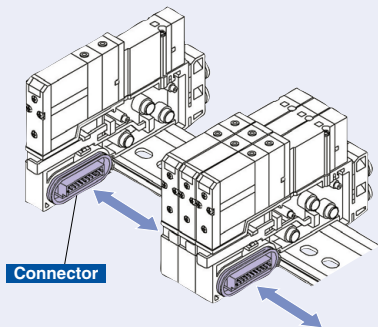
Lead wire connection

Wiring encasing the lead wire in a manifold block



Connector connection

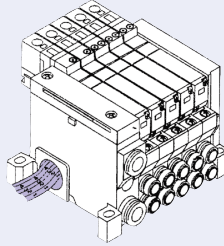
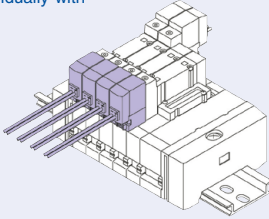
Manifold in which lead wires inside a manifold block are also connected with an electrical connector.



Wiring Specifications with External Device

Individual Wiring

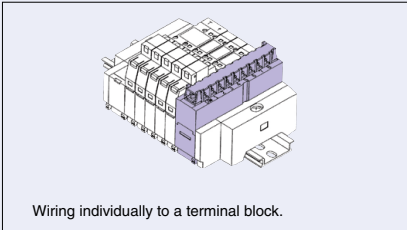
Wiring a valve individually with external device



Centralized Wiring

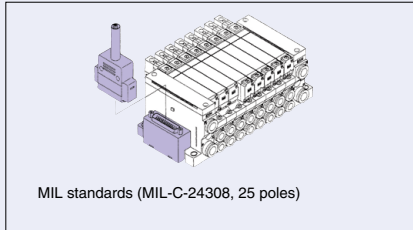
Wiring with external device, integrating lead wire from each valve into a manifold

Terminal block



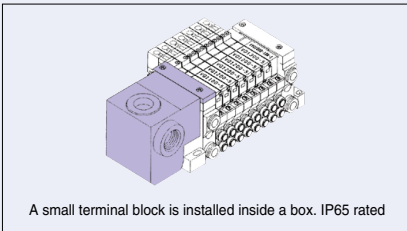
Wiring individually to a terminal block.

D-sub connector



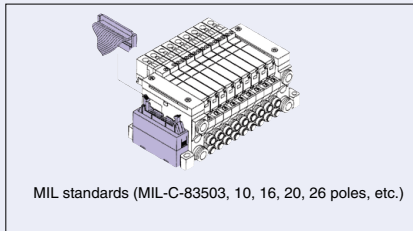
MIL standards (MIL-C-24308, 25 poles)

Terminal box



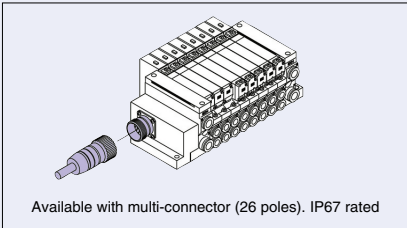
A small terminal block is installed inside a box. IP65 rated

Flat ribbon cable



MIL standards (MIL-C-83503, 10, 16, 20, 26 poles, etc.)

Multi-connector

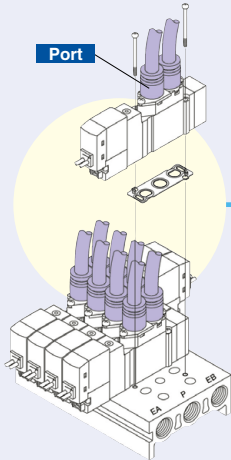


Available with multi-connector (26 poles). IP67 rated

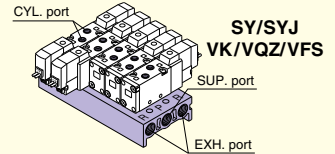
Pneumatics 4/5 Port Manifold

Piping Specifications/Body Ported

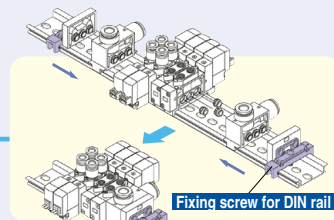
Port is available on the valve body for piping directly.



With base Upright piping
Vertical type



Without base
Cassette type,
low profile



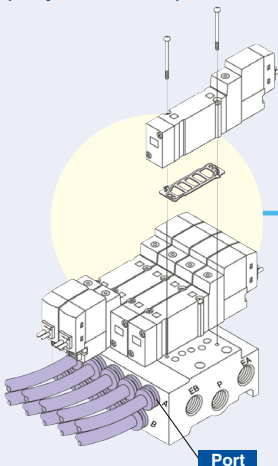
Upright piping
Vertical type

Side piping
Horizontal
piping

Valves are sandwiched between brackets to fix them onto DIN rail.

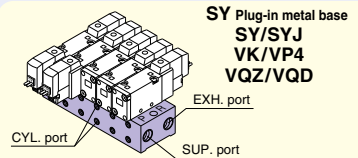
Piping Specifications/Base Mounted

Piping with the ports on the manifold base
A solenoid valve itself can be replaced regardless of the air piping.
(Easy maintenance)



Base mounted Unchangeable
station type

Side piping Horizontal
piping

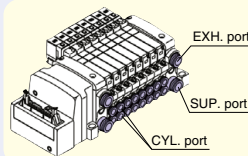


Metal joint type
Tie-rod type

Each manifold is connected with the tie-rod and the metal joint. Strong against the torsion of a manifold

Stacking base Changeable
station type

Side piping Horizontal
piping



DIN rail type

Each manifold is connected on the DIN rail. Easy to change the number of stations.

SJ 1. P.13
VP4 1. P.353

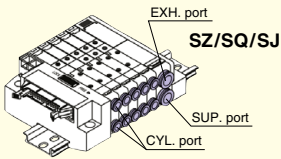
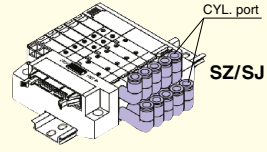
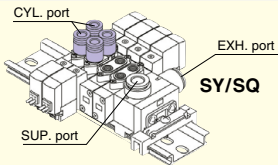
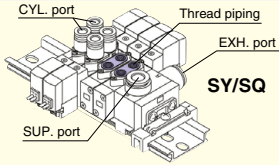
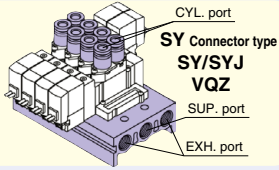
SY Connector type 1. P.123
VQ 1. P.365

SY 1. P.397
VQC 1. P.537
VFR 1. P.1015

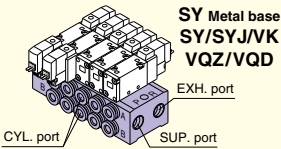
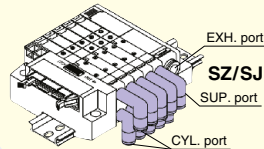
SV 1. P.13
VQZ 1. P.683
VQ7 1. P.1115

SYJ 1. P.145
SQ 1. P.759
VQD 1. P.1389

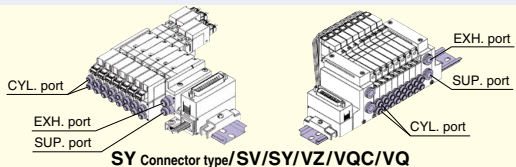
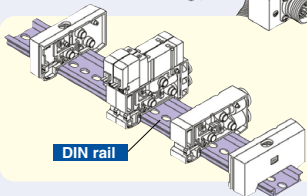
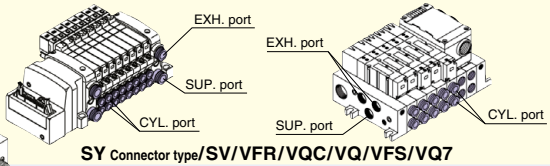
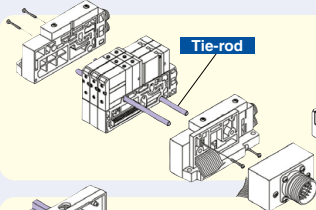
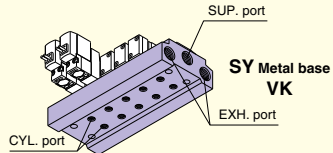
SZ 1. P.249
VFS 1. P.883
VK 1. P.1419



Rear piping



Bottom piping



Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination

Pressure Control Equipment

Pressure Detection Equipment

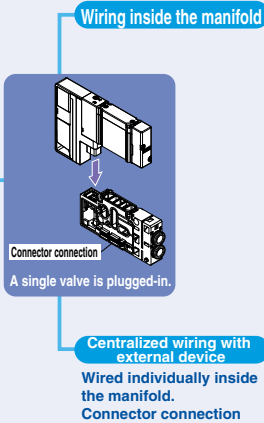
Flow Rate Detection Equipment

Pneumatics 4/5 Port Manifold

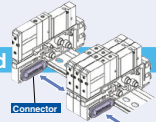
Points for Selection

Description

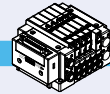
Point 1
Reduced wiring type



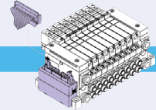
Connector connection manifold



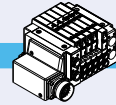
D-sub connector



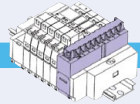
Flat ribbon cable



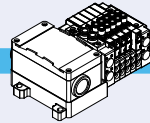
Multi-connector



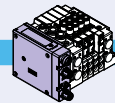
Terminal block



Terminal box



Serial transmission



Point 2
Space saving type

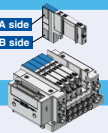
Height direction

Low profile cassette type



Around the valve

Single side solenoid type

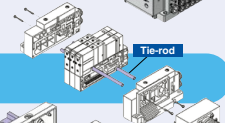


Point 3
Stations changeable type

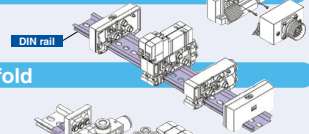
A single valve is plugged-in.
Direct wiring is possible.

Number of stations

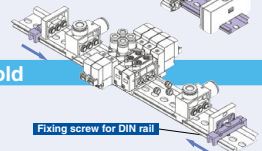
Tie-rod type
Metal joint type manifold



DIN rail type manifold



Cassette type manifold



SJ 1-1 P.13
S0700 1-1 P.645

SY^{Connector type} 1-1 P.123
VQ 1-2 P.365

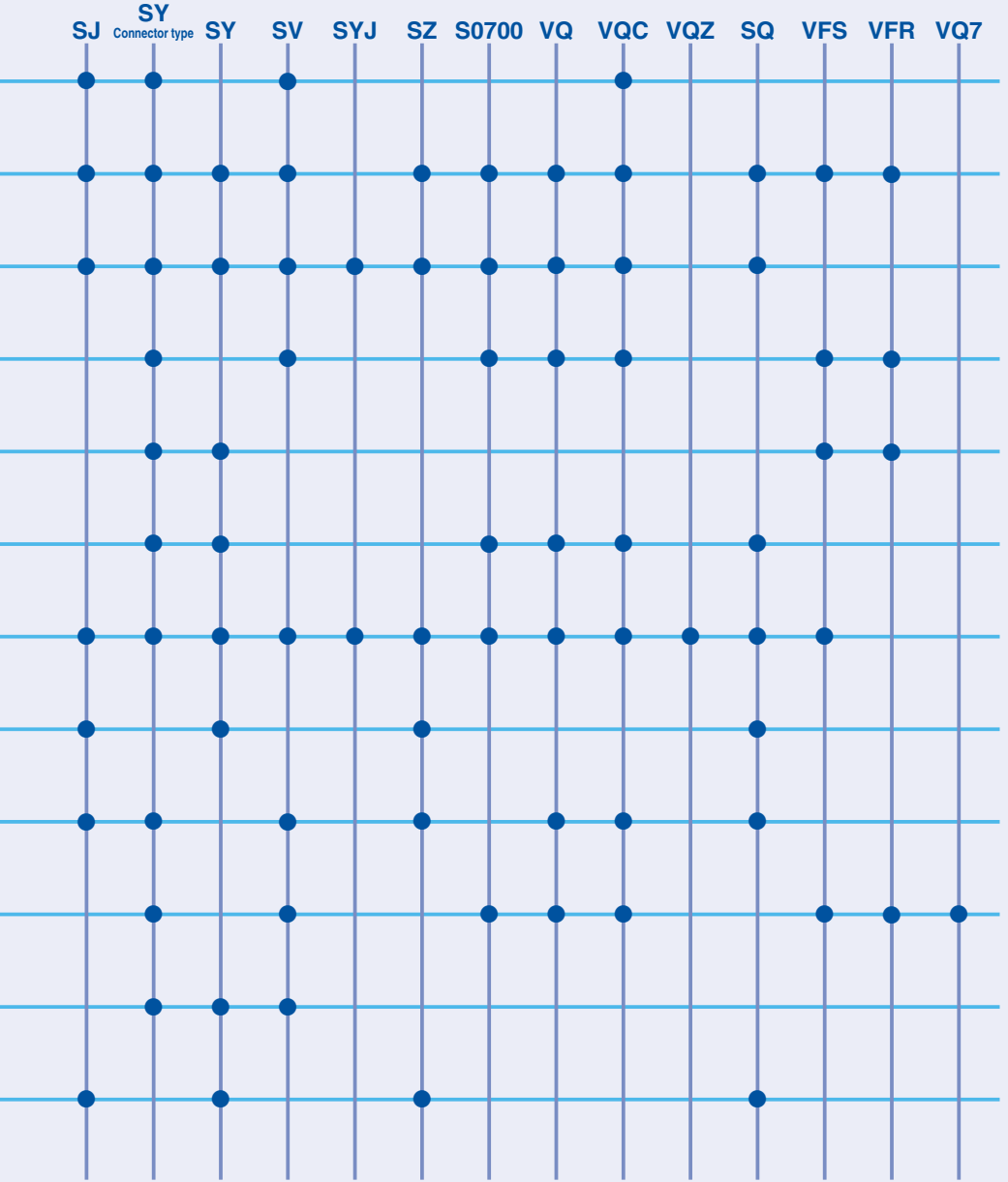
SY 1-1 P.397
VQC 1-2 P.537

SV 1-2 P.13
VQZ 1-2 P.683

SYJ 1-2 P.145
SQ 1-2 P.759
VFR 1-2 P.1015

SZ 1-2 P.249
VFS 1-2 P.883
VQ7 1-2 P.1115

Compliant Series



Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Pneumatics 4/5 Port **Features of manifold**

Series	Features	Connection method	Space	Max. operating pressure
SJ	<ul style="list-style-type: none"> • Can be mounted with SJ2000 and SJ3000. • Connectors make changing the number of stations easy. 	<ul style="list-style-type: none"> • Stacking type 	Low profile with the base-free structure	0.7
SY Connector type	<ul style="list-style-type: none"> • Manifold that allows SY3000 and 5000, or SY5000 and 7000 to be mounted together is also prepared. • Use of a multiple layer type makes it possible to consolidate the wiring, piping, and operation in one direction. 	<ul style="list-style-type: none"> • Aluminum bar type manifold • Stacking type manifold 	Solenoid on a single side	1.0
SY	<ul style="list-style-type: none"> • 3-port and 5-port valves can be mounted together. 	<ul style="list-style-type: none"> • Aluminum bar type manifold • Stacking type manifold 	—	0.7
SV	<ul style="list-style-type: none"> • Changing the number of stations and/or specifications are easily possible. • Dual 3-port valve with 4-positions. 	<ul style="list-style-type: none"> • Connectivity is fine with the attachment/detachment lever. 	Solenoid on a single side	0.7
SYJ	<ul style="list-style-type: none"> • 3-port and 4/5-port valves can be mounted together. 	<ul style="list-style-type: none"> • Aluminum bar type manifold 	The most smallest size in a single unit	0.7
SZ	<ul style="list-style-type: none"> • Cassette type method enables the easier valve replacement. • Safety maintenance is ensured by the valve with switch. 	<ul style="list-style-type: none"> • Directly connected on the body and can change the number of stations. 	Low profile with the base-free structure	0.7
VP4	<ul style="list-style-type: none"> • For driving the large sized cylinders 	<ul style="list-style-type: none"> • Aluminum bar type manifold 	—	0.9
S0700	<ul style="list-style-type: none"> • Low profile valve with 7 mm width. • Space-saving design with valves on a single side. • Dual 3-port valves can be used. 	<ul style="list-style-type: none"> • Aluminum bar type manifold • Stacking type manifold 	Solenoid on a single side	0.7
VQ	<ul style="list-style-type: none"> • Space-saving design with valves on a single side. • Numerous manifold options. • Dual 3-port valves can be used. 	<ul style="list-style-type: none"> • Valves can be clamped using one screw. • Stacking type manifold 	Solenoid on a single side	1.0
VQC	<ul style="list-style-type: none"> • Connectors make changing the number of stations easy. • Space-saving design with valves on a single side. • Numerous manifold options. • Dual 3-port valves can be used. 	<ul style="list-style-type: none"> • Valves can be clamped using one screw. • Stacking type manifold 	Solenoid on a single side	1.0
VQZ	<ul style="list-style-type: none"> • 3-port and 5-port valves can be mounted together. • Can be mounted on DIN rails. 	<ul style="list-style-type: none"> • Aluminum bar type manifold 	—	1.0
SQ	<ul style="list-style-type: none"> • Cassette type with valves and manifolds makes changing the number of stations easy. • Space-saving design with valves on a single side. • Dual 3-port valves can be used. 	<ul style="list-style-type: none"> • Valves can be clamped using one screw. • Stacking type manifold 	Low profile solenoid on a single side	1.0
VFS	<ul style="list-style-type: none"> • For driving the middle to large sized cylinders 	<ul style="list-style-type: none"> • Aluminum bar type manifold • Stacking type 	—	1.0
VFR	<ul style="list-style-type: none"> • For driving the middle to large sized cylinders 	<ul style="list-style-type: none"> • Aluminum bar type manifold • Stacking type 	—	0.9
VQ7	<ul style="list-style-type: none"> • Valves conforming to ISO standards 	<ul style="list-style-type: none"> • Stacking type 	—	1.0
VQD	<ul style="list-style-type: none"> • 4-port, direct poppet type 	<ul style="list-style-type: none"> • Aluminum bar type manifold 	—	0.7
VK	<ul style="list-style-type: none"> • Direct poppet type 	<ul style="list-style-type: none"> • Aluminum bar type manifold 	—	0.7

SJ 1.1 P.13	SV ^{Connector type} 1.1 P.123	SY 1.1 P.397	SV 1.2 P.13	SYJ 1.2 P.145	SZ 1.2 P.249
VP4 1.2 P.353	S0700 1.1 P.645	VQ 1.2 P.365	VQC 1.2 P.537	VQZ 1.2 P.683	SQ 1.2 P.759
	VFS 1.2 P.883	VFR 1.2 P.1015	VQ7 1.2 P.1115	VQD 1.2 P.1389	VK 1.2 P.1419

	Life expectancy (Million cycles)		Single unit C(d ³ m ³ /sbar) (Cv factor)	Centralized wiring	Serial transmission	Power consumption (0.1 W)*	Electrical spec. AC compatibility	Clean compatibility	Enclosure (IP65, 67 or greater)	Vacuum compatibility	Back pressure prevention
	Rubber seal	Metal seal									
	50	—	0.13 to 0.56 (0.04 to 0.12)	○	○	—	—	—	—	○	○ Possible with back pressure check valve (Main valve, check seal)
	70	200	1.0 to 6.6 (0.24 to 1.6)	○	○	○	—	○	○	○	○ Back pressure check valve
	50	—	1.0 to 8.0 (0.26 to 2.5)	○	○	○	○	○	○	○	○ Possible with spacers.
	50	—	1.1 to 7.0 (0.28 to 1.6)	○	○	—	—	○	○	○	○
	30	—	0.46 to 2.9 (0.12 to 0.74)	○	○	○	○	○	○	—	○ Possible with spacers.
	50	—	0.77 (0.19)	○	○	—	—	○	—	○	○
	10	—	16 to 60 (5.6 to 16.7)	—	—	—	○	—	—	—	—
	50	—	0.08 to 0.10	○	○	—	—	○	—	○	○
	50	200	0.72 to 17 (0.18 to 4.4)	○	○	—	○	○	○	○	○ Possible with spacers for VQ4000/5000.
	50	200	0.72 to 17 (0.18 to 4.4)	○	○	—	—	○	○	○	○ Possible with spacers for VQC4000/5000.
	50	200	0.7 to 4.6 (0.17 to 1.2)	—	○	—	○	○	○	○	○ Possible with spacers.
	50	200	0.62 to 3.1 (0.14 to 0.71)	○	○	—	—	○	—	○	○
	—	30	0.4 to 9.0	○	○	—	○	○	○	○	—
	20	—	2.5 to 40 (0.7 to 10.6)	○	—	—	○	—	—	—	—
	50	100	1.1 to 3.3	—	—	—	○	—	○	○	○
	50	—	0.05 to 0.07	—	—	—	—	○	—	○	—
	20	—	0.38 to 0.84 (0.09 to 0.19)	—	—	—	○	○	—	○	—

* The values when holding. Refer to Specific Product Precautions for details.

Directional
Control Valves

Actuators

Air Preparation
Equipment

Air Combination

Pressure Control
Equipment

Pressure Detection
Equipment

Flow Rate Detection
Equipment

Series	① Clean series	② Copper-free, Fluorine-free	③ Copper-free, Fluorine-free and Silicon-free	④ Intrinsically safety explosion proof
SJ	—	—	—	—
SY Connector type	○	—	—	—
SY	○	—	—	51-SY
SV	○	—	—	—
SYJ	○	—	—	—
SZ	○	—	—	—
VP4	—	—	—	—
S0700	○	○	○	—
VQ	○	○	○	—
VQC	○	○	○	—
VQZ	○	—	—	—
SQ	○	○	○	—
VFS	—	○	○	—
VFR	—	—	—	—
VQ7	—	○	—	—
VQD	○	○	○	—
VK	○	○	—	—

●: Available with standard products. ○: Available depending on a model. —: Not available.

① Clean Series

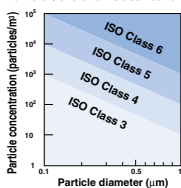
No particle generation because external leakage is zero. After blowing the external surface, double packaging to shut out the dust.

Exhaust of main valve and pilot valve are common exhaust and released to the outside of clean room.

The position of the pneumatic equipment to the workpiece is determined by the degree of particle generation.

Particle generation grade no. of pneumatic equipment ≤ Particle concentration grade no. around workpiece

Particle Generation Classification



Cleanliness Class (Reference)

ISO 14644-1	JIS B 9920	Fed.Std.209E ^{Note)}	
		SI unit	
ISO Class 3	JIS Class 3	M1.5	
ISO Class 4	JIS Class 4	M2.5	
ISO Class 5	JIS Class 5	M3.5	
ISO Class 6	JIS Class 6	M4.5	
ISO Class 7	JIS Class 7	M5.5	
ISO Class 8	JIS Class 8	M6.5	

Note) Fed.Std.209E was abolished in Nov. 2001, so these figures are for reference only.

② Copper-free, Fluorine-free

Copper and halogen-based materials are not used.
Grease: Lithium soap-based grease

③ Copper-free, Fluorine-free and Silicon-free

Copper and halogen and silicon-based materials are not used.
No dust generation because of zero external leakage.
Grease: Lithium soap-based grease

④ Intrinsically Safety Explosion Proof

The intrinsic safety type is 51-SY series.
Products that can be used in an explosive atmosphere.
Depending on an atmospheric level, specifications are different.

⑤ Ozone Resistant

Using rubber material (H-NBR or FKM) resistant for ozone in the compressed air.

SJ 1.1 P.13	SV ^{Connector type} 1.1 P.123	SY 1.1 P.397	SV 1.2 P.13	SYJ 1.2 P.145	SZ 1.2 P.249
VP4 1.2 P.353	S0700 1.1 P.645	VQ 1.2 P.365	VQC 1.2 P.537	VQZ 1.2 P.683	SQ 1.2 P.759
	VFS 1.2 P.883	VFR 1.2 P.1015	VQ7 1.2 P.1115	VQD 1.2 P.1389	VK 1.2 P.1419

5	6	7	International standards			
			CE	CSA	UL	ATEX
●	—	●	—	—	●	—
●	○	○	—	—	—	—
●	○	○	—	—	○	—
●	●	●	—	—	●	—
●	○	○	—	—	—	—
●	—	○	—	—	—	—
—	—	—	—	—	—	—
●	—	●	—	—	—	—
●	○	○	—	—	—	—
●	●	●	—	—	—	○
●	○	○	—	—	—	—
●	—	○	—	—	—	—
○	○	○	○	○	—	—
○	—	○	○	○	—	—
○	○	○	—	—	—	—
●	—	○	—	—	—	—
○	—	○	—	—	—	—

6 Enclosure

Enclosure for the electrical equipment against an external solid foreign object or water ingress.

-Enclosure

IEC (International Electrical Committee) standards (IEC60529) define the protection degree against the ingress of a solid foreign object as the 1st characteristics and against the ingress of water as the 2nd characteristics. With both of these characteristics, IP number is defined to show the protection degree.

IP20: Protection against fingers entering the enclosure but not specifically against water.

IP65: Protection against dust entering the enclosure and not greatly affected by jets of water from all directions.

IP67: Protection against dust entering the enclosure and immersion in water at a specific pressure and time.

7 International Standards

Name	Contents	Mark
CE	Mark needed to market products in Europe. Signifies the suitability to the directive needed to obtain.	
CSA	Canadian accreditation authority, No interchangeability with UL.	
UL	U.S. accreditation authority, No interchangeability with CSA.	
ATEX	Directive of explosion proof in Europe	

Directional Control Valves

Actuators

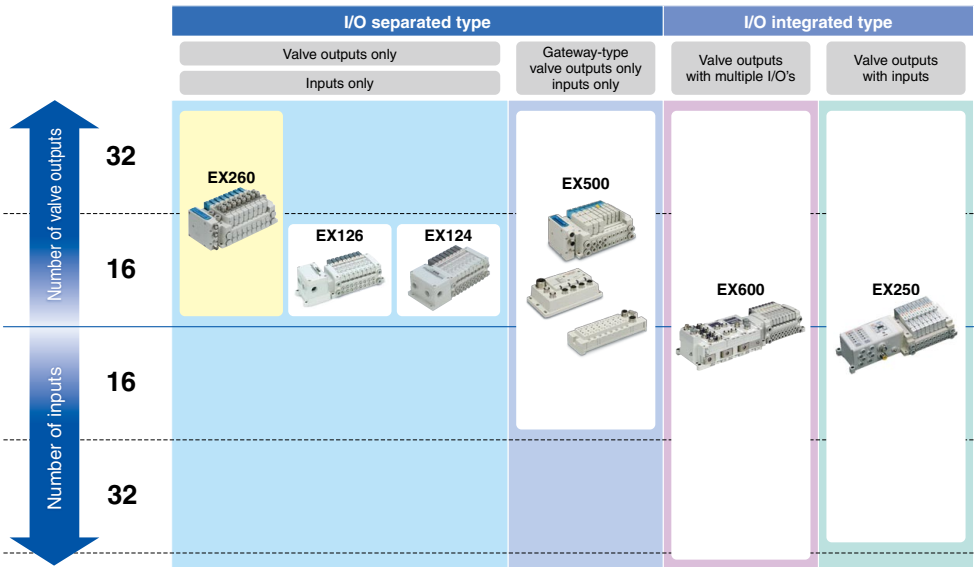
Air Preparation Equipment

Air Combination

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment



Number of valve outputs	16			32	Max. 32 (Max. 128)	32	32
Number of inputs	None						
SI unit series	EX260	EX126	EX124	EX260	EX500	EX600	EX250
Page	1, P.789	1, P.781	1, P.781	1, P.789	1, P.845	1, P.815	1, P.802

Open network	PROFINET	●			●				
	EtherCAT	●			●	●			
	EtherNet/IP™	●			●	●	●		
	PROFIBUS DP	●			●	●			
	DeviceNet™	●		●	●	●	●		
	CC-Link	●	●	●	●	●			
	AS-Interface						●		
	CANopen						●		
	CompoNet™								
Applicable valve series	SY (Plug-in connector connecting base)	3000	●	●	●	●	●	●	
		5000	●	●	●	●	●	●	
		7000	●	●	●	●	●	●	
	S0700 (Stacking base)	0700	●		●	●	●	●	
		SV	1000	●	●	●	●	●	●
			2000	●	●	●	●	●	●
	3000		●	●	●	●	●	●	
	4000		●		●	●	●	●	
	VQC	1000	●	●	●	●	●	●	
		2000	●	●	●	●	●	●	
		4000	●	●	●	●	●	●	
		5000	●	●	●	●	●	●	
	VQ	1000							
		2000			●				
		4000			●				
5000				●					

	I/O separated type				I/O integrated type	
	Valve outputs only		Gateway-type valve outputs only inputs only	Valve outputs with multiple I/O's		
	Inputs only			Valve outputs with inputs		
↑ Number of valve outputs	32		EX180			
	EX120	EX121				EX122
	16		EX510			
↓ Number of inputs	16					
	32					

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

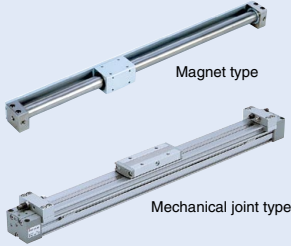
Number of valve outputs	16				32	16 (total 64)
Number of inputs	None					
SI unit series	EX120	EX121	EX122	EX140	EX180	EX510
Page	1, P.777	1, P.777	1, P.777	1, P.784	1, P.786	1, P.878

Open network	PROFINET					
	EtherCAT					
	EtherNet/IP™					
	PROFIBUS DP					●
	DeviceNet™	●	●	●	●	●
	CC-Link	●	●	●	●	●
	AS-Interface					
	CANopen					
	CompoNet™	●	●	●		

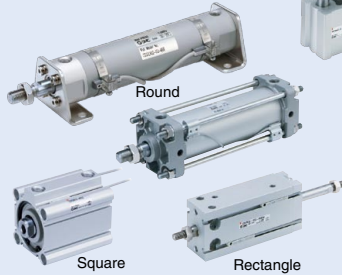
Applicable valve series	SY (Plug-in connector connecting base)	3000	●					
		5000	●					
		7000	●					
	SJ	2000				●	●	
		3000				●	●	
		3000					●	
	SY (Plug-in metal base)	5000					●	
		5000					●	
	S0700 (Bar stock)	0700				●	●	
		3000					●	
		5000					●	
	SY (Bar stock)	3000					●	
		5000					●	
		7000					●	
	SY (Stacking base)	3000		●	●		●	
		5000		●	●		●	
		7000					●	
	SV	1000	●					
		2000	●					
		3000	●					
		4000	●					
	VQ	1000	●				●	
		2000	●				●	
		4000	●				●	
		5000						
	SQ	1000			●		●	
		2000			●		●	
		3000			●		●	
VQZ	1000					●		
	2000					●		
	3000					●		
SYJ	3000					●		
	5000					●		
	7000					●		

Actuators

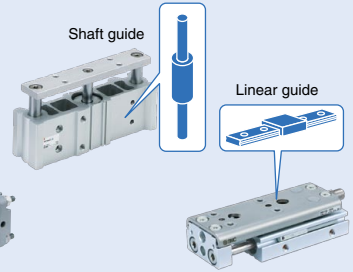
Rodless Cylinders



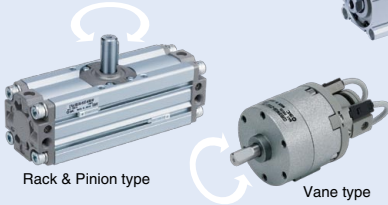
Basic



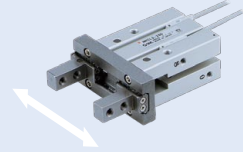
With Guide



Rotary Actuators



Air Grippers



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Basic Characteristics of Rodless Cylinders	P.42	Rotary Actuators: Option	P.62
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General Specifications

Operating fluid	Air
Ambient and operating temperature	With auto switch: -10 to 60°C (-10 to 150°C)* Without auto switch: -10 to 70°C (-10 to 150°C)*
Lubrication	Non-lube
Minimum operating pressure	0.05 MPa or less (0.001 MPa)
Maximum operating pressure	1.0 MPa
Proof pressure	1.5 MPa
Minimum operating speed	50 mm/s or less (0.3 mm/s)
Maximum operating speed	500 to 1000 mm/s (3000 mm/s)

* With no freezing. Figures in () are the manufacturable minimum or maximum values.


Since each value in the left table shows the representative values for the general actuators, it is not applicable for all the actuators.

The value may change depending on a model or cylinder's inner diameter.

For details, refer to each cylinder's specification.


SMC Actuator Variations

Basic

Round	Model	Bore size (mm)	Bore size (mm)	Maximum stroke (mm)*			
				Round	Square	Rectangle	
	CJP	4, 6, 10, 15	2.5	10	—	—	
	CJP2	4, 6, 10, 16	2.5, 4	20	—	10	
	CJ1	2.5, 4	6, 10, 16	60	—	60	
	CJ2	6, 10, 16	20, 25, 32, 40	150	—	—	
	CM2	20, 25, 32, 40	40, 50, 63, 80, 100	—	30	60	
	CG1	20, 25, 32, 40, 50, 63, 80, 100	125, 140, 160	1500	50	100	
	CA2	40, 50, 63, 80, 100	8, 10, 12, 16, 20, 25	2000	300	300	
	MB/MB1	32, 40, 50, 63, 80, 100, 125	8, 10, 12, 16, 20, 25	2000			
	CS1	125, 140, 160, 180, 200, 250, 300	32, 40, 50, 63, 80, 100, 125, 160, 180, 200, 250	1500			
	CS2	125, 140, 160	32, 40, 50, 63, 80, 100, 125, 160, 180, 200, 250	1500			
	Square	CQS	12, 16, 20, 25	12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 140, 160, 180, 200	1500	300	—
		CQ2	12, 16, 20, 25, 32, 40, 50, 63, 80, 100, 125, 140, 160, 180, 200	20, 25, 32, 40, 50, 63, 80, 100	1600		
		RQ	20, 25, 32, 40, 50, 63, 80, 100	056, 075, 106, 150, 200, 250, 300, 400 (inch)	2000		
		NCQ8	056, 075, 106, 150, 200, 250, 300, 400 (inch)	20, 25, 32, 40, 50, 63, 80, 100	2400		
C55 (Conforming to ISO)		20, 25, 32, 40, 50, 63, 80, 100	4, 6, 8, 10, 12, 16, 20	—			
Rectangle		CUJ	4, 6, 8, 10, 12, 16, 20	6, 10, 16, 20, 25, 32	—		
	CU	6, 10, 16, 20, 25, 32	20, 25, 32, 40	—	—	—	
	CQU	20, 25, 32, 40	25, 32, 40, 50, 63	—	—	—	
	MU	25, 32, 40, 50, 63					

* The maximum stroke changes depending on the model.

Rodless Cylinders

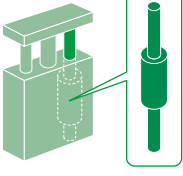
Magnet type	Model	Bore size (mm)	Maximum stroke (mm)* ¹	
			Rodless cylinders	Mechanical joint* ³
	CY3B	6, 10, 15, 20, 25, 32, 40, 50, 63	300	—
	CY3R	6, 10, 15, 20, 25, 32, 40, 50, 63	500	3000
	CY1S	6, 10, 15, 20, 25, 32, 40	1000	—
	CY1L	6, 10, 15, 20, 25, 32, 40	1500	—
	CY1H	10, 15, 20, 25	3000	—
	CY1HT	25, 32	5000	—
	MXY	6, 8, 12	—	—
	CY1F	10, 15, 25	—	—
Mechanical joint type	MY1B	10, 16, 20, 25, 32, 40, 50, 63, 80, 100	—	5000
	MY3A	16, 20, 25, 32, 40, 50, 63	—	—
	MY3B	16, 20, 25, 32, 40, 50, 63	—	—
	MY3M	16, 25, 40, 63	—	—
	MY1M	16, 20, 25, 32, 40, 50, 63	—	—
	MY1C	16, 20, 25, 32, 40, 50, 63	—	—
	MY1H	10, 16, 20, 25, 32, 40	—	—
	MY1HT	50, 63	—	—
	MY2C	16, 25, 40	—	—
	MY2H	16, 25, 40	—	—
	MY2HT	16, 25, 40	—	—

*1 The maximum stroke changes depending on the model.

*2 The maximum stroke for cylinders with a magnet is compatible with CY3B.

*3 The maximum stroke of the mechanical joint type shows the value for MY1B.

With Guide

Shaft guide	Model	Bore size (mm)	Maximum stroke (mm)*	
			With shaft guide	With linear guide
	CXS	6, 10, 15, 20, 25, 32	—	10
	CXSJ	6, 10, 15, 20, 25, 32	50	200
	CXW	10, 16, 20, 25, 32	—	300
	CXT	12, 16, 20, 25, 32, 40	75	—
	CQM	12, 16, 20, 25, 32, 40, 50, 63, 80, 100	250	400
	MGP	20, 25, 32, 40, 50, 63	400	200
	MGPW	20, 25, 32, 40, 50, 63	400	250
	MGQ	12, 16, 20, 25, 32, 40, 50, 63, 80, 100	500	300
	MGG	20, 25, 32, 40, 50, 63, 80, 100	600	—
	MGC	20, 25, 32, 40, 50	800	—
	MGJ	6, 10	1100	—
	MGF	40, 63, 100	1200	—
	MTS	8, 12, 16, 20, 25, 32, 40	1300	—
	Linear guide	MXQ	6, 8, 12, 16, 20, 25	—
MXW		8, 12, 16, 20, 25	—	—
MXP		6, 8, 10, 12, 16	—	—
MXJ		4.5, 6, 8	—	—
MXY		6, 8, 12	—	—
MXH		6, 10, 16, 20	—	—

* The maximum stroke changes depending on the model.

Rotary Actuators

	Model	Actuation	Torque (at 0.5 MPa)														N·m	Max. rotation angle	
			0.04	0.1	0.2	0.3	0.7	1	2	3	5	7	10	20	30	40			70
Vane Axis	CRB2	Single		0.12		0.32	0.70		1.83	3.73									Up to 270°
		Double				0.25	0.65	1.45		3.70		7.59							Up to 100°
	CRBU2	Single		0.12		0.32	0.70		1.83	3.73									Up to 270°
		Double				0.25	0.65	1.45		3.70		7.59							Up to 100°
	CRB1	Single										5.69		10.8	18.0		35.9		Up to 280°
		Double												11.8	22.7		36.5	72.6	Up to 100°
Table Table	MSUB	Single		0.11		0.31	0.69		1.78									Up to 180°	
		Double				0.23	0.62	1.42		3.63									Up to 90°
		Single		0.11		0.31	0.69		1.78										Up to 180°
Rack & Pinion Axis	CRJ	Single	0.042	0.095														Up to 190°	
	CRA1	Single							1.91				9.27	17.2	31.7		74.3	Up to 190°	
	CRQ2	Double				0.3	0.75		1.84	3.11	5.3								Up to 370°
	Table	MSQB	Double		0.09	0.18	0.29	0.56	0.89	1.84	2.73	4.64	6.79	10.1	19.8				Up to 190°
					0.09	0.18	0.29	0.56	0.89	1.84	2.73	4.64							

Air Grippers

	Model	Actuation	Size																	
			6	7	8	10	12	15	16	20	25	30	32	40	50	63	80	100	125	
Parallel Opening Square	2-finger	MHZ2	3.3			11				34	42	65		158	254					
		MHL2				14				45	74	131		228	396					
		MHF2			19		48			90	141									
		MHK2					15			31	46	80								
	Round	2-finger	MHS2							21	37	63		111	177	280	502			
			MHR2				12		24		33		58							
		3-finger	MHS3							14	25	42		74	118	187	335	500	750	1270
			MHR3				7		13											
		4-finger	MHS4							10	19	31		55	88	140	251			
			MHR4																	
Fulcrum Opening Square	2-finger	MHC2	0.038	0.017		0.1			0.39	0.7	1.36									
		MHT2											12.4	36	63	106				
		MHY2				0.16			0.54	1.1	2.28									
		MHW2								0.3	0.73		1.61	3.7	8.27					

Series included in these two pages are as follows:

Basic (Except C85, C96, C95, NCQ8 and C55*)	2	P.1
Rodless cylinders	2	P.1179
Rodless cylinders (MXY only)	2	P.355
With guide	2	P.399
With guide (CGM only)	2	P.1005
Rotary actuators	3	P.1
Air grippers	3	P.363

* Cylinders with specifications outside Japan. Contact SMC for details.

Basic Characteristics of Air Cylinders

The basic characteristics of air cylinders are as shown below.

Use the figures in the table below as a guide for model selection since they may be different depending on a model or bore size. For details, refer to the individual actuator's catalog.

1 Bore Size Selection

Use the table below as a guide for selecting a bore size.

Bore size (mm)	Maximum stroke (mm)	Transfer load (kg)					Allowable rod end lateral load (N)	
		0.1	1	10	100	1000	With rod retracted	With max. rod extended
		• Below figures were obtained with an operating pressure of 0.7 MPa and a load ratio of $\eta = 0.7$. • The cylinder's speed will be determined based on an operating pressure and a load ratio, mounting orientation. Refer to Front matter 22 in Best Pneumatics No. 2-1 for details.						
		(kg)						
2.5	Up to 10	0.2					—	—
4	Up to 20	0.6					—	—
6	Up to 60	1.4					0.2	0.05
8	Up to 400	2.5					0.4	0.05
10		3.8					0.7	0.08
12		5.5					1.2	0.15
16		9.8					2.0	0.2
20		15					5.0	1.0
25		24					7.0	1.5
32		39					10	2
40		62					18	3
50		96					30	4
63		153					45	5
80	246					70	8	
100	385					100	10	
125	Up to 1600	601					250	25
160		985					400	40
180	Up to 2000	1246					500	45
200		1539					600	55
250		2404					1000	100
300	Up to 2400	3462					1200	150

2 Minimum Operating Pressure

(MPa)

Bore size (mm)	6	10	16	20	25	32	40	50	63	80	100	125	160	180	200
Standard cylinder	0.12	0.06				0.05									
Low friction cylinder	—	0.03	0.025			0.01									
Metal seal cylinder (High speed, low friction)	0.02	0.005			—										

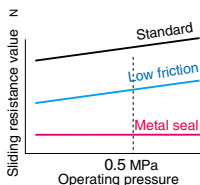
* Consult with SMC for figures other than those shown in this table.

Sliding resistance of a cylinder varies depending on the operating pressure.

Sliding resistance values at 0.5 MPa are shown in the table below. (Guide value)

Standard cylinder	19 to 102N ($\phi 40$ to $\phi 100$)
Low friction cylinder	8 to 40N ($\phi 40$ to $\phi 100$)
Metal seal cylinder	0.05 to 0.2N ($\phi 6$ to $\phi 40$)

* Contact SMC regarding the bore sizes which do not have a resistance value shown.

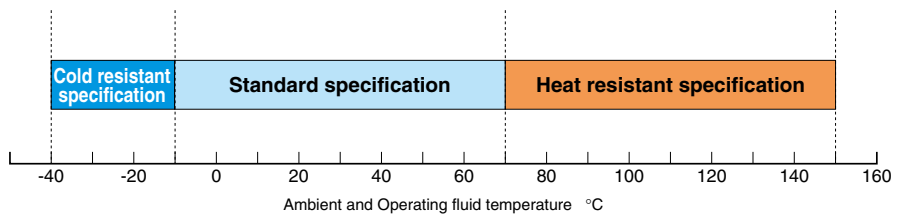


3 Cylinder Speed

Bore size (mm)	6	10	16	20	25	32	40	50	63	80	100	125	160	180	200	
Standard cylinder	50 to 750									50 to 1000			50 to 500			
Low speed cylinder	—	1 to 300								0.5 to 300			—			
High power cylinder (High speed)	—									50 to 3000			—			
Metal seal cylinder	0.5 to 3000 (ø6: Up to 1000)												—			

* Consult with SMC for figures other than those shown in this table.

4 Ambient and Operating Fluid Temperature



* For the selection of a piston speed and an operating pressure with cold or heat resistant specification and an auto switch, refer to the following pages.

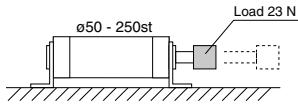
5 Service Life

This cylinder service life data is based on the service life test conducted under the test conditions shown below. This does not guarantee the service life under the customers' operating conditions.

Traveling distance	8000 km running (16 million reciprocating cycles)
Condition of cylinder	Operation condition: Good
	External air leakage: 5 cm ³ /min. ANR or less
	Seals: No problem in operation although there is slight friction.
	Piston rod: No abnormal change

Test Condition

Cylinder tested	Air cylinder/CA2 series
Bore size	50 mm
Stroke	250 mm
Operating direction	Horizontal
Operating pressure	0.7 MPa
Cylinder speed	650 mm/s
Operating frequency	65 complete cycles/min
Ambient temperature	Room temperature
Rod end load	23 N
Operating air supply	Using Air filter/AF and Mist Separator/AM
Lubrication	Non-lube (Initial lubrication by grease)
Air cushion	Adequately used



Others

Regarding the service life for other models, Clean Series, water resistant cylinder and oil-free (using white Vaseline), consult with SMC.

Basic

CJP 2. P.21

CJP2 2. P.21

CJ1 2. P.15

CJ2 2. P.41

CM2 2. P.167

CG1 2. P.287

CA2 2. P.465

Round

Panel mount, mountable in embedded type
Short total length



CJP

Two auto switches can be mounted, even on bore size ø4 (5-mm stroke)



CJP2

Bore size ø2.5 standardized



CJ1

Round and stainless cylinder tube type standard



CJ2



CM2

One-piece construction with head cover and tube allows for a shorter total length.



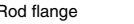
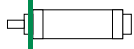
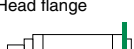
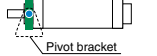
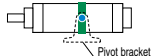
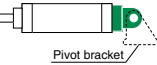


CG1

Square cover, tie-rod type standard



CA2

Model	Bore size (mm)	Port size (Rc, NPT, G)	Stroke (mm)	Speed (mm/s)	Pressure (MPa)	Actuation		Cushion (J)		Mounting	
						Double acting	Single acting	Rubber	Air		
CJP	4	M3 x 0.5	Up to 15	50 to 500	0.3 to 0.7	—	●	—	—	Panel 	
	6	M5 x 0.8			0.2 to 0.7						
	15				0.15 to 0.7						
CJP2	4	M3 x 0.5	Up to 20	10 to 500	0.12 to 0.7	●	▲	●	—	Foot 	
	6		Up to 25		0.06 to 0.7						
	10		Up to 40								
CJ1	2.5	ø4 tube	Up to 10	50 to 500	0.3 to 0.7	—	●	—	—	Rod flange 	
	4		Up to 20		0.2 to 0.7						
CJ2	6	M5 x 0.8	Up to 60	50 to 750	0.12 to 0.7	●	●	0.012 to 0.090	—	Head flange 	
	10		Up to 150		0.06 to 0.7						0.07 to 0.18
	16		Up to 200								
CM2	20	1/8	Up to 1000	50 to 750	0.05 to 1.0	●	●	0.27	0.54	Head flange 	
	25		Up to 1500					0.4	0.78		
	32		Up to 2000					0.65	1.27		
	40							1/4	1.2		2.35
CG1	20	1/8/ M5 x 0.8(G)	Up to 1500	50 to 1000	0.05 to 1.0	●	●	0.28	R:0.35 H:0.42	Center trunnion Note 2) 	
	25							0.41	R:0.56 H:0.65		
	32	1/8						0.66	0.91	Head trunnion Note 3) 	
	40							1.2	1.8		
	50							1/4	2.0		3.4
	63	3/8						50 to 700	3.4	4.9	
	80								5.9	11.8	
100	1/2	9.9	16.7								
CA2	40	1/4	Up to 800	50 to 500	0.05 to 1.0	●	▲	▲	2.8 to 29	Clevis 	
	50	3/8	Up to 1200								
	63	3/8	Up to 1400								
	80	1/2	Up to 1400								
	100	1/2	Up to 1500								

● : Standard ▲ : Available with a special order (Consult with SMC.)

* The stroke, speed, and pressure values show those of the basic products. For details, refer to the individual product catalog.

* Some bracket mounting methods are not supported depending on the product. For details, refer to the individual product catalog.

Note 1) For products with the rubber bumper.

50 to 1000 mm/s for products with the air cushion.

Note 2) Not available for CM2 and CG1 series.

Note 3) Not available for CA2 series.

Round



MB



MB1

Square cover, tie-rod type standard



CS1



CS2

Conforming to ISO, round tube and square cover, tie-rod type standard



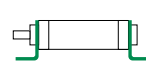
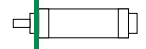
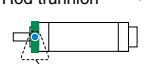
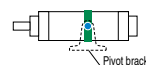
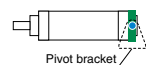
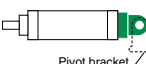
C85



C96



C95

Model	Bore size (mm)	Port size (Rc, NPT, G)	Stroke (mm)	Speed (mm/s)	Pressure (MPa)	Actuation		Cushion (J)		Mounting						
						Double acting	Single acting	Rubber	Air							
MB/MB1	32	1/8	Up to 700	50 to 1000	0.05 to 1.0	●	▲	▲	2.2 to 45	Foot 						
	40	1/4	Up to 800													
	50	1/4	Up to 1000													
	63	3/8														
	80	3/8														
	100	1/2														
	125	1/2	Up to 1400													
CS1	125	1/2	Up to 1600	50 to 500	0.05 to 0.97	●	▲	▲	32.3 to 265	Rod flange 						
	140	1/2														
	160	3/4														
	180	3/4	Up to 2000													
	200	3/4														
	250	1								Up to 2400						
300	1															
CS2	125	1/2	Up to 1600	50 to 1500	0.1 to 1.0	●	▲	▲	0.02 to 0.40	Rod trunnion (Note 1) 						
	140	1/2														
	160	3/4														
C85 (Conforming to ISO)	8	M5 x 0.8	Up to 400							50 to 1500	0.08 to 1.0	●	●	0.02 to 0.40	0.17 to 0.97	Center trunnion 
	10	M5 x 0.8														
	12	M5 x 0.8														
	16	M5 x 0.8														
	20	1/8	Up to 1000													
25	1/8															
C96 (Conforming to ISO)	32	1/8	Up to 1000	50 to 1000	0.05 to 1.0	●	▲	▲	2.2 to 147	Head trunnion (Note 1) 						
	40	1/4														
	50	1/4														
	63	3/8	Up to 1900													
	80	3/8														
	100	1/2														
	125	1/2	50 to 700													
C95 (Conforming to ISO)	160	3/4	Up to 2000	50 to 500						Clevis 						
	200	3/4														
	250	1	Up to 2400													

● : Standard ▲ : Available with a special order (Consult with SMC.)

* The stroke, speed, and pressure values show those of the basic products. For details, refer to the individual product catalog.

* Some bracket mounting methods are not supported depending on the product. For details, refer to the individual product catalog.

Note 1) Not available for MB, MB1, CS1, CS2 and C95.

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination Equipment

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Square

Square type with shorter total length



CQ2

Auto switch mountable on 4 faces (3 faces) even though it is ø25 or less



CQS

CQ2, CQS + Air cushion
The dimension range extends from 2.5 to 9 mm (compared with CQ2, CQS/with rubber bumper)



RQ

Shorter total length

Model	Bore size (mm)	Port size (Rc, NPT, G)	Stroke (mm)	Speed (mm/s)	Pressure (MPa)	Actuation		Cushion (J)		Mounting
						Double acting	Single acting	Rubber	Air	
CQ2	12	M5 x 0.8	Up to 30	50 to 500	0.07 to 1.0	●	▲	0.043 to 12.4	—	Tapped (Direct) Through-hole (Direct) Foot Head flange Rod flange Clevis
	16									
	20	Up to 50								
	25									
	32	Note 1) 1/8								
	40	1/4								
	50									
	63	3/8								
	80									
	100	Up to 300								
125										
140	1/2									
160										
180	20 to 400									
200										
CQS	12	M5 x 0.8	Up to 200	50 to 500	0.07 to 1.0	●	●	0.043 to 0.18	—	Rod flange
	16									
	20	Up to 300								
	25									
RQ	20	M5 x 0.8	Up to 50	50 to 500	0.05 to 1.0	●	—	0.055 to 2.27	—	Clevis
	25									
	32	1/8								
	40									
	50	1/4								
	63									
	80	3/8								
100										

● : Standard ▲ : Available with a special order (Consult with SMC.)

Note 1) M5 x 0.8 is used for a bore size of ø32 with 5 mm stroke and without auto switch.

Rectangle

Auto switch mountable on 2 faces



CU

CUK
Non-rotating

Compared with the CU, the total length is 64% shorter and 70% less in volume



CUJ

Compared with the CQ2, the width is reduced by up to 40%.



CQU

Elliptical piston width is shortened.



MU

Directly mountable in 3 directions

Model	Bore size (mm)	Port size (Rc, NPT, G)	Stroke (mm)	Speed (mm/s)	Pressure (MPa)	Actuation		Cushion (J)		Mounting
						Double acting	Single acting	Rubber	Air	
CU/ CUK	6	M5 x 0.8	Up to 60	50 to 500	0.12 to 0.7	●	●	0.0125 to 0.29	—	Axial direction
	10				0.06 to 0.7					
	16				0.05 to 0.7					
	20				0.05 to 0.7					
	25	1/8	Up to 100		0.05 to 0.7					
32	0.05 to 0.7									
CUJ	4	M3 x 0.5	Up to 20	50 to 500	0.15 to 0.7	●	●	▲	—	Vertical Horizontal
	6				0.1 to 0.7					
	8				0.07 to 0.7					
	10				0.05 to 0.7					
	12	M5 x 0.8	Up to 50		0.05 to 0.7					
	16				0.05 to 0.7					
CQU	20	M5 x 0.8	Up to 100	50 to 500	0.08 to 0.7	●	—	0.09 to 0.20	—	Foot with axial direction Foot with horizontal direction Clevis Axial mounting
	25				0.05 to 0.7					
	32				0.05 to 0.7					
	40				0.05 to 0.7					
	40				0.05 to 0.7					
MU	25	M5 x 0.8	Up to 300	50 to 500	0.05 to 0.7	●	●	0.18 to 1.54	▲	Foot with axial direction Rod flange Clevis Bottom mounting Horizontal mounting Axial mounting
	32	1/8								
	40	1/8								
	50	1/4								
	63	1/4								

● : Standard ▲ : Available with a special order (Consult with SMC.)

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination Equipment

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

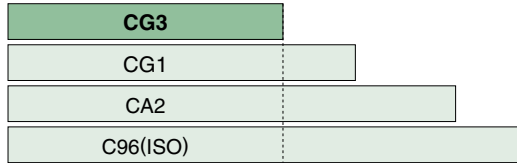
Air Cylinder/CG□ Series

Compact, Lightweight!

Total Length

Length at the stroke of 0 mm

Total length: Short
Cover: Small
Weight: Light



Extended dimensions on the basis of the CG3 series

(mm)

Bore size	40	50	63	80	100
CG3	93	121	121	151	152
CG1	+37	+29	+29	+31	+30
CA2	+53	+38	+49	+53	+63
C96(ISO)	+70	+58	+73	+67	+81



CG3



CG1

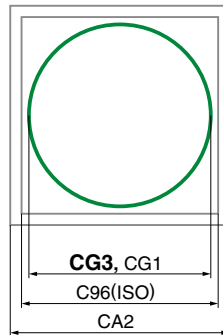


CA2



C96(ISO)

Cover Size



Extended dimensions on the basis of the CG3 series

(mm)

Bore size	40	50	63	80	100
CG3	47	58	72	89	110
CG1	0	0	0	0	0
CA2	+13	+12	+13	+13	+6
C96(ISO)	+5	+7	+3	+6	+4

Weight

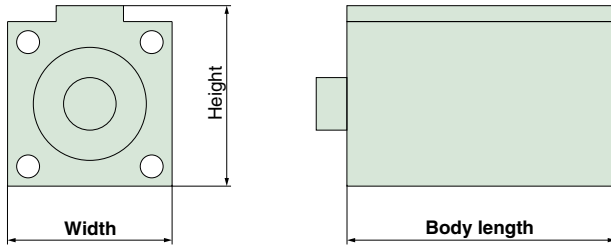
Weight at the stroke of 300 mm

Additional weight on the basis of the CG3 series (0)

(kg)

Bore size	40	50	63	80	100
CG3	1.1	1.8	2.3	3.6	5.3
CG1	+0.2	+0.2	+0.3	+0.5	+0.7
CA2	+0.9	+0.9	+1.4	+2.2	+2.5
C96(ISO)	+0.6	+1.1	+1.1	+2.1	+2.5

Compact Cylinder/CQ2 Series



Body Length

Without magnet

Extended dimensions on the basis of the CQ2 series (mm)

Bore size	CQS	CQ2	C55(ISO)	NCQ8
12	0	17	—	—
16 (14.2)	-1.5	18.5	—	-4.3
20 (19.1)	0	19.5	+17.5	-5.3
25 (26.9)	0	22.5	+16.5	-0.3
32	—	23	+21	—
40 (38.1)	—	29.5	+15.5	-7.3
50 (50.8)	—	30.5	+14.5	-6.6
63 (63.5)	—	36	+13	-5.8
80 (76.2)	—	43.5	—	-11.8
100 (101.6)	—	53	—	-13.4

(): NCQ8 bore size when converted to millimeter from inch.

With magnet

Extended dimensions on the basis of the CQ2 series (mm)

Bore size	CQS	CQ2	C55(ISO)	NCQ8	NCQ8□Z
12	-6	28	—	—	—
16 (14.2)	-8.5	30.5	—	+6.1	-3.6
20 (19.1)	-2	31.5	+5.5	+5.1	-4.6
25 (26.9)	0	32.5	+6.5	+12	-0.8
32	—	33	+11	—	—
40 (38.1)	—	39.5	+5.5	+5	-7.8
50 (50.8)	—	40.5	+4.5	+5.5	-10.3
63 (63.5)	—	46	+3	+3.2	-9.4
80 (76.2)	—	53.5	—	+0.5	-15.4
100 (101.6)	—	63	—	-1.2	-17.1

(): NCQ8 bore size when converted to millimeter from inch.

Height

Extended dimensions on the basis of the CQ2 series (mm)

Bore size	CQS	CQ2	C55(ISO)	NCQ8
12	0	25	—	—
16 (14.2)	0	29	—	-0.3
20 (19.1)	0	36	0	-2.7
25 (26.9)	0	40	0	+3.7
32	—	49.5	-1.5	—
40 (38.1)	—	57	-2	-1.4
50 (50.8)	—	71	-5	-1.7
63 (63.5)	—	84	-7	-2
80	—	104	—	—
100	—	123.5	—	—

(): NCQ8 bore size when converted to millimeter from inch.

Width

Extended dimensions on the basis of the CQ2 series (mm)

Bore size	CQS	CQ2	C55(ISO)	NCQ8
12	0	25	—	—
16 (14.2)	0	29	—	-0.3
20 (19.1)	0	36	0	-4.3
25 (26.9)	0	40	0	-0.4
32	—	45	+1	—
40 (38.1)	—	52	0	-1.2
50 (50.8)	—	64	0	0.3
63 (63.5)	—	77	-3	-4.9
80	—	98	—	—
100	—	117	—	—

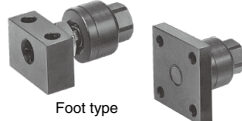
(): NCQ8 bore size when converted to millimeter from inch.

Floating Joint

● For male thread/JC
(Light weight type) 2-1 P.1137

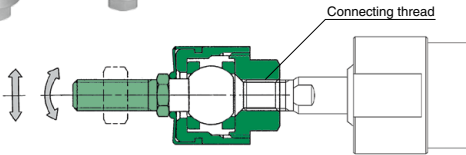


● For male thread/JA 2-1 P.1143



● For male thread/JS
(Stainless steel) 2-1 P.1156

- Stainless steel 304 (External parts)
- Dust cover
Fluorine rubber/Silicone rubber



Thread diameter	Bore size*	JC	JA	JS
M3 x 0.5	6	—	●	—
M4 x 0.7	10	—	●	●
M5 x 0.8	10, 15, 16	—	●	●
M6 x 1	15, 16	—	●	—
M8 x 1	20	—	●	—
M8 x 1.25		●	●	●
M10 x 1	32	—	●	—
M10 x 1.25	25, 32	●	●	●
M10 x 1.5	25	—	●	—
M12 x 1.25	32, 40	—	●	—
M12 x 1.5	40	—	●	—
M12 x 1.75	32, 40	—	●	—
M14 x 1.5	40	●	●	●
M16 x 1.5	50	—	●	—
M16 x 2	50, 63	—	●	—
M18 x 1.5		●	●	●
M20 x 2.5	80	—	●	—
M22 x 1.5		—	●	—
M24 x 3	—	—	●	—
M26 x 1.5	100	—	●	—
M27 x 1.5	—	—	●	—
M27 x 2	125	—	●	—
M30 x 1.5	125, 140	—	●	—
M33 x 2	160	—	●	—
M36 x 1.5	160	—	●	—

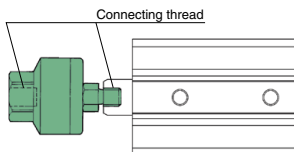
*This is a reference for the bore size of an applicable cylinder.
The rod end diameter varies according to the model.

● For female thread
(for compact cylinders)/JB 2-1 P.1154

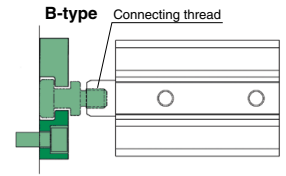
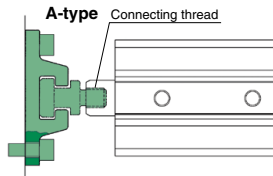
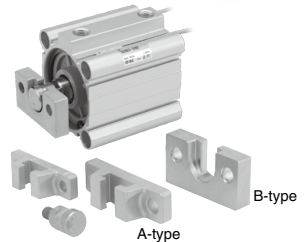


Thread diameter	Bore size*
M3 x 0.5	12
M4 x 0.7	16
M5 x 0.8	20
M6 x 1	25
M8 x 1.25	32, 40
M10 x 1.5	50, 63
M16 x 2	80
M20 x 2.5	100
M22 x 2.5	125, 140
M24 x 3	160

*This is a reference for the bore size of an applicable cylinder.
The rod end diameter varies according to the model.



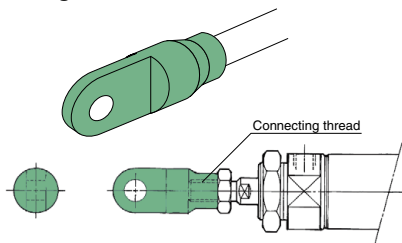
● Simple joint
(for compact cylinders)



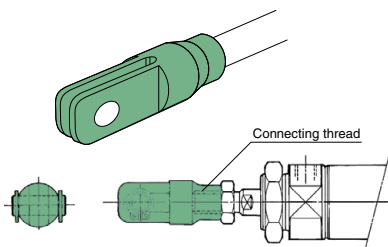
*B-type bracket can be mounted reversely, too.

Knuckle Joint

● Single clevis



● Double clevis



Thread diameter	Bore size*	Applicable pin diameter ϕ *
M3 x 0.5	6	—
M4 x 0.7	10	3.3
M5 x 0.8	10, 15, 16	5
M6 x 1	15, 16	—
M8 x 1.25	20	8
M10 x 1.25	25, 32	10
M14 x 1.5	40	10
M18 x 1.5	50, 63	14
M22 x 1.5	80	18
M26 x 1.5	100	22
M30 x 1.5	100	22
M36 x 1.5	125, 140, 160	25
M40 x 1.5	180	40
M45 x 1.5	200	40
M56 x 2	250	50
M64 x 2	300	63

* This is a reference for the bore size of an applicable cylinder. The rod end and applicable pin diameters vary according to the model.

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Basic: Option

Round

Model	CJP			CJP2			CJ1		CJ2			CM2			CG1						CA2												
	6	10	15	4	6	10	16	25	4	6	10	16	20	25	32	40	20	25	32	40	50	63	80	100	40	50	63	80	100				
Rod																																	
Double rod	▲			▲			—		CJ2W			CM2W			CG1W						CA2W												
Non-rotating rod	—	▲		▲			—		CJ2K			CM2K			CG1K			▲			CA2K		▲										
Combination																																	
With rod	—			—			—		—			CLJ2			CLM2			CNG/CLG1			—			CNA/CLA/CL1									
With end lock	—			—			—		—			CBJ2			CBM2			CBG1						CBA2									
With guide rod	▲			▲			▲		▲			▲			▲			MGG						▲									
With valve	▲			▲			▲		▲			▲			CVJ3 CVJ5			CVM3/CVM5						▲				CV3/CVS1					
Actuation																																	
Single acting	●			—			●		●			●			●						○			○									
Low speed	—			—			●		—			MQM			CJ2X			MQM			CM2X			CG1Y(Smooth)						CA2Y			
High speed	—			—			—		—			MQM			MQM			▲			RHC						▲						
Low friction	—			▲			—		—			MQM			CJ2Q			CM2Y(Smooth)			CG1Y(Smooth)						CA2Y						
Environmentally resistant																																	
Heat resistant	▲			◎			▲		◎			◎			◎						◎												
Cold resistant	▲			◎			▲		◎			◎			◎						◎												
Improved water and oil resistance	—			▲			—		—			▲			CJ5			●			▲			●			●						
Clean	▲			▲			—		●			●			●						●			●		▲							
Copper-free, Fluorine-free	●			●			▲		●			●			●						●			●									
Stainless steel																																	
External parts	▲			▲			—		▲			CJ5			-XB12			CG5						▲									
Rod, Bracket	▲			▲			▲		▲			CJ5			◎			◎						◎									
Others																																	
Air-hydro	▲			▲			—		▲			●			●						—			●									
Tandem	▲			▲			—		▲			▲			◎			◎						▲			◎						
Dual stroke	▲			▲			—		▲			▲			◎			◎						▲			◎						
Adjustable stroke	▲			▲			—		▲			▲			◎			◎						▲			◎						
Inch size*3	—			—			—		—			—			NCM						NCG			▲			NCA						

Model and ●: Available with a standard model, Model and ◎: Available with Made to Order, ○: Available with a special order A (*1), ▲: Available with a special order B (*2), —: Not available

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MB/MB1			CS1					CS2			C85 (Conforming to ISO)					C96/C95 (Conforming to ISO)																
32	40	50	63	80	100	125	125	140	160	180	200	250	300	125	140	160	8	10	12	16	20	25	32	40	50	63	80	100	125	160	200	250
MBW			CS1W					CS2W			C85W					C96S□-□W																
MBK			—					—			C85K					C96K																
MNB			CNS		CLS			—			—					C95N																
MBB			▲		-X1347			▲			▲			—		▲			○													
▲			▲					▲			▲					▲																
▲			▲					▲			▲					▲																
○			▲		▲			▲			●					▲																
-XB13			▲		▲			▲			○					◎		▲														
▲			▲					▲			▲					▲																
MBQ			▲		CS1Q			▲			CS2Y			—		▲			C85Q		○											
◎			▲		◎			▲			◎					●		▲														
○			▲		○			▲			▲		◎			○																
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Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Basic: Option

Square

Model	CQS		CQ2																RQ									
	12	16	20	25	12	16	20	25	32	40	50	63	80	100	125	140	160	180	200	20	25	32	40	50	63	80	100	
Rod																												
Double rod	CQSW				CQ2W																○							
Non-rotating rod	CQSK				CQ2K								▲		—						○							
Combination																												
With rod	—				—				CLQ								—				—		RLQ		—			
With end lock	▲		▲		CBQ2								▲				▲											
With guide rod	CQM				CQM								▲				○											
With valve	▲		▲				CVQ				▲				▲													
Actuation																												
Single acting	●				●								○				▲				—							
Low speed	CQSX/MQQ				CQ2X/MQQ								▲				—											
High speed	▲				▲								—				—											
Low friction	CQSY/MQQ				CQ2Y/MQQ								▲				—											
Environmentally resistant																												
Heat resistant	○		○								▲				▲													
Cold resistant	○		○				▲								—													
Improved water and oil resistance	▲		—				●				▲				○													
Clean	●		●								▲				○													
Copper-free, Fluorine-free	●		●								▲				○													
Stainless steel																												
External parts	▲		▲								▲				▲													
Rod, Bracket	▲		▲								▲				▲													
Others																												
Air-hydro	▲		—				●				▲				—													
Tandem	—				—								▲				▲											
Dual stroke	○		○								▲				▲													
Adjustable stroke	○		○								▲				○													
Inch size ^{*3}	NCQ8 (Bore size: 0.56, 0.75, 1.06, 1.50, 2.00, 2.50, 3.00, 4.00)				—				—				—															

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Rectangle

Model	CUJ						CU						CQU				MU				
	4	6	8	10	12	16	20	6	10	16	20	25	32	20	25	32	40	25	32	40	50
Bore size (mm)																					
Rod																					
Double rod	▲						CUW						—				MUW				
Non-rotating rod	▲						CUK						●				●				
Combination																					
With rod	—						—						—				MLU				
With end lock	—						—						—				▲				
With guide rod	—						CUK						—				—				
With valve	▲						—						▲				▲				
Actuation																					
Single acting	●						●						—				●				
Low speed	▲						CUX						▲				▲				
High speed	—						—						—				▲				
Low friction	—						—						▲				▲				
Environmentally resistant																					
Heat resistant	—						◎						—				—				
Cold resistant	▲						◎						—				—				
Improved water and oil resistance	—						—						▲				▲				
Clean	●						●						▲				○				
Copper-free, Fluorine-free	▲						●						●				●				
Stainless steel																					
External parts	▲						—						▲				▲				
Rod, Bracket	●						●						▲				▲				
Others																					
Air-hydro	—						—						▲				—				
Tandem	—						—						—				—				
Dual stroke	▲						—						▲				▲				
Adjustable stroke	▲						—						○				○				
Inch size ^{*3}	—						—						—				—				

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Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination Equipment

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Basic Characteristics of Rodless Cylinders

A performance comparison between a magnet and mechanically joint type rodless cylinder is shown below.

Use the figures in the table below as a guide for model selection since they may be different depending on a model or bore size. For details, refer to the individual actuator's catalog.

1 Bore Size and Stroke

Manufacturable maximum stroke is shown below.

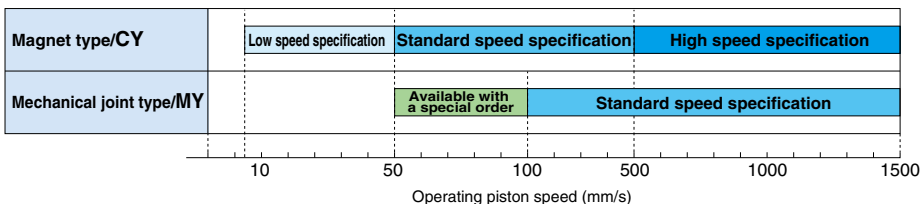
(mm)

	Bore size (mm)										
	6	10	15(16)	20	25	32	40	50	63	80	100
Magnet type/CY*1	300	500	1000	1500	3000			5000		—	
Mechanical joint type/MY*2	—	3000		5000							

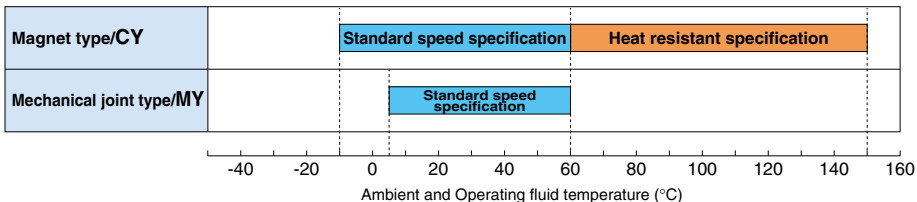
*1 The maximum stroke of the magnet type shows that for CY3B.

*2 The maximum stroke of the mechanical joint type shows that for MY1B.

2 Operating Piston Speed



3 Ambient and Operating Fluid Temperature



4 Operating Pressure

The minimum operating pressure is shown below.

(MPa)

	Bore size (mm)										
	6	10	15(16)	20	25	32	40	50	63	80	100
Magnet type/CY*	0.16	0.16	0.16	0.15	0.14	0.12		—			
Mechanical joint type/MY	—	0.2	0.15	0.1(0.15)							

The maximum operating pressure is shown below.

Magnetically coupled rodless cylinder: 0.7 MPa

Mechanically jointed rodless cylinder: 0.8 MPa

* The minimum operating pressure of the magnet type shows that for CY3B and CY3R.

5 Function Comparison

Comparison by function is shown below.

	Magnetically coupled rodless cylinder/CY	Mechanically jointed rodless cylinder/MY
With guide variation	<ul style="list-style-type: none"> • Basic • Slide bearing • Ball bushing bearing • Linear guide 	<ul style="list-style-type: none"> • Basic • Slide bearing (made of resin) • Cam follower guide • Linear guide
Clean Series	12-Series Clean rodless cylinder/CYP (Special grease)	—
Improved water resistance	—	With protective cover/MY1MW, MY1CW
Intermediate stop	Using 3 position solenoid valve (all ports blocked)	With brake/ML1C
Cushion	Rubber bumper Shock absorber Sign rodless cylinder/REA, REB	Rubber bumper Air cushion Shock absorber
Air-hydro specification	○	—

6 Service Life

This cylinder service life data is based on the service life test conducted under the test conditions shown below. This does not guarantee the service life under the customers' operating conditions.

	Magnetically coupled rodless cylinder/CY	Mechanically jointed rodless cylinder/MY
Traveling distance	3500 km	3000 km
Condition of cylinder	<ul style="list-style-type: none"> • Operation condition: Good • External air leakage: 1 cc/min or less • Interior air leakage: 1 cc/min or less • External appearance: Lubricated condition is good and there are no flaws on it. • Minimum operating pressure: Equivalent to the initial value 	<ul style="list-style-type: none"> • Operation condition: Good • Dust seal band: No peeling off, bulging or cracks • Air leakage: Equivalent to the initial value • Minimum operating pressure: Equivalent to the initial value • Air cushion: Good

Test Condition

	Magnetically coupled rodless cylinder	Mechanically jointed rodless cylinder
Cylinder tested	CY3B Series	MY1B Series
Bore size	50 mm	
Stroke	500 mm	
Operating direction	Horizontal	Horizontal wall mounting
Operating pressure	0.5 MPa	
Average piston speed	500 mm/s	
Operating frequency	20 c.p.m	
Ambient temperature	Room temperature	
Load mass	1.2 kg	9 kg
Lubrication	Non-lube (Initial lubrication by grease)	

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Rodless Cylinders

CY3B 2. P.1459
CY1H 2. P.1523

CY3R 2. P.1472
CY1HT 2. P.1523

CY1S 2. P.1485
MX 2. P.355

CY1L 2. P.1511
CYP 2. P.1561
CY1F 2. P.1541

Magnet type

Basic type

Standard model without guide
Used in combination with
other guides



CY3B

Direct mountable
Can be combined with
other guides.



CY3R

For a wide variety of transfer
Slide bearing



CY1S

Ball bushing bearing
Stable operation of
an eccentric load



CY1L

Linear guide. Excellent load
resistance and moment



CY1H/CY1HT

Long strokes, rigidity, and
lightweight and compact
type with built-in magnet
type rodless cylinders on a
linear guide.



MX

Clean
Dust generation amount 1/20
(compared with 12-CY1B)



CYP

The height and length are
reduced by 29% and 31%,
respectively.
(compared with CY1H)



CY1F

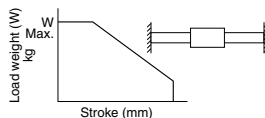
Model	Guide	Bore size (mm)	Port size	Stroke (mm)	Max. load (kg)	Note 1) Non-rotating accuracy (L ²) (Guideline)	Speed (mm/s)	Pressure (MPa)	Cushion J			
									Rubber	Air	Absorber	
CY3B	—	6	M3 x 0.5	Up to 300	0.2	—	50 to 500	0.16 to 0.7	0.007 to 5.07	Note)	—	
		10	M5 x 0.8	Up to 500	0.4							
		15		Up to 1000	1							
		20		Up to 1500	1.1							
		25		1/8	Up to 3000							1.2
		32	1/4	2	2.5							
		40		Up to 5000								3
		50		0.12 to 0.7								
63	0.12 to 0.7											
CY3R	—	6	M3 x 0.5	Up to 300	0.2	—	50 to 500	0.16 to 0.7	0.007 to 5.07	Note)	—	
		10	M5 x 0.8	Up to 500	0.4							
		15		Up to 750	1							
		20		Up to 1000	1.1							
		25		1/8	Up to 1200							1.2
		32	1/4	1.5	2.5							
		40		Up to 1500								3
		50		0.12 to 0.7								
63	0.12 to 0.7											
CY1S	Slide bearing	6	M3 x 0.5	Up to 300	1.8	0.26	50 to 400	0.18 to 0.7	0.07 to 2.00	Note)	—	
		10	M5 x 0.8	Up to 500	3	0.19						
		15		Up to 750	7	0.18						
		20		Up to 1000	12	0.15						
		25	1/8	Up to 1500	20	0.13						
		32	1/4	30	50	0.11						
40	30	0.13										
CY1L	Ball bushing bearing	6	M5 x 0.8	Up to 300	1.8	0.05	50 to 500	0.11 to 3.13	Note)	0.98 to 58.8		
		10		Up to 500	3	0.04						
		15		Up to 750	7							
		20	Up to 1000	12								
		25	1/8	Up to 1500	20	50					0.02	
		32	1/4	30	4							0.07
40	30	0.05										
CY1H	Linear guide (1 axis)	10	M5 x 0.8	Up to 500	4	0.07	70 to 500	0.2 to 0.7	Note)	0.30 to 3.20		
		15		Up to 750	9	0.05						
		20	1/8	Up to 1000	16	0.05						
		25		Up to 1200	25	0.04						
CY1HT	Linear guide (2 axis)	25	1/8	Up to 1200	25	0.03	40	0.02				
		32		Up to 1500	40	0.02						
MX	Linear guide	6	M5 x 0.8	Up to 200	0.6	0.04	50 to 400	0.2 to 0.55	0.018	—	—	
		8		Up to 300	1							
		12		Up to 400	2							0.03
CYP	Linear guide	15	M5 x 0.8	Up to 1	0.1	50 to 300	0.05 to 0.3	▲	CYP: With sine cushion	—	—	
		32		1/8	Up to 700							5
		10	M5 x 0.8	Up to 500	2							0.1
15	Up to 750	5		0.09								
CY1F	Linear guide	25	1/8	Up to 1500	40	0.02	50 to 500	0.2 to 0.7	—	—	0.98 to 3.92	
		32		Up to 1200	12	0.07						

▲: Available with a special order (Consult SMC.)

Note) Sine rodless cylinder: Available with REA/REB series

Note 1) Maximum load weight

■ Magnet type/The maximum load weight for the basic type, sliding bearing and ball bearing bushing varies depending on the stroke shown in the graph below. The figures in the above table are for a minimum stroke length.

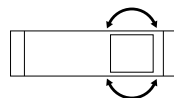


Note 2) Non-rotating accuracy

■ In the case of a linear guide

Since it is preloaded, the parts tolerance level is 0. The figures in the above table are the displacement angles when 50% of the allowable moment is applied.

■ In the case of a sliding bearing, ball bearing bushing
The figures in the above table are the parts tolerance (the looseness amount with no load)



MY1B 2. P.1183
MY1C 2. P.1277

MY3A 2. P.1403
MY1H 2. P.1201

MY3B 2. P.1413
MY1HT 2. P.1319

MY3M 2. P.1437
MY2C 2. P.1367

MY1M 2. P.1257
MY2H 2. P.1388
MY2HT 2. P.1388

Mechanical joint type

Basic type

Standard model without guide
Used in combination with
other guides



MY1B

The height and total length
are reduced by 36% and 30%
respectively.
(compared with MY1B)



MY3A



MY3B

Guide integrated type

For a wide variety of transfer
Slide bearing



MY3M



MY1M

Cam follower guide.
Stable actuation against the
eccentric load



MY1C

Linear guide. Excellent load
resistance, moment and
accuracy



MY1H



MY1HT

The height is reduced by 30%.
(compared with MY1C/H)



MY2C



MY2H

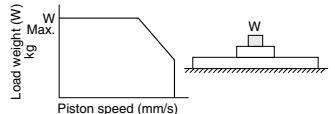


MY2HT

Model	Guide	Bore size (mm)	Port size	Stroke (mm)	Max. load (kg)	Non-rotating accuracy (±) (Guideline)	Speed (mm/s)	Pressure (MPa)	Cushion J		
									Rubber	Air	Absorber
MY1B	—	10	M5 x 0.8	Up to 3000	5	—	100 to 1000	0.2 to 0.8	0.024	—	0.98
		16			15						
		20			21						
		25			29						
		32	1/8	Up to 5000	40						
		40			53						
		50			70						
		63			83						
80	1/2	120									
100		150									
MY3A	—	16	M5 x 0.8	Up to 3000	6	—	80 to 500	0.15 to 0.8	0.04 to 0.6	—	—
		20			10						
		25	1/8	Up to 5000	16						
		32			26						
		40	1/4	40							
		50		56							
63	80										
MY3B	—	16	M5 x 0.8	Up to 3000	6	—	80 to 1000	0.15 to 0.8	—	0.2 to 6.4	0.84 to 46.6
		20			10						
		25	1/8	Up to 5000	16						
		32			26						
		40	1/4	40							
		50		56							
63	80										
MY3M	—	16	M5 x 0.8	Up to 3000	18	—	80 to 1500	0.15 to 0.7	—	0.6 to 17.3	2.9 to 147
		25			0.77						
		40	0.20								
		63	0.037								
MY1M	Slide bearing (made of resin)	16	M5 x 0.8	Up to 3000	18	—	80 to 1500	0.15 to 0.8	—	0.6 to 17.3	2.9 to 147
		20			0.34						
		25	0.16								
		32	0.11								
MY1C	Cam follower guide	32	1/8	Up to 5000	57	—	80 to 1500	0.15 to 0.8	—	0.6 to 17.3	2.9 to 147
		40			0.042						
		50	0.021								
		63	0.0092								
MY1C	Cam follower guide	16	M5 x 0.8	Up to 3000	18	—	80 to 1500	0.15 to 0.8	—	0.6 to 17.3	2.9 to 147
		20			0.072						
		25	0.038								
		32	0.022								
MY1C	Cam follower guide	40	1/4	Up to 5000	49	—	80 to 1500	0.1 to 0.8	—	0.6 to 17.3	2.9 to 147
		50			0.0087						
		63	0.0035								
		130	0.0016								
MY1H	Linear guide (1 axis)	10	M5 x 0.8	Up to 1000	6.1	—	100 to 1500	0.2 to 0.8	0.024	—	0.98 to 58.8
		16			0.29						
		20	0.039								
		25	0.01								
MY1HT	Linear guide (2 axis)	25	1/8	Up to 1500	27.5	—	100 to 1500	0.2 to 0.8	0.024	—	0.6 to 58.8
		32			0.0044						
		40	0.0021								
		50	0.0017								
MY2C	Cam follower guide	50	3/8	Up to 5000	200	—	100 to 1500	0.1 to 0.8	—	9.6 to 17.3	58.8 to 220.5
		63			0.0004						
		320	0.0002								
MY2H	Linear guide (1 axis)	16	M5 x 0.8	Up to 1000	18	—	100 to 1500	0.1 to 0.8	—	0.6 to 6.2	2.9 to 58.8
		25			0.024						
		32	0.004								
MY2HT	Linear guide (2 axis)	40	1/4	Up to 1500	62	—	100 to 1500	0.1 to 0.8	—	0.6 to 6.2	2.9 to 147
		50			0.0128						
		20	0.003								
MY2HT	Linear guide (2 axis)	16	M5 x 0.8	Up to 1000	38	—	100 to 1500	0.1 to 0.8	—	0.6 to 6.2	2.9 to 147
		25			0.001						
		40	0.003								
MY2HT	Linear guide (2 axis)	25	1/8	Up to 1500	38	—	100 to 1500	0.1 to 0.8	—	0.6 to 6.2	2.9 to 147
		40			0.001						
		80	0.003								

Note 1) Maximum load weight

■ Magnet type, Mechanical joint type/The maximum load weight of the linear guide and the cam follower guide varies depending on the piston speed shown in the right graph. The figures in the above table are for a minimum piston speed.



Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination Equipment



Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Rodless Cylinders: Option






Magnet type

Model	CY3B 										CY3R 									

Bore size (mm)	6	10	15	20	25	32	40	50	63	6	10	15	20	25	32	40	50	63									
Combination																											
With lock											—																
With end lock											—																
Actuation																											
Low speed											▲																
High speed	●					◎						●					◎										
Low friction											—																
Environmentally resistant																											
Heat resistant											▲																
Cold resistant											—																
Improved water and oil resistance											▲																
Clean											◎																
Copper-free, Fluorine-free	○					●						○					●										
Stainless steel																											
External parts											▲																
Others																											
Air-hydro	—										◎						—										◎
Floating joint											◎																
Stroke adjustment											—																

Model and : Available with a standard model, Model and : Available with Made to Order, : Available with a special order A (*1), : Available with a special order B (*2), : Not available

- * 1: In the case of being available with simple changes, compared with standard.
- * 2: This is technically possible, but contact SMC for dimensions, costs and delivery.

	CY1S							CY1L							CY1H				CY1HT		CY1F		
	6	10	15	20	25	32	40	6	10	15	20	25	32	40	10	15	20	25	25	32	10	15	25
																							
	-							-							-				-		-		
	-							-							-				-		-		
	○							○							▲				▲		▲		
	●							●							●				●		●		
	-							-							-				-		-		
	-							-							-				-		-		
	-							-							-				-		-		
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	▲							▲							-				-		-		
	-							-							-				○		○		
	-							-							-				-		○		
	●							●							●				●		●		

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination

Air Air

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Rodless Cylinders: Option

Mechanical joint type

Model	MY1B										MY3A						MY3B						MY3M							
	10	16	20	25	32	40	50	63	80	100	16	20	25	32	40	50	63	16	20	25	32	40	50	63	16	25	40	63		
Combination																														
With lock											▲						▲						▲							
With end lock											▲						▲						▲							
Actuation																														
Low speed	○										○						○						○							
High speed	—										—						—						—							
Low friction	—										—						—						—							
Environmentally resistant																														
Heat resistant	—										—						—						—							
Cold resistant	—										—						—						—							
Improved water and oil resistance	▲										▲						▲						▲							
Clean	—										—						—						—							
Copper-free, Fluorine-free	◎										◎						◎						◎							
Stainless steel																														
External parts	—										—						—						—							
Others																														
Air-hydro	—										—						—						—							
Floating joint	●										●						●						▲							
Stroke adjustment	●					▲					▲						●						●							

Model and [●]: Available with a standard model, Model and [◎]: Available with Made to Order, [○]: Available with a special order A (*1), [▲]: Available with a special order B (*2), [—]: Not available

- * 1: In the case of being available with simple changes, compared with standard.
- * 2: This is technically possible, but contact SMC for dimensions, costs and delivery.

	MY1M							MY1C							MY1H							MY1HT				MY2C			MY2H			MY2HT		
	16	20	25	32	40	50	63	16	20	25	32	40	50	63	10	16	20	25	32	40	50	63	16	25	40	16	25	40	16	25	40			
				▲							▲							▲						▲			▲			▲				
			▲								▲				▲			●						▲			▲			▲				
				○							○							○						○			○			○				
				—							—							—						—			—			—				
				—							—							—						—			—			—				
				▲							▲							▲						▲			▲			▲				
				—							—							—						—			—			—				
				◎							◎							◎						◎			◎			◎				
				—							—							—						—			—			—				
				—							—							—						—			—			—				
				▲							▲							▲						▲			▲			▲				
				●							●							●						●			●			●				

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Basic Characteristics of Cylinders with Guide

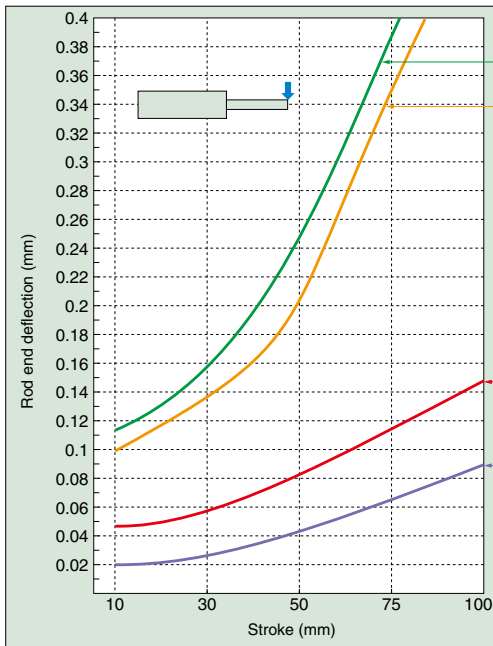
A performance comparison of cylinders with different types of mounting guides is shown below.

Use the figures in the table below as a guide for model selection since they may be different depending on a model or bore size. For details, refer to the individual actuator's catalog.

1 Accuracy

1) Deflection amount at the table or rod end (When the maximum load is applied to the stroke extension end.)

Below graph shows only the tendency since it may be different depending on a model or bore size. Refer to Best Pneumatics for details.



Guide Type

Ball bushing bearing

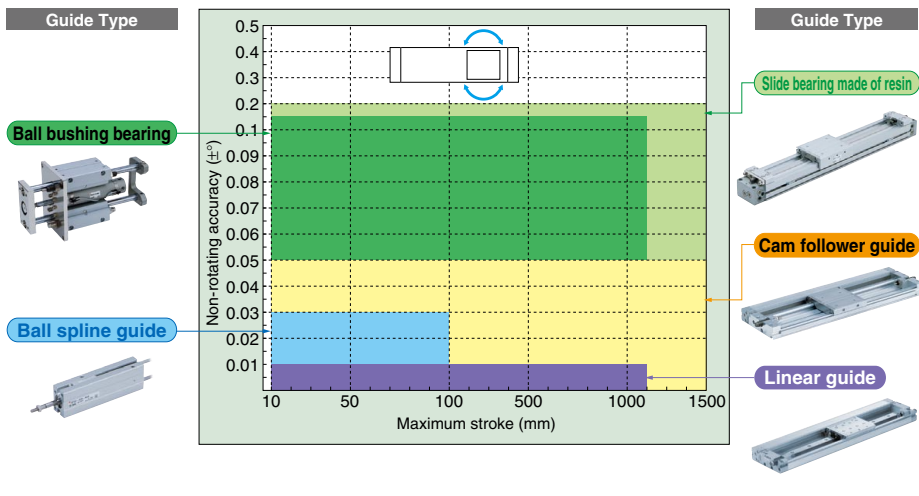
Slide bearing made of metal

Ball spline guide

Linear guide

2) Non-rotating accuracy at the table or rod end

Below graph shows only the tendency since it may be different depending on a model or bore size. Refer to Best Pneumatics for details.



Guide Type

Ball bushing bearing

Ball spline guide

Guide Type

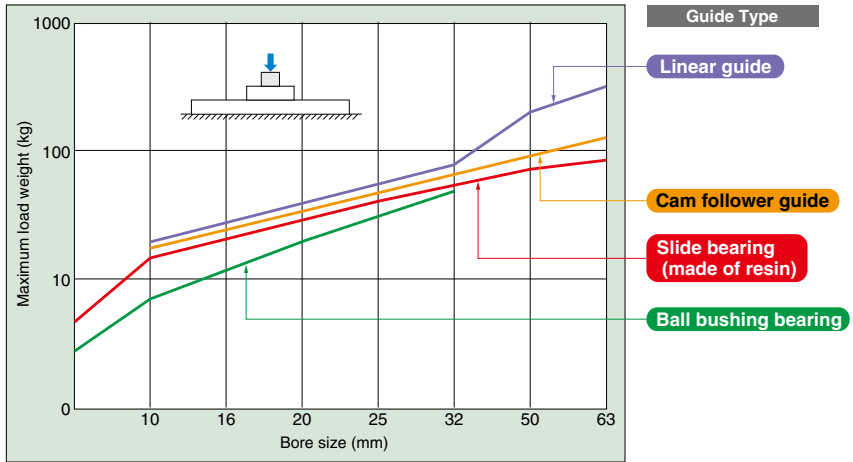
Slide bearing made of resin

Cam follower guide

Linear guide

2 Load Mass

Below graph shows only the tendency since it may be different depending on a model or bore size. Refer to Best Pneumatics for details.



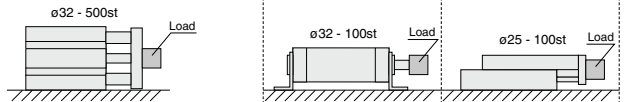
* The figures will change depending on the operating speed and the amount of overhang. For details, refer to pages described to each product model selection.

3 Service Life

This cylinder service life data is based on the service life test conducted under the test conditions shown below. This does not guarantee the service life under the customers' operating conditions.

Guide type	Slide bearing (Copper alloy)	Ball bushing bearing	Ball spline guide	Linear guide
Cylinder for test	MGGM	MGGL	MTS	MXQ
Traveling distance (number of complete cycles)	3000 km (3 million cycles)		1000 km (10 million cycles)	1000 km (10 million cycles)
Non-rotating accuracy	± 0.03 mm or less $\pm 0.04^\circ$		$\pm 0.05^\circ$	± 0.005 mm or less

* The figures of non-rotating accuracy is measured when 50% of the allowable torque is applied.
 * It is the same as the lubrication.



Test Condition

Guide type	Slide bearing (Copper alloy)	Ball bushing bearing	Ball spline guide	Linear guide
Cylinder for test	MGGM	MGGL	MTS	MXQ
Bore size	ø32		ø32	ø25
Stroke	500 mm		100 mm	100 mm
Operating direction	Horizontal		Horizontal	Vertical, downward
Average piston speed	800 mm/s		800 mm/s	350 mm/s
Operating frequency	18 complete cycles/min		29 complete cycles/min	60 complete cycles/min
Load mass	2.8 kg		4.3 kg	3.8 kg
Lubrication	Non-lube (Initial lubrication by grease)			

Others

Regarding the other models, consult with SMC.

Cylinders with Guide

CXSJ 2: P.723

CXS 2: P.723

CXW 2: P.658

CXT 2: P.709

CQM 2: P.1005

MGJ 2: P.401

Shaft guide

2 rods, double thrust



CXSJ

Mounting: Housing and plate can be fixed.



CXW

Table and actuator are combined.



CXT

CQ2 with guide rod
3 to 4 times stronger anti-lateral load
(compared with CQ2)



CQM

Compact cylinder with guide



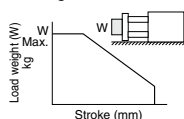
MGJ

Model	Guide	Bore size (mm)	Port size	Stroke (mm)	Max load (kg)	Non-rotating accuracy (±) (Guideline)		Speed (mm/s)	Pressure (MPa)	Cushion J		
						Slide	Ball			Rubber	Air	Absorber
CXSJ		6 x 2	M3 x 0.5	Up to 50	0.5	0.1	0.1	30 to 800	0.15 to 0.7	0.016 to 0.25	—	—
		10 x 2	M5 x 0.8	Up to 75	2.4							
		15 x 2		4.8								
		20 x 2		8								
		25 x 2		10								
32 x 2	1/8	Up to 100	12	30 to 600	0.05 to 0.7							
CXS	Slide bearing Ball bushing bearing	6 x 2	M5 x 0.8	Up to 50	0.5	0.1	0.1	30 to 300	0.15 to 0.7	0.0023 to 0.25	—	—
		10 x 2		Up to 75	2.4							
		15 x 2		4.8								
		20 x 2		8								
		25 x 2	10									
32 x 2	1/8	Up to 100	12	30 to 600	0.05 to 0.7	0.4 to 1						
CXW		10 x 2	M5 x 0.8	Up to 100	1	0.09	0.09	30 to 500	0.15 to 1.0	—	—	0.98 to 14.7
		16 x 2		4	0.03	0.03						
		20 x 2		5	0.02	0.02						
		25 x 2		6	0.02	0.02						
		32 x 2	1/8	Up to 200	10	0.01	0.01					
CXT	Slide bearing Ball bushing bearing	12	M5 x 0.8	Up to 100	3	0.12	0.05	50 to 500	0.15 to 0.7	0.043 to 0.52	—	2.94 to 58.8
		16		7	0.10	0.04						
		20		12	0.08							
		25		20	0.07	0.03						
		32	30									
40	1/8	Up to 300	50	0.06								
CQM	Alloy slide bearing	12	M5 x 0.8	Up to 30	1.3	0.1	—	50 to 500	0.12 to 1.0	0.043 to 4.54	▲	—
		16		1.3								
		20		2.6								
		25		2.6								
		32	1/8	Up to 100	3.5							
		40	4.8									
		50	6.1									
		63	12									
		80	1/4	17								
100	3/8	23	50 to 300									
MGJ		6	M3 x 0.5	Up to 15	0.08	0.1	—	50 to 500	0.15 to 0.7	0.012 to 0.035	—	—
		10		Up to 20	0.29							

▲: Available with a special order (Consult with SMC.)

Note 1) Maximum load weight

■ Shaft guide



Note 2) Non-rotating accuracy

■ Shaft guide

Displacement angle at no load



MGF 2: P.423

MGPW 2: P.495

MGQ 2: P.519

MGF 2: P.595

MGG 2: P.535

MGC 2: P.577

MTS 2: P.375

Shaft guide

Compact cylinder with guide



MGP



MGPW



MGQ

Low profile, large bore size guide rod type



MGF

Basic cylinder and guide rod are combined.



MGG



MGC

Spine rod type with internal guide function.



MTS

Model	Guide	Bore size (mm)	Port size	Stroke (mm)	Note 1)		Note 2)		Speed (mm/s)	Pressure (MPa)	Cushion J																	
					Max. load (kg)	Non-rotating accuracy (±) (Guideline)	Slide	Ball			Rubber	Air	Absorber															
MGP	Slide bearing • Ball bushing bearing • High precision ball bushing	12	M5 x 0.8	Up to 250	1	0.08	0.08	—	50 to 500	0.12 to 1.0	0.043 to 4.54	0.23 to 16.4	2.94 to 147															
		16			1.8	0.07																						
		20			3	0.07																						
		MGPW	Slide bearing • Ball bushing bearing • High precision ball bushing	25	1/8	Up to 400	4.1		0.06	0.06	50 to 400	0.1 to 1.0	0.043 to 4.54	—	—													
				32			13		0.05	0.05																		
				40	1/4		21		0.05	0.05																		
				50			23		0.04	0.04																		
				63			35		0.04	0.04																		
MGQ	Slide bearing • Ball bushing bearing • High precision ball bushing	20	1/8	Up to 200	3	0.05	0.03	0.01	50 to 500	0.1 to 1.0	0.043 to 4.54	—	—															
		25			4.1	0.04																						
		32			13	0.04																						
		MG	Slide bearing • Ball bushing bearing		40	1/4								Up to 100	13	0.08	—	—	50 to 500	0.12 to 1.0	0.043 to 4.54	▲	▲					
					20										4	0.07												
					25										7	0.07												
MGG	Slide bearing • Ball bushing bearing	32	1/8	Up to 200	20	0.06	0.06	—	50 to 400	0.1 to 1.0	0.043 to 4.54	—	—															
		40			30	0.05	0.05																					
		MGF	Slide bearing		50	1/4	Up to 100		36	0.04				0.04	—	50 to 400	0.1 to 1.0	0.76 to 4.6	—	—								
					63				13	0.08				—														
					MGC	Slide bearing • Ball bushing bearing			100	1/4				Up to 100							32	0.06	—	—	20 to 200	0.1 to 1.0	—	—
									55												0.05	—						
MGG	Slide bearing • Ball bushing bearing	20	1/8	Up to 400	5	0.07	0.06	—	50 to 1000	0.15 to 1.0	0.28 to 9.9	—	5.88 to 147															
		25		Up to 500	6	0.06	0.05																					
		32		Up to 600	9	0.06	0.04																					
		MGC	Slide bearing • Ball bushing bearing	40	1/4	Up to 800	15		0.05	0.04	—	50 to 700	0.15 to 1.0	0.35 to 3.4	—													
				50		Up to 1000	25		0.04	0.03																		
				63	Up to 1100	39	0.04		0.03																			
				80	3/8	Up to 1200	55		0.03	0.02																		
				100	1/2	Up to 1300	80		0.03	0.02																		
MTS	Ball spline	20	M5 x 0.8	Up to 400	4	0.07	0.06	—	50 to 750	0.1 to 0.7	0.02	—																
		25		Up to 500	4.7	0.05																						
		32		Up to 600	6.1	0.06																						
		MGC	Slide bearing • Ball bushing bearing	40	1/8	Up to 800	10		0.05	0.04	—	50 to 500	0.15 to 0.7	0.02	—													
				50		Up to 1000	18.5		0.04																			
				8		M3 x 0.5	Up to 30		0.05	0.1																		
MTS	Ball spline	12	M5 x 0.8	Up to 100	0.6	0.05	—	50 to 800	0.1 to 0.7	0.1 to 0.7	—	0.02 to 2.8																
		16		0.7																								
		20		2																								
		MGC	Slide bearing • Ball bushing bearing	25	1/8			Up to 200	2.2	—	—	—	—	—	—													
				32				5																				
				40				8.5																				

▲: Available with a special order (Consult with SMC.)

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination Equipment

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Cylinders with Guide

Cross roller/Linear guide

The height is reduced by a maximum of 47% (compared with MXS)



MXF

Reduced in height and weight with thinner table 2 combinations of the guide and cylinder bore size available



MXQ

MXQ long stroke type (Max. 300 mm)

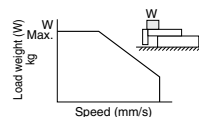


MXW

Model	Guide	Bore size (mm)	Port size	Stroke (mm)	Max. load (kg)	Non-rotating accuracy (mm)	Speed (mm/s)	Pressure (MPa)	Cushion J			
									Rubber	Air	Absorber	Metal stopper with bumper
MXF	Cross roller	8	M3 x 0.5	Up to 30	0.6	0.03	50 to 500	0.15 to 0.7	0.027			
		12	M5 x 0.8	Up to 50	1	0.03			0.055			
		16		Up to 75	2	0.02			0.11			
		20		Up to 100	4	0.03			0.16			
MXQ□A MXQ□C MXQ□	Linear	6 x 2	M5 x 0.8	Up to 50	0.6	0.02	50 to 500 (Metal stopper with bumper: 50 to 300)	0.15 to 0.7	0.026		0.14	—
		8 x 2		Up to 75	1	0.02			0.033		0.17	0.016
		12 x 2		Up to 100	2	0.02			0.09		0.24	0.034
		16 x 2		Up to 125	4	0.02			0.1	—	0.61	0.07
		20 x 2		Up to 150	6	0.03			0.2		1.2	0.1
		25 x 2			9	0.03			0.32		1.3	0.15
		6 x 2			Up to 75	0.6			0.02	0.025		0.17
MXQ□B	Linear	8 x 2	M5 x 0.8	Up to 100	1	0.02	50 to 500	0.15 to 0.7	0.046		0.24	0.013
		12 x 2		Up to 125	2	0.02			0.095	—	0.61	0.03
		16 x 2		Up to 150	4	0.03			0.16		1.2	0.06
		20 x 2			6	0.03			0.32		1.3	0.095
		8 x 2			Up to 150	1.8			0.02	0.041		0.082
MXW	Linear	12 x 2	M5 x 0.8	Up to 200	4	0.01	50 to 500	0.15 to 0.7	0.09		0.18	
		16 x 2		Up to 250	7	0.01			0.16	—	0.32	—
		20 x 2		1/8	Up to 300	11			0.01	0.255		0.51
		25 x 2	17		0.01	0.39				0.78		

Note 1) Maximum load weight

■ Linear guide/Cross roller



Note 2) Non-rotating accuracy

■ Linear guide/Cross roller

Displacement angle with the maximum catalog stroke length body and when the 50% of the allowable moment at the rod end position is applied.



MXF 2-P.265

MXQ 2-P.73

MXW 2-P.281

MXP 2-P.327

MXJ 2-P.305

MXY 2-P.355

MXH 2-P.15

Cross roller/Linear guide

Linear guide having an integrated cylinder



MXP

Achieves high precision and rigidity by integrating the front mounting part with the table.



MXJ

Long strokes, rigidity, and lightweight and compact type with built-in magnet type rodless cylinders on a linear guide.



MXY

CU with a linear guide
High rigidity type

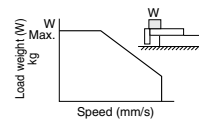


MXH

Model	Guide	Bore size (mm)	Port size	Stroke (mm)	Note 1) Note 2)		Speed (mm/s)	Pressure (MPa)	Cushion J		
					Max. load (kg)	Non-rotating accuracy (μm) (Guideline)			Rubber	Air	Absorber
MXP	Linear	6	M3 x 0.5	Up to 10	0.32	0.05	50 to 500	0.15 to 0.7	0.01	—	—
		8	M5 x 0.8	Up to 20	0.75	0.05			0.033		
		10		Up to 20	1.2	0.05			0.045		
		12		Up to 25	1.7	0.05			0.076		
		16		Up to 30	3	0.06			0.135		
4.5		M3 x 0.5		Up to 10	0.1	0.05	0.0031				
6			Up to 15	0.2	0.05	0.0061					
8			Up to 20	0.35	0.06	0.011					
MXY		6	M5 x 0.8	Up to 200	0.6	0.04	50 to 400	0.2 to 0.55	0.018	—	—
		8		Up to 300	1	0.04			0.027		
	12	Up to 400		2	0.03	0.055					
MXH	6	M5 x 0.8	Up to 60	1	0.03	50 to 500	0.15 to 0.7	0.0125	—	—	
	10			2.5	0.03			0.025			
	16			7	0.03			0.05			
	20			11	0.03			0.1			

Note 1) Maximum load weight

■ Linear guide/Cross roller



Note 2) Non-rotating accuracy

■ Linear guide/Cross roller

Displacement angle with the maximum catalog stroke length body and when the 50% of the allowable moment at the rod end position is applied.



Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination Equipment

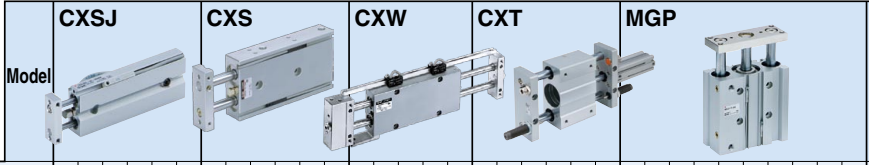
Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Cylinders with Guide: Option

Shaft guide



Bore size (mm)	6 10 15 20 25 32					6 10 15 20 25 32					10 16 20 25 32					12 16 20 25 32 40					12 16 20 25 32 40 50 63 80 100									
----------------	------------------	--	--	--	--	------------------	--	--	--	--	----------------	--	--	--	--	-------------------	--	--	--	--	--------------------------------	--	--	--	--	--	--	--	--	--

Combination																																				
With lock	—					—					—					—										○	—					MLGP				
With end lock	▲					●					●					—		○			—					●										
With valve	—					—					—					▲					▲															
Actuation																																				
Low speed	○					○					○					○		○			○															
High speed	▲					○					▲					▲		▲			▲															
Low friction	▲					▲					▲					—		—			—															
Environmentally resistant																																				
Heat resistant	○					○					○					○		○			○															
Cold resistant	○					○					○					▲		▲			▲															
Improved water and oil resistance	▲					▲					▲					—		—			●															
Clean	●	▲				●	▲				●	▲				○					●	▲														
Copper-free, Fluorine-free	●					●					●					●																				
Stainless steel																																				
Stainless steel specification (-XC6)	○					○					▲					▲		▲			○															
Others																																				
Air-hydro	▲					▲					○					○		○			▲															
Tandem	▲					▲					—					○		○			▲															
Dual stroke	▲					▲					—					○		○			▲															
Stroke adjustment	▲					▲					—					○		○			○															

Model and ●: Available with a standard model, Model and ○: Available with Made to Order, ○: Available with a special order A (*1), ▲: Available with a special order B (*2), —: Not available

* 1: In the case of being available with simple changes, compared with standard.
 * 2: This is technically possible, but contact SMC for dimensions, costs and delivery.

MGPW						MGQ						MGG						MGC					MGJ			MGF							
20	25	32	40	50	63	12	16	20	25	32	40	50	63	80	100	20	25	32	40	50	63	80	100	20	25	32	40	50	6	10	40	63	100
		▲								—										◎													
		▲						—		▲										●													
		—								MVGQ										▲													
		▲								◎										◎													
		▲								▲										○													
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		▲								◎										◎													
		▲								▲										▲													
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		▲								◎										◎													
		▲								◎										●													
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		▲								▲										◎													
		▲								▲										◎													

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination

Pressure Control Equipment



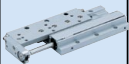
Pressure Detection Equipment






Flow Rate Detection Equipment

Cylinders with Guide: Option

Shaft guide

Linear guide

Model	CQM										MTS						MXF				
																					
Bore size (mm)	12	16	20	25	32	40	50	63	80	100	8	12	16	20	25	32	40	8	12	16	20
Combination																					
With lock	—										—						—				
With end lock	▲	○									—	●					▲				
With valve	▲		CVQM			▲					▲						—				
Actuation																					
Low speed	—										—						—				
High speed	▲										—						—				
Low friction	—										—						—				
Environmentally resistant																					
Heat resistant	○										—						—				
Cold resistant	○										—						—				
Improved water and oil resistance	—		○								—						—				
Clean	▲										—						—				
Copper-free, Fluorine-free	○										●						●				
Stainless steel																					
External parts	▲										▲						—				
Others																					
Air-hydro	—		○								—						—		▲		
Tandem	—										—						—				
Dual stroke	○										▲						—				
Stroke adjustment	○										◎						—				


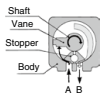
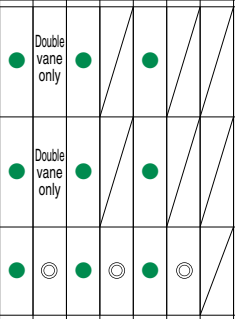

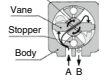

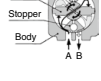

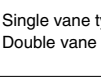
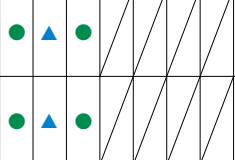

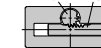
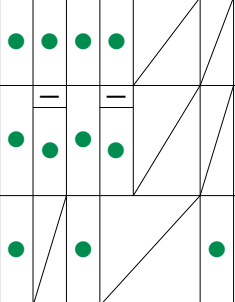

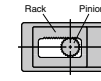

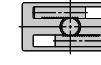


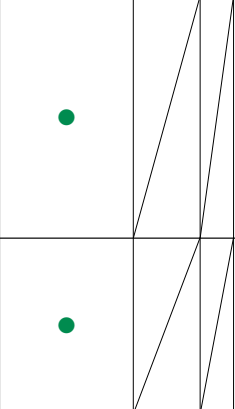


Model and : Available with a standard model. Model and : Available with Made to Order, : Available with a special order A (*1), : Available with a special order B (*2), : Not available

* 1: In the case of being available with simple changes, compared with standard.
 * 2: This is technically possible, but contact SMC for dimensions, costs and delivery.

	MXQ					MXW					MXP					MXJ			MXY			MXH					
	6	8	12	16	20	25	8	12	16	20	25	6	8	10	12	16	4	6	8	6	8	12	6	10	16	20	
			—						—					—					—			—				—	
			●						▲					—					—			—				—	
			—						—					—					—			—				—	
			▲						▲					▲					—			—			◎		
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			—						—					—					—			—			▲		
			—						—					—					—			—			▲		
			●						—					● (Except ø8)					●			—			▲		
			●						●					●					●			●			▲		
			—						—					—					—			—			—	▲	
			—	▲					—	▲				—					—			—			—	▲	
			—						—					—					—			—			—		
			▲						—					—					—			—			—		
			—						—					—					—			—			—	▲	

- Directional Control Valves
- Actuators
- Air Preparation Equipment
- Air Combination
- Air Combination
- Pressure Control Equipment
- Pressure Control Equipment
- Pressure Detection Equipment
- Pressure Detection Equipment
- Flow Rate Detection Equipment

Rotary Actuators

Type	Rotating parts	Rotating accuracy	Model	Construction	Size	Port size	Torque N·m (Guide at 0.5 MPa)			Allowable axis load N	Rotating angle								
							Single	Double	↓		90°	100°	180°	190°	270°	280°	360°		
Vane	Axis	Basic type	CRB2 Round compact Max. 270° capable 	Single vane type 	10	M3 x 0.5	0.1	0.3	14.7		● : Standard ▲ : Available with a special order ◎ : Semi-standard								
					15		0.3	0.7	14.7										
					20		0.7	1.5	24.5										
					30	M5 x 0.8	1.8	3.7	29.4										
					40		3.7	7.6	60										
					10	M3 x 0.5	0.1	0.3	14.7										
			15		0.3	0.7	14.7												
			20		0.7	1.5	24.5												
			30	M5 x 0.8	1.8	3.7	29.4												
	40		3.7	7.6	60														
	CRBU2 Mountable in 3 directions 	Double vane type 	10	M3 x 0.5	0.1	0.3	14.7												
			15		0.3	0.7	14.7												
20				0.7	1.5	24.5													
CRB1 Max. 280° capable 	Single vane type 	30	M5 x 0.8	1.8	3.7	29.4													
		40		3.7	7.6	60													
		50	1/8	5.7	12	245													
		63		11	23	390													
		80	1/4	18	37	490													
100		36	73	588															
Table	High precision type		MSUB Can mount a load directly. 	Single vane type Double vane type 	1	M3 x 0.5	0.1	0.2	20										
					3	M3 x 0.5	0.3	0.6	40										
					7	M5 x 0.8	0.7	1.4	50										
					20		1.8	3.6	60										
					1	M3 x 0.5	0.1	0.1	20										
					3	M3 x 0.5	0.3	—	40										
7	M5 x 0.8	0.7	—	50															
20		1.8	—	60															
Axis	Basic type		CRJ Compact type of single rack type 	In-line single rack type 	05	M3 x 0.5	0.04	—	25										
					1				30										
			CRA1 	In-line single rack type 	30	M5 x 0.8	1.9	—	29.4										
					50	1/8	9.3		196										
					63		17		294										
					80		1/4		32									392	
					100		3/8		74									588	
					10		M5 x 0.8		—									0.3	14.7
			15		0.8		19.6												
			20		1.8	49													
			30	1/8	3.1	78													
			40		5.3	98													
CRQ2 Double rack type Thin and its height 17 to 37 mm. 	Parallel double rack type 	1	M5 x 0.8	—	0.09	31													
		2				32													
		3				33													
		7				54													
		10				M5 x 0.8	0.9	78											
		20					1.8	147											
		30					2.7	196											
		50					4.6	314											
		70				1/8	6.8	333											
		100				M5 x 0.8	10	390											
200		20	543																
Table	High precision type		MSQB A load can be mounted directly. Angle is adjustable steplessly up to 190° 	Parallel double rack type 	1	M3 x 0.5	—	0.09	31										
					2				32										
					3				33										
					7				54										
					10				M5 x 0.8									0.9	78
					20													1.8	147
					30													2.7	196
					50													4.6	314
					70				1/8									6.8	333
					100				M5 x 0.8									10	390
200		20	543																
MSQA Amount of table movement in the radial and thrust is within 0.01 mm or less. 	Parallel double rack type 	1	M3 x 0.5	—	0.09	31													
		2				32													
		3				33													
		7				54													
		10				M5 x 0.8	0.9	86											
		20					1.8	166											
		30				1/8	2.7	233											
50	M5 x 0.8	4.6	378																





● : Standard
 ▲ : Available with a special order
 ◎ : Semi-standard

Angle adjustor	Speed adjustment capable time S/90°		Pressure MPa		Mounting	Port location		Auto switch	Back lash	
	Minimum	Maximum	Minimum	Maximum		Axial direction	Body side			
0° to 230°	0.03	0.3	0.2	0.7				●	None	
0° to 240°										0.04
230°	0.07	0.5	0.2	0.7				●	None	
230°	0.04	0.15	1							
240°	0.03	0.3	0.2	0.7				●	None	
240°	0.04	0.15	1							
230°	0.07	0.5	0.2	0.7				●	None	
230°	0.07	0.5	1							
At the rotation end ±5° (S) ±2.5° (D)	0.07	0.3	0.2	0.7				●	None	
			0.15	1						
At the rotation end ±5°	0.07	0.3	0.2	0.7				●	None	
			0.15	1						
At the rotation end ±5°	0.1	0.5	0.15	0.7				●	None	
			0.2	1						
At the rotation end ±3° 0° to 90° 90° to 180°	0.2	0.1	1	1				●	Within 1°	
			2							
			3							
			4							
			5							
At the rotation end ±5°	0.2	0.7	0.15	0.7				●	None	
			1	1						
0° to 190°	0.2	1	0.7	0.2				●	None	
			*1							*3
			1.5							0.6
			2							*2
			2.5							1
0° to 190°	0.2	1	0.7	0.2				●	None	
			*1							*3
			0.1							0.6
			0.2							*1
			0.2							0.2






* 1: For the products with internal absorber (size: 10, 20, 30, 50).
 * 2: For the products with internal absorber (size: 70, 100, 200).
 * 3: For the products with internal absorber (size: 10, 20, 30, 50).

Directional Control Valves
 Actuators
 Air Preparation Equipment
 Air Combination
 Pressure Control Equipment
 Pressure Detection Equipment
 Flow Rate Detection Equipment





Rotation Rotary Actuators Basic: Option

Model	CRB2					CRBU2					CRB1				MSU				
																			
Size	10	15	20	30	40	10	15	20	30	40	50	63	80	100	1	3	7	20	

Stopping type																				
Variable angle	● CRB2□U					● CRBU2□U					—				●					
External stopper	—					—					—				—					
Internal absorber	—					—					—				—					
External absorber	—					—					—				—					
Combination																				
With valve	—					—					● CVRB1				—					
Actuation																				
Low speed	—					—					—				—					
Intermediate stop	—					—					—				—					
Environmentally resistant																				
Clean	● 10-CRB1		—			—					● 10-		▲		—					
Copper-free, Fluorine-free	● 20-					● 20-					● 20-				●					
Copper-free, Fluorine-free and Silicon-free + Low particle generation	● 21-CRB1		—			—					● 21-		▲		—					
Heat resistant	—					—					—				—					
Cold resistant	—					—					—				—					
Water resistant	—					—					—				—					
Material																				
Main parts, Stainless steel	●		▲			●					▲		◎				—			
Rubber parts FKM	—					—					—				—					
Others																				
High precision type	—					—					—				● MSUA					
Air-hydro	—					—					—				—					

Model and  : Available with a standard model, Model and  : Available with Made to Order (Optional),  : Available with a special order A (Consult with SMC.),  : Available with a special order B (Consult with SMC for costs and delivery),  : Not available

Note 1) For size 10 to 200, side ports cannot be used. Note 2) Shock absorber is not available. Note 3) Shock absorber is a special order item

CRJ		CRA1					CRQ2					MSQ										
																						
05	1	30	50	63	80	100	10	15	20	30	40	1	2	3	7	10	20	30	50	70	100	200
● CRJU		● CRA1□U						●									●					
● CRJU		▲						▲				▲					○				▲	
—	—		▲				—		▲			—						● MSQ□R				
—	—		▲				—		▲			—						● MSQ□L,H			▲	
—	—		● CVRA1				—					—										
—			▲					● CRQ2X				▲						● MSQX			▲	
—			▲					▲				—						● MSZ			▲	
▲		● 11-		▲				▲							● 11-						▲	
○			●					●				●						● Note 1) 20-				
▲		○ 22-		▲				▲				○						● Note 1) 22-			▲	
▲			○ -X7					▲										▲ Note 2)				
▲			▲					▲										▲ Note 2)				
▲			▲					▲										▲ Note 2)				
○			○ -X6				●		○ -X6									▲ Note 2)				
○			○ -X16					○ -XC69										○ Note 3)				
—			—				—		—									● MSQA			○	
—	—		● CRA1□H				—		—									—				

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment



Parallel Opening

2-finger

Square type

Model	Linear guide MHZ2							Wide opening MHL2								
	Linear guide. With dust cover Long stroke is also available.							Open/Closed stroke Max. 200 mm								
Size	6	10	16	20	25	32	40	10	16	20	25	32	40			
Port size	M3 x 0.5			M5 x 0.8				M5 x 0.8					1/8	1/8		
Gripping force (0.5 MPa) N	O. D.	3.3	11	34	42	65	158/254	14	45	74	131	228	369			
	I. D.	6.1	17	45	66	104	193/318									
Finger (mm)	Open width	12	15.2	9.7	19.2	20.9	12.6	26.9	26.3	17.2	34.3	33.3	22.8	41.3	48	60
	Closed width	8	11.2	5.7	11.2	14.9	6.6	14.9	16.3	7.2	16.3	19.3	8.8	19.3	26	30
	Stroke	4	4	4	8	6	6	12	10	18	14	14	22	22	30	30
Operating pressure (MPa)	Minimum	0.15	0.2	0.1				0.15	0.1							
	Maximum	0.7				0.6										
Max. operating frequency (cpm)	180			60				60 / 40 (Middle long stroke)					30/20 (Middle long stroke)			
Repeatability (± mm)	0.01			0.02				0.1								

Parallel Opening

3-finger

4-finger

Round type

Round type

Model	Slide guide MHS3							Rotary MDHR3 Cross roller guide	Slide guide MHS4														
	With dust cover, Long stroke, Through-hole W/ Center pusher is also available.								Positioning of a square-shaped work.														
Size	16	20	25	32	40	50	63	80	100	125	10	15	16	20	25	32	40	50	63				
Port size	M3 x 0.5		M5 x 0.8					1/8	1/4	3/8	M3 x 0.5	M3 x 0.5	M5 x 0.8										
Gripping force (0.5 MPa) N	O. D.	14	25	42	74	118	187	335	500	750	1270	7	13	10	19	31	55	88	140	251			
	I. D.	16	28	47	82	130	204	359	525	780	1320	6.5	12	12	21	35	61	97	153	268			
Finger (mm)	Open width	14	27	16	28	20	32	24	44	28	53	34	72	46	84	63	97	80	130	92	160	22	27
	Closed width	10	17	12	18	14	20	16	28	20	33	22	44	30	52	43	57	56	82	60	96	16	19
	Stroke	4	10	4	10	6	12	8	16	8	20	12	28	16	32	20	40	24	48	32	64	6	8
Operating pressure (MPa)	Minimum	0.2			0.1				0.2			0.15	0.2		0.1								
	Maximum	0.6				0.6					0.6		0.6										
Max. operating frequency (cpm)	120			60				30			180		120		60								
Repeatability (± mm)	0.01			0.01				0.01			0.01		0.01										

MHL2 3 P.497	MHF2 3 P.465	MHK2 3 P.547	MHS2 3 P.569	MDHR2 3 P.515	MHS3 3 P.584
MDHR3 3 P.530	MHS4 3 P.628	MHC2 3 P.657	MHT2 3 P.685	MHY2 3 P.697	MHW2 3 P.711

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment



Round type

Compact MHF2				Slide guide MHK2				Slide guide MHS2				Rotary MDHR2							
Height reduced to 1/3 (compared with MHZ2)				With dust cover, Long stroke, Through-hole, Stainless steel finger is also available.				Wedge cam construction. Weight reduced (compared with MHZ2)				Cross roller guide							
8 12 16 20				12 16 20 25				16 20 25 32 40 50 63				10 15 20 30							
M3 x 0.5		M5 x 0.8				M3 x 0.5		M5 x 0.8		M3 x 0.5		M5 x 0.8		M3 x 0.5		M5 x 0.8			
19		48		90		141		15 14 31 27 46 45 80 74		21 37 63 111 177 280 502		12 24 33 58		12 25 34 59					
8 16 32	12 24 48	16 32 64	20 40 80	13 20	20.6 28.6	26 34 33 41		14 16 20 24 28 34 46	16 22 28 37	10 12 14 16 20 22 30	10 14 16 19	8 12 18	6 8 12 18						
0.15		0.1				0.1				0.2		0.1		0.2		0.15			
0.7				0.6				0.6				0.6							
120 / 60 (Long stroke)				120 / 90 (Long stroke)				120				60				180			
0.05				0.01				0.01				0.01				0.01			

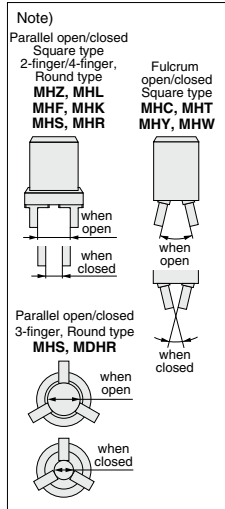


Fulcrum Opening

2-finger

Square type

Model	Standard MHC2				Toggle MHT2				Cam 180° MHY2				Gear 180° MHW2						
	Double piston construction Gripping force: Large				Can hold a work even at air-down				180° open/closed type				180° open/closed type Dustproof spec.						
Size	6	7	10	16	20	25	32	40	50	63	10	16	20	25	20	25	32	40	50
Port size	M3 x 0.5		M5 x 0.8			1/8	1/4	M5 x 0.8			M5 x 0.8		1/8	1/4					
Gripping force (0.5 MPa)	0.038	0.017	0.10	0.39	0.70	1.36	12.4	36.0	63.0	106	0.16	0.54	1.10	2.28	0.30	0.73	1.61	3.70	8.27
(Note) Finger opening/closing angle	Open	30	20	30			28	27	23		180			180					
	Closed	-10	-7	-10			-3	-2			-3			-5	-6	-5	-4		
Operating pressure (MPa)	Minimum	0.15	0.4	0.1			0.1			0.1		0.15							
	Maximum	0.6	0.6	0.6			0.6			0.6		0.7							
Max. operating frequency (cpm)	180		180			60		(Reference Value)		60			60		30				
Repeatability (± mm)	0.02		0.01			0.5		(Reference Value)		0.2			0.2						



Gripping Air Grippers Basic: Option

Model	Linear guide				Wide opening				Compact			Slide guide				Slide guide				Rotary												
	MHZ2				MHL2				MHF2			MHK2				MHS2				MHR2												
Size	6	10	16	20	25	32	40	10	16	20	25	32	40	8	12	16	20	12	16	20	25	16	20	25	32	40	50	63	10	15	20	30

Actuation																														
Single acting		●					▲					▲				●					▲					—				
Low speed		◎					◎					◎				◎					◎					—				
Spring assist		◎					▲					▲				◎					▲					—				
Environmentally resistant																														
Heat resistant		◎					◎					◎				◎					◎					—				
Oil proof		◎					◎					◎				◎					◎					—				
Cold resistant		○					○					○				○					○					—				
Clean		●					●					▲*4				○*4					○*4					●				
Copper-free, Fluorine-free	◎	●					◎					◎				◎					◎					●				
Dust cover		●					—					—				●					▲					—				
Finger option																														
Tapped in open/close direction		●					●					—				●					—					—				
Tapped in side face		●					○					—				◎					—					—				
Through-hole		●					○					—				◎					—					—				
Flat type		●					—					●				—					●					●				
Remarks: Other specific variants		· Body option · For AHC				· With scraper															· For AHC									

Model and : Available with a standard model, Model and : Available with Made to Order, : Available with a special order A (*1), : Available with a special order B (*2), : Not available

- * 1: In the case of being available with simple changes, compared with standard.
- * 2: This is technically possible, but contact SMC for dimensions, costs and delivery.
- * 4: For details about particle generation data, contact SMC.

MHL2 3 P.497
MHR3 3 P.530








MHF2 3 P.465
MHS4 3 P.628

MHK2 3 P.547
MHC2 3 P.657

MHS2 3 P.569
MHT2 3 P.685

MHR2 3 P.515
MHY2 3 P.697

MHS3 3 P.584
MHW2 3 P.711

												Slide guide		Rotary		Slide guide						Standard				Toggle				Cam 180°				Gear 180°			
																																					
												MHS3		MHR3		MHS4						MHC2				MHT2				MHY2				MHW2			
16	20	25	32	40	50	63	80	100	125	10	15	16	20	25	32	40	50	63	6	7	10	16	20	25	32	40	50	63	10	16	20	25	20	25	32	40	50
			⊙								▲				▲							●					○						▲			▲	
			⊙								—				⊙							⊙					○				⊙				⊙		
			▲								—				▲							⊙*3					○				▲				▲		
			⊙								—				⊙							⊙					⊙				⊙				⊙		
			⊙								—				⊙							⊙					⊙				⊙				⊙		
			○								—				○							○					○				○				○		
			○*4								●				○*4							—					—				—				—		
			⊙								●				⊙					⊙		●					⊙				⊙				⊙		
			●								—				▲							—					—				—				—		
			—								—				—							●					●				●				●		
			—								—				—							⊙					○				○				—		
			—								—				—							⊙					○			●			○		○		
			●								●				●							—					—				—				●		
			· Through-hole · With pusher								· For AHC										*3: Spring assist is not available with MHC2-7. Single acting only.																

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination

Air Control Equipment

Pressure Control Equipment

Pressure Detection Equipment

Special Actuation, Specific Functions

MQQ/MQM/MQP 2, P.317

High speed, High frequency,
Low speed, Low friction

Metal seal cylinder

Compact, low friction cylinder



MQQT/Standard type
MQQL/Lateral load resisting type

Lateral load resisting, low friction cylinder



MQQL/Standard type
MQML□□H/High speed, High frequency type

Low friction, pressure-applying cylinder



MQP

Model	Bore size (mm)	Port size	Stroke (mm)	Speed (mm/s)	Pressure (MPa)	Cushion (J)
MQQT	10	M5 x 0.8	Up to 40	0.3 to 300	0.005 to 0.7	Rubber bumper
	16		Up to 60			
	20		Up to 100			
	25	1/8	Up to 100			
	30					
40	1/4					
MQQL	10	M5 x 0.8	Up to 40	0.5 to 500	0.005 to 0.7	
	16		Up to 60			
	20		Up to 100			
	25	1/8				
	30					
40	1/4					
MQML	6	M5 x 0.8	Up to 60	0.5 to 1000	0.02 to 0.7	
	10		Up to 100		0.005 to 0.7	
	16					
	20	1/8				
	25					
MQML□□H	10	M5 to 0.8	Up to 100	5 to 3000	0.01 to 0.7	
	16					
	20	1/8				
	25					
MQP	4	M5 to 0.8	10	—	0.001 to 0.7	—
	6					
	10					
	16					
	20					

Common Specifications

Operating temperature	-10 to 80°C
Lubrication	Non-lube
Life service	10000 km or 100 million cycles

	Description	Model	
Impact relaxation	Sine cylinder	REA/REB/REC	2.3 P.15
	Smooth cylinder	CQSY/CQ2Y/CM2Y/CG1Y/CA2Y/CS2Y	2.3 P.135
Low speed, Low friction	Low speed cylinder	CM2X/CG1X/CQSX/CQ2X	2.3 P.250
	Low speed rotary actuator	CRQ2X/MSQX	3 P.301
High speed, High frequency, Low speed, Low friction	Metal seal cylinder	MQQ/MQM/MQP	2.3 P.317
High speed	High power cylinder	RHC	2.3 P.345
3-point stops	3 position cylinder	RZQ	2.3 P.367
	3 position rotary table	MSZ	3 P.287
Clamp	Clamp cylinder	CK/MK/CKQ/CLK	2.3 P.381
Stopper cylinder	Stopper cylinder	RSQ/RSG/RSH	2.3 P.559
	Escapement	MIS/MIW	2.3 P.617
With measurement function	Stroke reading cylinder	CE1/CE2/ML2	2.3 P.656
Double power	Double power cylinder	MGZ	2.3 P.607
Combined operations	Rotary cylinder (Rotation + Linear)	MRQ	3 P.343
	Rotary gripper (Rotation + Gripping)	MRHQ	3 P.749
High vacuum	Rodless cylinder for vacuum	CYV	10 P.535

Directional
Control Valves

Actuators

Air Preparation
Equipment

Air Combination
Equipment

Pressure Control
Equipment

Pressure Detection
Equipment

Flow Rate Detection
Equipment

Air Preparation Equipment

Air Preparation Filters



Air Dryers



Air Tank



Aftercoolers



Clean Gas Filters



Clean Air Filters

Directional
Control Valves

Actuators

Air Preparation
Equipment

Air Combination

INDEX

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Air Dryers	P.78
Air Preparation Filters	P.86
Clean Gas Filters	P.90
Clean Air Filters	P.92
Related Equipment	P.94

Pressure Control
Equipment

Pressure Detection
Equipment

Flow Rate Detection
Equipment

SMC Air Preparation System

Class	Solid particle			Moisture Pressure dew point (At air pressure) of 0.7 MPa °C	Oil concentration mg/m ³
	Max. number of particles/1 m ³				
	Particle diameter d μm				
	0.1 < d ≤ 0.5	0.5 < d ≤ 1.0	1.0 < d ≤ 5.0		
1	≤ 20000	≤ 400	≤ 10	1	≤ 0.01
2	≤ 400000	≤ 6000	≤ 100	2	≤ 0.1
3	Not specified	≤ 90000	≤ 1000	3	≤ 1
4	Not specified	Not specified	≤ 10000	4	≤ 5
5	Not specified	Not specified	≤ 100000	5	≤ +3
				6	≤ +7
				6	≤ +10

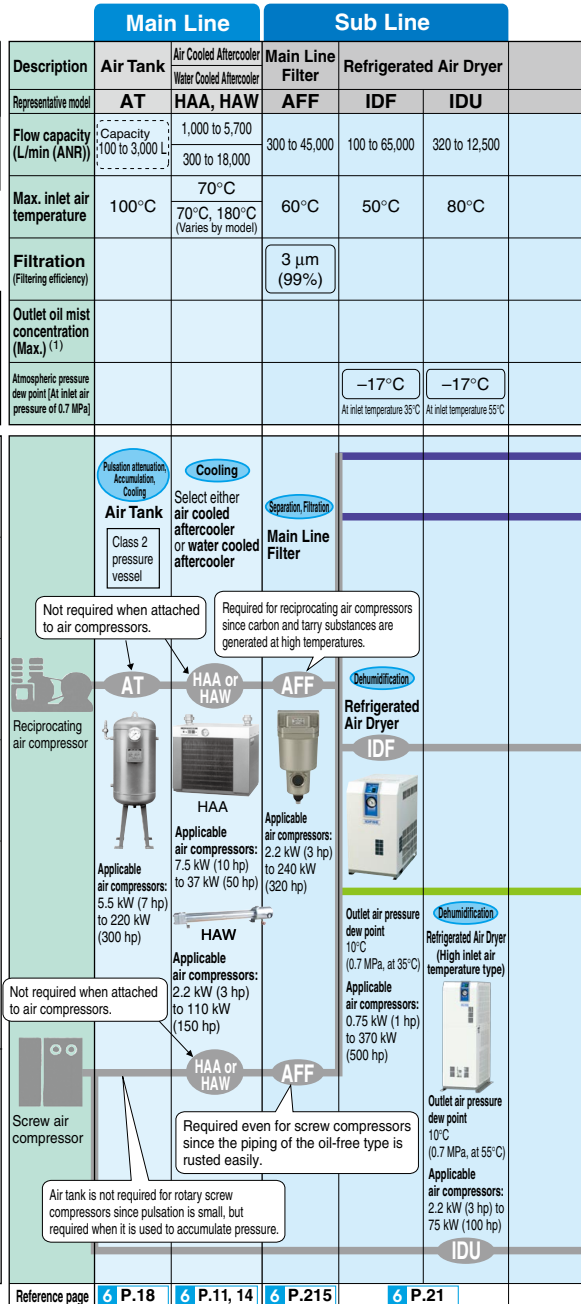
Indication: The degree of quality is indicated with 1, 4 and 2 for systems with solid particle "class 1," moisture "class 4" and oil "class 2."

System no.	Application	Impurity in compressed air				
		Moisture		Filtration	Oil mist density (1)	Oil odor
		Dew point	Moisture			
						Quality grade as system (2)

A	Water drop removal air • Air blowing (Simple removal of particles) • General pneumatic tools	Atmospheric pressure dew point 6°C 0.7 MPa Pressure dew point 40°C	7 g/m ³ (ANR)	3 μm (Filtering efficiency 99%)	—	4: - : -
B	Dry air • Used for the same applications as A, when temperature drop in the middle of piping is large.					4: 4: - 4: 5: - 4: 6: -
C	Dry air • General pneumatic equipment • General painting	Atmospheric pressure dew point		0.3 μm (Filtering efficiency 99.9%)	Max. 1 mg/m ³ (ANR) 0.8 ppm	Yes 2: 4: 3 2: 5: 3 2: 6: 3
D	Dry clean air • High grade painting • Sequence control • Measurement device • Instrumentation • Drying and cleaning (Precision parts) • Machine tools (Pneumatic bearing)	-14 to -23°C 0.7 MPa Pressure dew point 15 to 3°C	1.7 g/m ³ (ANR) 0.8 g/m ³ (ANR)		Max. 0.1 mg/m ³ (ANR) 0.08 ppm	1: 4: 2 1: 5: 2 1: 6: 2
E	Dry clean air • Without refrigerated air dryer on the sub line • Built-in with equipment (With machine tools, 3-D measurement device, etc.)			0.01 μm (Filtering efficiency 99.9%)	Max. 0.01 mg/m ³ (ANR) 0.008 ppm	1: 4: 1 1: 5: 1 1: 6: 1
F	Deodorant air • Stirring, transporting, drying and packaging • Food Industry (Except direct blowing to foods)				Max. 0.004 mg/m ³ (ANR) 0.0032 ppm	No 1: 1: 1 1: 6: 1
G	Low dew point clean air • Drying electric and electronic parts • Drying a filling tank • Transporting powders • Ozone generator • Low temperature actuated equipment	Atmospheric pressure dew point -30 to -60°C	0.5 g/m ³ (ANR) to		Max. 0.01 mg/m ³ (ANR) 0.008 ppm	Yes 1: 2: 1 1: 3: 1
H	Low dew point clean air (For clean room) • Blowing semi-conductor parts in the clean room	0.7 MPa Pressure dew point -6 to -42°C	0.02 g/m ³ (ANR)	0.01 μm (Filtering efficiency 99.9%)	Max. 0.004 mg/m ³ (ANR) 0.0032 ppm	No 1: 2: 1 1: 3: 1

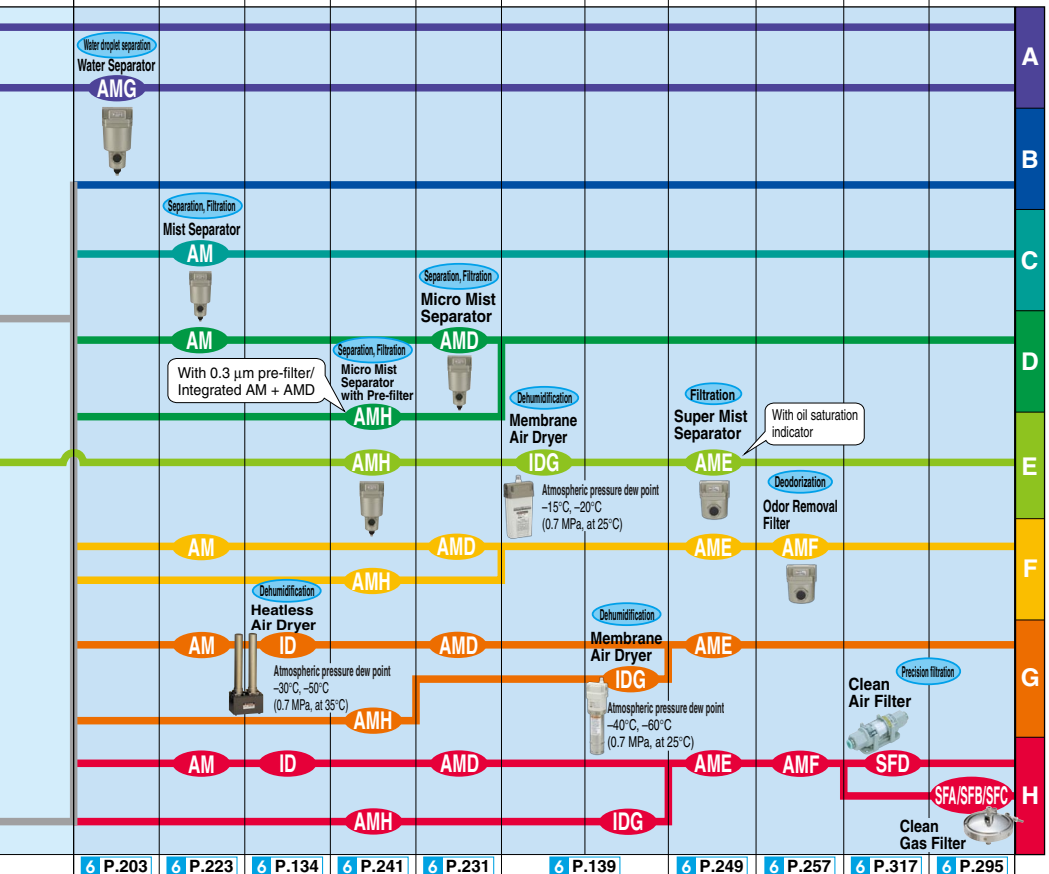
Note 1) When the inlet oil mist density (compressed air density) is approximately 30 mg/m³ (ANR) or less.

Note 2) This describes the grade of compressed air quality based on ISO8573-1:2010 (JIS B8392-1:2012), which is the maximum quality grade for the system. It varies, however, depending on the inlet air conditions.



Local line

Water Separator	Mist Separator	Heatless Air Dryer	Micro Mist Separator with Pre-filter	Micro Mist Separator	Membrane Air Dryer	Super Mist Separator	Odor Removal Filter	Clean Air Filter	Clean Gas Filter
AMG	AM	ID	AMH	AMD	IDG	AME	AMF	SFD	SFA, SFB, SFC
300 to 12,000		80 to 780	200 to 12,000	200 to 40,000	10 to 1,000	75 to 300 50 to 150	200 to 12,000	100 to 500	26 to 300
60°C		50°C	60°C		50°C, 55°C (Varies by model)	50°C	60°C	45°C	80°C, 120°C (Varies by models)
Water removal rate: 99%	0.3 μm (99.9%)		0.01 μm (With 0.3 μm pre-filter)	0.01 μm (99.9%)			0.01 μm (99.9%)	0.01 μm (99.99%)	0.01 μm (99.99%)
	1 mg/m ³ (ANR) [≈ 0.8 ppm]		0.1 mg/m ³ (ANR) [≈ 0.08 ppm]				0.01 mg/m ³ (ANR) [≈ 0.008 ppm]	0.004 mg/m ³ (ANR) [≈ 0.0032 ppm]	
		-30°C -50°C At inlet temperature 35°C			-15°C -20°C At inlet temperature 25°C	-40°C -60°C At inlet temperature 25°C			



Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination Equipment

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

SMC Air Preparation System Technical Information

Impurities Reducible by Air Preparation Equipment

Product name	Model	Solid foreign matter Filtration Minimum solid diameter that can be removed more than 95 % (μm)	Oil mist Outlet oil mist concentration Max. mg/m^3 (ANR) [ppm]	Smell	Moisture	
					Droplet Removal rate (%)	Water steam Atmospheric pressure dew point ($^{\circ}\text{C}$)
Air Filter	AF	5				
Main Line Filter	AFF	3 (Filtration efficiency: 99%)	Δ		Δ	
Mist Separator	AM	0.3 (Filtration efficiency: 99.9%)	1 [0.8]			
Micro Mist Separator	AMD AMH		0.1 [0.08]	\times		
Super Mist Separator	AME	0.01 (Filtration efficiency: 99.9%)	0.01 [0.008]			\times
Odor Removal Filter	AMF		0.004 [0.0032]	Deodorization of oil smell	\times	
Clean Gas Filter	SFA SFB SFC	0.01 (Filtration efficiency: 99.99%)				
Clean Air Filter	SFD					
Water Separator	AMG	—			99	
Air-cooled Aftercooler	HAA		\times	\times	Δ	Δ
Water-cooled Aftercooler	HAW					
Refrigerated Air Dryer	IDF/IDU	\times				-14 to -23
Heatless Air Dryer	ID					-30 to -70
Membrane Air Dryer	IDG				\times	-15 to -60

Red: Reducible \times : Not reducible Δ : Reducible as secondary effect.

Dew Point

When air is cooled under the constant pressure and water vapor becomes saturated into dew. The temperature at which the condensed water is formed is defined as the dew point.

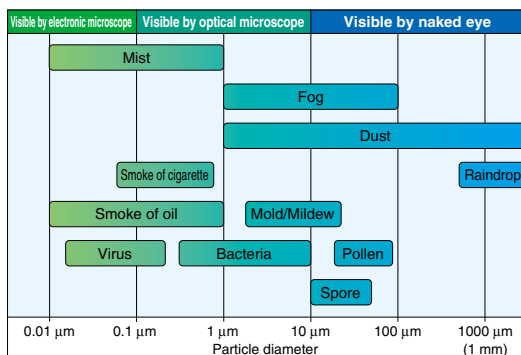
Atmospheric pressure dew point: The dew point under atmospheric pressure

<Ex.> Blow the compressed air into atmospheric:
Dew appears when cooled under the atmospheric pressure.

Pressure dew point: The dew point under applied pressure

<Ex.> Compressed air line:
Condensed into dew when cooled lower than the pressure dew point.

Particle Diameter (Reference)



ISO Compressed Air Quality Grade

The grade of compressed air purity with solid particles, water, and oil as defined by ISO 8573-1: 2010 (JIS B8392-1: 2012).

Class	Solid particle			Moisture Pressure dew point At air pressure of 0.7 MPa / $^{\circ}\text{C}$	Oil concentration mg/m^3
	Max. number of particles/1 m^3 Particle diameter d μm				
	0.1 < d \leq 0.5	0.5 < d \leq 1.0	1.0 < d \leq 5.0		
1	\leq 20000	\leq 400	\leq 10	1 \leq -70	2 \leq 0.1
2	\leq 400000	\leq 6000	\leq 100	2 \leq -40	3 \leq 1
3	Not specified	\leq 90000	\leq 1000	3 \leq -20	4 \leq 5
4	Not specified	Not specified	\leq 10000	4 \leq +3	
5	Not specified	Not specified	\leq 100000	5 \leq +7	
6				6 \leq +10	

Indication: The degree of quality is indicated with 1, 4 and 2 for systems with solid particle "class 1", moisture "class 4" and oil "class 2".

AF, AFF, AM, AMD, AMH, AME, AMF	6 P.215, 429
SFA, SFB, SFC	6 P.295
AMG	6 P.203
HAA, HAW	6 P.11
IDF/IDU	6 P.21
ID, IDG	6 P.134

Air Tank

Pulsation prevention
Accumulation
Cooling

Air Tank



AT

2nd class pressure vessel
(Japan)

6 P.18

Model	Size (L)	Port size for air inlet/outlet	Applicable compressor output (kW)	Weight (kg)	Operating conditions range		Proof pressure (MPa)	Safety valve set pressure (MPa)	Material	Painting color	Accessories	
					Max. operating pressure (MPa)	Max. fluid temperature (°C)						
AT	6C	100	Rc 1/2	5.5	55	0.97	0 to 100 Note 2)	1.46	0.97	Rolled steel plate	External surface: Mansel N5.5 (Gray) Internal surface: Not painted	Safety valve Pressure gauge Drain valve Anchor bolts
	11C	200	Rc 3/4	11	105							
	22C	400	Rc 1 1/2	22	170							
	37C	500		37	195							
	55C	700	50A (2B) flange	55	265							
	75C	1,000		75	385							
	125C	1,500	80A (3B) flange	125	495							
	150C	2,000	100A (4B) flange	150	775							
	220C	3,000		220	965							

Note 1) Use outside Japan is not allowed. The AT series air tank is in compliance with the regulations in Japan (Class 2 Pressure Vessel), but is not in compliance with related regulations outside Japan. (This is also applicable when the series is used as a unit.)

Note 2) The maximum operating temperature of the standard accessory pressure gauge is 50°C. If temperature of the air tank exceeds 50°C, provide a heat radiator (i.e. pipe siphon, etc.) between the tank and the pressure gauge.

Variant Model

Model	Stainless steel	Paint and color change	Painting method	Internal surface treatment	Port size change	Flange connection	With companion flange	With auto drain	Mounting hole location change	Horizontal type	Vacuum	International standards
AT	6C											
	11C											
	22C					○	○					
	37C											
	55C	○	○	○	○			●	○	▲	▲	—
	75C					●	●					
	125C											
	220C											

6 P.18

- : Standard (Including option) ○ : Made to Order (*1) ○ : Special order A (*2) ▲ : Special order B (*3) — : Not available
- *1) Special listed in the catalog.
- *2) Available by modifying the standard model.
- *3) This is technically possible, but contact SMC for dimensions, costs and delivery.

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Aftercoolers

Cooling

Aftercooler Air cooled



HAA

6 P.11

Aftercooler Water cooled



HAW

6 P.14

Model		Basic performance		Basic performance conditions		
		Outlet air temperature (°C)	Air flow rate L/min (ANR) [Applicable compressor output (kW)]		Inlet air temperature (°C)	Inlet air pressure (MPa)
			Screw compressor	Reciprocating compressor		
HAA	7	40	1,000 ^{Note)} [7.5]		70	0.7
	15		2,200 ^{Note)} [15]			
	22		3,300 ^{Note)} [22]			
	37		5,700 ^{Note)} [37]			
HAW	2	40	300 [2.2]		70	0.7
	7		1,000 [7.5]			
	22		3,300 [22]	2,100 [15]	Screw compressor 70 Reciprocating compressor 180	
	37		5,700 [37]	4,300 [22]		
	55		8,600 [55]	5,600 [37]		
	75		12,000 [75]	8,000 [55]		
	110		18,000 [110]	11,000 [75]		

Note) The applicable compressors are based on the discharge rate and discharge temperature (70°C) of screw type compressors.

Variant Model

Model	Power terminal connection	With auto drain	With pre-filter	With base	With companion flange (Screwed flange)	Paint and color change	Port size change
HAA	7	●	●	●	●	▲	—
	15						
	22						
	37						
HAW	2	—	●	—	—	▲	—
	7						
	22						
	37				●		
	55						
	75						
110	○						

● : Standard (Including option) ○ : Special order A (*1) ▲ : Special order B (*2) — : Not available

*1) Available by modifying the standard model.

*2) This is technically possible, but contact SMC for dimensions, costs and delivery.

	Ambient temperature (°C)	Cooling water inlet temperature (°C)	Operating conditions range			Port size for inlet/outlet	Drain size	Power supply (Air cooled)	Cooling water amount L/min (Water cooled)
			Inlet air temperature (°C)	Inlet air pressure (MPa)	Ambient temperature (°C)				
32	—	5 to 100	0.05 to 1.0 (With auto drain: 0.15 to 1.0)	2 to 50	Rp 3/4 Socket	Rc 3/8	Single phase 100 VAC (50/60 Hz) Single phase 200 VAC (50/60 Hz)	—	
					1B Union				Single phase 100 VAC (50/60 Hz) 3 phase 200 VAC (50/60 Hz)
					1 1/2 Union		3 phase 200 VAC (50/60 Hz)		
32	30	5 to 100	0.05 to 1.0 (With auto drain: 0.15 to 1.0)	2 to 50	Air side Rc 1/2 Cooling water side Rc 1/2	Rc 1/2	—	5	
					Air side Rc 3/4 Cooling water side Rc 1/2				
		5 to 200	0.05 to 0.97 (With auto drain: 0.15 to 0.97)		Air side Rc 1 1/2 Cooling water side Rc 3/4	Rc 3/4		17	
					Air side Rc 1 1/2 Cooling water side Rc 1			25	
					Air side Rc 2 Cooling water side Rc 1			36	
					Air side 80 (3B) flange Cooling water side Rc 1 1/4	Rc 1		40	
								45	

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Air Dryers (Refrigerated Type)

Cooling, Dehumidification

Refrigerated Air Dryer

Standard inlet air type
Max. inlet air temperature: 50°C



IDF

6 P.21



IDF100F

6 P.35

Refrigerated Air Dryer

High inlet air temperature type
Max. inlet air temperature: 80°C



IDU

6 P.21

Model	Applicable compressor output (kW)	Basic performance		Basic performance conditions					
		Dew point (°C)	Air flow rate (m³/min [ANR])		Inlet air temperature (°C)	Inlet air pressure (MPa)			
			50 Hz	60 Hz					
IDF	1E	0.75	Pressure dew point 10 (At 0.7 MPa)	0.1	0.12	35	0.7		
	2E	1.5		0.2	0.235				
	3E	2.2		0.32	0.37				
	4E	3.7		0.52	0.57				
	6E	5.5		0.75	0.82				
	8E	7.5		1.22	1.32				
	11E	11		1.65	1.82				
	15E1	15		2.8	3.1	40	0.7		
	22E	22		3.9	4.3				
	37E	37		5.7	6.1				
	55E	55		8.4	9.8				
	75E	75		11.0	12.4				
	100F	100		16.0	18.8				
	125F	125		20.1	23.7				
150F	150	25.0	30.0	35	0.7				
190D	190	32.0	38.0						
240D	240	43.0	50.0						
370D	370	54.0	65.0						
IDU	3E	2.2	Pressure dew point 10 (At 0.7 MPa)	0.32	0.37	55	0.7		
	4E	3.7		0.52	0.57				
	6E	5.5		0.75	0.82				
	8E	7.5		1.1	1.2				
	11E	11		1.5	1.7				
	15E1	15		2.6	2.8				Atmospheric pressure dew point -17
	22E	22		3.9	4.3				
	37E	37		5.7	6.1				
	55E	55		8.4	9.8				
75E	75	11.0	12.5						

	Operating condition range				Power supply voltage (V) (50/60 Hz)	Power consumption (W)		Port size	Refrigerant	Refrigerant condensation method			
	Ambient temperature (°C)	Inlet air temperature (°C)	Inlet air pressure (MPa)	Ambient temperature (°C)		50 Hz	60 Hz						
32	5 to 50	0.15 to 1.0	2 to 40	Single phase AC 100/100, 110 Single phase AC 200/200, 220		180	202	Rc 3/8	R134a (HFC)	Air cooled condenser			
						208	236	Rc 1/2					
						385	440	Rc 3/4					
						420	480	Rc 1					
				Single phase AC 200/ 200, 220		3 phase AC 200/ 200, 220	810	940	R 1		R 1 1/2		
									R 2				
				3 phase AC 200/200, 220		2 to 45	1,450	1,890	65 (2 1/2B) flange 80 (3B) flange 100 (4B) flange 150 (6B) flange		R 2	R407C (HFC)	
							2,000	2,500					
							2,900	3,500					
							4,000	4,700					
	4,000	4,800											
	4,900	5,900											
	6,300	7,600											
			2 to 40	11,600	11,600			Water cooled condenser					
			2 to 43										
32	5 to 80	0.15 to 1.0	2 to 40	Single phase AC 100/100, 110 Single phase AC 200/200, 220 Single phase AC 230/—		180	202	Rc 3/8	R134a (HFC)	Air cooled condenser			
						208	236	Rc 1/2					
						385	440	Rc 3/4					
						250	290						
						425	470						
							460	570	Rc 1				
				Single phase AC 230/ —		3 phase AC 200/ 200, 220	1,100	1,450	R 1		R407C (HFC)		
							1,100	1,450	R 1 1/2				
							1,570	2,050	R 2				
							2,200	2,850					

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Air Dryers (Refrigerated Type)

Variant Model

International Standards

CE/IDFA series

Single phase 230 VAC (50 Hz)
The IDFA series are available.

UL/IDFB series

Single phase 115 VAC (60 Hz) or
Single phase 230 VAC (60 Hz)
The IDFB series are available.

Heat Exchanger

Stainless steel (Plate type heat exchanger)

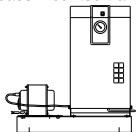
Anti-corrosion and compact stainless steel plate heat exchanger is adopted.



Electric

Optional voltage (Base mounted transformer)

Common base mounted transformer



Corresponding voltage
Single phase 110 to 480 VAC (50 Hz)
110 to 520 VAC (60 Hz)
3 phase 220 to 440 VAC (50, 60 Hz)

Optional voltage (Without transformer)

Electric parts of a refrigerator and a fan motor uses the corresponding voltage components without using a transformer.
Corresponding voltage
Single phase 115 VAC (60 Hz)
Single phase 220 to 240 VAC (50 Hz)

Optional voltage (Built-in transformer)

Installing a transformer inside a panel.
Corresponding voltage
3 phase 220, 240, 380, 400,
415, 440 VAC

Others

For medium pressure

Max. operating pressure: 1.6 MPa
Changing a heat exchanger and an auto drain to the medium pressure specifications.

Water cooled condenser

Possible to use under the environment at high ambient temperatures or closed locations without raising the ambient temperature.
(A cooling tower is required when the cooling water is circulated for using.)

Contents		Model	IDF								
			1E	2E	3E	4E	6E	8E	11E	15E1	22E
International standards	CE		▲								● (=4)
	UL		▲								● (=5)
Heat exchanger material	Stainless steel (Plate heat type exchanger)		▲				●				
	Stainless steel (Shell & tube type)										
Electric	Optional voltage (Without transformer)		▲				● (=6)				
	Optional voltage (Built-in transformer)										
	Optional voltage (Base mounted transformer)		▲								●
	With terminals for operation/irregular signal		○								
Auto drain	With heavy duty auto drain		○								
	With motor driven auto drain		○								
Environment	Anti-corrosive treatment copper tube										●
	Copper-free, Fluorine-free										—
Others	For medium pressure			○							●
	Water cooled condenser							▲			
	For compressed air cooling									●	
	Air clean unit				○						
	Air clean unit (With temperature control unit)		▲				○				

● : Standard (Including option) ○ : Made to Order (*1) ○ : Special order A (*2) ▲ : Special order B (*3) — : Not available / : Substitutable

Stainless steel (Shell & tube type)

Integrating a plate fin tube type heat exchanger (Material: Copper, Aluminum) in a stainless vessel.

Auto Drain

With heavy duty auto drain

Durable float type auto drain
Higher reliability with waste.



With motor driven auto drain

High reliability with waste and high viscosity material. Periodical discharge by opening/closing the valve.



With terminals for operation/irregular signal

Integrating the terminals which can read the following signals:
Operation signal
(During operation: Contact closed with no voltage.)
Irregular signal
(Irregular happens: Contact closed with no voltage.)

With electric leak breaker

Sensitivity current: 30 mA
Integrated or mounted on the side panel of a dryer. (Depending on the model)

Environment

Anti-corrosive treatment copper tube

Epoxy painting on the copper and copper alloy parts to resist corrosive gases (Hydrogen sulphide, sulfurous acid gas etc.) Except for electric parts.

For compressed air cooling

Using for cooling purpose because cooled and dehumidified air (approx.10°C) will not be processed without heating.
(Pay attention to the air consumption because it will be less consumed than a standard model. Use caution when selecting a model.)

Thermo-dryer

Stable supply of temperature and pressure controlled dry clean air



										IDU								
37E	55E	75E	100F	125F	150F	190D	240D	370D	3E	4E	6E	8E	11E	15E1	22E	37E	55E	75E
							▲						▲					
					▲							●					▲	
	●							▲									●	
	● (※4)							▲						▲				
							●											
●														●				
●														●				
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														●				
							▲							●				
					●									▲				
							▲											▲
	▲																	
	▲																	

*1) Special listed in the catalog. *2) Available by modifying the standard model.
 *3) This is technically possible, but contact SMC for dimensions, costs and delivery.
 *4) Supported by the IDFA series. *5) Supported by the IDFB series.
 *6) Select the IDFA series when power supply is single phase, 220 to 240 VAC (50 Hz).
 Select the IDFB series when power supply is single phase, 115, 230 VAC (60 Hz).

Air Dryer (Desiccant Type)

Dehumidification

Heatless Air Dryer



ID

6 P.134

Model	Basic performance		Basic performance conditions				
	Atmospheric pressure dew point (°C)	Air flow rate L/min (ANR)	Inlet air temperature (°C)	Inlet air pressure (MPa)	Ambient temperature (°C)		
							Outlet
ID	200	-30	80	20	35	0.7	32
	300		155	37			
	400		330	85			
	600		780	195			
	205		80	20			
	305		155	37			
	405		330	85			
	605		780	195			
	201		80	20			
	301		155	37			
	401		330	85			
	601		780	195			
	206		80	20			
	306		155	37			
	406		330	85			
606	780	195					

Variant Model

Lower dew point (Atm. pressure dew point: -50°C)

Changing desiccant, from standard silica aluminum oxide gel to synthetic zeolite.
 Outlet atmospheric pressure dew point: -50°C
 (Conditions: Inlet pressure: 0.7 MPa, Inlet air temperature: 20°C)

Lower dew point (Atm. pressure dew point: -70°C)

Changing desiccant to synthetic zeolite (small particle type) or active alumina, etc. to conform to the outlet air atmospheric temperature dew point -70°C.
 (Conditions: Inlet pressure: 0.7 MPa, Inlet air temperature: 20°C)

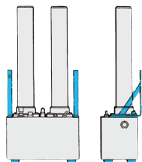
Model	ID			
Size	20□	30□	40□	60□
Lower dew point (Atm. pressure dew point: -50°C)			○	
Lower dew point (Atm. pressure dew point: -70°C)			○	
With bracket			○	
Copper-free, Fluorine-free			—	
International standards (CE/UL)			—	

○ : Made to Order (*1) ○ : Special order A (*2) — : Not available
 *1) Optional product listed in the catalog *2) Available by modifying the standard model.

Operating condition range			Power supply voltage (V)	Port size for air inlet/outlet Rc, G, NPT
Inlet air temperature (°C)	Inlet air pressure (MPa)	Ambient temperature (°C)		
5 to 50	0.3 to 1.0	2 to 50	Single phase 100/100, 110 VAC (50/60 Hz)	1/4
				1/2
				3/4
	0.3 to 0.9		Single phase 200/200, 220 VAC (50/60 Hz)	1/4
				1/2
				3/4
	0.3 to 1.0		Single phase 110 VAC (50 Hz)	1/4
				1/2
				3/4
	0.3 to 0.9		Single phase 220 VAC (50 Hz)	1/4
				1/2
				3/4

With bracket

Wall mounting brackets are available. (Standard type is floor sitting.)



Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Air Dryer (Membrane Type)

Meets a wide variety of flow rates (10 to 1000 L/min (ANR)) and dew points (Atmospheric pressure dew point: -15°C to -60°C).

Single Unit Type

Standard dew point: -20°C		Standard dew point: -15°C		Standard dew point: -40°C		Standard dew point: -60°C	
Series	Outlet air flow rate L/min (ANR)	Series	Outlet air flow rate L/min (ANR)	Series	Outlet air flow rate L/min (ANR)	Series	Outlet air flow rate L/min (ANR)
IDG1	10						
IDG3	25	IDG3H	25				
IDG5	50	IDG5H	50				
IDG10	100	IDG10H	100				
IDG20	200	IDG20H	200				
IDG30A	300	IDG30HA	300	IDG30LA	75		
IDG50A	500	IDG50HA	500	IDG50LA	110		
IDG60	600	IDG60H	600	IDG60LA	170	IDG60SA	50
IDG75	750	IDG75H	750	IDG75LA	240	IDG75SA	100
IDG100	1000	IDG100H	1000	IDG100LA	300	IDG100SA	150

Note) Standard dew point: Outlet air atmospheric pressure dew point under standard performance conditions
Outlet air flow rate : Values under standard performance conditions



Dew point indicator visually confirms air drying.

(Except IDG1)
(Semi-standard on IDG3, IDG5, IDG3H, IDG5H)

- ◎ Color of the dew point indicator
- Normal operating: Blue
- Initial state: White/Pink



Model with fitting for purge air discharge is also available.

When purge air discharge is undesirable in the area around the membrane air dryer, it can be discharged to atmosphere via tubing (Semi-standard).

Fitting for exhausting purge air for dew point indicator

Fitting for exhausting purge air for dehumidification



Reduced in purge air discharge noise with built-in silencer

(Except IDG1, IDG3, IDG3H, IDG5, IDG5H, IDG30A, IDG30HA, IDG30LA, IDG50A, IDG50HA, IDG50LA)

Unit Type

〈Type M〉 A mist separator, micro mist separator, or micro mist separator with pre-filter combined with a single unit

Standard dew point: -20°C		Standard dew point: -15°C		Standard dew point: -40°C		Standard dew point: -60°C	
Series	Outlet air flow rate L/min (ANR)	Series	Outlet air flow rate L/min (ANR)	Series	Outlet air flow rate L/min (ANR)	Series	Outlet air flow rate L/min (ANR)
IDG3M4	25	IDG3HM4	25				
IDG5M4	50	IDG5HM4	50				
IDG10M4	100	IDG10HM4	100				
IDG20M4	200	IDG20HM4	200				
IDG30AM4	300	IDG30HAM4	300	IDG30LAM4	75		
IDG50AM4	500	IDG50HAM4	500	IDG50LAM4	110		
IDG60M2	600	IDG60HM2	600	IDG60LAM4	170	IDG60SAM4	50
IDG75M2	750	IDG75HM2	750	IDG75LAM4	240	IDG75SAM4	100
IDG100M2	1000	IDG100HM2	1000	IDG100LAM4	300	IDG100SAM4	150

* Rated conditions are 0.7 MPa of inlet air pressure and 25°C of inlet air temperature.



〈Type V〉 A regulator combined with the type M

Standard dew point: -20°C		Standard dew point: -15°C		Standard dew point: -40°C		Standard dew point: -60°C	
Series	Outlet air flow rate L/min (ANR)	Series	Outlet air flow rate L/min (ANR)	Series	Outlet air flow rate L/min (ANR)	Series	Outlet air flow rate L/min (ANR)
IDG3V4	25	IDG3HV4	25				
IDG5V4	50	IDG5HV4	50				
IDG10V4	100	IDG10HV4	100				
IDG20V4	200	IDG20HV4	200				
IDG30AV4	300	IDG30HAV4	300	IDG30LAV4	75		
IDG50AV4	500	IDG50HAV4	500	IDG50LAV4	110		
IDG60V4	600	IDG60HV4	600	IDG60LAV4	170	IDG60SAV4	50
IDG75V4	750	IDG75HV4	750	IDG75LAV4	240	IDG75SAV4	100
IDG100V4	1000	IDG100HV4	1000	IDG100LAV4	300	IDG100SAV4	150

* Rated conditions are 0.7 MPa of inlet air pressure and 25°C of inlet air temperature.

Made to Order

Symbol	Contents
-X016	With element service indicator
-X017	With micro mist separator regulator
-X032	With differential pressure gauge



Air Preparation Filters

Water droplet separation

Water Separator

Dehumidification rate: 99%



AMG150C to 550C

AMG650, 850

6 P.203

Large dust particle filtration, Oil droplet separation

Main Line Filter

Nominal filtration rating: 3 μm

[Filtration efficiency:

99%]



AFF2C to 22C

AFF37B, 75B

6 P.215

Dust filtration, Oil mist separation

Mist Separator

Nominal filtration rating: 0.3 μm

[Filtration efficiency: 99.9%]

Oil mist density at outlet:

Max. 1.0 mg/m^3 (ANR)

[Approx. 0.8 ppm]



AM150C to 550C AM650, 850

6 P.223

Dust filtration, Oil mist separation

Micro Mist Separator

Nominal filtration rating: 0.01 μm

[Filtration efficiency: 99.9%]

Oil mist density at outlet:

Max. 0.1 mg/m^3 (ANR)

[Approx.
0.08 ppm]



AMD150C to 550C

AMD650, 850

6 P.231

Model	Rated flow L/min (ANR)	Port size	Note
AMG	150C	300	1/8, 1/4
	250C	750	1/4, 3/8
	350C	1,500	3/8, 1/2
	450C	2,200	1/2, 3/4
	550C	3,700	3/4, 1
	650	6,000	1, 1 1/2
850	12,000	1 1/2, 2	Piping support type
AFF	2C	300	1/8, 1/4
	4C	750	1/4, 3/8
	8C	1,500	3/8, 1/2
	11C	2,200	1/2, 3/4
	22C	3,700	3/4, 1
	37B	6,000	1, 1 1/2
	75B	12,000	1 1/2, 2
	75A	12,400	50 (2B) flange
	125A	23,700	80 (3B) flange
150A	30,000	100 (4B) flange	
220A	45,000		
AM	150C	300	1/8, 1/4
	250C	750	1/4, 3/8
	350C	1,500	3/8, 1/2
	450C	2,200	1/2, 3/4
	550C	3,700	3/4, 1
	650	6,000	1, 1 1/2
850	12,000	1 1/2, 2	Piping support type
AMD	150C	200	1/8, 1/4
	250C	500	1/4, 3/8
	350C	1,000	3/8, 1/2
	450C	2,000	1/2, 3/4
	550C	3,700	3/4, 1
	650	6,000	1, 1 1/2
	850	12,000	1 1/2, 2
	900	24,000	50 (2B), 80 (3B), 100 (4B) flange
	1000	40,000	100 (4B), 150 (6B) flange
			Free standing type

[Dust filtration, Oil mist separation]

Micro Mist Separator with Pre-filter

Built-in 0.3 μm pre-filter
 The AM + AMD element have been integrated to achieve a space-saving design.
 Nominal filtration rating: 0.01 μm
 [Filtration efficiency: 99.9%]
 Oil mist density at outlet:
 Max. 0.1 mg/m^3 (ANR)
 [Approx. 0.08 ppm]



AMH150C to 550C AMH650, 850

6 P.241

[Dust filtration, Oil mist separation]

Super Mist Separator

Color change indicates when element is saturated.
 Nominal filtration rating: 0.01 μm
 [Filtration efficiency: 99.9%]
 Oil mist density at outlet:
 Max. 0.01 mg/m^3 (ANR)
 [Approx. 0.008 ppm]
 Cleanliness at outlet:
 Not more than 35 particles of size 0.3 μm or larger/10 L (100 particles or less/ft³)



AME150C to 550C AME650, 850

6 P.249

[Deodorization]

Odor Removal Filter

Nominal filtration rating: 0.01 μm
 [Filtration efficiency: 99.9%]
 Oil mist density at outlet:
 Max. 0.004 mg/m^3 (ANR)
 [Approx. 0.0032 ppm]



AMF150C to 550C AMF650, 850

6 P.257

Model		Rated flow L/min (ANR)	Port size	Note
AMH	150C	200	1/8, 1/4	Piping support type
	250C	500	1/4, 3/8	
	350C	1,000	3/8, 1/2	
	450C	2,000	1/2, 3/4	
	550C	3,700	3/4, 1	
	650	6,000	1, 1 1/2	
	850	12,000	1 1/2, 2	
AME	150C	200	1/8, 1/4	Piping support type
	250C	500	1/4, 3/8	
	350C	1,000	3/8, 1/2	
	450C	2,000	1/2, 3/4	
	550C	3,700	3/4, 1	
	650	6,000	1, 1 1/2	
	850	12,000	1 1/2, 2	
AMF	150C	200	1/8, 1/4	Piping support type
	250C	500	1/4, 3/8	
	350C	1,000	3/8, 1/2	
	450C	2,000	1/2, 3/4	
	550C	3,700	3/4, 1	
	650	6,000	1, 1 1/2	
	850	12,000	1 1/2, 2	

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination Equipment

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Air Preparation Equipment Filters

Variant Model

Drain Port

With drain cock/M5



Manual discharge of accumulated drain inside the housing

With drain guide/1/4 female thread



Pipe threaded connection for the drain exhaust port
1/4 female thread

With N.O. auto drain/ø10 One-touch fitting



Auto-discharge of accumulated drain inside the housing
(Normally open: Drain port is open when pressure is not applied.)

With N.C. auto drain/ø10 One-touch fitting



Auto-discharge of accumulated drain inside the housing
(Normally closed: Drain port is closed when pressure is not applied.)

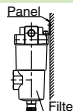
With N.O. auto drain for medium pressure (1.4 MPa)/1/4 female thread



Auto-discharge of accumulated drain inside the housing
(Normally open: Drain port is open when pressure is not applied.)

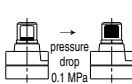
Other Equipment Accessories

With bracket



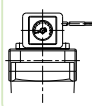
Mounting a filter on the panel, etc.

With element checker



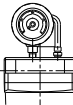
Clogging of the element can be observed visually.

With differential pressure switch (with indicator)



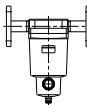
Clogging of the element can be observed visually or with an electrical signal.

With differential pressure gauge



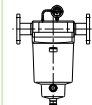
Clogging of the element can be observed visually.

With IN/OUT flange



Flange connection is possible with the pneumatic piping.

With differential pressure gauge /IN/OUT flange



Flange connection is possible with the pneumatic piping.
Clogging of the element can be observed visually.

Model		AMG						AFF							AM								
Model		150C	250C	350C	450C	550C	650	850	2C	4C	8C	11C	22C	37B	75B	75A to 220A	150C	250C	350C	450C	550C	650	850
Drain port	With drain cock/M5			●				—			●			—	—				●				—
	With drain guide/1/4 female thread			●				—			●								●				—
	With N.O. auto drain/ø10 One-touch fitting			●				—			●				—				●				—
	With N.C. auto drain/ø10 One-touch fitting		●					—			●				—				●				—
	With N.O. auto drain/1/4 female thread				●						○				—				○				—
Other equipment accessories	With bracket			●							●				—				●				
	With element checker			—							●				—				●				
	With differential pressure switch (with indicator)			—							○				—				○				
	With differential pressure gauge			—							◎				—				◎				
	With IN/OUT flange		○				◎			○		◎			●			○			◎		
With differential pressure gauge /IN/OUT flange			—						○		◎			○			○			◎			
Environment	With white Vaseline			◎							◎				—				◎				
	Clean series			○							○				—				○				
	Copper-free, Fluorine-free			○							○				—				○				
	Grease-free			○							○				—				○				
Material	Rubber material/FKM		●					○			●				○			●				○	
	Stainless vessel			—							—				○			—					
	IN/OUT flow reversible			◎							◎				○			◎					
	Nominal filtration rating change			—							—				◎			—					
Medium pressure (1.4 MPa)			◎				—			◎				—			◎					—	

● : Standard (Including option) ◎ : Made to Order ○ : Special order (*1) — : Not available

*1) For detailed specifications, please contact SMC.

Environment

With white Vaseline

The lubrication grease for O-ring and gasket is changed to white vaseline.

Clean series

Possible to use in clean room.
(High-purity air blow is performed under clean environment and packed by double package with an antistatic prevention material.)

Copper-free, Fluorine-free

No copper & no fluorine materials are included.
Nickel plated on copper materials.

Silicon-free

Silicon is not included in materials.

Others

Rubber material/FKM

Using FKM for O-rings and gaskets, etc.

IN/OUT flow reversible

Flow direction: Right to left
(Flow direction of the standard: Left to right)

Nominal filtration rating change

A large flow filter with the elements for AFF75A to 220A changed to the same filtration rating (0.3 μm) as the AM series mist separator.

	AMD								AMH								AME								AMF							
	150C	250C	350C	450C	550C	650	850	900,1000	150C	250C	350C	450C	550C	650	850	150C	250C	350C	450C	550C	650	850	150C	250C	350C	450C	550C	650	850			
			●				○	—				●			○				—													
			●					○				●			○				—													
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Clean Gas Filters

[Disc type]

- Short IN/OUT distance
- Easy element replacement



Cartridge type
SFA

6 P.295

[Straight type]

- Compact
- Easy element replacement
- For small flow rate filtration



Cartridge type
SFB

6 P.295



Disposal type
SFB

6 P.295

[Multistage disc type]

- Large flow rate can be filtrated.



Disposal type
SFC

6 P.295

Model	Air flow rate L/min (ANR)	Filtration (μm)	Element surface (cm^2)	Connection	Element replacement	Inlet air temperature ($^{\circ}\text{C}$)
SFA	100	26	14	Rc 1/4	Possible	5 to 80
	101			NPT 1/4		
	102			TSJ 1/4		
	103			UOJ 1/4		
	200			Rc 1/4		
	201	70	33	NPT 1/4		
	202	TSJ 1/4				
	203	UOJ 1/4				
	300	140	57	Rc 1/4		
	301	NPT 1/4				
302	TSJ 1/4					
303	UOJ 1/4					
SFB	100	45	0.01 (Filtration efficiency 99.99%)	Rc 1/4	Possible	5 to 80
	101			NPT 1/4		
	102			TSJ 1/4		
	103			UOJ 1/4		
	104			M5		
	200	400	10	Rc 1/4		
	201	Nominal 120 (Sintered metallic element)	NPT 1/4			
	202	TSJ 1/4				
	203	UOJ 1/4				
	300	45	0.01 (Filtration efficiency 99.99%)	Rc 1/4		
302	TSJ 1/4					
305	URJ 1/4					
315						
SFC	100	240	0.01 (Filtration efficiency 99.99%)	300	Not Possible	5 to 120
	102			Rc 1/4, 3/8		
	105			TSJ 1/4, 3/8 URJ 1/4, 3/8		

Connection symbol

Symbol	Meaning	Description
TSJ	Tube Swage Joint	<p>A type of the self-align fittings Popular in semi-conductor industry</p> <p>Outside diameter 1/4" = $\phi 6.35$ mm Outside diameter 3/8" = $\phi 9.53$ mm</p>
UOJ	Union O-ring Joint	<p>A type of the O-ring seals Popular in semi-conductor industry</p> <p>Outside diameter 1/4" = $\phi 6.35$ mm</p>
URJ	Union Ring Joint	<p>A type of the metal seal fittings Popular in semi-conductor industry</p> <p>Outside diameter 1/4" = $\phi 6.35$ mm Outside diameter 3/8" = $\phi 9.53$ mm</p>

Ambient temperature (°C)	Other Specifications
5 to 80	<ul style="list-style-type: none"> Operating fluid: Air, Nitrogen Maximum operating pressure: 0.99 MPa
5 to 80	<ul style="list-style-type: none"> Material / Housing: Stainless steel 316 (Electrolytic polishing) Filter medium: PTFE Seal material: Fluororubber (FKM) (PTFE: SFC only) Packaging: Antistatic double packaging
5 to 120	
5 to 120	

Variant Model

Aluminum body

- Light weight and inexpensive.
- For small flow rate filtration.
- White anodized aluminum treatment.

Filtration grade change

- Filtration grade is selectable with stainless steel element between 2 to 120 μm because of adopting a sintered metal stainless steel element.

6 P.295

6 P.295

6 P.295

Model	Variant model	
	Aluminum body	Filtration grade change
SFA	100	
	101	
	102	
	103	
	200	
	201	—
	202	—
	203	
	300	
	301	
SFB	302	
	303	
	100	⊙
	101	○
	102	
	103	—
	104	
	200	○
	201	
	202	—
SFC	203	
	300	
	302	
	305	
	315	
	100	
SFA	102	
	105	
	105	

⊙: Made to Order (*1) ○: Special order A (*2)

—: Not available

*1) Special listed in the catalog

*2) Available by modifying the standard model.

Integrated production in a clean environment 6 P.296

Under a clean environment, all components are washed by ultrasonic wave/ultra-pure deionized water. Assembly inspection and antistatic double packaging processes are conducted in an integrated production system.

- Assembly environment**
- Clean room Class M5.5 (ISO Class 7)*
 - Clean bench Class M3.5 (ISO Class 5)*

*Fed.Std.209E (): based on ISO14644-1

Upper concentration for cleanliness class (Particles/m³)

Particle diameter (mm)	Cleanliness level	
	Class 5	Class 7
0.1	10 ⁵	—
0.2	23,700	—
0.3	10,200	—
0.5	3,520	352,000
5	29	2,930
Particle diameter range for cleanliness class	0.1 to 5	0.5 to 5
Relation to the Fed. Std. 209E	Class 100	Class 10,000

* Number in a () is the reference value for evaluating the cleanliness class.

* Fed.Std.=FEDERAL STANDARD

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Clean Air Filters

- Nominal filtration rating: **0.01** μm (filtration efficiency 99.99%)
- Initial pressure drop: **0.03** MPa (at inlet pressure 0.7 MPa, maximum flow)
- Maximum operating pressure: **1.0** MPa (at 20°C)

6 P.317



Type	Disposable type (non-replaceable element)			Cartridge type (replaceable element)			
Flow rate L/min (AWR) (at inlet pressure 0.7 MPa)	Up to 60	Up to 80	Up to 100	Up to 300	Up to 400	Up to 500	Up to 100
Port size	One-touch fitting ^{Note 1)}	ø4	ø6	ø8	ø8	ø10	ø12
	Female thread	—	—	Rc 1/4, G 1/4 NPT 1/4	—	—	Rc 1/4, G 1/4 NPT 1/4
Case material	Resin			Resin		Aluminum	Stainless steel
Fluid	Air (Nitrogen)						
Nominal filtration rating	0.01 μm (filtration efficiency: 99.99%) ^{Note 2)}						
Initial pressure drop	0.03 MPa (at inlet pressure 0.7 MPa, maximum flow)						
Operating pressure (at 20°C)	~100 kPa to 1.0 MPa (in case of nitrogen: 0.99 MPa)						
Operating temperature	5 to 45°C						

Note 1) When using One-touch fittings, handle them in accordance with instructions of Clean One-touch Fittings (KP Series).
 Note 2) The clean air filter is designed for the filtration of solid objects. It is not suitable for the separation of water and oil.

Integrated production in a clean environment

Under a clean environment, all components are washed by ultrasonic wave/ultra-pure deionized water. Assembly inspection and antistatic double packaging processes are conducted in an integrated production system.

Upper concentration for cleanliness class (Particles/m³)

Particle diameter (mm)	Cleanliness level	
	Class 5	Class 7
0.1	10 ⁵	—
0.2	23,700	—
0.3	10,200	—
0.5	3,520	352,000
5	29	2,930
Particle diameter range for cleanliness class	0.1 to 5	0.5 to 5
Relation to the Fed. Std. 209E	Class 100	Class 10,000

Assembly environment

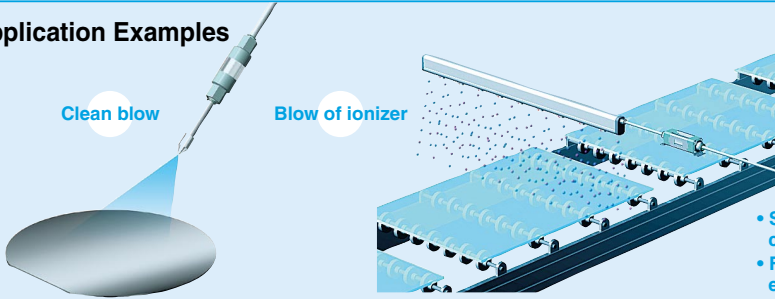
- Clean room
Class M5.5 (ISO Class 7)*
- Clean bench
Class M3.5 (ISO Class 5)*

*Fed.Std.209E () : based on ISO14644-1

6 P.319

- Number in a () is the reference value for evaluating the cleanliness class.
- Fed.Std.=FEDERAL STANDARD

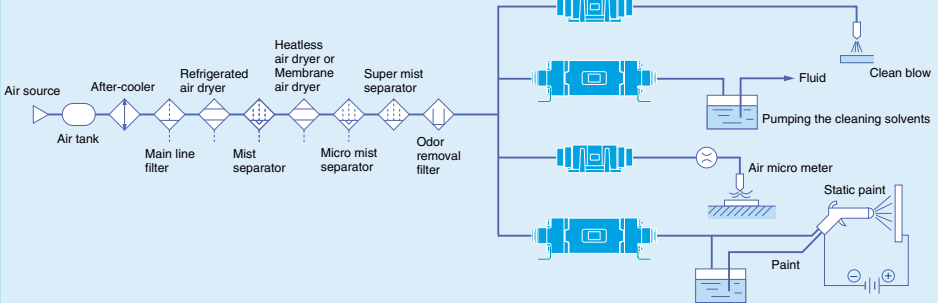
Application Examples



* When blowing, take care not to entrain ambient air which could contaminate the workpieces.

- Substitution of chamber
- Fluid pumping, etc.

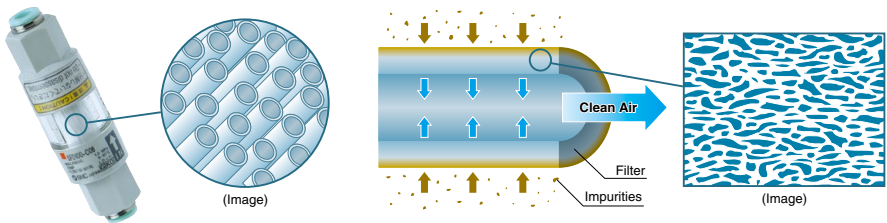
Circuit Examples



* The equipment mounted to the outlet side of SFD should be cleaned by flushing and have the same level of cleanliness as SFD.

Hollow fiber membrane

The hollow fiber membrane has a porous construction with numerous fine holes on a straw type fiber membrane wall. The hollow fiber membrane filter traps and filtrates the impurities from the compressed air through the overlapping layered fine holes.



Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination Equipment

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Heavy Duty Auto Drain

Model		Max. drain discharge	Operation	Valve type	Max. operating pressure (MPa)	Proof pressure (MPa)	Operating pressure range (MPa)	Ambient and fluid temperature (°C)	Fluid
ADH	4000	400 cc/min. (In case of water at 0.7 MPa pressure)	Float type	N.O. (Drain port is open when pressure is not applied)	1.6	2.5	0.05 to 1.6	5 to 60	Compressed air



ADH

- Reliable to heavy duty operation
- Large drain discharge capacity
- Easy manual flush button: Manual discharge & flushing
- Common exhaust is possible at the drain outlet.

6 P.380

Variant Model

Model		With ball valve	With bracket
ADH	4000	●	●

● : Standard (Option)



With ball valve

With bracket

Differential Pressure Gauge

Model		Method	Max. operating pressure (MPa)	Proof pressure (MPa)	Scale range (MPa)	Accuracy (MPa)	Ambient and fluid temperature (°C)	Fluid
GD	40	Bourdon tube	1	1.5	0.0 to 0.2	±0.006	5 to 60	Compressed air



GD

6 P.383

Variant Model

Pressure unit indication change

Possible to change the standard MPa unit to psi, bar unit or the parallel notation. (Outside Japan sales only)

With white Vaseline

The lubrication grease for O-ring is changed to white vaseline.

Model		Pressure unit indication change	With white Vaseline
GD	40	○	○

○ : Special order (For detailed specifications, please contact SMC.)

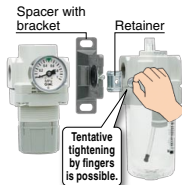
Air Combination

F.R.L. Units AC Series



Mounting

Step ①



- Mount the product by lining up the mating surface of the new spacer with bracket.
- Insert the retainer into the spacer bolt and tighten the nut. (temporary assembling)

Step ②



- Tighten the nut with the hexagon wrench.

Interchangeable with current model

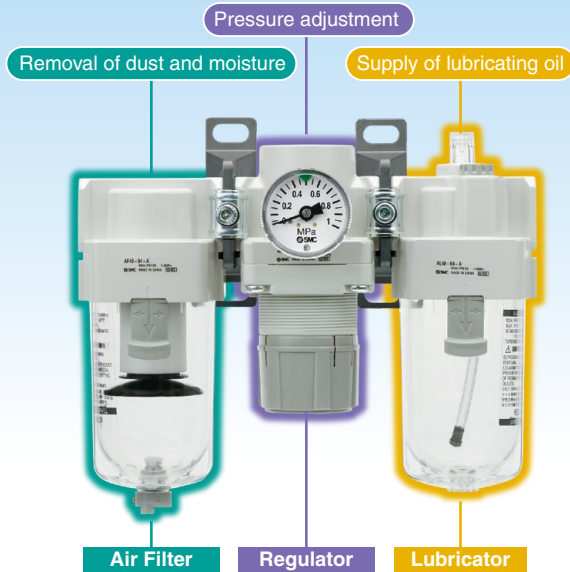
- New spacer can be connected to current AF, AR, AL, AW series.
- Current spacer cannot be used for new AR□A, AW□A series.

INDEX

Selection	P.98	Option/Semi-standard/Made to Order	P.106
Variation of Combination	P.100	F.R.L. Basic Explanation	P.108
Basic Specifications for Other F.R.L. Units	P.104		

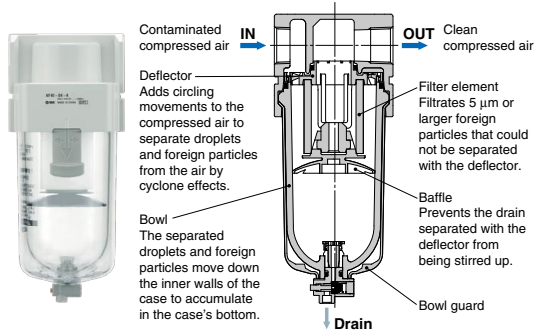


In general, moisture, oil content and solid foreign matter contained in compressed air from compressors used in general industrial machinery are removed using air preparation equipment before the air reaches an operating line. The compressed air experiences a temperature drop on the way to the operating line and oversaturated moisture due to condensation or rust inside the piping may mix into the compressed air, possibly causing problems to pneumatic equipment. In addition, proper pressure levels must be set at the operating line according to the type of equipment. In most applications, the Air Combination is installed in the operating line and used for the purpose of preventing the above-mentioned problems and setting required pressures. The Air Combination basically consists of an air filter, a regulator and a lubricator and has the following functions.



Air Filter

The air filter is installed at the inlet to prevent moisture and dust contained in compressed air from entering the pneumatic control circuit.



A 5 μm element has been employed as a standard for the air filter's nominal filtration rating and this nominal filtration rating is compatible with most general-purpose pneumatic equipment. If a filtration rating other than 5 μm are required, select an air filter that uses an element with a different filtration rating. If the Air Combination is used in, for example, precision instruments and even finer foreign particles need to be removed, select a mist separator (0.3 μm) or a micromist separator (0.01 μm).

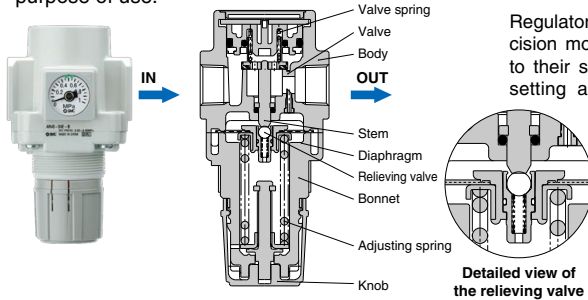
Refer to the "Air Preparation Equipment" catalog no. NCAT.E30-1.

Directional Control Valves

Actuators

Regulator

In pneumatic control equipment, a regulator or other pressure control valves are used since the pressure of air from an air compressor need to be reduced to a specific level according to the purpose of use.



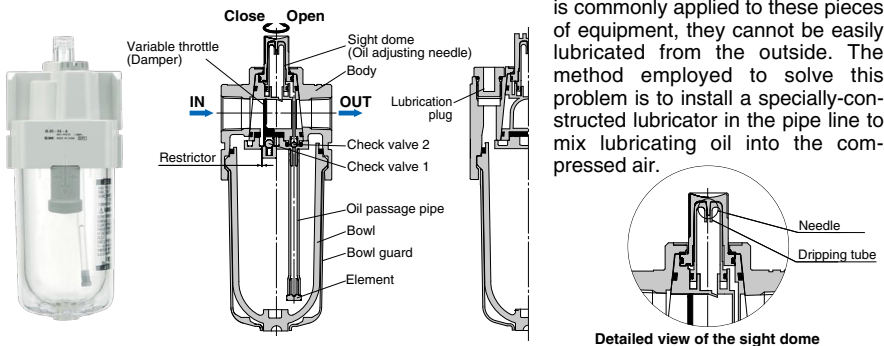
Regulators come in general-purpose and precision models are selectively used according to their setting accuracy. In most cases, the setting accuracy levels of general-purpose and precision regulators are approximately ± 0.05 MPa and ± 0.01 MPa, respectively. In general industrial machinery, general-purpose regulators are commonly used, while precision regulators are used only when high pressure accuracy levels are required.

Air Preparation Equipment

Air Combination

Lubricator

Portions of pneumatic equipment in need of lubrication include control valve spools and the sliding surfaces of, for example, cylinder pistons and pneumatic motor vanes. Since compressed air is commonly applied to these pieces of equipment, they cannot be easily lubricated from the outside. The method employed to solve this problem is to install a specially-constructed lubricator in the pipe line to mix lubricating oil into the compressed air.



Detailed view of the sight dome

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Air Combination Basic Specifications

Air Filter



Regulator



Lubricator

[Application]

Applicable to remove solid foreign objects sized 5 μm or more and oversaturated water contained in the compressed air, prevent malfunction of actuators and solenoid valves, control (regulate) the outlet pressure, suppress fluctuations of the outlet pressure affected by fluctuations of the inlet pressure, and apply oil to pneumatic equipments at the outlet side.



AC20



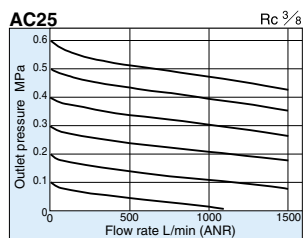
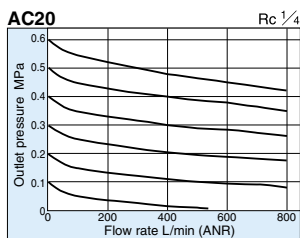
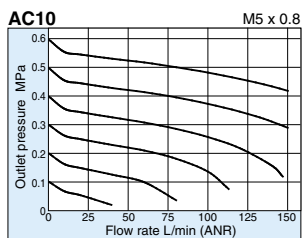
AC40

Standard Specifications

Model	AC10	AC20	AC25	AC30	AC40	AC40-06	AC50	AC55	AC60	
Component	Air Filter	AF10	AF20	AF30	AF30	AF40	AF40-06	AF50	AF60	AF60
	Regulator	AR10	AR20	AR25	AR30	AR40	AR40-06	AR50	AR50	AR60
	Lubricator	AL10	AL20	AL30	AL30	AL40	AL40-06	AL50	AL60	AL60
Port size	M5	1/8, 1/4	1/4, 3/8	1/4, 3/8	1/4, 3/8, 1/2	3/4	3/4, 1	1	1	
Fluid	Air									
Proof pressure (MPa)	1.5									
Max. operating pressure (MPa)	1.0									
Set pressure range (MPa)	0.05 to 0.7								0.05 to 0.85	
Ambient and fluid temperature (°C)	-5 to 60 (No freezing)									
Nominal filtration rating (μm)	5									
Bowl material	Polycarbonate									
Bowl guard	—	Semi-standard	Standard							
Regulator construction	Relieving type									
Weight (kg)	0.27	0.46	0.91	1	1.74	1.95	4.17	4.25	4.34	

Flow Rate Characteristics (Representative value)

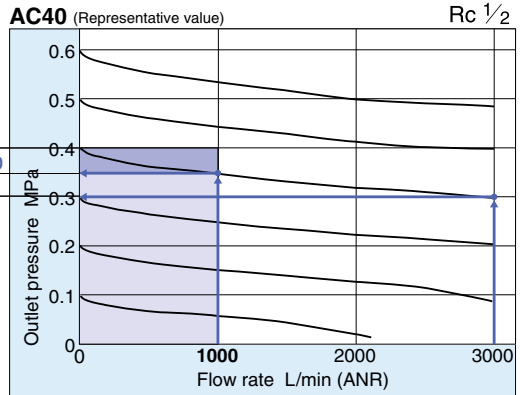
Condition: Inlet pressure 0.7 MPa



Selecting a body size applicable to service conditions according to the flow rate and flow rate characteristics

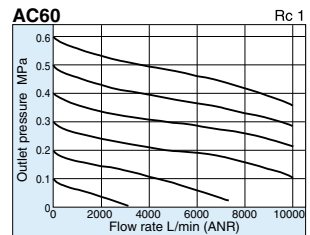
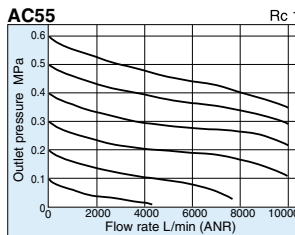
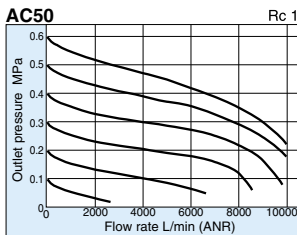
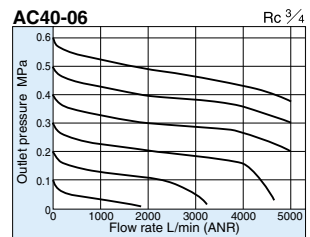
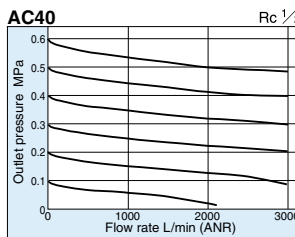
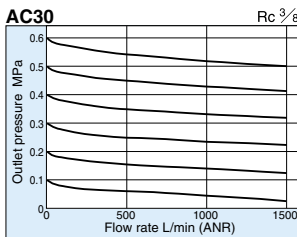
(Example) Selecting the AC40

The flow rate characteristics are presented by characteristic charts indicating the variation of set pressure (amount of pressure drop) corresponding to the consumption air flow at the outlet side. When the outlet pressure is set to 0.4 MPa and the air flow of 1000 L/min (ANR) is supplied, the set pressure drops to 0.35 MPa. If the required pressure range of a device is between 0.3 and 0.4 MPa and the set pressure of AC40 is set to 0.4 MPa, the corresponding air flow rate to the outlet pressure of 0.3 MPa is indicated to be 3000 L/min (ANR) in the chart, therefore the air flow is allowed to be provided up to this flow rate. If the air flow rate is required more than this, select a larger size.



Flow Rate Characteristics (Representative value)

Condition: Inlet pressure 0.7 MPa



Variation of Combination

Foreign matter and moisture removal + Pressure control + Lubrication

(Nominal filtration rating: 5 μm) (0.05 to 0.85 MPa)



Air Filter + Regulator + Lubricator

Filter Regulator + Lubricator

Foreign matter and moisture removal + Pressure control

(Nominal filtration rating: 5 μm) (0.05 to 0.85 MPa)



Air Filter + Regulator

Foreign matter and moisture removal + Oil mist removal + Pressure control


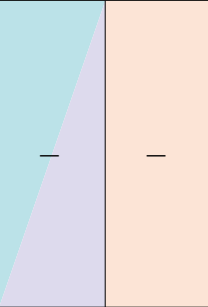
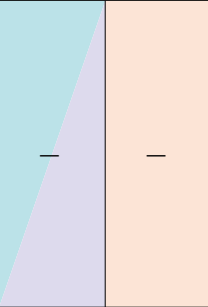




(Nominal filtration rating: 5 μm) (Nominal filtration rating: 0.3 μm) (0.05 to 0.85 MPa)



Air Filter + Mist Separator + Regulator

Filter Regulator + Mist Separator

AC-A 6 P.395	AF-A 6 P.429	AR-A 6 P.449	AL-A 6 P.459	AW-A 6 P.467	AFM-A 6 P.440
AC-B 6 P.481	AF-A 6 P.523	AR-B 6 P.543	AL-A 6 P.559	AW-B 6 P.567	AFM-A 6 P.534

Appearance	Model	Port size	Component				
			Air Filter AF	Regulator AR	Lubricator AL	Filter Regulator AW	Mist Separator AFM
AF + AR + AL 	AC10	M5 x 0.8	AF10	AR10	AL10		
	AC20	1/8, 1/4	AF20	AR20	AL20		
	AC25	1/4, 3/8	AF30	AR25	AL30		
	AC30	1/4, 3/8	AF30	AR30	AL30		
	AC40	1/4, 3/8, 1/2	AF40	AR40	AL40		
	AC40-06	3/4	AF40-06	AR40-06	AL40-06		
	AC50	3/4, 1	AF50	AR50	AL50		
	AC55	1	AF60	AR50	AL60		
AC60	1	AF60	AR60	AL60			
AW + AL 	AC10A	M5 x 0.8	—	—	AL10	AW10	—
	AC20A	1/8, 1/4			AL20	AW20	
	AC30A	1/4, 3/8			AL30	AW30	
	AC40A	1/4, 3/8, 1/2			AL40	AW40	
	AC40A-06	3/4			AL40-06	AW40-06	
	AC50A	3/4, 1			AL50	AW60	
	AC60A	1			AL60	AW60	
	AF + AR 	AC10B			M5 x 0.8	AF10	
AC20B		1/8, 1/4	AF20	AR20			
AC25B		1/4, 3/8	AF30	AR25			
AC30B		1/4, 3/8	AF30	AR30			
AC40B		1/4, 3/8, 1/2	AF40	AR40			
AC40B-06		3/4	AF40-06	AR40-06			
AC50B		3/4, 1	AF50	AR50			
AC55B		1	AF60	AR50			
AC60B	1	AF60	AR60				
AF + AFM + AR 	AC20C	1/8, 1/4	AF20	AR20	—	—	AFM20
	AC25C	1/4, 3/8	AF30	AR25			AFM30
	AC30C	1/4, 3/8	AF30	AR30			AFM30
	AC40C	1/4, 3/8, 1/2	AF40	AR40			AFM40
	AC40C-06	3/4	AF40-06	AR40-06			AFM40-06
	AW + AFM 	AC20D	1/4, 3/8	—			—
AC30D		1/4, 3/8	AW30		AFM30		
AC40D		1/4, 3/8, 1/2	AW40		AFM40		
AC40D-06		3/4	AW40-06		AFM40-06		

Directional
Control Valves

Actuators

Air Preparation
Equipment





Air Combination

Pressure Control
Equipment

Pressure Detection
Equipment

Flow Rate Detection
Equipment

Variation of Combination

Product classification					Specifications and			
Appearance	Function	Application	Connection	Model	Set pressure range MPa	Max. flow rate *1 L/min (ANR)	Pressure characteristics (Air supply pressure characteristics) %	
AF + AR + AL ① Air Filter + ② Regulator + ③ Lubricator 	Foreign matter and moisture removal + Pressure control + Lubrication	General industrial equipment air tool (lubrication equipment)	Modular connection	AC10	0.05 to 0.7	180	17	
				AC10A				
				AC20	0.05 to 0.85	1,900	2	
				AC20A		1,700		
				AC25	0.05 to 0.85	2,400	2	
				AC30		3,500		
				AC30A	0.05 to 0.85	2,300	2	
				AC40		5,800		
				AC40A	0.05 to 0.85	4,600	2	
				AC40-06		5,800		
				AC40A-06	0.05 to 0.85	4,600	2	
				AC50		10,000		
				AC50A	0.05 to 0.85	13,000	2	
				AC55		14,000		
AC60	0.05 to 0.85		2					
AC60A								
AF + AR ① Air Filter + ② Regulator 	Foreign matter and moisture removal + Pressure control	General industrial equipment (non-lube equipment)	Modular connection	AC10B	0.05 to 0.7	180	17	
				AC20B				
				AC25B	0.05 to 0.85	1,900	2	
				AC30B		2,400		
				AC40B	0.05 to 0.85	3,500	2	
				AC40B-06		5,800		
				AC50B	0.05 to 0.85	5,800	2	
				AC55B		10,000		
				AC60B	0.05 to 0.85	13,000	2	
						14,000		
AF + AFM + AR ① Air Filter + ② Mist Separator + ③ Regulator  AW + AFM ① Filter Regulator + ② Mist Separator 	Foreign matter and moisture removal + Oil mist removal + Pressure control	Instrumentation and control air (non-lube air)	Modular connection	AC20C	0.05 to 0.85	200*2	2	
				AC20D				
				AC25C	0.05 to 0.85	450*2	2	
				AC30C		450*2		
				AC30D	0.05 to 0.85		2	
				AC40C				
				AC40D	0.05 to 0.85	1,100*2	2	
				AC40-06				
				AC40D-06	0.05 to 0.85	1,100*2	2	

*1: Indicates the maximum flow rate at inlet pressure 0.7 MPa or the maximum flow rate at inlet pressure 0.7 MPa and set pressure 0.5 MPa.
 *2: Indicates the rated flow of inlet pressure 0.7 MPa.

AC-A 6 P.395	AF-A 6 P.429	AR-A 6 P.449	AL-A 6 P.459	AW-A 6 P.467	AFM-A 6 P.440
AC-B 6 P.481	AF-A 6 P.523	AR-B 6 P.543	AL-A 6 P.559	AW-B 6 P.567	AFM-A 6 P.534

* Select with particular attention to the maximum flow rate and the port size.

Characteristics		Piping	Product combination				
Nominal filtration rating μm	Oil mist concentration mg/m^3 (ANR)	Port size	Air Filter AF	Regulator AR	Lubricator AL	Filter Regulator AW	Mist Separator AFM
5	—	M5	① AF10	② AR10	③ AL10	—	—
			—	—	② AL10	① AW10	—
5	—	1/8, 1/4	① AF20	② AR20	③ AL20	—	—
			—	—	② AL20	① AW20	—
5	—	1/4, 3/8	① AF30	② AR25	③ AL30	—	—
5	—	1/4, 3/8	① AF30	② AR30	③ AL30	—	—
			—	—	② AL30	① AW30	—
5	—	1/4, 3/8, 1/2	① AF40	② AR40	③ AL40	—	—
			—	—	② AL40	① AW40	—
5	—	3/4	① AF40-06	② AR40-06	③ AL40-06	—	—
			—	—	② AL40-06	① AW40-06	—
5	—	3/4, 1	① AF50	② AR50	③ AL50	—	—
			—	—	② AL50	① AW60	—
5	—	1	① AF60	② AR50	③ AL60	—	—
5	—	1	① AF60	② AR60	③ AL60	—	—
			—	—	② AL60	① AW60	—
5	—	M5	① AF10	② AR10	—	—	—
5	—	1/8, 1/4	① AF20	② AR20	—	—	—
5	—	1/4, 3/8	① AF30	② AR25	—	—	—
5	—	1/4, 3/8	① AF30	② AR30	—	—	—
5	—	1/4, 3/8, 1/2	① AF40	② AR40	—	—	—
5	—	3/4	① AF40-06	② AR40-06	—	—	—
5	—	3/4, 1	① AF50	② AR50	—	—	—
5	—	1	① AF60	② AR50	—	—	—
5	—	1	① AF60	② AR60	—	—	—
0.3	1	1/8, 1/4	① AF20	③ AR20	—	—	② AFM20
			—	—	—	① AW20	② AFM20
0.3	1	1/4, 3/8	① AF30	④ AR25	—	—	② AFM30
			① AF30	③ AR30	—	—	② AFM30
0.3	1	1/4, 3/8	—	—	—	① AW30	② AFM30
			① AF40	③ AR40	—	—	② AFM40
0.3	1	1/4, 3/8, 1/2	—	—	—	① AW40	② AFM40
			① AF40-06	③ AR40-06	—	—	② AFM40-06
0.3	1	3/4	—	—	—	① AW40-06	② AFM40-06

(Note) Numerical value 1 to 3 of the product combination shows the order of arrangement of the equipment from the upstream.

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Basic Specifications for Other F.R.L. Units

Filter Regulator



Lubricator

Application: Applicable to remove solid foreign objects seized 5 μm or more and oversaturated water contained in the compressed air, prevent malfunction of actuators and solenoid valves, control (regulate) the outlet pressure, suppress fluctuations of the outlet pressure affected by fluctuations of the inlet pressure, and apply a lubricant to pneumatic equipments at the outlet side.



Standard Specifications

Model	AC10A	AC20A	AC30A	AC40A	AC40A-06	AC50A	AC60A
Component	Filter Regulator	AW10	AW20	AW30	AW40	AW40-06	AW60
	Lubricator	AL10	AL20	AL30	AL40	AL40-06	AL50
Port size	M5	1/8,1/4	1/4,3/8	1/4, 3/8, 1/2	3/4	3/4,1	1
Fluid	Air						
Proof pressure (MPa)	1.5						
Max. operating pressure (MPa)	1.0						
Set pressure range (MPa)	0.05 to 0.7		0.05 to 0.85				
Ambient and fluid temperature (°C)	-5 to 60 (No freezing)						
Nominal filtration rating (μm)	5						
Bowl material	Polycarbonate						
Bowl guard	—	Semi-standard	Standard				
Regulator construction	Relieving type						
Weight (kg)	0.20	0.38	0.75	1.41	1.46	3.33	3.40

Air Filter



Regulator

Application: Applicable to remove solid foreign objects seized 5 μm or more and oversaturated water contained in the compressed air, prevent malfunction of actuators and solenoid valves, control (regulate) the outlet pressure, and suppress fluctuations of the outlet pressure affected by fluctuations of the inlet pressure.



Standard Specifications

Model	AC10B	AC20B	AC25B	AC30B	AC40B	AC40B-06	AC50B	AC55B	AC60B
Component	Filter Regulator	AF10	AF20	AF30	AF30	AF40	AF40-06	AF50	AF60
	Regulator	AR10	AR20	AR25	AR30	AR40	AR40-06	AR50	AR60
Port size	M5	1/8,1/4	1/4,3/8	1/4,3/8	1/4, 3/8, 1/2	3/4	3/4,1	1	1
Fluid	Air								
Proof pressure (MPa)	1.5								
Max. operating pressure (MPa)	1.0								
Set pressure range (MPa)	0.05 to 0.7		0.05 to 0.85						
Ambient and fluid temperature (°C)	-5 to 60 (No freezing)								
Nominal filtration rating (μm)	5								
Bowl material	Polycarbonate								
Bowl guard	—	Semi-standard	Standard						
Regulator construction	Relieving type								
Weight (kg)	0.16	0.33	0.55	0.63	1.12	1.16	2.44	2.45	2.54

Attachment

Piping adapter

A piping adapter allows installation/removal of the component without removing the piping.



Port size M5 x 0.8, 1/8, 1/4, 3/8, 1/2, 3/4, 1

T-interface

Redirection of air flow is possible.



Port size M5 x 0.8, 1/8, 1/4, 3/8, 1/2

Pressure switch with piping adapter

Compact reed switch integrated with the piping adapter



Port size 1/8, 1/4, 3/8, 1/2, 3/4

Check valve

Can be used to prevent a back flow of lubricant from lubricator.



Port size 1/8, 1/4, 3/8

Air Filter



Mist Separator



Regulator

Application: Applicable to remove minute solid foreign objects and oil mist contained in the compressed air, control (regulate) the outlet pressure, and control pulsations of the outlet pressure affected by pulsations of the inlet pressure.



Standard Specifications

Model	AC20C	AC25C	AC30C	AC40C	AC40C-06	
Component	Air Filter	AF20	AF30	AF30	AF40	AF40-06
	Mist Separator	AFM20	AFM30	AFM30	AFM40	AFM40-06
	Regulator	AR20	AR25	AR30	AR40	AR40-06
Port size	1/8, 1/4	1/4, 3/8	1/4, 3/8	1/4, 3/8, 1/2	3/4	
Fluid	Air					
Proof pressure (MPa)	1.5					
Max. operating pressure (MPa)	1.0					
Set pressure range (MPa)	0.05 to 0.85					
Nominal filtration rating (µm)	0.3 (95% filtered particle size)					
Outlet side oil mist concentration	Maximum 1.0 mg/m ³ (ANR) standard unit (=0.8 ppm)					
Rated flow rate L/min (ANR)	200	450	450	1,100	1,100	
Ambient and fluid temperature (°C)	-5 to 60 (No freezing)					
Bowl material	Polycarbonate					
Bowl guard	Semi-standard	Standard				
Regulator construction	Relieving type					
Weight (kg)	0.48	0.88	0.95	1.76	1.83	

Filter Regulator



Mist Separator

Application: Applicable to remove minute solid foreign objects and oil mist contained in the compressed air, control (regulate) the outlet pressure, and control pulsations of the outlet pressure affected by pulsations of the inlet pressure.



Standard Specifications

Model	AC20D	AC30D	AC40D	AC40D-06	
Component	Filter Regulator	AW20	AW30	AW40	AW40-06
	Mist Separator	AFM20	AFM30	AFM40	AFM40-06
Port size	1/8, 1/4	1/4, 3/8	1/4, 3/8, 1/2	3/4	
Fluid	Air				
Proof pressure (MPa)	1.5				
Max. operating pressure (MPa)	1.0				
Set pressure range (MPa)	0.05 to 0.85				
Nominal filtration rating (µm)	0.3 (95% filtered particle size)				
Outlet side oil mist concentration	Maximum 1.0 mg/m ³ (ANR) standard unit (=0.8 ppm)				
Rated flow rate L/min (ANR)	150	330	800	800	
Ambient and fluid temperature (°C)	-5 to 60 (No freezing)				
Bowl material	Polycarbonate				
Bowl guard	Semi-standard	Standard			
Regulator construction	Relieving type				
Weight (kg)	0.37	0.74	1.38	1.43	

Pressure switch

Compact reed switch



Cross interface

Branch piping is possible in all 4 directions.



Port size M5 x 0.8, 1/8, 1/4, 3/8, 1/2

3-port valve for residual pressure release

Residual pressure in the line can be exhausted.



Port size 1/8, 1/4, 3/8, 1/2, 3/4, 1

Option/Semi-standard/Made to Order

Model	Option					Attachment				Filter /		
	Auto drain		Pressure gauge		Digital pressure switch	Check valve	Pressure switch	T-interface	3-port valve for residual pressure release	Metal bowl	Nylon bowl	Metal bowl with level gauge
	N.C.	N.O.	Square embedded type	Round type								
AC10	●	—	—	●	—	—	—	●	—	●	●	—
AC10A	●	—	—	●	—	—	—	—	—	●	●	—
AC20	●	—	●	●	●	●	●	●	●	●	●	—
AC20A	●	—	●	●	●	●	●	—	●	●	●	—
AC25	●	●	●	●	●	●	●	●	●	●	●	●
AC30	●	●	●	●	●	●	●	●	●	●	●	●
AC30A	●	●	●	●	●	●	●	—	●	●	●	●
AC40	●	●	●	●	●	●	●	●	●	●	●	●
AC40A	●	●	●	●	●	●	●	—	●	●	●	●
AC40-06	●	●	●	●	●	—	●	●	●	●	●	●
AC40A-06	●	●	●	●	●	—	●	—	●	●	●	●
AC50	●	●	●	●	●	—	●	●	●	●	●	●
AC50A	●	●	●	●	●	—	●	—	●	●	●	●
AC55	●	●	●	●	●	—	●	●	—	●	●	●
AC60	●	●	●	●	●	—	●	●	—	●	●	●
AC60A	●	●	●	●	●	—	●	—	—	●	●	●
AC10B	●	—	—	●	—	—	—	●	—	●	●	—
AC20B	●	—	●	●	●	—	●	●	●	●	●	—
AC25B	●	●	●	●	●	—	●	●	●	●	●	●
AC30B	●	●	●	●	●	—	●	●	●	●	●	●
AC40B	●	●	●	●	●	—	●	●	●	●	●	●
AC40B-06	●	●	●	●	●	—	●	●	●	●	●	●
AC50B	●	●	●	●	●	—	●	●	●	●	●	●
AC55B	●	●	●	●	●	—	●	●	—	●	●	●
AC60B	●	●	●	●	●	—	●	●	—	●	●	●
AC20C	●	—	●	●	●	—	●	●	●	●	●	—
AC20D	●	—	●	●	●	—	●	—	●	●	●	—
AC25C	●	●	●	●	●	—	●	●	●	●	●	●
AC30C	●	●	●	●	●	—	●	●	●	●	●	●
AC30D	●	●	●	●	●	—	●	—	●	●	●	●
AC40C	●	●	●	●	●	—	●	●	●	●	●	●
AC40D	●	●	●	●	●	—	●	—	●	●	●	●
AC40C-06	●	●	●	●	●	—	●	●	●	●	●	●
AC40D-06	●	●	●	●	●	—	●	—	●	●	●	●

●: Available ▲: Not available at the moment, but available from engineering viewpoints (special order) —: Not available

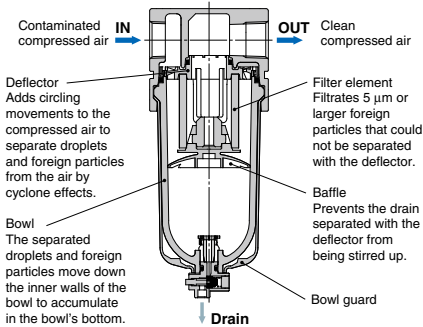
Semi-standard									Made to Order				
Lubricator		Filter drain outlet			Lubricator oil outlet	Regulator exhaust function	Flow direction	Clean room	Copper-free Fluorine-free	Applicable for high pressure	Applicable for high temperature	Applicable for low temperature	
With bowl guard	Nylon bowl with bowl guard	With drain guide 1/8	With drain guide 1/4	With drain cock barb fitting	With drain cock	Non-relieving type	Reverse flow (right → left)						
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Directional Control Valves
Actuators
Air Preparation Equipment
Air Combination
Pressure Control Equipment
Pressure Detection Equipment
Flow Rate Detection Equipment

Air Filter

Construction

Moisture and dust are contained in compressed air. The air filter is installed at the inlet to prevent such moisture and dust from entering the pneumatic control circuit.



The compressed air introduced from the inlet is given circling movements by the deflector. The resulting cyclone effects forcibly push comparatively large free droplets and foreign particles toward the inner walls of the bowl, causing them to move down the wall surfaces and accumulate in the bowl's bottom.

The compressed air from which most foreign particles have been removed passes through the centrally-placed filter element made of synthetic resin or sintered metal and having numerous micropores. At the filter element, even finer dust particles are removed and the compressed air flows out to the outlet side.

On the other hand, the separated moisture, dust and other foreign particles are discharged out of the air filter by a manually-operated drain valve, such as a cock valve or a push valve, or an automatic drain valve mounted in the bowl's bottom.

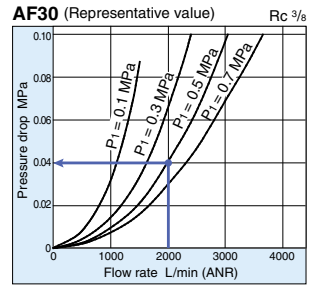
In most applications, filter elements with a 5 μm filtration rating are used.

Characteristics and Selection

Flow Rate Characteristics

As one of the characteristics inherent in air filters, there is a flow rate characteristics. The flow rate characteristics refers to the relationship between the volume of air passing through the air filter and the resulting pressure drop. This relationship is represented by the curve illustrated below.

Flow Rate Characteristics



Example: How to read the AF30's flow rate and pressure drop

The pressure drop when the inlet pressure is 0.5 MPa and air is flowed at a rate of 2000 L/min (ANR), is 0.04 MPa.

Select a model so that the pressure thus determined is no greater than 0.1 MPa.

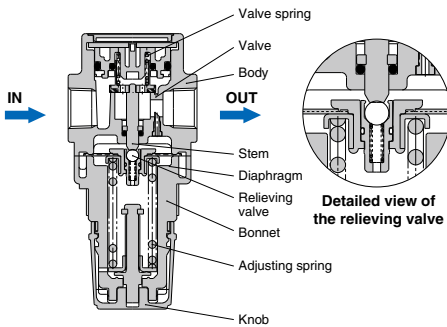
Regulator

Construction

In a pneumatic system used for general industrial equipment, the pressure of compressed air to be supplied must be controlled to a level appropriate for the purpose of use of each piece of equipment. For this purpose, regulators are commonly used.

The regulator is used to reduce the inlet pressure and thereby regulate the outlet pressure to a given set point. It is also used when variations in the set pressure need to be kept to a minimum also against changes in the inlet pressure or in the volume of air consumed under the outlet pressure.

The following figure shows the construction of a direct-operated regulator with a release function.



When the knob is rotated to compress the adjusting spring, the valve is pushed downward by way of the stem and the inlet pressure is transmitted to the outlet. This pressure acts upon the diaphragm and produces a downward force to conflict with the force produced by the adjusting spring. The inlet pressure continues to transmit as long as the outlet pressure is lower than the set point. The diaphragm goes down as the difference between these pressures decreases and, when the two forces counterbalance, the valve closes and the required pressure is established. If the outlet pressure rises above the set point or if the compressive load of the adjusting spring is reduced by rotating the knob, the diaphragm goes down and the relieving valve moves away from the stem. As a result, the outlet pressure is relieved to the atmosphere and therefore reduces.

Non-relieving type regulators have no relief ports on their relieving valves and are used when air is constantly consumed at the outlet or when the evacuation of air to the outside must be avoided.

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination

Pressure Control Equipment

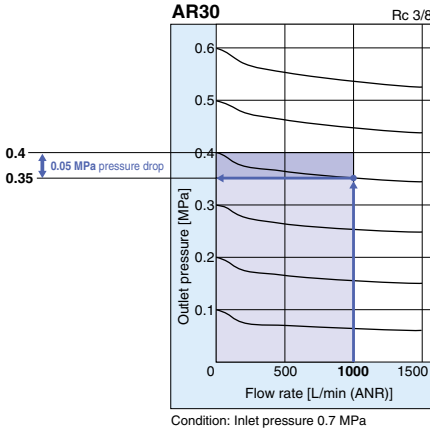
Pressure Detection Equipment

Flow Rate Detection Equipment

Regulator

Characteristics and Selection

The main characteristics of a regulator are the flow and pressure characteristics. As a rule, select a size of the regulator body suited to the conditions of use by judging from the flow rate characteristics.

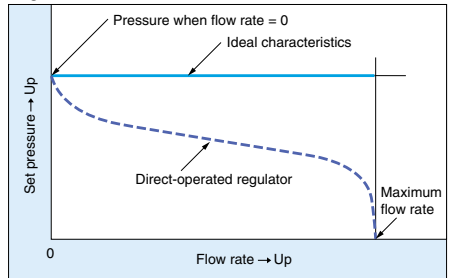


Example: How to read the AR30's flow rate characteristics
 When the outlet pressure is set to 0.4 MPa and the air flow of 1000 L/min (ANR) is supplied, the set pressure drops to 0.35 MPa. It is desirable to use the regulator with a reference pressure drop from the set pressure no greater than 0.08 MPa. Since the pressure drop in this example is 0.05 MPa, smaller than the reference value 0.08 MPa, the pressure value 0.35 MPa is tolerable.

Flow Rate Characteristics

Under normal conditions, the outlet pressure is adjusted without flowing air. If the outlet is gradually opened to increase the flow rate after pressure setting, the set pressure decreases consequently. It can be said that the smaller the pressure drop is, the better the flow rate characteristic is. Ideally, the pressure should be kept at a constant level even if the flow rate changes.

Regulator's Flow Rate Characteristics

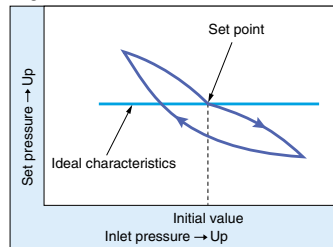


Pressure Characteristics

The characteristics in which the set pressure changes as the inlet pressure varies is referred to as the pressure characteristics.

A typical example is shown below:

Regulator's Pressure Characteristics



Lubricator

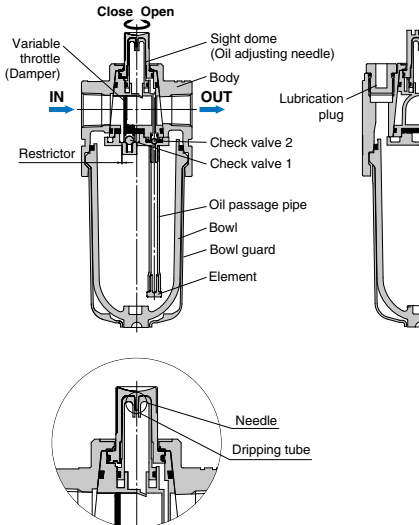
Construction

The compressed air introduced from the inlet passes through a variable throttle (damper) and flows out to the outlet. At this point, a pressure difference is produced between the inlet and the outlet by the variable throttle.

The inlet pressure is introduced into the bowl through the restrictor.

On the other hand, the pressure within the sight dome is equivalent to the outlet pressure. The lubricating oil within the bowl is driven by the inlet pressure into the oil passage pipe. Thus, the oil passes through the sight dome and reaches the drip regulating needle built in the sight dome.

The lubricating oil adjusted to a specified drip rate by the drip regulating needle drips from the dripping tube and is carried on the stream of compressed air on the outlet side to reach equipment (e.g., cylinder) to be lubricated.



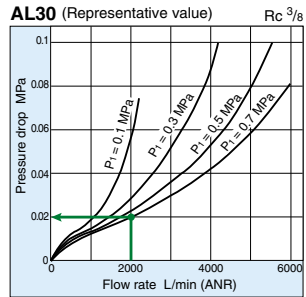
Detailed view of the sight dome

Characteristics and Selection

Flow Rate Characteristics

The flow rate characteristics refers to the relationship between the volume of air passing through the lubricator and the resulting pressure drop. This relationship is represented by the curve illustrated below.

Flow Rate Characteristics



Example: How to read the AL30's flow rate characteristics

The pressure drop when the inlet pressure is 0.7 MPa and air is flowed at a rate of 2000 L/min (ANR), is 0.02 MPa. Select a model so that the pressure drop is no greater than 0.1 MPa.

Minimum Flow Rate for Charging

The minimum flow rate for charging refers to the rate of air flow for producing a pressure difference necessary for the lubricating oil to drip.

Although this minimum flow rate for charging varies depending on the inlet pressure, it is based on the air flow rate at which five droplets of oil drip every minute when the inlet pressure is 0.5 MPa. Since the correct drip rate of oil depends on the conditions of use, it is difficult to universally prescribe a standard rate. As a guide however, the rate should be considered as one droplet (approximately 0.02 mL) for a flow rate of 10 L under pressure. An excessively large amount of oil results in an increase in the amount of oil mixed into the exhaust air of a directional control valve and thus emitted outside. Care must be taken since this is not only wasteful but also likely to lead to environmental pollution.

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Pressure Control Equipment

General Purpose



High-pressure



Precision



Vacuum



Special Fluid/Deionized Water (Pure Water)



INDEX

Pressure Control Equipment [General purpose, high-pressure, precision, vacuum, special fluid, deionized water (pure water)]	P.114
Basic Characteristics of Pressure Control Equipment	P.120
Specifications and Options	P.124

General Specifications

Fluid	Air
Ambient and fluid temperature	-5 to 60°C (No freezing)
Proof pressure	1.5 MPa
Maximum operating pressure	1.0 MPa
Set pressure range	0.05 to 0.85 MPa
Construction*	Relieving type

Each of the above values represents a typical value of general pressure control equipment, and does not apply to all pressure control equipment. For more details, check the specifications of each pressure control equipment because the values vary depending on the model.

*Construction

Relieving type (Standard)

When the outlet pressure exceeds the set value, the excess pressure is discharged to the outside to reduce the pressure to the set value.

Non-relieving type

Since there is no discharge port, the outlet pressure cannot be decreased if there is no air consumption on the outlet side. In general, air discharge using a solenoid valve on the outlet side is often employed.

Bleed type

A small amount of air is always discharged by providing a port for continuous air discharge, so that the pressure can be promptly adjusted.

Directional Control Valves

Actuators

Air Preparation Equipment




Air Combination

Pressure Control Equipment

Pressure Detection Equipment


Flow Rate Detection Equipment

General purpose [Pressure characteristics (Supply air pressure characteristics): 1 to 17%]···

Products classification			Specifications/Characteristics (Representative value)			Piping
Classification	Features	Model	Set pressure range [MPa]	Supply air characteristics Maximum flow rate *1 [L/min (ANR)]	Exhaust air characteristics Maximum flow rate *2 [L/min (ANR)]	Port size (): Tubing size
Basic 	Miniature	ARJ1020F ARJ210/310	0.2 to 0.7	100 to 500	5 to 60	M5, 1/8 (ø4, ø6)
	Standard	AR10 to 60	0.05 to 0.85	220 to 18,900	60 to 120	M5, 1/8 to 1
	High-pressure 2.0 MPa compliant	ARX20	0.05 to 0.85	950	95	1/8, 1/4
	Relieving type	AR425 to 925	0.05 to 0.83	6,000 to 35,000	300 to 380	1/4 to 2
	Compact manifold type	ARM5 ARM10	0.05 to 0.7	300 400	20 75	(ø4, ø6, ø8)
	Manifold type	ARM1000 to 3000	0.05 to 0.85	300 to 4,200	40 to 80	1/8 to 1/2
	With air filter 	Nominal filtration rating for instrumentation 5 µm	IW / 1301	0.02 to 0.5	320 to 530	55
Nominal filtration rating 5 µm		AW10 to 60	0.05 to 0.85	220 to 14,000	60 to 120	M5, 1/8 to 1
Nominal filtration rating 0.3 µm		AWM20 to 40	0.05 to 0.85	150 to 820	60 to 120	1/8 to 1/2
		AMR3000 to 6000	0.05 to 0.85	750 to 6,000	55 to 150	1/4 to 1
Nominal filtration rating 0.01 µm	AWD20 to 40	0.05 to 0.85	90 to 450	60 to 120	1/8 to 1/2	

*1) The flow rate on the atmospheric release with inlet pressure at 0.7 MPa, set pressure at 0.5 MPa. *2) The exhaust flow rate with set pressure at 0.5 MPa, outlet pressure at 1.0 MPa.


High-pressure 6.0 MPa compliant

Products classification			Specifications/Characteristics		Piping
Classification	Features	Model	Set pressure range [MPa]	Supply air characteristics Maximum flow rate *1 [L/min(ANR)]	Port size
Basic 	Direct operated regulator (Relieving type)	VCHR30	0.5 to 5.0	50,000	G3/4, G1
		VCHR40	0.5 to 5.0	50,000	G1, G1½

*1) The flow rate on the atmospheric release with inlet pressure at 6.0 MPa, set pressure at 5.0 MPa.

AR 6 P.543	ARX 6 P.681	AR425 to 925 6 P.678	ARM 6 P.691	IW 11 P.154	1301 11 P.158
AWM 6 P.586	AMR 6 P.686	AWD 6 P.586	VCHR 9 P.444	IR 6 P.807	VE1□ 6 P.840
ARP 6 P.759	ITV 6 P.893	IRV 6 P.825	SRP 6 P.869	SRH 6 P.855	SRF 6 P.877

◆◆ Precision [Pressure characteristics (Supply air pressure characteristics): 1% or less] ◆◆


Products classification			Specifications/Characteristics (Representative value)			Piping
Classification	Features	Model	Set pressure range [MPa]	Supply air characteristics Maximum flow rate [L/min (ANR)]	Exhaust air characteristics Maximum flow rate ^{*3} [L/min (ANR)]	Port size (): Tubing size
Basic	 Pilot	IR1000-A to 3000-A	0.005 to 0.2 ^{*1} 0.01 to 0.4 0.01 to 0.8	720 to 4,500	120 to 3,000	1/8 to 1/2
		VEX1A33/1B33 VEX1133 to 1933	0.05 to 0.7	290 to 29,000	400 to 30,000	M5, 1/8 to 2
Electronic	Precision direct-operated regulator	ARP20 to 40	0.005 to 0.6	300 to 900	45 to 100 ^{*4}	1/8 to 1/2
	With built-in pressure sensor	ITV0000 to 3000	0.001 to 0.9 ^{*5}	6 to 4,500	6 to 3,000	1/8 to 1/2 (ø4, ø5/32")
Air-operated	High-relief nozzle-flapper type	IR2120/3120	0.01 to 0.8	900 to 4,000	450 to 3,000	1/4 to 1/2

*1) 0.01 to 0.2 MPa for IR3000. *2) The flow rate on the atmospheric release with inlet pressure at 0.7 MPa, set pressure at 0.5 MPa.

*3) The exhaust flow rate when keeping the set pressure at 0.5 MPa. *4) The exhaust flow rate with set pressure at 0.4 MPa, outlet pressure at 0.5 MPa.


*5) This varies depending on each model.

◆◆ Vacuum ◆◆

Products classification			Specifications/Characteristics		Piping
Classification	Features	Model	Set pressure range [kPa]	Supply air characteristics Maximum flow rate ^{*1} [L/min (ANR)]	Port size (): Tubing size
	Manual	IRV10/20 IRV10A/20A	-1.3 to -100	140 to 240	(ø6, ø8, ø10, ø1/4" ø5/16", ø3/8")
	Electronic (Built-in pressure sensor)	ITV0090/2090	-1.0 to -100 ^{*2}	2 to 130	1/4 (ø4, ø5/32")

*1) The maximum flow rate varies depending on the conditions. *2) This varies depending on each model.

◆◆ Special fluid/Deionized water (Pure water) (For pressure controls other than general pneumatics) ◆◆

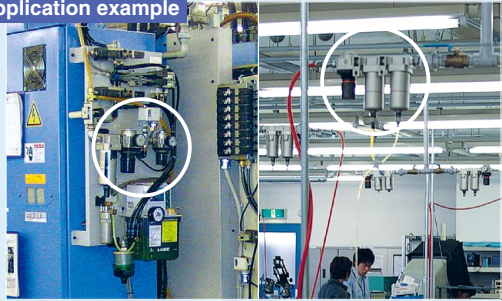
Products classification			Specifications/Characteristics (Representative value)		Piping
Classification	Features	Model	Set pressure range [MPa]	Supply air characteristics Maximum flow rate [L/min (ANR)]	Port size (): Tubing size
	Manual	SRP1111	0.01 to 0.4	20 to 200	M5, 1/8
		SRH3000/4000	0.05 to 0.7	100 to 1500	1/8 to 1/2
	Air-operated	SRF10 to 50	0.02 to 0.4	2 to 50	(ø1/4, ø3/8, ø3/4)

Pressure Control Equipment

..... **General purpose** Widely used for pressure control in factory lines.

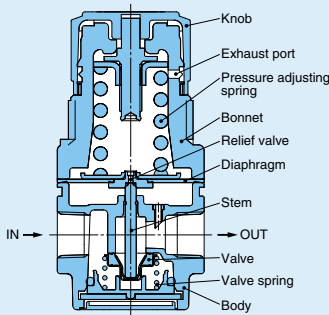


Application example



Relieving type

Model: AR, ARJ, ARX, ARM, AMR, IW, 1301



Features

When the outlet pressure exceeds the set value, the excess pressure is discharged to the outside to reduce the pressure to the set value.

How to use

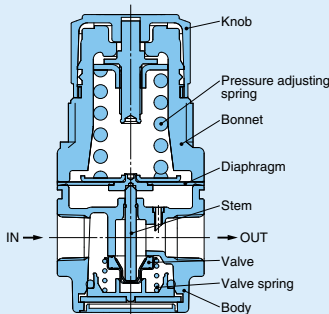
This is used when the load fluctuation of the outlet side is large, when adjusting frequently and filling the container (including a cylinder) of the outlet side, etc.

Specifications (representative value)

Maximum operating pressure	1.0 MPa
Set pressure range	0.05 to 0.85 MPa
Pressure characteristics (Supply air pressure characteristics)	1 to 5%
Repeatability	±0.02 MPa

Non-relieving type

Model: AR, ARJ, ARX, ARM, AMR



Features

The outlet pressure cannot be decreased if there is no air consumption on the outlet side.

How to use

This is applicable if the air is always used at the outlet side (e.g., air discharge using a solenoid valve).

Specifications (representative value)

Maximum operating pressure	1.0 MPa
Set pressure range	0.05 to 0.85 MPa
Pressure characteristics (Supply air pressure characteristics)	1 to 5%
Repeatability	±0.02 MPa

Residual pressure exhaust valve

Model: VHS

Features

The outlet pressure can be easily discharged.

How to use

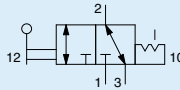
This is a manual switching valve for safety measures to prevent accidents caused by residual pressure.

Flow rate characteristics

Model	Port size		Flow rate characteristics					
	IN, OUT	EXH	IN → OUT			OUT → EXH		
			C (dm ³ /s-bar)	b	Cv	C (dm ³ /s-bar)	b	Cv
VHS20	1/8	1/8	2.4	0.43	0.65	2.5	0.39	0.69
	1/4		3.3	0.40	0.88	3.1	0.51	0.84
VHS30	1/4	1/4	6.4	0.45	1.7	6.2	0.38	1.7
	3/8		8.3	0.41	2.3	7.0	0.41	1.9
VHS40	1/4	3/8	7.3	0.49	2.0	8.5	0.35	2.3
	3/8		10.9	0.45	3.0	11.6	0.40	3.1
VHS40-06	1/2	1/2	14.2	0.39	3.8	13.3	0.43	3.6
	3/4		18.3	0.31	5.0	17.7	0.37	4.8
VHS50	3/4	1/2	23.8	0.41	6.4	21.8	0.41	5.9
	1		31.9	0.33	8.6	23.5	0.44	6.4

Note) Use an air filter on the inlet side for proper operation.

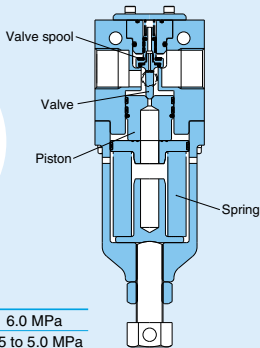
Symbol



Pressure Control Equipment

..... **High-pressure 6.0 MPa compliant** Durable up to 6.0 MPa pressure.

Model: VCHR



Specifications

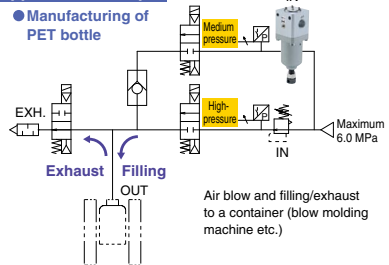
Maximum operating pressure	6.0 MPa
Set pressure range	0.5 to 5.0 MPa

Working principle

Direct-operated type with a piston valve.

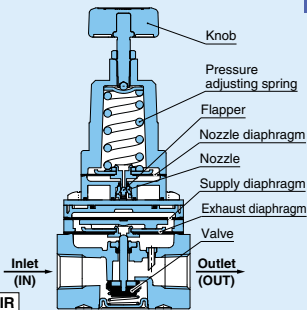
Application example

- Manufacturing of PET bottle



..... **Precision** Possible to set within 0.2% of the sensitivity full span.

Model: IR, ITV, VEX



Specifications (representative value)

Maximum operating pressure	1.0 MPa
Set pressure range	0.01 to 0.8 MPa (0.005 to 0.9 MPa)
Pressure characteristics (Supply air pressure characteristics)	1% (0.3%)
Repeatability	±0.004 MPa (±0.005 MPa)

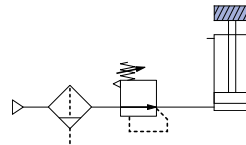
() : In case of electronic type

Working principle

This type has an internal pilot structure that causes the valve to be opened through the diaphragm by the air pressure controlled by a nozzle-flapper mechanism.

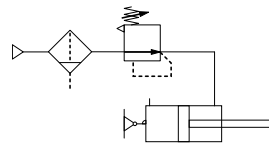
Application example

- Balance and actuation
Accurate balance pressure setting



Pressure changes during cylinder actuation are suppressed, balancing the cylinder in both static and dynamic conditions.

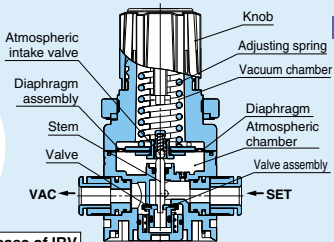
- Contact pressure control



Pressure is kept steady, responding rapidly to the position change of a piston in the cylinder.

Vacuum For vacuum settings

Model: IRV, ITV



In case of IRV

Specifications (representative value)

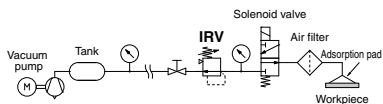
Maximum operating pressure	-101 kPa
Set pressure range	-1.3 to -100 kPa (-1 to -100 kPa/ITV0090, -1.3 to -80 kPa/ITV2090)
Pressure characteristics (Supply air pressure characteristics)	2% (1%)
Repeatability	±5 kPa (±0.5 kPa)

Working principle

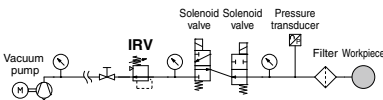
The compression force of an adjusting spring opens the main valve through a diaphragm, causing the degree of vacuum to rise. At this moment, the pressure of the SET side is led to the vacuum chamber through a feedback path and is set with a balance of the generated force of a spring.

Application example

● Adsorption of workpiece



● Leak tester



Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination

Pressure Control Equipment

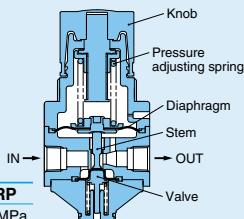
Pressure Detection Equipment

Flow Rate Detection Equipment

Special fluid/Deionized water (Pure water) For pressure controls other than general pneumatics

Manual

Model: SRP, SRH



Specifications (representative value)

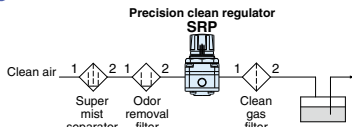
	SRH	SRP
Maximum operating pressure	1.0 MPa	1.0 MPa
Set pressure range	0.05 to 0.7 MPa	0.01 to 0.4 MPa
Pressure characteristics (Supply air pressure characteristics)	6 to 9%	1%
Repeatability	0.05 MPa or less	0.004 MPa or less

Working principle

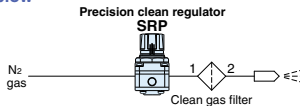
Like the general type, this type has a direct-operated structure that causes the valve to be directly opened by adjusting spring load.

Application example

● Pressure feed of chemicals



● N₂ blow



Wetted parts material

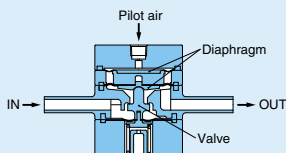
Stainless steel, Fluororesin, Fluororubber

Fluid

Air, N₂, CO₂, Ar, Clean air, Deionized water (Pure water), Water

Air-operated

Model: SRF



Specifications (representative value)

Maximum operating pressure	1.0 MPa
Set pressure range	0.02 to 0.4 MPa
Pressure characteristics (Supply air pressure characteristics)	1 to 4%
Repeatability	±0.01 MPa

Working principle

This air-operated structure causes the pressure to be controlled by the pressure of the pilot air from outside. A valve is opened and closed reacting the force of pilot pressure.

Wetted parts material

Fluororesin

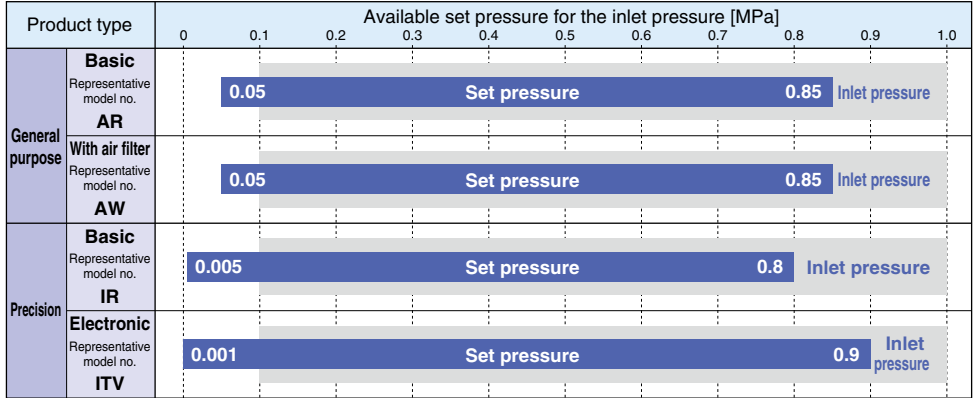
Fluid

N₂, Deionized water (Pure water)

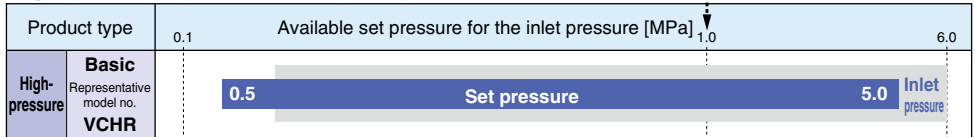
Basic Characteristics of Pressure Control Equipment

Shown below is the basic characteristics of pressure control equipment. Use the values as guidelines. For more details, check the catalog of each pressure control equipment.

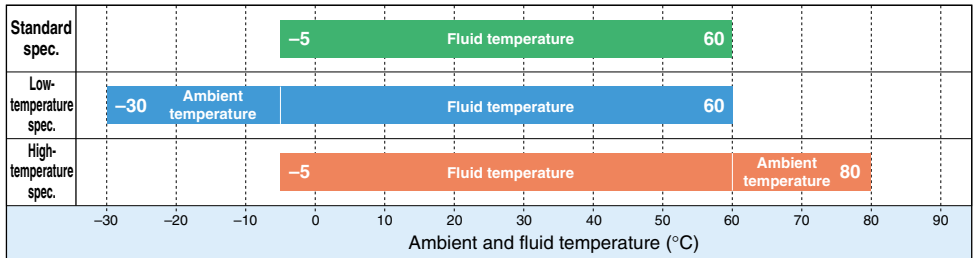
1 Available set pressure for the inlet pressure



High-pressure (6.0 MPa compliant)



2 Ambient and fluid temperature



Note) The above indicates the temperature specification of a basic regulator for general purposes and a precision basic regulator. The standard temperature specification of an electronic regulator is ranging from 0 to 50°C.

3 Service life

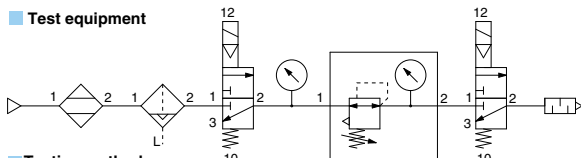
The number of service life is based on our test results and no guarantee is assured for everything. Use these values as guidelines. The following table shows the service life of a typical general type, high-pressure type and precision type.

Product type		Service life
General purpose	Basic (Model: AR)	5 million cycles
	With air filter (Model: AW)	5 million cycles
High-pressure	Basic (Model: VCHR)	10 million cycles
Precision	Basic (Model: IR)	5 million cycles
	Electronic (Model: ITV)	24 million cycles*

Test equipment and condition

Shown below are the circuit diagram of **service life test equipment of general pressure control equipment and the test condition**. They conform to JIS B8372: 1994.

Test equipment



Test condition (A)

Inlet pressure	0.63 MPa
Outlet pressure	0.5 MPa
Operating frequency	1 cycle/sec

Testing method

While the solenoid valve (1) on the inlet side is in the ON state, and the solenoid valve (3) on the outlet side is in the OFF state, set the pressure of the regulator (2) on the inlet side and the outlet side to the test condition value (as given in test condition A). Set the switching time of the solenoid valve to 0.5 sec for both ON and OFF, so that solenoid valves (1) and (3) located in front of and behind a regulator (2) can repeat fully-opening or fully-closing alternatively. Check the regulator periodically for the service life by measuring its leakage and performance, etc.

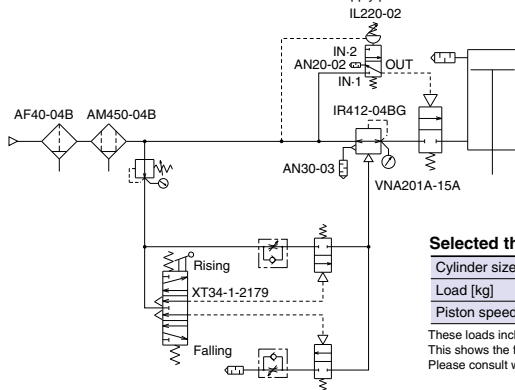
Guideline of service life

Phenomenon	Cause	Reference time of service life
Leakage	<ul style="list-style-type: none"> • Damage of diaphragm • Wearing and cracks of rubber 	The amount of leakage exceeds 10 cm ³ /mm (ANR) per minute.
Inferior adjustment	<ul style="list-style-type: none"> • Damage of spring • Biting of foreign materials 	Neither the flow rate characteristics value nor the pressure characteristics value satisfy the specifications.

* The service life of the electronic type (ITV) is 24 million input signal ON/OFF operation cycles.

4 Example of manual balancer circuit

Prevention of air omission when supply pressure decreases



Operation

Set the balance pressure with the rising button. When the load starts moving upward, adjust the load to be stayed in the middle of the stroke by pressing the rising and falling button alternately. Then, the load can be easily moved up and down manually. To remove the load, press the falling button until the hook can be removed.

Selected the balance pressure as 0.5 MPa

Cylinder size [mm]	32	40	50	63	80	100
Load [kg]	35	54	84	143	231	364
Piston speed [mm/sec]	2,031	1,330	851	501	231	196

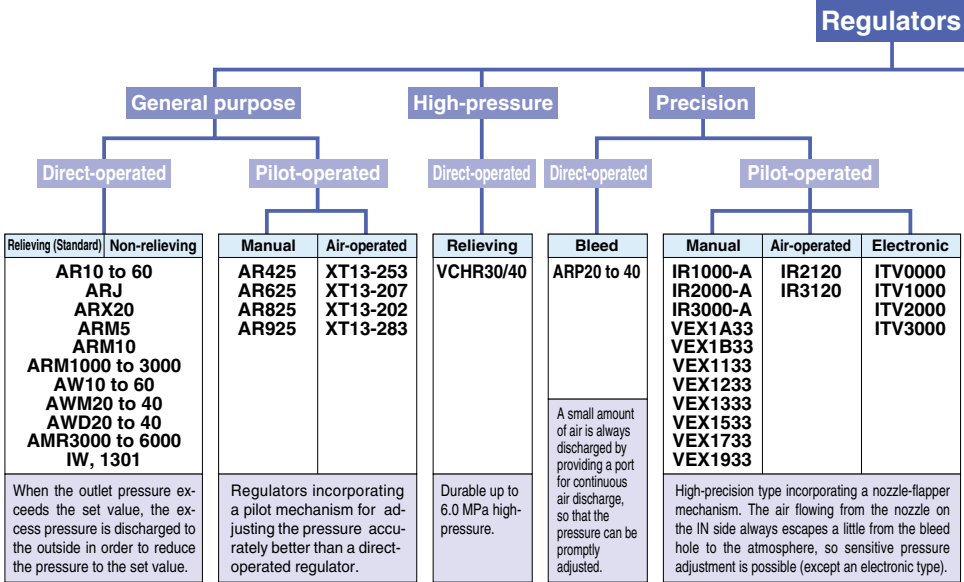
These loads include those of a piston and a rod. This shows the falling speed. The rising speed is faster than this. Please consult with SMC if you use this actually.

Note) A cylinder with fixed throttle is not applicable.

Basic Characteristics of Pressure Control Equipment

5 Selection

1) Select the regulator depending on the application.

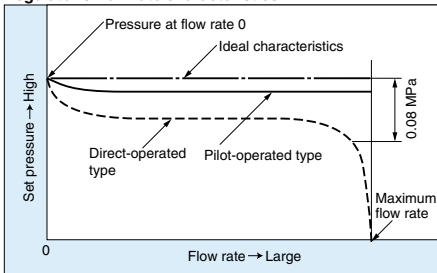


Terminological explanation

Flow rate characteristics

Generally, the outlet pressure is adjusted with no flow status. When the outlet side is gradually opened after setting the pressure and the flow rate is increased, the set pressure decreases accordingly. The smaller the degree of this pressure reduction, the better the flow rate characteristic of the regulator. Ideally, a constant pressure should always be maintained even if the flow rate changes. Use the pilot type to suppress fluctuations, even if only slightly. The pressure drop is generally within 0.08 MPa for the set pressure.

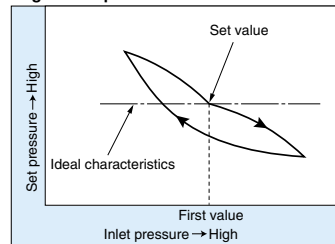
Regulator's flow rate characteristics



Pressure characteristics

The regulator has the characteristics that, as the inlet pressure varies, the set pressure varies accordingly. This is called the pressure characteristics, and a general example is given as shown below.

Regulator's pressure characteristics

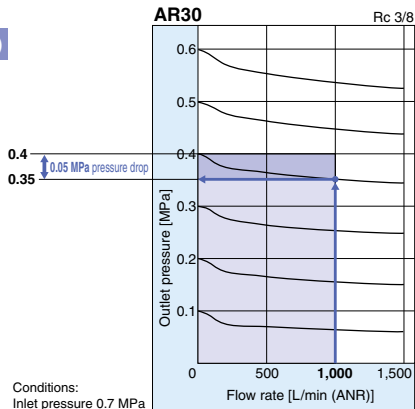
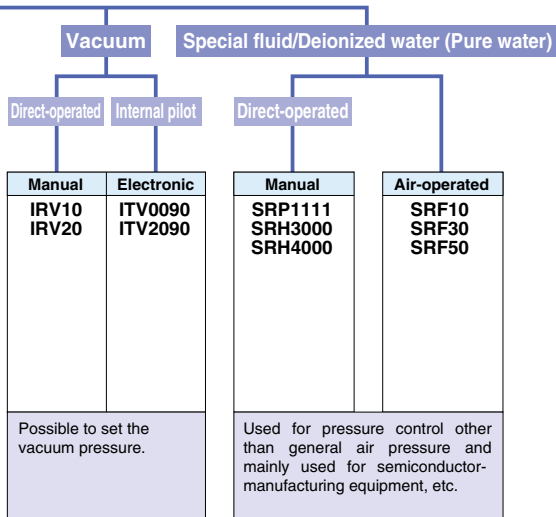


Maximum flow rate

When the inlet pressure is constantly maintained and the outlet pressure is set to the prescribed value, the air flow rate is represented when the outlet side is released to the atmosphere. The maximum flow rate in this catalog is represented when the inlet pressure is 0.7 MPa and the outlet pressure is 0.5 MPa.

AR	6	P.543	ARJ	6	P.668	ARX	6	P.681	ARM	6	P.691	AW	6	P.567	AWM/AWD	6	P.586			
AMR	6	P.686	IW	11	P.154	1301	11	P.158	AR425 to 925	6	P.678	VCHR	9	P.444	ARP	6	P.759			
IR	6	P.807	VEEX1□	6	P.840	ITV	6	P.893	IRV	6	P.825	SRP	6	P.869	SRH	6	P.855	SRF	6	P.877

2) Select the body size suitable for the operating conditions from the flow rate and flow rate characteristics.
Example) How to read of the AR30 flow rate characteristics

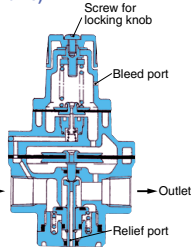


When the flow rate is 1,000 L/min (ANR) with the outlet pressure set to 0.4 MPa, the outlet pressure goes down (pressure drop) to 0.35 MPa due to the flow rate characteristics.

The guideline of pressure drop should be set to less than 0.08 MPa against the set pressure; thus in this case the pressure drop is 0.05 MPa, which is within 0.08 MPa, so 0.35 MPa is within the tolerance.

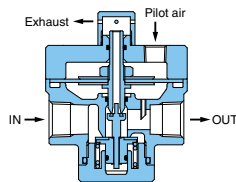
● **High-relieving type (Quick exhaust valve)**

This regulator is used when a rapid discharge is necessary in case the outlet pressure is higher than the set pressure. In general, the pressure control valve has a good relief sensitivity. By enlarging the cross-sectional area of the relief valve, rapid air discharge is obtained. This type of regulator has a rapid discharging function such that the discharge speed is high at the outlet side and is used mainly for adjusting pressure rapidly and precisely when the outlet pressure such as an air balancer increases.



● **Air-operated type**

The regulator controls the pressure of a main line by the pressure of pilot air from the outside. When the pilot air is introduced into the top part of the diaphragm, a valve is pushed downward and the inlet pressure is blown out to the outlet side. This pressure acts under the diaphragm, generates an upward force, against the force by the pilot pressure, and controls the opening of the valve. The valve is closed when the pilot pressure force is almost identical to the outlet pressure. This type of regulator enables remote operation, and is used at locations where humans cannot easily access or centralized control is desired.

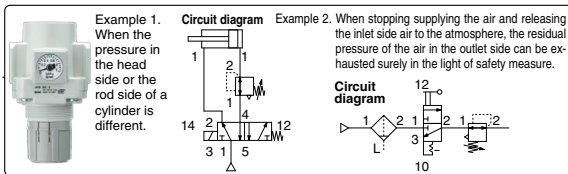


● **Repeatability**

Repeatability means the degree of fluctuation of a set value on the repeated actuation at comparatively short intervals.












● **Regulator with back flow mechanism**

The regulator is equipped with a check valve as a reverse flow mechanism in which the air pressure of the outlet side is discharged precisely and quickly to the inlet side. In general, it is installed between a solenoid valve and an actuator and used for dual-pressure control.



Directional Control Valves
 Actuators
 Air Preparation Equipment
 Air Combination
 Pressure Control Equipment
 Pressure Detection Equipment
 Flow Rate Detection Equipment





General purpose Specifications and options

Products classification			Specifications/Characteristics (Representative value)			Port size
Classification	Features	Model	Set pressure range [MPa]	Maximum flow rate *1 [L/min(ANR)]	Pressure characteristics (Supply air pressure characteristics) [%]	(): Tubing size
Basic	 Miniature	ARJ1020F	0.1 to 0.7	100	8	M5 (ø4, ø6)
		ARJ210	0.2 to 0.7	200	11	M5, 1/8
		ARJ310	0.2 to 0.7	500	10	M5, 1/8 (ø4, ø6)
	 Standard	AR10	0.05 to 0.7	220	17	M5
		AR20(K)	0.05 to 0.85	2,000	2	1/8, 1/4
		AR25(K)	0.05 to 0.85	2,700	2	1/4, 3/8
		AR30(K)	0.05 to 0.85	4,300	2	1/4, 3/8
		AR40(K)	0.05 to 0.85	8,200	2	1/4, 3/8, 1/2, 3/4
		AR50(K)	0.05 to 0.85	16,700	2	3/4, 1
		AR60(K)	0.05 to 0.85	18,900	2	1
	 High-pressure 2.0 MPa Relieving type	ARX20	0.05 to 0.85	950	8	1/8, 1/4
		AR425	0.05 to 0.83	6,000	1	1/4, 3/8, 1/2
		AR625	0.05 to 0.83	16,000	2	3/4, 1
		AR825	0.05 to 0.83	28,000	1	1 1/4, 1 1/2
		AR925	0.05 to 0.83	35,000	1	2
 Compact manifold type	ARM5	0.05 to 0.7	300	6	(ø4, ø6, ø8)	
	ARM10	0.05 to 0.7	400	12	(ø4, ø6)	
	ARM10F	0.05 to 0.7	400	12	(ø4, ø6)	
	ARM11	0.05 to 0.7	400	12	(ø4, ø6, ø8, ø10)	
	 Manifold type	ARM1000	0.05 to 0.7	300	8	1/8
		ARM2000	0.05 to 0.7	600	8	1/8, 1/4
		ARM2500	0.05 to 0.85	1,900	1	1/4, 3/8
ARM3000		0.05 to 0.85	4,200	2	3/8, 1/2	
With air filter	 Nominal filtration rating for instrumentation 5 μm	1301	0.02 to 0.5	320	0.5	1/4
		IW	0.02 to 0.5	530	1	1/4
		AW10	0.05 to 0.7	220	17	M5
	 Nominal filtration rating 5 μm	AW20(K)	0.05 to 0.85	1,700	3	1/8, 1/4
		AW30(K)	0.05 to 0.85	2,300	4	1/4, 3/8
		AW40(K)	0.05 to 0.85	5,200	4	1/4, 3/8, 1/2, 3/4
		AW60(K)	0.05 to 0.85	14,000	2	3/4, 1
		 Nominal filtration rating 0.3 μm	AWM20	0.05 to 0.85	150	1
	AWM30		0.05 to 0.85	330	1	1/4, 3/8
	AWM40		0.05 to 0.85	820	2	1/4, 3/8, 1/2
	AMR3000		0.05 to 0.85	750	5	1/4, 3/8
	AMR4000		0.05 to 0.85	1,500	3	1/4, 3/8, 1/2
	AMR5000		0.05 to 0.85	3,500	6	1/2, 3/4
 Nominal filtration rating 0.01 μm	AMR6000	0.05 to 0.85	6,000	3	3/4, 1	
	AWD20	0.05 to 0.85	90	1	1/8, 1/4	
	AWD30	0.05 to 0.85	180	1	1/4, 3/8	
	AWD40	0.05 to 0.85	450	2	1/4, 3/8, 1/2	
Built-in pressure gauge	 Modular	ARG20(K)	0.05 to 0.85	2,000	2	1/8, 1/4
		ARG30(K)	0.05 to 0.85	4,300	2	1/4, 3/8
		ARG40(K)	0.05 to 0.85	8,200	2	1/4, 3/8, 1/2
Built-in pressure gauge With air filter	 Nominal filtration rating 5 μm	AWG20(K)	0.05 to 0.85	1,700	3	1/8, 1/4
		AWG30(K)	0.05 to 0.85	2,300	4	1/4, 3/8
		AWG40(K)	0.05 to 0.85	5,200	4	1/4, 3/8, 1/2
Air-operated	High-flow type	XT13-253	0.02 to 0.83	6,000	1	1/4, 3/8, 1/2
		XT13-207	0.02 to 0.83	16,000	2	3/4, 1
		XT13-202	0.02 to 0.83	28,000	1	1 1/4, 1 1/2
		XT13-283	0.02 to 0.83	35,000	1	2


*1) The maximum flow rate depends on the condition. *2) Available from -5°C to 100°C. However, available up to 80°C with a pressure gauge mounted on the product.

*3) Parts made of resin are used. Consult with SMC separately for the temperature range.

Precision Specifications and options

Products classification			Specifications/Characteristics (Representative value)			
Classification	Features	Model	Set pressure range [MPa]	Maximum flow rate *2 [L/min(ANR)]	Pressure characteristics (Supply air pressure characteristics) [%]	Port size (): Tubing size
Basic 	Pilot  Precision direct-operated regulator	IR1000-A	0.005 to 0.2*1	720	0.5	1/8
		IR2000-A	0.01 to 0.4	1,900	0.5	1/4
		IR3000-A	0.01 to 0.8	4,500	1	1/4, 3/8, 1/2
		VEX1A33	0.01 to 0.7	900	0.8	M5, 1/8
		VEX1B33	0.01 to 0.7	900	0.8	M5, 1/8
		VEX1133	0.05 to 0.7	2,200	0.7	1/8, 1/4
		VEX1233	0.05 to 0.7	2,200	0.7	1/8, 1/4
		VEX1333	0.05 to 0.7	6,300	0.7	1/4, 3/8, 1/2
		VEX1533	0.05 to 0.7	16,000	0.6	1/2, 3/4, 1
		VEX1733	0.05 to 0.7	29,000	0.7	1, 1 1/4
		VEX1933	0.05 to 0.7	60,000	0.7	1 1/2, 2
		ARP20	0.005 to 0.6	300	0.7	1/8, 1/4
		ARP30	0.005 to 0.6	600	0.5	1/4, 3/8
ARP40	0.005 to 0.6	900	0.5	1/4, 3/8, 1/2		
Electronic Refer to the electric spec. table on page 128. 	Built-in pressure sensor	ITV0000	0.001 to 0.9	6	0.3	(ø4, ø5/32")
		ITV1000	0.005 to 0.9	200	0.3	1/8, 1/4
		ITV2000	0.005 to 0.9	1,200	0.3	1/4, 3/8
		ITV3000	0.005 to 0.9	4,500	0.3	1/4, 3/8, 1/2
Air-operated 	High-relief nozzle-flapper type	IR2120	0.01 to 0.8	1,000	0.5	1/4
		IR3120	0.01 to 0.8	5,000	1	1/4, 3/8, 1/2

High-pressure 6.0 MPa compliant Specifications and options

Products classification			Specifications/Characteristics			
Classification	Features	Model	Set pressure range [MPa]	Maximum flow rate *1 [L/min(ANR)]	Port size	Body ported
Basic 	Direct-operated regulator (Relieving type)	VCHR30	0.5 to 5.0	50,000	G3/4, G1	●
		VCHR40			G1, G1 1/2	●

*1) The maximum flow rate depends on the condition.

Piping					Option		Semi-standard	Made to Order				
Body ported	Base piping	Tube piping	Modular connection	Manifold	Pressure gauge	Bracket	Non-relieving	Clean room	Copper-free, Fluorine-free	High-pressure	High-temperature (-5 to 80°C)	Low-temperature (-30 to 60°C)
●	—	—	●	●	●	●	—	●	●	—	—	—
●	—	—	●	●	●	●	—	●	●	—	—	—
●	—	—	●	—	●	●	—	●	●	—	—	—
●	—	—	—	—	●	●	—	▲	●	—	▲	—
—	●	—	—	—	●	●	—	▲	●	—	▲	—
●	—	—	—	—	●	●	—	▲	●	—	▲	—
—	●	—	—	—	●	●	—	▲	●	—	▲	—
●	—	—	—	—	●	●	—	▲	●	—	▲	—
●	—	—	—	—	●	●	—	▲	●	—	▲	—
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●	—	—	●	—	●	●	—	●	●	—	▲	▲
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●	—	—	●	—	●	●	—	●	●	—	—	—
—	—	●	—	●	—	●	—	▲	▲	▲	—	—
●	—	—	—	●	●*4	●	—	▲	▲	●	—	—
●	—	—	●	●	●*4	●	—	▲	▲	●	—	—
●	—	—	▲	—	●*4	●	—	▲	▲	●	—	—
●	—	—	●	—	●	●	—	●	●	—	●*3	●
●	—	—	●	—	●	●	—	●	●	—	●*3	●

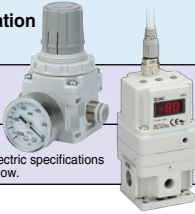
● : Available with a standard model, ▲ : This is technically possible, but contact SMC for dimensions, costs and delivery. — : Not available
 * 1) 0.01 to 0.2 MPa for IR3000-A.* 2) The maximum flow rate depends on the condition.
 * 3) Available from -5°C to 100°C. However, available up to 80°C with the pressure gauge mounted on the product.
 * 4) With LED indicator

Piping				Option		Semi-standard	Made to Order				
Base piping	Tube piping	Modular connection	Manifold	Pressure gauge	Bracket	Non-relieving	Clean room	Copper-free, Fluorine-free	High-pressure	High-temperature	Low-temperature
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—

● : Available with a standard model, — : Not available

Vacuum Specifications and options

Products classification		Specifications/Characteristics					
Classification	Model	Set pressure range [kPa]	Maximum flow rate*1 [L/min(ANR)]	Pressure characteristics (Supply air pressure characteristics) [%]	Port size (): Tubing size		
Manual	IRV10	-1.3 to -100	140	2	ø6, ø8, ø1/4", ø5/16"		
	IRV20	-1.3 to -100	240	2.7	ø6, ø8, ø10, ø1/4", ø5/16", ø3/8"		
Electronic	ITV0090	-1.0 to -100	2	1	(ø4, ø5/32)		
	ITV2090	-1.3 to -80	130	1	1/4		




Refer to the electric specifications to the table below.

Special fluid/Deionized water (Pure water) Specifications and options

Products classification		Specifications/Characteristics (Representative value)		Piping	
Classification	Model	Set pressure range [MPa]	Pressure characteristics (Supply air pressure characteristics) [%]	Port size (): Tubing size	Body ported
Manual	SRP1111	0.01 to 0.4	1	M5, 1/8	●
	SRH3000	0.05 to 0.7	6	1/8, 1/4	●
	SRH4000	0.05 to 0.7	8	1/4, 3/8, 1/2	●
Air-operated	SRF10	0.02 to 0.4	2	(ø1/4)	—
	SRF30	0.02 to 0.4	1	(ø3/8)	—
	SRF50	0.02 to 0.4	4	(ø3/4)	—



Electronic type / ITV Electrical specifications

Model			Power supply voltage		Input specifications									
			24 VDC ±10%	12 to 15 VDC	Analog					Parallel			DeviceNet™	
					4 to 20 mA DC	0 to 20 mA DC	0 to 5 VDC	0 to 10 VDC	Other voltage and current	4 points preset (2 bit)	16 points preset (4 bit)	10 bit		
	Positive pressure	ITV0000	●	●	●	●	●	●	▲	—	—	—	—	
		ITV1000	●	●	●	●	●	●	▲	●	●	●	●	
		ITV2000	●	●	●	●	●	●	●	▲	●	●	●	●
		ITV3000	●	●	●	●	●	●	●	▲	●	●	●	●
Vacuum	ITV0090	●	●	●	●	●	●	●	▲	—	—	—	—	
	ITV2090	●	●	●	●	●	●	●	▲	●	●	●	●	

Piping			Option		Semi-standard	Made to Order				
Body ported	Tube piping	Manifold	Pressure gauge	Bracket	Non-relieving	Clean room	Copper-free, Fluorine-free	High-pressure	High-temperature (-5 to 80°C)	Low-temperature (-30 to 60°C)
▲	●	—	●	●	—	●	●	—	—	—
▲	●	—	●	●	—	●	●	—	—	—
—	●	●	—	●	—	▲	▲	—	—	—
●	—	—	●*2	●	—	▲	▲	—	—	—

● : Available with a standard model, ▲ : This is technically possible, but consult with SMC for dimensions, costs and delivery. — : Not available
 * 1) The maximum flow rate depends on the condition.
 * 2) With LED indicator

		Option		Semi-standard	Made to Order				
Tube piping	Pressure gauge	Bracket	Non-relieving	Clean room	Copper-free, Fluorine-free	High-pressure	High-temperature (-5 to 80°C)	Low-temperature (-30 to 60°C)	
—	●	●	—	●*2	●	—	▲	▲	
—	●	●	●	●*2	●	—	▲	▲	
—	●	●	●	●*2	●	—	▲	▲	
●	—	—	●*1	●*2	●	—	—	—	
●	—	—	●*1	●*2	●	—	—	—	
●	—	—	●*1	●*2	●	—	—	—	

● : Available with a standard model, ▲ : This is technically possible, but consult with SMC for dimensions, costs and delivery. — : Not available
 * 1) This is not compatible with the relieving type.
 * 2) Clean room specifications are available as standard.

Serial transmission			Output specifications *1						Cable connector *2						Reverse type *3	CE marking
			1 to 5 V DC	4 to 20 mA DC (sink)	4 to 20 mA DC (source)	NPN output	PNP output	M8 straight union type 3 m	M12 straight union type 3 m	M8 right angle type 2 m	M12 right angle type 3 m	Shielding cable	Special length			
CC-Link	RS-232C	PROFIBUS DP														
—	—	—	●	—	—	—	—	●	—	●	—	▲	▲	—	●	
●	●	●	●	●	▲	●	●	—	●	—	●	▲	▲	▲	●	
●	●	●	●	●	▲	●	●	—	●	—	●	▲	▲	▲	●	
●	●	●	●	●	▲	●	●	—	●	—	●	▲	▲	▲	●	
—	—	—	●	—	—	—	—	●	—	●	—	▲	▲	—	●	
●	●	●	●	●	▲	●	●	—	●	—	●	▲	▲	▲	●	

● : Available with a standard model, ▲ : Special order, — : Not available
 * 1) Select either one. Not possible to use them together. Refer to the output specifications of each equipment in detail.
 * 2) Prepare a serial transmission cable separately. *3) Specifications that reverse the input-output characteristics.

Directional Control Valves
 Actuators
 Air Preparation Equipment
 Air Combination
 Pressure Control Equipment
 Pressure Detection Equipment
 Flow Rate Detection Equipment

Pressure Detection Equipment

For Gas



For Gas and Liquid



Monitor (Controller)



INDEX

Pressure Sensor Product Variations	P.132
General Performance Table [For gas and liquid]	P.134
Pressure Range and Application Examples	P.138
Output Type	P.141
Wiring Specifications	P.141
Type of Mounting	P.142
Type of Piping	P.142
Adaptable to Different Environments	P.143
Functions	P.144
Accuracy	P.145
Glossary of Terms	P.145
Working Principle of Pressure Sensors/Pressure Type	P.146

Directional
Control Valves

Actuators

Air Preparation
Equipment

Air Combination

Pressure Control
Equipment

Pressure Detection
Equipment

Flow Rate Detection
Equipment

Applicable fluids

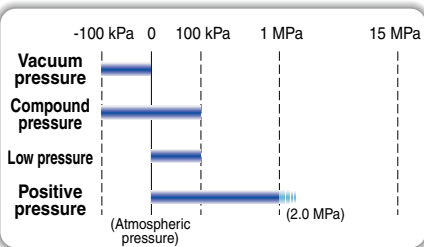
Pressure range

"Pressure range and application examples" Pages 138 to 140

For Gas

Silicon diaphragm

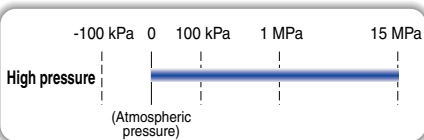
- Air, Nitrogen, Argon, Carbon dioxide



For Gas and Liquid

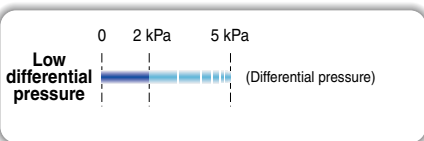
Stainless steel diaphragm

- Liquids such as water, oil, etc. Air, Nitrogen, Argon, Carbon dioxide
- Anti-corrosiveness, Airtightness



Ceramic diaphragm

- Liquids such as water, oil, etc. Air, Nitrogen, Argon, Carbon dioxide



Functions and environment

Page 144

Functions

Auto shift function Auto preset function Display calibration function
 Key lock function Anti-chattering function
 Peak/Bottom hold function Power-saving mode
 Copy function

Pages 134 to 137

Refer to "General Performance Table".

Page 143

Adaptable to different environments

Clean room Copper, zinc, lead-free Grease-free
 Silicon-free Fluorine-free Low density ozone gas

Product type

Corresponding model

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination


Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Digital

Output type




Switch output Analog output Digital display

- Sensor/Display self-contained
- Numerically displays the setting and measurement values.

For Air	For Air/Liquid
<p>Page 134, 135</p> <ul style="list-style-type: none"> • Z/ISE20 series • Z/ISE30A series • Z/ISE40A series • Z/ISE10 series • ISE70 series • Z/ISE3 series 	<p>Page 134, 135</p> <ul style="list-style-type: none"> • Z/ISE80 series • ISE75 series (for high pressure)

Switch

Output type




- Sensor only product
- ON/OFF confirmed by LED

<p>Page 135</p> <ul style="list-style-type: none"> • Z/ISE1 series • Z/ISE2 series • PS1000/1100/1200 series 	
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Sensor

Output type




- Sensor only product
- Can be connected to a separate monitor.

<p>Page 136</p> <ul style="list-style-type: none"> • PSE530 series • PSE540 series • PSE550 series (Low differential pressure) 	<p>Page 136</p> <ul style="list-style-type: none"> • PSE560 series • PSE570 series
---	--

Monitor

Output type



- Sensor type display
- Numerical control can be placed in a distant location.

<p>Page 137</p> <p>[For 1 ch]</p> <ul style="list-style-type: none"> • PSE300 series <p>[For 4 ch]</p> <ul style="list-style-type: none"> • PSE200 series 	
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General Performance Table (For Gas and Liquid)

Model Selection Table

Self-contained Type

Model	ZSE20 (F) ISE20	ZSE30A (F) ISE30A	ZSE40A (F) ISE40A	ZSE10 (F) ISE10	ISE70	ISE75 ISE75H	
Fluid	General pneumatic					General fluids	
Calibration method	Push-button calibration						
Set pressure range	-105 to 105 kPa 10 to -105 kPa -0.105 to 1.05 MPa				-0.1 to 1 MPa	0.4 to 10 MPa 0.5 to 15 MPa	
Power supply voltage	12 to 24 VDC±10% (Ripple ±10%)						
Temperature characteristics (based on 25°C)	±2% F.S. (-5 to 50°C)	±2% F.S. (0 to 50°C)	±2% F.S. (-5 to 50°C)	±2% F.S. (0 to 50°C)		±3% F.S. (0 to 50°C)	
Repeatability	±0.2% F.S.±1digit				±0.5% F.S.		
Hysteresis	Hysteresis mode: Variable Window comparator mode: Variable						
Output	NPN/PNP open collector	NPN/PNP open collector Analog voltage output Analog current output		NPN/PNP open collector Analog voltage output	1 setting NPN/PNP 2 settings NPN/PNP open collector PNP open collector		
Display	2-color display			1-color display	2-color display		
Enclosure	IP40		IP65	IP40	IP67		
Note	Panel mounting possible Selectable pressure unit Anti-chattering function Display calibration function Power-saving mode Sub screen setting function	Panel mounting possible Selectable pressure unit Anti-chattering function Display calibration function Power-saving mode Copy function	Panel mounting possible Selectable pressure unit Anti-chattering function Auto shift function Power-saving mode Copy function	Panel mounting possible DIN rail mountable Selectable pressure unit Anti-chattering function Display calibration function Power-saving mode Copy function	Selectable pressure unit Anti-chattering function Display calibration function		
Page	8 P.15	8 P.31	8 P.45	8 P.67	8 P.79		

ZSE80 (F) ISE80 (H)	ZSE3 ISE3	ZSE1 ISE1	ZSE2 ISE2	PS1000 PS1100 PS1200	ISE35
General pneumatic					
		Trimmer calibration			Push-button calibration
-110 to 110 kPa 10 to -111 kPa -0.105 to 1.1 MPa -0.105 to 2.2 MPa	0 to 98 kPa 0 to 0.98 MPa 0 to -101 kPa	0 to 100 kPa 0 to 1 MPa 0 to -101 kPa		-0.1 to 0.45 MPa -0.1 to 0.4 MPa -100 to 0 kPa	-0.1 to 1 MPa
	±3% F.S. (0 to 60°C)			±3% F.S. (0 to 60°C)	
±0.2% F.S.±1 digit	±1% F.S.				
	Hysteresis mode: Variable Window comparator mode: Fixed (3 digits*) *Digit is min. calibration unit.	Variable 1 to 10% Fixed 3% F.S. or less	Fixed 3% F.S. or less	Fixed 4% F.S. or less Fixed 10% F.S. or less	Hysteresis mode: Variable Window comparator mode: Variable
NPN/PNP open collector Analog voltage output Analog current output	NPN open collector Analog voltage output	NPN/PNP open collector Analog voltage output	NPN/PNP open collector	2-wire type	NPN/PNP open collector
2-color display	1-color display				2-color display
IP65	IP40				
R thread, URJ, TSJ Panel mounting possible Selectable pressure unit Anti-chattering function Auto shift function Display calibration function Power-saving mode	For use with ZX ejector Self-diagnostic function Failure diagnostic output function Peak hold Bottom hold	For use with ZM ejector	For use with ZX or ZR ejector		Modular type mountable ARM10/11 series mountable Selectable pressure unit Anti-chattering function Power-saving mode
8 P.89	Web Catalog	Web Catalog	Web Catalog	8 P.105	8 P.126

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination






Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment



General Performance Table (For Gas and Liquid)

Model Selection Table

	Sensor				
Model	PSE53□ 	PSE54□ 	PSE550 	PSE56□ 	PSE57□ 
Fluid	General pneumatic		General pneumatic	General fluids	
Calibration method					
Rated pressure range	0 to 1 MPa 0 to -101 kPa 0 to 101 kPa -101 to 101 kPa	0 to 1 MPa 0 to -101 kPa -100 to 100 kPa	0 to 2 kPa	0 to 1 MPa 0 to -101 kPa -100 to 100 kPa 0 to 500 kPa	-100 to 100 kPa 0 to 500 kPa 0 to 1 MPa
Power supply voltage	12 to 24 VDC±10% (Ripple ±10%)				
Temperature characteristics (based on 25°C)	±2% F.S. (0 to 50°C)		±3% F.S. (0 to 50°C)	±2% F.S. (0 to 50°C) ±3% F.S. (-10 to 60°C)	PSE570 ±2% F.S. (0 to 50°C) ±3% F.S. (-10 to 60°C) PSE573/574 ±3% F.S. (0 to 50°C) ±4% F.S. (-10 to 60°C)
Repeatability	±1% F.S.	±0.2% F.S.	±0.3% F.S.	±0.2% F.S.	
Hysteresis					
Output	Analog voltage output			Analog voltage output Analog current output	
Display					
Enclosure	IP40		IP40	IP65	
Note					
Page	8 P.134	8 P.137	8 P.140	8 P.143	8 P.146

Model Selection Table

Controller

	PSE200	PSE300
Model		
Sensor input amount	4 inputs	1 input
Calibration method	Push-button calibration	
Set pressure range	-0.1 to 1 MPa 10 to -101 kPa -101 to 101 kPa -10 to 101 kPa	-0.1 to 1 MPa -50 to 500 kPa 10 to -101 kPa -0.2 to 2 kPa -101 to 101 kPa -10 to 100 kPa
Power supply voltage	12 to 24 VDC±10% (Ripple ±10%)	
Temperature characteristics (based on 25°C)	±0.5% F.S. (0 to 50°C)	
Repeatability	±0.1% F.S. ±1 digit	±0.1% F.S.
Hysteresis	Hysteresis mode: Variable Window comparator mode: Fixed (3 digits)	Hysteresis mode: Variable Window comparator mode: Variable
Output	NPN/PNP open collector 1 CH: 2 outputs 2 to 4 CH: 1 output	NPN/PNP open collector Analog voltage output Analog current output
Display	1-color display	2-color display
Enclosure	Front only IP65 The rest IP40	IP40
Note	Panel mounting possible Auto shift function Display calibration function Anti-chattering function Copy function Selectable pressure unit	Panel mounting possible DIN rail mountable Auto shift function Display calibration function Anti-chattering function Selectable pressure unit Current input possible
Page	8 P.149	8 P.155

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

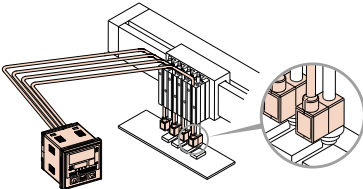
Pressure Range and Application Examples

Application examples	Pressure range	(Atmospheric pressure)				
		-100 kPa	0	100 kPa	1 MPa	15 MPa
• Suction verification	Vacuum pressure					
• Suction verification (confirmation of release pressure)	Compound pressure					
• Workpiece placement verification	Low pressure					
• Supply pressure confirmation • Leak test	Positive pressure					
• Liquid coolant pressure control	High pressure					
• Monitoring filter clogging	Low differential pressure	 (Differential pressure)				
• Level detection of a liquid						

Suction Verification

Sensor installed close to a pad (No. 1)

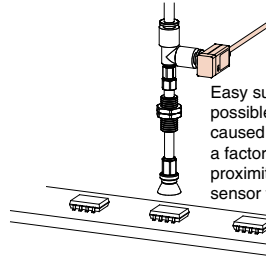
PSE54□ + PSE200 series



Due to the small size, the sensor can be installed close to a pad.
Calibration is easy with the auto preset function.

Sensor installed close to a pad (No. 2)

PS1100 series

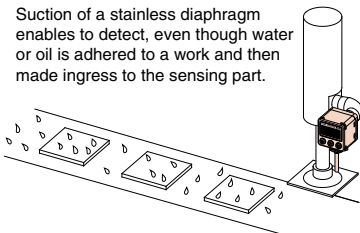


Easy suction verification is possible. Response delays caused by piping will not be a factor, due to the close proximity of the sensor to the pad.

Suction verification of a workpiece absorbed with moisture

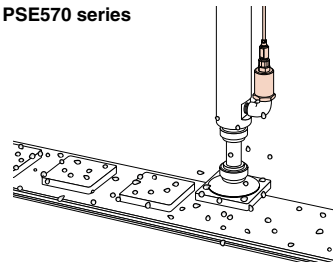
ZSE80F series

Suction of a stainless diaphragm enables to detect, even though water or oil is adhered to a work and then made ingress to the sensing part.



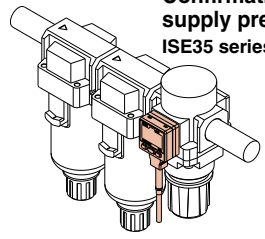
Suction verification of a workpiece absorbed with moisture

PSE570 series



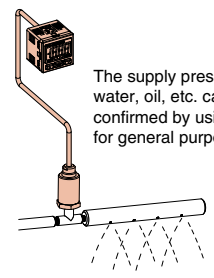
Supply Pressure Confirmation

Confirmation of airline supply pressure ISE35 series



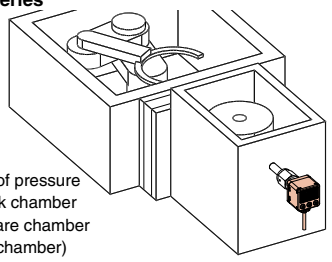
The line pressure can be adjusted by monitoring the digital readout which provides a visual verification of the operating pressure. The output can be programmed to respond to supply pressure drops, etc.

Confirmation of supply pressure in washing line PSE560 + PSE300 series



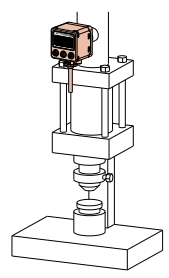
The supply pressure of water, oil, etc. can be confirmed by using a sensor for general purpose fluids.

Confirmation of atmospheric pressure for a load lock chamber ZSE80F series

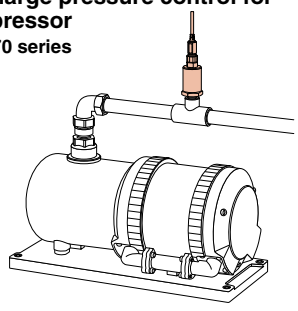


Verification of pressure in a load lock chamber (vacuum spare chamber of the main chamber)

Verifies caulking by a hydraulic cylinder ISE80 series

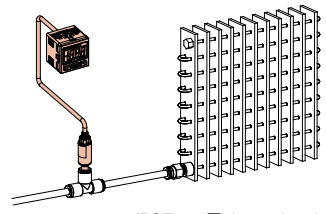


Discharge pressure control for compressor PSE570 series



Leak Test

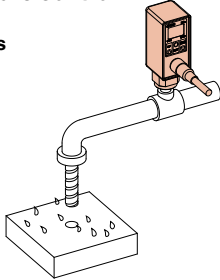
Inspection of a radiator PSE532 + PSE300 series



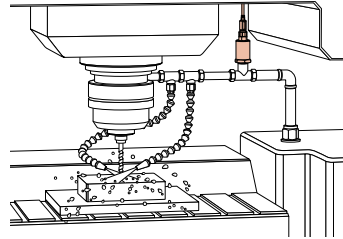
A low pressure sensor (PSE532-□) is used to detect minute differences. The auto shift function reduces the influence of fluctuations in the supply pressure.

Liquid Coolant Pressure Control

Liquid pressure control of a gun drill ISE75 (H) series

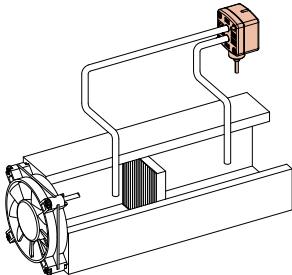


Liquid coolant pressure control PSE570 series



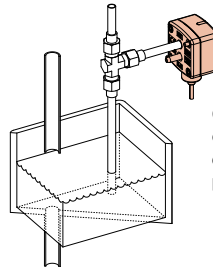
Monitoring Filter Clogging

PSE550 series



The filtration and replacement periods can be controlled by monitoring the clogging of the filter.

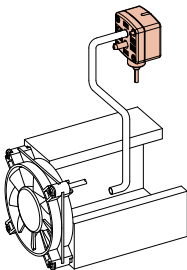
PSE550 series



Can detect the level of a liquid through changes in the purge pressure.

Air Flow Control

PSE550 series



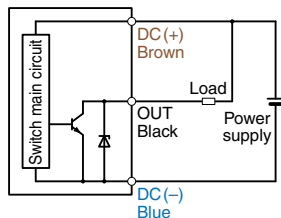
Can monitor the air flow in the duct and control air blasts.

Output Type

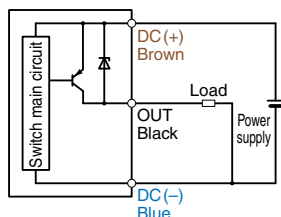
Switch output (ON/OFF output)

- Detects when the limit value exceeds the set value and generates an output for a switch.

• NPN output type



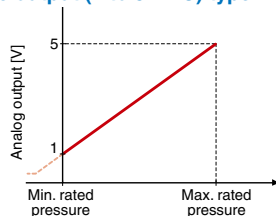
• PNP output type



Analog output

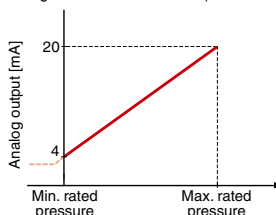
- The voltage, and current output are in proportion to the pressure. (They may vary depending on the product. For details, refer to the individual specifications.)

• Voltage output (1 to 5 VDC) type



• Current output (4 to 20 mA DC) type

Effective for long distance transmission (more than 10 m).



Wiring Specifications

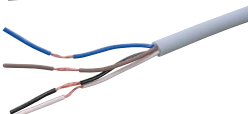
Cable end option

• Standard

Tinned



Half-stripped



• Made to Order

We can provide the cable with a connector from the shown manufacturers. (Tyco Electronics AMP K.K., Molex, J.S.T. Mfg. Co., Ltd., HIROSE ELECTRIC CO., LTD., 3M Japan Limited, etc.)

Pre-wired

Made to Order

We will prepare the cable with a M8 or M12 connector.

• M8 connector

• M12 connector



Available with 2 to 4-wire sensors.
(5-wire sensors can be used without using 1 wire.)

Cable length

• Standard

0.6 m, 2 m, 3 m, and 5 m
(The cable length may vary depending on the product.
For details, refer to the individual specifications.)

• Made to Order

Available less than 10 m.

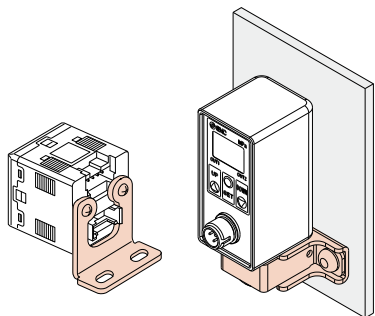
Flexible cable

Made to Order

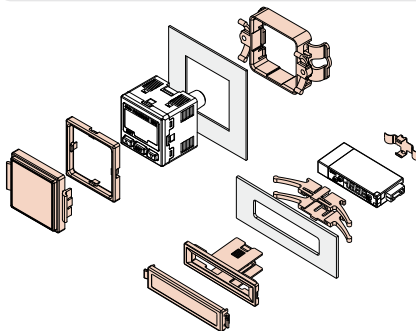
The flexible cables (robot cable) are suited for applications having excessive movement or bends.

Type of Mounting

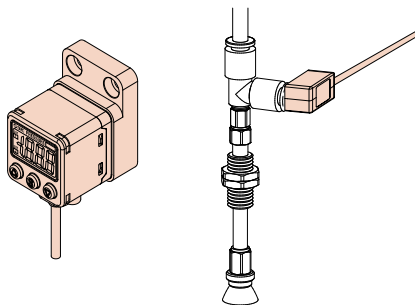
Bracket



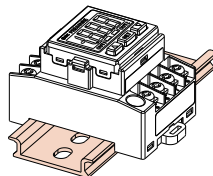
Panel mount



Direct mount



DIN rail



Type of Piping

Fittings

Steel piping is available with PT thread (R thread/Rc thread), NPT thread, NPTF thread, PF thread (G thread), TSJ thread, URJ thread, and M thread.

Compatible with 1/8 or 1/4 inch port size, but not with M thread.

M thread is available with 3 mm or 5 mm.

One-touch fittings/Plug-in reducer

One-touch fittings

Straight and elbow fittings are available in mm and inch diameter.



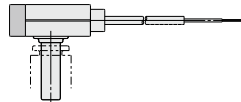
Straight type



Elbow type

Plug-in reducer

Compatible with the smaller size $\phi 4$, $\phi 6$. Can be connected with One-touch fitting directly. Easy handling. Maintenance is good.



Adaptable to Different Environments

Clean room

10- series

● Application

- To prevent particles from entering a clean room.

● Details

- After inspection, blowing with a high purity air (Cleanliness class: ISO class 5) is performed inside of a clean environment.
- Packaging consists of an antistatic protection bag, which is double packaged before being shipped.
- Grease-free for the wetted parts' seals.

Copper, zinc, lead-free

20- series

● Application

Suitable in environment where copper, zinc, or lead cannot be used.

● Details

Copper, zinc, and lead are not used.
* Except for electric parts.

Grease-free

Made to Order

● Application

- Suitable in environments where oils are not allowed. For example, in a nitrogen or oxygen supply line.

● Details

- Any components which include oil are not used. (e.g. NBR coated with oil, etc.)
- No grease is used in the product assembly. (Grease-free)

Silicon-free

Made to Order

● Application

- Suitable in environments where siloxane, the gas emitted from silicon, is not permitted.

● Details

- Any components which contain silicon are not used.
- Since a pressure sensor with a silicon diaphragm is not permitted, one with a stainless steel diaphragm is used.

Fluorine-free

Made to Order

● Application

- Suitable in environments where fluorine based resins can not be used.

● Details

- Fluorine based greases are not used.
- FKM is not used for the seals.

Low density ozone gas compatible

Made to Order

● Application

- Suitable in environments where low density ozone gas is generated.

● Details

- HNBR or FKM is used for the seals.
- Sensor unit and resin materials are the same as those used for standard products.

Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Functions

Auto shift function

- **Summary**

Function to correct the pressure setting of the switch output when there is a pressure fluctuation in the main line.

For example, when the main line pressure increases by 50 kPa, at the time of auto shift signal input, the pressure setting will be increased by 50 kPa, accordingly.

- **Application**

The solution of the supply pressure fluctuation during the suction verification.

Auto preset function

- **Summary**

Function to automatically optimize the setting for the suction verification.

- **Application**

To easily setup the suction verification.

Display calibration function

- **Summary**

Function to prevent inconsistent output values and to allow the adjustment of the display values.

- **Application**

When multiple sensors are used, the differences among the units can be eliminated and the displayed values for each sensor can be adjusted to read the same.

Key lock function

- **Summary**

Function to prevent the changing of settings other than those for normal key operations.

- **Application**

For preventing a malfunction due to unauthorised changes in set-up.

Anti-chattering function

- **Summary**

Function to prevent detection of any momentary pressure fluctuation. Averages the pressure values detected during the response time, which is set by the user.

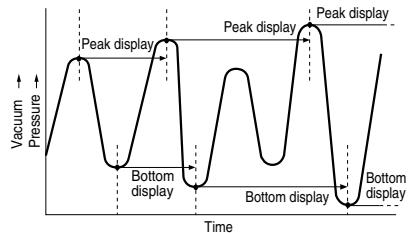
- **Application**

For preventing a momentary fluctuation in the main line pressure from being detected as an abnormal pressure during the actuator's or ejector's operation.

Peak/Bottom hold function

- **Summary**

Function to detect and display the fluctuating pressure peak (maximum value) and bottom (minimum value).



- **Application**

• For confirming the maximum or minimum pressure being measured.

Power-saving mode

Power-saving mode can be selected.

It shifts to the power-saving mode without button operation for 30 seconds.

It is set to the normal mode (Power-saving mode is OFF) when ex-factory. (Decimal points and operation indicator light (only when the switch output is turned ON.) blink in the power-saving mode.)

Copy function

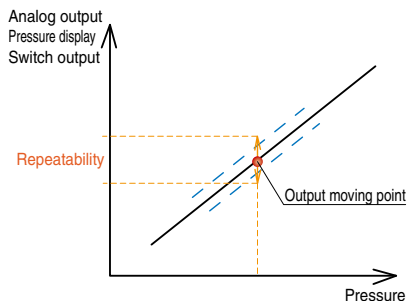
The settings of the master sensor can be copied to the slave sensors. It is to reduce the time taken for setting and prevent the input of wrong values.

Can copy to up to 10 switches simultaneously. (Maximum transmission distance 4 m)

Accuracy

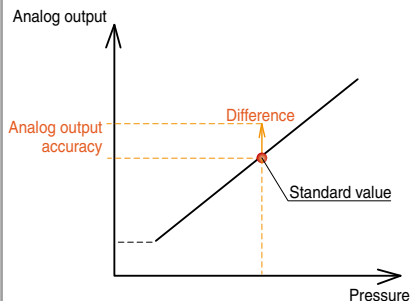
Repeatability

This graph shows the repeatability of an analog output, pressure display and a switch (ON-OFF) output's moving point. The pressure is increased or decreased under normal temperature (25°C).



Analog output accuracy

This graph shows the difference between the analog output voltage (current) standard value versus the input pressure, at a normal temperature (25°C).



Glossary of Terms

UL/CSA standards

UL and CSA standards have been applied in North America (U.S.A. and Canada) symbolizing safety of electrical products, and are defined to mainly prevent danger from an electrical shock or fire, resulting from trouble with the electrical products. The power supply of the pressure sensor is 24 VDC, which does not meet the voltage requirement for the electrical shock category. However, measures against a fire hazard have been taken. Some pressure sensors are **UL/CSA** certified. (Use the UL approved products for DC power supply combinations. Refer to each product's operation manuals for details.)

CE marking

CE marked products or equipment that are imported to countries that are EU members must conform to the EC directives.

SMC products are subject to either or both the low power voltage directive (regarding electrical safety) and the EMC directive (regarding noise conformity).

The operating voltage of the sensors is 24 VDC, therefore it is not subjected to the low voltage directive (50 to 1000 VAC or 75 to 1500 VDC).

The sensors undergo EMC testing by a third party and bears the **CE marking** (self-declaration).

Since the product is a component which is ultimately integrated into the user's equipment machine or facility, the user must confirm that the product conforms to the EC directive.

Enclosure

The **enclosure** is rated according to the IP (International Protection) standards (IEC60529) which defines protection against dust or water.

IP40: Is not protected against the water intrusion, even though a wire exceeding 1.0 mm in diameter can not enter.

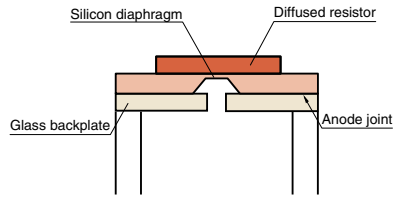
IP65: Powdered dust cannot enter the enclosure and the enclosure is not affected by water sprayed from all directions.

IP67: Powdered dust cannot enter the enclosure, as well as water, even though the enclosure is immersed in water with a specified pressure and time.

Working Principle of Pressure Sensors

Silicon diffused metal oxide semiconductor pressure sensor

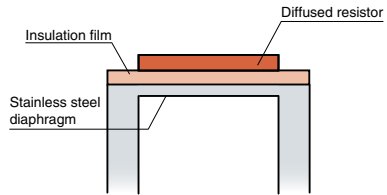
- This sensor is used in dry air and inert gas applications. Four diffused resistors form a bridged circuit on a silicon diaphragm. When pressure is applied, the diaphragm is deflected causing the diffused resistors to change resistance. An electrical signal, which is proportional to the pressure change, is inputted during normal operation.



Silicon diaphragm sensor construction

Stainless steel diaphragm pressure sensor

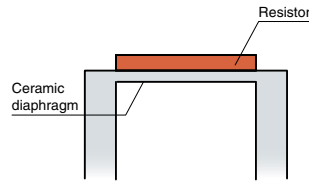
- This pressure sensor is used in humid air, water or oil. Four resistors form a bridged circuit on a stainless steel diaphragm. Since all pressured parts are made of stainless steel, the sensor can measure fluids that do not corrode the stainless steel. Pressure detection is identical to the silicon diffused metal oxide semiconductor pressure sensor.



Stainless steel diaphragm sensor construction

Ceramic diaphragm pressure sensor

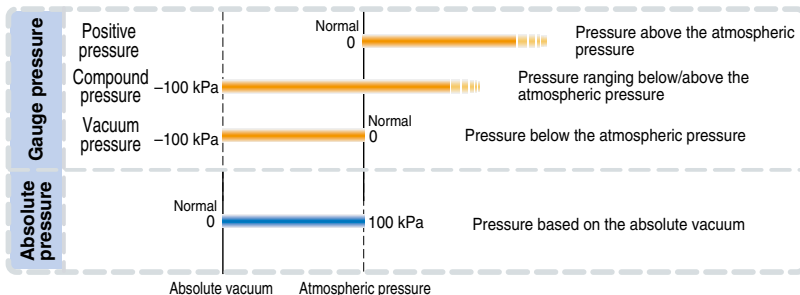
- This pressure sensor is used in humid air, water or oil. Four resistors form a bridged circuit on a ceramic diaphragm. Since all pressured parts are made of ceramic, the sensor can measure fluids that do not corrode the ceramic. Pressure detection is identical to the silicon diffused metal oxide semiconductor pressure sensor.



Ceramic diaphragm sensor construction

Pressure Type

- There are two types of pressures: The Gauge Pressure, and Absolute Pressure. The gauge pressure is based on the atmospheric pressure. Whereas the absolute pressure is based on the absolute vacuum. (The gauge pressure will change in accordance with the atmospheric pressure change.)
- All of our products are made based on the gauge pressure.



Flow Rate Detection Equipment

For Gas



For Liquid



Monitor (Controller)



Directional
Control Valves

Actuators

Air Preparation
Equipment

Air Combination

Pressure Control
Equipment

Pressure Detection
Equipment

Flow Rate Detection
Equipment

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Type of Mounting	P.157
Piping Specifications	P.157
Adaptable to Different Environments	P.158
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Accuracy	P.160
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Flow Sensor

Product Variations

Standard: █ Made to Order: █

Applicable fluids

For Air

Thermal type (MEMS)

Dry air, Nitrogen, Argon,
CO₂

(Air quality grade is
JIS B 8392.1-1. 1.2 to 1.6.2,
ISO 8573.1-1. 1.2 to 1.6.2.)

For Air

Thermal type (Thermistor)

Air, Nitrogen

For Water

Karman vortex

Water
Mixture of water (50%)
and ethylene glycol (50%)

For Water and Water-soluble Coolant

Electromagnetic type

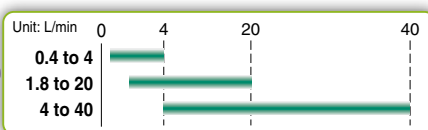
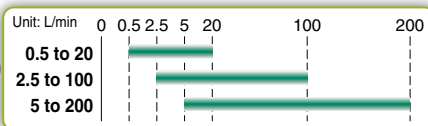
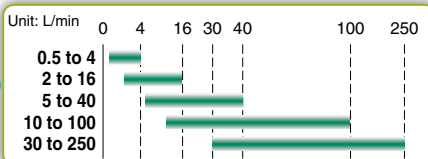
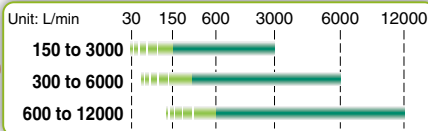
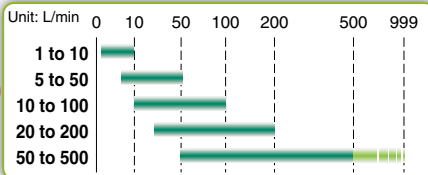
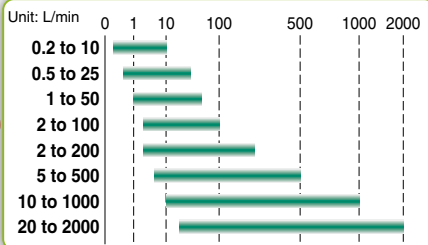
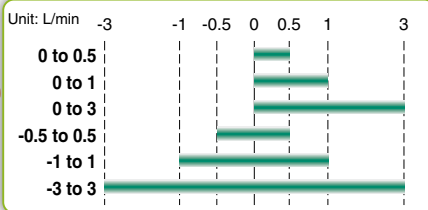
Water
Water-soluble Coolant

For Deionized Water and Chemical Liquids

Karman vortex

Deionized water
Fluids that does not corrode or osmose the wetted
parts (with viscosity 3 mPa·s [3 cP] or less)

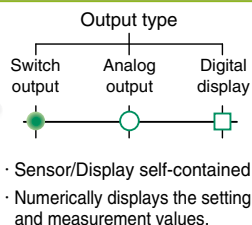
Flow range



Product type

Corresponding model

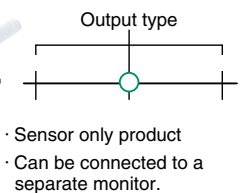
Integrated type



For Air	For Water	For Water, Water-soluble Coolant	For Deionized Water, Chemical Liquids
Page 150, 151	Page 151	Page 151	Page 151
· PFM7 series · PFM87 series · PFM7C series · PF2A7 series · PF2A7□□H series	· PF3W7 series	· LFE□ series	· PF3W7 series

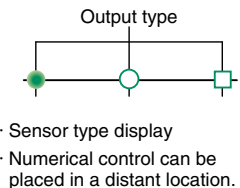
Note) The PF2A7 and PF2A7□□H series are compatible with Made to Order specifications.

Sensor



Page 152	Page 153	Page 153	Page 153
· PFM5 series · PFMV5 series · PF2A5 series	· PF3W5 series	· LFE□ series	· PF2D5 series · PF3W5 series

Monitor



Page 152	Page 153	Page 153	Page 153
[For 1 ch] · PFM3 series · PFMV3 series · PF2A3 series	[For 1 ch] · PF3W3 series	[For 1 ch] · LFE0 series	[For 1 ch] · PF2D3 series
[For 4 ch] · PF2A2 series			[For 4 ch] · PF2D2 series

Directional
Control Valves

Actuators

Air Preparation
Equipment

Air Combination

Pressure Control
Equipment

Pressure Detection
Equipment




Flow Rate Detection
Equipment

General Performance Table

Model Selection Table

Self-contained Type

Model	PFM7	PF2A7	PFMB7
Fluid	Dry air, N ₂ , Ar, CO ₂	Air, N ₂	Dry air, N ₂
Calibration method			Push-button calibration
Rated flow range	0.2 to 10 L/min 0.5 to 25 L/min 1 to 50 L/min 2 to 100 L/min	1 to 10 L/min 5 to 50 L/min 10 to 100 L/min 20 to 200 L/min 50 to 500 L/min 150 to 3000 L/min 300 to 6000 L/min 600 to 12000 L/min	2 to 200 L/min 5 to 500 L/min 10 to 1000 L/min 20 to 2000 L/min
Power supply voltage	24 VDC ±10%		
Temperature characteristics (based on 25°C)	±2% F.S. (15 to 35°C) ±5% F.S. (0 to 50°C)	±3% F.S. (15 to 35°C) ±5% F.S. (0 to 50°C) ±2% F.S. (PF2A7□□H: 0 to 50°C)	±2% F.S. (15 to 35°C) ±5% F.S. (0 to 50°C)
Repeatability	±1% F.S. (Fluid: Dry air) Analog output: ±3% F.S.	±1% F.S. (PF2A7□0, PF2A7□□H) ±2% F.S. (PF2A7□1)	±1% F.S. (Fluid: Dry air)
Hysteresis	Hysteresis mode: Variable Window comparator mode: Variable	Hysteresis mode: Variable Window comparator mode: Fixed (3 digits*) * Digit is min. calibration unit.	Hysteresis mode: Variable Window comparator mode: Variable
Output	NPN/PNP open collector Accumulated pulse output Analog voltage output Analog current output	NPN/PNP open collector Accumulated pulse output	
Display	2-color display	1-color display	2-color LED display 2-color LCD display
Enclosure	IP40	IP65	IP40
Note	Flow adjustment valve integrable Panel mounting possible DIN rail mountable Selectable flow rate display unit Responses time setting function Secret code setting function Power-saving mode Accumulated flow display function	Selectable flow rate display unit Accumulated flow display function	Flow adjustment valve integrable (for 200 L) Panel mounting possible (for 200 L) DIN rail mountable (for 200 L) Selectable flow rate display unit Responses time setting function → All renewed Secret code setting function Power-saving mode Accumulated flow display function
Page	8 P.207	8 P.305	8 P.253









PFMC7	PF3W7		LFE□
	 PVC piping type		
	Water, ethylene glycol aqueous solution		For Water, water-soluble coolant
5 to 500 L/min 10 to 1000 L/min 20 to 2000 L/min	0.5 to 4 L/min 2 to 16 L/min 5 to 40 L/min 10 to 100 L/min 50 to 250 L/min		0.5 to 20 L/min 2.5 to 100 L/min 5 to 200 L/min
12 to 24 VDC ±10%			24 VDC ±10%
±5% F.S. (0 to 50°C)			±5% F.S.
±2% F.S.			±2% F.S. (Displayed values) Analog output: ±1.5% F.S.
Variable			
NPN/PNP open collector Accumulated pulse output Analog voltage output Analog current output			NPN/PNP open collector Analog voltage output Analog current output
3-color LCD display		3-color display	
IP65			
Selectable flow rate display unit Responses time setting function → All renewed Secret code setting function Power-saving mode Accumulated flow display function	3-color/2-screen display Selection of display on sub screen Switching of flow direction Responses time setting function Secret code setting function Power-saving mode Accumulated flow display function		
8 P.275	8 P.329		8 P.359

General Performance Table

Model Selection Table

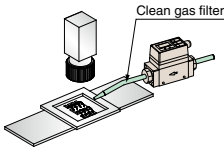
Remote Type

Model	Sensor unit	Monitor unit	Sensor unit	Monitor unit	Sensor unit	Monitor unit	
	PFM5	PFM3	PFMV5	PFMV3	PF2A5	PF2A3	PF2A2
Fluid	Dry air, N ₂ , Ar, CO ₂		Dry air, N ₂		Air, N ₂		
Sensor input amount	1 input		1 input		1 input		4 inputs
Calibration method	Push-button calibration		Push-button calibration		Push-button calibration		
Rated flow range	0.2 to 10 L/min 0.5 to 25 L/min 1 to 50 L/min 2 to 100 L/min		0 to 0.5 L/min 0 to 1 L/min 0 to 3 L/min		-0.5 to 0.5 L/min -1 to 1 L/min -3 to 3 L/min		1 to 10 L/min 5 to 50 L/min 10 to 100 L/min 20 to 200 L/min 50 to 500 L/min
Power supply voltage	24 VDC ±10%		24 VDC ±10%		12 to 24 VDC ±10%		
Temperature characteristics (based on 25°C)	±2% F.S. (15 to 35°C) ±5% F.S. (0 to 50°C)	±0.5% F.S. (0 to 50°C)	±2% F.S. (15 to 35°C) ±5% F.S. (0 to 50°C)	±0.5% F.S. (0 to 50°C)	±2% F.S. (15 to 35°C) ±3% F.S. (0 to 50°C)	±1% F.S. (15 to 35°C) ±2% F.S. (0 to 50°C)	±2% F.S. (0 to 50°C)
Repeatability	±1% F.S. (Fluid: Dry air) Analog output: ±5% F.S.	±0.1% F.S. (Fluid: Dry air) Analog output: ±0.5% F.S.	±1% F.S. (Fluid: Dry air) Analog output: ±5% F.S.	±0.1% F.S. (Fluid: Dry air) Analog output: ±0.5% F.S.	±1% F.S. (connected with PF2A3□) ±2% F.S. (connected with PF2A2□)	±1% F.S.	±3% F.S.
Hysteresis		Hysteresis mode: Variable Window comparator mode: Variable		Hysteresis mode: Variable Window comparator mode: Variable		Hysteresis mode: Variable Window comparator mode: Fixed (3 digits*) * Digit is min. calibration unit.	
Output	Analog voltage output Analog current output	NPN/PNP open collector Accumulated pulse output Analog voltage output Analog current output	Analog voltage output Analog current output	NPN/PNP open collector Analog voltage output Analog current output	Analog voltage output Analog current output	NPN/PNP open collector Accumulated pulse output	
Display		2-color display		2-color display		1-color display	1-color display
Enclosure	IP40		IP40		IP65	IP40	Front only: IP65 The rest: IP40
Note	Flow adjustment valve integrable Panel mounting possible Manifold mountable DIN rail mountable	Panel mounting possible Selectable flow rate display unit Secret code setting function Power-saving mode Accumulated flow display function	Manifold mountable	Panel mounting possible Selectable flow rate display unit Secret code setting function Power-saving mode Auto shift function	Connectable with 4 ch monitor (Analog voltage output only)	Selectable flow rate display unit Accumulated flow display function	
Page	8 P.207		8 P.287		8 P.305		

Sensor unit	Monitor unit	Sensor unit	Sensor unit	Monitor unit	Sensor unit	Monitor unit	
PF3W5 	PF3W3 	PF3W5  PVC piping type	LFE□ 	LFE0 	PF2D5 	PF2D3 	PF2D2 
Water, ethylene glycol aqueous solution		Water, deionized water, chemicals	For Water, water-soluble coolant		Deionized water, Fluids that does not corrode or osmose Super PFA.		
	1 input			1 input		1 input	4 inputs
	Push-button calibration			Push-button calibration		Push-button calibration	
0.5 to 4 L/min 2 to 16 L/min 5 to 40 L/min 10 to 100 L/min 50 to 250 L/min		10 to 100 L/min 30 to 250 L/min	0.5 to 20 L/min 2.5 to 100 L/min 5 to 200 L/min		0.4 to 4 L/min 1.8 to 20 L/min 4 to 40 L/min		
12 to 24 VDC ±10%			24 VDC ±10%		12 to 24 VDC ±10%		
±5% F.S. (0 to 50°C)	±0.5% F.S. (0 to 50°C)	±5% F.S. (0 to 50°C)	±5% F.S.		±5% F.S. (0 to 50°C)	±1% F.S. (15 to 35°C) ±2% F.S. (0 to 50°C)	±2% F.S. (0 to 50°C)
±2% F.S.	±0.5% F.S.	±2% F.S.	±1.5% F.S.	±0.5% F.S.	±1% F.S.	±0.5% F.S.	±3% F.S.
	Variable			Variable		Hysteresis mode: Variable Window comparator mode: Fixed (3 digits*) * Digit is min. calibration unit.	
Analog voltage output Analog current output	NPN/PNP open collector Analog voltage output Analog current output	Analog voltage output Analog current output	Analog voltage output Analog current output	NPN/PNP open collector Analog voltage output Analog current output	Analog voltage output Analog current output	NPN/PNP open collector Accumulated pulse output	
	3-color display			3-color display		1-color display	1-color display
IP65	Front only: IP65 The rest: IP40	IP65	IP65	Front only: IP65 The rest: IP40	IP65	IP40	Front only: IP65 The rest: IP40
Temperature sensor and flow adjustment valve integrable Flow indicator	3-step setting Copy function 3-color/ 2-screen display	Flow indicator		3-color/ 2-screen display	Connectable with 4 ch monitor (Analog voltage output only)	Selectable flow rate display unit Accumulated flow display function	
8 P.329			8 P.359		8 P.381		

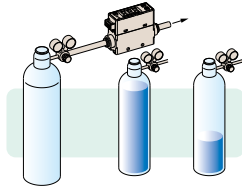
Application Examples

- **Flow control of N2 gas to prevent detection camera shimmering and lead frame oxidation**

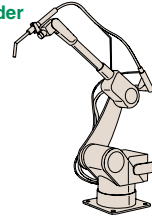


Set the clean gas filter on the outlet side piping of the flow switch.

- **Accumulated indication shows the operating flow rate or residual amount (of N₂ etc.) in a gas cylinder.**

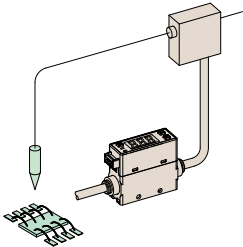


- **Welder**

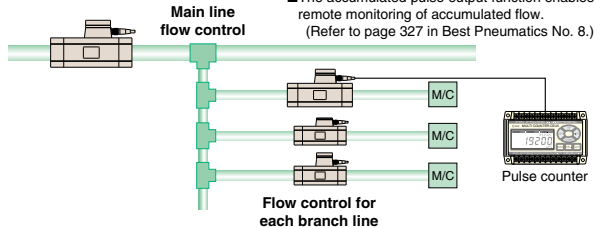


Models compatible with argon (Ar) and carbon dioxide (CO₂) mixed gas are available. Refer to page 251 in Best Pneumatics No. 8 for details.

- **Control of metal wire tension**



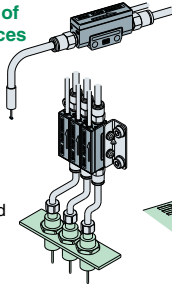
- **Makes it possible to monitor the air flow from the main line to each branch line.**



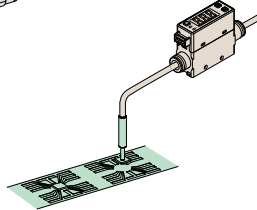
- **Suction verification of very small work pieces**

- Suction of small components can be checked.
- Highly applicable to small nozzles
- Nozzle clogging and crushing detectable.

- Sensors can be mounted as a manifold.
- Sensors can be mounted near pads.

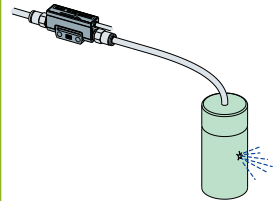


- **Suction verification**



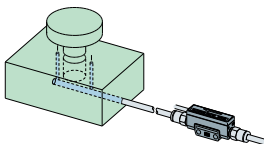
- **Easy leak test**

- Easily detects pin halls on molded parts.

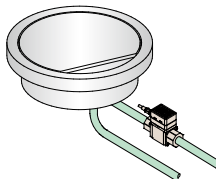


- **Easy placement verification**

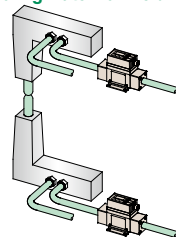
- Placement verification is possible by flow rate change.



- **Flow control of cooling water for wafer temperature control and high frequency power supply**



- **Flow control of pressurized cooling water for welding gun**

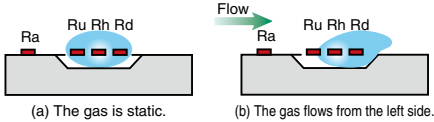


Flow Sensor Principle

Thermal type (MEMS)

This MEMS sensor chip consists of upstream temperature measuring sensor (Ru) and downstream temperature measuring sensor (Rd), which are placed symmetrically from the center of a platinum thin film coated heater (Rh) mounted on a membrane, and an ambient temperature sensor (Ra) for measuring gas temperature.

The principle is shown as the diagram below, the difference in resistance between Ru and Rd is proportional to the flow velocity, so measurement and analysis of the resistance can show the flow direction and velocity of the gas. Ra is used to compensate the gas and/or ambient temperature.



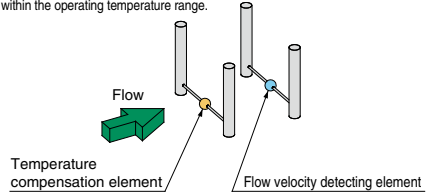
(a) The gas is static.

(b) The gas flows from the left side.

This flow switch uses L/min as the flow rate indicator unit. The mass flow is converted and displayed under the conditions of 0°C and 101.3 kPa and 20°C and 101.3 kPa.

Thermal type (Thermistor)

A heated thermistor is installed in the passage, and fluid absorbs heat from the thermistor as it is introduced to the passage. The thermistor's resistance value increases as it loses heat. Since the resistance value increase ratio has a uniform relationship to the flow velocity, the flow velocity can be detected by measuring the resistance value. To further compensate the fluid and ambient temperature, the temperature sensor is also built into the switch to allow stable measurement within the operating temperature range.



Temperature compensation element

Flow velocity detecting element

This flow switch uses L/min as the flow rate indicator unit. The mass flow is converted and displayed under the conditions of 0°C and 101.3 kPa and 20°C and 101.3 kPa.

For air

Applicable fluid: Air, nitrogen, argon, carbon dioxide
Air quality grade is
JIS B8392.1-1.6.2 , ISO8573.1-1.6.2

For air

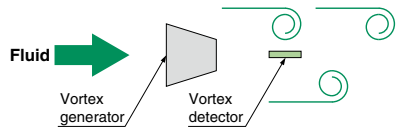
Applicable fluid: Air, nitrogen

Karman vortex

When an elongated object (vortex generator) is placed in the flow, reciprocal vortices are generated on the downstream side. These vortices are stable under certain conditions, and their frequency is proportional to the flow velocity, resulting the following formula.

$$f = k \times v$$

f: Frequency of vortex v: Flow velocity k: Proportional constant (determined by the vortex generator's dimensions and shape).
Therefore, the flow rate can be measured by detecting this frequency.



For water

Applicable fluid: Water
Mixture of water (50%) and ethylene glycol (50%)

For deionized water, chemicals

Applicable fluid: Deionized water
Ultrapure water
Fluids that does not corrode piping materials.

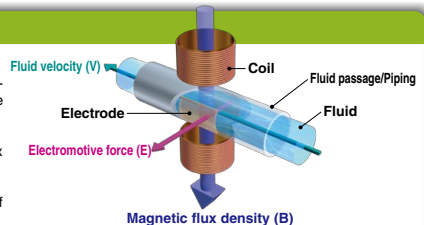
Electromagnetic type

Faraday's law of induction

Measure the volume flow of inductive liquid by applying the Faraday's law of induction "when conductive object is moved through a magnetic field, electromotive force will be generated."

Electromotive force (E) is proportional to fluid velocity (V) multiplied by magnetic flux density (B).

Volume flow is calculated by converting measured electromotive force (E).
Oval fluid passage is used to improve the magnetic flux density by small amount of current.



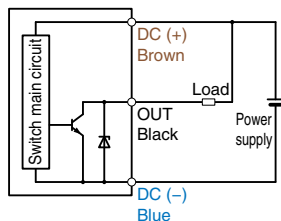
Fluid: For Water, water-soluble coolant

Output Type

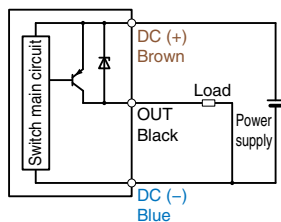
Switch output (ON/OFF output)

The switch is activated when the set threshold value is exceeded.

● NPN output type



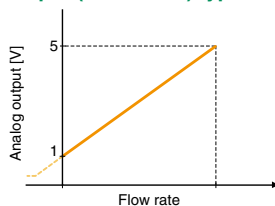
● PNP output type



Analog output

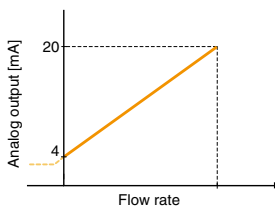
Outputs voltage and current proportional to flow rate.

● Voltage output (1 to 5 VDC) type



● Current output (4 to 20 mA DC) type

Effective for long distance transmission (10 m or more).



Wiring Specifications

Wiring

● M8/M12 connector

The main body wiring part connector specification for the PF2□7□ and PF2A5□/PF2W5□ series is M12. The PF3W7□ and PFMC series connector specification is M8.

The provided cable with connector terminal is half-stripped.



● Terminal block

The PF2□3□ series has a terminal block in the bottom which is connected to the sensor unit of the PF2□5□ series and control component such as PLC.



● Dedicated cable

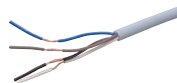
The PFM, PFMB, PFMV, PF2□2□, and PF2D series are wired with the dedicated cable or the dedicated cable with connector.

Cable end option

● Standard

Half-stripped

Half-stripped cables are used except for the PF2□3□ series, which is wired onto terminal blocks, and the PF2D5□ series, which is pre-solder wiring compatible.



● Made to Order

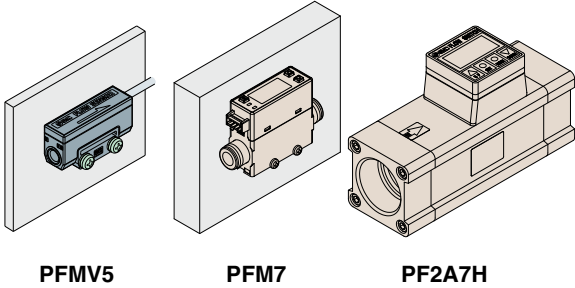
We can provide the cable with a connector from the shown manufacturers.

(Tyco Electronics Japan G.K., Molex Japan Co., Ltd., J.S.T. Mfg. Co., Ltd., HIROSE ELECTRIC CO., LTD., 3M Japan Limited, etc.)

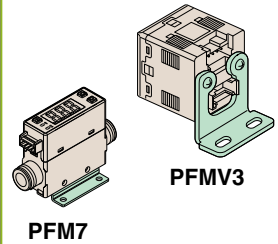


Type of Mounting

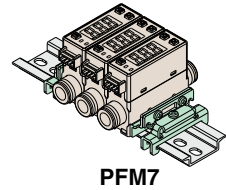
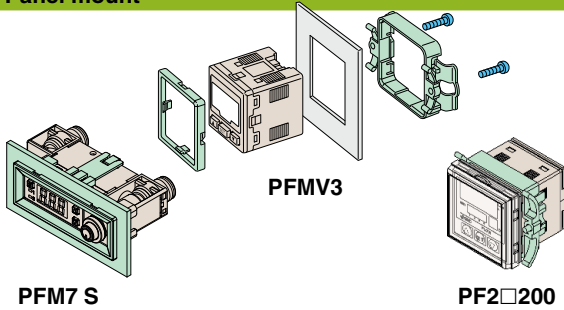
Direct mount



Bracket



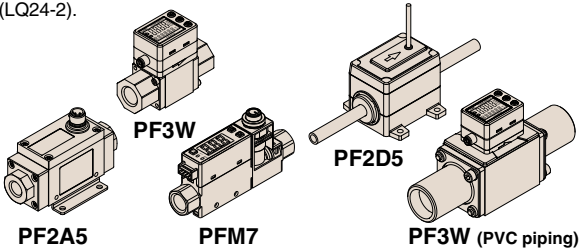
Panel mount



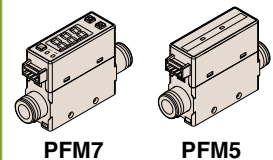
Piping Specifications

Fittings

Steel tube piping compatible with PT thread (R thread/Rc thread), NPT thread, PF thread (G thread) and M thread.
The PF2D5□ series for chemicals compatible with fluoropolymer fittings (LQ24-2).



Straight types available in mm and inch diameter.



Directional Control Valves

Actuators

Air Preparation Equipment

Air Combination Equipment

Pressure Control Equipment

Pressure Detection Equipment

Flow Rate Detection Equipment

Adaptable to Different Environments

Clean room

Made to Order

- **Application**
To prevent particles from entering a clean room.
- **Details**
 - After inspection, blowing with a high purity air (Cleanliness class: ISO class 5) is performed inside of a clean environment.
 - Packaging consists of an antistatic protection bag, which is double packaged before being shipped.
 - Grease-free for the wetted parts' seals.

Copper-free

Made to Order

- **Application**
Suitable in environments where copper ions are not permitted. For example, CRT manufacturing or frontend semiconductor manufacturing process equipment.
- **Details**
Application of material which does not include copper in wetted parts (or electroless nickel plated treatment).

Grease-free

Made to Order

- **Application**
Suitable in environments where oils are not permitted. For example, in a nitrogen or oxygen supply line.
- **Details**
 - No grease is used in the product assembly. (Grease-free)

Silicon-free

Made to Order

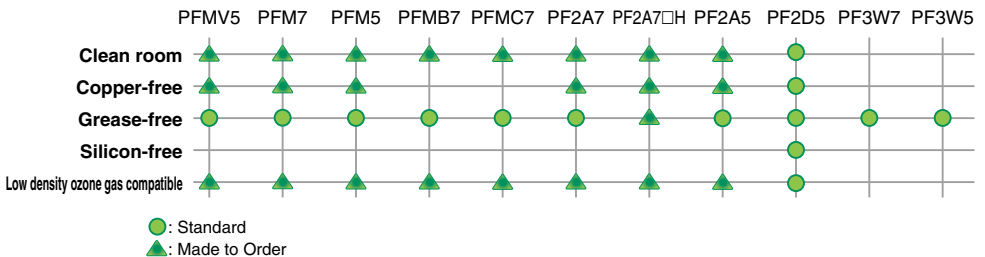
- **Application**
Suitable in environments where siloxane, the gas emitted from silicon, is not permitted.
- **Details**
 - Any components which contain silicon are not used.
 - Since the MEMS sensor with a silicon film cannot be used, it is not applicable to the PFM series.

Low density ozone gas compatible

Made to Order

- **Application**
Suitable in environments where low density ozone gas is generated.
- **Details**
 - FKM is used for the seals.
 - Sensor parts and resin materials are the same as those used for standard products.

● Applicability chart



Functions

Auto shift function

● Summary

Function to output for relative change amount referring the instantaneous flow when external signal is input as a base.

● Application

The solution of the flow rate fluctuation due to supply pressure fluctuation or nozzle diameter change during suction verification.

Auto preset function

● Summary

Function to calculate the rough set value automatically for suction verification.

● Application

To easily setup the suction verification.

Keylock function

● Summary

Function to prevent the changing of settings other than those for normal key operations.

● Application

For preventing a malfunction due to unauthorised changes in setup.

Accumulating function

● Summary

Function to confirm a total flow rate in a certain period.

● Application

For confirming the consumption flow rate.

Response time setting function

● Summary

Function to select the response time for the switch output.

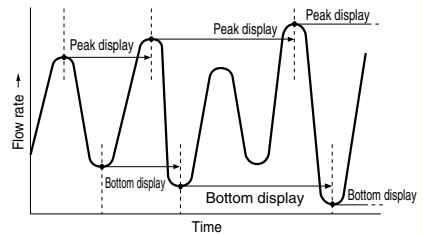
● Application

Can be prevented the output chattering in such a case when the fluid pulsation should not be detected as an abnormal flow rate.

Peak/Bottom hold function

● Summary

Function to detect and display the fluctuating flow rate peak (maximum value) and bottom (minimum value).



● Application

For confirming the maximum or minimum flow rate being measured.

Accumulated pulse output function

● Summary

Function to provide pulse output every time the flow rate reaches a certain value.

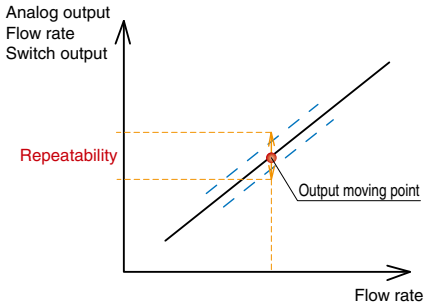
● Details

For monitoring the flow rate by remote control.

Accuracy

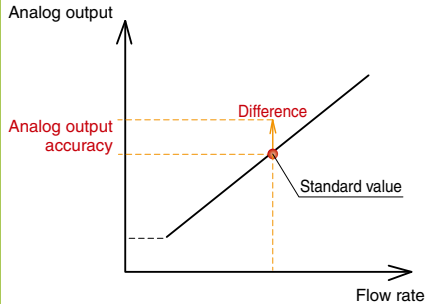
Repeatability

This graph shows the repeatability of an analog output, pressure display and a switch (ON-OFF) output's moving point. The flow rate is increased or decreased under normal temperature (25°C).



Analog output accuracy

This graph shows the difference between the analog output voltage (current) standard value versus the flow rate, at a normal temperature (25°C).



Glossary of Terms

UL/CSA standards

UL and CSA standards have been applied in North America (U.S.A. and Canada) symbolizing safety of electrical products, and are defined to mainly prevent danger from an electrical shock or fire, resulting from trouble with the electrical products. The power supply of the flow switch is 24 VDC, which does not meet the voltage requirement for the electrical shock category. However, measures against a fire hazard have been taken. Some flow switches are **UL/CSA** certified. (Use the UL approved products for DC power supply combinations. Refer to each product's operation manuals for details.)

CE marking

CE marked products or equipment that are imported to countries that are EU members must conform to the EC directives.

SMC products are subject to either or both the low power voltage directive (regarding electrical safety) and the EMC directive (regarding noise conformity).

The operating voltage of the flow switches is 24 VDC, therefore it is not subjected to the low voltage directive (50 to 1000 VAC or 75 to 1500 VDC).

The flow switches undergo EMC testing by a third party and bears the **CE marking** (self-declaration).

Since the product is a component which is ultimately integrated into the user's equipment machine or facility, the user must confirm that the product conforms to the EC directive.

Enclosure

The **enclosure** is rated according to the IP (International Protection) standards (IEC60529) which defines protection against dust or water.

IP40: Is not protected against the water intrusion, even though a wire exceeding 1.0 mm in diameter can not enter.

IP65: Powdered dust cannot enter the enclosure and the enclosure is not affected by water sprayed from all directions.

IP67: Powdered dust cannot enter the enclosure, as well as water, even though the enclosure is immersed in water with a specified pressure and time.

Best Pneumatics

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You can search all products in Best Pneumatics



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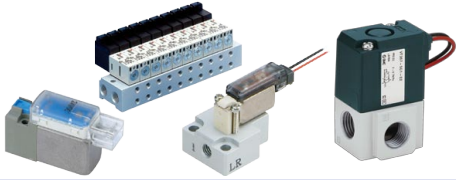
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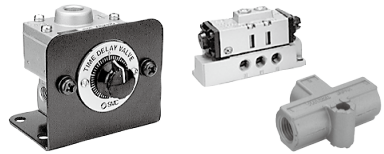


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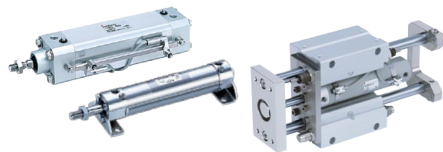
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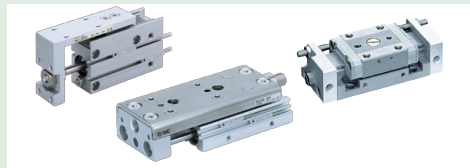
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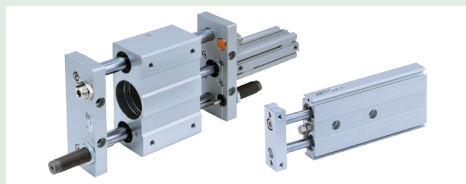
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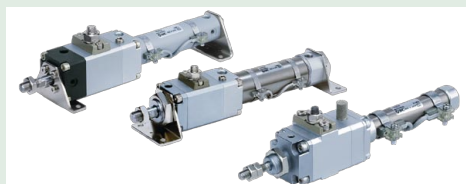
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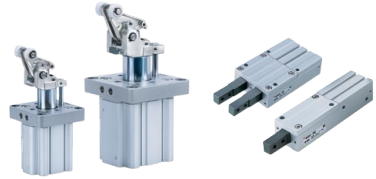
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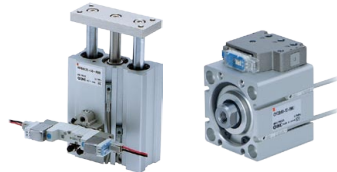
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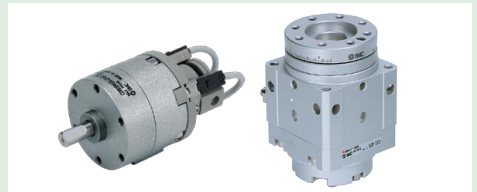
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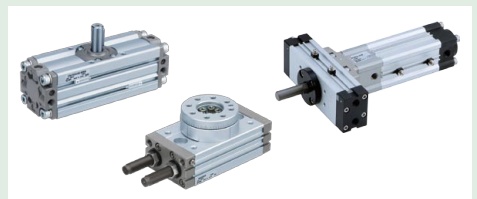
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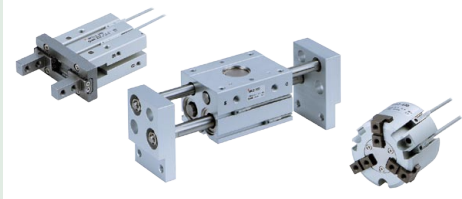


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- 2-Color Indicator P.236
- 2-Color Indicator with Diagnostic Output P.236

- Water Resistant 2-Color Indicator P.236
- With Timer P.236
- Trimmer Auto Switch P.236
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- 2-Color Indicator P.236
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Best Pneumatics

4

Vacuum Equipment

P.238

Vacuum Ejectors/ Vacuum Pump System

P.238



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- Space Saving Vacuum Ejector/Vacuum Pump System/ZQ... P.238
- Large Size Vacuum Module/ZR P.238
- Compact Vacuum Unit/ZB P.238
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- Vacuum Ejector/ZH P.240
- All Stainless Steel Vacuum Ejector/ZH□□-X267 **New** P.240
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Best Pneumatics 4

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Best Pneumatics 5

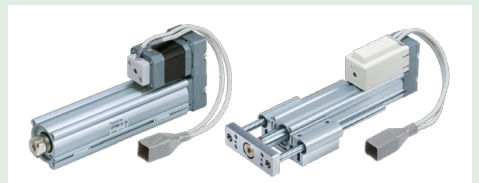
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Miniature P.251



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Electric Rotary Table/LEP P.252

Grippers P.252



Electric Gripper/LEH P.252

Environment P.253



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- Clean Room Specification
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- Electric Actuator/High Rigidity Slider Type/11-LEJS P.254
- Secondary Battery Compatible
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Best Pneumatics 6

Air Preparation Equipment ▶ P.261

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Modular F.R.L. Units P.268



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◆ **Electro-Pneumatic Regulators**

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◆ **Electro-Pneumatic Proportional Valves**

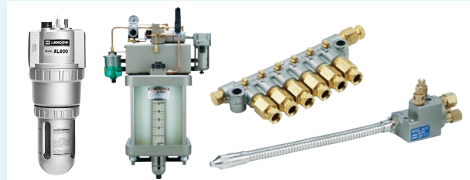
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Lubrication Equipment ▶ P.281

Lubrication Equipment P.281



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 Related Products: Oil Distributor/**VA, VB Series, Nylon Tubing** P.281
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Best Pneumatics

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Fittings and Tubing

P.283

Fittings for General Purposes P.283



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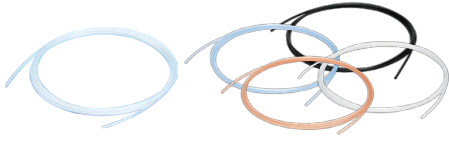


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Low Torque Rotary/ MQR	P.289
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Tubing P.289

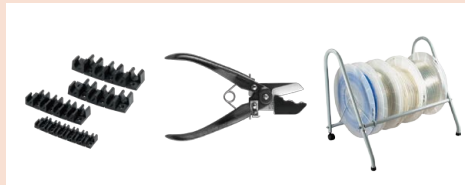


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Polyurethane Flat Tubing/Multi-core, Multi-color/ TU New	P.290
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Tube Cutter/ TK	P.295
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Flow Control Equipment ▶ P.296

Speed Controllers P.296



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Elbow Type/Universal Type/ AS-FG	P.299
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Dual Speed Controller/ ASD□□□F-D	P.300
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Elbow Type/Universal Type/ AS□□□1F-T	P.300
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Standard Type/Elbow Type (Metal Body)/ AS□2□0-T	P.300
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Best Pneumatics

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Related Equipment P.301



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Quick Exhaust Valve/AQ	P.301
Quick Exhaust Valve with One-touch Fittings/ AQ240F/340F	P.301
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Silencers/Exhaust Cleaners ▶ P.303

Silencers P.303



Silencer/AN	P.303
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Exhaust Cleaners P.303



Exhaust Cleaner/AMC	P.303
Exhaust Cleaner for Vacuum Pump/AMV	P.303
Exhaust Cleaner for Clean Room/AMP	P.303
Exhaust Cleaner for Clean Filter/SFE	New P.303

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▶ P.304



Blow Gun/VMG	P.304
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Pressure Gauges

▶ P.304

Pressure Gauges P.304



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Compact Manometer/PPA	P.305



Best Pneumatics

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Pressure Switches

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Electronic Pressure Switches (Self-contained Type)

P.306



- 3-Screen Display High-Precision Digital Pressure Switch/
ZSE20(F)/ISE20 **New** P.306
- 2-Color Display High-Precision Digital Pressure Switch/
ZSE30A(F)/ISE30A P.306
- 2-Color Display High-Precision Digital Pressure Switch/
ZSE40A(F)/ISE40A P.306
- Compact Digital Pressure Switch/**ZSE10(F)/ISE10** P.306
- 2-Color Display Digital Pressure Switch/**ISE70/75/75H** ... P.306
- 2-Color Display Digital Pressure Switch/
ZSE80(F)/ISE80(H) P.307
- Air Checker: Electronic Pressure Switch/
PS1000/PS1100/PS1200 P.307
- 3-Color Display Digital Gap Checker/**ISA3** **New** P.307
- Air Catch Sensor/**ISA2** P.307
- Digital Pressure Switch (Built-in Regulator Type)/**ISE35** ... P.307

Electronic Pressure Switches (Remote Type)

P.308



- Compact Pneumatic Pressure Sensor/**PSE530** P.308
- Compact Pneumatic Pressure Sensor/**PSE540** P.308
- Low Differential Pressure Sensor/**PSE550** P.308
- Pressure Sensor for General Fluids/**PSE560** P.308
- Pressure Sensor for General Fluids/**PSE570** **New** P.308
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Mechanical Pressure Switches

P.309



- Pressure Switch/Reed Switch Type/**IS10** P.309

- Pressure Switch/Micro Switch Type/**IS3000** P.309
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Flow Switches

P.310

Digital Flow Switches

P.310



- 2-Color Display Digital Flow Switch/**PFM** P.310
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- Digital Flow Switch for Air/**PF2A** P.311
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Mechanical Flow Switches

P.312



- Diaphragm Style Flow Switch/**IFW5** P.312
- Paddle Style Flow Switch/**IF3** P.312

Static Neutralization Equipment

P.313

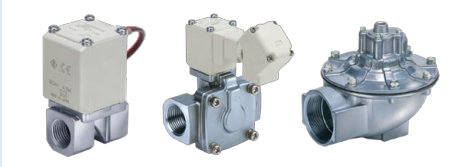


- Ionizer/Bar Type/**IZS40/41/42** P.313
- Ionizer/Nozzle Type/**IZN10** P.313
- Fan Type Ionizer/**IZF** **New** P.313
- Desktop Duster Box/**ZVB** **New** P.313
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Best Pneumatics **9**

2/3 Port Valves for Fluid Control ▶ P.315

**2/3 Port Valves for Fluid Control/
 Air Operated Valves** P.315



Direct Operated 2 Port Solenoid Valve/**VX21/22/23** P.315
 2 Port Solenoid Valve with Built-in Y-strainer/
VXK21/22/23 P.315
 Pilot Operated 2 Port Solenoid Valve/**VXD** P.315
 Zero Differential Pressure Type Pilot Operated
 2 Port Solenoid Valve/**VXZ** P.315
 Zero Differential Pressure Type Pilot Operated
 2 Port Solenoid Valve/**VXS** P.315
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 Water Hammer Relief, Pilot Operated
 2 Port Solenoid Valve/**VXR21/22/23** P.316
 Diaphragm Type Pilot Operated
 2 Port Solenoid Valve for High Pressure/**VXH** P.316
 2 Port Solenoid Valve/
 Air Operated Valve for Dust Collector/**VXF2/VXFA2** P.317
 Direct Operated 3 Port Solenoid Valve/**VX31/32/33** P.317
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**2/3 Port Solenoid Valves for Fluid Control/5.0 MPa/
 Water and Air/High Speed/Chemical Liquids** ... P.318



5.0 MPa Pilot Operated 2/3 Port Solenoid Valve
 & Check Valve/**VCH41/42/410/VCHC40** P.318
 Direct Operated Regulator for 6.0 MPa (Relieving Type)
VCHR P.318
 5.0 MPa Silencer/**VCHN** P.318
 Compact Direct Operated 2 Port Solenoid Valve/**VDW** ... P.318
 Compact Direct Operated 3 Port Solenoid Valve for Water and Air/**VDW** ... P.318
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VDW30/40-XF P.319
 High Speed 2 Port Valve/**SX10** **New** P.319
 Pilot Operated 2 Port Solenoid Valve for Dry Air/**VQ** P.319
 Compact Direct Operated 2/3 Port Solenoid Valve for Chemical Liquids/**LVM** ... P.319

**2/3 Port Valves for General
 Purpose Fluid Control** P.320



Process Valve/**VNA** P.320
 Process Valve/**VNB** P.320
 Coolant Valve/**SGC** P.320
 3 MPa/7 MPa High Pressure Coolant Valve/**SGH** P.320
 Coolant Valve/**VNC** P.320
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 Steam Valve/**VND** P.321
 Valve for Water and Chemical Base Fluids
 (2/3 Port Air Operated Valve)/**VCC** P.321
 2-Layer Soft Fluoropolymer Tubing/**TQ** P.321



Clean Wet Series

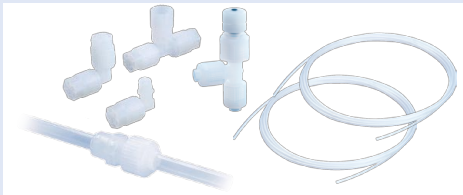
▶ P.322

Chemical Liquid Valves P.322



- High Purity Chemical Liquid Valve: Air Operated, Integrated Fitting Type/LVC ... P.322
- High Purity Chemical Liquid Valve: Air Operated, Threaded Type/LVA ... P.322
- High Purity Chemical Liquid Valve: Manually Operated (Integrated Fitting Type/Threaded Type)/LVH P.322
- Compact Type High Purity Air Operated Chemical Liquid Valve/LVD ... P.323
- High Purity Chemical Liquid Valve Non-Metallic Exterior/LVQ ... P.323
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Fittings and Needle Valves/ Tubing P.324



- Fluoropolymer Fittings/Hyper Fittings/LQ1 P.324
- Fluoropolymer Fittings/Hyper Fittings/Flare Type/LQ3 P.324
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- Fluoropolymer Bore Through Connector/LQHB P.324
- Fluoropolymer Tubing/TL/TIL P.324
- Fluoropolymer Tubing (PFA)/TLM/TILM P.325
- Soft Fluoropolymer Tubing/TD/TID P.325
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Best Pneumatics

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Temperature Control Equipment ▶ P.326

Circulating Fluid Temperature Controller · P.326



- Thermo-chiller/Standard Type/HRS P.326
- Thermo-chiller/Standard Type/HRS090 **New** P.326
- Thermo-chiller/Standard Type/HRS100/150 **New** P.326
- Thermo-chiller/Inverter Type/HRSH090 **New** P.326
- Thermo-chiller/Inverter Type/HRSH **New** P.327
- Thermo-chiller/Basic Type/HRSE **New** P.327
- Thermo-chiller/High-performance Type/HRZ P.327
- Thermo-chiller/High-performance Inverter Type/HRZ P.327
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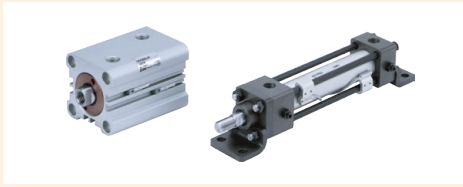


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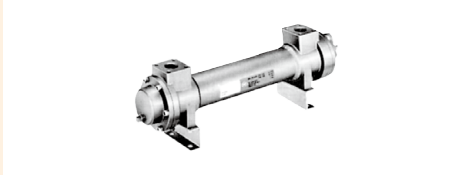
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Pilot Operated 4/5 Port Solenoid Valves

4 Port Solenoid Valve/Cassette Type Manifold **SJ2000/3000**

▶ P.13

Rubber Seal



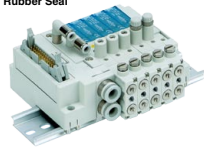
- Low-profile cassette type with baseless structure
- Takes up minimal space with a body width of 7.5 mm (SJ2000) or 10 mm (SJ3000).
- Combination of the SJ2000 and the SJ3000 is possible.
- A multi-pin connector makes it easy to add or subtract stations or to exchange valves.
- One side solenoid
- 4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

Series	Flow rate characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 3/5 (A/B → E)				
	C [dm ³ /(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**

▶ P.101

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 the SJ3000 series)
- 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 **SY3000/5000/7000**

▶ P.123

Metal Seal
Rubber Seal



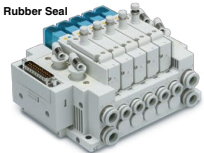
- Thanks to the flow increase, valve size can be reduced!
Saves energy and space.
- Power consumption: 0.1 W (With power saving circuit)/0.35 W (Standard)
- Service life: 200 million cycles (Metal seal)/70 million cycles (Rubber seal)
- Plug-in sub-plate newly added!
- Plug-in metal base (IP40)/Plug-in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

Series	Flow rate characteristics		Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → EA/EB)			
	C [dm ³ /(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	

Vacuum Release Valve with Restrictor **SY³A□R**

▶ P.148

Rubber Seal



- Vacuum suction and release can be controlled with a single valve.
 - With a restrictor that can adjust the flow rate of the release air.
 - Can be mounted on the same manifold valve with the standard valve.
- * When the individual EXH spacer is used.

Pilot Operated 4/5 Port Solenoid Valves

5 Port Solenoid Valve SY3000/5000/7000/9000

▶ P.397

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

Series	Flow rate characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → EA/EB)				
	C [dm ³ /(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	

5 Port Solenoid Valve/Plug-in Type S0700

▶ P.645

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

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

5 Port Solenoid Valve/Plug Lead Type S0700

▶ P.735

Rubber Seal



- Valve width: 7.4 mm
- Possible to drive cylinders: Up to ø32 (Body ported)
- Power consumption: 0.35 W
- Weight: 39 g (Body ported)

Series	Flow rate characteristics		Applicable cylinder size	Power consumption (W)
	1 → 4/2 (P → A/B)			
	C [dm ³ /(s·bar)]	Cv		
SS0752 Body ported	0.62	0.18	ø32	0.35
SS0755 Base mounted	0.39	0.11	ø25	0.35

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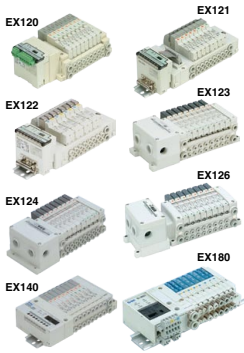
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Reduced-wiring Fieldbus System (Serial Transmission System)

Serial Transmission System EX

▶ P.777

For Output



* The applicable protocols differ depending on the series. For details, refer to the catalog for each series.

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

Serial Transmission System EX260

▶ P.789

For Output



* The applicable protocols differ depending on the series. For details, refer to the catalog for each series.

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, 5000 SV1000, 2000, 3000 S0700 (IP40)

Serial Transmission System EX250

▶ P.802

For Input/Output



* The applicable protocols differ depending on the series. For details, refer to the catalog for each series.

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, 5000 SV1000, 2000, 3000 S0700 (IP40)

Reduced-wiring Fieldbus System (Serial Transmission System)

Serial Transmission System EX600

P.815

For Input/Output



* The applicable protocols differ depending on the series. For details, refer to the catalog for each series.

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, 5000 SV1000, 2000, 3000 S0700 (IP40)

Serial Transmission System EX500

P.845

For Input/Output, Gateway Type



* The applicable protocols differ depending on the series. For details, refer to the catalog for each series.

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

Serial Transmission System EX510

P.878

For Input/Output, Gateway Type



* The applicable protocols differ depending on the series. For details, refer to the catalog for each series.

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

P.907



- Communication cable/connector: CC-Link, DeviceNet™, PROFIBUS DP
- Conforms 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.

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Pilot Operated 4/5 Port Solenoid Valves

5 Port Solenoid Valve SV1000/2000/3000/4000

▶ P.13

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

Series	Flow rate characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → E)				
	C [dm ³ /(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 SYJ3000/5000/7000

▶ P.145

Rubber seal



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

Series	Flow rate characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → EA/EB)				
	C [dm ³ /(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 SZ3000

▶ P.249

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

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

5 Port Solenoid Valve VF1000/3000/5000

▶ P.293

Rubber seal



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

Series	Flow rate characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → EA/EB)				
	C [dm ³ /(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 VP4□50/4□70

▶ P.353

Rubber seal



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

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

5 Port Solenoid Valve VQ1000/2000

▶ P.365

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

Series	Flow rate characteristics			Applicable cylinder size	Power consumption (W)
	2/4 → 3/5 (A/B → R1/R2)				
	C [dm ³ /(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 VQ4000/5000

▶ P.445

Metal seal
Rubber seal



- Compact and large flow capacity
- Installation volume: 42% reduction, Installation area: 26% reduction
- VQ4000: Possible to drive cylinders up to ø160
- VQ5000: Possible to drive cylinders up to ø180
- Power saving: Power consumption 0.4 W (Low wattage type)
- Long service life: 100 million cycles (According to SMC life test conditions)

Series	Flow rate characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → EA/EB)				
	C [dm ³ /(s·bar)]	b	Cv		
VQ4000	7.3	0.38	2.0	ø160	1.0 0.4 (Low wattage type)
VQ5000	17	0.31	2.0	ø180	1.0 0.4 (Low wattage type)

5 Port Solenoid Valve VQC1000/2000

▶ P.537

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

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

Pilot Operated 4/5 Port Solenoid Valves

5 Port Solenoid Valve **VQC4000/5000**

▶ P.603

Metal seal
Rubber seal



- Compact and large flow capacity
VQC4000: Possible to drive cylinders up to $\phi 160$
VQC5000: Possible to drive cylinders up to $\phi 180$
- Extensive range of protocols available
- Power saving: Power consumption 0.4 W (Low wattage type)
- Long service life: 100 million cycles (According to SMC life test conditions)
- Enclosure IP67 compliant

Series	Flow rate characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → EA/EB)				
	C [dm ³ /(s·bar)]	b	Cv		
VQC4000	7.3	0.38	2.0	$\phi 160$	1.0 0.4 (Low wattage type)
VQC5000	17	0.31	4.7	$\phi 180$	1.0 0.4 (Low wattage type)

5 Port Solenoid Valve **VQZ1000/2000/3000**

▶ P.683

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, VV5QZ21, VV5QZ25, VV5QZ32, VV5QZ35

Series	Flow rate characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → EA/EB)				
	C [dm ³ /(s·bar)]	b	Cv		
VQZ1000	1.3	0.24	0.32	$\phi 63$	0.35 (Standard) 0.9
VQZ2000	2.3	0.29	0.53	$\phi 80$	(High pressure type, High speed response type)
VQZ3000	4.6	0.26	1.2	$\phi 100$	

5 Port Solenoid Valve **SQ1000/2000**

▶ P.759

Metal seal
Rubber seal



- Power saving: Power consumption 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 rate characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → R1/R2)				
	C [dm ³ /(s·bar)]	b	Cv		
SQ1000	0.8	0.20	0.19	$\phi 32$	0.4 W (Standard)
SQ2000	3.1	0.18	0.71	$\phi 63$	0.95 W (High pressure type)

Pilot Operated 4/5 Port Solenoid Valves

5 Port Solenoid Valve VFS1000/2000/3000/4000/5000/6000

▶ P.883

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

Series	Flow rate characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → R1/R2)				
	C [dm ³ /(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 VFR2000/3000/4000/5000/6000

▶ P.1015

Rubber seal



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

Series	Flow rate characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → EA/EB)				
	C [dm ³ /(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

5 Port Solenoid Valve/ISO Standard VQ7-6/7-8

▶ P.1115

Metal seal
Rubber seal



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

Series	Flow rate characteristics			Applicable cylinder size	Power consumption (W)
	4/2 → 5/3 (A/B → EA/EB)				
	C [dm ³ /(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

Explosion Proof 3/5 Port Solenoid Valve 50-VFE/50-VPE

▶ P.1153

Rubber seal



- Exia II BT4 (TIIS approved product)
- Waterproof: Passed the IPX6 test.
- Exhausting equipment for pilot valve not required. (Common exhaust type for main and pilot valve [50-VFE3000])
- Possible to be into manifold. (50-VEF)
- As a selector valve, divider valve, or able to use for vacuum applications. (50-VPE)
- Manifold type No.: 50-VV5FE3, 50-VV5FE5

Series	No. of ports	Effective area mm ² (Cv)	Power consumption (W)
50-VFE3000	5 port	18 (1.0)	3.5
50-VFE5000	5 port	45 (2.5)	3.5
50-VPE500	3 port	41.4 (2.3)	3.5
50-VPE700	3 port	72 (4)	3.5

Pilot Operated 4/5 Port Solenoid Valves

Intrinsically Safe Explosion-proof System 5 Port Solenoid Valve **51-SY5000/7000/9000** ▶ P:1154

Rubber seal



- Exia II BT4 (TIS approved product)
- Can be selected from 3 types of connectors. L plug connector, L plug connector with a cover, Terminal block
- Can be selected from 3 barriers.
- Manifold type No.: 51-SS5Y5, 51-SS5Y7

Series	Flow rate characteristics			Power consumption (W)
	4/2 → 5/3 (A/B → EA/EB)			
	C [dm ³ /(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 **SYJ300/500/700** ▶ P:1157

Rubber seal



- Power consumption: 0.1 W (with power saving circuit)
- Manifold type No.: SSSYJ3, SSSYJ5, SSSYJ7

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

3 Port Solenoid Valve **VQZ100/200/300** ▶ P:1219

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

Series	Flow rate characteristics			Power consumption (W)	Available in vacuum applications
	2 → 3 (A → R)				
	C [dm ³ /(s·bar)]	b	Cv		
VQZ100	0.56	0.30	0.14	0.35 (Standard) 0.9 (High pressure type, High speed response type)	-100 kPa
VQZ200	1.7	0.36	0.45		-100 kPa
VQZ300	3.0	0.33	0.72		-100 kPa

3 Port Solenoid Valve/Pilot Operated Poppet Type **VP300/500/700** ▶ P:1261

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

Series	Flow rate characteristics			Power consumption (W)	Available in vacuum applications
	2 → 3 (A → P)				
	C [dm ³ /(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)	-100 kPa
VP500	8.9	0.20	2.1		-100 kPa
VP700	15.3	0.22	3.7	1.55 (Standard) 0.55 (With power saving circuit)	-100 kPa

Pilot Operated 3 Port Solenoid Valves

3 Port Solenoid Valve/Pilot Operated Poppet Type **VG342**

P.1301

Rubber seal



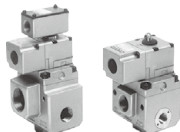
- Low power consumption
- No lubrication required
- Can be used under vacuum or low pressure.
- Easy conversion to N.C., N.O., or external pilot.
- Can be used as selector valve or divider valve. (External pilot type)

Series	Flow rate characteristics			Power consumption (W)	Available in vacuum applications
	2 → 3 (A → P)				
	C [dm ³ /(s·bar)]	b	Cv		
VG342	38	0.32	9.8	4 (Standard) 1.8 (Energy-saving type) 1.8 (Continuous duty type)	~101.2 kPa

Large Size 3 Port Solenoid Valve **VP3145/3165/3185**

P.1307

Rubber seal



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

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

ISO13849-1 Certified: 3 Port Solenoid Valve/Residual Pressure Release Valve with Detection of Main Valve Position **VP/VG**

P.1317

Rubber seal



- Safety standard ISO13849-1 certified (Corresponding to category 2 to 4)
- With detection of main valve position
- Redundant system can be constructed easily.
- Highly reliable construction
- Safety limit switch can be selected.
- With soft start-up function (-X555)

Series	Category	Flow rate characteristics		
		2 → 3 (A → R)		
		C [dm ³ /(s·bar)]	b	Cv
Residual pressure release valve VP542-X536	2	8.9	0.20	2.1
Residual pressure release valve VP742-X536	2	15.3	0.22	3.7
Dual residual pressure release valve VP544-X538	3, 4	6.7	0.10	1.3
Dual residual pressure release valve VP744-X538	3, 4	9.7	0.08	2.1
Dual residual pressure release valve with soft start-up function VP544-X555	3, 4	6.7	0.10	1.3
Dual residual pressure release valve with soft start-up function VP744-X555	3, 4	9.7	0.08	2.1
Dual residual pressure release valve VG342-X87	3, 4	28.6	0.03	5.6

General Contents

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Direct Operated 3/4/5 Port Solenoid Valves

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

▶ P.1321

Rubber seal



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

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

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

▶ P.1331

Rubber seal



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

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

3 Port Solenoid Valve **V100**

▶ P.1357

Rubber seal



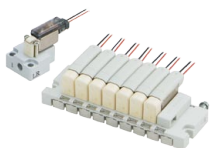
- Power consumption: 0.1 W (with power saving circuit)
- Manifold type No.: VV100-S41

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

3 Port Solenoid Valve **S070**

▶ P.1369

Rubber seal



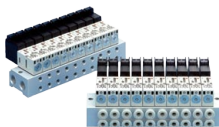
- 7 mm width compact solenoid valve manifold
- Weight of valve alone: 5 g
- Single unit specifications, base mounted manifold, body ported manifold can be selected.
- Manifold type No.: SS073

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

4 Port Solenoid Valve/Direct Operated Poppet Type **VQD1000**

▶ P.1389

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

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

Direct Operated 3/4/5 Port Solenoid Valves

Vacuum/Release Unit **VQD1000-V**

▶ P.1401

Rubber seal



- Applicable to 0603 chip.
- Response speed: 13 msec (at time of 500 mm³) / 18.5 msec (at time of 1000 mm³)
- 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 **VK300**

▶ P.1409

Rubber seal



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

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

5 Port Solenoid Valve/Direct Operated Poppet Type **VK3000**

▶ P.1419

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

Series	Flow rate characteristics 4/2 → 5/3 (A/B → R1/R2)			Power consumption (W)	Available in vacuum applications
	C [dm ³ /(s·bar)]	b	Cv		
VK3000	0.54	0.12	0.12	ø25	4.0

3 Port Solenoid Valve/Direct Operated Poppet Type **VT307**

▶ P.1431

Rubber seal



- Energy-saving type: 1.8 W
- A single valve with various valve functions (Universal porting type)
- Low concentration ozone resistant
- Rubber seal material: HNBR for main valve
- Mounting dimensions are interchangeable with current product.
- Manifold type No.: VV307

Series	Flow rate characteristics 2 → 3 (A → R)			Power consumption (W)	Available in vacuum applications
	C [dm ³ /(s·bar)]	b	Cv		
VT307	0.71	0.25	0.17	4 (Standard) 1.8 (Energy-saving type)	-101.2 kPa

Direct Operated 3/4/5 Port Solenoid Valves

3 Port Solenoid Valve/Direct Operated Poppet Type **VT317/325**

▶ P.1441

Rubber seal



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

Series	Flow rate characteristics			Power consumption (W)	Available in vacuum applications
	2 → 3 (A → R)				
	C [dm ³ /(s·bar)]	b	Cv		
VT317	2.6	0.34	0.67	6.0	-101.2 kPa
VT325	6.1	0.37	1.6	12	-101.2 kPa

Air Operated Valves

5 Port Air Operated Valve **SYA3000/5000/7000**

▶ P.1458

Rubber seal



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

Series	Flow rate characteristics			Applicable cylinder size
	4/2 → 5/3 (A/B → EA/EB)			
	C [dm ³ /(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 **SYJA3000/5000/7000**

▶ P.1474

Rubber seal



- Same manifolds as the SYJ3000/5000/7000 series are prepared.

Series	Flow rate characteristics			Applicable cylinder size
	4/2 → 5/3 (A/B → EA/EB)			
	C [dm ³ /(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 **VZA2000/4000**

▶ P.1484

Metal seal



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

Series	Flow rate characteristics			Applicable cylinder size
	4/2 → 5/3 (A/B → EA/EB)			
	C [dm ³ /(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 **VFA1000/3000/5000**

▶ P.1495

Rubber seal



- Same manifolds as the VF1000/3000/5000 series are prepared.

Series	Flow rate characteristics			Applicable cylinder size
	4/2 → 5/3 (A/B → EA/EB)			
	C [dm ³ /(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 VFRA3000/4000

▶ P.1524

Rubber seal



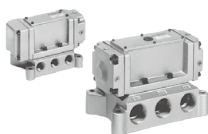
- Same manifolds as the VFR3000/4000 series non plug-in type manifolds are prepared.

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

5 Port Air Operated Valve VPA4□50/4□70

▶ P.1530

Rubber seal



- Same manifolds as the VP4□50 series are prepared.

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

3 Port Air Operated Valve SYJA300/500/700

▶ P.1536

Rubber seal



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

Series	Flow rate characteristics		
	2 → 3 (A → R)		
	C [dm ³ /(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 VZA200/400

▶ P.1542

Metal seal



- Metal seal main valve construction

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

3 Port Air Operated Valve VTA301/315

▶ P.1548

Rubber seal



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

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

Air Operated Valves

3 Port Air Operated Valve **VGA342**

▶ P.1553

Rubber seal



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

Series	Flow rate characteristics		
	2 → 3 (A → R)		
	C [dm ³ /(s·bar)]	b	Cv
VGA342	38	0.32	9.8

3 Port Air Operated Valve **VPA300/500/700**

▶ P.1555

Rubber seal



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

Series	Flow rate characteristics		
	2 → 3 (A → R)		
	C [dm ³ /(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 **VPA3145/3165/3185**

▶ P.1574

Rubber seal



- High flow capacity, small exhaust resistance

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

Mechanical Valves/Hand Valves

Mechanical Valve **VM/VZM/VFM**

▶ P.1582



- 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, VM200	2/3 ports
	VM400	3 ports
	VZM500, VZM400	5 ports
	VFM300, VFM200	5 ports
	VM800	3 ports

Mechanical Valves/Hand Valves

Blow Gun VMG

▶ P.1657



- Reduction of 2,000 m³ per annum is possible. (Energy saving)
- Pressure loss: 1% or less (Nozzle size: ø2.5)
- Available nozzle:
Male thread nozzle, High efficiency nozzle with male thread,
Low noise nozzle with male thread, Copper extension nozzle

Series	Port size	Operating pressure range (MPa)	Effective area (mm²)	Nozzle port size
VMG	Rc, NPT, G 1/4, 3/8	0 to 1.0	30	Rc1/4

Transmitters VR

▶ P.1669



- Air transmitters used for a variety of All Air System

Description	Series
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

Two Hand Control Valve VR51

▶ P.1681



- 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).

Series	Sonic conductance: C	Port size		Applicable tubing material
		Metric size	Inch size	
VR51	0.3 dm³/(s·bar)	ø6	ø1/4	Nylon Soft nylon Polyurethane FR soft nylon FR double layer FR double layer polyurethane

Finger Valve VHK

▶ P.1688

2 or 3 port valve selectable



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

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

Hand Valve VH200/300/400/600

▶ P.1696



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

Description	Series	Max. operating pressure	Port size
Hand valve	VH200	1.0 MPa	1/4
	VH300		1/4, 3/8
	VH400		1/4, 3/8, 1/2, 3/4
	VH600	0.7 MPa	3/4, 1

Mechanical Valves/Hand Valves

Compliant with OSHA Standards: Pressure Relief 3 Port Valve with Locking Holes **VHS20/30/40/50** ▶ P.1705

For pressure relief



- Compliant with OSHA standards (Occupational Safety and Health Administration Department of Labor).
- Manually operated valve can be used to prevent accidents caused by residual pressure in pneumatic lines.
- It is 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 knob and then turn, 2-step action prevents malfunction.

Series	Description	Knob 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			1/8, 1/4	
VHS3510		1/4, 3/8		
VHS4510		1/4, 3/8, 1/2, 3/4		
VHS5510		3/4, 1		
		Double action		

Residual Relief 3 Port Valve **VHS400/500** ▶ P.1716

For pressure relief



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

Description	Series	Port size
Residual relief 3 port valve	VHS400	1/4, 3/8, 1/2
	VHS500	3/4

Power Valves

3 Port 3 Position Valve **VEX3** ▶ P.1721



- Intermediate stopping of cylinders up to $\phi 125$ is possible.
- Power consumption: 1 W
- 4 Manual override options:
Non-locking push type
Locking slotted type
Push-turn locking slotted type
Push-turn locking lever type

Description	Series	Function
3 port 3 position valve	VEX3	Directional control valve

Power Valve **VEX** ▶ P.1740



- Extensive size variations, port sizes 1/8 to 2
- VEX1: Large capacity exhaust regulator
- VEX3: 3 port, 3 position valve

Description	Series	Function
Regulator valve	VEX1	Regulator + Directional control valve
3 position valve	VEX3	Directional control valve

Standard Air Cylinders (Round Type)

Air Cylinder CJ1

▶ P.15



- 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

▶ P.21



- Two auto switches can be mounted even for ø4, 5 st.
- Possible to connect a ø2 One-touch fitting and a speed controller.
- With auto switch (CDJP2 series: 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

▶ P.41



- 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 (CDJ2 series: CDJ2, CDJ2W, CDJ2K, CDJ2Z, CDJ2ZW, CDJ2RA, CDJ2RK)

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

Air Cylinder JCM/JCDM

▶ P.153



- Overall length shortened by up to 97 mm
- Weight reduced by up to 54% (0.69 kg → 0.32 kg)
- Various cover types available
- Port size: M5 and Rc1/8 available
- Male and female rod end available
- With auto switch (JCDM series: JCDM)

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

Standard Air Cylinders (Round Type)

Air Cylinder **CM2/CDM2**

▶ P.167



- 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 (CDM2-Z series: 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 rod	CM2K-Z	Double acting, Single rod	20, 25, 32, 40
Non-rotating rod	CM2K-Z	Single acting (Spring return/extend)	20, 25, 32, 40
Non-rotating 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
With end lock	CBM2	Double acting, Single rod	20, 25, 32, 40
Low friction	CM2Q	Double acting, Single rod	20, 25, 32, 40

Air Cylinder/Short Type **CM3/CDM3**

▶ P.269



- Up to 66 mm shorter, up to 21% lighter (comparison with the CM2 series)
- Female rod end available as standard
- With auto switch (CDM3 series: CDM3)

Type	Series	Action	Bore size (mm)
Standard	CM3	Double acting, Single rod	20, 25, 32, 40

Air Cylinder **CG1/CDG1**

▶ P.287



- 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 (CDG1-Z series: CDG1, CDG1W, CDG1K, CDG1KW, CDG1R, CDG1KR, CDBG1)

Type	Series	Action	Bore size (mm)
Standard	CG1-Z	Double acting, Single rod	20, 25, 32, 40, 50, 63, 80, 100
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 rod	CG1K-Z	Double acting, Single rod	20, 25, 32, 40, 50, 63
Non-rotating 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
With end lock	CBG1	Double acting, Single rod	20, 25, 32, 40, 50, 63, 80, 100
Low friction	CG1□G	Double acting, Single rod	20, 25, 32, 40, 50, 63, 80, 100

Standard Air Cylinders (Round Type)

Air Cylinder/Short Type **CG3/CDG3**

▶ P.363



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

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

Standard Air Cylinders (Square Cover)

Air Cylinder **JMB/JMDB**

▶ P.377



- Intermediary bore sizes ø45, ø56, ø67, ø85
- Air saving, Space saving
- Overall length shortened by 27 mm
- Weight reduced by up to 30% (1.45 kg → 1.00 kg)
- Air saving: Reduced by up to 29%
- Air consumption reduced by optimal size selection
- Reduces labor time.
- Air cushion adjustment is not required due to non-adjustable air cushion.
- With auto switch (JMDB series: JMDB)

Type	Series	Action	Bore size (mm)
Standard	JMDB	Double acting, Single rod	32, 40, 45, 50, 56, 63, 67, 80, 85, 100

Air Cylinder **MB/MDB**

▶ P.387



- Reduced weight by changing the shape of the rod cover and head cover. Max. 10% 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 (MDB-Z series: MDB, MDBW, MDBK, MDBKW, MDBB, MDB□Q)

Type	Series	Action	Bore size (mm)
Standard	MB-Z	Double acting, Single rod	32, 40, 50, 63, 80, 100, 125
Standard	MBW-Z	Double acting, Double rod	32, 40, 50, 63, 80, 100, 125
Non-rotating rod	MBK-Z	Double acting, Single rod	32, 40, 50, 63, 80, 100
Non-rotating rod	MBKW-Z	Double acting, Double rod	32, 40, 50, 63, 80, 100
With end lock	MBB	Double acting, Single rod	32, 40, 50, 63, 80, 100
Low friction	MB□Q	Double acting, Single rod	32, 40, 50, 63, 80, 100

Air Cylinder **MB1/MDB1**

▶ P.435



- Weight: 10% lighter (ø50-100 stroke)
- Reduced weight by changing the shape of the rod cover and head cover.
- Can mount small auto switches on 4 surfaces.
- Fastener on auto switch mounting groove for dust-prevention (Option)
- With auto switch (MDB1 series: MDB1, MDB1W, MDB1K)

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

Standard Air Cylinders (Square Cover)

Air Cylinder **CA2/CDA2**

▶ P.465



- Weight reduced by up to 15%
- 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 (CDA2 series: CDA2, CDA2W, CDA2K, CDA2KW, CDBA2, CDA2□H, CDA2W□H, CDA2□Q)

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 rod	CA2K	Double acting, Single rod	40, 50, 63
Non-rotating rod	CA2KW	Double acting, Double rod	40, 50, 63
With end lock	CBA2	Double acting, Single rod	40, 50, 63, 80, 100
Air-hydro	CA2□H	Double acting, Single rod	40, 50, 63, 80, 100
Air-hydro	CA2W□H	Double acting, Double rod	40, 50, 63, 80, 100
Low friction	CA2□Q	Double acting, Single rod	40, 50, 63, 80, 100

Air Cylinder **CS1/CDS1**

▶ P.527



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

* The air hydro type is only available in ø125, ø140 and ø160.

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**

▶ P.565



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

Compact Air Cylinders

Mini Free Mount Cylinder **CUJ/CDUJ**

▶ P.593



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

▶ P.619



- Space-saving cylinder enables cylinders to mount directly on multiple sides.
- With auto switch (CDU series: 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 rod	CUK	Double acting, Single rod	6, 10, 16, 20, 25, 32
Non-rotating rod	CUK	Single acting (Spring return/extend)	6, 10, 16, 20, 25, 32
Non-rotating 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 Cylinder/Compact Type **CQS/CDQS**

▶ P.687



- 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 (CDQS series: 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 rod	CQSK	Double acting, Single rod	12, 16, 20, 25
Non-rotating 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 **JCQ/JCDQ**

▶ P.753



- Compact: Overall length shortened by 6.5 mm, Width shortened by 6 mm, Height shortened by 4 mm
- Weight reduced by up to 45% (150 g → 82 g)
- Volume reduced by up to 40%
- With auto switch (JCDQ series: JCDQ)

Type	Series	Action	Bore size (mm)
Standard	JCQ	Double acting, Single rod	12, 16, 20, 25, 32, 40, 50, 63

Compact Air Cylinders

Compact Cylinder **CQ2/CDQ2**

▶ P.763



- Space-saving cylinder designed with a compact body.
- 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 current 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 (CDQ2 series: 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 rod	CQ2K-Z	Double acting, Single rod	12, 16, 20, 25, 32, 40, 50, 63
Non-rotating rod	CQ2KW-Z	Double acting, Double rod	12, 16, 20, 25, 32, 40, 50, 63
Axial piping (Centralized piping type)	CQP2	Double acting, Single rod	12, 16, 20, 25, 32, 40, 50, 63, 80, 100
Axial piping (Centralized piping type)	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
With end lock	CBQ2	Double acting, Single rod	20, 25, 32, 40, 50, 63, 80, 100

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

▶ P.981



- 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 the CQS and CQ2 series)
- Added compact type foot brackets.
- With auto switch (RDQ series: RDQ)

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

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

▶ P.1005



- 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 the CQ series compact cylinder
- Load can be directly mounted.
- Mounting dimensions compatible with the CQS and CQ2 series.
- With auto switch (CDQM series: 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**

▶ P.1021



- 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 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

Compact Air Cylinders

Plate Cylinder **MU/MDU**

▶ P.1033



- 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 (MDU series: 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

Water Resistant Cylinders

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

▶ P.1063



- Applicable for use in an environment with water splashing
- With auto switch (CDJ5-S series: CDJ5-S, CDG5-S series: 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□**

▶ P.1081



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

▶ P.1125



- Can be used in environments where contact with water or coolant occurs.
- With water-resistant 2-color indicator auto switch
- Suitable for factory machinery, food manufacturing machinery, car washers, 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 (10 MPa)	CHKDB	Double acting	20, 25, 32, 40, 50, 63, 80, 100
Hydraulic cylinder conforming to JIS (7 MPa)	CH2F	Double acting	32, 40, 50, 63, 80, 100

Water Resistant Cylinders

Cylinder with Stable Lubrication Function (Lube-retainer)

▶ P.1134



- 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, 8, 12, 16, 20, 25, 32

Dust Resistant Cylinder

▶ P.1134



- Applicable for environments with flying micro-powder such as ceramic powder, toner powder, paper powder, and metallic powder (Except weld spatter).
- 4 times stronger than the standard model
- 2 Lube-retainers on the rod cover prevent micro-powder of 30 μm or less from entering.
- The Lube-retainers create coat with grease on the piston rod for improving durability.

Type	Series	Action	Bore size (mm)
Air cylinder	CM2-XC92	Double acting	20, 25, 32, 40
Compact cylinder	CQS-XC92	Double acting	12, 16, 20, 25
Compact cylinder	CQ2-XC92	Double acting	32, 40, 50, 63, 80, 100
Compact guide cylinder	MGP-XC92	Double acting	12, 16, 20, 25, 32, 40, 50, 63, 80, 100

Floating Joints

Floating Joint J

▶ P.1137



- 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 type for light load	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
Standard	JA-X530, JAF-X530, JAL-X530	180, 200
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 type	JS	10, 15, 16, 20, 25, 32, 40, 50, 63

Air-hydro Units

Air-hydro Unit CC

▶ P.1163



- 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	—

Mechanically Jointed Rodless Cylinders

Mechanically Jointed Rodless Cylinder/Basic Type **MY1B**

▶ P.1183



- Remodeled to make it lighter.
- Weight reduced by 17% (Compared to the current MY1B)
- Auto switches can be mounted from the front at any position on the mounting groove.
- Retention mechanism of the dust seal band is changed to the magnet attraction method to improve the retention ability.
- Mounting dimensions are interchangeable with current model.

Type	Series	Action	Bore size (mm)
Basic	MY1B-Z	Double acting	25, 32, 40

Mechanically Jointed Rodless Cylinder/Linear Guide Type **MY1H**

▶ P.1201



- Piping can be connected from 4 directions on the head cover.
- Allows on-site piping to suit the installation conditions.
- Easy adjustment of cushion needle. Adjustment is easier by changing the cushion needle adjustment from side to top.
- Auto switch can be mounted in any desired position. (D-M9□, D-A9□)
- New dust seal band improves life.
- The mounting and performance are the same as before, but the weight is reduced.

Type	Series	Action	Bore size (mm)
Linear guide type	MY1H-Z	Double acting	25, 32, 40

Mechanically Jointed Rodless Cylinder **MY1**

▶ P.1225



- 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	Double acting	10, 16, 20, 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 type	MY1H	Double acting	10, 16, 40
Linear guide type	MY1HT	Double acting	50, 63

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

▶ P.1339



- 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**

▶ P.1367



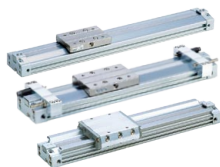
- Reduces the height by maximum of 30% compared to the mechanically jointed rodless cylinder, MY1H series. Furthermore, possible to replace the cylinder for the drive unit while the workpiece is mounted.

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

Mechanically Jointed Rodless Cylinders

Mechanically Jointed Rodless Cylinder MY3

▶ P.1403



- 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, MY1B series.

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

▶ P.1459

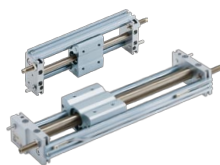


- Further improvement on CY1 series
- Same mounting dimensions as those of the CY1 series. Upgraded bearing performance and reduction of sliding resistance.
- NPT thread and G thread as standard

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 Cylinder CY1S

▶ P.1485



- Weight: Max. 15% reduction (0.96 kg: Current model 1.13 kg)
- Overall length: Max. 15 mm shorter (240 mm: Current model 255 mm)
- Improved durability: Lube-retainers are mounted on the internal and external surfaces of the cylinder tube to maintain the lubrication.
- Adjustment bolt improves stroke accuracy/repeatability.

Type	Series	Action	Bore size (mm)
Slider (Slide bearing)	CY1S-Z	Double acting	6, 10, 15, 20, 25, 32, 40

Magnetically Coupled Rodless Cylinder CY1

▶ P.1511



- Magnetically coupled, space-saving cylinder permits a wide range of applications.

Type	Series	Action	Bore size (mm)
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

▶ P.1541



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

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

Magnetically Coupled Rodless Cylinders

Clean Rodless Cylinder **CYP**

▶ P.1561



- Low particle generation transfer in clean environments

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

Auto Switches

Auto Switch **D**

▶ P.1575



Series	Type	Features
D Series	Solid state auto switch	General purpose type 2-color indicator 2-color indicator with diagnostic output Water resistant 2-color indicator Hygienic With timer Magnetic field resistant 2-color indicator Heat resistant 2-color indicator Wide range detection type
D Series	Reed auto switch	General purpose type 2-color indicator Magnetic field resistant 2-color indicator Heat resistant

Trimmer Auto Switch **D**

▶ P.1639



- One auto switch allows workpieces to be distinguished easily.
 - Minimum adjustment width to detect: 0.5 mm
 - Applicable to the short stroke cylinder.
- Only one auto switch can detect the extended and retracted end positions.
This switch can be used when two auto switches cannot be mounted due to short stroke.

Series	Type	Mounting
D-M9K	Sensor unit	Direct mounting (Round groove)
D-Y7K	Sensor unit	Direct mounting (Square groove)
D-F7K	Sensor unit	Rail mounting
D-R□K	Amplifier unit	—

Cylinder Speed Checker **IN574**

▶ P.1674



- Realizes increase in efficiency with visualization of air cylinder operation.
Quantification of cycle time improvements.
For reduction of numerical management/adjustment labor when starting up equipment.
For reduction of numerical confirmation/inspection labor during periodic maintenance.
- 3 measurement modes
Speed (mm/s), Time required for stroke (s), Operation count (Times)

Series	Rated measurement range: Speed	Rated measurement range: Time required for stroke	Rated measurement range: Operation count
IN574	-1999 to 1999 mm/s	-999.9 to 999.9 s	0 to 999 times

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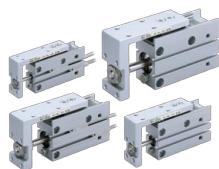
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11

Table Cylinders

Compact Slide **MXH**

▶ P.15



- Allowable moment improved by up to 240%
- With new high rigidity linear guide. Allowable moment improved.
- The weight has been reduced by incorporating a new high rigidity linear guide and piston. Weight: 19% reduction (ø20-10 stroke)
- Piping is possible in 3 directions.

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

Air Slide Table **MXS**

▶ P.33



- 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 current 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□**

▶ P.73



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

▶ P.215



- 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

Low Profile Slide Table **MXF**

▶ P.265



- 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**

▶ P.281



- 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**

▶ P.305

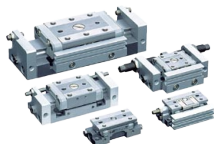


- Integrated front mounting part and table result in a highly accurate and rigid top and front mounting surface.
- Traveling parallelism: 0.005 mm
- Height: 10 mm/Width: 20 mm/Length: 43 mm (MXJ4)

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

Air Slide Table **MPX**

▶ P.327



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

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

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

▶ P.355



- 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**

▶ P.375



- Precision cylinder with internal guide function

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

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Guide Cylinders (MG Series)

Miniature Guide Rod Cylinder **MGJ**

▶ P.401



- Overall length: 23 + Stroke mm/Width: 29 mm/Height: 14.5 mm (MGJ6)
- Two auto switches can be mounted even for 5 strokes.
- Integrated 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 **JMGP**

▶ P.409



- Compact: Overall length shortened by 30.5 mm, Height shortened by 16 mm
- Weight: Max. 69% lighter (0.32 kg → 0.1 kg)
- 3 mounting options:
Top mounting, Side mounting, Bottom mounting
- Piping is possible in 4 directions.
- The solid state auto switch D-M9□ is mountable.
- Suitable for pushing, lifting or clamping in a transport line.

Type	Bearing	Series	Action	Bore size (mm)
Basic type	Slide bearing	JMGPM	Double acting	12, 16, 20, 25, 32, 40, 50, 63

Compact Guide Cylinder **MGP**

▶ P.423



- Weight reduced by up to 24% 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	
With 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	MGPMR-Z	Double acting	20, 25, 32, 40, 50, 63, 80, 100
With end lock	Slide bearing/ Ball bushing bearing	MGP	Double acting	20, 25, 32, 40, 50, 63, 80, 100
	Slide bearing	MGPS	Double acting	

Compact Guide Cylinder/Wide Type **MGPW**

▶ P.495



- 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

Guide Cylinders (MG Series)

Compact Guide Cylinder **MGQ**

▶ P.519



- 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 bearing	MGQL	Double acting	

Guide Cylinder **MGG**

▶ P.535

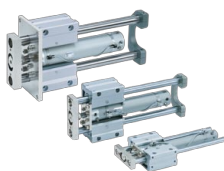


- Basic cylinder with integrated guide rods in a compact configuration
- A linear transfer unit that achieves lateral load resistance and high non-rotating accuracy

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

Guide Cylinder/Compact Type **MGC**

▶ P.577



- 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**

▶ P.595



- 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**

▶ P.607



- 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
With end lock	MGZ	Double acting	40, 50, 63
Without non-rotating mechanism	MGZR	Double acting	20, 25, 32, 40, 50, 63, 80

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Guide Cylinders (MG Series)

Cylinder with Turntable **MGT**

▶ P.635



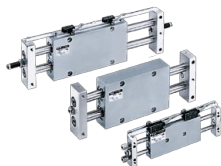
- Integration of the compact guide cylinder (MGP series) and a manual turntable.
- High precision bearings for smooth turning return movement
- Table unit has positioning mechanisms for each 90° and 180° of rotation.

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

Guide Cylinders (CX Series)

Slide Unit **CX2/CDBX2/CDPX2**

▶ P.647

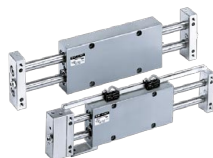


- Possible to install a shock absorber that absorbs impact and noise as desired. Ideal for workpiece transfers requiring positional accuracy.
- With auto switch (CDBX2 series: CDBX2, CDPX2 series: CDPX2)

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

Slide Unit **CXW/CDBXW/CDPXW**

▶ P.658

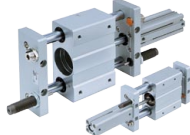


- Built-in shock absorber that absorbs impact
- Can be mounted on the housing or on the plate. Highly precise parallelism of cylinders and workpieces.
- With auto switch (CDBXW series: CDBXWM, CDBXWL, CDPXW series: CDPXWM, CDPXWL)

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

Platform Cylinder **CXT**

▶ P.709



- 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 bearing	CXTL	Double acting	12, 16, 20, 25, 32, 40

Dual Rod Cylinder **CXSJ**

▶ P.723



- More compact body compared to the CXS series dual rod cylinder. 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 bearing	CXSJL	Double acting	6, 10, 15, 20, 25, 32

Guide Cylinders (CX Series)

Dual Rod Cylinder **CXS**

▶ P.723



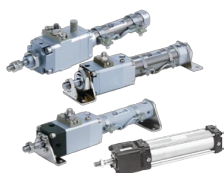
- Compact cylinder with high-precision guide function for pick & place applications

Type	Bearing	Series	Action	Bore size (mm)
Basic type	Slide bearing/ Ball bushing bearing	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

Lock Cylinders

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

▶ P.785

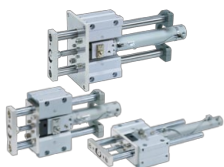


- Locking cylinder ideal for intermediate stops, emergency stops and drop prevention. (Bi-directional lock)
* CL1: Single-directional lock
- With auto switch (CDL series: CDLJ2, CDLM2, CDLG1, CDL1)

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

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

▶ P.853



- 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,
Standard	Ball bushing bearing	MLGCL	Double acting, Single rod	20, 25, 32, 40	Spring/Air pressure lock, Air pressure lock

Cylinder with Lock **CNG/CDNG**

▶ P.863



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

▶ P.887



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

Lock Cylinders

Cylinder with Lock **CNA2/CDNA2**

▶ P.917



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

▶ P.953



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

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

Cylinder with Lock **CLS/CDLS**

▶ P.977



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

▶ P.1005



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

▶ P.1033



- 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 (RDLQ series: RDLQ)

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

Lock Cylinders

Plate Cylinder with Lock **MLU/MDLU**

▶ P.1057



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

▶ P.1075



- 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,	Spring lock
Standard	Ball bushing bearing	MLGPL	Double acting, Single rod	50, 63, 80, 100	Spring lock

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

▶ P.1105



- 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

Auto Switches

Auto Switch D

P.1119



Series	Type	Features
D Series	Solid state auto switch	General purpose type 2-color indicator 2-color indicator with diagnostic output Water resistant 2-color indicator Hygienic With timer Magnetic field resistant 2-color indicator Heat resistant 2-color indicator Wide range detection type
D Series	Reed auto switch	General purpose type 2-color indicator Magnetic field resistant 2-color indicator Heat resistant

Trimmer Auto Switch D

P.1183



- One auto switch allows workpieces to be distinguished easily.
 - Minimum adjustment width to detect: 0.5 mm
 - Applicable to the short stroke cylinder.
- Only one auto switch can detect the extended and retracted end positions.
 This switch can be used when two auto switches cannot be mounted due to short stroke.

Series	Type	Mounting
D-M9K	Sensor unit	Direct mounting (Round groove)
D-Y7K	Sensor unit	Direct mounting (Square groove)
D-F7K	Sensor unit	Rail mounting
D-R□K	Amplifier unit	—

Cylinder Speed Checker IN574

P.1218



- Realizes increase in efficiency with visualization of air cylinder operation.
 Quantification of cycle time improvements.
 For reduction of numerical management/adjustment labor when starting up equipment.
 For reduction of numerical confirmation/inspection labor during periodic maintenance.
- 3 measurement modes
 Speed (mm/s), Time required for stroke (s), Operation count (Times)

Series	Rated measurement range: Speed	Rated measurement range: Time required for stroke	Rated measurement range: Operation count
IN574	-1999 to 1999 mm/s	-999.9 to 999.9 s	0 to 999 times

Specialty Cylinders

Sine Rodless Cylinder **REA**

▶ P.15



- 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**

▶ P.85



- 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**

▶ P.115



- 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

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

▶ P.135



- 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 (CDJ2Y-Z series: CDJ2Y, CDM2Y-Z series: CDM2Y-Z, CDG1Y-Z series: CDG1Y, MDBY-Z series: MDBY, CDA2Y-Z series: CDA2Y, CDS2Y series: CDS2Y, CDQSY series: CDQSY, CDQ2Y-Z series: CDQ2Y)

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

Specialty Cylinders

Low Speed Cylinder **CJ2X/CM2X/CQSX/CQ2X/CUX**

▶ P.250



- 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 (CDJ2X-Z series: CDJ2X-Z, CDM2X-Z series: CDM2X, CDQSX series: CDQSX, CDQ2X series: CDQ2X, CDUX series: 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**

▶ P.317



- 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)	Operating pressure range (MPa)	Driving speed (mm/s)
Standard	MQQT	10, 16, 20, 25, 30, 40	0.005 to 0.5	0.3 to 300
Anti-lateral load	MQQL	10, 16, 20, 25, 30, 40	0.005 to 0.7	0.5 to 500
Anti-lateral load	MQML	6	0.02 to 0.7	0.5 to 1000
Anti-lateral load	MQML	10, 16, 20, 25	0.005 to 0.7	0.5 to 1000
High speed/High frequency	MQML□□H	10, 16, 20, 25	0.01 to 0.7	5 to 3000
Single acting	MQP	4, 6, 10, 16, 20	0.001 to 0.7	—

High Power Cylinder **RHC**

▶ P.345



- Provides 10 to 20 times the energy absorption capacity of general purpose cylinder (CG1 series).
- 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 (RHC series)

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**

▶ P.367



- 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**

▶ P.383



- 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	Double acting	12, 16, 20, 25, 32, 40, 50, 63

Rotary Clamp Cylinder **MK2T**

▶ P.403



- 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 type	MK2T	Double acting	20, 25, 32, 40, 50, 63

Clamp Cylinder **CK□1**

▶ P.419



- 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-P74LZ type

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

Clamp Cylinder with Lock **CLK2**

▶ P.445



- 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

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Clamp Cylinders

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

▶ P.473



- The smallest class of clamp cylinder in the world.
- $\phi 25$ is available.
Weight: 380 g, Length: 186.7 mm
($\phi 25$ -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	25, 32, 40
With lock (Built-in strong magnet)	CLKP-X2095	Double acting	9, 12	25, 32, 40

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

▶ P.497



- 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**

▶ P.527



- 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: Magnetic field resistant auto switch, Small auto switch mounting type	CKU32-X2321/X2322	Round/ Diamond	32
Plate cylinder with lock: Magnetic field resistant auto switch, Small auto switch mounting type	CLKU32-X2321/X2322	Round/ Diamond	32
Pin plate cylinder: Magnetic field resistant auto switch mounting type	CKU32-X2359	Round/ Diamond	32
Pin plate cylinder with lock: Magnetic field resistant auto switch mounting type	CLKU32-X2359	Round/ Diamond	32

Clamp Cylinders

For High Precision Positioning: Pin Shift Cylinder **CKQG-X2370/CKQP-X2371** ▶ P.549



- High Precision: Rod end deflection ± 0.1 mm or less
- Position reproducibility
- Pin for positioning the workpiece provided by the customer can be directly mounted.
- Built-in coil scraper
- Reduces labor time by integrating the cylinder and guide.
- Magnetic field resistant auto switches are mountable.

Type	Series	Bore size (mm)	Stroke (mm)
Built-in standard magnet	CKQG-X2370	32, 40, 50	25, 30, 40, 50
Built-in strong magnet	CKQP-X2371	50	30, 50

Stopper Cylinders

Stopper Cylinder **RSQ/RSDQ/RSG/RSDG** ▶ P.559



- 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 (RSDQ series: RSDQ, RSDG series: RSDG)

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

Heavy Duty Stopper Cylinder **RS2H** ▶ P.589



- Weight: Reduced by up to 22% (compared with current 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 Double acting with spring Single acting, spring extend	50, 63, 80

Heavy Duty Stopper Cylinder **RSH** ▶ P.605



- 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** ▶ P.617



- 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**

▶ P.641



- Movable scale cylinder

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

Stroke Reading Cylinder **CE1**

▶ P.656



- 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**

▶ P.667



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

Stroke Reading Cylinder with Brake **CE2**

▶ P.679



- 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**

▶ P.698



Type	Series	Applicable counter
Controller	CEU2	CE2/ML2B

Stroke Reading Cylinders

Stroke Reading Rodless Cylinder with Brake **ML2B**

▶ P.701



- 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 Air Cylinders

Valve Mounted Compact Cylinder **CVQ**

▶ P.725



- 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**

▶ P.739



- 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 Air Cylinder **CV□/CDV□**

▶ P.749



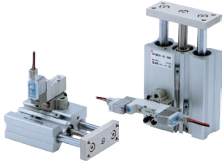
- Valve is mounted on a round cylinder.
- Built-in speed controller for some models
- Cylinder with a valve makes it easy to adjust speed.
- With auto switch (CDVJ series: CDVJ5, CDVJ3, CDVM series: CDVM5, CDVM5K, CDVM3, CDVM3K, CDV3 series: CDV3, CDV3K, CDVS1 series: CDVS1, CDVS1K)

Type	Series	Action	Bore size (mm)	Component: Cylinder	Component: Valve
Standard	CVJ5	Double acting	10, 16	CJ2	SYJ3190
Standard	CVJ3	Single acting (Spring return/extend)	10, 16	CJ2	SYJ319
Standard	CVM5	Double acting	20, 25, 32, 40	CM2	VZ3□90
Standard	CVM3	Single acting (Spring 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 (Spring 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 Air Cylinders

Valve Mounted Guide Cylinder **MVGQ**

▶ P.851



- 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
Ball bushing bearing	MVGQL	25, 32, 40, 50, 63	VZ5000
Ball bushing bearing	MVGQL	80, 100	VF3000

ISO Cylinders

ISO Cylinder

▶ P.873



Series	Bore size (mm)
C85	8, 10, 12, 16, 20, 25
CP96	32, 40, 50, 63, 80, 100
C96	32, 40, 50, 63, 80, 100
C55	20, 25, 32, 40, 50, 63, 80, 100
HYC	32, 40, 50, 63

Shock Absorbers

Shock Absorber **RJ**

▶ P.879



- Max. operating cycles: 10 million cycles
- Stops transferred objects gently.
- Lineup M6 to M27
- Compatible with the RB series 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 1 m/s

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

Shock Absorber **RB**

▶ P.895



- Automatic adjustment to the most appropriate absorption performance

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

Auto Switches

Auto Switch D

P.941



Series	Type	Features
D Series	Solid state auto switch	General purpose type 2-color indicator 2-color indicator with diagnostic output Water resistant 2-color indicator Hygienic With timer Magnetic field resistant 2-color indicator Heat resistant 2-color indicator Wide range detection type
D Series	Reed auto switch	General purpose type 2-color indicator Magnetic field resistant 2-color indicator Heat resistant

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Trimmer Auto Switch D

P.1005



- One auto switch allows workpieces to be distinguished easily.
- Minimum adjustment width to detect: 0.5 mm
- Applicable to the short stroke cylinder.
Only one auto switch can detect the extended and retracted end positions.
This switch can be used when two auto switches cannot be mounted due to short stroke.

Series	Type	Mounting
D-M9K	Sensor unit	Direct mounting (Round groove)
D-Y7K	Sensor unit	Direct mounting (Square groove)
D-F7K	Sensor unit	Rail mounting
D-R□K	Amplifier unit	—

Cylinder Speed Checker IN574

P.1040



- Realizes increase in efficiency with visualization of air cylinder operation.
Quantification of cycle time improvements.
For reduction of numerical management/adjustment labor when starting up equipment.
For reduction of numerical confirmation/inspection labor during periodic maintenance.
- 3 measurement modes
Speed (mm/s), Time required for stroke (s), Operation count (Times)

Series	Rated measurement range: Speed	Rated measurement range: Time required for stroke	Rated measurement range: Operation count
IN574	-1999 to 1999 mm/s	-999.9 to 999.9 s	0 to 999 times

Rotary Actuators/Vane Type

Rotary Actuator **CRB2/CDRB2**

▶ P.47



- 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: 0.2 MPa (Size 10), 0.15 MPa (Size 15 to 40)
- Possible to adjust the angle as desired.
- With auto switch (CDRB2 series: CDRB2□W, CDRB2□WU)

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

Rotary Actuator/Free Mount Type **CRBU2/CDRBU2**

▶ P.68



- Possible to change the starting position as desired to suit the installation conditions.
- 12% weight reduction
- Six types of direct mounting are possible.
- Possible to adjust the angle as desired.
- The mounting position of the auto switch can be set freely.
- With auto switch (CDRB2 series: CDRBU2, CDRBU2W)

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

Rotary Actuator **CRB1/CDRB1**

▶ P.107



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

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

Rotary Table **MSU/MDSU**

▶ P.139



- 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 (MDSU series: MDSUA, MDSUB)

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

Rotary Actuators/Rack & Pinion Type

Mini Rotary Actuator **CRJ**

▶ P.171

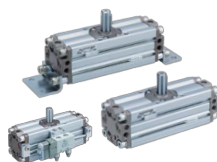


- Compact, Lightweight
- Flexible mounting. Top, bottom and side mounting possible.
- Front or side ported selectable.

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**

▶ P.183

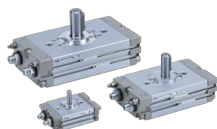


- Compact auto switches (D-M9□ type) are mountable on 2 surfaces. Auto switch can be mounted from the front.
- Weight is reduced by up to 14%.
- With air cushion. Easy adjustment of cushion valve
- With auto switch (CRA1 series: CDRA1, CDRA1□□U, CDVRA1)

Type	Series	Rack type	Size	Rotating angle
Standard	CRA1	Single	30, 50, 63, 80, 100	30: 90°, 180° 50 to 100: 90°, 100°, 180°, 190°
Angle adjustable	CRA1□□U	Single	50, 63, 80, 100	90°, 100°, 180°, 190°
With solenoid valve	CVRA1	Single	50, 63, 80, 100	90°, 100°, 180°, 190°

Compact Rotary Actuator **CRQ2/CDRQ2**

▶ P.233

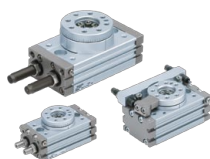


- With cushion
- Equipped with an angle adjustment mechanism.
- Single or double axis selectable.
- With auto switch (CDRQ2 series: CDRQ2)

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

Rotary Table **MSQ**

▶ P.261



- 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**

▶ P.287



- 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

Rotary Actuators/Rack & Pinion Type

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

▶ P.301



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

▶ P.343



- 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

Air Grippers (Parallel Type)

Linear Guide Parallel Type Air Gripper **MHZ□2**

▶ P.381



- 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
Long stroke, with dust cover	MHZL2	10, 16, 20
With dust cover	MHZJ2	6, 10, 16, 20, 25, 32, 40

Low Profile Air Gripper **MHF2**

▶ P.465



- 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

Wide Type Air Gripper **MHL2**

▶ P.497



- 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**

▶ P.515



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

▶ P.515



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

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

Air Grippers (Parallel Type)

Wedge Cam Operation Slide Guide Air Gripper 2-Finger Type **MHK2**

▶ P.547



- 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**

▶ P.569



- 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: ± 0.01 mm

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

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

▶ P.569



- 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: ± 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)
Double acting	MHS3	16, 20, 25, 32, 40, 50, 63, 80, 100, 125
Single acting	MHS3-X84	16, 20, 25, 32, 40, 50, 63
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**

▶ P.569



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

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

Air Grippers (Angular Type)

Angular Type Air Gripper/Compact Type **MHC2**

▶ P.657



- MHC2-6: Auto switch mountable.
- MHC2A-6: Short body
- MHC2M-7: Compact, lightweight

Series	Cylinder bore size (mm)
MHC2-6	6
MHC2A-6	6
MHC2M-7	7

Angular Type Air Gripper/Standard Type **MHC2**

▶ P.657



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

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

Toggle Type Air Gripper **MHT2**

▶ P.685



- 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	32, 40, 50, 63

180° Angular Type Air Gripper/Cam Type **MHY2**

▶ P.697



- Lightweight and compact through the use of a cam mechanism

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

180° Angular Type Air Gripper/Rack & Pinion Type **MHW2**

▶ P.697



- 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

Air Grippers

Rotary Gripper **MRHQ**

▶ P.749



- 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**

▶ P.773



- 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

Auto Switches

Auto Switch **D**

▶ P.797



Series	Type	Features
D series	Solid state auto switch	General purpose type 2-color indicator 2-color indicator with diagnostic output Water resistant 2-color indicator Hygienic With timer Magnetic field resistant 2-color indicator Heat resistant 2-color indicator Wide range detection type
D series	Reed auto switch	General purpose type 2-color indicator Magnetic field resistant 2-color indicator Heat resistant

Trimmer Auto Switch **D**

▶ P.828



- One auto switch allows workpieces to be distinguished easily.
 - Minimum adjustment width to detect: 0.5 mm
 - Applicable to the short stroke cylinder.
- Only one auto switch can detect the extended and retracted end positions.
 This switch can be used when two auto switches cannot be mounted due to short stroke.

Series	Type	Mounting
D-M9K	Sensor unit	Direct mounting (Round groove)
D-Y7K	Sensor unit	Direct mounting (Square groove)
D-F7K	Sensor unit	Rail mounting
D-R□K	Amplifier unit	—

Auto Switches

Cylinder Speed Checker IN574

▶ P.851



- Realizes increase in efficiency with visualization of air cylinder operation.
Quantification of cycle time improvements
For reduction of numerical management/adjustment labor when starting up equipment
For reduction of numerical confirmation/inspection labor during periodic maintenance
- 3 measurement modes
Speed (mm/s), Time required for stroke (s), Operation count (Times)

Series	Rated measurement range: Speed	Rated measurement range: Time required for stroke	Rated measurement range: Operation count
IN574	-1999 to 1999 mm/s	-999.9 to 999.9 s	0 to 999 times

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Vacuum Ejectors/Vacuum Pump Systems

Vacuum Unit ZK2

▶ P.55



- 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 reduced by 90%
- More efficient ejector: Suction flow increased by 50%
Air consumption reduced by 30%
(Compared to other SMC single stage ejectors)
- Compact/Lightweight: Volume 88 cm³ (28% reduction)
Weight 81 g (59% reduction)

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

Space Saving Vacuum Ejector/Vacuum Pump System ZQ

▶ P.101



- 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 manifold application

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

Large Size Vacuum Module ZR

▶ P.131



- Compatible with ejector systems and the vacuum pump systems
- Necessary functions can be combined through a modular design.
- Double solenoids provide a self-holding 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 rate [L/min (ANR)]	Air consumption [L/min (ANR)]	Guidelines for applicable pad (mm)	Vacuum pump system series
ZR110	1.0	22	46	2 to 32	ZR100
ZR113	1.3	38	78	2 to 50	
ZR115	1.5	54	95	2 to 100	
ZR118	1.8	62	150	2 to 125	
ZR120	2.0	84	185	2 to 150	

Compact Vacuum Unit ZB

▶ P.181



With vacuum pressure switch

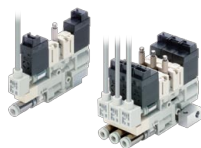
- Compatible with ejector systems and the vacuum pump systems
- Quick response: Response time of the valve 5 ms, Vacuum response time 28 ms
- Energy-saving: Air consumption 17% reduction, Vacuum pressure reached 21% increase
- Compact/Lightweight: 46 g
- With vacuum pressure switch. Can copy to up to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

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

Vacuum Ejectors/Vacuum Pump Systems

Compact Vacuum Ejector ZA

▶ P.203

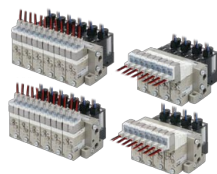


- Total width: 9.9 mm, Total length: 72.9 mm, Total height: 52.5 mm, Weight: 50 g
- Can be installed on moving parts.
- Improved response through shortening of the length of the tube to the pad
- Adaptable for manifold application

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

Vacuum Module ZX

▶ P.204

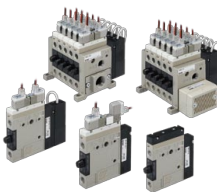


- Compatible with ejector systems and the vacuum pump systems
- Necessary functions can be combined through a modular design.
- Ideal for electronic parts or small precision parts weighing up to 100 g
- Compatible with ejector systems and the vacuum pump systems
- Adaptable for manifold application

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

Vacuum Ejector ZM

▶ P.205



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

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

Multistage Ejector ZL

▶ P.207



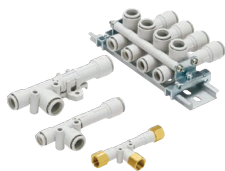
- Suction flow rate increased by a 3 stage diffuser construction
- Functions such as a digital vacuum switch or a vacuum pressure gauge can be selected.

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

Vacuum Ejectors/Vacuum Pump Systems

Vacuum Ejector ZH

▶ P.221



- Compact and Lightweight
Overall length: Max. 11% reduction (6.7 mm shorter)
Port height: Max. 19% reduction (6.3 mm shorter)
Weight: Max. 74% reduction (65.1 g lighter)
- 4 mounting types:
Direct mounting, Standard bracket mounting, L-bracket mounting, DIN rail mounting

Series	Nozzle diameter (mm)	Max. suction flow rate [L/min (ANR)]	Air consumption [L/min (ANR)]	Guidelines for applicable pad (mm)
ZH05DSA	0.5	6	13	2 to 13
ZH07DSA	0.7	12	27	2 to 20
ZH10DSA	1.0	26	52	2 to 32
ZH13DSA	1.3	40	84	2 to 50
ZH15DSA	1.5	58	113	2 to 100
ZH18DSA	1.8	76	162	2 to 125
ZH20DSA	2.0	90	196	2 to 150

Vacuum Ejector ZH

▶ P.237



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

Series	Nozzle diameter (mm)	Max. suction flow rate [L/min (ANR)]	Air consumption [L/min (ANR)]	Guidelines for applicable pad (mm)
ZH05	0.5	5	13	2 to 13
ZH07	0.7	12	23	2 to 20
ZH10	1.0	24	46	2 to 32
ZH13	1.3	40	78	2 to 50
ZH15	1.5	55	95	2 to 100
ZH18	1.8	65	150	2 to 125
ZH20	2.0	85	185	2 to 150

All Stainless Steel Vacuum Ejector ZH□□-X267

▶ P.249



- All stainless steel (SCS13: Equivalent to stainless steel 304)
- Sealant not required
- Maximum operating temperature: 260°C
- Grease-free

Series	Nozzle diameter (mm)	Max. suction flow rate [L/min (ANR)]	Air consumption [L/min (ANR)]	Guidelines for applicable pad (mm)
ZH05-X267	0.5	5	13	2 to 13
ZH07-X267	0.7	12	23	2 to 20
ZH10-X267	1.0	24	46	2 to 32

Vacuum Pad with Ejector ZHP

▶ P.253



- Ejector and pad are integrated. Space saving and reduced piping labor!
- Two-stage ejector
Suction flow rate: 50% increase, Air consumption: 30% reduction
- Easier maintenance
Mounting with the lock plate reduces the pad replacement work steps!
- Pad diameter: $\phi 63$, $\phi 80$

Series	Pad diameter	Pad form	Nozzle nominal size
ZHP	$\phi 63$, $\phi 80$	Bellows type with groove, Flat type with groove	$\phi 0.7$, $\phi 1.0$, $\phi 1.2$, $\phi 1.5$

Vacuum Ejectors/Vacuum Pump Systems

Vacuum Ejector In-line Type ZU

P.261



- 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 rate [L/min (ANR)]	Air consumption [L/min (ANR)]	Guidelines for applicable pad (mm)
ZU05	0.5	7, 12	14	2 to 13
ZU07	0.7	10, 16	29	2 to 20

Vacuum/Release Unit VQD1000-V

P.265

Rubber seal



- Adaptable to 0603 chip
- Response speed: 13 msec (at 500 mm²)/18.5 msec (at 1000 mm²)
- Smooth detachment of a workpiece without over-blow
- No need to adjust the timing when switching between vacuum and positive pressure.
- No need to design a restrictor circuit for release air.
- Suction filter: ZFC050 (Made to Order)

* Distance from the unit to the work area

Air Suction Filters

Air Suction Filter ZFA

P.275



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

Series	Port size	Air flow [L/min (ANR)]	Filtration (μ m)
ZFA10	1/8	50	30
ZFA20	1/4	200	30

Air Suction Filter with One-touch Fittings ZFB

P.279



- 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 [L/min (ANR)]	Filtration (μ m)
	Metric	Inch		
ZFB10	$\phi 4, \phi 6$	$\phi 3/16, \phi 1/4$	10 to 20	30
ZFB20	$\phi 6, \phi 8$	$\phi 1/4$	30 to 50	30
ZFB30	$\phi 8, \phi 10$	$\phi 3/8$	75	30
ZFB40	—	$\phi 1/2$	100	30

In-line Air Filter ZFC

P.281



- Operating pressure range: -100 kPa to 1.0 MPa
 - 2 types of transparent case materials are available. Both positive pressure and vacuum pressure can be used with one unit. Polycarbonate (standard), Nylon (Made to Order)
 - With lock mechanism
- During positive pressure, prevents components from being scattered when they are loosened.
- Note 1) Supply pressure 0.1 MPa, Differential pressure 30 kPa
Note 2) Made to Order

Series	Applicable tubing O.D.		Air flow [L/min (ANR)] ^{Note 1)} Positive pressure	Air flow [L/min (ANR)] Vacuum pressure	Filtration (μ m)
	Metric	Inch			
ZFC5□	$\phi 4, \phi 6$	$\phi 5/32", \phi 1/4"$	45/100	10/20	5, 10 ^{Note 2)}
ZFC7□	$\phi 6, \phi 8, \phi 10, \phi 12$	$\phi 1/4", \phi 5/16", \phi 3/8"$	120/250/ 300/350	30/70/ 80/100	5, 10 ^{Note 2)}

Vacuum Pads

Vacuum Pad **ZP3**

▶ P.297

- 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

4.5-Stage Bellows Pad **ZP2**

▶ P.544

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



Vacuum Pad **ZP3E**

▶ P.377

- Stability of suction position, improved ease of removal. Dents and bumps on the adsorption surface expands the area which is in contact with the workpiece. Ribs reduce the inclinations during transport of workpiece.

- Number of mounting screws reduced (4 pcs. → 1 pc.)
- Pad and metal parts can be disposed of separately.
- Pad diameter: $\phi 32$ to $\phi 125$

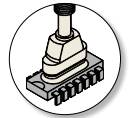


Series	Type
ZP3E	Flat type with groove
ZP3E	Bellows type with groove

Oval Pad **ZP2**

▶ P.550

- For rectangular workpieces
- Pad diameter: 3.5×7 to 8×30



Compact/Short/Nozzle Pad **ZP2**

▶ P.495

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



Series	Type
ZP2	Compact
ZP2	Short
ZP2	Nozzle

Pad with Ball Spline Buffer **ZP2**

▶ P.557

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



Thin Flat/Flat Pad **ZP2**

▶ P.537

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



Series	Type
ZP2	Thin flat
ZP2	Flat

Mark-free Pad **ZP2**

▶ P.560

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



Bellows Pad **ZP2**

▶ P.540

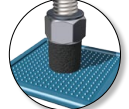
- For spherical workpieces or workpieces with inclined surface
- Pad diameter: $\phi 2$ to $\phi 46$



Sponge Pad **ZP2**

▶ P.563

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

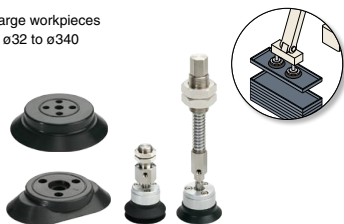


Vacuum Pads

Heavy-duty Pad ZP2

▶ P.566

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



Vacuum Pad: Large/Heavy Duty Type ZPT/ZPX

▶ P.582

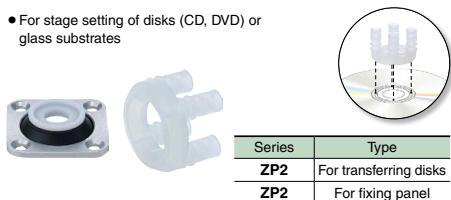
- Ideal for heavy or large workpieces such as CRT tubes and automobile bodies
- Pad diameter: $\phi 40$ to $\phi 125$



Special Configuration Pad ZP2

▶ P.592

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



Series	Type
ZP2	For transferring disks
ZP2	For fixing panel

Vacuum Pad: Large Bellows Pad ZPT/ZPX

▶ P.582

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



Vacuum Saving Valve ZP2V

▶ P.627

- 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 μm)
- With One-touch fitting



Vacuum Pad: Ball Joint Type ZPT/ZPR

▶ P.707

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



Vacuum Pad ZP

▶ P.637

- 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 diameter: $\phi 2$ to $\phi 50$



Non-contact Gripper XT661

▶ P.727

- Assist in non-contact workpiece transfer.
 - Max. workpiece suction distance: 10 mm
 - Two types are available.
- Cyclone type: High lifting force: Max. 44 N
Bernoulli type: Amplitude of the workpiece during gripping: ± 0.01 mm or less



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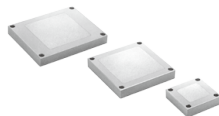
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Other Equipment

Adsorption Plate **SP**

▶ P.749



- Specialized for adsorption and fixing in place of thin sheets, glass substrates, and soft workpieces. Workpieces do not deform since they are adsorbed with multiple micro air vents on the adsorption surface.
- High processing precision
- High adsorption force

Series	Shape	Adsorption surface size	Sintered metallic element particle diameter	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

Free Mount Cylinder for Vacuum **ZCUK**

▶ P.759



- In the rectangular, compact cylinder CU series 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**

▶ P.773



- 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 [L/min (ANR)]	Max. operating pressure (MPa)	Water drop removal ratio
AMJ	1/4, 3/8, 1/2, 3/4, 1	200, 300, 500	1.0	90%

Vacuum Filter **AFJ**

▶ P.779



- Prevents vacuum equipment trouble!
- Nominal filtration rating: 5, 40, 80 μm
- Large flow capacity: Max. 660 L/min (ANR)
- Elements can be reused by washing them.
- Water drops can be removed.
- The bowl is covered with a transparent bowl guard!

Series	Port size	Recommended flow rate [L/min (ANR)]	Nominal filtration rating
AFJ	1/8, 1/4, 3/8, 1/2	180, 380, 660	5, 40, 80

Exhaust Cleaner for Vacuum Pump **AMV**

▶ P.788



- Captures 99.5% of greasy fumes exhausted from the vacuum pump.
- Creates a comfortable working environment without greasy fumes.
- Captures and separates 99.5% of even low-flow and highly concentrated greasy fumes.
- Exhaust ducts from a vacuum pump is not necessary.

Series	Port size	Max. air flow [L/min (ANR)]	Oil mist removal	Filtration (μm)
AMV	1, 11/2, 2, 3BJIS 10K FF flange 4BJIS 10K FF flange	360 to 16000	99.5% or more	0.3 (Trapping efficiency 95%)

Other Equipment

Vacuum Flow ZH□-□□-X185

P.790



- 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 System Peripherals

P.793



- Vacuum Regulator
- Electronic Vacuum Regulator
- Directional Control Valve
- Vacuum Pressure Switch
- Pressure Gauge for Vacuum
- Flow Control Equipment
- Made to Order

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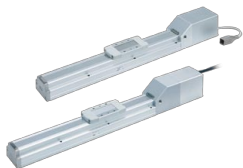
Slider Type

Electric Actuator/Slider Type, Ball Screw Drive **LEFS**

▶ P.31

Motorless Type

Clean Room Specification



LEFS Series Step Motor (Servo/24 VDC), Servo Motor (24 VDC)

- Max. work load: 65 kg
- Positioning repeatability: ± 0.015 mm (High precision type)
- Clean specification: Complies with ISO Class 4 (ISO14644-1) (11-LEFS)
- Compatible controllers/drivers: LECP6, LECA6, LECP1, LECPA, LECPMJ

LEFS Series AC Servo Motor

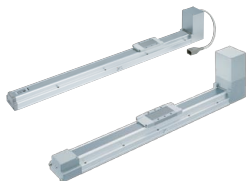
- High-output motor (100/200/400 W)
- Improved high-speed transfer ability
- High acceleration/deceleration (20000 mm/s^2)
- Pulse input type
- With internal absolute encoder
- Positioning repeatability: ± 0.01 mm (High precision type)
- Clean specification: Complies with ISO Class 4 (ISO14644-1) (11-LEFS)
- Compatible drivers: LECSA, LECSB, LECSA, LECSA, LECSA-T, LECSA
- Motorless specification is available.

Specification	Model	Stroke (mm)	Work load (kg) Horizontal	Speed (mm/s)	Screw lead (mm)
Step motor (Servo/24 VDC)	LEFS16	50 to 500	Max. 15	Max. 700	5, 10
	LEFS25	50 to 800	Max. 30	Max. 1100	6, 12, 20
	LEFS32	50 to 1000	Max. 50	Max. 1200	8, 16, 24
	LEFS40	150 to 1200	Max. 65	Max. 1200	10, 20, 30
Servo motor (24 VDC)	LEFS16A	50 to 500	Max. 10	Max. 500	5, 10
	LEFS25A	50 to 800	Max. 18	Max. 800	6, 12, 20
AC servo motor (100/200/400 W)	LEFS25S	50 to 800	Max. 20	Max. 1500	6, 12, 20
	LEFS32S	50 to 1000	Max. 45	Max. 1500	8, 16, 24
	LEFS40S	150 to 1200	Max. 60	Max. 1500	10, 20, 30

Electric Actuator/Slider Type, Belt Drive **LEFB**

▶ P.31

Motorless Type



LEFB Series Step Motor (Servo/24 VDC), Servo Motor (24 VDC)

- Max. stroke: 2000 mm
- Max. speed: 2000 mm/s
- Positioning repeatability: ± 0.08 mm
- Compatible controllers: LECP6, LECA6, LECP1, LECPA, LECPMJ

LEFB Series AC Servo Motor

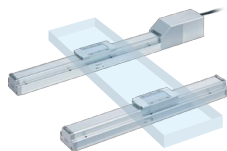
- Max. speed: 2000 mm/s
- Max. stroke: 3000 mm
- Max. acceleration/deceleration: 20000 mm/s^2
- Pulse input type
- With internal absolute encoder
- Positioning repeatability: ± 0.06 mm
- Compatible drivers: LECSA, LECSB, LECSA, LECSA, LECSA-T, LECSA
- Motorless specification is available.

Specification	Model	Stroke (mm)	Work load (kg) Horizontal	Speed (mm/s)	Equivalent lead (mm)
Step motor (Servo/24 VDC)	LEFB16	300 to 1000	1	48 to 1100	48
	LEFB25	300 to 2000	10	48 to 1400	48
	LEFB32	300 to 2000	19	48 to 1500	48
Servo motor (24 VDC)	LEFB16A	300 to 1000	1	5 to 2000	48
	LEFB25A	300 to 2000	2	5 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

Slider Type

Electric Actuator/LEF Series Support Guide **LEFG**

P.59



- A support guide that is designed to support workpieces with significant overhang
- Easy installation with the same outer dimensions as the LEF series body, Contributes to the reduction of design and assembly labor
- The standardly equipped sealing band prevents the scattering of grease and the entry of foreign matter from outside.

Drive method	Model	Stroke (mm)
Ball screw drive/S	LEFG16-S	50 to 500
Ball screw drive/S	LEFG25-S	50 to 800
Ball screw drive/S	LEFG32-S	50 to 1000
Ball screw drive/S	LEFG40-S	150 to 1200
Belt drive/BT	LEFG16-BT	300 to 1000
Belt drive/BT	LEFG25-BT	300 to 2000
Belt drive/BT	LEFG32-BT	300 to 2000
Belt drive/BS	LEFG25-BS	300 to 2000
Belt drive/BS	LEFG32-BS	300 to 2500
Belt drive/BS	LEFG40-BS	300 to 3000

Electric Actuator/High Rigidity Slider Type, Ball Screw Drive **LEJS**

P.115

- Motorless Type
- Clean Room Specification



- Low profile/Low center of gravity: Height reduced by approx. 36% (Reduced by 32 mm)
- Max. work load: 85 kg
- Positioning repeatability: ±0.01 mm
- Max. acceleration/deceleration: 20000 mm/s²
- Clean specification: Complies with ISO Class 4 (Class 10) (11-LEJS)
- Compatible drivers: LECSA, LECSB, LECS, LECS, LECS-T, LECS□
- Motorless specification is available.

Specification	Model	Stroke (mm)	Work load (kg)	Speed (mm/s)	Screw lead (mm)
			Horizontal		
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**

P.115



- Max. stroke: 3000 mm
- Max. speed: 3000 mm/s
- Max. acceleration/deceleration: 20000 mm/s²
- Compatible drivers: LECSA, LECSB, LECS, LECS
- Motorless specification is available.

Specification	Model	Stroke (mm)	Work load (kg)	Speed (mm/s)	Screw lead (mm)
			Horizontal		
AC servo motor	LEJB40	200 to 2000	Max. 20	Max. 2000	27
	LEJB63	300 to 3000	Max. 30	Max. 3000	42

Electric Actuator/Guide Rod Slider, Belt Drive **LEL**

P.147



- Low profile/Flat: Height 48 mm
- Profile reduced by the side mounting of the motor.
No interference with the motor, even with large workpieces.
- Auto switch mountable (Made to order)
- Max. stroke: 1000 mm
- Transfer speed: 1000 mm/s
- Positioning repeatability: ±0.1 mm
- Compatible controllers: LECP6, LECP1, LECPMJ

Specification	Model	Bearing	Stroke (mm)	Work load (kg)	Speed (mm/s)
Step motor (Servo/24 VDC)	LEL25M	Sliding bearing	100 to 1000	3	Max. 500
	LEL25L	Ball bushing bearing	100 to 1000	5	Max. 1000

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Slider Type

Electric Actuator/Low Profile Slider Type **LEM**

P.165



- 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: Select from above or below, right or left
- Solid state auto switches can be mounted for limit confirmation and intermediate signal confirmation.
- Selectable controllability (Controller)
Complete control like an air cylinder (Allows for a 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	50 to 2000	6, 11	Max. 1000	48
Cam follower guide	LEMC	50 to 2000	10, 20	Max. 1000	48
Linear guide (Single axis)	LEMH	50 to 1500	10, 20	Max. 2000	48
Linear guide (Double axis)	LEMHT	100 to 1500	10, 20	Max. 2000	48

Rod Type/Guide Rod Type

Electric Actuator: Rod Type, Motor Top/Parallel Type **LEY**

P.215

Motorless Type

Dust-tight/Water-jet-proof



- LEY Series**
- Step Motor (Servo/24 VDC)**
Servo Motor (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.
It is possible to hold the actuator with the rod pushing on a workpiece, etc.
 - Positioning repeatability: ± 0.02 mm or less
 - Dust-tight/Water-jet-proof (IP65)
 - Compatible controllers/drivers: LECP6, LECA6, LECP1, LECPA, LECPMJ
- LEY Series**
- AC Servo Motor**
- High-output motor (100/200/400 W)
 - Improved high-speed transfer ability
 - High acceleration compatible (5000 mm/s²)
 - Pulse input type
 - With internal absolute encoder
 - Positioning repeatability: ± 0.02 mm or less
 - Dust-tight/Water-jet-proof (IP65)
 - Compatible drivers: LECSA, LECSB, LECS, LECS, LECS-S, LECS-T, LECSY□
 - Motorless specification is available.

Specification	Model	Stroke (mm)	Pushing force (N)	Speed (mm/s)	Screw lead (mm)
Step motor (Servo/24 VDC)	LEY16	30 to 300	Max. 141	Max. 500	2.5, 5, 10
	LEY25	30 to 400	Max. 452	Max. 500	3, 6, 12
	LEY32	30 to 500	Max. 707	Max. 500	4, 8, 16
	LEY40	30 to 500	Max. 1058	Max. 300	4, 8, 16
Servo motor (24 VDC)	LEY16A	30 to 300	Max. 111	Max. 500	2.5, 5, 10
	LEY25A	30 to 400	Max. 130	Max. 500	3, 6, 12
	LEY25□S	30 to 400	Max. 485	Max. 900	3, 6, 12
AC servo motor	LEY32□S	30 to 500	Max. 588	Max. 1200	5, 10, 20
	LEY63□S	100 to 800	Max. 3343	Max. 1000	5 (2.86), 5, 10, 20

Rod Type/Guide Rod Type

Electric Actuator: Rod Type, In-line Motor Type LEY□D

P.215

Motorless Type

Dust-tight/Water-jet-proof



LEY Series Step Motor (Servo/24 VDC), Servo Motor (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.
- It is possible to hold the actuator with the rod pushing on a workpiece, etc.
- Positioning repeatability: ±0.02 mm or less
- Compatible controllers/drivers: LEC6P, LECA6, LEC1P, LECPA, LECPMJ

LEY Series AC Servo Motor

- High-output motor (100/200/400 W)
- Improved high-speed transfer ability
- High acceleration/deceleration compatible (5000 mm/s²)
- Pulse input type
- With internal absolute encoder
- Positioning repeatability: ±0.02 mm or less
- Compatible drivers: LECSA, LECSB, LECS, LECSS, LECSS-T, LECY□
- Motorless specification is available.

Specification	Model	Stroke (mm)	Pushing force (N)	Speed (mm/s)	Screw lead (mm)
Step motor (Servo/24 VDC)	LEY16D	30 to 300	Max. 141	Max. 500	2.5, 5, 10
	LEY25D	30 to 300	Max. 141	Max. 500	2.5, 5, 10
	LEY32D	30 to 500	Max. 707	Max. 500	4, 8, 16
	LEY40D	30 to 500	Max. 1058	Max. 300	4, 8, 16
Servo motor (24 VDC)	LEY16DA	50 to 300	Max. 111	Max. 500	2.5, 5, 10
	LEY25DA	50 to 400	Max. 130	Max. 500	3, 6, 12
AC servo motor	LEY25DS	30 to 400	Max. 485	Max. 900	3, 6, 12
	LEY32DS	30 to 500	Max. 736	Max. 1200	4, 8, 16
	LEY63DS	100 to 800	Max. 1910	Max. 1000	5, 10, 20

Electric Actuator/Guide Rod Type, Motor Top Mounting Type LEYG

P.215

Motorless Type



LEYG Series 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 a rod type, size 25, 100 stroke)
- Compatible with sliding bearings and ball bushing bearings
- Compatible with moment load and stopper (sliding bearings)
- Speed control/Positioning: Max. 64 points
- Either positioning or pushing control can be selected.
- It is possible to hold the actuator with the rod pushing on a workpiece, etc.
- Positioning repeatability: ±0.02 mm or less
- Compatible controllers/drivers: LEC6P, LECA6, LEC1P, LECPA, LECPMJ

LEY Series AC Servo Motor

- High-output motor (100/200 W)
- Improved high-speed transfer ability
- High acceleration/deceleration compatible (5000 mm/s²)
- Pulse input type
- With internal absolute encoder
- Compatible drivers: LECSA, LECSB, LECS, LECSS, LECSS-T, LECY□
- Motorless specification is available.

Specification	Model	Stroke (mm)	Pushing force (N)	Speed (mm/s)	Screw lead (mm)
Step motor (Servo/24 VDC)	LEYG16	30 to 200	Max. 141	Max. 500	2.5, 5, 10
	LEYG25	30 to 300	Max. 452	Max. 500	3, 6, 12
	LEYG32	30 to 300	Max. 707	Max. 500	4, 8, 16
	LEYG40	30 to 300	Max. 1058	Max. 300	4, 8, 16
Servo motor (24 VDC)	LEYG16A	30 to 200	Max. 111	Max. 500	2.5, 5, 10
	LEYG25A	30 to 300	Max. 130	Max. 500	3, 6, 12
AC servo motor	LEYG25□S	30 to 300	Max. 485	Max. 900	3, 6, 12
	LEYG32□S	30 to 300	Max. 588	Max. 1200	5, 10, 20

Rod Type/Guide Rod Type

Electric Actuator/Guide Rod Type, In-line Motor Type **LEYG** □ D

▶ P.215

Motorless Type



- LEYG Series 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, 100 stroke)
 - Compatible with sliding bearings and ball bushing bearings
 - Compatible with moment load and stopper (sliding bearings)
 - Speed control/Positioning: Max. 64 points
 - Either positioning or pushing control can be selected.
 - It is possible to hold the actuator with the rod pushing on a workpiece, etc.
 - Positioning repeatability: ±0.02 mm or less
 - Compatible controllers/drivers: LECP6, LECA6, LECP1, LECPA, LECPMJ

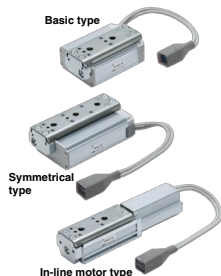
- LEY Series AC Servo Motor**
- High-output motor (100/200 W)
 - Improved high-speed transfer ability
 - High acceleration/deceleration compatible (5000 mm/s²)
 - Pulse input type
 - With internal absolute encoder
 - Compatible drivers: LECSA, LECSB, LECS, LECS, LECS-T, LECY □
 - Motorless specification is available.

Specification	Model	Stroke (mm)	Pushing force (N)	Speed (mm/s)	Screw lead (mm)
Step motor (Servo/24 VDC)	LEYG16D	30 to 200	Max. 141	Max. 500	2.5, 5, 10
	LEYG25D	30 to 200	Max. 452	Max. 500	3, 6, 12
	LEYG32D	30 to 200	Max. 707	Max. 500	4, 8, 16
	LEYG40D	30 to 200	Max. 1058	Max. 300	4, 8, 16
Servo motor (24 VDC)	LEYG16DA	30 to 200	Max. 111	Max. 500	2.5, 5, 10
	LEYG25DA	30 to 300	Max. 130	Max. 500	3, 6, 12
AC servo motor	LEYG25DS	30 to 300	Max. 485	Max. 900	3, 6, 12
	LEYG32DS	30 to 300	Max. 736	Max. 1000	4, 8, 16

Slide Tables

Electric Slide Table/Compact Type **LES**

▶ P.307



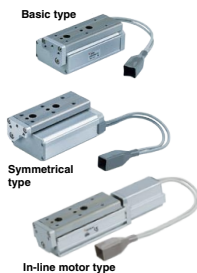
- Compact: Workpiece mounting surface height reduced by up to 12% compared with the LESH
- Vertical work load: Increased by up to 50%
- Lightweight: Reduced by up to 29%
- Max. pushing force: 180 N
- Positioning repeatability: ±0.05 mm
- Cycle time can be reduced.
- Max. acceleration/deceleration: 5000 mm/s²
- Max. speed: 400 mm/s
- Compatible controllers/drivers: LECP6, LECA6, LECP1, LECPA, LECPMJ

Specification	Model	Stroke (mm)	Work load (kg)		Speed (mm/s)	Screw lead (mm)
			Horizontal	Vertical		
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**

P.307



- 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.)
- Integrated guide rail and table
Uses a recirculating linear guide for high rigidity and high precision
- Reduced cycle time
Max. acceleration/deceleration: 5000 mm/s² Max. speed: 400 mm/s
- Max. pushing force: 180 N
- Positioning repeatability: ±0.05 mm
- Compatible controllers/drivers: LECP6, LECA6, LECP1, LECPA, LECPMJ

Specification	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. 8	Max. 2	Max. 400	5, 10
	LESH25□	50, 100, 150	Max. 12	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**

P.369



- Compact and lightweight
W 20.5 mm x H 30 mm x L 125.6 mm, Weight 240 g
- Max. pushing force: 50 N
- Positioning repeatability: ±0.05 mm
- It is possible to set the position, speed, and force. (64 points)
- Max. speed (Horizontal): 350 mm/s
- Compatible controllers/drivers: LECP6, LECP1, LECPA, LECPMJ

Specification	Model	Stroke (mm)	Pushing force [N]		Max. work load [kg] (Horizontal)		Screw lead
			Basic	Compact	Basic	Compact	
Step motor (Servo/24 VDC)	LEPY6	25, 50, 75	Max. 20	—	Max. 2.0	—	4.8
	LEPY10	25, 50, 75	Max. 50	Max. 40	Max. 6.0	Max. 4.0	5, 10

Electric Actuator/Miniature Slide Table Type **LEPS**

P.369



- Compact and lightweight
W 21 mm x H 41 mm x L 138.6 mm, Weight 290 g
- Max. pushing force: 50 N
- Positioning repeatability: ±0.05 mm
- It is possible to set the position, speed, and force. (64 points)
- Max. speed (Horizontal): 350 mm/s
- Compatible controllers/drivers: LECP6, LECP1, LECPA, LECPMJ

Specification	Model	Stroke (mm)	Pushing force [N]		Max. work load [kg] (Horizontal)		Screw lead
			Basic	Compact	Basic	Compact	
Step motor (Servo/24 VDC)	LEPS6	25, 50	Max. 20	—	Max. 1.0	—	4.8
	LEPS10	25, 50	Max. 50	Max. 40	Max. 2.0	Max. 2.0	5, 10

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Rotary Tables

Electric Rotary Table **LER**

▶ P.399



- Rotation angle: 360°, 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: 3000°/sec² (52.36 rad/sec²)
- It is possible to set the 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/drivers: LECP6, LECP1, LECPA, LECPMJ

* Value when an external stopper is mounted

Model	Rotating torque [N·m]		Max. speed [°/s]		Positioning repeatability [°]	
	Basic	High torque	Basic	High torque	Basic type	High precision type
LER10	0.22	0.32	420	280	±0.05	
LER30	0.8	1.2	420	280	±0.05	±0.03
LER50	6.6	10	420	280	±0.05	±0.03

Grippers

Electric Gripper 2-Finger Type (Z Type) **LEHZ**

▶ P.425



- Easy setting: Data can be set with only 2 items, position and force.
The controller is already set with the data of the actuator. (The actuator and controller are provided as a set.)
- Equipped with a drop prevention function (All series come equipped with a self-lock mechanism.)
- The self-lock mechanism reduces power consumption.
- Equipped with a gripping check function.
- It is possible to set the position, speed, and force. (64 points)
- Compatible controllers/drivers: LECP6, LECP1, LECPA, LECPMJ

Series	Body size	Open and close stroke/ both sides (mm)	Gripping force [N]		Opening and closing speed (mm/s)
			Basic	Compact	
LEHZ	10	4	6 to 14	2 to 6	5 to 80
	16	6	6 to 14	3 to 8	5 to 80
	20	10	16 to 40	11 to 28	5 to 100
	25	14	16 to 40	11 to 28	5 to 100
	32	22	52 to 130	—	5 to 120
	40	30	84 to 210	—	5 to 120

Electric Gripper 2-Finger Type/With Dust Cover (Z Type) **LEHZJ**

▶ P.425



- Easy setting: Data can be set with only 2 items, position and force.
The controller is already set with the data of the actuator. (The actuator and controller are provided as a set.)
- Equipped with a drop prevention function (All series come equipped with a self-lock mechanism.)
- The self-lock mechanism reduces power consumption.
- Equipped with a gripping check function.
- It is possible to set the position, speed, and force. (64 points)
- Compatible controllers/drivers: LECP6, LECP1, LECPA, LECPMJ

Series	Body size	Open and close stroke/ both sides (mm)	Gripping force [N]		Opening and closing speed (mm/s)
			Basic	Compact	
LEHZJ	10	4	6 to 14	3 to 6	5 to 80
	16	6	6 to 14	4 to 8	5 to 80
	20	10	16 to 40	11 to 28	5 to 100
	25	14	16 to 40	11 to 28	5 to 100

Grippers

Electric Gripper 2-Finger Type (F Type) **LEHF**

▶ P.425



- Easy setting: Data can be set with only 2 items, position and force. The controller is already set with the data of the actuator. (The actuator and controller are provided as a set.)
 - Equipped with a drop prevention function (All series come equipped with a self-lock mechanism.)
 - The self-lock mechanism reduces power consumption.
 - Equipped with a gripping check function.
 - It is possible to set the position, speed, and force. (64 points)
 - Compatible controllers/drivers: LECP6, LECP1, LECPA, LECPMJ
- Note) (): For long strokes

Series	Body size	Open and close stroke/ both sides (mm)	Gripping force [N]		Opening and closing speed (mm/s)
			Basic	Compact	
LEHF	10	16(32) <small>Note)</small>	3 to 7	3 to 7	5 to 80
	20	24(48) <small>Note)</small>	11 to 28	11 to 28	5 to 100
	32	32(64) <small>Note)</small>	48 to 120	48 to 120	5 to 100
	40	40(80) <small>Note)</small>	72 to 180	72 to 180	5 to 100

Electric Gripper 3-Finger Type (S Type) **LEHS**

▶ P.425



- Easy setting: Data can be set with only 2 items, position and force. The controller is already set with the data of the actuator. (The actuator and controller are provided as a set.)
- Equipped with a drop prevention function (All series come equipped with a self-lock mechanism.)
- The self-lock mechanism reduces power consumption.
- Equipped with a gripping check function.
- It is possible to set the position, speed, and force. (64 points)
- Compatible controllers/drivers: LECP6, LECP1, LECPA, LECPMJ

Series	Body size	Open and close stroke/ both sides (mm)	Gripping force [N]		Opening and closing speed (mm/s)
			Basic	Compact	
LEHS	10	4	2.2 to 5.5	1.4 to 3.5	5 to 70
	20	6	9 to 22	7 to 17	5 to 80
	32	8	36 to 90	—	5 to 100
	40	12	52 to 130	—	5 to 120

Environment: Dust-tight/Water-jet-proof (IP65 Equivalent)

Electric Actuator/Rod Type **LEY-X5**

▶ P.485



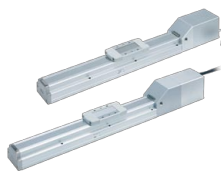
- Enclosure: IP65
- Max. stroke: 500 mm

Specification	Model	Stroke (mm)	Pushing force (N)	Speed (mm/s)	Screw lead (mm)
Step motor (Servo/24 VDC)	LEY25-X5	30 to 400	Max. 452	Max. 400	3, 6, 12
Step motor (Servo/24 VDC)	LEY32-X5	30 to 500	Max. 707	Max. 400	4, 8, 16
Servo motor (24 VDC)	LEY25A-X5	30 to 400	Max. 130	Max. 400	3, 6, 12
AC servo motor	LEY25S-X5	30 to 400	Max. 485	Max. 900	3, 6, 12
AC servo motor	LEY32S-X5	30 to 500	Max. 588	Max. 1200	5, 10, 20
AC servo motor	LEY63S-X5	100 to 800	Max. 1910	Max. 1000	5, 10, 20
AC servo motor (In-line motor type)	LEY25DS-X5	30 to 400	Max. 485	Max. 900	3, 6, 12
AC servo motor (In-line motor type)	LEY32DS-X5	30 to 500	Max. 736	Max. 1000	4, 8, 16
AC servo motor (In-line motor type)	LEY63DS-X5	100 to 800	Max. 1910	Max. 1000	5, 10, 20

Environment: Clean Room Specification

Electric Actuator/Slider Type, Ball Screw Drive **11-LEFS**

▶ P.509

**LEFS Series Step Motor (Servo/24 VDC), Servo Motor (24 VDC)**

- Max. work load: 60 kg
- Positioning repeatability: ± 0.02 mm
- Compatible controllers/drivers: LECP6, LECA6, LEC1, LEC1A, LEC1PMJ

LEFS Series AC Servo Motor

- High-output motor (100/200/400 W)
- Improved high-speed transfer ability
- High acceleration/deceleration (20000 mm/s²)
- Pulse input type
- With internal absolute encoder
- Positioning repeatability: ± 0.02 mm
- Compatible drivers: LECSA, LECSB, LECSC, LECSS
- Motorless specification is available.

Specification	Model	Stroke (mm)	Work load (kg) Horizontal	Speed (mm/s)	Screw lead (mm)
Step motor (Servo/24 VDC)	11-LEFS16	50 to 500	Max. 14	Max. 500	5, 10
Step motor (Servo/24 VDC)	11-LEFS25	50 to 600	Max. 25	Max. 500	6, 12
Step motor (Servo/24 VDC)	11-LEFS32	50 to 800	Max. 45	Max. 500	8, 16
Step motor (Servo/24 VDC)	11-LEFS40	150 to 1000	Max. 55	Max. 500	10, 20
Servo motor (24 VDC)	11-LEFS16A	50 to 500	Max. 10	Max. 500	5, 10
Servo motor (24 VDC)	11-LEFS25A	50 to 600	Max. 18	Max. 500	6, 12
AC servo motor (100/200/400 W)	11-LEFS25S	50 to 600	Max. 20	Max. 900	6, 12
AC servo motor (100/200/400 W)	11-LEFS32S	50 to 800	Max. 45	Max. 1000	8, 16
AC servo motor (100/200/400 W)	11-LEFS40S	150 to 1000	Max. 60	Max. 1000	10, 20

Electric Actuator/High Rigidity Slider Type, Ball Screw Drive **11-LEJS**

▶ P.509



- Low profile/Low center of gravity: Height reduced by approx. 36% (Reduced by 32 mm)
- Max. work load: 85 kg
- Positioning repeatability: ± 0.02 mm
- Max. acceleration/deceleration: 20000 mm/s²
- Clean room specification
- Compatible drivers: LECSA, LECSB, LECSC, LECSS
- Motorless specification is available.

Specification	Model	Stroke (mm)	Work load (kg) Horizontal	Speed (mm/s)	Screw lead (mm)
AC servo motor	11-LEJS40	200 to 1200	Max. 55	Max. 1200	8, 16
AC servo motor	11-LEJS63	300 to 1500	Max. 85	Max. 1200	10, 20

Environment: Secondary Battery Compatible

Electric Actuator **25A-**

▶ P.537



* Excludes motors, cables, and controllers/drivers

Type	Motor type	Model
Slider type/Ball screw drive	Step motor Servo motor	25A-LEFS
Slider type/Ball screw drive	AC servo motor	25A-LEFS
High-rigidity slider type/Ball screw drive	AC servo motor	25A-LEJS
Rod type	Step motor Servo motor	25A-LEY
Rod type	AC servo motor	25A-LEY

Controllers/Drivers

Controller/Step Data Input Type **LECP6/LECA6**

▶ P.560



- The controller is already set with the data of the actuator. (The actuator and controller are provided as a set.)
- Easy operation and simple setting: Easy mode, Detail setting: Normal mode
- Teaching box, controller setting software

Type	Series	Compatible motor	Power supply voltage	Parallel I/O		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

Fieldbus-compatible Gateway (GW) Unit **LEC-G**

▶ P.572



- The LEC□ series electric actuators are applicable to Fieldbus protocols.
- Conversion unit for Fieldbus network and LEC serial communication
- 2 methods of operation:
Step data input, numerical data input
- Position, speed, and other 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%	LECP6 series LECA6 series

Programless Controller **LECP1**

▶ P.576



- No programming required
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
- 3-level pushing force settings

Type	Series	Compatible motor	Power supply voltage	Parallel I/O		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

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Controllers/Drivers

Programless Controller (With Stroke Study) **LECP2**

▶ P.583



- No programming required
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
- 3-level pushing force settings

Type	Series	Compatible motor	Power supply voltage	Parallel I/O		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)	2 stroke end points, 12 intermediate points

Step Motor Driver (Pulse Input Type) **LECPA**

▶ P.590



- 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 operations available.)

Type	Series	Compatible motor	Power supply voltage	Parallel I/O		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**

▶ P.600



- 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

Controllers/Drivers

AC Servo Motor Controller (Pulse Input Type) **LECS**

▶ P.607 ▶ P.629



- Pulse input type motor driver
- Compatible motor capacity: 100 W, 200 W, 400 W
- Compatible encodes:
Incremental type
Absolute type
- Servo adjustment using auto gain tuning
- With display setting function

Type	Series	Compatible motor	Power supply voltage	Parallel I/O	
				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	4
Pulse input type (For absolute encoder)	LECSB			10	6
CC-Link direct input type (For absolute encoder)	LECS			—	—
SSCNET III type (For absolute encoder)	LECSS			—	—
SSCNET III/H type (For absolute encoder)	LECSS-T		200 to 240 VAC (50/60 Hz)	—	—

AC Servo Motor Driver (MECHATROLINK Compatible) **LECYM/LECYU**

▶ P.659



- Position control, speed control, and torque control can be used.
- Control encoder: Absolute 20-bit encoder (Resolution: 1048576 p/rev)
- Applicable Fieldbus protocol: MECHATROLINK-II, MECHATROLINK-III

Type	Series	Compatible motor	Power supply voltage	Parallel I/O	
				Input	Output
MECHATROLINK-II type (For absolute encoder)	LECYM	AC servo motor (100/200/400 W)	200 to 230 VAC (50/60Hz)	7 (Number of optional allocations)	1 (Number of fixed allocations) 3 (Number of optional allocations)
MECHATROLINK-III type (For absolute encoder)	LECYU	AC servo motor (100/200/400 W)	200 to 230 VAC (50/60Hz)	7 (Number of optional allocations)	1 (Number of fixed allocations) 3 (Number of optional allocations)

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Motorless Type

Electric Actuator/Slider Type **LEF**

▶ P.779



- Various servo motors can be mounted due to the addition of the motorless type.
- Compatible motors:
Mitsubishi Electric Corporation, YASKAWA Electric Corporation, SANYO DENKI CO., LTD., OMRON Corporation, Panasonic Corporation, FANUC CORPORATION, ORIENTAL MOTOR Co., Ltd., FASTECH Co., Ltd., Rockwell Automation, Inc. (Allen-Bradley), Beckhoff Automation GmbH, Siemens AG, Delta Electronics, Inc.

Specification	Model	Stroke (mm)	Work load (kg)	Speed (mm/s)	Screw lead (mm)
Motorless Ball screw drive	LEFS25	50 to 800	Max. 20	Max. 900	6, 12, 20
Motorless Ball screw drive	LEFS32	50 to 1000	Max. 45	Max. 1000	8, 16, 24
Motorless Ball screw drive	LEFS40	150 to 1200	Max. 60	Max. 1000	10, 20, 30
Motorless Belt drive	LEFB25	300 to 2000	5	Max. 2000	Equivalent to 54
Motorless Belt drive	LEFB32	300 to 2500	15	Max. 2000	Equivalent to 54
Motorless Belt drive	LEFB40	300 to 3000	25	Max. 2000	Equivalent to 54

Electric Actuator/High Rigidity Slider Type **LEJ**

▶ P.824



- Various servo motors can be mounted due to the addition of the motorless type.
- Compatible motors:
Mitsubishi Electric Corporation, YASKAWA Electric Corporation, SANYO DENKI CO., LTD., OMRON Corporation, Panasonic Corporation, FANUC CORPORATION, ORIENTAL MOTOR Co., Ltd., FASTECH Co., Ltd., Rockwell Automation, Inc. (Allen-Bradley), Beckhoff Automation GmbH, Siemens AG, Delta Electronics, Inc.

Specification	Model	Stroke (mm)	Work load (kg)	Speed (mm/s)	Screw lead (mm)
Motorless Ball screw drive	LEJS40	200 to 1200	Max. 55	Max. 1800	8, 16, 24
Motorless Ball screw drive	LEJS63	300 to 1500	Max. 85	Max. 1800	10, 20, 30

Electric Actuator/Rod Type **LEY**

▶ P.848



- Various servo motors can be mounted due to the addition of the motorless type.
- Compatible motors:
Mitsubishi Electric Corporation, YASKAWA Electric Corporation, SANYO DENKI CO., LTD., OMRON Corporation, Panasonic Corporation, FANUC CORPORATION, ORIENTAL MOTOR Co., Ltd., FASTECH Co., Ltd., Rockwell Automation, Inc. (Allen-Bradley), Beckhoff Automation GmbH, Siemens AG, Delta Electronics, Inc.

Specification	Model	Stroke (mm)	Pushing force (N)	Speed (mm/s)	Screw lead (mm)
Motorless Top/Parallel	LEY25	30 to 400	Max. 485	Max. 900	3, 6, 12
Motorless In-line	LEY25D	30 to 400	Max. 485	Max. 900	3, 6, 12
Motorless Top/Parallel	LEY32	30 to 500	Max. 588	Max. 1200	4, 8, 16
Motorless In-line	LEY32D	30 to 500	Max. 736	Max. 1000	4, 8, 16
Motorless Top/Parallel	LEY63	100 to 800	Max. 3343	Max. 1000	5, 10, 20
Motorless In-line	LEY63D	100 to 800	Max. 1910	Max. 1000	5, 10, 20

Motorless Type

Electric Actuator/Guide Rod Type **LEYG**

▶ P.864



- Various servo motors can be mounted due to the addition of the motorless type.
- Compatible motors:
Mitsubishi Electric Corporation, YASKAWA Electric Corporation, SANYO DENKI CO., LTD., OMRON Corporation, Panasonic Corporation, FANUC CORPORATION, ORIENTAL MOTOR Co., Ltd., FASTECH Co., Ltd., Rockwell Automation, Inc. (Allen-Bradley), Beckhoff Automation GmbH, Siemens AG, Delta Electronics, Inc.

Specification	Model	Stroke (mm)	Pushing force (N)	Speed (mm/s)	Screw lead (mm)
Motorless Top mounting	LEYG25	30 to 300	Max. 485	Max. 900	3, 6, 12
Motorless In-line	LEYG25D	30 to 300	Max. 485	Max. 900	3, 6, 12
Motorless Top mounting	LEYG32	30 to 300	Max. 588	Max. 1200	4, 8, 16
Motorless In-line	LEYG32D	30 to 300	Max. 736	Max. 1000	4, 8, 16

Card Motor

Card Motor **LAT3**

▶ P.887



- The transportation, pushing, and length measurement systems have been miniaturized through the use of a linear motor.
- Thickness 9 mm, Weight 130 g (At a stroke of 10 mm)
- Linear motor type: Moving magnet type linear motor
- Max. pushing force: 6 N
- Positioning repeatability: ±5 μm
- Pushing measurement accuracy: ±10 μm
- Max. operating frequency: 500 cpm

Model	Stroke (mm)	Sensor (Optical linear encoder) Resolution	Pushing Max. instantaneous thrust	Positioning repeatability	Pushing measurement accuracy	Max. speed
LAT3F	10, 20, 30, 50	1.25 μm	Up to 6 N	±5 μm	±10 μm	400 mm/s
LAT3M	50	5 μm	Up to 6 N	±20 μm	±40 μm	400 mm/s
LAT3	10, 20, 30	30 μm	Up to 6 N	±90 μm	±100 μm	400 mm/s

Card Motor Controller **LATCA**

▶ P.904



- Easy programming (Cycle time entry)
Just input 3 parameters: Positioning time, Target position, Load mass

Type	Series	Power supply voltage	Parallel I/O	
			Input	Output
Step data input type/ Pulse input type	LATCA	24 VDC ±10%	6 (Optically isolated)	4 (Optically isolated, open collector output)

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Electric Cylinders

Electric Cylinder **LZB/LDZB/LZC/LDZC**

▶ P.925



- It can be operated like an air cylinder.
- With auto switch (LDZB series: LDZB, LDZC series: LDZC)

Series	Max. thrust	Max. speed	Lead screw type	Stroke (mm)
LZB	196 N or more	200 mm/s or more	Slide screw: ø8, ø12	25, 40, 50, 100, 200
LZC	196 N or more	200 mm/s or more	Lead: 2 mm, 6 mm, 12 mm	25, 40, 50, 100, 200

Directional Control Driver for Electric Cylinder **LC3F**

▶ P.947



- Directional control driver like a solenoid valve
- Command for transfer with ON/OFF signal, Thrust can be set
- Driver and motor burnout protection with current control

Series	Applicable model
LC3F2	LZB, LZC

Aftercoolers/Air Tanks

Air Cooled Aftercooler **HAA**

P.11



- 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 L/min (ANR)
HAA	7.5 to 37	1000 to 5700

Water Cooled Aftercooler **HAW**

P.14



- 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 L/min (ANR)
HAW	2.2 to 110	300 to 18000

Air Tank **AT**

P.18



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

Series	Port size	Tank capacity (L)
AT	1/2 to 4 ^B flange	100 to 3000

Air Dryers

Refrigerated Air Dryer **IDF□E/F/D**

P.21



Series	Rated inlet condition	Air flow capacity (m ³ /min[ANR])		Applicable air compressor (kW)	Refrigerant	Port size
		50 Hz	60 Hz			
IDF1E	35°C 0.7 MPa	0.1	0.12	0.75	R134a (HFC)	Rc3/8
IDF2E		0.2	0.235	1.5		Rc3/8
IDF3E		0.32	0.37	2.2		Rc3/8
IDF4E		0.52	0.57	3.7		Rc1/2
IDF6E		0.75	0.82	5.5		Rc3/4
IDF8E		1.22	1.32	7.5		Rc3/4
IDF11E		1.65	1.82	11		Rc3/4
IDF15E1		2.8	3.1	15		Rc1
IDF22E		3.9	4.3	22		R1
IDF37E		5.7	6.1	37		R1 1/2
IDF55E	8.4	9.8	55	R2		
IDF75E	40°C 0.7 MPa	11.0	12.4	75	R407C (HFC)	R2
IDF100F		16.0	18.8	100		R2
IDF125F		20.1	23.7	125		65(2 1/2B) flange
IDF150F		25.0	30.0	150		80(3B) flange
IDF190D		32.0	38.0	190		80(3B) flange
IDF240D		43.0	50.0	240		100(4B) flange
IDF370D	35°C 0.7 MPa	54.0	65.0	370	150(6B) flange	

Air Dryers

Refrigerated Air Dryer IDU□E

▶ P.21



Series	Rated inlet condition	Air flow capacity (m ³ /min[ANR])		Applicable air compressor (kW)	Refrigerant	Port size
		50 Hz	60 Hz			
IDU3E	35°C 0.7 MPa	0.32	0.37	2.2	R134a (HFC)	Rc3/8
IDU4E		0.52	0.57	3.7		Rc1/2
IDU6E		0.75	0.82	5.5		Rc3/4
IDU8E		1.1	1.2	7.5		Rc3/4
IDU11E		1.5	1.7	11		Rc3/4
IDU15E1		2.6	2.8	15		Rc1
IDU22E		3.9	4.3	22	R407C (HFC)	R1
IDU37E		5.7	6.1	37		R1 1/2
IDU55E		8.4	9.8	55		R2
IDU75E		11.0	12.5	75		R2

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

▶ P.69



- Energy saving design (Second re-heater + Digital scroll compressor)
- Power consumption: Reduced by up to 76%
- Exhaust heat: Reduced by up to 25%
- Tolerant of high temperature environment!
- Ambient temperature: Up to 45°C, Inlet air temperature: Up to 60°C

Series	Applicable compressor (kW)	Air flow capacity (m ³ /min[ANR])	
		50 Hz	60 Hz
IDF100FS	100	16	18.8
IDF125FS	125	20.1	23.7
IDF150FS	150	25	27

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

▶ P.89



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

Series	Rated inlet condition	Air flow capacity (m ³ /h[ANR])			Refrigerant	Port size
		Outlet air pressure dew point				
		3°C	7°C	10°C		
IDFA3E	35°C 0.7MPa	12	15	17	R134a (HFC)	Rc3/8
IDFA4E		24	31	34		Rc1/2
IDFA6E		36	46	50		Rc3/4
IDFA8E		65	83	91		Rc3/4
IDFA11E		80	101	112		Rc3/4
IDFA15E		120	152	168		Rc1
IDFA22E		182	231	254	R407C (HFC)	R1
IDFA37E		273	347	382		R1 1/2
IDFA55E		390	432	510		R2
IDFA75E		660	720	822		R2
IDFA100F-38	40°C 0.7 MPa	—	—	960	R407C (HFC)	R2
IDFA125F-38		—	—	1210		R2 1/2
IDFA150F-38		—	—	1500		DIN flange 80
IDFA100F-40	35°C 0.7 MPa	860	—	—	R407C (HFC)	R2
IDFA125F-40		1100	—	—		R2 1/2
IDFA150F-40		1340	—	—		DIN flange 80



Air Dryers

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

P.107



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

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

Series	Rated inlet condition	Air flow capacity SCFM (m ³ /h[ANR])			Refrigerant	Port size
		Outlet air pressure dew point Note)				
		37°F (2.8°C)	45°F (7.2°C)	50°F (1.0°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 1/2
IDFB37E		161(273)	173(294)	181(308)		NPT2
IDFB55E		226(384)	258(438)	297(504)		NPT2
IDFB75E		300(510)	353(600)	406(690)		NPT2

Thermo-dryer with Air Temperature Adjustment Function IDH□

P.123



- 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/m³(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, 200, 230 VAC (50/60 Hz)

Series	Air flow capacity L/min (ANR)	Outlet air temperature adjustment range	Outlet air set pressure range	Outlet air temperature stability	Temperature control method
IDH□4	100 to 500	15 to 30°C	0.15 to 0.85 MPa	±0.1	Heater operation, PID control
IDH□6	200 to 800	15 to 30°C	0.15 to 0.85 MPa	±0.1	Heater operation, PID control

Heatless Air Dryer ID

P.134



- 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 type allows for easy maintenance.)

Series	Outlet flow L/min (ANR)	Inlet flow L/min(ANR)
ID	80 to 780	100 to 975

Membrane Air Dryer IDG□A/IDG

P.139



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

Series	Outlet flow L/min (ANR)	Standard dew point (°C)
IDG□A/IDG	10 to 1000	-15, -20, -40, -60

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Air Dryers

Moisture Control Tube **IDK**

▶ P.191



- 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 Linear shape	2/1.2	100 200	KQ2
IDK04 Linear shape	4/2.5	100 200	KQ2
IDK06 Linear shape	6/4	100 200	KQ2
IDK04-100-C1 Coil shape	4/2.5	100	KQ2

Air Preparation Filters

Water Separator **AMG**

▶ P.203



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

Series	Air flow capacity L/min (ANR)	Port size
AMG	300 to 12000	1/8 to 2

Main Line Filter **AFF**

▶ P.215



- 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 L/min (ANR)	Port size
AFF	3 (Filtration efficiency 99%)	300 to 42000	1/8 to 4 ^ø flange

Mist Separator **AM**

▶ P.223



- 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 L/min (ANR)	Port size
AM	0.3 (Filtration efficiency 99.9%)	300 to 12000	1/8 to 2

Air Preparation Filters

Micro Mist Separator **AMD**

P.231



- 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 L/min (ANR)	Port size
AMD	0.01 (Filtration efficiency 99.9%)	200 to 40000	1/8 to 6 th flange

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

P.241



- Integrates the AM series and AMD series 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 L/min (ANR)	Port size
AMH	0.01 (Filtration efficiency 99.9%)	200 to 12000	1/8 to 2

Super Mist Separator **AME**

P.249



- 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 L/min (ANR)	Port size
AME	0.01 (Filtration efficiency 99.9%)	200 to 12000	1/8 to 2

Odor Removal Filter **AMF**

P.257



- 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 L/min (ANR)	Port size
AMF	0.01 (Filtration efficiency 99.9%)	200 to 40000	1/8 to 2

In-line Air Filter **ZFC**

P.283



- Operating pressure range: -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 L/min (ANR)	
	Metric	Inch	Positive pressure	Vacuum pressure
ZFC5	ø4, ø6	ø5/32", ø1/4"	45 to 100	10 to 20
ZFC7	ø6, ø8, ø10, ø12	ø1/4", ø5/16", ø3/8"	120 to 350	30 to 100

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Air Preparation Filters

Clean Gas Filter SF

▶ P.295



- 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: 1.3×10^{-6} kPa)	0.01 (Filtration efficiency 99.99%)
Cartridge type straight	SFB100	Max. 0.99 MPa (Vacuum: 1.3×10^{-6} kPa)	0.01 (Filtration efficiency 99.99%)
Disposable type straight	SFB300	Max. 0.99 MPa (Vacuum: 1.3×10^{-6} kPa)	0.01 (Filtration efficiency 99.99%)
Disposable type multiple disc	SFC100	Max. 0.99 MPa (Vacuum: 1.3×10^{-6} kPa)	0.01 (Filtration efficiency 99.99%)

Clean Gas Strainer SFB200

▶ P.295



Type	Series	Operating pressure	Filtration (μm)
Cartridge type straight	SFB200	Max. 0.99 MPa (Vacuum: 1.3×10^{-6} kPa)	120

Clean Air Filter/Hollow Fiber Element SFD

▶ P.317



- Built-in hollow fiber element
- Pressure drop: 0.03 MPa (Inlet pressure 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. 1.0 MPa	0.01 (Filtration efficiency: 99.99%)
SFD200	Cartridge type (Replaceable element)	Max. 1.0 MPa	0.01 (Filtration efficiency: 99.99%)

Clean Air Module LLB

▶ P.331



- Clean equipment modularization (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 L/min (ANR)
LLB3	Clean air, N ₂ gas ^{Note)}	0.05 to 0.4 MPa	5 to 100
LLB4	Clean air, N ₂ gas ^{Note)}	0.05 to 0.4 MPa	50 to 500

Air-blow Module LLB1

▶ P.351



- Integration of devices in compact space
 - Reduced piping man-hours/space-saving
 - 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 L/min (ANR)
LLB1	Air, N ₂ gas	0.05 to 0.6 MPa 0.05 to 0.35 MPa	Up to 100

Auto Drains/Differential Pressure Gauges

Auto Drain Valve **AD** ▶ P.376



- Drainage is automatically discharged.

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

Motor Operated Auto Drain **ADM** ▶ P.378



- Reliably discharges even highly viscous drainage.

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

Heavy Duty Auto Drain **ADH** ▶ P.380



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

Series	Port size	Auto drain
ADH4000	1/2	Float type

Differential Pressure Gauge **GD40** ▶ P.383



- 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.

Series	Accuracy	Scale range
GD40	±0.006 MPa	0 to 0.2 MPa

Modular F.R.L.

Modular F.R.L. Units **AC-A**

▶ P.395



- 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 (MPa)
Air filter, Regulator, Lubricator	AC10 to 40-A	M5, 1/8, 1/4, 3/8, 1/2, 3/4	0.05 to 0.7, 0.02 to 0.2
Filter regulator, Lubricator	AC10A to 40A-A		
Air filter, Regulator	AC10B to 40B-A		
Air filter, Mist separator, Regulator	AC20C to 40C-A	1/8, 1/4, 3/8, 1/2, 3/4	
Filter regulator, Mist separator	AC20D to 40D-A		

Air Filter **AF-A**

▶ P.430



- 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)
AF10 to 60-A	M5, 1/8, 1/4, 3/8, 1/2, 3/4	5

Mist Separator **AFM-A**

▶ P.440



- 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)
AFM20 to 40-A	1/8, 1/4, 3/8, 1/2, 3/4	0.3

Micro Mist Separator **AFD-A**

▶ P.440



- 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)
AFD20 to 40-A	1/8, 1/4, 3/8, 1/2, 3/4	0.01

Regulator **AR-A**

▶ P.450



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

Series	Port size	Set pressure (MPa)
AR10 to 40-A	M5, 1/8, 1/4, 3/8, 1/2, 3/4	0.05 to 0.7, 0.02 to 0.2

Modular F.R.L.

Lubricator **AL-A**

▶ P.460



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

Series	Port size	Bowl capacity (cm ³)
AL10 to 60-A	M5, 1/8, 1/4, 3/8, 1/2, 3/4, 1	7 to 135

Filter Regulator **AW-A**

▶ P.468



- 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 (MPa)	Filtration (μm)
AW10 to 40-A	M5, 1/8, 1/4, 3/8, 1/2, 3/4	0.05 to 0.7, 0.02 to 0.2	5

Modular F.R.L Units **AC-A/AC-B**

▶ P.481



- Better visibility and environmental resistance
- 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
- Regulator: Set pressure 0.05 to 0.85 MPa, 0.02 to 0.2 MPa
- Selection of pressure gauges
Square embedded type pressure gauge, Round type pressure gauge, Digital pressure switch

Combination equipment	Series	Port size	Set pressure (MPa)
Air filter, Regulator, Lubricator	AC10-A	M5, 1/8, 1/4, 3/8, 1/2, 3/4, 1	0.05 to 0.85 0.02 to 0.2
	AC20 to 60-B		
Filter regulator, Lubricator	AC10A-A	M5, 1/8, 1/4, 3/8, 1/2, 3/4, 1	0.05 to 0.85 0.02 to 0.2
	AC20A to 60A-B		
Air filter, Regulator	AC10B-A	M5, 1/8, 1/4, 3/8, 1/2, 3/4, 1	0.05 to 0.85 0.02 to 0.2
	AC20B to 60B-B		
Air filter, Mist separator, Regulator	AC20C to 40C-B	1/8, 1/4, 3/8, 1/2, 3/4	0.05 to 0.85 0.02 to 0.2
Filter regulator, Mist separator	AC20D to 40D-B	1/8, 1/4, 3/8, 1/2, 3/4	0.05 to 0.85 0.02 to 0.2

Air Filter **AF-A**

▶ P.524



- 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)
AF10 to 60-A	M5, 1/8, 1/4, 3/8, 1/2, 3/4	5

Modular F.R.L.

Mist Separator **AFM-A**

▶ P.534



- 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)
AFM20 to 40-A	1/8, 1/4, 3/8, 1/2, 3/4	0.3

Micro Mist Separator **AFD-A**

▶ P.534



- 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)
AFD20 to 40-A	1/8, 1/4, 3/8, 1/2, 3/4	0.01

Regulator **AR-A/AR-B**

▶ P.544



Series	Port size	Set pressure (MPa)
AR10-A AR20 to 60-B	M5, 1/8, 1/4, 3/8, 1/2, 3/4, 1	0.05 to 0.85 0.02 to 0.2

Regulator with Backflow Function **AR□K-B**

▶ P.546



- With the backflow function it incorporates a mechanism to exhaust the air pressure in the outlet side quickly.

Series	Port size	Set pressure (MPa)
AR20K to 60K-B	1/8, 1/4, 3/8, 1/2, 3/4, 1	0.05 to 0.85 0.02 to 0.2

Lubricator **AL-A**

▶ P.560



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

Series	Port size	Bowl capacity (cm ³)
AL10 to 60-A	M5, 1/8, 1/4, 3/8, 1/2, 3/4, 1	7 to 135

Modular F.R.L.

Filter Regulator **AW-A/AW-B**

▶ P.568



Series	Port size	Set pressure (MPa)	Filtration (μm)
AW10-A AW20 to 60-B	M5, 1/8, 1/4 3/8, 1/2, 3/4, 1	0.05 to 0.85 0.02 to 0.2	5

Filter Regulator with Backflow Function **AW□K-B**

▶ P.570



- Integrated filter and regulator units save space and require less piping.
- With the backflow function it incorporates a mechanism to exhaust the air pressure in the outlet side quickly.

Series	Port size	Set pressure (MPa)	Filtration (μm)
AW20K to 60K-B	1/8, 1/4, 3/8, 1/2, 3/4, 1	0.05 to 0.85 0.02 to 0.2	5

Mist Separator Regulator **AWM**

▶ P.586



Series	Port size	Set pressure (MPa)	Filtration (μm)
AWM20 to 40	1/8, 1/4, 3/8, 1/2	0.05 to 0.85	0.3

Micro Mist Separator Regulator **AWD**

▶ P.586



Series	Port size	Set pressure (MPa)	Filtration (μm)
AWD20 to 40	1/8, 1/4, 3/8, 1/2	0.05 to 0.85	0.01

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

▶ P.599



- Improves visibility of pressure gauges located in various locations.

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

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Modular F.R.L.

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

▶ P.620



- Improves visibility of pressure gauges located in various locations.

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

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

▶ P.624



- Improves visibility of pressure gauges located in various locations.

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

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

▶ P.632



- Improves visibility of pressure gauges located in various locations.

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

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

▶ P.636

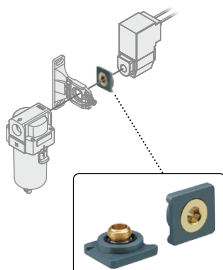


- Improves visibility of pressure gauges located in various locations.

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

Modular Adapter **E210/310/410**

▶ P.643



- Easy connection to current products.
- Can be freely rotated, thus allowing a wide selection of mounting directions.
- Can be connected to current 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	

Modular F.R.L.

Soft Start-up Valve **AV**

▶ P.651



- 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 (MPa)
AV2000 to 5000	1/4, 3/8, 1/2	0.1 to 1

Large Flow Air Filter **AF**

▶ P.661



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

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Regulators

Miniature Regulator **ARJ1020F**

▶ P.668



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

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

Miniature Regulator **ARJ210**

▶ P.670



- Lightweight with an aluminum body (60 g)

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

Miniature Regulator **ARJ310**

▶ P.673



- 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 (MPa)
ARJ310	Direct operated relieving type	IN: 1/8 (Male thread), M5 x 0.8 (Female thread) OUT: 1/8 (Female thread)	0.2 to 0.7

Pilot Operated Regulator **AR**

▶ P.678



- Internal pilot operated type relieving type

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

Compact Regulator **ARX**

▶ P.681



- Compatible with inlet supply pressure of 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 (MPa)
ARX20	1/4, 1/8	0.05 to 0.85

Regulators

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

▶ P.686



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

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

Compact Manifold Regulator **ARM5**

▶ P.691



- 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 (MPa)
			Metric size	Inch size	
ARM5A	Manifold specifications	Common air supply	ø4, ø6, ø8	ø5/32, ø1/4, ø5/16	0.05 to 0.7
ARM5B	Manifold specifications	Individual air supply	ø4, ø6	ø5/32, ø1/4	0.05 to 0.7
ARM5S	Single unit specifications	Individual air supply	ø4, ø6	ø5/32, ø1/4	0.05 to 0.7

Compact Manifold Regulator **ARM10/11**

▶ P.715



- 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 (MPa)
			Metric size	Inch size	
ARM11A	Manifold specifications	Common air supply	ø4 to ø10	ø5/32 to ø3/8	0.05 to 0.7
ARM11B	Manifold specifications	Individual air supply	ø4, ø6	ø5/32, ø1/4	0.05 to 0.7
ARM10	Single unit specifications	Standard	ø4, ø6	ø5/32, ø1/4	0.05 to 0.7
ARM10F	Single unit specifications	Knob front face	ø4, ø6	ø5/32, ø1/4	0.05 to 0.7

Manifold Regulator **ARM1000/2000**

▶ P.751



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

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

Manifold Regulator **ARM2500/3000**

▶ P.754



- 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 (MPa)
ARM2500, 3000	Manifold (Common IN, Individual IN) Modular type	1/4, 3/8	0.05 to 0.85

Regulators

Direct Operated Precision Regulator **ARP**

▶ P.759



- Setting sensitivity: 0.2% F.S. or less
 - Energy saving, reduces air consumption 80% (SMC comparison)
 - Repeatability: $\pm 1\%$ 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	0.005 to 0.4 MPa 0.005 to 0.2 MPa 0.005 to 0.6 MPa
ARP30(K)	1/4, 3/8	
ARP40(K)	1/4, 3/8, 1/2	

Regulator **IR1200-A/2200-A/3200-A**

▶ P.771



- Air consumption: Bleed air "0"
- High flow rate: Up to approx. twice (Compared to the current SMC product)
- Lightweight: Reduced by up to approx. 27% (Compared to the current SMC product)
- Repeatability: $\pm 1\%$ (Full span)

Series	Port size	Set pressure (MPa)
IR1200-A	1/8	0.02 to 0.2
		0.02 to 0.4
		0.02 to 0.8
IR2200-A	1/4	0.02 to 0.2
		0.02 to 0.4
		0.02 to 0.8
IR3200-A	1/4, 3/8, 1/2	0.02 to 0.2
		0.02 to 0.4
		0.02 to 0.8

Precision Regulator **IR1000-A/2000-A/3000-A**

▶ P.789



- Air consumption: Reduced by up to approx. 90% (Compared to the current SMC product)
- High flow rate: Up to approx. twice (Compared to the current SMC product)
- Lightweight: Reduced by up to approx. 27% (Compared to the current SMC product)
- Sensitivity: 0.2% (Full span)
- Repeatability: $\pm 0.5\%$ (Full span)

Series	Port size	Set pressure (MPa)
IR1000-A	1/8	0.005 to 0.2
		0.01 to 0.4
		0.01 to 0.8
IR2000-A	1/4	0.005 to 0.2
		0.01 to 0.4
		0.01 to 0.8
IR3000-A	1/4, 3/8, 1/2	0.01 to 0.2
		0.01 to 0.4
		0.01 to 0.8

Precision Regulator **IR**

▶ P.807



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

Series	Port size	Set pressure (MPa)
IR1000	1/8	0.005 to 0.2 0.01 to 0.4 0.01 to 0.8
IR2000	1/4	
IR3000	1/4, 3/8, 1/2	0.01 to 0.2 0.01 to 0.4 0.01 to 0.8

Regulators

Vacuum Regulator **IRV**

▶ P.825



- Allows adjustment of vacuum line pressure.
- Single sided connections series
- Weight reduced by 20% (Compared with the current 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 (kPa)
IRV10	ø6, ø8, ø1/4, ø5/16	-100 to -1.3
IRV20	ø6, ø8, ø10, ø1/4, ø5/16, ø3/8	-100 to -1.3

Power Valve/Precision Regulator **VEX**

▶ P.840



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

Series	Port size	Set pressure (MPa)
VEX1A33, 1B33	M5, 1/8	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	0.05 to 0.7

Clean Regulator **SRH**

▶ P.855



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

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

Precision Clean Regulator **SRP**

▶ P.869



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

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

Clean Regulator/Fluoresin Type **SRF**

▶ P.877



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

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

Electro-Pneumatic Regulators

Electro-Pneumatic Regulator **ITV**

▶ P.993



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

Series	Port size	Set pressure (MPa)
ITV0000	Built-in One-touch fitting $\phi 4$, $\phi 5/32$	0.001 to 0.1
		0.001 to 0.5
		0.001 to 0.9
		-1 to -100 kPa
ITV1000	1/8, 1/4	0.005 to 0.1
ITV2000	1/4, 3/8	0.005 to 0.5
ITV3000	1/4, 3/8, 1/2	0.005 to 0.9

Electronic Vacuum Regulator **ITV**

▶ P.928



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

Series	Port size	Set pressure (kPa)
ITV009□	$\phi 4$, $\phi 5/32$ One-touch fitting	-1 to -100
ITV209□	1/4	-1.3 to -80

Controller for Electro-Pneumatic Regulator **IC**

▶ P.947



- 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 $2^{10} = 1024$ points possible.
- 4 point preset output
 - Applicable in the programming function with up to 20 steps.

3.0 MPa Maximum Supply Pressure High Pressure Electro-Pneumatic Regulator **ITVH**

▶ P.955



- Maximum supply pressure: 3.0 MPa
- Set pressure range: 0.2 to 2.0 MPa
 - Stepless control of air pressure up to 2.0 MPa
- Stability: ± 1 F.S. or less
- Power consumption: 3 W or less
- Maximum flow rate: 3,000 L/min (ANR)
- Parts in contact with fluid: Fluorine grease

Series	Port size	Set pressure (MPa)
ITVH	1/4, 3/8	0.2 to 2.0

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

▶ P.965



- Stepless control of air pressure proportional to an electrical signal
- Maximum supply pressure: 5.0 MPa
- Set pressure range: 0.01 to 3.0 MPa
- Maximum flow rate: 3,000 L/min (ANR)
- Fluid: Air, N₂, O₂, Ar
- Wetted parts: Fluorine grease

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

Proportional Valves

Compact Proportional Solenoid Valve **PVQ**

▶ P.975



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

Series	Flow control range L/min	Fluid
PVQ	0 to 5	Air, inert gas
	0 to 6	
	0 to 75	
	0 to 100	

E-P HYREG® **VY1**

▶ P.989



- 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 (MPa)
VY1	M5 x 8	0.05 to Supply pressure
	1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2, 2	

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Booster Regulators

Booster Regulator **VBA**

▶ P:1007



- 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 (MPa)
VBA	1/4, 3/8, 1/2	VBA1□A: 0.2 to 2.0 VBA2□A: 0.2 to 1.0 VBA4□A: 0.2 to 1.0 VBA43A: 0.2 to 1.6

Air Tank **VBAT**

▶ P:1022



- 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

Chinese Pressure Vessel Regulations Compliant Product: Air Tank for Booster Regulator **VBAT-X104**

▶ P:1023



- Compliant with Chinese pressure vessel regulations
Safety and Technical Regulations: TSG R0003-2007 Simple Pressure Vessels Safety and Technical Regulations
- Regulations compliant product
Safety Technical Supervision Regulations for Safety valves TSG ZF001-2006
- Compact connections are possible with booster regulators.

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

Pressure Control Valve (Relief Valve) **AP100**

▶ P:1039



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

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

Lubrication Equipment

Large Flow Lubricator AL

▶ P.1044



- Individual lubrication
- Large capacity type

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

Auto Feed Lube, Auto Feed Tank ALF/ALT

▶ P.1047

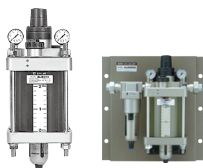


- Reduces maintenance labor with an auto lubrication function.

Series	Type	Port size	Bowl capacity (cm ³)
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

▶ P.1052



- 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 ³)
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

▶ P.1057

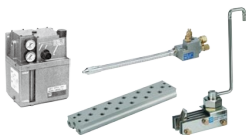


- Centralized control of multi-point lubrication
- Stable oil feeding with a micromist
- Through the use of a booster, a pressure that is higher than that of the main air passage can be supplied. This difference is used as the mist generating pressure differential. Thus, the pressure drop in the main 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 ³)
ALB900	Booster lube	1, 2, 3	5000
ALBA90	Bypass lubrication adapter	1/4, 1/2	—

Mist Spray Unit LMU

▶ P.1063



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

Lubrication Equipment

Impulse Lubricator **ALIP**

▶ P.1068



- 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 ³)
ALIP	Pressure type	1/8	0 to 0.04
ALT10	Oil tank	Air: 1/8	Tank capacity: 160 cm ³
ALT20	Oil tank	Oil: 1/4	Tank capacity: 1000 cm ³

Liquid Collector/Exhaust Pressure Type **AEP100**

▶ P.1073



- 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**

▶ P.1075



- 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

One-touch Fittings **KQ2**

P.21

Applicable tubing: Metric size



Applicable tubing: Inch size



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

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**

P.139



- Compact and lightweight
- Fluid temperature: -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**

P.160

Applicable tubing: Metric size



- Applicable to use for oscillating and rotating sections in robots.
- Low torque rotation type 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**

P.164

Applicable tubing: Inch size



- Applicable to use for oscillating and rotating sections in robots.
- Low torque rotation type 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

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Fittings for General Purposes

One-touch Fittings Manifold **KM**

P.167

Applicable tubing: Metric 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

Applicable tubing: Inch size



Insert Fittings **KF**

P.175



- Vacuum 1.3×10^{-2} kPa applicable.
- Piping can be done without removing nut.
- Fluid temperature: -5 to 150°C (Brass sleeve)
-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**

P.191



- 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**

P.201



- 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**

▶ P.207



- 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**

▶ P.213



- 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**

▶ P.231



- Cv factor: Increased by 34%*
 - Plug insertion force: Reduced by 22% (20 N)*
 - Lightweight: Reduced by 14% (12 g)*
- * Compared to the current 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**

▶ P.244



- 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**

▶ P.248



- One-touch installation and removal of multi-tubes
- Prevents installation mistakes.

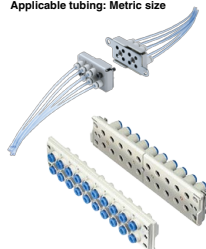
Series	No. of connecting tubes	Applicable tubing O.D.
DMK	6, 12	ø3.2, ø4

Fittings for General Purposes

Rectangular Multi-connector **KDM**

▶ P.251

Applicable tubing: Metric 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.
KDM6(-X955)	6	Metric	ø2
KDM	10, 20	Metric	ø3.2, ø4, ø6, ø8
KDM	10, 20	Inch	ø1/8, ø5/32, ø1/4, ø5/16
KDM(-X1053)	6, 10, 20	Metric	ø10, ø12

Applicable tubing: inch size



Piping Module **KB**

▶ P.263



- 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**

▶ P.274



- 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

FR One-touch Fittings Manifold **KRM**

▶ P.281



- 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

Fittings for Special Environments

Antistatic One-touch Fittings **KA**

▶ P.283



- Surface resistance: 10⁴ Ω to 10⁷ Ω
- 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**

▶ P.289



- Compact and lightweight
- Fluid temperature: -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 Steel One-touch Fittings **KG**

▶ P.307



- 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 Insert Fittings **KFG2**

▶ P.319



- Compact and lightweight
- Fluid temperature: -65 to 260°C (Swivel elbow: -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

Miniature Fittings Stainless Steel 316 **MS**

▶ P.336



- 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

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Fittings for Special Environments

S Couplers Stainless Steel Type **KKA**

▶ P.341



- Body material: Stainless steel 304
- Seal material: Fluoropolymer (Special FKM) is employed.
- Grease-free
- Check valve built in to both plug and socket

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**

▶ P.349



- 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. (-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**

▶ P.356



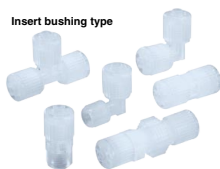
- One-touch fittings suitable for drive air systems in clean room environments
- Resin parts: Polypropylene
- All metal portions: Brass (Electroless nickel plated) KPQ
Stainless steel (Stainless steel 304) KPG

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 Fittings **LQ1**

▶ P.363

Insert bushing type



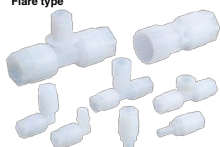
- Material: New PFA
- Quadruple sealing construction
- The reducer method allows tubing size changes without replacing the body.

Series	Max. operating pressure	Operating temperature
LQ1	1.0 MPa	0 to 200°C

Fluoropolymer Fittings Hyper Fittings **LQ3**

▶ P.416

Flare type



- Material: New PFA
- Triple-seal construction
- Ease of installation

Series	Max. operating pressure	Operating temperature
LQ3	1.0 MPa	Nut material PVDF: 0 to 150°C Nut material PFA: 0 to 200°C

Fittings for Special Environments

Fluoropolymer Bore Through Connector **LQHB**

▶ P.442



- 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 chemicals, etc., during the production process of semiconductors.
- Applicable to chemicals such as acid, alkali and deionized water.
- Material: New PFA (Body, nut), PTFE (Collet)

Series	Applicable tubing O.D.		Operating temperature (°C)
	Metric size	Inch size	
LQHB	ø3 to ø25	ø1/8" to ø1"	0 to 200

Low Torque Rotary Joint **MQR**

▶ P.447



- Metal seal type
- Air supply to rotary/pivot shafts of turntables and robot arms
- Low rotational torque: 0.003 to 0.50 N·m or less
- Operating temperature: -10 to 80°C
- Allowable rpm: 200 to 3000 min⁻¹ (r.p.m)

Series	Number of circuits	Port size	Operating pressure
MQR	1, 2, 4, 8, 12, 16	M5 x 0.8	-100 kPa to 1 MPa

Rubber Seal Rotary Joint **MQR-X229**

▶ P.457



- Rubber seal
 - Oldham coupling
 - Operating pressure range: -100 kPa to 0.7 MPa
 - Allowable rpm: 200 min⁻¹(r.p.m)^{*1}
 - Max. start-up rotation torque: 0.50 N·m^{*2} or less
 - Service life: 10 million rotations^{*3}
 - Number of circuits: 8 circuits
- *1 Reference value
*2 When no pressure applied.
*3 Under SMC's life test conditions.

Series	Number of circuits	Port size	Operating pressure
MQR-X229	8	M5 x 0.8	-100 kPa to 0.7 MPa

Tubing

Nylon Tubing **T**

▶ P.462



- For general pneumatic tubing
- Max. operating pressure: 3.0 MPa (T0604, at 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**

▶ P.464



- Max. operating pressure: 1.0 MPa (at 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

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Tubing

Polyurethane Tubing **TU**

▶ P.465



- Max. operating pressure: 0.8 MPa (at 20°C)
- Food Sanitation Law compliant (-X217)

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
TU(-X217)	ø4, ø6, ø8, ø10, ø12	—	Black, White, Blue, Clear	

Polyurethane Flat Tubing: Multi-core, Multi-color **TU**

▶ P.467



- Multi-core, multi-color specification
- Compact piping possible
- 8 color variations

Series	Tubing O.D.	Color	Number of cores	Fluid
TU	ø2, ø4, ø6, ø8 ø10, ø12	Black, White, Red, Blue, Yellow, Green, Clear, Orange	2, 3, 4, 5, 6	Air

Soft Polyurethane Tubing **TUS**

▶ P.470

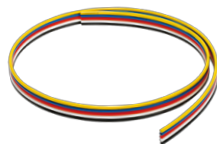


- Max. operating pressure: 0.6 MPa (at 20°C)

Series	Tubing O.D.	Color	Fluid
TUS	ø4, ø6, ø8, ø10, ø12	Black, White, Red, Blue, Yellow, Green, Translucent, Yellow brown	Air

Soft Polyurethane Flat Tubing: Multi-core, Multi-color **TUS**

▶ P.471



- Multi-core, multi-color specification
- Compact piping possible
- 8 color variations

Series	Tubing O.D.	Color	Number of cores	Fluid
TUS	ø4, ø6, ø8, ø10, ø12	Black, White, Red, Blue, Yellow, Green, Translucent, Yellow brown	2, 3, 4, 5	Air

Hard Polyurethane Tubing **TUH**

▶ P.472



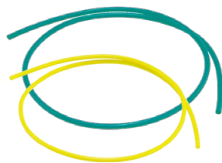
- Superior restoring compared to the nylon tubing

Series	Type	Max. operating pressure	Tubing O.D.	Color	Fluid
TUH	Standard type	0.8 MPa (at 20°C)	ø4, ø6, ø8	Black, White, Blue, Translucent	Air
TUH	High pressure type	1.0 MPa (at 20°C)	ø10, ø12	Black, White, Blue, Translucent	Air

Tubing

Wear Resistant Tubing **TUZ**

▶ P.475

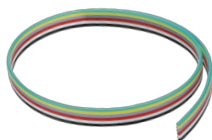


- Abrasion: Approx. 1/3 (Compared with SMC polyurethane tubing TU series)

Series	Tubing O.D.	Color	Fluid
	Metric size		
TUZ	ø4, ø6, ø8, ø10, ø12	Black, White, Red, Blue, Yellow, Green	Air

Wear Resistant Flat Tubing: Multi-core, Multi-color **TUZ**

▶ P.478

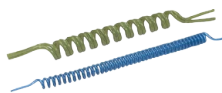


- Multi-core, multi-color specification
- Compact piping possible
- 8 color variations
- Abrasion: Approx. 1/3

Series	Tubing O.D.	Color	Number of cores	Fluid
TUZ	ø4, ø6, ø8, ø10, ø12	Black, White, Red, Blue, Yellow, Green	2, 3, 4, 5, 6	Air

Polyurethane Coil Tubing **TCU**

▶ P.481



- Flexible
- Max. operating pressure: 0.8 MPa (at 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

Polyurethane Flat Tubing **TFU**

▶ P.482



- Max. operating pressure: 0.8 MPa (at 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**

▶ P.483



- Max. operating pressure: 1.2 MPa (at 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

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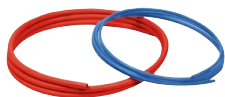
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11

Tubing

FR Double Layer Tubing **TRB**

▶ P.484



- Max. operating pressure: 1.0 MPa (at 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**

▶ P.486



- Max. operating pressure: 0.8 MPa (at 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**

▶ P.488

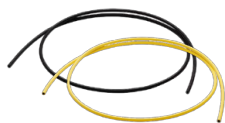


- Allows easy stripping of the outer layer from double layer tubes.

Series	Tubing O.D.	Color
TKS	ø6, ø8, ø10, ø12	Orange, Yellow, Blue, Green

FR Three-layer Polyurethane Tubing **TRTU**

▶ P.491

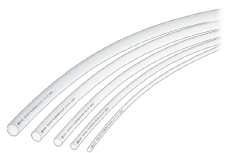


- Spatter resistance is improved by installing an aluminum layer between the outer layer and inner tube. (It is twice that of FR double layer polyurethane tubing TRBU series.)
- For general pneumatic and water piping in environments exposed to sparks from arc welding, etc.

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**

▶ P.495



- 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

Tubing

Antistatic Soft Nylon Tubing **TAS**

▶ P.498



- Max. operating pressure: 1.2 MPa (at 20°C)
- For preventing static electricity.

Series	Tubing O.D.		Color	Fluid
	Metric size	Inch size		
TAS	ø3.2, ø4, ø6, ø8, ø10, ø12		Black	Air

Antistatic Polyurethane Tubing **TAU**

▶ P.499



- Max. operating pressure: 0.9 MPa (at 20°C)
- For preventing static electricity.

Series	Tubing O.D.		Color	Fluid
	Metric size	Inch size		
TAU	ø3.2, ø4, ø6, ø8, ø10, ø12		Black	Air

Fluoropolymer Tubing **TL/TIL**

▶ P.501

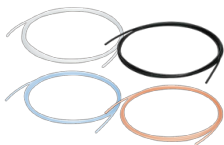


- Max. operating pressure: 1.0 MPa (at 20°C)
- Max. operating temperature: 260°C (This can vary according to operating pressure.)

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

Fluoropolymer Tubing (PFA) **TLM/TILM**

▶ P.503



- Max. operating temperature: 260°C (This can vary according to operating pressure.)
- Food Sanitation Law compliant
- 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

FEP Tubing (Fluoropolymer) **TH/THI**

▶ P.506



- Max. operating pressure: 2.3 MPa (at 20°C)*
 - Food Sanitation Law compliant
 - Complies with FDA (Food and Drug Administration) § 177-1550 dissolution test.
 - Max. operating temperature: 200°C (This can vary according to operating pressure.)
- * This can vary according to 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

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Tubing

Soft Fluoropolymer Tubing **TD/TID**

▶ P.509



- Max. operating pressure: 1.6 MPa (at 20°C)*
 - Food Sanitation Law compliant
 - Complies with FDA (Food and Drug Administration) § 177-1550 dissolution test.
 - Max. operating temperature: 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

Clean Series Tubing **10-T□**

▶ P.515

Polyurethane Tubing **10-TU**

- Flexible tubing 0.8 MPa max. (at 20°C)
- * Only black and blue for the inch size

Series	Tubing O.D.		Color *
	Metric size	Inch size	
10-TU	ø4, ø6, ø8, ø10, ø12	ø1/8	Black, White, Red, Blue, Yellow, Green, Clear, Orange

Polyurethane Coil Tubing **10-TCU**

- For flexible and moving applications



Series	Tubing O.D.	Color	Number of cores
10-TCU	ø4, ø6, ø8	Black	1, 2, 3

Polyurethane Flat Tubing **10-TFU**

- Flexible and multi-core tubing



Series	Tubing O.D.	Color	Number of cores
10-TFU	ø4, ø6, ø8	Black	2, 3

Polyolefin Tubing **TPH**

▶ P.516



- Max. operating pressure (at 20°C): 1.0 MPa (ø4, ø6), 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**

▶ P.517



- Max. operating pressure (at 20°C): 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**

▶ P.519



- 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 Linear shape	2/1.2	100 200	KQ2
IDK04 Linear shape	4/2.5		KQ2
IDK06 Linear shape	6/4		KQ2
IDK04-100-C1 Coil shape	4/2.5	100	KQ2

Related Products

Multi-tube Holder **TM**

▶ P.530

- Easy arrangement of tubing



Multi-holder **TMA**

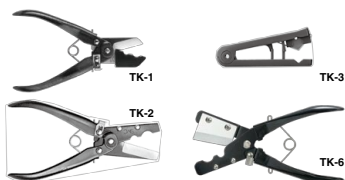
▶ P.531

- Possible to secure an exhaust valve with One-touch fitting and One-touch fittings.



Tube Cutter **TK**

▶ P.532



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**

▶ P.533



Series	Applicable tubing size	Applicable tubing material
TG-1	Metric size: ø4, ø6	Nylon, Soft nylon, Polyurethane
TG-2	Inch size: ø1/8", ø1/4"	Nylon, Soft nylon, Polyurethane

Tube Stand & Tube Reel **TB/TBR**

▶ P.534



- Compact size without taking up space
- Easy installment just by putting tube reel

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Speed Controllers

Elbow Type/Universal Type: Push-lock Type AS

▶ P.549



- Easy to lock with push-lock type
 - Larger knob
 - Improved tube insertion/removal
 - Electroless nickel plating type is standardized.
 - 360° swivel piping possible. (Universal type)
- Insertion force: Max. 30% (8 N) reduction
Removal force: Max. 20% (5 N) reduction*
* Tube removal strength is ensured to be equivalent to previous model.

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"
Universal type	AS13□1F to 43□1F	M5 x 0.8 10-32UNF R, NPT, G 1/8 to 1/2	ø3.2 to ø12	ø1/8" to ø1/2"
Elbow type Stainless steel type	AS12□1FG to 42□1FG	M5 x 0.8 10-32UNF R, NPT, G 1/8 to 1/2	ø2 to ø16	ø1/8" to ø1/2"
Universal type Stainless steel type	AS13□1FG to 43□1FG	M5 x 0.8 10-32UNF R, NPT, G 1/8 to 1/2	ø3.2 to ø12	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"

Elbow Type/Universal Type AS

▶ P.576



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 throttle type	AS1201F to 22□1F-X250	M3 to 1/4	ø4, ø6	—

Speed Controller with Indicator AS-FS

▶ P.583



- Numerical indication of knob rotation for flow rate reduces flow setting time and setting errors. The value can be controlled with the indicator window.
- Contact face stopper clarifies the zero flow point for easier flow setting.
- Easier to insert and remove the tube
- Larger push-lock type knob
- Electroless nickel plating type is standardized.

Type	Series	Port size in the cylinder side	Applicable tubing O.D.	
			Metric size	Inch size
Elbow type	AS12□1FS to 42□1FS	M5 x 0.8 10-32UNF R, NPT, G 1/8 to 1/2	ø2 to ø16	ø1/8" to 1/2"
Universal type	AS13□1FS to 43□1FS	M5 x 0.8 10-32UNF R, NPT, G 1/8 to 1/2	ø3.2 to ø12	ø1/8" to 1/2"
Elbow type Stainless steel type	AS12□1FSG to 42□1FSG	M5 x 0.8 10-32UNF R, NPT, G 1/8 to 1/2	ø2 to ø16	ø1/8" to 1/2"
Universal type Stainless steel type	AS13□1FSG to 43□1FSG	M5 x 0.8 10-32UNF R, NPT, G 1/8 to 1/2	ø3.2 to ø12	ø1/8" to 1/2"
Elbow type Uni thread	AS22□1FS to 42□1FS	Uni 1/8 to 1/2	ø3.2 to ø16	ø1/8" to 1/2"

Speed Controllers

Flame Resistant Elbow Type **AS**

P.603



- Flame resistant (Equivalent to UL94 Standard V-0)

Type	Series	Port size in the cylinder side	Applicable tubing O.D.	
			Metric size	Inch size
Elbow type	AS22□1F-W2 to AS42□1F-W2	1/8 to 1/2	ø6 to ø12	

All Metal Exterior Speed Controller with One-touch Fitting **AS-X737**

P.607



- Improved environmental resistance with the all metal exterior *
* Except sealant
 - Prepared spatter cover.
- Also available for the KQB2/KQG2 series.

Type	Series	Port size in the cylinder side	Applicable tubing O.D.
All metal exterior	AS-X737	R1/8 to 3/8	ø6 to ø10

Plug-in Type **AS**

P.609



- 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**

P.611



- 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**

P.615



- 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 current 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"

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Speed Controllers

In-line Panel Mount Type AS

P.621

Centralized piping type



Panel mount type

- 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 Fitting AS

P.630



- 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 fitting	AS□□□1F-U□	1/8 to 1/2	ø3.2 to ø12	ø1/8" to ø1/2"

Dual Speed Controller ASD

P.640



- 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

P.646



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

P.650



Type	Series	Port size in the cylinder side
In-line type	AS1000 to 5000	M3 to 1/2

Speed Controllers

Large Flow In-line Type **AS**

▶ P.654



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**

▶ P.656



- 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 Controller with Residual Pressure Release Valve **AS**

▶ P.658



- 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**

▶ P.680



- 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**

▶ P.709



- Low particle generation type speed controller suitable for use in clean rooms
- AS-FPQ: Brass (Electroless nickel plating)
- AS-FPG: Stainless steel 304
- AS-FPQ/AS-FPG: Polypropylene resin (Resin parts)

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

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Speed Controllers

Speed Controller for Low Speed Control AS

▶ P.716

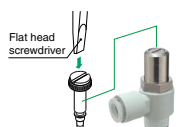


- Ideal for low-speed control (from 10 to 50 mm/sec)
- Number of needle rotations: 10 turns

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 Controller Adjustable by Flat Head Screwdriver AS

▶ P.734

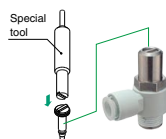


- Flow adjustable by flat head screwdriver.
- Prevention of an unnecessary manual operation

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

▶ P.752



- 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

▶ P.769



- 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"

Flow Control Related Equipment

Holder for Speed Controller **TMH**

▶ P.620



- A holder for securing a speed controller (In-line type) with One-touch fittings
- Universal mounting

Type	Series
Holder	TMH

Residual Pressure Release Valve with One-touch Fittings **KE□**

▶ P.665



- 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

Metering Valve with Silencer **ASN2**

▶ P.774



- 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

Quick Exhaust Valve **AQ**

▶ P.776



- 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**

▶ P.780



- 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
	ASV310F/410F/510F	1/8 to 1/2

Flow Control Related Equipment

Check Valve **AK**

▶ P.784



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"> · Body material: Brass, Stainless steel · Rubber material: NBR, FKM, CR · High temperature, low temperature · Low cracking 	1/8 to 1/2	—	—

5.0 MPa Check Valve **VCHC40**

▶ P.795



- 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	0.05 to 5.0 MPa

Air Saving Valve **ASR/ASQ**

▶ P.801



- 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

Silencers/Exhaust Cleaners

Silencer: Compact Resin Type **AN**

▶ P.818



Series	Features
AN05 to 40	<ul style="list-style-type: none"> • Compact and lightweight • Noise reduction: 30 dB(A)
AN10 to 30-C	<ul style="list-style-type: none"> • Can connect with One-touch fitting directly. • Noise reduction: 30 dB(A)

Silencers **AN**

▶ P.820



Series	Features	Series	Features
AN□00	<ul style="list-style-type: none"> • Metal body type • Noise reduction: 30 dB(A) 	AN□02	<ul style="list-style-type: none"> • High noise reduction type
25□□	<ul style="list-style-type: none"> • Metal case type • Noise reduction: 19 dB(A) 	AN□1	<ul style="list-style-type: none"> • Noise reduction: 35, 38, 40 dB(A)

Silencer: BC Sintered Body Type **AN**

▶ P.822



Series	Features
AN	<ul style="list-style-type: none"> • BC sintered body type • Noise reduction: 13, 16, 18, 21 dB(A)

Exhaust Cleaner **AMC**

▶ P.827



- Noise reduction: 35 dB(A)
- Oil mist removal: 99.9% or more

Exhaust Cleaner for Vacuum Pump **AMV**

▶ P.830



- 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**

▶ P.832



- An exhaust cleaner that can be used inside a clean room

Series	Filtration (μm)	Maximum flow capacity [L/min(ANR)]	Port size
AMP	0.01 (Filtration efficiency: 95%)	200 to 1000	1/4, 3/8, 1/2, 3/4

Clean Exhaust Filter **SFE**

▶ P.837



- 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
- One-touch fitting type is available.

Series	Filtration (μm)	Maximum flow capacity [L/min(ANR)]	Port size
SFE	0.01 (Filtration efficiency: 99.99%)	3, 30, 65, 130, 200	M5 x 0.8, R1/8, R1/4 ø4, ø6, ø8, ø10

Blow Guns

Blow Gun VMG

▶ P.849



- Reduction of 2,000 m³ per annum is possible. (Energy saving)
- Pressure loss: 1% or less (Nozzle size: ø2.5)
- Available nozzle:
Male thread nozzle, high efficiency nozzle with male thread, low noise nozzle with male thread, copper extension nozzle

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

Nozzles for Blowing KN

▶ P.861



Series	Type	Nozzle size
KN	Nozzle with male thread	ø1 to ø8
	High efficiency nozzle	ø1 to ø2
	Low noise nozzle with male thread	ø0.75 x 4 to ø1.1 x 8
	Copper extension nozzle	ø1.5 to ø3
	Pivoting nozzle	ø4, ø6
	Nozzle with self-align fitting	ø1 to ø6
	Nozzle for One-touch fitting	ø1 to ø3

Pressure Gauges

Pressure Gauge for General Purposes G□

▶ P.870



- Available with a limit indicator and color zones.

Series	Size (O.D.)	Connection thread
G15	ø15	R1/8, M5 (Female thread)
G27	ø27	R1/8, 1/16
G36	ø37.5	R1/8, M5 (Female thread)
GA36	ø37.5	R1/8
G46	ø42.5	R1/8, 1/4, M5 (Female thread)
GA46	ø42.5	R1/8, 1/4
G33	ø30	R1/8
GA33	ø30	R1/8
G43	ø43	R1/8, 1/4
G36-L	ø37.5	R1/8
G46-L	ø42.5	R1/8, 1/4

Oil-free/External Parts Copper-free Pressure Gauge G46E

▶ P.882



- Oil-free, external parts copper-free
- With limit indicator

Series	Size (O.D.)	Connection thread
G46E	ø42.5	R1/8, 1/4

Pressure Gauges

Pressure Gauge for Clean Series (10- Series) **G49**

▶ P.884



- For clean series (10- series)

Series	Size (O.D.)	Connection thread
G49	ø44	R1/4

Pressure Gauge for Clean Regulator **G46-□-□-SRA, B**

▶ P.886



- 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**

▶ P.888



- 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**

▶ P.892



- Pressure gauge for vacuum
- Pressure range: -100 to 200 kPa

Series	Size (O.D.)	Connection thread
GZ46	ø42.5	R1/8, 1/4

Digital Pressure Sensor **GS40**

▶ P.894



- A pressure switch function added to the gauge with digital display.

Series	Set pressure (MPa)
GS40	0 to 0.98

Compact Manometer **PPA**

▶ P.897



- Pressure measurements can easily be taken any time, anywhere.

Series	Set pressure	Applicable tubing size	Type
PPA100	-0.1 to 1 MPa	ø4, ø6	For high pressure
PPA101	-101 to 10 kPa	ø4, ø6	For vacuum
PPA102	-10 to 100 kPa	ø4, ø6	For low pressure

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Electronic Pressure Switches/Pressure Sensors (Self-contained Type)

3-Screen Display High-Precision Digital Pressure Switch ZSE20(F)/ISE20 ▶ P.15



- Visualization of setting items
- Simple 3 step setting
- Easy screen switching
- Setting is possible while checking the measured value.
- Delay time: Fastest 1.5 ms or less
- Current consumption: 25 mA or less

Series	Type	Rated pressure range
ZSE20F	Compound pressure	-100.0 to 100.0 kPa
ZSE20	Vacuum pressure	0.0 to -101.0 kPa
ISE20	Positive pressure	-0.100 to 1.000 MPa

2-Color Display High-Precision Digital Pressure Switch ZSE30A(F)/ISE30A ▶ P.31



- 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	-100.0 to 100.0 kPa
ZSE30A	Vacuum pressure	0.0 to -101.0 kPa
ISE30A	Positive pressure	-0.100 to 1.000 MPa

2-Color Display High-Precision Digital Pressure Switch ZSE40A(F)/ISE40A ▶ P.45



- 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	-100.0 to 100.0 kPa
ZSE40A	Vacuum pressure	0.0 to -101.3 kPa
ISE40A	Positive pressure	-0.100 to 1.000 MPa

Compact Digital Pressure Switch ZSE10(F)/ISE10 ▶ P.67



- 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	-100.0 to 100 kPa
ZSE10	Vacuum pressure	0.0 to -101.0 kPa
ISE10	Positive pressure	-0.100 to 1.000 MPa

2-Color Display Digital Pressure Switch ISE70/75(H) ▶ P.99



- Metal body type (Aluminum die-casted)
- IP67
- With M12 connector

Series	Type	Rated pressure range
ISE70	Positive pressure (for air)	0 to 1 MPa
ISE75	Positive pressure (for general fluids)	0 to 10 MPa
ISE75H	Positive pressure (for general fluids)	0 to 15 MPa

Electronic Pressure Switches/Pressure Sensors (Self-contained Type)

2-Color Display Digital Pressure Switch ZSE/ISE80

▶ P.89



- Suitable for a wide variety of fluids with stainless diaphragm.
- IP65
- RoHS compliant
- Low leakage. VCR®, Swagelok® compatible fittings can be selected.
- Back piping, underside piping

Series	Type	Rated pressure range
ZSE80F	Compound pressure	-100.0 to 100.0 kPa
ZSE80	Vacuum pressure	0.0 to -101.0 kPa
ISE80	Positive pressure	-0.100 to 1.000 MPa
ISE80H	Positive pressure	-0.100 to 2.000 MPa

Air Checker: Electronic Pressure Switch PS1000/1100/1200

▶ P.105



- Plug-in port for One-touch fittings
- With LED light

Series	Type	Rated pressure range
PS1000	Positive pressure	-0.1 to 0.45 MPa
PS1100	For vacuum/residual pressure	-0.1 to 0.4 MPa
PS1200	For vacuum	-100 to 0 kPa

3-Color Display Digital Gap Checker ISA3

▶ P.109



- 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: Change the settings while checking the displayed value
- Energy saving: Air consumption reduced by 60%
- Improved drainage resistance: 10 times or more

Series	Rated distance range	Piping specifications: Supply side	Piping specifications: Detection side
ISA3-F	0.01 to 0.03 mm	Rc, G 1/8	ø4, ø6 One-touch fitting, G 1/8
ISA3-G	0.02 to 0.15 mm	Rc, G 1/8	ø4, ø6 One-touch fitting, G 1/8
ISA3-H	0.05 to 0.30 mm	Rc, G 1/8	ø4, ø6 One-touch fitting, G 1/8

Non-Contact Sensor for Workpiece Placement Verification: Air Catch Sensor ISA2

▶ P.125



- 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

▶ P.126



- Modular type mountable
- ARM10/11 series mountable
- Selectable pressure unit
- With anti-chattering function
- Power-saving mode

Series	Type	Rated pressure range
ISE35	Positive pressure	-0.1 to 1 MPa

Electronic Pressure Switches/Pressure Sensors (Remote Type)

Compact Pneumatic Pressure Sensor PSE53

▶ P.134



- Connector type
- Analog output (voltage)

Series	Type	Rated pressure range
PSE531	Vacuum pressure	0 to -101 kPa
PSE533	Compound pressure	-101 to 101 kPa
PSE532	Positive pressure	0 to 101 kPa
PSE530	Positive pressure	0 to 1 MPa

Compact Pneumatic Pressure Sensor PSE54

▶ P.137



- Analog output (voltage)

Series	Type	Rated pressure range
PSE541	Vacuum pressure	0 to -101 kPa
PSE543	Compound pressure	-100 to 100 kPa
PSE540	Positive pressure	0 to 1 MPa

Low Differential Pressure Sensor PSE550

▶ P.140



- Suitable for applications such as air current volume maintenance, filter blockage, and liquid surface detection.
- Analog output (voltage/current)

Series	Type	Rated differential pressure range
PSE550	Vacuum pressure	0 to 2 kPa

Pressure Sensor for General Fluids PSE56

▶ P.143



- 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 -101 kPa
PSE563	Compound pressure	-100 to 100 kPa
PSE564	Positive pressure	0 to 500 kPa
PSE560	Positive pressure	0 to 1 MPa

Pressure Sensor for General Fluids PSE57

▶ P.146



- Proof pressure: 3.0 MPa
- Withstand voltage: 500 VAC
- Enclosure: IP65
- Materials of parts in contact with fluid
Piping port: C3604 + Nickel plating
Pressure sensor: Al₂O₃ (Alumina 96%)
O-ring: FKM + Grease

Series	Type	Rated pressure range
PSE570	Positive pressure	0 to 1 MPa
PSE573	Compound pressure	-100 to 100 kPa
PSE574	Positive pressure	0 to 500 kPa

Electronic Pressure Switches/Pressure Sensors (Remote Type)

Multi-Channel Digital Pressure Sensor Controller **PSE200**

▶ P.149



- Four sensors can be connected.
- Applicable sensor: PSE53□, 54□, 56□
- A single controller monitors various applications.
- 4 inputs, 5 outputs

Series	Set pressure range
PSE200	-101 to 101 kPa 10 to -101 kPa -10 to 101 kPa -0.1 to 1 MPa

2-Color Display Digital Pressure Sensor Controller **PSE300**

▶ P.155



- Applicable sensor: PSE53□, 54□, 55□, 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	-101 to 101 kPa 10 to -101 kPa -10 to 100 kPa -0.1 to 1 MPa -50 to 500 kPa -0.2 to 2 kPa

Mechanical Pressure Switches

Pressure Switch/Reed Switch Type **IS10**

▶ P.167



- 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	0.1 to 0.4 MPa 0.1 to 0.6 MPa

Pressure Switch/Micro Switch Type **IS3000**

▶ P.170



- Can be used for micro load, around 10 mA e.g.
- With neon light

Series	Type	Set pressure range
IS3000	Positive pressure	0.1 to 0.7 MPa

Mechanical Pressure Switches

General Purpose Pressure Switch/Snap Switch Type ISG

▶ P.172



- For general fluids
- Equivalent to IP44
- With neon light

Series	Type	Set pressure range
ISG11□, 21□	Positive pressure	0.02 to 0.3 MPa
ISG12□, 22□	Positive pressure	0.05 to 0.7 MPa
ISG13□, 23□	Positive pressure	0.1 to 1.0 MPa
IS2761	Positive pressure	0.1 to 1.0 MPa
ISG19□, 29□	Vacuum pressure	-10 to -100 kPa

Vacuum Switch/Reed Switch Type ZSM1

▶ P.178



- Can be integrated with ZM ejector system.

Series	Type	Set pressure range
ZSM1	Vacuum pressure	-27 to -80 kPa

Digital Flow Switches

2-Color Display Digital Flow Switch PFM

▶ P.207



- Air, N₂, Ar, CO₂
- Grease-free
- Integrated flow adjustment valve
- Compact, Lightweight, Space-saving

Series	Rated flow range (L/min)
PFM	0.2 to 10 (0.2 to 5)
	0.5 to 25 (0.5 to 12.5)
	1 to 50 (1 to 25)
	2 to 100 (2 to 50)
	() : For CO ₂

2-Color Display Digital Flow Switch PFMB

▶ P.253



- Air, N₂
- Grease-free
- Integrated flow adjustment valve
- Compact, Space-saving

Series	Rated flow range (L/min)
PFMB	2 to 200
	5 to 500
	10 to 1000
	20 to 2000

3-Color Display Digital Flow Switch PFMC

▶ P.275



- Dry air, N₂
- 3-color/2-screen display
- Expanded flow range: Wide range of flow measurement with one product
- Compact, Space saving

Series	Rated flow range (L/min)
PFMC	5 to 500
	10 to 1000
	20 to 2000

Digital Flow Switches

Flow Sensor **PFMV**

▶ P.287



- Suction verification of very small workpieces
- Repeatability: $\pm 2\%$ F.S.
- Response speed: 5 ms or less, withstand pressure: 500 kPa
- Grease-free, RoHS compliant
- Covers total range with one voltage monitor.
- Related equipment: Suction filter ZFC050 series

Series	Rated flow range (L/min)
PFMV	0 to 0.5
	0 to 1
	0 to 3
	-0.5 to 0.5
	-1 to 1
	-3 to 3

Digital Flow Switch for Air **PF2A**

▶ P.305



- 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 (L/min)
PF2A	1 to 10
	5 to 50
	10 to 100
	20 to 200
	50 to 500
	150 to 3000
	300 to 6000
	600 to 12000

3-Color Display Digital Flow Switch for Water **PF3W**

▶ P.329



- 3-color/2-screen display
- Integrated temperature sensor
- 40% smaller than current product
- IP65 compliant, non-grease type
- Fluid temperature: 0 to 90°C
- PVC piping type : Applicable to deionized water and chemical liquids, etc

Series	Rated flow range (L/min)
PF3W	0.5 to 4
	2 to 16
	5 to 40
	10 to 100
	50 to 250

Digital Flow Switches

3-Color Display Electromagnetic Type Digital Flow Switch LFE□

▶ P.359



- Applicable fluid: Water, Water-soluble coolant
- Compact, Lightweight
56 mm x 40 mm x 90 mm (H x W x D)
Weight: 340 g (LFE1□3)
- Reverse flow can be detected.
- Operating fluid temperature: 0 to 85°C
- Current consumption: 45 mA

Series	Rated flow range (L/min)
LFE□	0.5 to 20
	2.5 to 100
	5 to 200

Digital Flow Switch for Deionized Water and Chemical Liquids PF2D

▶ P.381



- Body sensor: New PFA, Tube: Super PFA
- Low-particle generation, Excellent flow-through characteristics

Series	Rated flow range (L/min)
PF2D	0.4 to 4
	1.8 to 20
	4.0 to 40

Mechanical Flow Switches

Diaphragm Type Flow Switch IFW5

▶ P.396



- 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 (L/min)
IFW5	1 to 10
	10 to 20
	20 to 50

Paddle Type Flow Switch IF3

▶ P.402



- 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 (L/min)
IF3	14 to 60
	20 to 1500
	36 to 2600

Static Neutralization Equipment

Ionizer/Bar Type IZS40/41/42

▶ P.411



- Potential amplitude is reduced with Dual AC type, 25 V or less (at the installation height of 300 mm)
- Rapid neutralization 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 neutralization cartridges and energy saving static neutralization 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/Nozzle Type IZN10

▶ P.439



- Nozzle type: Dust removal and static neutralization by air blow, spot type static neutralization
- Slim design: Thickness dimension 16 mm
- RoHS compliant
- Nozzle type can be selected according to applications.
- Energy saving static neutralization nozzle (Short range static neutralization, design focuses on ion balance)
- High flow static neutralization nozzle (Long range static neutralization and dust removal)

Series	Ion generation method	Ion balance
IZN10	Corona discharge type	Energy saving static neutralization nozzle: Within ±10 V High flow rate nozzle: Within ±15 V

Fan Type Ionizer IZF

▶ P.467



- Thinnest: Thickness 40 mm
- Fastest: Rapid static neutralization 0.5 seconds
- Offset voltage (ion balance): ±5 V
- Stable static neutralization performance, Easier maintenance

Series	Maximum air flow	Ion generation method	Offset voltage (ion balance)
IZF10	0.46 m ³ /min, 0.66 m ³ /min	Corona discharge type	±13 V
IZF21	1.8 m ³ /min	Corona discharge type	±5 V
IZF31	4.4 m ³ /min	Corona discharge type	±5 V

Desktop Duster Box ZVB

▶ P.493



- Integrated the static neutralization, dust removal and dust collection processes into one box.
- Supports workpieces of various sizes.
- Electronic components, lens, smartphone, lamp cover, cosmetic case, parts for home appliances
- Improved the static neutralization and dust removal efficiency with a separate ion blow and air blow structure.

Series	Size	Ion generation method	Offset voltage
ZVB20	A4	Corona discharge type	Within ±10V (Static neutralization distance: 100 mm from the nozzle)
ZVB40	A3	Corona discharge type	Within ±10V (Static neutralization distance: 100 mm from the nozzle)

Electrostatic Sensor IZD10

▶ P.501



- Detects the electrostatic potential and outputs in an analog voltage.

Series	Potential measurement	Output voltage	Effective detection distance
IZD10-110	±0.4 kV (detected at a 25 mm distance)	1 to 5 V (Output impedance: Approx. 100 Ω)	10 to 50 mm
IZD10-510	±20 kV (detected at a 50 mm distance)		25 to 75 mm

Static Neutralization Equipment

Electrostatic Sensor IZE11

▶ P.501



- Displays the electrostatic potential with a connected electrostatic sensor (IZD10), 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

▶ P.517



- 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 Valves for Fluid Control/Air Operated Valves

Direct Operated 2 Port Solenoid Valve **VX2**

▶ P.27



- For air, medium vacuum, water, oil, steam (Can be used with heated water.)
- Flow rate: 20% more flow*
- Height: 10% smaller*
- Weight: 30% lighter*
- Body material: Aluminum, resin, C37, stainless steel
- Available with One-touch fittings (resin body).
- * Comparison with SMC current model
- Manifold type No.: VVX21, VVX22, VVX23

Series	Valve type	Port size	Orifice diameter (mmø)
VX21/22/23	N.C./N.O.	1/8 to 1/2 ø6 to ø12	2 to 10

2 Port Solenoid Valve with Built-in Y-strainer **VXK**

▶ P.81

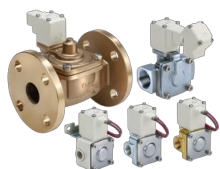


- For air, water, oil, steam
- Space saving and reduced piping labor
- Built-in strainer

Series	Valve type	Port size	Orifice diameter (mmø)
VXK21/22/23	N.C./N.O.	1/8 to 3/8	2 to 8

Pilot Operated 2 Port Solenoid Valve **VXD**

▶ P.113



- For air, water, oil, heated water, high temperature oil
- Body material: Aluminum, resin, C37, stainless steel, CAC407
- With One-touch fittings (resin body) type is available.
- IP65

Series	Valve type	Port size	Orifice diameter (mmø)
VXD	N.C./N.O.	ø10, ø12, ø3/8" 1/4 to 1 32A to 50A	10 to 50

Zero Differential Pressure Type Pilot Operated 2 Port Solenoid Valve **VXZ**

▶ P.171



- 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	Valve type	Port size	Orifice diameter (mmø)
VXZ	N.C./N.O.	ø10, ø12, ø3/8" 1/4 to 1	10 to 25

Zero Differential Pressure Type Pilot Operated 2 Port Solenoid Valve **VXS**

▶ P.215



- For steam
- Long service life: 3 million cycles (Based on SMC's test condition)
- Improved air filtration
- Reduced apparent power: 18 VA → 12 VA, 20 VA → 15 VA
- Reduced coil temperature rise: 120°C → 100°C
- IP65

Series	Valve type	Port size	Orifice diameter (mmø)
VXS	N.C.	1/4 to 1	10 to 25

2/3 Port Valves for Fluid Control/Air Operated Valves

Angle Seat Valve/Air Operated Type **VXB**

▶ P.239



- For steam (Can be used with air and water.)
- Low pressure loss due to angle seat structure
- Reduced leakage with rubber seal
- Long service life: 3 million cycles (Steam), 5 million cycles (Air)
- Low leakage: 10 cm³/min or less
- Space saving: Height 100 mm
- Body material: Stainless steel 316L equivalent, Bronze (CAC)

Series	Valve type	Port size	Orifice diameter (mmø)
VXB	N.C.	3/8, 1/2, 3/4 10A, 15A, 20A	11, 14, 18

Energy Saving Type 2 Port Solenoid Valve **VXE**

▶ P.257

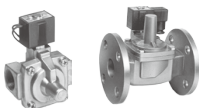


- Power consumption 1/3 (SMC comparison)
- For air, water, oil

Series	Valve type	Port size	Orifice diameter (mmø)
VXE2	N.C.	1/8 to 1/2	2 to 10
VXED2	N.C.	1/4 to 1 32A to 50A	10 to 50
VXE22	N.C.	1/4 to 1	10 to 25

Pilot Operated 2 Port Solenoid Valve **VXP**

▶ P.311

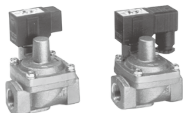


- For air, gas, steam, water, oil

Series	Valve type	Port size	Orifice diameter (mmø)
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**

▶ P.323

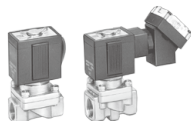


- For water, oil

Series	Valve type	Port size	Orifice diameter (mmø)
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**

▶ P.333

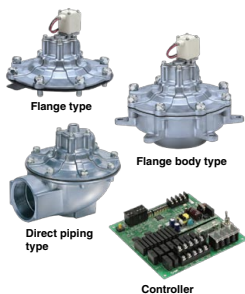


- Maximum operating pressure differential of 2 MPa with orifice diameter ø10

Series	Valve type	Port size	Orifice diameter (mmø)
VXH	N.C.	1/4 to 1/2	10

2/3 Port Valves for Fluid Control/Air Operated Valves

2 Port Solenoid Valve/Air Operated Valve for Dust Collector **VXF2/VXFA2** ▶ P.335



- 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)
- Enclosure: IP65*
 - * Electrical entry flat terminal type terminal is IP40.
- Applicable for high temperature: Fluid temperature 100°C
- Flat terminal type added
- Controller dedicated for operation, VXFC series

Series	Valve type	Port size	Orifice diameter (mmø)
VXF2	N.C.	20A to 100A	22 to 100
VXFA2	N.C.	20A to 100A	22 to 100

Direct Operated 3 Port Solenoid Valve **VX3** ▶ P.377



- For air, water, oil, steam
- Manifold type No.: VVX31, VVX32, VVX33

Series	Valve type	Port size	Orifice diameter (mmø)
VX31/32/33	N.C./N.O./COM.	1/8 to 3/8	1.5 to 4

Direct Air Operated 2 Port Valve **VXA** ▶ P.407



- For air, water, oil
- Manifold type No.: VVXA21, VVXA22

Series	Valve type	Port size	Orifice diameter (mmø)
VXA21/22	N.C./N.O.	1/8 to 1/2	3 to 10

2/3 Port Valves for Fluid Control/5.0 MPa/Water and Air/High Speed/Chemical Liquids

5.0 MPa Pilot Operated 2/3 Port Solenoid Valve & Check Valve **VCH/VCHC** ▶ P.431

- Service life: 10 million times
- Use the polyurethane elastomer poppet for valve parts.
- Improves durability at high pressure.

Series	Type	Port size	Orifice diameter (mmø)
VCH41	2 port valve, N.C.	G3/4, 1	ø16
VCH42	2 port valve, N.O.	G3/4, 1	ø17.5
VCH410	3 port valve	G1/2 to 1	ø18
VCHC40	Check valve	G3/4, 1	ø16

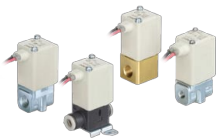
Direct Operated Regulator for 6.0 MPa (Relieving Type) **VCHR** ▶ P.444

- 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 (MPa)
VCHR	VCHR30/40	Direct operated regulator (Relieving type)	G3/4, 1, 1 1/2	0.5 to 5.0 (Max. operating pressure : 6.0)

5.0 MPa Silencer **VCHN** ▶ P.450

- Reduces clogging with the double-layer structure.
- Noise reduction: 35 dB (A)

Compact Direct Operated 2 Port Solenoid Valve **VDW** ▶ P.453

- For air, medium vacuum, water
- Body material: Aluminum, resin (PPS), C37, stainless steel
- With One-touch fittings (resin body)
- IP65

Series	Valve type	Port size	Orifice diameter
VDW10/20	N.C.	ø3.2, ø4, ø6, M5, 1/8	ø1 to ø3.2

Compact Direct Operated 2/3 Port Solenoid Valve for Water and Air **VDW** ▶ P.471

Series	Valve type	Port size	Orifice diameter (mmø)
VDW200/300	C.O.	M5 to 1/4 (8A)	1 to 4

2/3 Port Valves for Fluid Control/5.0 MPa/Water and Air/High Speed/Chemical Liquids

Compact/Lightweight 2 Port Solenoid Valve for Water and Air **VDW-XF** ▶ P.497



- Compact, lightweight resin body (PPS)
- IP65
- Power consumption: 3 W (Standard), 0.5 W (With power-saving circuit)

Series	Valve type	Port size	Orifice diameter (mmø)
VDW30/40-XF	N.C.	P7, P8 (Quick fastener) ø4, ø6, ø8, ø10	1 to 6

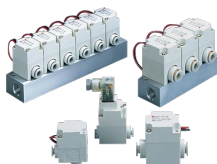
High Speed 2 Port Valve **SX10** ▶ P.505



- High speed response ON: 0.45 ms, OFF: 0.4 ms (±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** ▶ P.513



- High frequency operation possible: High speed response 7 ms or less (VQ20), 20 ms or less (VQ30)
- Easy piping with One-touch Fittings
- Dust-tight, water-jet-proof enclosure (IP65) compliant in DIN terminal type.
- Application: Air-blow, Blow-off of workpiece, etc.
- Manifold type No.: VV2Q22, VV2Q32

Series	Valve type	Port size	Orifice diameter (mmø)
VQ20	N.C.	ø6 to ø12	3.4
VQ30	N.C.	ø6 to ø12	4.8

Compact Direct Operated 2/3 Port Solenoid Valve for Chemical Liquids **LVM** ▶ P.527



- Wetted part material Body/plate: PEEK
Diaphragm: Choice of EPDM, FKM, Kalrez®
- Life expectancy: 10 million times or more (under test conditions used by SMC)

Series	Valve structure	Valve type	Orifice diameter (mmø)
LVM09/090	Diaphragm type direct operated poppet (Rocker type)	N.C./N.O./Universal	1.1
LVM11	Diaphragm type direct operated poppet	N.C.	1.5
LVM10/100	Diaphragm type direct operated poppet (Rocker type)	N.C./N.O./Universal	1.4
LVM15/150			1.6
LVM20/200			2

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2/3 Port Valves for General Purpose Fluid Control

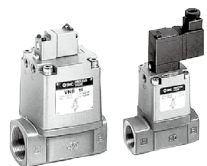
Process Valve/2 Port Valve for Compressed Air and Air-hydro Circuit Control **VNA** ▶ P.559



- Exclusively for pneumatic system and air-hydro circuit control.
- The balance poppet permits normal and reverse flow.
- Air operated, external pilot solenoid

Series	Valve type	Port size	Orifice diameter (mmø)
VNA	N.C./N.O./C.O.	1/8 to 2	10 to 50

Process Valve/2 Port Valve for Fluid Control **VNB** ▶ P.567



- 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	Valve type	Port size	Orifice diameter (mmø)
VNB	N.C./N.O./C.O.	1/8 to 2 1 1/4B to 2B	7 to 50

Coolant Valve **SGC** ▶ P.575



- High flow type to control coolants (cutting fluid) in machine tools.
- Low power consumption: 0.35 W (for 24 VDC)
- Maximum operating pressure: 0.5 MPa, 1 MPa, 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	Valve type	Port size	Orifice diameter (mmø)
SGC	N.C./N.O.	3/8 to 2	9 to 51

High Pressure Coolant Valve **SGH** ▶ P.597



- Maximum operating pressure: 3 MPa, 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 (for 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	Valve type	Port size	Orifice diameter (mmø)
SGH	N.C./N.O.	3/8 to 1	9 to 25

Coolant Valve **VNC** ▶ P.617



- For controlling coolants (cutting fluid) used in machine tools.
- Maximum operating pressure: 0.5 MPa, 1 MPa
- Air operated, external pilot solenoid

Series	Valve type	Port size	Orifice diameter (mmø)
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**

▶ P.627



- For controlling coolants (cutting fluid) used in machine tools.
- Maximum operating pressure: 3.5 MPa, 7 MPa
- Air operated, external pilot solenoid

Series	Valve type	Port size	Orifice diameter (mm)
VNH	N.C.	3/8 to 1	3.9 to 15.7

Steam Valve/2 Port Valve for Steam **VND**

▶ P.633



- For steam control
- Adopting PTFE seals
- With indicator light (option)
- Air operated type

Series	Valve type	Port size	Orifice diameter (mm)
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**

▶ P.641



- 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 mounting
Resin manifold block

Series	Orifice diameter	Fluid
VCC	ø3.8	Water/chemical base paint, Ink, Cleaning fluid (Water, butyl acetate), Air

2-Layer Soft Fluoropolymer Tubing **TQ**

▶ P.669



- 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

High Purity Chemical Liquid Valves

High Purity Chemical Liquid Valve: Air Operated, Integrated Fitting Type **LVC** ▶ P.683

- Body material: New PFA
- N.C./N.O./Double acting with same configuration
- Compatible with 100°C fluid temperature
- Manifold type No.: LLC2, LLC3, LLC4, LLC5

Series	Type	Valve type	Applicable tubing O.D.	Orifice diameter (mmø)
LVC	Integrated fitting	N.C./N.O./Double acting	Metric: 3 to 25 Inch: 1/8 to 1	4 to 22

High Purity Chemical Liquid Valve: Air Operated, Threaded Type **LVA** ▶ P.701

- Body material: New PFA/Stainless steel/PPS
- Diaphragm material: PTFE, EPR, NBR can be selected.
- Manifold type No.: LLA2, LLA3, LLA4, LLA5

Series	Type	Valve type	Port size	Orifice diameter (mmø)
LVA	Threaded type	N.C./N.O./Double acting	1/8 to 1	2 to 22

Organic Solvents Compatible

- Body material: Stainless steel
- Actuator material: ADC
- Buffer material: FKM/EPDM
- Fitting type: Double ferrule fittings, Metal gasket seal fittings, Integrated tubing



Series	Type	Valve type	Applicable tubing O.D.	Orifice diameter (mmø)
LVA	Double ferrule fittings, Metal gasket seal fittings, Integrated tubing	N.C./N.O./Double acting	Metric: 6 to 19 Inch: 1/4 to 1	4 to 22

High Purity Chemical Liquid Valve: Manually Operated (Integrated Fitting Type/Threaded Type) **LVH** ▶ P.719

- Body material: New PFA/Stainless steel/PPS
- Compatible with locking and non-locking types.
- Manifold type No.: LLH2, LLH3, LLH4

Series	Type	Valve type	Port size (Applicable tubing O.D.)	Orifice diameter (mmø)
LVH	Manually operated type (Integrated fitting/Threaded type)	N.C.	Threaded type: 1/8 to 1/2 Integrated fitting, Metric: ø3 to ø12 Inch: 1/8 to 1/2	4 to 12

Organic Solvents Compatible

- Body material: Stainless steel
- Actuator material: ADC
- Buffer material: FKM/EPDM
- Fitting type: Double ferrule fittings, Metal gasket seal fittings, Integrated tubing



Series	Type	Valve type	Applicable tubing O.D.	Orifice diameter (mmø)
LVH□M	Double ferrule fittings, Metal gasket seal fittings, Integrated tubing	N.C.	Metric: 6 to 19 Inch: 1/4 to 1	4 to 22

High Purity Chemical Liquid Valves

Compact Type High Purity Air Operated Chemical Liquid Valve **LVD** ▶ P.737



- Space saving, compact model available. Dimension across inlet/outlet ports: Reduced by up to 29%
- Body material: New PFA
- Diaphragm material: PTFE
- Actuator material: PPS, PVDF (LVD-F/FN)

Note) Tubing O.D. for tube extension type

Series	Type	Valve type	Applicable tubing O.D. ^{Note)}		Orifice diameter (mmø)
			Metric	Inch	
LVD	Integrated fittings	N.C./N.O./Double acting	3 to 19	1/8 to 3/4	2 to 16
LVD	Tube extensions	N.C./N.O./Double acting	6 to 19	1/4 to 3/4	4 to 16
LVD-F/FN	LQ1 Integrated fittings	N.C./N.O./Double acting	3 to 25	1/8 to 1	4 to 22
LVD-F/FN	LQ3 Integrated fittings	N.C./N.O./Double acting	6 to 25	1/4 to 1	4 to 22
LVD-F/FN	Tube extensions	N.C./N.O./Double acting	6 to 25	1/4 to 1	4 to 22

High Purity Chemical Liquid Valve: Air Operated, Non-Metallic Exterior **LVQ** ▶ P.771



- Screwless construction. Non-metallic construction without using metal screws to fasten the body of the actuator.
- Body material: New PFA
- Diaphragm material: PTFE
- Actuator material: PVDF

Note) Tubing size

Series	Type	Valve type	Applicable tubing O.D.		Orifice diameter (mmø)
			Metric	Inch	
LVQ	Integrated fitting type	N.C./N.O./Double acting	3 to 25	1/8 to 1	4 to 22
LVQ	Space saving type	N.C./N.O./Double acting	Fitting size: 2 to 6	Fitting size: 2 to 6	4 to 22
LVQ	Tube extension type	N.C./N.O./Double acting	6 to 25 ^{Note)}	1/4 to 1 ^{Note)}	4 to 22

Vinyl Chloride Air Operated Valve **LVP** ▶ P.847



- 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 fluid: Deionized water, chemical liquids

Series	Applicable tubing O.D.	Orifice diameter (mmø)	Valve type	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** ▶ P.851



- Complies to JIS standard for polyvinyl chloride piping (JIS K 6742).
- Applicable fluid: Deionized water, Chemical liquids
- Fluid contact material: 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	Valve type
LVW60	ø32 (Nominal dia. 25A)	ø25	Double acting
LVW80	ø38 (Nominal dia. 32A)	ø40	Double acting
LVW80	ø48 (Nominal dia. 40A)	ø48	Double acting
LVW90	ø60 (Nominal dia. 50A)	ø65	Double acting
LVW90	ø75 (Nominal dia. 65A)	ø65	Double acting
LVW90	ø89 (Nominal dia. 80A)	ø80	Double acting

Fittings & Needle Valves

Fluoropolymer Fittings/Hyper Fittings/Insert Bushing Type **LQ1**

▶ P.937



- Material: New PFA
- Quadruple sealing construction
- The reducer method allows tubing size changes without replacing the body.

Series	Max. operating pressure	Operating temperature (°C)
LQ1	1.0 MPa	0 to 200

Fluoropolymer Fittings/Hyper Fittings/Flare Type **LQ3**

▶ P.912



- Material: New PFA
- Triple-seal construction
- Ease of installation

Series	Max. operating pressure	Operating temperature (°C)
LQ3	1.0 MPa	Nut material PVDF : 0 to 150 Nut material PFA : 0 to 200

High Purity Fluoropolymer Needle Valve **LVN**

▶ P.938



- 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 (L/min)	Orifice diameter (mm)
	Metric	Inch		
LVN	4 to 12	1/8" to 1/2"	0 to 12	4.4 to 10

Fluoropolymer Bore Through Connector **LQHB**

▶ P.941



- 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 (°C)
	Metric size	Inch size	
LQHB	ø3 to ø25	ø1/8" to ø1"	0 to 200

Tubing

Fluoropolymer Tubing **TL/TIL**

▶ P.947



- Material: Super PFA
- Maximum operating temperature : 260°C (This can vary according to operating conditions.)

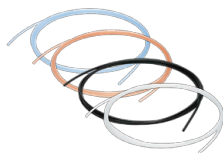
* Made to order

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

Tubing

Fluoropolymer Tubing (PFA) **TLM/TILM**

▶ P.949



- Maximum operating temperature : 260°C (This can vary according to operating conditions.)
- Food Sanitation Law compliant
- 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**

▶ P.952



- Maximum operating pressure: 1.6 MPa (at 20°C)*
- Food Sanitation Law compliant
- Complies with FDA (Food and Drug Administration) § 177-1550 dissolution test.
- Maximum operating temperature : 260°C (This can vary according to operating conditions.)

* 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

FEP Tubing (Fluoropolymer) **TH/TH**

▶ P.954



- Maximum operating pressure: 2.3 MPa (at 20°C)*
- Food Sanitation Law compliant
- Complies with FDA (Food and Drug Administration) § 177-1550 dissolution test.
- Maximum operating temperature: 200°C (This can vary according to operating conditions.)

* This can vary according to 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

Circulating Fluid Temperature Controllers

Thermo-chiller/Standard Type HRS

▶ P.19

Standard type



- With this chiller, cooling water can be obtained anywhere it is necessary because of easy installation and easy operation.
- For a wide range of applications such as laser machine tool, analytical equipment, LCD manufacturing equipment, mold temperature control, etc.
- Compact: W 377 x H 615 x D 500 mm, 40 kg (HRS012/018/024)
- Timer operation function, low level in tank, power failure auto-restart, anti-freezing operation function, etc.
- Self diagnosis function
- Ideal for overseas models. (Single-phase 200 to 230 VAC, Single-phase 100, 115 VAC)
- Conforms to UL specifications, CE-marking.

Series	Set temperature range	Cooling capacity	Temperature stability	Cooling method	Circulating fluid
HRS012 to 060	5 to 40°C	1.3 kW, 1.9 kW 2.4 kW, 3.2 kW 5.1 kW, 5.9 kW (60 Hz)	±0.1°C	Air-cooled refrigeration Water-cooled refrigeration	Tap water Deionized water Ethylene glycol aqueous solution (15%)

Thermo-chiller/Standard Type HRS090

▶ P.67



- Lightweight and compact
- Cooling capacity: 9 kW
- Temperature stability: ±0.5°C
- Set temperature range: 5 to 35°C
- Max. ambient temperature: 45°C
- Power supply: 3-phase 200 to 230 VAC, 380 to 415 VAC

Series	Set temperature range	Cooling capacity	Temperature stability	Cooling method	Circulating fluid
HRS090	5 to 35°C	9 kW (60 Hz)	±0.5°C	Air-cooled refrigeration Water-cooled refrigeration	Tap water Deionized water Ethylene glycol aqueous solution (15%)

Thermo-chiller/Standard Type HRS100/150

▶ P.93



- No heater required, circulating fluid is heated using heat exhausted by refrigerating circuit.
- Compatible power supplies in Europe, Asia, Oceania, North, Central and South America
- Low-noise design: 70 dB (A)
- Outdoor installation: IPX4
- Compact, space-saving

Series	Set temperature range	Cooling capacity	Temperature stability	Cooling method	Circulating fluid
HRS100 HRS150	5 to 35°C	9.5 kW, 14.5 kW (60 Hz)	±1.0°C	Air-cooled refrigeration Water-cooled refrigeration	Tap water Deionized water Ethylene glycol aqueous solution (15%)

Thermo-chiller/Inverter Type HRSH090

▶ P.127



- Power consumption reduced by 53%
Outstanding energy saving effect with the triple inverter !
- Cooling capacity: 9.5 kW (Air-cooled), 11.0 kW (Water-cooled)
- Temperature stability: ±0.1°C
- Set temperature range: 5°C to 40°C

Series	Set temperature range	Cooling capacity	Temperature stability	Cooling method	Circulating fluid
HRSH090	5 to 40°C	9.5 kW	±0.1°C	Air-cooled refrigeration Water-cooled refrigeration	Tap water Deionized water Ethylene glycol aqueous solution (15%)

Circulating Fluid Temperature Controllers

Thermo-chiller/Inverter Type **HRSH**

P.155

Large type



- Outstanding energy saving effect with the triple inverter !
- Outdoor installation, splashproof type (IPX4)
- Max. ambient temperature: 45°C
- Temperature stability: $\pm 0.1^{\circ}\text{C}$ (when a load is stable)
- Space-saving and lightweight: 280 kg (25 kW type)
- Conforms to UL specifications, CE-marking.

Series	Set temperature range	Cooling capacity	Temperature stability	Cooling method	Circulating fluid
HRSH	5 to 35°C	10 kW, 15 kW 20 kW, 25 kW 28 kW	$\pm 0.1^{\circ}\text{C}$	Air-cooled refrigeration Water-cooled refrigeration	Tap water Deionized water Ethylene glycol aqueous solution (15%)

Thermo-chiller/Basic Type **HRSE**

P.191

Compact basic type



- Large energy saving by triple control !
- Power consumption 33% energy saving
- Compact and 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 fluid
HRSE	10 to 30°C	1.2 kW, 1.6 kW 2.2 kW (60 Hz)	$\pm 2.0^{\circ}\text{C}$	Air-cooled refrigeration	Tap water Ethylene glycol aqueous solution (15%)

Thermo-chiller/High-performance Type **HRZ**

P.213

High-performance chiller



- Suitable for semiconductor processing equipment with a wide variety of features such as high temperature stability, wide temperature range, failure diagnosis, external communication, etc.
- Conforms to various safety standards.
- Conforms to UL, SEMI standards, CE-marking.

Series	Set temperature range	Cooling capacity	Temperature stability	Cooling method	Circulating fluid
HRZ	-20 to 40°C 20 to 90°C -20 to 90°C	1 kW, 2 kW 4 kW, 8 kW	$\pm 0.1^{\circ}\text{C}$	Water-cooled refrigeration	Fluorinated fluid Tap water Deionized water Ethylene glycol aqueous solution (60%)

Thermo-chiller/High-performance Inverter Type **HRZ**

P.213

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, SEMI standards, CE-marking.

Series	Set temperature range	Cooling capacity	Temperature stability	Cooling method	Circulating fluid
HRZ	-20 to 90°C 10 to 60°C	10 kW	$\pm 0.1^{\circ}\text{C}$	Water-cooled refrigeration	Fluorinated fluid, Tap water, Deionized water, Ethylene glycol aqueous solution (60%)

Dual Thermo-chiller/High-performance Inverter Type **HRZD**

P.247

(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
- Conforms to SEMI standards, CE-marking.

Series	Set temperature range	Cooling capacity	Temperature stability	Cooling method	Circulating fluid
HRZD	-30 to 90°C	9.5 kW x 2	$\pm 0.1^{\circ}\text{C}$	Water-cooled refrigeration	Fluorinated fluid Ethylene glycol aqueous solution (60%)

Circulating Fluid Temperature Controllers

Water-cooled Thermo-chiller/High-performance Type **HRW**

▶ P.249

High-performance chiller (Water-cooled type)



- Direct heat exchanger for in-plant circulating fluid
- Can control the temperature over a wide range since a compressor is not required.
- Suitable for semiconductor processing equipment with a wide variety of features such as high temperature stability, wide temperature range, failure diagnosis, external communication, etc.
- Conforms to UL, SEMI standards, CE-marking.
- Possible to select the inverter type.

Series	Set temperature range	Cooling capacity	Temperature stability	Cooling method	Circulating fluid
HRW	20 to 90°C	2 kW, 8 kW 15 kW, 30 kW	±0.3°C	Water-cooled type (Without compressor)	Fluorinated fluid, Tap water, Deionized water, Ethylene glycol aqueous solution (60%)

Peltier-type Thermo-con/Rack Mount Type **HECR**

▶ P.279



- Good space utilization: Mountable in a 19-inch rack
Saves space by mounting multiple equipment together in a rack.
- Temperature stability: ±0.01°C to 0.03°C
- Set temperature range: 10°C to 60°C
- Cooling capacity: 200 W, 400 W, 510 W, 800 W, 1 kW
- Power consumption: 200 W, 400 W

Series	Set temperature range	Cooling capacity	Temperature stability	Cooling method
HECR002	10 to 60°C	200 W	±0.01 to 0.03°C	Peltier-type air cooled
HECR004	10 to 60°C	400 W	±0.01 to 0.03°C	Peltier-type air cooled
HECR006	10 to 60°C	510 W	±0.01 to 0.03°C	Peltier-type air cooled
HECR008	10 to 60°C	800 W	±0.01 to 0.03°C	Peltier-type air cooled
HECR010	10 to 60°C	1 kW	±0.01 to 0.03°C	Peltier-type air cooled

Peltier-type Thermo-con **HEC**

▶ P.303

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 standards, CE-marking.

Series	Set temperature range	Cooling capacity	Temperature stability	Cooling method	Circulating fluid
HEC	10 to 60°C	230 W 600 W	±0.01 to 0.03°C	Peltier-type air cooled	Tap water
HEC	10 to 60°C	140 W 320 W	±0.01 to 0.03°C	Peltier-type water cooled	Tap water Ethylene glycol aqueous solution (20%)
HEC	10 to 60°C	600 W 1200 W	±0.01 to 0.03°C	Peltier-type water cooled	Tap water Fluorinated fluid

Thermoelectric Baths

Peltier-type Thermoelectric Bath **HEB**

▶ P.337

High-precision thermoelectric bath



- High-precision temperature control bath with a Peltier device
- Compact and low noise
- Minimal up-down temperature distribution with a unique agitation method

Series	Set temperature range	Max. cooling capacity	Temperature stability	Cooling method	Circulating fluid
HEB	-15 to 60°C	140 W 280 W	0.01°C	Round type Peltier-type water cooled	Tap water, Fluorinated fluid

Thermoelectric Baths

Peltier-type Thermoelectric Bath **INR**

P.347



- High-precision temperature control bath with a Peltier device
- Compact and low noise
- Minimal up-down temperature distribution with a unique agitation method

Series	Set temperature range	Max. cooling capacity	Temperature stability	Cooling method	Circulating fluid
INR-244-696A	-15 to 60°C	280 W	±0.02°C	Peltier-type water cooled	Tap water Ethylene glycol aqueous solution Fluorinated fluid (Square type can only be used at room temperature.)
INR-244-745	0 to 60°C	140 W	±0.03°C	Peltier-type water cooled	
INR-244-733	0 to 60°C	140 W	±0.03°C	Peltier-type water cooled	
INR-244-747	0 to 60°C	320 W	±0.03°C	Peltier-type water cooled	
INR-244-736	0 to 60°C	320 W	±0.03°C	Peltier-type water cooled	
INR-244-746	0 to 60°C	320 W	±0.03°C	Peltier-type water cooled	
INR-244-734	0 to 60°C	320 W	±0.03°C	Peltier-type water cooled	
INR-244-749	0 to 60°C	320 W	±0.03°C	Peltier-type water cooled	
INR-244-748	0 to 60°C	320 W	±0.03°C	Peltier-type water cooled	
INR-244-757	0 to 60°C	220 W	±0.03°C	Peltier-type air cooled	

Temperature Control System for Chemical Liquids

Peltier-type Chemical Thermo-con **HED**

P.349

Fluoropolymer temperature control equipment for chemical liquids



- Heat exchanger for direct temperature control with a Peltier device
- Compatible with a wide range of chemical liquids by use of a fluororesin heat exchanger.
- Conforms to UL standards, CE-marking.

Series	Set temperature range	Cooling capacity	Temperature stability	Cooling method	Circulating fluid
HED	10 to 60°C	300 W 500 W 750 W	±0.1°C	Peltier-type water cooled	Deionized water, Fluorinated fluid, Ammonia hydrogen peroxide solution, etc.

Air Temperature Controllers

Peltier-type Air-Thermo **HEA**

P.367



- 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	0 to 50°C	22 W	±0.1°C	Peltier-type air cooled	Air

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

P.371



- 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/m³ (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, 200, 230 VAC (50/60 Hz)

Series	Air flow capacity [L/min (ANR)]	Outlet air temperature adjustment range	Outlet air set pressure range	Outlet air temperature stability	Cooling method
IDH□4	100 to 500	15 to 30°C	0.15 to 0.85 MPa	±0.1	Heater operation PID control
IDH□6	200 to 800	15 to 30°C	0.15 to 0.85 MPa	±0.1	

High Vacuum Valves

Aluminum High Vacuum Angle Valve XLA

P.401



- Aluminum bodied
Uniform baking temperature
Lightweight, Compact
Minimal outgassing
Minimal contamination from heavy metals
- Bellows are replaceable.

Series	Actuation	Shaft seal type	Valve type	Material	Flange size
XLA	Air operated	Bellows seal	Single acting (N.C.)	Body: Aluminum alloy Bellows: Stainless steel 316L	16 to 80

Aluminum High Vacuum Angle Valve XL□

P.413



- High fluorine resistance
- Minimal outgassing
- Minimal contamination from heavy metals

Series	Actuation	Shaft seal type	Valve type	Material	Flange size	
XLA	Air operated	Bellows seal	Single acting (N.C.)	Body: Aluminum alloy Bellows: Stainless steel 316L	16 to 160	
XLAV (With solenoid valve)		Bellows seal	Single acting (N.C.)		16 to 160	
XLC		Bellows seal	Double acting		16 to 160	
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		Manual	Bellows seal O-ring seal	Single acting (N.C.)	Body: Aluminum alloy Bellows: Stainless steel 316L	25 to 160
XLDV (With solenoid valve)			Bellows seal O-ring seal	Single acting (N.C.)		25 to 160
XLH		Manual	Bellows seal	Manual		16 to 50
XLS		Electromagnetic	Bellows pressure balance	Single acting (N.C.)		16, 25

Aluminum One-touch Connection and Release High Vacuum Angle Valve XLAQ/XLDQ

P.467



- One-touch connection and release (No tools are required.)

Series	Actuation	Shaft seal type	Valve type	Material	Flange size
XLAQ	Air operated	Bellows seal	Single acting (N.C.)	Body: Aluminum alloy Bellows: Stainless steel 316L	16 to 50
XLDQ		Bellows seal O-ring seal			40, 50

High Vacuum Valves

Stainless Steel High Vacuum Angle/In-line Valve **XM/XY**

▶ P.479



- A precision casting, unified composition prevents accumulation of gas.
- The XM series is interchangeable with the XL series, aluminum high vacuum angle valve.

Note) Size 16 is not available for in-line type.

Series	Actuation	Shaft seal type	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 (Note)
XMC/XYC		Bellows seal	Double acting		16 to 80 (Note)
XMD/XYD		Bellows seal O-ring seal	Single acting (N.C.)		25 to 80
XMH/XYH	Manual	Bellows seal	Manual		16 to 50 (Note)

Normal Close High Vacuum Solenoid Valve **XSA**

▶ P.511



- Minimum operating pressure: 1×10^{-6} Pa (abs)
- Leakage: Internal 1.3×10^{-9} Pa·m³/s, External 1.3×10^{-11} Pa·m³/s
- 2 types of fitting
- Power consumption: Max. 25% reduction
- Weight: Max. 18% lighter (0.5 kg → 0.41 kg)

Series	Valve type	Fluid	Piping	Port size
XSA	Normally closed	Air, Inert gas	Face seal fitting Compression fitting	1/4B, 3/8B

Smooth Vent Valve **XVD**

▶ P.522



- Valve/needle valve integrated construction requires only 1/4 the piping space of previous models.
- Particulates significantly reduced through the use of a metal diaphragm in the sheet portion
- Flow of both initial air supply and main air supply can be adjusted.

Series	Valve type	Fluid	Piping	Port size
XVD	Normally closed (Pressurize to open, Spring seal)	Nitrogen, Air, Inert gas, etc.	VCR® Swagelok®	1/4B

Slit Valve **XGT**

▶ P.527



- This product is suitable for the partition valve between the load lock chamber and the transfer chamber or between the transfer chamber and the process chamber in semiconductor equipment or other equipment.

Series	Operating pressure range (Pa)	Fluid	Gate size (Height x Width) (mm)	Operating pressure (MPa)
XGT	Atmospheric pressure to 1×10^{-6}	Inert gas type vacuum	32 x 222 46 x 236 50 x 336	0.45 to 0.6

Rodless Cylinder for Vacuum **CYV**

▶ P.535



- Air cylinder for transfer in vacuum environments (1.3×10^{-4} Pa)

Series	Operating environment pressure [Pa (ABS)]	Bore size (mm)
CYV	Atmosphere to 1.3×10^{-4}	15, 32

Process Pumps

Process Pump/Double Acting Pump **PA/PAP/PAX**

▶ P.553



Series	Actuation	Discharge rate (L/min)	Wetted parts material
PA3□□0	Automatically operated type	1 to 20	ADC12 (Aluminum) SCS14 (Stainless steel)
PA3□13	Air operated type	0.1 to 12	ADC12 (Aluminum) SCS14 (Stainless steel)
PA5□□0	Automatically operated type	5 to 45	ADC12 (Aluminum) SCS14 (Stainless steel)
PA5□13	Air operated type	1 to 24	ADC12 (Aluminum) SCS14 (Stainless steel)
PAP3310	Automatically operated type	1 to 13	New PFA (Fluororesin)
PAP3313	Air operated type	0.1 to 9	New PFA (Fluororesin)
PAX1□12	Automatically operated type, Built-in pulsation attenuator	0.5 to 10	ADC12 (Aluminum) SCS14 (Stainless steel)

Process Pump/Single Acting Pump **PB**

▶ P.581



Series	Actuation	Discharge rate (mL/min)	Wetted parts 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**

▶ P.595



* Tightening bolt, air switching valve: Stainless steel
Use the PAF series standard products when metal-free pump is necessary for hydrofluoric acid, etc.

Series	Actuation	Discharge rate (L/min)	Wetted parts material
PAF3410	Automatically operated type	1 to 20	New PFA (Fluororesin)
PAF3413	Air operated type	1 to 15	New PFA (Fluororesin)
PAF3410-X68*	Automatically operated type	1 to 20	New PFA (Fluororesin)
PAF5410	Automatically operated type	5 to 45	New PFA (Fluororesin)
PAF5413	Air operated type	5 to 38	New PFA (Fluororesin)

Process Gas Equipment

Regulators for Ultra High Purity (UHP) **AP/SL/AP/AZ**

P.666



- 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	Type	Application	Body material	Connection type	Connection size
AP/SL	Single stage	Distribution (Compact)	316L SS	Face seal Tube weld	1/4", 3/8"
AP/SL	Single stage	Distribution	secondary remelt		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	316L SS secondary remelt		1/4", 3/8", 1/2", 3/4"
AP/SL	Single stage	Sub-atmospheric pressure			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**

P.710



- For wide variety of applications from semiconductor to general.
- Body material 316 SS or brass available depending on gas.

Series	Type	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**

P.758



- 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 type	316L SS secondary remelt	Face seal	1/4", 3/8", 1/2", 3/4"
AP	Manually operated type		Tube weld	1/4", 3/8", 1/2", 3/4"

Diaphragm Valve for Ultra High Purity **AZ**

P.801



- Cleaned for high purity semiconductor applications and clean room assembled.
- He leaked tested.
- SEMI standard
- User-friendly forged body

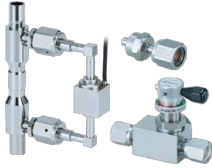
Series	Type	Body material	Connection type	Connection size
AZ	Air operated type	316L SS	Face seal	1/4", 3/8", 1/2"
AZ	Manually operated type		Tube weld	1/4", 3/8", 1/2"

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Process Gas Equipment

Check Valve/Vacuum Generator/Flow Switch **AP**

▶ P.786



[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"

Diaphragm Valve for General Applications **AK**

▶ P.811



- Rc, R and NPT connections are added to series.
- For wide variety of applications from semiconductor to general.
- Cleaned for O₂ 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 type	316 SS	Compression Rc, R, NPT	1/4", 3/8"
AK	Manually operated type			1/4", 3/8"

Regulator for General Applications **AK100T**

▶ P.819



- For wide variety of applications from semiconductor to general.
- Compact and lightweight
Weight: 0.52 kg, Height: 97.5 mm
- Minimum dead leg construction
- Multiple port available in various configurations
Selectable by compression, NPT female, Rc thread

Series	Type	Body material	Connection type	Connection size
AK100T	Manually operated type	316 SS	Compression Rc, NPT	1/4", 3/8"

Industrial Filters

Industrial Filter/Vessel Series **FGD**

▶ P.24



- Ideal for low flow filtration. (Max. 60 L/min)
- Possible to select the antistatic specification (FGDE, FGDF).

Series	Port size	Max. operating pressure	Operating temperature (°C)
FGD	Rc3/8, 1/2, 3/4	0.7, 1 MPa	Max. 80

Industrial Filter/Vessel Series **FGE**

▶ P.29



- Ideal for medium flow rate filtration. (Max. 230 L/min)
- Easy element replacement for V-band type (With cover anti-scattering mechanism)

Series	Port size	Max. operating pressure	Operating temperature (°C)
FGE	R1, 2	0.7 MPa	Max. 80

Industrial Filter/Vessel Series **FGG**

▶ P.32



- Ideal for high flow filtration. (Max. 350 L/min)
- Easy element replacement for V-band type (With cover anti-scattering mechanism)

Series	Port size	Max. operating pressure	Operating temperature (°C)
FGG	Rc2	0.7 MPa	Max. 80

Industrial Filter/Vessel Series **FGA**

▶ P.35



- Ideal for high flow filtration. (Max. 3200 L/min)

Series	Port size	Max. operating pressure	Operating temperature (°C)
FGA	25 to 150 (1B to 6B) JIS 10KFF	1 MPa	Max. 80

Industrial Filter/Vessel Series **FGC**

▶ P.38



- Ideal for low flow filtration. (Max. 80 L/min)

Series	Port size	Max. operating pressure	Operating temperature (°C)
FGC	15 to 25 (1/2B to 1B) JIS 10KFF	1, 2, 4 MPa	Max. 80

Industrial Filters

Bag Filter **FGF**

▶ P.43



- Highly effective for filtration of high temperature and high viscosity fluids.
- Ideal for high flow filtration. (Max. 2000 L/min)
- Easy handling of filtered impurities

Series	Port size	Max. operating pressure	Operating temperature (°C)
FGF	100(4B), 150(6B)JIS 10KFF	0.5 MPa	Max. 80

High Precision Filter for Liquids **FGH**

▶ P.61



- Filtration efficiency: 99% or more

Series	Port size	Max. operating pressure	Operating temperature (°C)
FGH	Rc3/8 to 1	1 MPa	Max. 80

Filter for Cleaning Fluid/Quick Change Filter **FQ1**

▶ P.75



- Ideal for low flow filtration. (Max. 30 L/min)
- No tools required.
- Takes only 60 seconds for element replacement.

Series	Port size	Max. operating pressure	Operating temperature (°C)
FQ1	Rc1/2, 3/4, 1	1 MPa	Max. 80

Low Maintenance Filter **FN**

▶ P.87



- Element replacement is not required.
- System circuit allows the automatic cleaning of element when clogged.

Series	Port size	Max. operating pressure	Operating temperature (°C)
FN1	Rc1	1 MPa	Max. 80
FN4	Rc2	1 MPa	Max. 80

Sintered Metal Elements

Sintered Metal Element **EB/ES**

▶ P.103



- Large mechanical strength and withstand pressure, anti-corrosive
- Mechanical process, caulking, brazing, 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

Positioners

Electro-Pneumatic Positioner/Smart Positioner **IP8□00/IP8□01**

▶ P.124

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IP8001 (Lever type)



IP8101 (Rotary type)

- Enclosure: JISF8007 IP65 (conforms to IEC 60529)
- Monitoring function
- Explosion-proof construction
 - Electro-pneumatic positioner: TIS explosion-proof construction (Exd IIBT5) ATEX intrinsically safe explosion-proof construction (II2G Ex ib IIC5/T6)
 - Smart positioner: ATEX intrinsically safe explosion-proof construction (II1G Ex ia IIC4/T5/T6)
- HART transmission function (Smart positioner)

Description	Series	Type	Port size (Rc, NPT, G)	Supply air pressure (MPa)	Input current
Electro-pneumatic positioner	IP8000	Lever type	1/4	0.14 to 0.7	4 to 20 mA DC
Electro-pneumatic positioner	IP8100	Rotary type	1/4	0.14 to 0.7	4 to 20 mA DC
Smart Positioner	IP8001	Lever type	1/4	0.14 to 0.7	4 to 20 mA DC
Smart Positioner	IP8101	Rotary type	1/4	0.3 to 0.7	4 to 20 mA DC

Pneumatic-Pneumatic Positioner **IP5000/5100**

▶ P.149



- JIS F8007 IP55

Series	Port size	Supply air pressure (MPa)	Input pressure (MPa)
IP5000/5100	Rc1/4	0.14 to 0.7	0.02 to 0.1

Cylinder Positioner **IP200**

▶ P.152



- Servo-mechanism allows precise and stable position control of cylinders.
- Can be used as a cylinder position control unit for general industrial machines.

Series	Port size	Supply air pressure (MPa)	Input pressure (MPa)
IP200	Rc1/4	0.3 to 0.7	0.02 to 0.1

Regulators

Filter Regulator **1301/IW**

▶ P.154



Series	Port size	Set pressure (MPa)	Filtration accuracy (μm)
1301	Rc1/4	0.02 to 0.2 0.02 to 0.29 0.02 to 0.49	5
IW		0.02 to 0.2 0.02 to 0.3 0.02 to 0.5	

Filter Regulator: Made to Order **AW30 to AW60-X430/X440**

▶ P.161



- Special temperature environment:
Special materials are used in the manufacturing of seals and resin parts to allow them to withstand various temperature conditions in cold or tropical (hot) climates.

Series	Environment	Port size	Set pressure (MPa)	Filtration accuracy
AW30 to AW60-X430	Low temperature -30 to 60°C	1/4 to 1	0.05 to 0.85 0.02 to 0.2	5 μm
AW30 to AW60-X440	High temperature -5 to 80°C			

Filter Regulator **AW30/40-X2622**

▶ P.163



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

Series	Port size	Set pressure (MPa)	Nominal filtration rating (μm)
AW30/40-X2622	1/4, 3/8, 1/2, 3/4	0.05 to 0.85	5

Relays/Valves

Booster Relay **IL100/XT240**

▶ P.167



- 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	Pressure ratio	Input/Output pressure (MPa)
IL100	Rc1/4, 3/8	1:1	0.7
XT240	Rc, NPT1/4 (IN), 1 (SUP, OUT)	1:1	0.7

Lock-Up Valve **IL201/211/220**

▶ P.171



- The lock-up valve is used if any air source or air supply piping line failure occurs in the air operated process control line.
- Single acting, Double acting: Retains pressure at the operating area as emergency operation until the air source is recovered to its normal state.
- 3 port: Changes the supply port if a trouble occurs.

Series	Port size	Set pressure (MPa)	Shut-off pneumatic circuit pressure (MPa)
IL201/211/220	Rc1/4	0.14 to 0.7	0.7

Electro-Pneumatic Transducers

Electro-Pneumatic Transducer **IT600/601**

▶ P.174



- The air pressure in proportion to the current signal can be output.
- Wide output pressure range: 0.02 to 0.6 MPa
- Fast response
- Independent electric unit/Explosion-proof (flameproof) construction
- Easy span adjustment

Series	Port size	Supply pressure (MPa)	Input current
IT600	Rc1/4	0.14 to 0.24	4 to 20 mADC
IT601	Rc1/4	0.24 to 0.7	4 to 20 mADC

Actuators

Cylinder with Positioner CP

▶ P.176



- The cylinder positioning in proportion to the input signal (air pressure) is possible.
- Correction operation function: Returns to the initial setting position even when the position deviates due to load variations.

Series	Bore size	Stroke (mm)	Air connection port	Supply pressure (MPa)	Input pressure (MPa)
CPA2	ø50 to 100	25 to 300	Rc1/4 female thread	0.3 to 0.7	0.02 to 0.1
CPS1	ø125 to 300	30 to 300	Rc1/4 female thread	0.3 to 0.7	0.02 to 0.1

Detection Conversion Unit

Pressure Switch IS

▶ P.189



- The pressure switch IS100 series can be utilized for automatic air pressure control in a wide variety of fields, such as industrial machinery or chemical plant.
- Pressure adjustment range: 0.02 to 0.1 MPa
- Electric wiring: Various wiring and entry methods can be selected.
- Mechanical service life: 100,000 cycles

Series	Port size	Pressure adjustment range (MPa)	Contact
IS100	Rc1/4	0.02 to 0.1	Using micro switch A, B 2 contacts

Solenoid Valves

NAMUR Interface 3 Port Solenoid Valve VFN200N

▶ P.189



- The interface surface complies with NAMUR.
Can be directly installed on the industrial valve actuator that complies with NAMUR.

Series	Flow rate characteristics 4/2 → 5/3 (A/B → EA/EB) C	Flow rate characteristics 4/2 → 5/3 (A/B → EA/EB) b	Flow rate characteristics 4/2 → 5/3 (A/B → EA/EB) Cv	Power consumption (W)
VFN200N	5.41	0.31	1.38	1.8

NAMUR Interface 5 Port Solenoid Valve VFN2000N

▶ P.192



- The interface surface complies with NAMUR.
Can be directly installed on the industrial valve actuator that complies with NAMUR.

Series	Flow rate characteristics 4/2 → 5/3 (A/B → EA/EB) C	Flow rate characteristics 4/2 → 5/3 (A/B → EA/EB) b	Flow rate characteristics 4/2 → 5/3 (A/B → EA/EB) Cv	Power consumption (W)
VFN2000N	4.57	0.17	1.06	1.8

Solenoid Valves

NAMUR Interface 3/5 Port Solenoid Valve IP67 Compliant, Hygienic Design Type **VFN2120N-X23/-X36**

▶ P.199



- Hygienic design is adopted. Resin body with less concaves. Direct cleaning of valve is possible. (IP67)
- 3 port/5 port available. Function plate realized 3/5 port selectable.
- Low power consumption
Power consumption: 0.5 W
- Port thread: NPT1/4, G1/4 available

Series	Flow rate characteristics (Cv/Effective area)	Manual override	Type of coil insulation	Power consumption (W)
VFN2120N-X23/-X36	0.8/11 mm ²	Push type Locking type (tool required) Locking type (manual type)	Class B	0.5

Piping Materials

Double-layered Tubing for Instrumentation Device (Single-tubed/Double-tubed) **IN-241, T-X120/121/166**

▶ P.205



- Double-layered tubing with an external layer of vinyl chloride or polyolefin to protect the inner tubing
- Inner tubing color: "Black" or "Black + White"

Series	Tube size O.D. (øD) x I.D. (ød)	Fluid
IN-241, T-X120/121/166	ø6 x ø4 ø8 x ø6 ø10 x ø7.5	Air

Reinforced Corrugated Cardboard Specification/ Longer Length Reel: Nylon Tubing **T0604-X64**

▶ P.207



- Length per roll: 500/250 m
- For general pneumatic tubing
- Nylon tubing

Series	Tube size O.D. (øD) x I.D. (ød)	Fluid
T0604-X64	ø6 x ø4	Air, Water

Reinforced Corrugated Cardboard Specification/ Longer Length Reel: FEP Tubing (Fluoropolymer) **TH0604-X64**

▶ P.208

- Length per roll: 500/250 m
- Operating temperature: 200°C
- Compatible with the Food Sanitation Law.

Series	Tube size O.D. (øD) x I.D. (ød)	Fluid
TH0604-X64	ø6 x ø4	Air, Water, Inert gas

Hydraulic Cylinders

Compact Hydraulic Cylinder **CHQ/CHDQ**

P.241



- Lightweight, compact aluminum body
- Possible to mount auto switches.
- Same longitudinal dimensions for cylinders with/without auto switches
- With auto switch (CHQ series: CHDQ, CHDQW)

Series	Nominal pressure (MPa)	Body material	Action	Bore size (mm)
CHQ	3.5	Aluminum	Double acting, Single rod	20, 32, 40, 50, 63, 80, 100
CHQW	3.5	Aluminum	Double acting, Double rod	20, 32, 40, 50, 63, 80, 100

JIS Standard Compact Hydraulic Cylinder **CHK□/CHDK□**

P.263



- Lightweight, compact aluminum body
- Possible to mount auto switches.
- Same longitudinal dimensions for cylinders with/without auto switches
- Conforming to JIS Standard. (CHKD series)
- With auto switch (CHK□ series: CHDKD, CHDKG)

Series	Nominal pressure (MPa)	Body material	Action	Bore size (mm)
CHKD	10	Aluminum	Double acting, Single rod	20, 25, 32, 40, 50, 63, 80, 100
CHKG	16	Aluminum	Double acting, Single rod	20, 25, 32, 40, 50, 63, 80, 100

Small Bore Hydraulic Cylinder **CHN**

P.295



- 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 (MPa)	Tube material	Action	Bore size (mm)
CHN	7	Stainless steel	Double acting, Single rod	20, 25, 32, 40

Round Type Hydraulic Cylinder **CHM/CHDM**

P.315



- Lightweight with an aluminum tube and cover
- With auto switch (CHM series: CHDM)

Series	Nominal pressure (MPa)	Tube material	Action	Bore size (mm)
CHM	3.5	Aluminum	Double acting, Single rod	20, 25, 32, 40

ISO Standard Hydraulic Cylinder **CHS□/CHDS□**

P.331



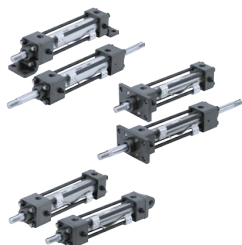
- Cylinder with built-in cover and mounting bracket allows easy disassembly and assembly.
- Compact section dimension of the cover compared to tie-rod cylinders
- Reduced overall length (Compared to the CH2 series)
- With auto switch (CHS□ series: CHDSD, CHDSG)

Series	Nominal pressure (MPa)	Tube material	Action	Bore size (mm)
CHSD	10	Stainless steel	Double acting, Single rod	40, 50, 63, 80, 100
CHSG	16	Stainless steel	Double acting, Single rod	32, 40, 50, 63, 80, 100

Hydraulic Cylinders

JIS Standard Hydraulic Cylinder CH2/CHD2

▶ P.357



- 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 (CH2 series: CHD2E, CHD2EW, CHD2F, CHD2FW, CHD2G, CHD2H)

Series	Nominal pressure (MPa)	Tube material	Action	Bore size (mm)
CH2E	3.5	Aluminum	Double acting, Single rod	32, 40, 50, 63, 80, 100
CH2EW	3.5	Aluminum	Double acting, Double rod	32, 40, 50, 63, 80, 100
CH2F	7	Stainless steel	Double acting, Single rod	32, 40, 50, 63, 80, 100
CH2FW	7	Stainless steel	Double acting, Double rod	32, 40, 50, 63, 80, 100
CH2G	14	Iron	Double acting, Single rod	32, 40, 50, 63, 80, 100
CH2H	14	Stainless steel	Double acting, Single rod	32, 40, 50, 63, 80, 100

Tie-rod Type Hydraulic Cylinder CHA/CHDA

▶ P.395



- With auto switch (CHA series: CHDA, CHDAW)

Series	Nominal pressure (MPa)	Tube material	Action	Bore size (mm)
CHA	3.5	Aluminum	Double acting, Single rod	40, 50, 63, 80, 100
CHAW	3.5	Aluminum	Double acting, Double rod	40, 50, 63, 80, 100
CHA□F	3.5	Iron	Double acting, Single rod	40, 50, 63, 80, 100, 125, 160
CHAW□F	3.5	Iron	Double acting, Double rod	40, 50, 63, 80, 100, 125, 160

Air-Hydro Booster CQ2

▶ P.425



- Converts air pressure to hydraulic pressure for high pressure hydraulic cylinder actuation.
- No hydraulic pump is required. High hydraulic pressure can easily be obtained.
- Application: For lifting work pieces, for automatic clamping devices, and 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 ³)
CQ2	100, 140, 160	3.5 to 14	17 to 105

Hydraulic Filters

Vertical Suction Filter FHIA

▶ P.498



- 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	Rated flow rate (L/min)	Operating pressure	Element (µm) (Nominal filtration)
FHIA	1/2B to 4B	30 to 1300	Negative pressure	Micromesh: 74, 105, 149

Suction Filter with Case FH99

▶ P.502



- 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	Rated flow rate (L/min)	Operating pressure	Element (µm) (Nominal filtration)
FH99	INLET: 1B to 4B	20 to 900	Negative pressure	Micromesh: 74, 105, 149

Suction Guard FHG

▶ P.506



- 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	Rated flow rate (L/min)	Operating pressure	Element (µm) (Nominal filtration)
FHG	1/2B to 3B	18 to 450	Negative pressure	Micromesh: 74, 105, 149

Line Filter FH

▶ P.510



- 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	Rated flow rate (L/min)	Operating pressure (MPa)	Element (µm) (Nominal filtration)
FH34	Threaded (Rc) 3/8 to 1 1/2 Flange SSA 15 (1/2B) to 80 (3B)	10 to 600	3.5, 7, 14, 21	Paper: 5, 10, 20
FH44		10 to 600	3.5, 7, 14, 21	
FH54		10 to 600	3.5, 7, 14, 21	
FH64		10 to 600	3.5, 7, 14, 21	

Vertical Return Filter FHBA

▶ P.514



- 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 rate (L/min)	Element (µm) (Nominal filtration)
FHBA	3/4 to 1 1/2	150, 300, 400	Paper: 5, 10, 20 Micromesh: 5, 10, 20

Hydraulic Filters

Return Filter **FH100**

▶ P.517



- Easy maintenance
- Possible to detect clogging with the differential pressure indicator and differential pressure indication switch (CB-□□H).

Series	Port size (Rc)	Rated flow rate (L/min)	Element (μm) (Nominal filtration)
FH100	3/4 to 3	Paper: 50 to 600 Micromesh: 60 to 700	Paper: 5, 10, 20 Micromesh: 74, 105

Oil Filter **FH150**

▶ P.521



- 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 rate (L/min)	Element (μm) (Nominal filtration)
FH150	1/4 to 1/2	5 to 20	Paper: 5, 10, 20

Magnetic Separator **FHM**

▶ P.525



- 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

Water Cooled Oil Coolers

Fixed Pipe Type Oil Cooler: Water Cooled, Iron Particle Type **HOWF**

▶ P.534



- High heat transfer coefficient through the effects of turbulence
- Compact design requiring less installation space. 1/2 to 1/5 the size of current oil coolers
- Flexible installation orientation
- Minimal pressure drop

Series	Heat transfer area (Inside pipe)(m ²)	Heat exchange volume (kW)	Flow rate (L/min) Oil side	Flow rate (L/min) Cooling water side
HOWF	0.077 to 1.28	5.2 to 73	20 to 800	40 to 125

Floating Pipe Type Oil Cooler: Water Cooled, Copper Particle Type **HOW**

▶ P.539



- High heat conductivity
- Compact design requiring less installation space. 1/2 to 1/5 the size of current oil coolers
- High heat exchange effectiveness due to turbulence
- Minimal pressure drop

Series	Heat transfer area (Inside pipe)(m ²)	Heat exchange volume (kW)	Flow rate (L/min) Oil side	Flow rate (L/min) Cooling water side
HOW	0.084 to 0.75	6 to 52	20 to 400	25 to 100

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