ABP

Air booster

Components for air preparation and pressure adjustment

Overview

Air booster ABP is a component that enables boosting by pneumatics only up to twice primary pressure (1.0MPa max.) in combination with using air tank but not using electricity. Energy and cost saving will be achieved in total manufacturing lines, since pressure can be increased at the required point in plant. Air tank and optional pressure gauge directly combined to air booster are also available.

Features

Boosting up to double ratio
Boosting ratio is adjusted within range of twice primary pressure (1.0MPa max.) by pressure adjustment knob, since boosted with compression by piston.

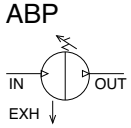
Flexible installation
This can be installed vertically due to flexible installation attitude. Pipe can be connected from 3 directions.

Tool not required pressure adjustment
Enabling pressure adjustment by single hand and lock by one push. Futhermore knob can be easily manually adjusted even for high pressure setting.

Compact
Longitudinal direction shortened compact shape.

CONTENTS

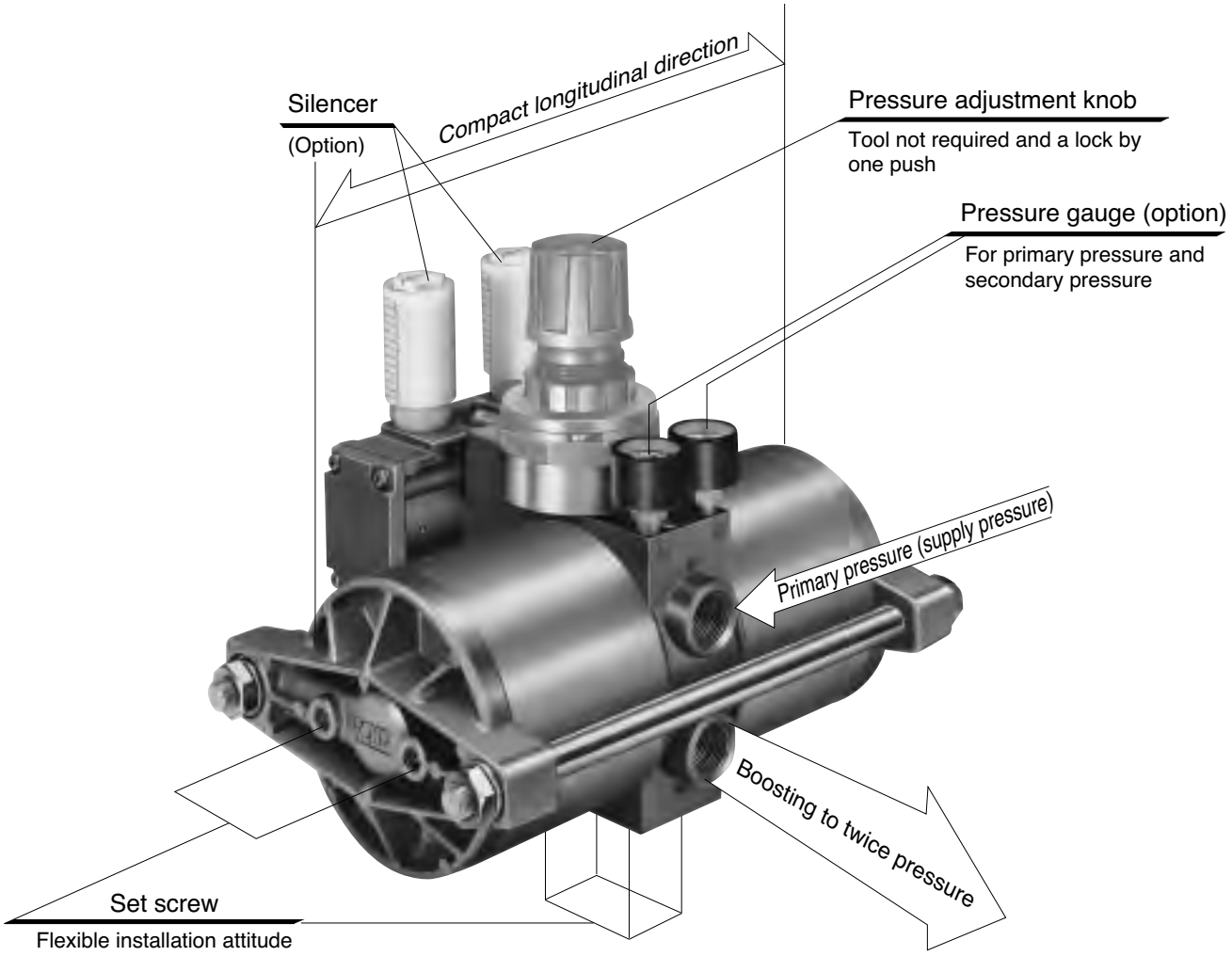
●: Standard, ◎: Option

Model	Model no. JIS symbol	OUT port position			Option			Page
		Same side of IN port	Bottom (Air tank directly connected)	Rear side of IN port	Pressure gauge	Silencer	Foot bracket	
		Blank	D	L	G	S	B	
Air booster	ABP 	●	●	●	◎	◎	◎	816

Double high compressed air is obtained.

Electroless air booster ABP

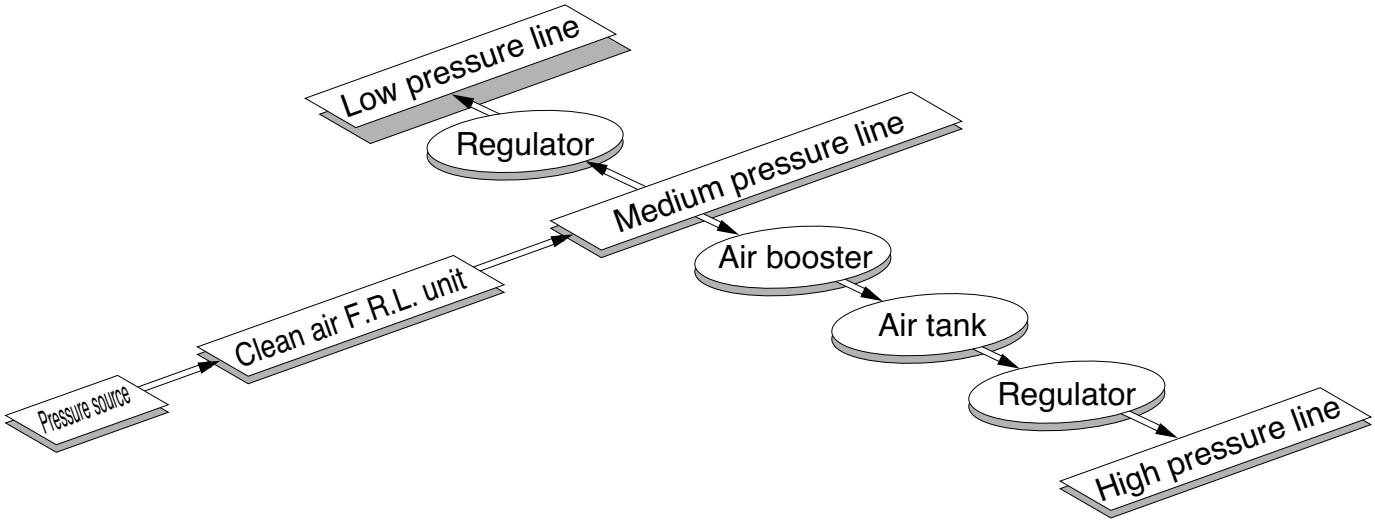
Produce high compressed air (1.0MPa max.) up to twice primary pressure (equivalent).



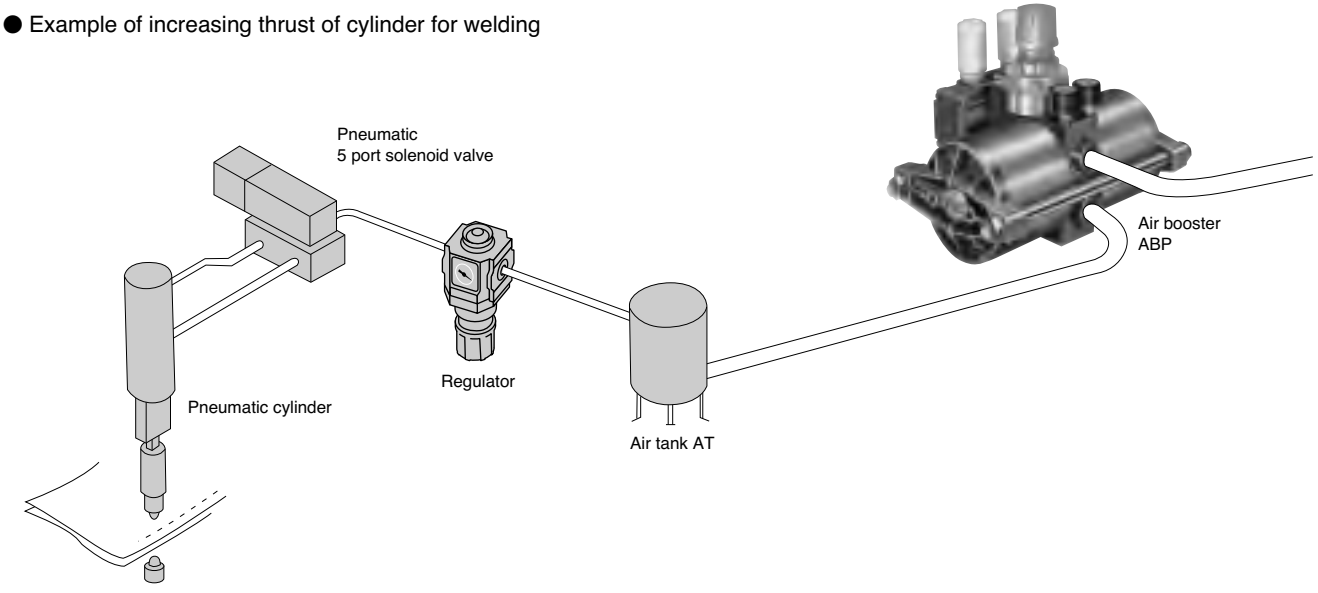
Compact design and flexible installation

⚠ Always read precautions on page 814 before starting use.

□Plant wide total cost reduction is achieved.



● Example of increasing thrust of cylinder for welding



● Other applications

1. Downsized air cylinder
2. Improving unsatisfied actuator (air cylinder, air motor etc.) output
3. High pressure and quick filling to air tank
4. Boosting in explosive environment
5. For pressure change (such as pressure decrease of line) of plant line

Safety precautions

Always read this section before starting use.
Refer to Intro 67 for general precautions.

Air booster ABP Series

Design & Selection

⚠ WARNING

■ Do not use the air booster for continuous operation such as in a compressor.

The air booster is designed for partial boosting in a factory, etc. Life is shortened if used for high frequency continuous operation, such as in a compressor. (The air booster's nominal life is approximately 5 million times when used under normal conditions)
Refer to page 817 for the estimate life calculation.

⚠ CAUTION

■ Do not use this product if vibration exceeds 50 m/s^2 or impact exceeds 300 m/s^2.

■ Pressure is raised by air pressure, so half of the air is discharged during boosting.

If the secondary side flow rate must be 1, the primary side requires a flow rate of 1 + 1 = 2.

■ The inside is cylindrical, so noise of 60 to 80 dB (primary side 0.49 MPa and secondary side 0.95 MPa for measurement of 1 m) is generated during boosting.

* This is noise when a silencer is used.

Installation & Adjustment

⚠ WARNING

■ Do not supply pressure exceeding 0.99 MPa onto the primary side.

■ Check that set pressure does not exceed 0.99 MPa.

⚠ CAUTION

■ Install a filter on the primary side to remove rust, foreign matter, and drainage. The air booster compresses compressed air so drainage is discharged easily from the secondary side. Installation of a filter is recommended to remove any moisture from piping.

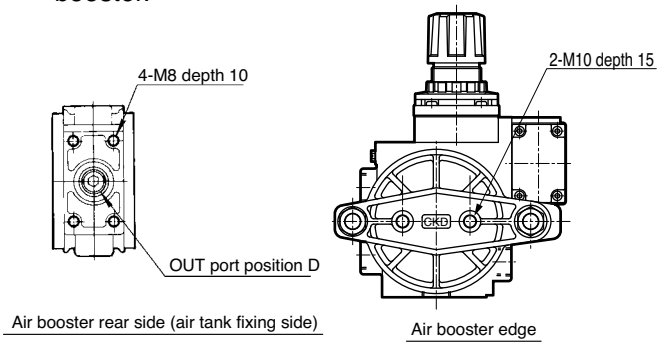
■ Install primary side piping at 1/2B and over to attain sufficient flow.

■ Install a silencer (SLW-15A, SL-15) or exhaust cleaner (FA430-15A) on the exhaust port of the air booster. When using exhaust cleaner, common porting of the exhaust port is recommended.

■ Use piping with a stop valve to the air tank's drain port.
Regularly discharge from the tank.

■ There are no set regulations regarding the air booster's installation angle, it should optimally be horizontally installed on a flat surface.

■ Install the air booster using 4-M8 depth 10 screw holes on the bottom or 2-M10 depth 15 screw holes on both sides.
Use these screw holes only for installing the air booster.



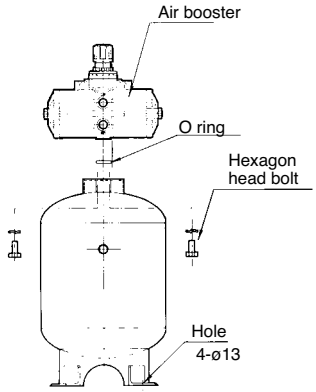
■ The bolt used to install the air booster must not exceed the screw hole depth.

Forcibly tightening a long bolt could damage the screw hole and cause air leakage.

■ A foot bracket installed on both ends is available as an option.
(Model no. ABP-12-B)

■ Fix the air tank with the 4- ø13 anchor bolt hole on the bottom.

■ When directly connecting the air booster to the air tank (AT-24), use OUT port position D, and mount the O ring enclosed with the air tank on the air booster. Then, fix to the top of the air tank with a hexagon head bolt.



■ Installation of an air tank and regulator after the air booster is recommended for attaining stable secondary pressure.

During Use & Maintenance

⚠ WARNING

■ Stop primary pressure and release secondary pressure before maintenance, inspecting, or repairing the air booster.

⚠ CAUTION

■ When setting pressure, lift the pressure adjustment knob to release the lock, and then the pressure adjustment knob.

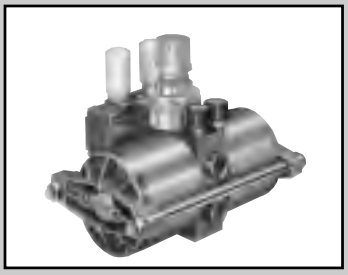
Secondary pressure increases when the pressure adjustment knob is turned clockwise. Pressure adjustment knob must be locked after using.

■ If primary pressure exceeds set pressure due to fluctuation in pressure, etc., air is released from the pressure adjustment knob.

Set a regulator on the primary side, and adjust the pressure at least 0.1MPa lower from the set pressure.

■ The silencer and pressure gauge are consumables and must be regularly replaced.

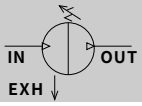
*Refer to the separate Maintenance Manual (ST-130606) for the maintenance procedures.



Air booster

ABP Series

JIS symbol



RoHS

Functional explanation

- Primary pressure flowed from IN passes through check valve on IN side, and flows in booster chamber A and B. Primary pressure also passes through pressure adjustment section and switching valve, and flows in drive room A. Piston moves to left hand due to pressure of drive room A. Air in booster chamber A is compressed, and passes through check valve on OUT side, and goes to OUT side.
- If piston reaches stroke end, changeover switch is pushed, and compressed air is supplied to pilot room of switching valve, and switching valve is switched. Then the air in drive room A is exhausted, and the air is delivered to drive room B.
- Therefore, piston moves to right hand and air in booster chamber B is compressed, and passes through check valve on OUT side, and goes to OUT side.
- Boosting on OUT side is compressed, if operations above are repeated. Feedback pressure is transmitted to pressure adjustment section due to OUT side pressure passes through shuttle valve, and boosting is continued until pressure adjustment spring and pressure is balanced.

Specifications

Descriptions	ABP
Working fluid	Compressed air
Max. working pressure MPa	0.99
Min. working pressure MPa	0.2
Set pressure range MPa	From primary pressure+0.1MPa to twice primary pressure (0.99MPa max.)
Withstanding pressure MPa	1.5
Flow m^3/min. (ANR)	Refer to the right graph rate flow characteristics
Boosting ratio	Max. double pressure (or equivalent)
Ambient temperature range °C	0 to 50 (no freezing)
Lubrication	Not required (use the turbine oil Class 1ISO VG32 if lubricated)
Port size	Rc1/2
Weight kg	4.6
Product sevice life	5 million (nominal)

How to order

ABP - 12 D - G

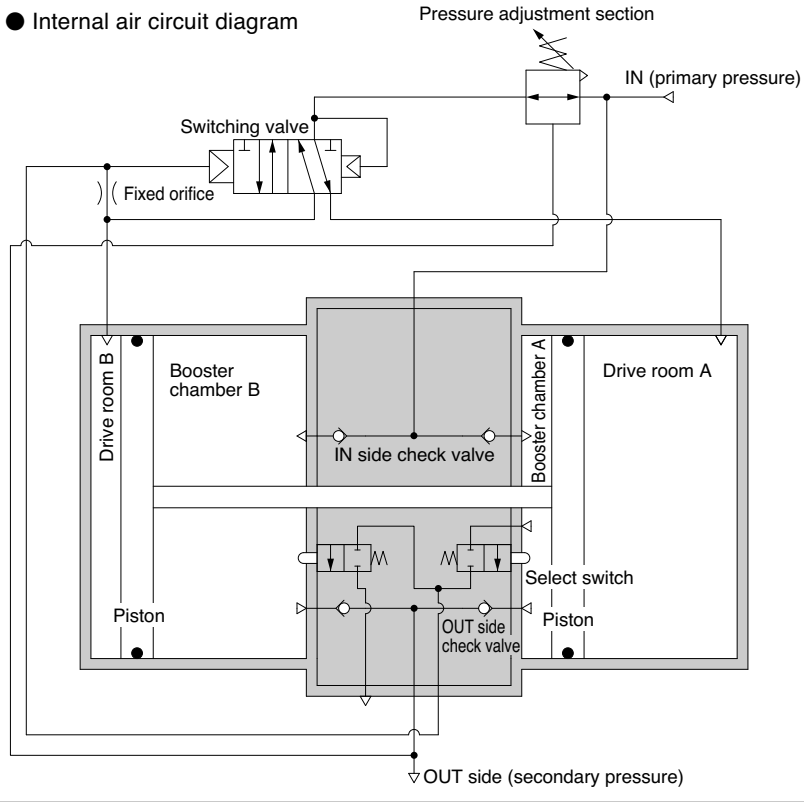
Air booster

Ⓐ OUT port position	
Blank	Same side of IN port
D	Bottom (air tank directly connected)
L	Rear side of IN port

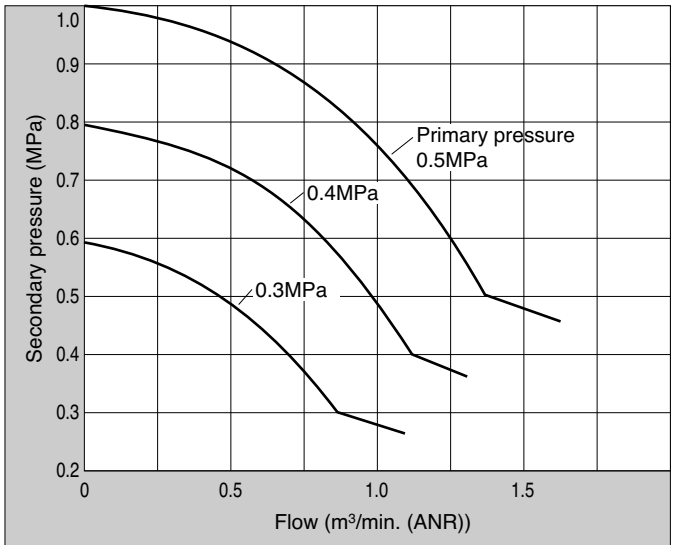
Ⓑ Option	
G	Pressure gauge
S	Silencer
B	Foot bracket

Note) Option G (pressure gauge) is installed onto air booster at shipment. B (foot bracket) and S (silencer) are attached.

● Internal air circuit diagram

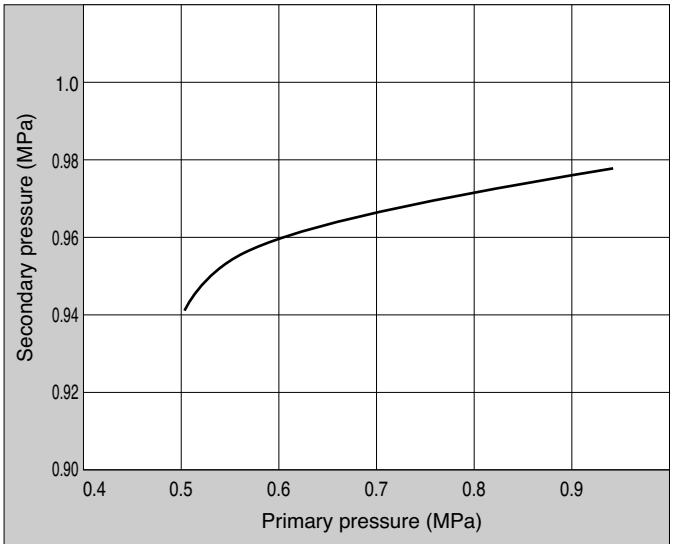


Flow characteristics (With air tank AT-24 installed, double pressure increase)



Flow rate characteristics show max. flow rate of air booster.
If primary pressure is constant and secondary side flow rate is increased, max. secondary pressure decreases.

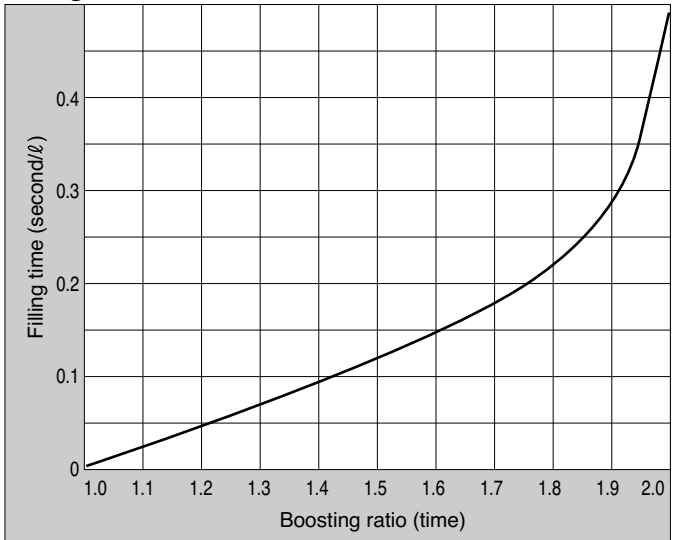
Pressure characteristics (Setting: Primary pressure 0.69MPa, secondary pressure 0.97MPa, flow rate 0.02m³/min.ANR)



Pressure characteristics show variation of set secondary pressure according to primary pressure variation.
If primary pressure is decreases, secondary pressure decreases slightly.

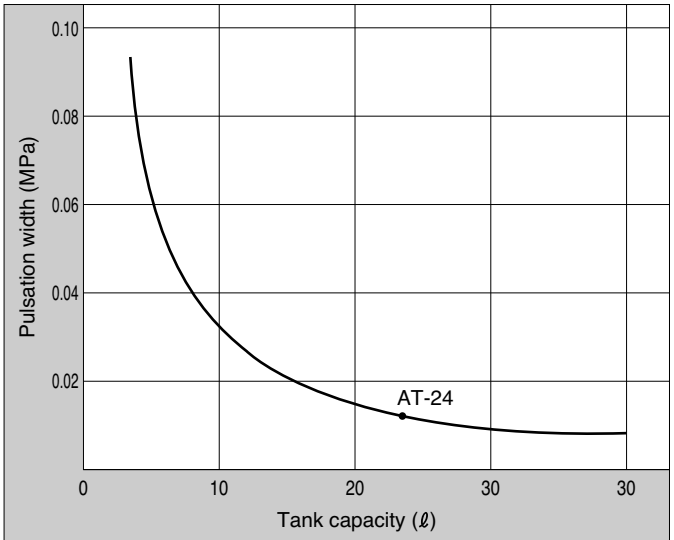
Note) Air booster needs approx. twice secondary side flow rate (max.) for primary side due to structure.
Confirm that the instantaneous flow rate is within the curve.

Filling characteristics



Filling characteristics show relations between boosting ratio and filling time, if tank etc. filled with compressed air.

Pulsation



Pulsation shows width of pulsation if air tank is installed onto secondary side of air booster.

To find filling time, when filling tank with air, where secondary side air pressure P_0, air pressure in tank before filling P_1, air pressure after filling P_2, boosting ratio before filling k_1 and boosting ratio after filling k_2, therefore $k_1 = \frac{P1}{P0}$ and $k_2 = \frac{P2}{P0}$ are led. Find k_1 and k_2 at first, then read filling time t_1 and t_2 according to graph where boosting ratio k_1, k_2, finally filling time for tank capacity A (ℓ) is obtained with $t = (t_2-t_1)$ A.

Formula of air booster operational cycle

$$N = \frac{Q \times 10^3}{7.55P+0.76}$$

N : Operational cycle
Q : Required flow (m³/min.(ANR))
P : Primary pressure (MPa)

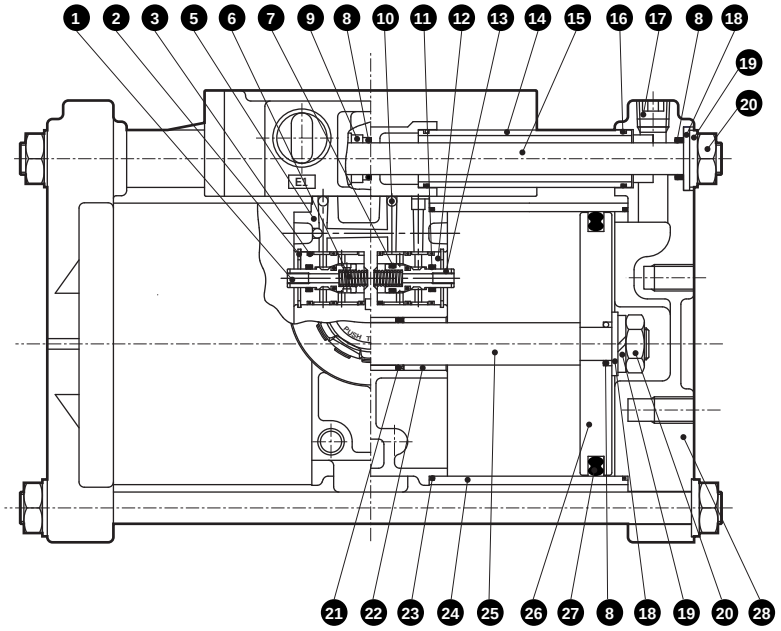
Formulation of air booster service life
Since nomin.al service life of operational cycle is 5 million

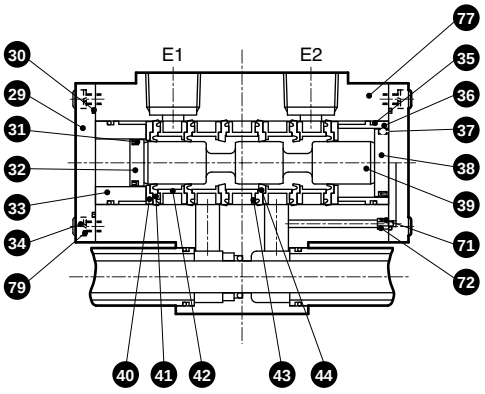
$$T = \frac{5{,}000{,}000}{N \times 60}$$

T : Service life (hour)

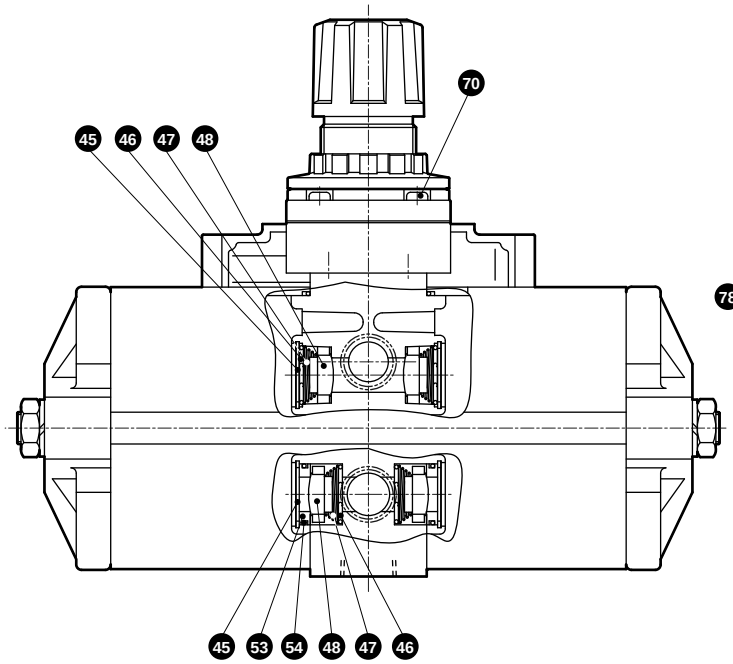
Each characteristics are just reference, but not assured conditions.

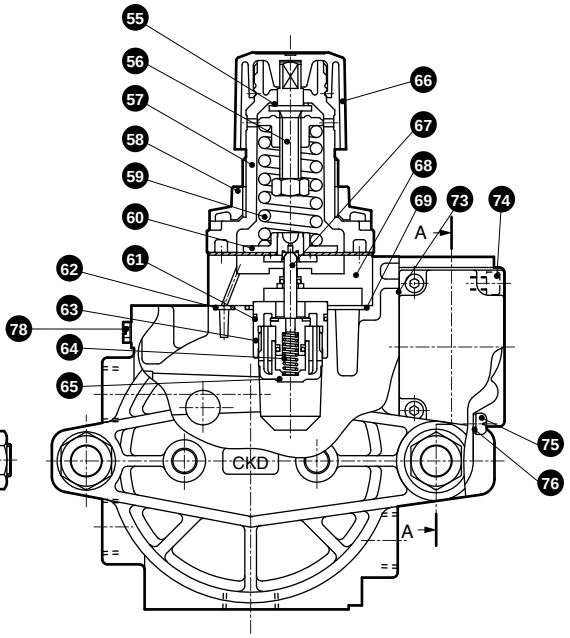
Internal structure





A-A cross section





Part list

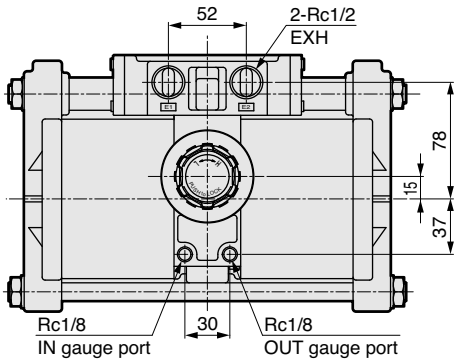
No.	Parts name	Material	Quantity	No.	Parts name	Material	Quantity
1	Valve stem (A)	Stainless steel	1	41	Soft packing seal	Urethane rubber	4
2	C type snap ring for hole	Stainless steel	2	42	Spacer	Aluminum alloy	4
3	O ring	Nitrile rubber	5	43	Spacer	Polyacetal resin	1
5	Body block assembly	Aluminum alloy	1	44	Soft packing seal	Urethane rubber	2
6	Spring	Stainless steel	2	45	C type snap ring for hole	Stainless steel	4
7	O ring	Nitrile rubber	1	46	Spring sheet	Stainless steel	4
8	O ring	Nitrile rubber	5	47	Spring	Stainless steel	4
9	Spacer	Stainless steel	1	48	Check valve	Nitrile rubber	4
10	Steel ball	Steel	3	53	Valve seat	Aluminum alloy	2
11	Packing seal	Nitrile rubber	2	54	O ring	Nitrile rubber	1
12	Detection valve body	Copper alloy	2	55	Slip ring	Polyacetal resin	4
13	Valve stem (B)	Stainless steel	1	56	Adjusting assembly		1
14	Pipe	Stainless steel	2	57	Guard	PBT resin	1
15	Tie rod	Steel	2	58	Mounting nut	Polyacetal resin	1
16	O ring	Nitrile rubber	4	59	Adjusting spring	Steel	1
17	Plug with hexagon head hole	Stainless steel	2	60	Diaphragm assembly		1
18	Plain washer	Steel	4	61	O ring	Nitrile rubber	1
19	Spring washer	Steel	6	62	O ring	Nitrile rubber	1
20	Hexagon nut	Steel	6	63	Valve seat	Copper alloy	1
21	MY packing seal	Nitrile rubber	2	64	Bottom spring	Stainless steel	1
22	Rod bushing	Oil impregnated bearing alloy	3	65	Stud	Polyacetal resin	1
23	O ring	Nitrile rubber	4	66	Knob	Polyacetal resin	1
24	Cylinder tube	Aluminum alloy	2	67	Valve assembly		1
25	Piston rod	Steel	1	68	Regulator assembly		1
26	Piston	Aluminum alloy	2	69	O ring	Nitrile rubber	1
27	Piston packing seal	Nitrile rubber	2	70	Cross-recessed tapping screw	Steel	4
28	Head cover	Aluminum alloy	2	71	Fixed orifice	Copper alloy	1
29	Cap	Aluminum alloy	2	72	O ring	Nitrile rubber	1
30	Gasket	Nitrile rubber	2	73	Master valve gasket	Nitrile rubber	1
31	Lip packing seal	Nitrile rubber	1	74	Hexagon socket head cap bolt	Steel	2
32	Piston	Polyacetal resin	1	75	Cross headed pan	Steel	1
33	Cylinder	Aluminum alloy	1	76	Gasket	Nitrile rubber	1
34	Hexagon socket head cap bolt	Steel	8	77	Valve	Aluminum alloy	1
35	O ring	Nitrile rubber	2	78	Plug	Copper alloy	1
36	Cylinder	Aluminum alloy	1	79	Spring washer	Steel	8
37	Lip packing seal	Nitrile rubber	1				
38	Piston	Polyacetal resin	1				
39	Spool	Aluminum alloy	1				
40	Stopper	Polyacetal resin	2				

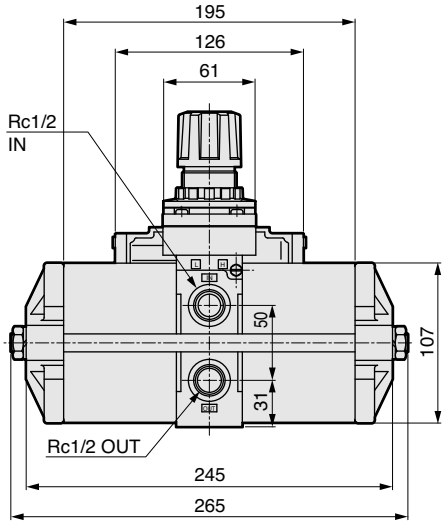
Discrete consumable parts and options

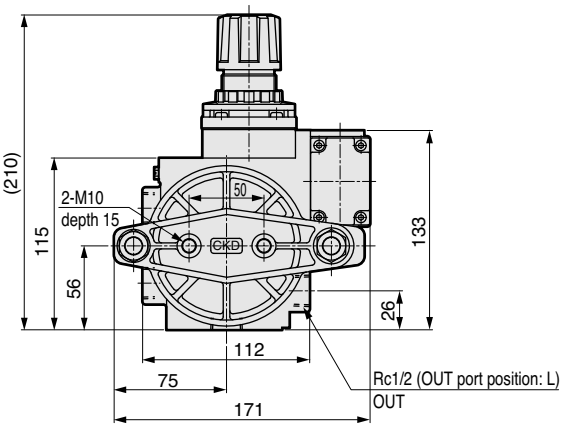
Parts name	Model no.	Part number	Remarks
Select switch packing set	ABP-K1	❶ ×1, ❸ ×5, ❻ ×2, ⓫ ×2, ⓬ ×2, ⓭ ×1	
Cylinder section packing seal set	ABP-K2	❽ ×5, ⓰ ×4, ㉑ ×2, ㉓ ×4, ㉗ ×2	
Switching valve piston assembly	ABP-K3	㉛ ×1, ㉜ ×1, ㉗ ×1, ㉘ ×1	
Switching valve sealant assembly	ABP-K4	㊵ ×2, ㊶ ×4, ㊷ ×4, ㊸ ×1, ㊹ ×2	
Check valve shuttle valve assembly	ABP-K5	㊽ ×4, ㊿ ×1, ㊶ ×2, ㊸ ×2, ㊹ ×2	Using parts prior to minor changes
Diaphragm assembly	ABP-K6	㊿ ×1	
Pressure adjustment section valve assembly	ABP-K7	㊶ ×1, ㊷ ×1, ㊼ ×1, ㊾ ×1	
Check valve assembly	ABP-K8	㊽ ×4, ㊸ ×2, ㊹ ×2	
Bracket	ABP-B		For 1 unit
Pressure gauge	ABP-GAUGE		Pressure gauge 1 pc.
Silencer	SLW-15A		Silencer 1 pc.

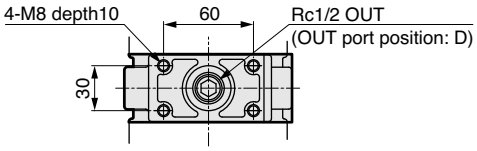
Dimensions

● ABP-12



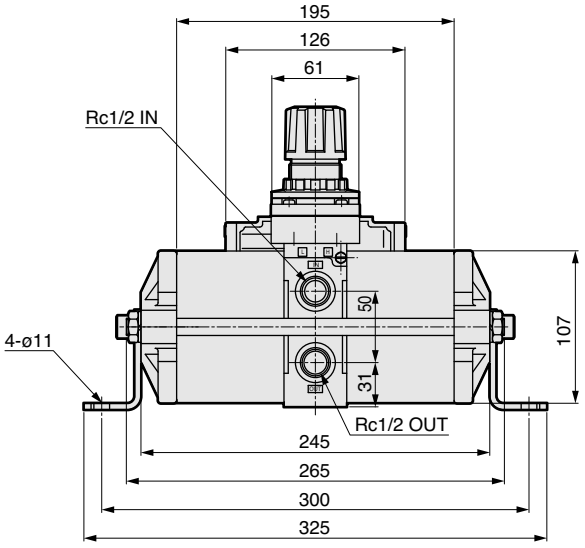


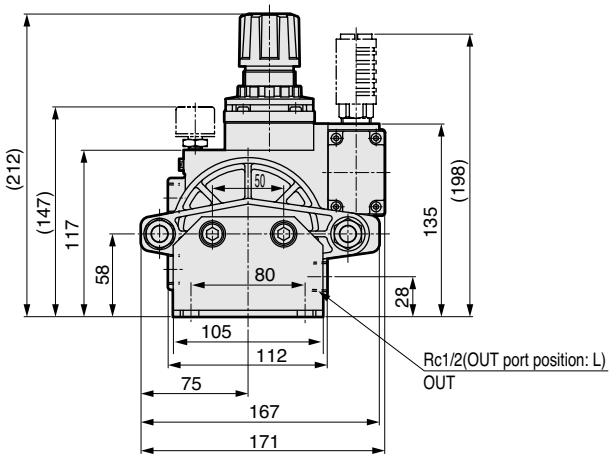




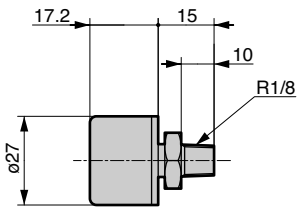
Optional dimensions

● ABracket (ABP-B) installation

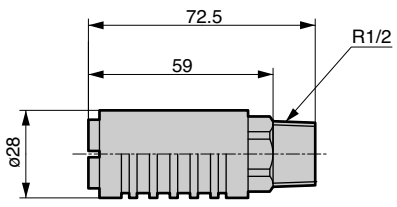




● APressure gauge (ABP-GAUGE)



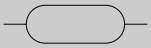
● ASilencer (SLW-15A)



Air tank (related products)

AT Series

JIS symbol



RoHS

Features

Air tank directly connected to air booster ABP-12 with compact body.

Specifications

Descriptions	AT
Working fluid	Compressed air
Max. working pressure MPa	0.99
Hydraulic test pressure MPa	1.5
Ambient temperature range °C	0 to 50 (no freezing)
Capacity m³	0.024
Port size	Rc1/2
Material	Steel
Weight kg	17.5

Note: O ring, hexagon head bolt and spring washer are attached to install air booster.

How to order

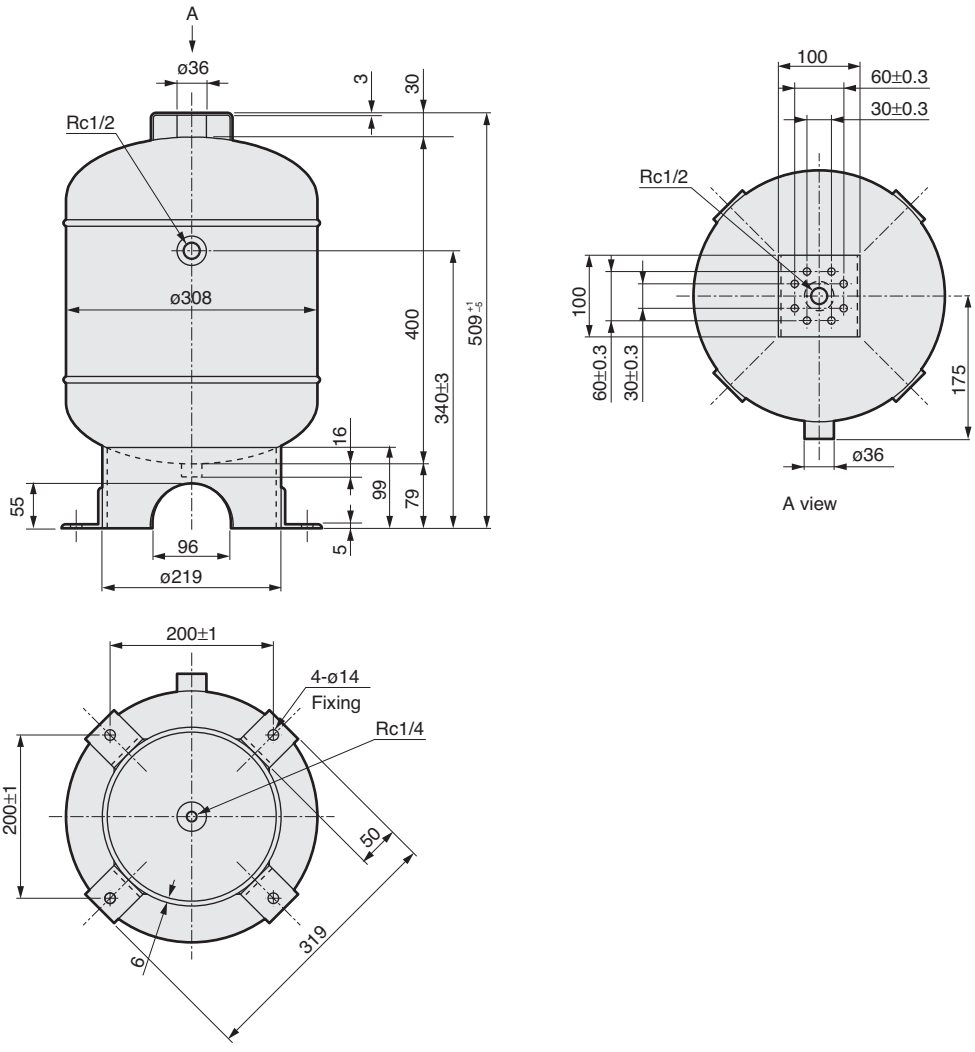
AT - 24

Air tank — Capacity

● Part model no.

AT-K1 (O ring, hexagon head bolt, spring washer)

Dimensions



Auxiliary valve
(Check valve / others)

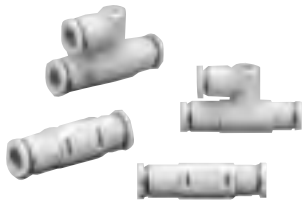
■ **Pneumatics auxiliary components**

CONTENTS

Series variation

Auxiliary valve

● Quick exhaust and circuit switching valves, etc. are available.

Model	Product appearance	Model no.	Port size (R, or Rc)											Page
			M5	ø4	ø6	1/8	1/4	3/8	1/2	3/4	1	11/4	11/2	
Quick exhaust valve with push-in joint		QEL-H44		●										894
		QEL-H66			●									
Quick exhaust valve		QEV2-6				●								896
		QEV2-8					●							
		QEV2-10						●						
		QEV2-15							●					
		QEV2-20								●				
		QEV2-25									●			
Shuttle valve		SHV2-6				●								900
		SHV2-8					●							
		SHV2-10						●						
		SHV2-15							●					
		SHV2-20								●				
		SHV2-25									●			
Compact check valve with push-in joint		CHL-M54	●											904
		CHL-H44		●										
		CHL-H66			●									
Check valve		CHV2-6				●								906
		CHV2-8-J					●							
		CHV2-8					●							
		CHV2-10-J						●						
		CHV2-10						●						
		CHV2-15							●					
		CHV2-20								●				
		CHV2-25									●			
		CHV2-32										●		
		CHV2-40											●	
Block valve		FPV-M5	●											908
		FPV-6A				●								
		FPV-8A					●							
		FPV-10A						●						
		FPV-15A							●					
Threshold sensor		PWS-B155	●											912
		PWS-B1882				●								
		PWS-B1992					●							
		PWS-B1332						●						
		PWS-B1222							●					

Safety precautions

Always read this section before starting use.
Refer to Intro 67 for general precautions, and to "⚠Safety precautions" in this section for details on each series.

Design & Selection

⚠CAUTION

■ Use this product in accordance with the specifications range.
Consult with CKD when using the product for special applications.

- Use with exceeding the specifications range may result in insufficient performance, and safety can not be secured.
- This product could not use in special applications and environment.
  For example, use for special applications including nuclear energy, railway, aircraft, marine vessel, vehicle, medical equipment, equipment, or applications coming into contact with beverage or food, amusement equipment, emergency shutoff circuits, press machine, brake circuits, or for safeguard.

■ Confirm that the product will withstand the working environment.

- This product cannot be used in environments where functional obstacles could occur.
  Such environments include high temperatures, a chemical atmosphere, or where chemicals, vibration, moisture, water drip, or gas are present; or where ozone is generated.
- Do not use the product in the place that the product could directly contact with coolant or spatter, etc.,

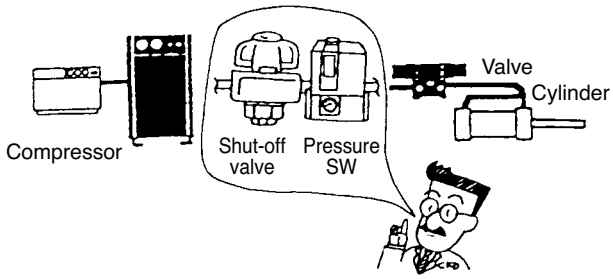
■ Understand compressed air features before designing a pneumatic circuit.

- The same functions as mechanical, hydraulic, and electrical methods cannot be anticipated if instantaneous service interruption and holding are required during an emergency stop.
- Pop-out, air discharge, or leakage due to air compression and expansion could occur.

■ This valve can not be used as a stop valve that has no leakage. Slight leakage is allowed in product specifications.

■ Install a "pressure switch" and "shut-off valve" on the device's compressed air supply side.

- The pressure switch will disable operation until set pressure is reached. The shut-off valve will exhaust compressed air in the pneumatic pressure circuit, and will prevent accidents caused by operation of pneumatic components by residual pressure.



■ Indicate the maintenance conditions in the device's instruction manual.

- The product's function can drop markedly with working status, working environment, and maintenance, and can prevent safety from being attained. With correct maintenance, the product functions can be used to the fullest.

■ Rubber parts deteriorate and life is shortened if ultra dry air is used.

Installation & Adjustment

Piping

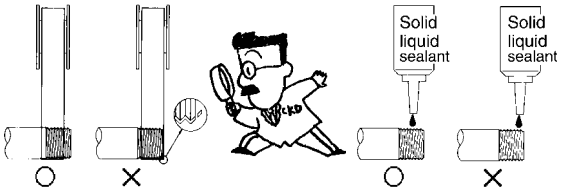
⚠CAUTION

■ Do not remove the package or seal cap on the piping port until just before piping the product.

- If the piping port cap is removed from the piping port before piping work is started, foreign matter could enter the pneumatic component from the piping port and result in faults or faulty operation.

■ When connecting pipes, wrap sealing tape in the opposite direction from threads starting 2 mm inside from the end of piping threads.

- If sealing tape protrudes from pipe threads, it could be cut when screwed in. This could cause the tape to enter the pneumatic components and lead to faults.



■ Handling push-in joints and tubes

- Refer to Cautions of joint and tube, and "Safety Precautions" (pages 918 to 921) for handling push-in joints and tubes.

■ Always flush just before piping pneumatic component.

- Any foreign matter that has entered during piping must be removed so it does not enter the pneumatic component.

■ When supplying compressed air for the first time after connecting pipes, do not apply high pressure suddenly.

- Piping connection could be dislocated or the piping tube fly off, leading to accidents.

■ After connecting piping, check pipe connections for air leaks before supplying compressed air.

- Apply a leakage detection agent on pipe connections with a brush, and check for air leaks.

■ Apply recommended tightening torque when connecting pipes.

- To prevent air leakage and screw damage.
- First tighten the screw by hand to prevent threads are not damaged, then use a tool.
- Do not tighten while pressure is applied.

(Recommended tightening torque)

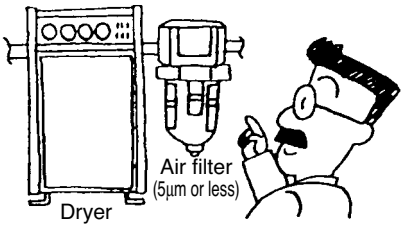
Port thread	Tightening torque N·m
M5	1.0 to 1.5
Rc1/8	3 to 5
Rc1/4	6 to 8
Rc3/8	13 to 15
Rc1/2	16 to 18
Rc3/4	19 to 40
Rc1	41 to 70
Rc1 1/4	43 to 75
Rc1 1/2	45 to 80

■ Connect piping so that connections are not dislocated by system movement, vibration, or tension.

- Control of actuator speed will be disabled if piping on the exhaust side of the pneumatic circuit is disengaged.
- When using the chuck holding mechanism, the chuck will be released creating a hazardous state.

■ Ensure spaces around the pneumatic component for installation, removal, wiring, and piping work.

■ Install an air filter just before the pneumatic component in the circuit.



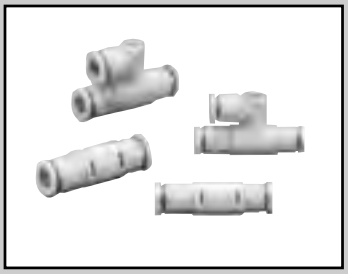
- Observe the following precautions when using nylon tubes or urethane tubes for piping material.
  Use recommended tube and CKD plastic plug (GWP Series). Do not use metal plugs.
  Tube outer diameter precision
  - Polyamide tube : Within ±0.1mm
  - Polyurethane tube (up to ø6): Within ±0.1mm
    (up to ø8): Within $^{+0.1}_{-0.15}$ mm

  Use a tube with a hardness of 92° or more. If a tube that does not satisfy diameter accuracy or hardness is used, chucking force may drop or the tube may come off or be difficult to insert. Consult with CKD when using a nondesignated tube or plug.
  - Cut the tube with a dedicated cutter, and cut at a right angle.
  - Do not use a worn or damaged tube. That could be crushed or rupture.
  - Do not reuse a tube that could be deteriorated and deformed.
  - Do not let the tube directly contact other surfaces, it could wear and break.
- Do not use this product for applications that constantly rotate, vibrate or which have a tube that moves vigorously.
- Use tubing that is within the minimum bending radius but long enough to avoid sharp bends.
  - Consider changes in tubing length caused by pressure when tubing is connected, and provide sufficient length within the minimum tube bending radius.
- Make sure that the joint and tube are not twisted or pulled, and that moment load is not applied.
- Do not tighten while pressure is applied.

During Use & Maintenance

⚠WARNING

■ Stop air and confirm that there is no residual pressure before replacing the tube.

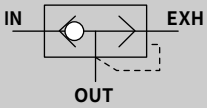


Quick exhaust valve with push-in joint

QEL Series

● Port size: ø4, ø6

JIS symbol



RoHS

Features

● Compact, space saving inline type
ø4 or ø6 push-in joint built-in
Release to air type and type with exhaust port joint available

● Standard ozone-resistant materials
Ozone-proof materials for degradation prevention are used as a standard for the check packing.

● Environment compatible products
With this RoHS Directive compatible product, all substances which adversely affect the global environment have been eliminated from the materials.

Specifications

Model no. / Descriptions			QEL-H44	QEL-H44-S	QEL-H66	QEL-H66-S
Working fluid			Compressed air			
Max. working pressure		MPa	0.7			
Min. working pressure		MPa	0.1			
Minimum working pressure		MPa	0.05			
Withstanding pressure (at room temperature)		MPa	1.35			
Ambient temperature range		°C	5 to 60 (no freezing)			
Port size	IN, OUT		ø4	ø4	ø6	ø6
	EXH		ø4	Released to air	ø6	Released to air
Product weight		g	5.2	3.3	7.6	4.9
Mounting attitude			Free			
Effective sectional area	IN→OUT	mm²	1.8	1.8	4	4
	OUT→EXH	mm²	1.8	1.8	4	4

How to order

QEL - H44 - S

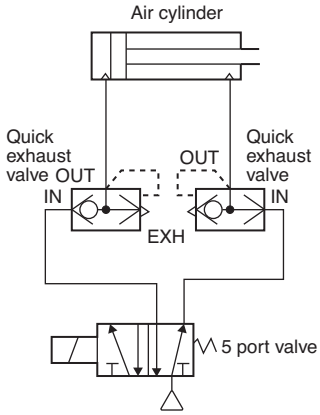
Model no.

Ⓐ Applicable tube outer diameter

Ⓑ Option

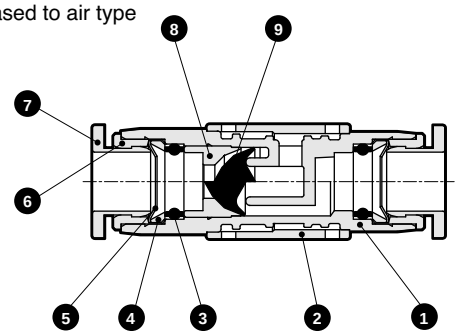
Symbol	Descriptions
Ⓐ Applicable tube outer diameter	
H44	ø4
H66	ø6
Ⓑ Option	
Blank	Type with exhaust port joint
S	Released to air type

Applications



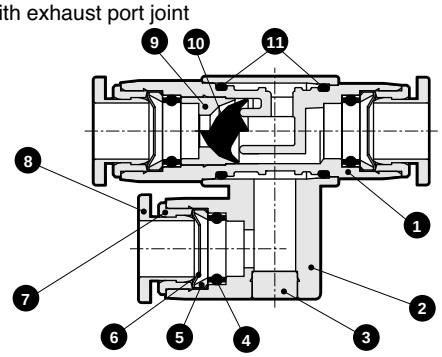
Internal structure and parts list

● Released to air type



No.	Parts name	Material
1	Resin body	PBT
2	Exhaust cover	PBT
3	Rubber sleeve	Nitrile rubber
4	Lock ring	Stainless steel
5	Lock jaw	Brass (with electroless nickeling)
6	Guide ring	Brass (with electroless nickeling)
7	Release ring	Acetal resin
8	Valving element stopper	Brass (with electroless nickeling)
9	Valving element	Hydrogen nitrile rubber

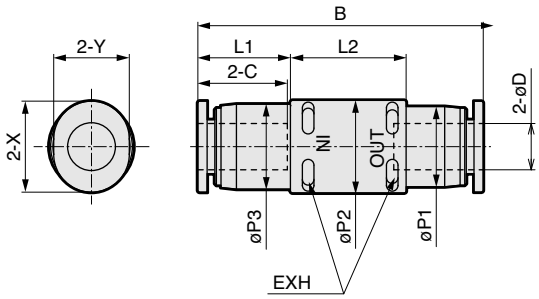
● Type with exhaust port joint



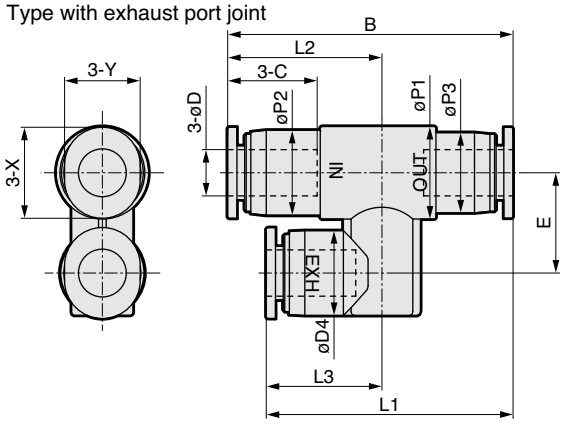
No.	Parts name	Material
1	Resin body	PBT
2	Exhaust joint body	PBT
3	Plug	Brass (with electroless nickeling)
4	Rubber sleeve	Nitrile rubber
5	Lock ring	Stainless steel
6	Lock jaw	Brass (with electroless nickeling)
7	Guide ring	Brass (with electroless nickeling)
8	Release ring	Acetal resin
9	Valving element stopper	Brass (with electroless nickeling)
10	Valving element	Hydrogen nitrile rubber
11	O ring	Nitrile rubber

Dimensions

● Released to air type



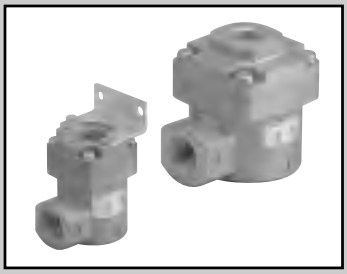
● Type with exhaust port joint



Symbol / Model no.	øD Tube outer diameter	B	L1	L2	L3	øP1	øP2	øP3	øP4	C	E	X	Y
QEL-H44	ø4	35.2	30.5	18.8	14.1	10	9	8.4	9	11.3	11	9.8	7.8
QEL-H66	ø6	37.4	32.4	20.2	15.2	12	11	10.4	11	11.8	13	11.8	9.8
QEL-H44-S	ø4	35.2	11.3	15	–	8.4	10	9	–	11.3	–	9.8	7.8
QEL-H66-S	ø6	37.4	12.2	15	–	10.4	12	11	–	11.8	–	11.8	9.8

Safety precautions

- Always use within the product specifications.
- This product is for compressed air. Avoid using with other fluids.
- Securely insert the tube to the tube end, and make sure that the tube cannot be pulled off.
- Always provide a differential pressure when using as a shuttle valve. The product could malfunction if there is no differential pressure.

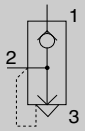


Quick exhaust valve

QEV2 Series

● Port size: Rc1/8 to Rc1

JIS symbol



RoHS CAD

Features

● Large flow rate design realizing outstanding exhaust

● Variety of bore sizes available

Series are available for piping bore sizes Rc1/8 to Rc1.

● Wide range of options

- Fluorine rubber specifications available as options
- Mounting bracket available (small bore)

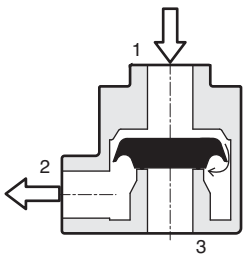
● Eco-friendly product

- Eco-friendly design is free of lead and hexavalent chrome.
- Paint-free
- Sorting is simplified.

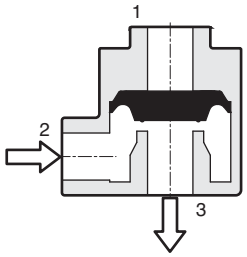
Specifications

Model no. / Descriptions		QEV2-6	QEV2-8	QEV2-10	QEV2-15	QEV2-20	QEV2-25
Working fluid		Compressed air					
Max. working pressure MPa		1.0					
Min. working pressure MPa		0.05					
Min. operating differential pressure MPa		0.05					
Withstanding pressure MPa		1.5					
Fluid temperature range °C		5 to 60					
Ambient temperature range °C		0 to 60 (no freezing)					
Port size	1, 2	1/8	1/4	3/8	1/2	3/4	1
Rc	3	1/4	1/4	1/2	1/2	1	1
Product weight g		80	78	250	250	710	660
Mounting attitude		Free					
Effective sectional area mm²	1 → 2	25	35	90	105	205	275
	2 → 3	30	40	100	115	280	330

Operational explanation



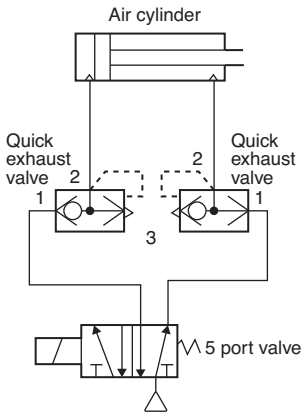
● 1 → 2
The valve closes port 3 with pressure from port 1. Air passes around the valve and flows to port 2.



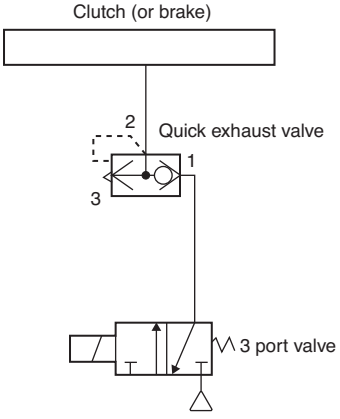
● 2 → 3
When port 1 pressure drops, the valve closes port 1, opens port 3, and exhausts port 2 air.

Applications

(1) Usage to increase exhaust speed of air cylinder.



(2) Usage to increase exhaust speed of clutch (or brake)



How to order

● Quick exhaust valve

QEV2 - 6 - A P

Model no.

Ⓐ Port size

Ⓑ Option

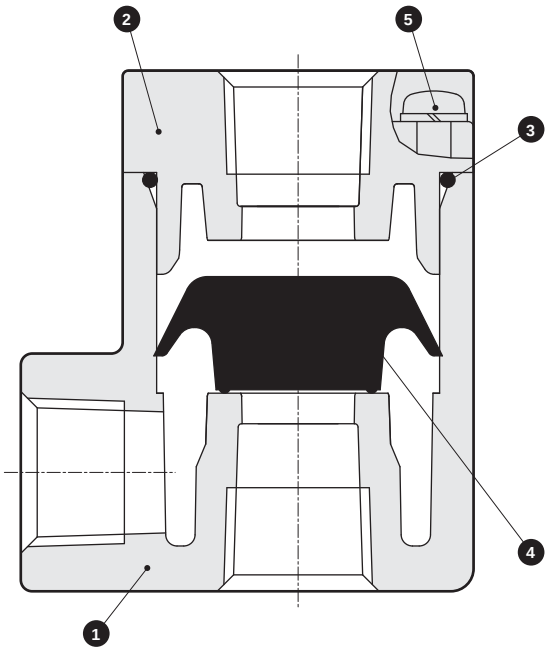
Ⓒ Accessory

Symbol	Descriptions
Ⓐ Port size	
6	Rc 1/8
8	Rc 1/4
10	Rc 3/8
15	Rc 1/2
20	Rc 3/4
25	Rc 1
Ⓑ Option	
Blank	No option
A	Fluoro rubber specifications
Ⓒ Accessory	
Blank	None
P	Mounting bracket attached

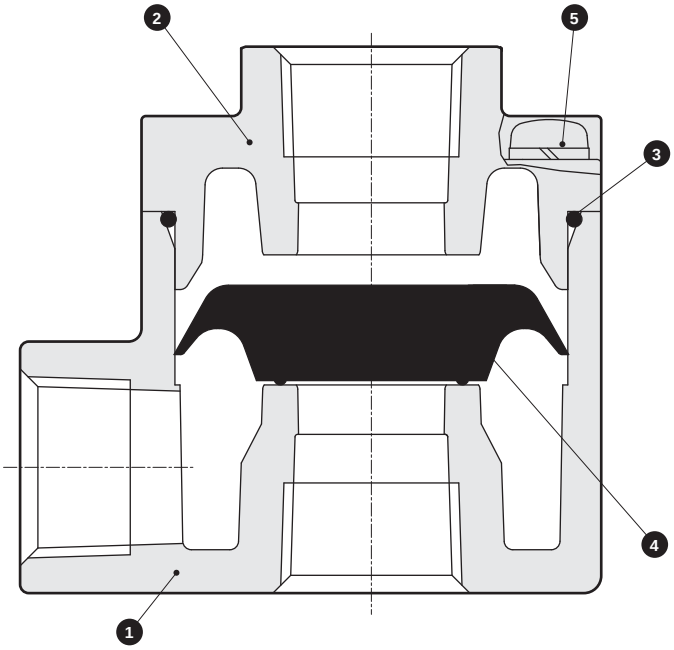
Note 1: The installation bracket is enclosed only with QEV2-6 and QEV2-8.

Internal structure and part list

● QEV2-6/8



● QEV2-10/15/20/25

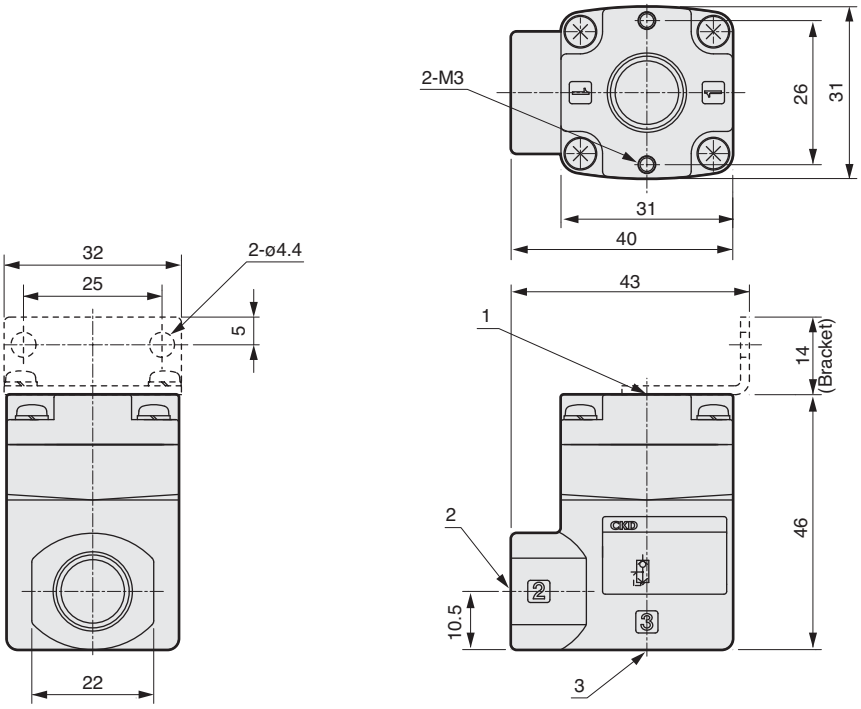


No.	Parts name	Material
1	Body	Aluminum alloy die-casting
2	Plug	Aluminum alloy die-casting
3	O ring	Nitrile rubber (fluoro rubber)
4	Valve	Hydrogen Nitrile rubber (fluoro rubber)
5	Cross headed pan head machine screw with SW	Stainless steel

* The material in ( ) is for option "A" (fluorin rubber specification) .

Dimensions CAD

● QEV2-6/8

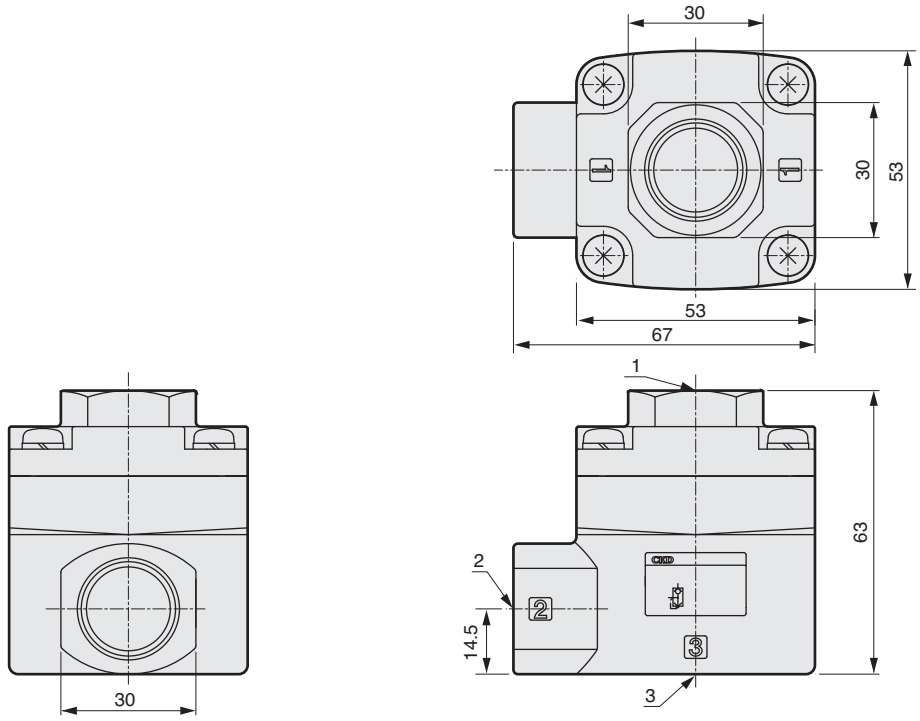


Model no.	Port position		
	1	2	3
QEV2-6	Rc 1/8		Rc 1/4
QEV2-8	Rc 1/4		

(Piping port indication)

Port symbol	Descriptions
1	IN (input)
2	OUT (output)
3	EXH (exhaust)

● QEV2-10/15



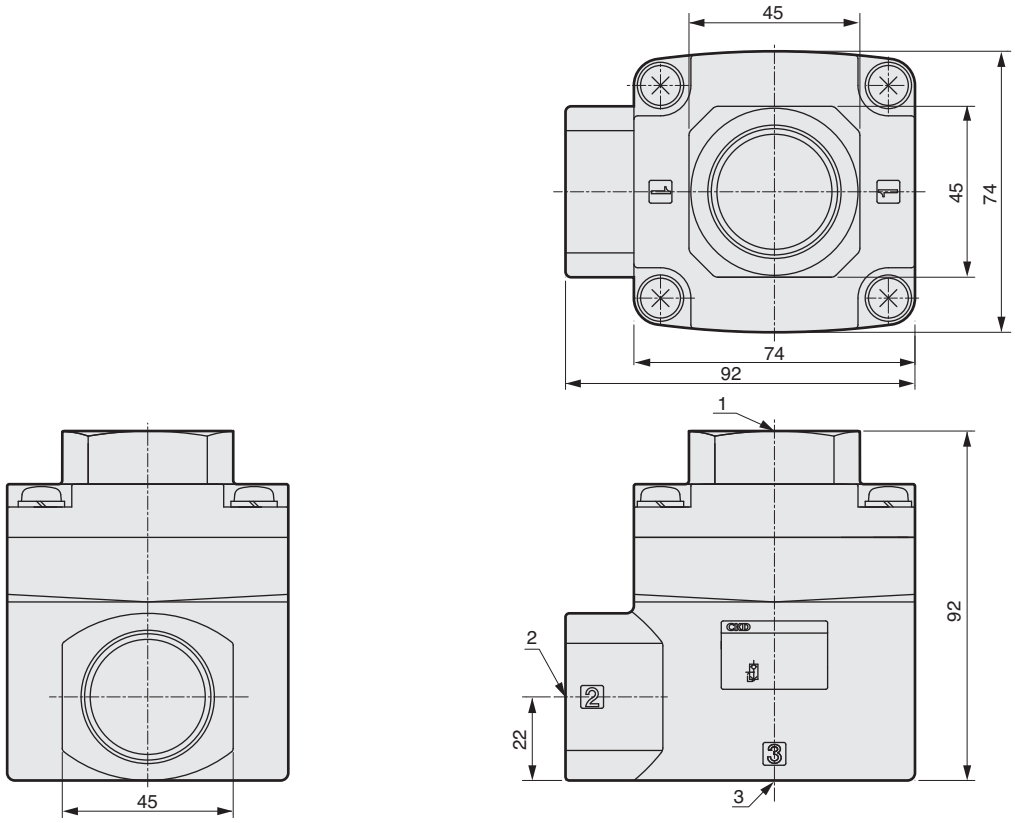
Model no.	Port position		
	1	2	3
QEV2-10	Rc 3/8		Rc 1/2
QEV2-15	Rc 1/2		

(Piping port indication)

Port symbol	Descriptions
1	IN (input)
2	OUT (output)
3	EXH (exhaust)

Dimensions

● QEV2-20/25



Model no.	Port position		
	1	2	3
QEV2-20	Rc 3/4		Rc 1
QEV2-25	Rc 1		

(Piping port indication)

Port symbol	Descriptions
1	IN (input)
2	OUT (output)
3	EXH (exhaust)

Safety precautions

■ Design & Selection

- This valve can not be used as a stop valve that has no leakage. Slight leakage is allowed in product specifications.
- In the following cases, vibration may cause malfunctions or abnormal noise:
  - When 1 (IN) port side piping is extremely thin and long or when the direction control valve's orifice is small, generating residual or back pressure on the port 1 side.
  - When differential pressure of (IN) port 1 and (OUT) port 2 is lower than minimum working pressure (0.05 MPa)

■ Installation & Adjustment

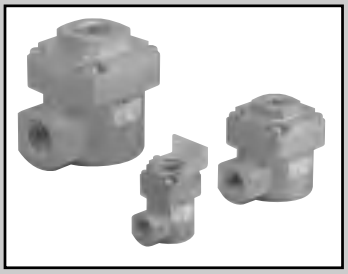
- Apply recommended tightening torque when connecting pipes.
  - To prevent air leakage or damage of screw.
  - First tighten the screw by hand to prevent threads, then use a tool.
  - Do not tighten while pressure is applied.
- Install an air filter just before the pneumatic component in the circuit.

(Recommended tightening torque)

	Tightening torque N·m
Rc 1/8	3 to 5
Rc 1/4	6 to 8
Rc 3/8	13 to 15
Rc 1/2	16 to 18
Rc 3/4	19 to 40
Rc 1	41 to 70

■ During Use & Maintenance

- Before replacing tubing, stop the air flow and confirm that no pressure remains.

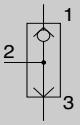


Shuttle valve

SHV2 Series

● Port size: Rc1/8 to Rc1

JIS symbol



RoHS CAD

Features

● Variety of bore sizes available

Series are available for piping bore sizes Rc1/8 to Rc1.

● Wide range of options

- Fluorine rubber specifications available as options
- Mounting bracket available (small bore)

● Eco-friendly product

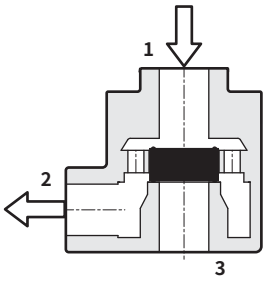
- Eco-friendly design is free of lead and hexavalent chrome.
- Paint-free
- Sorting is simplified.

Specifications

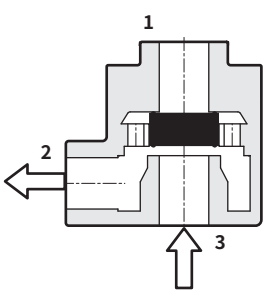
Model no. / Descriptions		SHV2-6	SHV2-8	SHV2-10	SHV2-15	SHV2-20	SHV2-25
Working fluid	MPa	Compressed air					
Max. working pressure	MPa	1.0					
Min. working pressure	MPa	0.05					
Min. operating differential pressure	MPa	0.05					
Withstanding pressure	°C	1.5					
Fluid temperature range	°C	5 to 60					
Ambient temperature range		0 to 60 (no freezing)					
Port size	Rc	1/8	1/4	3/8	1/2	3/4	1
Product weight	g	86	82	270	270	760	700
Mounting attitude		Free					
Effective sectional area	mm² 1 → 2	20	28	90	105	205	245
	mm² 3 → 2	22	32	95	115	210	250
Min. required flow *1	ℓ/min.	20	30	100		150	

*1: The valve may not change completely if the flow rate is less than this value.

Operational explanation



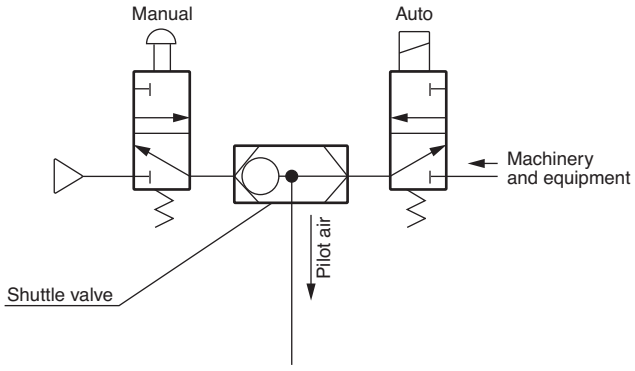
● 1 → 2
The valve closes port 3 with pressure from port 1. Air flows to port 2.



● 3 → 2
The valve closes port 1 with pressure from port 3. Air flows to port 2.

Applications

(1) Switching manual/auto



How to order

● Shuttle valve

SHV2 - 6 - A P

Model no.

Ⓐ Port size

Ⓑ Option

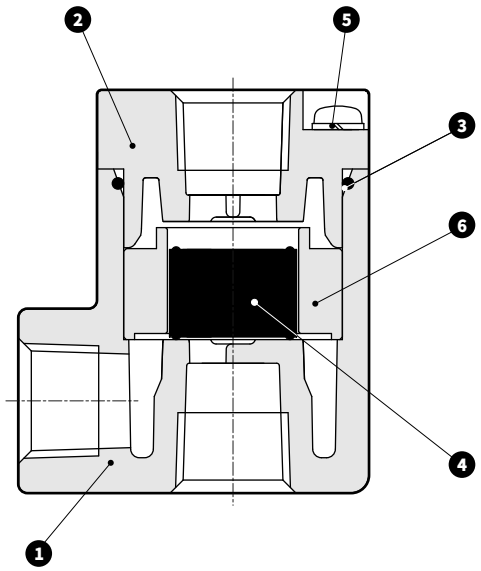
Ⓒ Accessory

Symbol	Descriptions
Ⓐ Port size	
6	Rc 1/8
8	Rc 1/4
10	Rc 3/8
15	Rc 1/2
20	Rc 3/4
25	Rc 1
Ⓑ Option	
Blank	No option
A	Fluoro rubber specifications
Ⓒ Accessory	
Blank	None
P	Mounting bracket attached

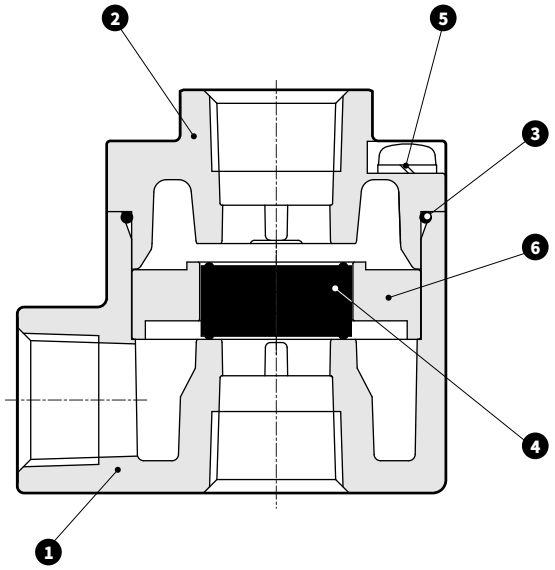
Note 1: The installation bracket is enclosed only with SHV2-6 and SHV2-8.

Internal structure and part list

● SHV2-6/8



● SHV2-10/15/20/25

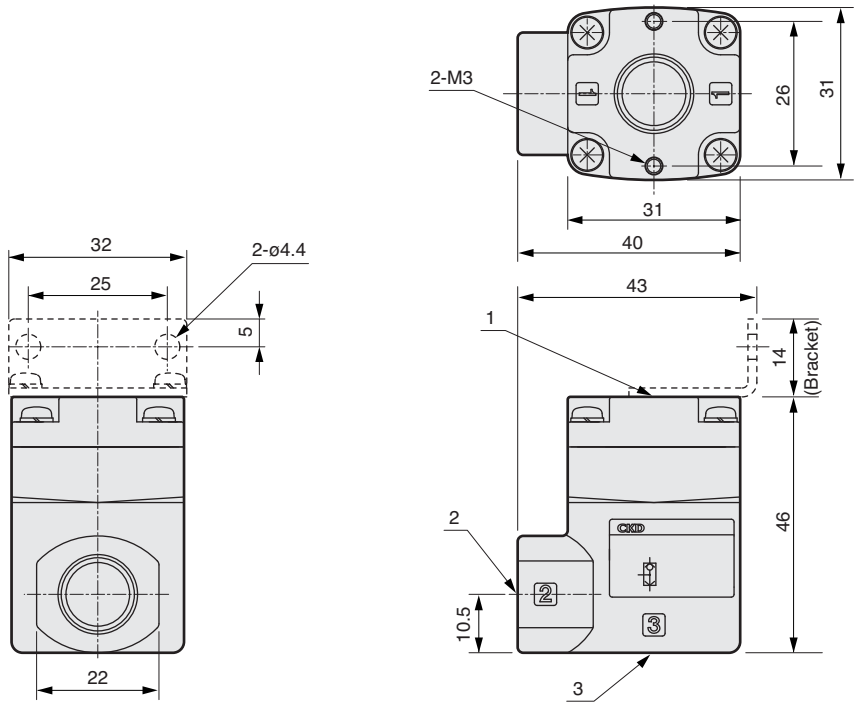


No.	Parts name	Material
1	Body	Aluminum alloy die-casting
2	Plug	Aluminum alloy die-casting
3	O ring	Nitrile rubber (fluoro rubber)
4	Valve	Nitrile rubber (fluoro rubber)
5	Cross headed pan head machine screw with SW	Stainless steel
6	Guide ring	Aluminum alloy

* The material in ( ) is for option "A" (fluorin rubber specification) .

Dimensions CAD

● SHV2-6/8

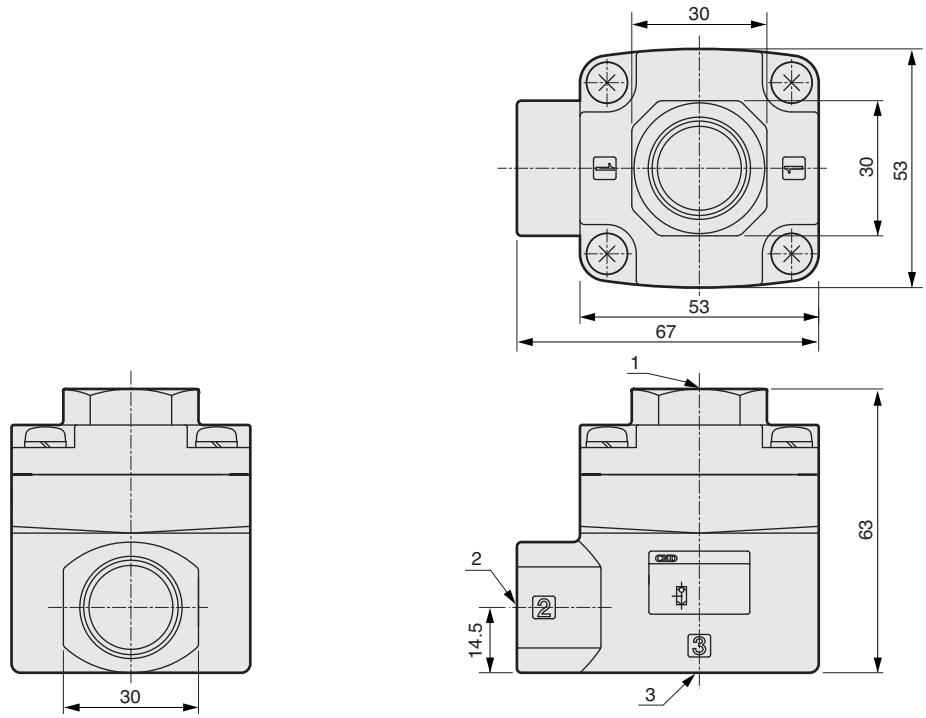


Model no.	Port position		
	1	2	3
SHV2-6	Rc 1/8		
SHV2-8	Rc 1/4		

(Piping port indication)

Port symbol	Descriptions
1	A (input)
2	OUT (output)
3	B (input)

● SHV2-10/15



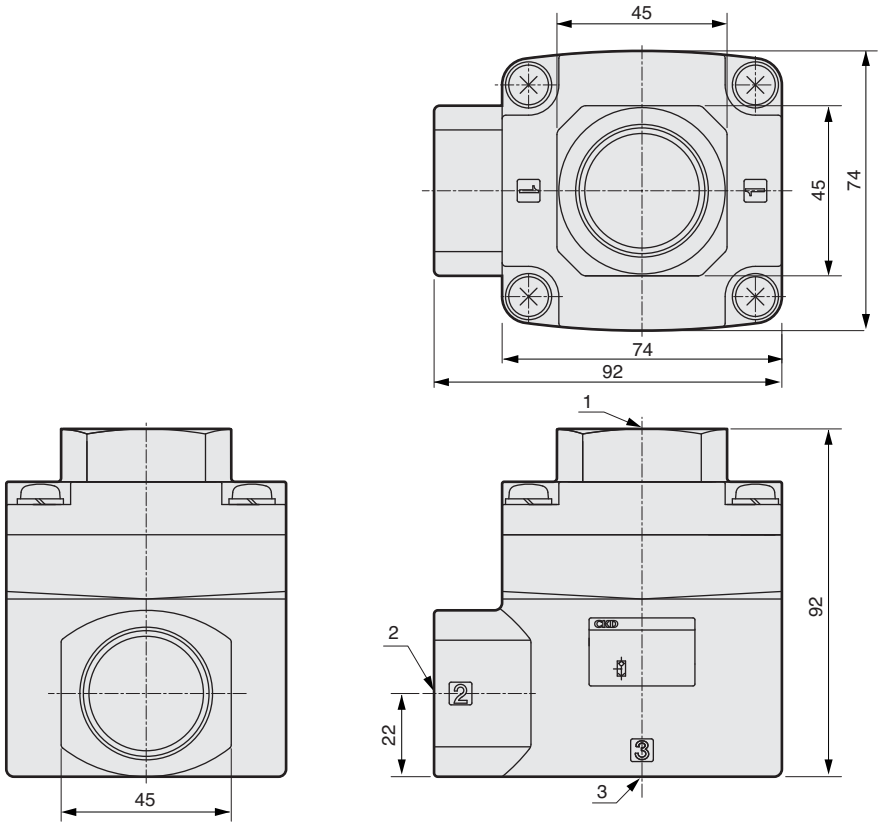
Model no.	Port position		
	1	2	3
SHV2-10	Rc 3/8		
SHV2-15	Rc 1/2		

(Piping port indication)

Port symbol	Descriptions
1	A (input)
2	OUT (output)
3	B (input)

Dimensions

● SHV2-20/25



Model no.	Port position		
	1	2	3
SHV2-20	Rc 3/4		
SHV2-25	Rc 1		

(Piping port indication)

Port symbol	Descriptions
1	A (input)
2	OUT (output)
3	B (input)

Safety Precautions

■ Design & Selection

- This valve can not be used as a stop valve that has no leakage. Slight leakage is allowed in product specifications.
- While there is no direction to the installation, use in a range with little differential pressure (0.05MPa or less), the movement could become dull.

■ Installation & Adjustment

- Apply recommended tightening torque when connecting pipes.
  - To prevent air leakage or damage of screw.
  - First tighten the screw by hand to prevent threads are not damaged, then use a tool.
  - Do not tighten while pressure is applied.
- Install an air filter just before the pneumatic component in the circuit.

(Recommended tightening torque)

	Tightening torque N·m
Rc 1/8	3 to 5
Rc 1/4	6 to 8
Rc 3/8	13 to 15
Rc 1/2	16 to 18
Rc 3/4	19 to 40
Rc 1	41 to 70

■ During Use & Maintenance

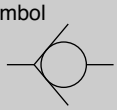
- Before replacing tubing, stop the air flow and confirm that no pressure remains.

Compact check valve with push-in joint

CHL Series

Compact and space saving line type for vacuum retention and low pressure use

● JIS symbol



RoHS CAD

Specifications

Descriptions	CHL-M54	CHL-H44	CHL-H66
Working fluid	Compressed air		
Max. working pressure MPa	1.0		
Min. working pressure MPa	0.03		
Cracking pressure MPa	0.03		
Working vacuum range kPa	-30 to -100		
Withstanding pressure MPa	1.5		
Fluid temperature range °C	0 to 60 (no freezing)		
Ambient temperature range °C	0 to 60 (no freezing)		
Port size	ø5	ø4	ø6
Product weight g	8.9	10.8	16.6
Applicable tube outer diameter	ø4	ø4	ø6
Flow ℓ/min.(ANR)	170	180	440
Effective sectional area mm^2	2.6	2.8	6.8

Note: Flow rate is the atmospheric pressure conversion value at pressure 0.5MPa.

How to order

CHL – M5 4 – A

Model no.

Ⓐ Selected only M54 type

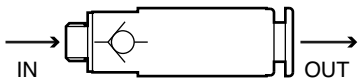
Ⓐ Port size		Ⓑ Tube outer diameter	
M5	M5	4	ø4
H4	ø4	4	ø4
H6	ø6	6	ø6

Ⓒ Free flow	
A	M5 screw side input
B	M5 screw side output

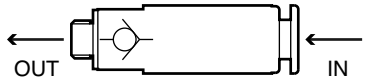
Note: Model no. must be selected according to above specifications.

Ⓒ Free flow (M54 type only) explanation diagram

Free flow A (M5 screw side input)



Free flow B (M5 screw side output)



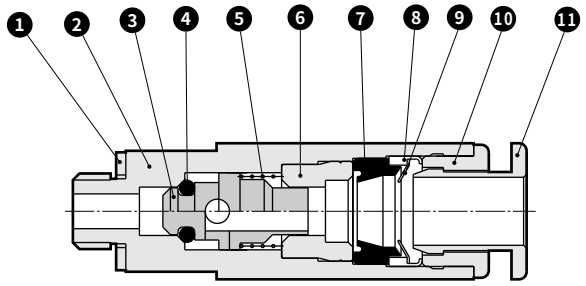
Clean room specifications (catalog No. CB-033SA)

● Dust generation preventing structure for use in cleanrooms

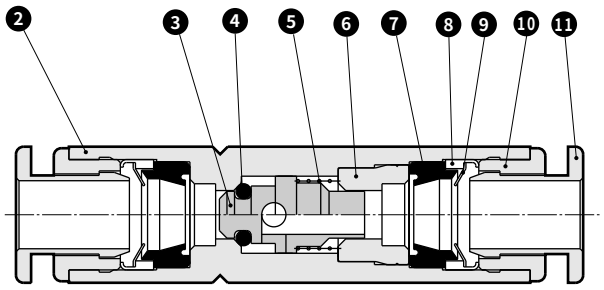
CHL–·····–P7*

Internal structure and part list

● CHL-M54



● CHL-H44, H66



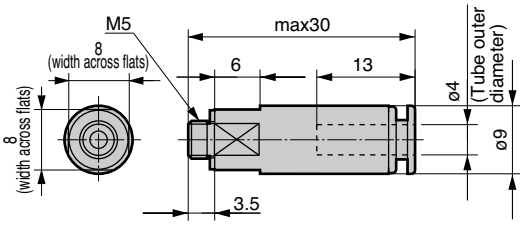
No.	Parts name	Material
1	Gasket	Nitrile rubber, Steel
2	Body	Brass (electroless nickeling)
3	Valving element	Aluminum
4	O ring	Nitrile rubber
5	Spring	Stainless steel

No.	Parts name	Material
6	Valve seat	Aluminum
7	Packing seal	Nitrile rubber
8	Chuck holder	Brass (electroless nickeling)
9	Chuck	Stainless steel
10	Outer ring	Brass (electroless nickeling)
11	Push ring	PBT

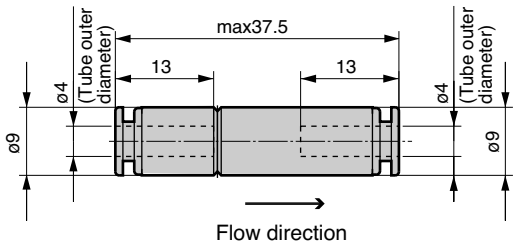
Dimensions

CAD

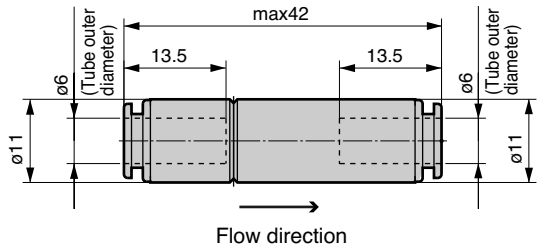
● CHL-M54-*



● CHL-H44



● CHL-H66



Check valve

CHV2 Series

Perfectly preventing reverse flow of compressed air, etc. Wide variation in 10 types

● Port size: Rc1/8 to Rc11/2

JIS symbol

RoHS CAD

Features

● Wide variation
Series are available for piping bore sizes Rc1/8 to Rc1 1/2.

● Compact and lightweight
The body has been downsized compared to CKD conventional parts, with an average volume of 34% and average mass of 25%.

● Ample options
Fluor rubber specifications and oil-prohibition specifications available as options. An installation bracket is available for small bore sizes.

● Neat shape

● Eco-friendly product
Products can be sorted and processed for recycling.

Specifications

Model no.	CHV2-6	CHV2-8-J	CHV2-8	CHV2-10-J	CHV2-10	CHV2-15	CHV2-20	CHV2-25	CHV2-32	CHV2-40
Working fluid	Compressed air									
Max. working pressure MPa	1									
Min. working pressure MPa	0.03									
Withstanding pressure MPa	1.5									
Cracking pressure MPa	0.02									
Fluid temperature °C	5 to 60									
Ambient temperature °C	0 to 60 (no freezing)									
Port size Rc	1/8	1/4		3/8		1/2	3/4	1	11/4	11/2
Product weight g	47		81		140		265		875	
Effective sectional area mm^2	28		55	60	94	110	220	250	700	730

How to order

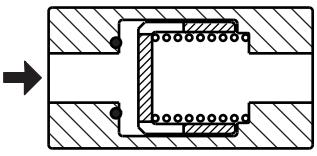
CHV2 - 8 - J - A P

- CHV2: Model no.
- 8: Ⓐ Port size
- J: Small flow compact type Note1
- A: Ⓑ Option Note 2
- P: Ⓒ Accessory Note 3

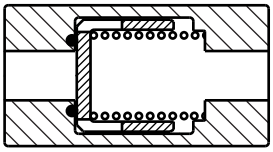
Symbol	Descriptions
Ⓐ Port size	
6	Rc1/8
8	Rc1/4
10	Rc3/8
15	Rc1/2
20	Rc3/4
25	Rc1
32	Rc11/4
40	Rc11/2
Ⓑ Option	
Blank	No option
A	Fluoro rubber specifications
P8	Oil-prohibited specifications
Ⓒ Accessory	
Blank	None
P	Mounting plate attached

Note 1: Small flow compact type (J) is applicable only for port size Rc1/4 (8) and Rc3/8 (10).
Note 2: Options are indicated as alphabetic order. (AP8)
Note 3: Attachment of mounting plate is applicable for CHV2-6, CHV2-8-J, CHV2-8 and CHV2-10.

Operational principle



If pressurized from arrow → direction on the side body, the valve fully opens, and the flow turns to free flow.



If pressurized from reverse direction of arrow → on the side body, the valve closes, and flow is interrupted.

Clean room specifications (catalog No. CB-033SA)

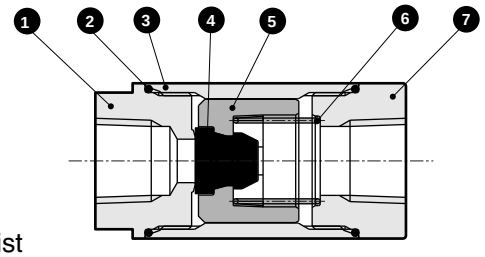
● Dust generation preventing structure for use in cleanrooms

CHV2 –·····– P7*

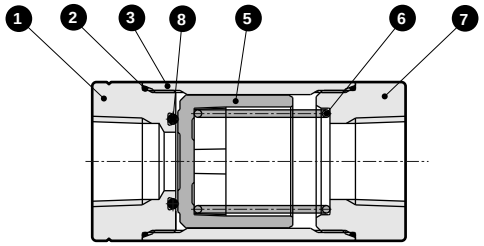
CHV2 –·····– P80

Internal structure and parts list

● CHV2-6, 8-J



● CHV2-8 to 40

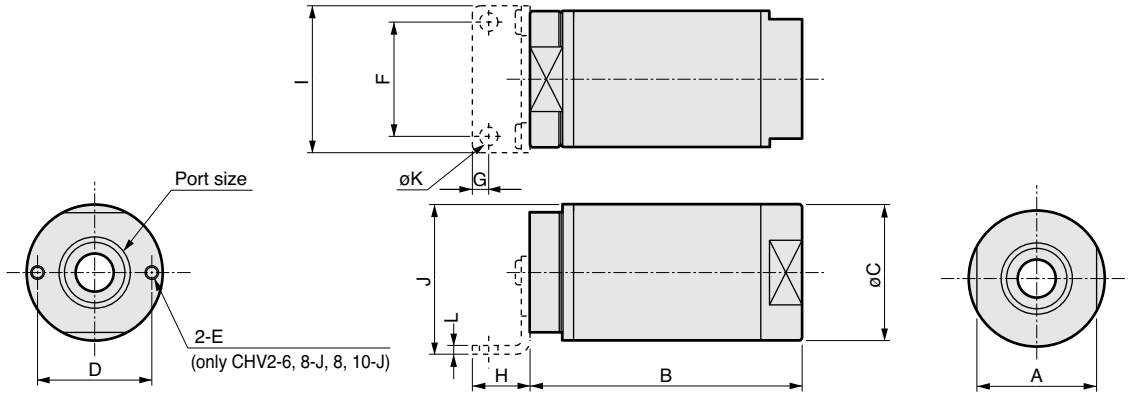


Parts list

No.	Parts name	Material	No.	Parts name	Material
1	Guard A	Aluminum alloy	5	Valve guide	Polyacetal
2	O ring	Nitrile rubber (fluoro rubber)	6	Coil spring	Stainless steel
3	Tube	Aluminum alloy	7	Guard B	Aluminum alloy
4	Valving element	Nitrile rubber (fluoro rubber)	8	O ring	Nitrile rubber (fluoro rubber)

* The material in ( ) is for option "A" (fluorin rubber specification).

Dimensions



Dimensions table

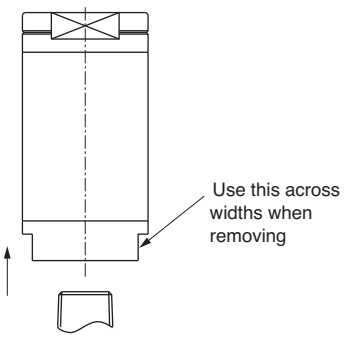
Model no.	Port size	A	B	øC	D	E	F	G	H	I	J	øK	L
CHV2-6	Rc1/8	22	50	25	21	M2.5	21	3	10.5	27	27.5	3.4	1.6
CHV2-8-J	Rc1/4												
CHV2-8		27	60	31	26	M3	25	5	14	32	34	4.4	
CHV2-10-J	Rc3/8												
CHV2-10		32	75	38	–	–	–	–	–	–	–	–	–
CHV2-15	Rc1/2												
CHV2-20	Rc3/4	42	95	47	–	–	–	–	–	–	–	–	–
CHV2-25	Rc1												
CHV2-32	Rc11/4	63	140	72	–	–	–	–	–	–	–	–	–
CHV2-40	Rc11/2												

Safety Precautions

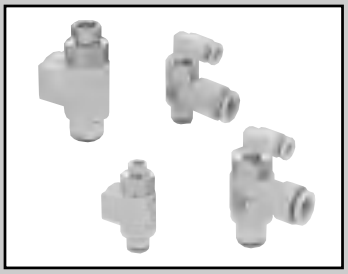
■ During Use & Maintenance

Installation of CHV2

● After temporarily tightening the mounting port by hand, tighten with the width across flats using a tool.
When connecting piping, tighten within the recommended tightening torque.
When removing piping from this product, use the width across flats of piping to be removed.
If the width across flats on the opposite side are used, the cover could loosen and lead to external leaks.



● Check JIS symbols on the product nameplate and pipe accordingly.
If pressure is applied from IN, fluid will flow freely. If pressure is applied from OUT, fluid will be shielded.
The side of the cover with a groove is IN, so check the direction when piping.

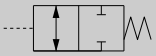


Block valve

FPV Series

● Port size: (Rc or R)1/4 to 1/2

JIS symbol



RoHS CAD

Features

- Compact valve ideal for preventing dropping and for cylinder braking.
- Compact and lightweight
  The body has been greatly downsized compared to CKD conventional parts, with an average volume of 75% and average mass of 50%.
- Wide range of choices
  Series variations from M5 to R1/2 bore sizes enable direct cylinder installation.

Specifications

Descriptions	FPV-M5	FPV-6A			FPV-8A			FPV-10A			FPV-15A		
Port size	M5	R1/8			R1/4			R3/8			R1/2		
Main side applicable tube O.D.	ø6	ø6	ø8	Rc1/8	ø6	ø8	Rc1/4	ø8	ø10	Rc3/8	ø10	ø12	Rc1/2
Pilot side applicable tube O.D.	ø4			M5	ø4		M5	ø4		Rc1/8	ø4		Rc1/8
Working fluid	Compressed air												
Max. working pressure MPa	1.0												
Min. working pressure MPa	0												
Withstanding pressure MPa	1.5												
Pilot air pressure MPa	* Refer to a separate table on page 927.												
Fluid temperature °C	5 to 60												
Ambient temperature °C	0 to 60 (no freezing)												
Product weight g	28	26		36	50	51	68	90	93	120	143	145	192
Effective sectional area mm²	1.3	5			10			17			27		

How to order

FPV - 6A - 06

Ⓐ Port size

Ⓐ Port size	
M5	M5
6A	R1/8
8A	R1/4
10A	R3/8
15A	R1/2

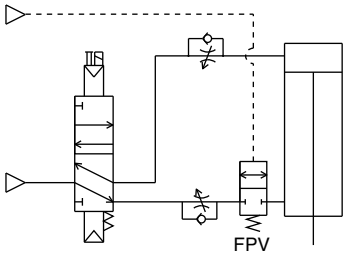
Ⓑ Applicable tube outer diameter

Ⓑ Applicable tube outer diameter		Ⓐ Port size				
		M5	6A	8A	10A	15A
O6	ø6	●	●	●		
08	ø8		●	●	●	
10	ø10				●	●
12	ø12					●
6A	Rc1/8		●			
8A	Rc1/4			●		
10A	Rc3/8				●	
15A	Rc1/2					●

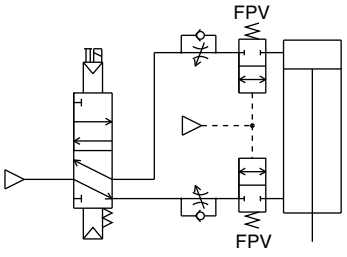
not available.

Applications

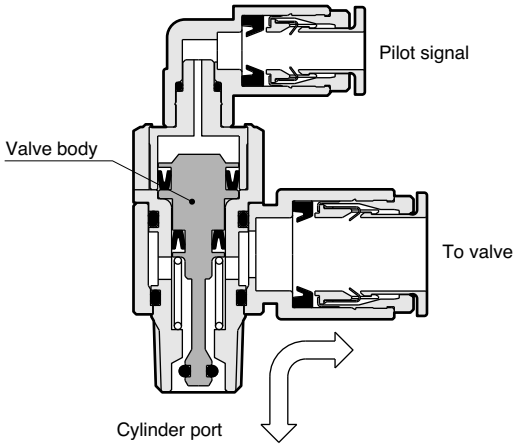
● Used for cylinder position locking circuit



● Used for cylinder braking circuit



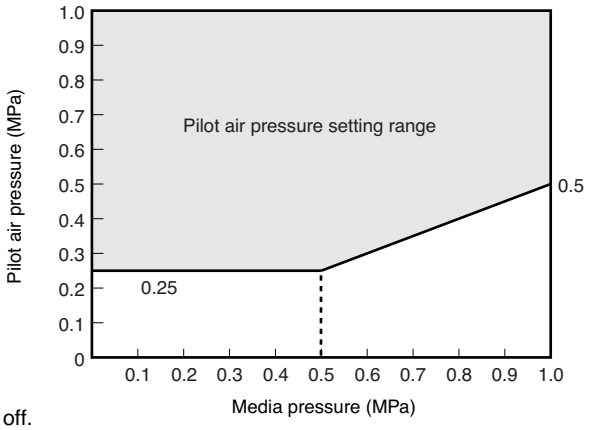
Operational principle



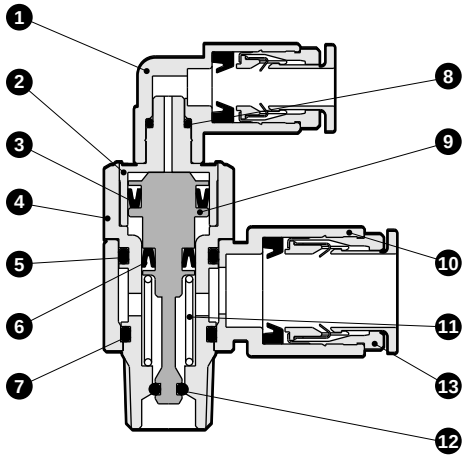
The valve opens if there is a pilot signal, but closes if the pilot signal is cut off.

Pilot air pressure

Set pilot air pressure within the specified range.



Internal structure and parts list



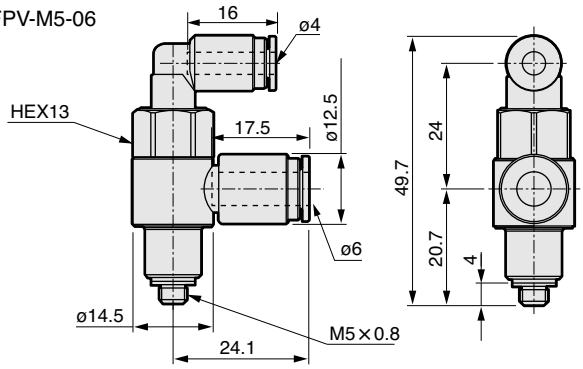
No.	Parts name	Material
1	Joint body	PBT (flame resistance resin)
2	Rotary shaft A	Brass (electroless nickeling)
3	Packing seal	Nitrile rubber
4	Rotary shaft B	Brass (electroless nickeling)
5	O ring	Nitrile rubber
6	Packing seal	Nitrile rubber
7	O ring	Nitrile rubber
8	O ring	Nitrile rubber
9	Valve body	Brass (electroless nickeling)
10	Body	PBT (flame resistance resin) Note1
11	Spring	Stainless steel
12	O ring	Nitrile rubber
13	Push-in joint	

Note 1: Zinc alloy die-casting is applied for female thread type.

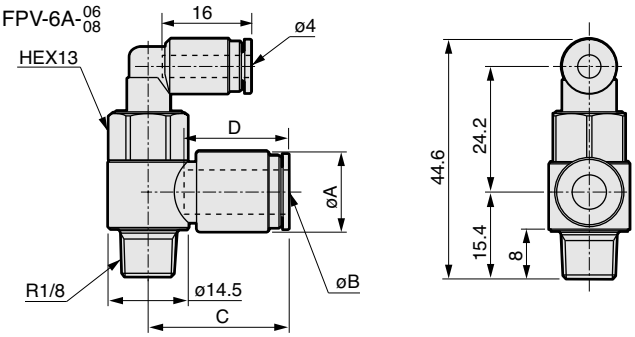
Dimensions

CAD

● FPV-M5-06

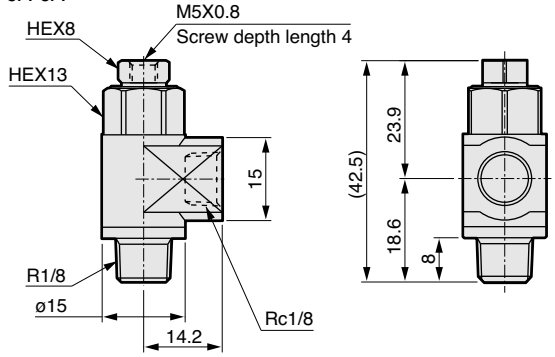


● FPV-6A-06 / 08



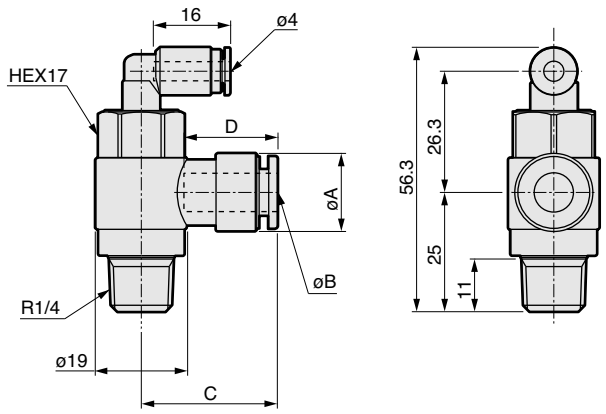
Model no.	A	B	C	D
FPV-6A-06	ø12.5	ø6	24.1	17.5
FPV-6A-08	ø14.5	ø8	25.3	19.0

● FPV-6A-6A

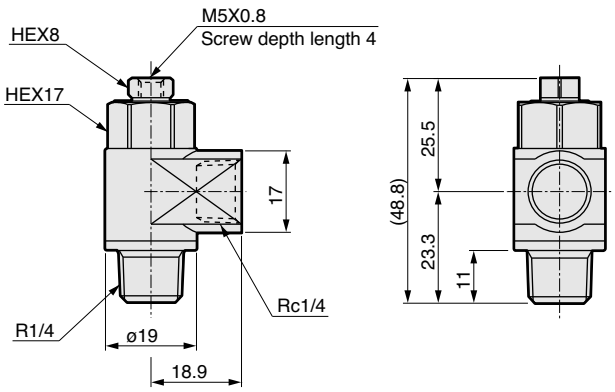


Dimensions

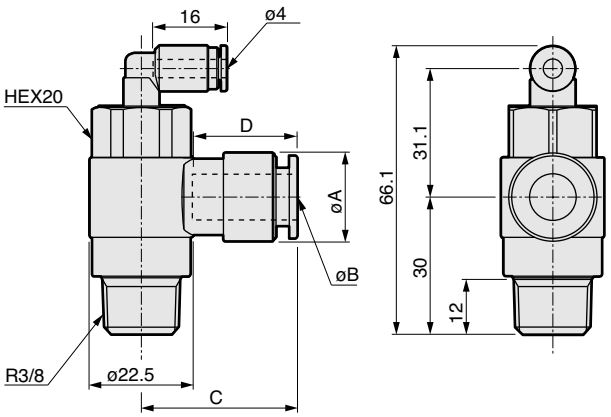
● FPV-8A-$^{06}_{08}$



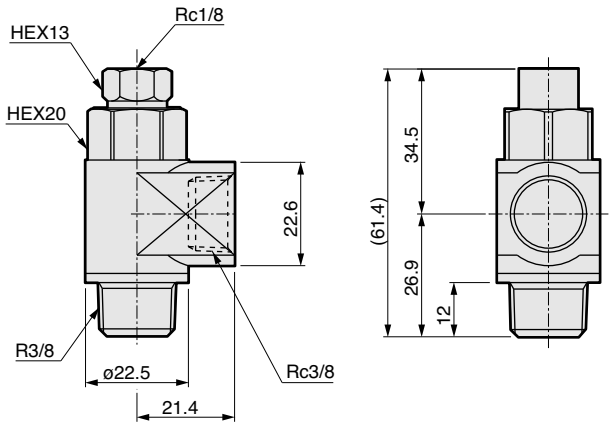
● FPV-8A-8A



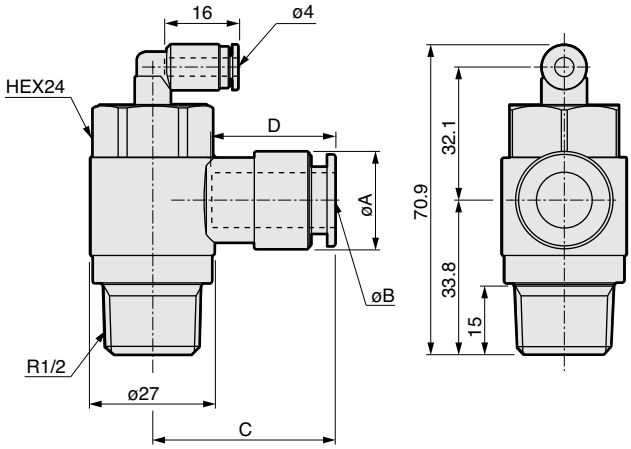
● FPV-10A-$^{08}_{10}$



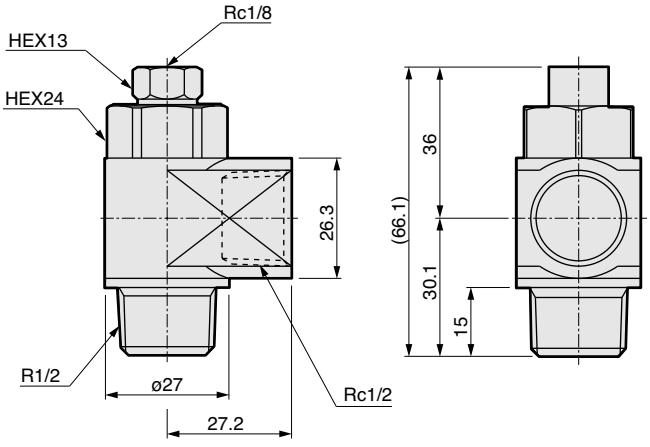
● FPV-10A-10A



● FPV-15A-$^{10}_{12}$



● FPV-15A-15A



Model no.	A	B	C	D
FPV-8A-06	ø13.8	ø6	26.7	18.0
FPV-8A-08	ø16.3	ø8	28.5	19.0
FPV-10A-08	ø16.3	ø8	30	19.5
FPV-10A-10	ø19.3	ø10	34	23
FPV-15A-10	ø19.3	ø10	36.4	23
FPV-15A-12	ø21.3	ø12	39.9	27

⚠ Safety Precautions

■ Design & Selection

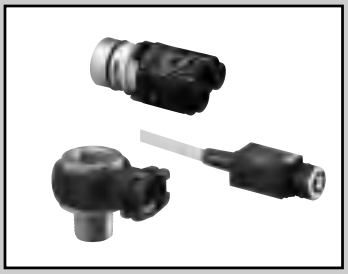
● Confirm that PTFE can be used.
- The sealant contains PTFE (polytetrafluoroethylene resin) powder. Check that this poses no problem during use.

■ Installation & Adjustment

(Piping)

● When supplying compressed air after connecting pipes, check for air leaks at all piping connections and actuator sections.
- Cases may occur when position locking or braking do not function correctly.

● Set pilot and main pressure within the specified pressure.
- If actuator load is high, main pressure increases and cannot be maintained.



Threshold sensor

PWS Series

Detect exhaust pressure near the stroke end accurately

● Port size: (Rc or R)1/8 to 1/2

JIS symbol

Maker Telepneumatic

CAD

Specifications

Universal coupling type connector

Descriptions	PWS-B155	PWS-B1882	PWS-B1992	PWS-B1332	PWS-B1222
Working fluid	Compressed air				
Max. working pressure MPa	0.8				
Min. working pressure MPa	0				
Withstanding pressure MPa	1.5				
Working air temperature °C	5 to 60				
Ambient temperature °C	-10 to 60 (no freezing)				
Port size	M5	R (c)1/8	R (c)1/4	R (c)3/8	R (c)1/2
Effective sectional area mm^2	3	20	50	80	120
Flow ℓ/min. (ANR) Note1	190	1300	3200	5200	7800
Product weight kg	0.01	0.04	0.05	0.08	0.11

Built-in sensor module

Descriptions	PWS-P111	PWS-M1012
Output method	Compressed air	Electric
Switchover pressure MPa Note2	0.04	0.06
Working air temperature °C	5 to 60	
Ambient temperature °C	-10 to 60 (no freezing)	
Effective sectional area mm^2	1.2	–
Flow ℓ/min. (ANR) Note1	80	–
Output connection	ø4 push-in joint	0.5mm^2 × 3 wire
Voltage	–	250 VAC 5A or 48 VDC 5W or less
Contact	–	C Contact
Insulation class	–	Class B
Applicable tube	O.D. ø4.0, bore size ø2.5 rigid nylon tube	–

Note 1: The flow is a value at pressure 0.5MPa.
Note 2: Select pressure for PSW-P111 is that output by the air pressure signal to port S.
Select pressure for PSW-M1012 is the pressure changed by the electrical contact.

Operational principle

The threshold sensor is attached like a joint to the cylinder port. This sensor detects pressure change generated at both ends of the piston or a drop in exhaust pressure (P2) near the stroke end and issues an air pressure signal (S) when P2 < 1/10 P. (Refer to Fig. 1, 2)

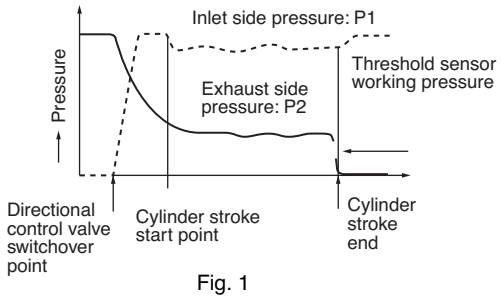


Fig. 1

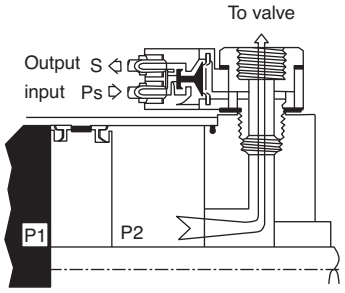


Fig. 2

How to use

A limit switch is used to confirm cylinder operation. If it is difficult or a problem to install a limit switch, this joint threshold sensor can be used. (Refer to Fig. 3)

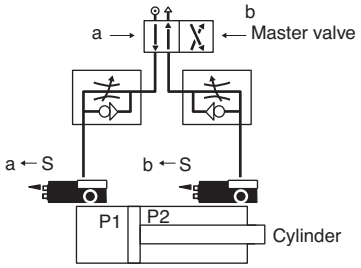


Fig. 3

Connection and installation

- The modular threshold sensor consists of two parts, a build-in sensor module and free joint connector.
- Connector (free joint type)
  The sensor (detector) to be installed directly above the cylinder port is attached to the connector with a clip. The speed control valve or cylinder stop valve, etc., can be attached above the connector. Parts are tightened in the connector port with the hexagon socket bolt found inside the connector. (Refer to Fig. 5)
- Built-in sensor module
  Signal output can be either by selected from air pressure or electric. (Refer to Fig. 4)

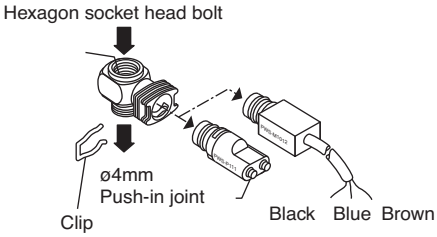


Fig. 4

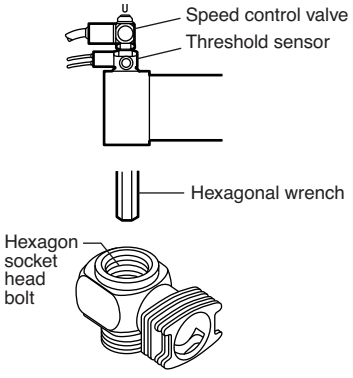
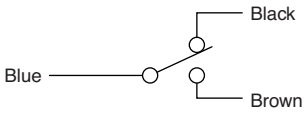


Fig. 5

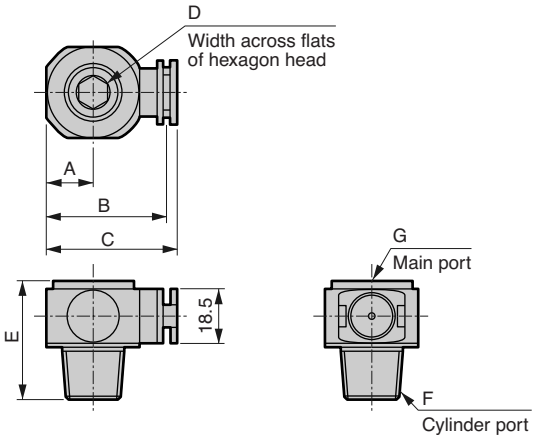
Connection

- Pneumatic outlet module
  ø4mm tube connection
- Electric output module
  (C contact)



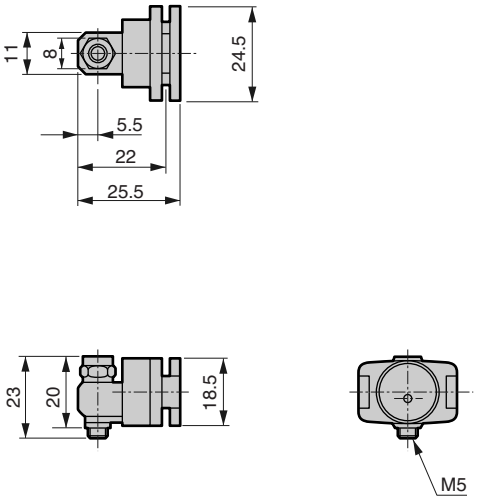
Dimensions

● PWS-B1* * 2

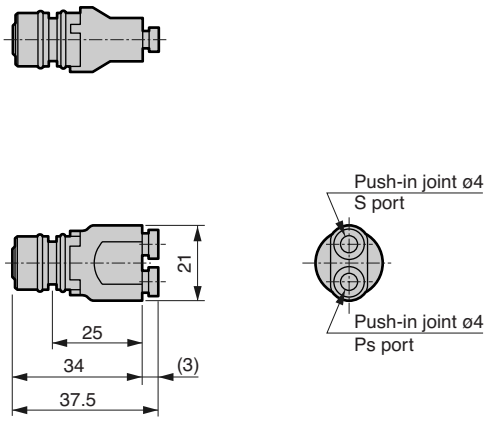


Model no.	A	B	C	D	E	F	G
PWS-B1882	8	28	31.5	5	28	R1/8	Rc1/8
PWS-B1992	10.5	32.5	36	8	32.5	R1/4	Rc1/4
PWS-B1332	14	39	43.5	10	35	R3/8	Rc3/8
PWS-B1222	16.5	42.5	46	12	42	R1/2	Rc1/2

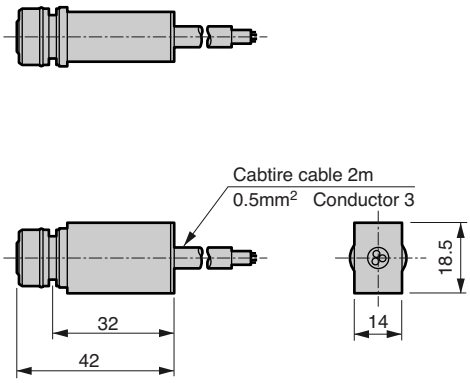
● PWS-B155



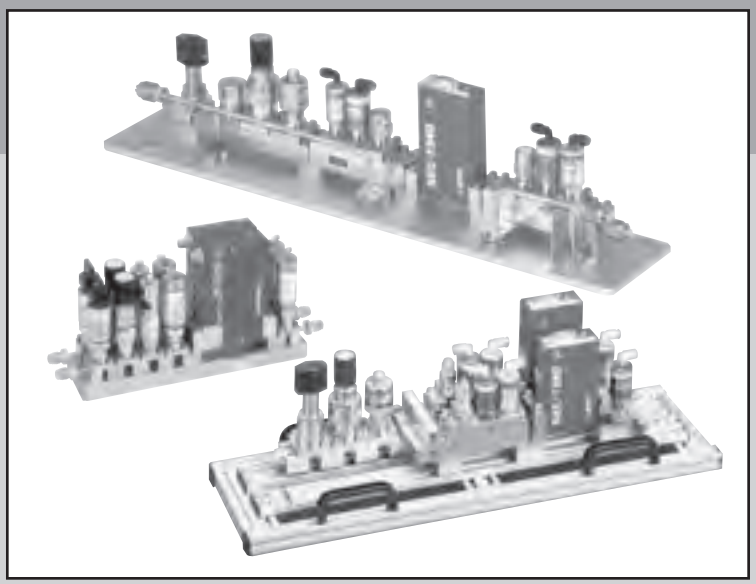
● PWS-P111



● PWS-M1012



Integrated Gas Supply System



CONTENTS

Integrated Gas Supply System

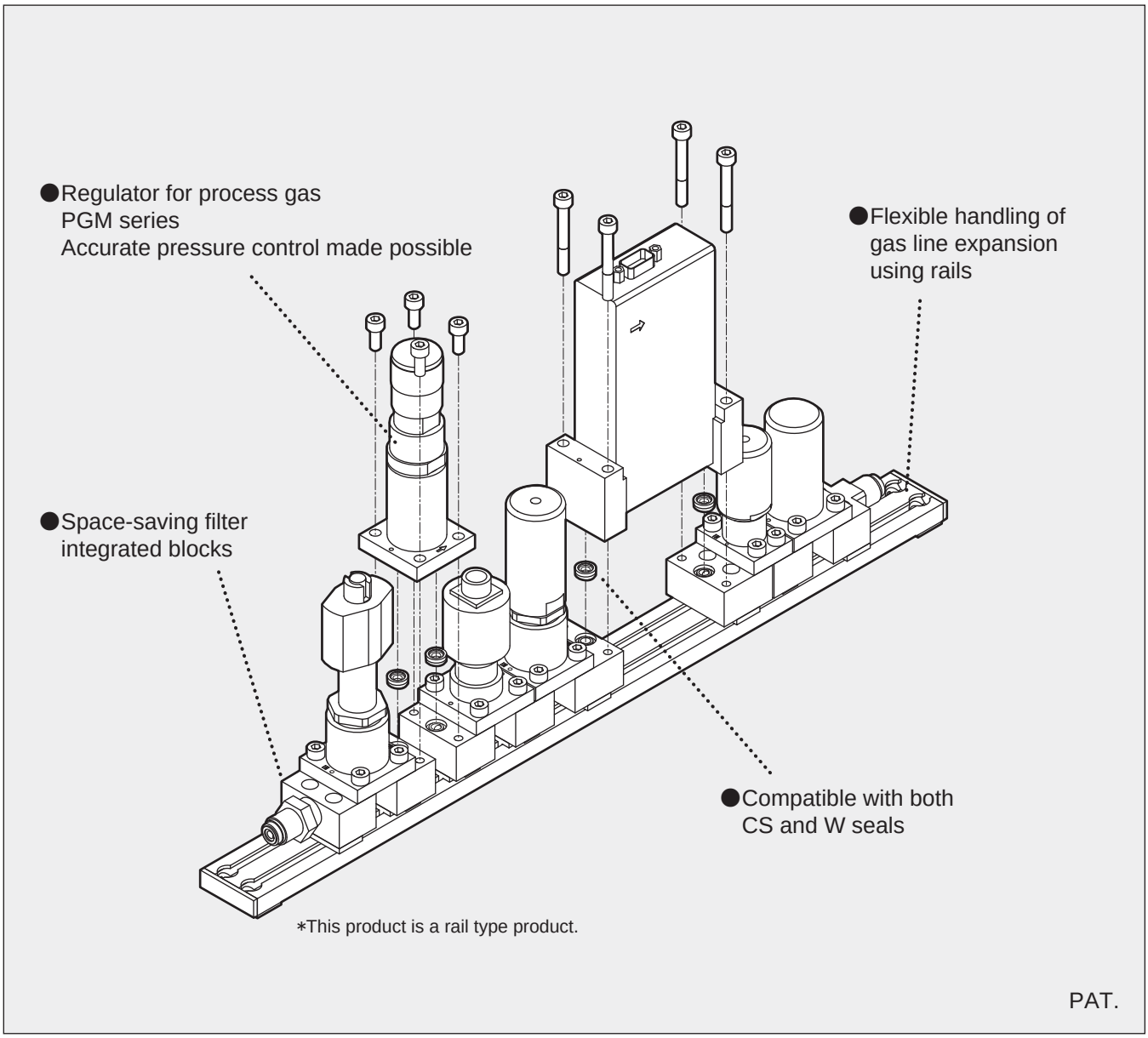
IAGD3/IAGD4/IAGD5 Series

Custom order

Greatly improved space saving and maintenance.

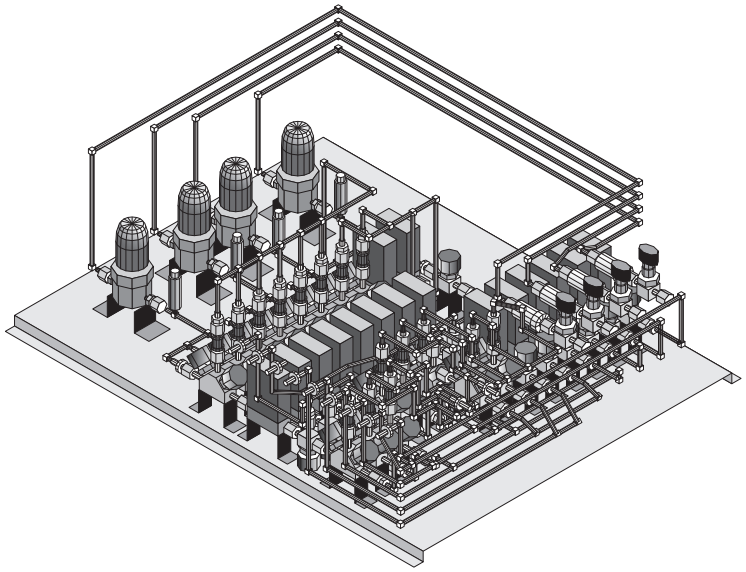
Overview

This system was developed for use in the gas supply line of semiconductor manufacturing equipment.
Surface mount type air-operated valves and mass flow controllers standardized by SEMI are integrated compactly.
We offer optimal layout according to your requested flow and achieve significant space-saving compared to previous models structured with welded fittings.



Features

Existing gas jungle



Footprint reduction

- Footprint 60% of conventional
- Volume 16% of conventional

Improved workability

- Components can be attached and removed from the top
- With the rail model, gasline expansion is handled.
- Simplified heating

Improved reliability

- CS seal/W seal used

Increase corrosion resistance (Contamination hardly generated)

- Welded areas reduced by more than 80%
  Conventional causes of contamination are greatly reduced by reducing welded areas.

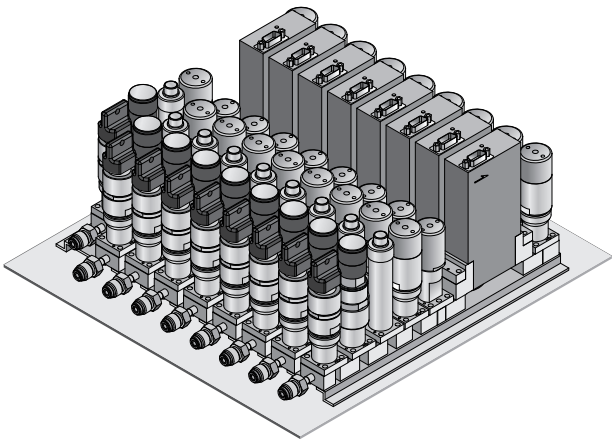
Improved replacement features

- The flow path is configured with little internal volume and dead volume.
- Improved purging

Standardization

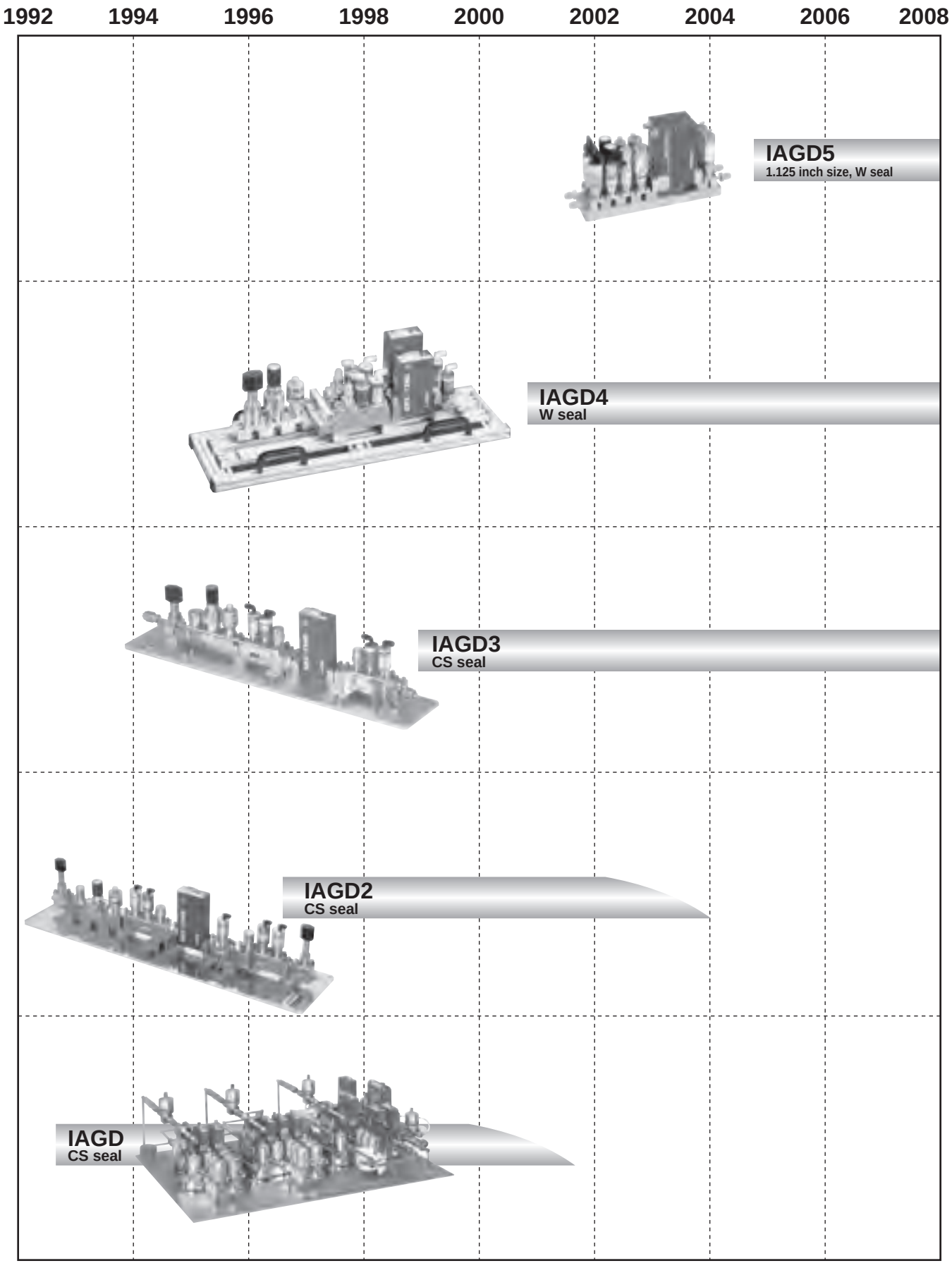
- Promoting component standardization

Integrated Gas Supply System



Integrated Gas System Series

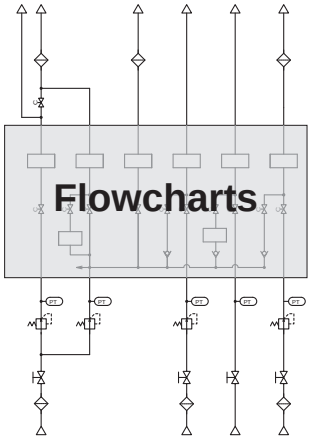
Integrated Gas Supply System History

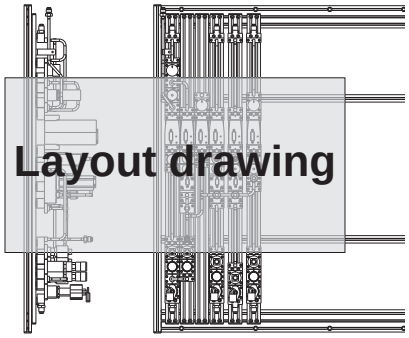


Integrated gas supply system manufacturing flow

Layout

· Layout is based on user specifications and flowcharts.



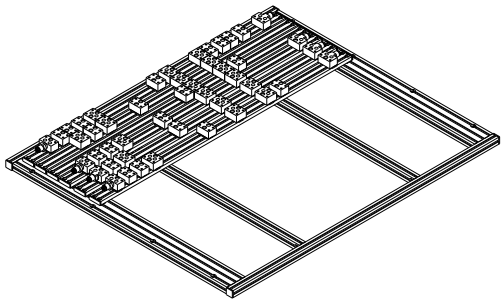


Parts preparation

· Device manufacturers and models are selected and prepared based on the user's specifications.

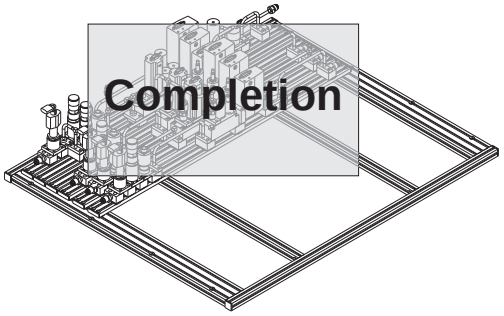
Assembly 1

· Jigs are used for positioning and base blocks will be installed.



Assembly 2

· Integrated devices are installed.



Inspection

Components for integrated gas supply system

Air operated valve for IAGD4

Custom order

NEW

■MAGD series - Newly redesigned with the environment in mind

∗See page 68 for previous model

Specifications

Descriptions		MAGD4-R-0	MAGD4-R-1
Working fluid		Inert gas/process gas	
Working pressure range Pa (abs)-MPa (G)		1.3×10^{-6} to 0.99	1.3×10^{-6} to 0.7
Fluid temperature ℃		-10 to 80	
Ambient temperature ℃		-10 to 80	
Valve seat leakage Pa·m³/s.He		1.3×10^{-9} or less	1.0×10^{-10} or less
External leakage Pa·m³/s.He		2.8×10^{-12} or less	
Cv flow factor (23℃, under pressure)		0.1	0.26
Connection		1.5 inch W seal (nominal 6.35)	
Operating pressure MPa	NC	0.4 to 0.6	
	NO	0.4 to 0.5	
Control port		M5	
Material	Body	SUS316L	
	Diaphragm	Ni-Co alloy	
	Sheet	PCTFE	

How to order

MAGD4 - R - 02A - W - 1 2

- A Series
- B Valve shape
- C Seal shape
- D Actuation (V1)
- E Actuation (V2)

Symbol	Descriptions	Cv value
A Series		
MAGD4	Air operated valve for IAGD4	
B Valve shape		**Cv value**
01D	1-station block D type valve (2-port)	0.1
01X	1-station block X type valve (3-port)	
01Y	1-station block Y type valve (3-port)	
02A	2-station block A type valve (3-port)	
11D	1-station block D type valve (2-port)	0.26
C Seal shape		
W	W seal (nominal 6.35)	
D Actuation (V1)		
1	NC	
2	NO	
3	NC (with proximity sensor (energized when valve closed))	
4	NO (with proximity sensor (energized when valve opened))	
5	NC (with proximity sensor (energized when valve opened))	
6	NO (with proximity sensor (energized when valve closed))	
E Actuation (V2)		
1	NC	
2	NO	
3	NC (with proximity sensor (energized when valve closed))	
4	NO (with proximity sensor (energized when valve opened))	
5	NC (with proximity sensor (energized when valve opened))	
6	NO (with proximity sensor (energized when valve closed))	

<Example of model number>

MAGD4-R-02A-W-12

- A Series : Air operated valve for IAGD4
- B Valve shape : 2-station block A type valve (3-port)
- C Seal shape : W seal (nominal 6.35)
- D Actuation (V1) : NC
- E Actuation (V2) : NO

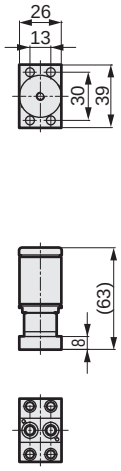
Note 1: Installation bolts, gasket, actuator and drive air fitting are not included. Please purchase them separately.

Note 2: Contact with our sales office if a type with installation bolts is required.

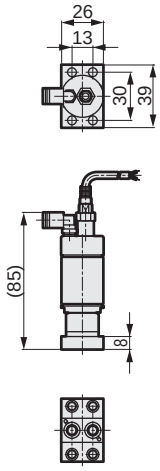
Dimensions

1-station block

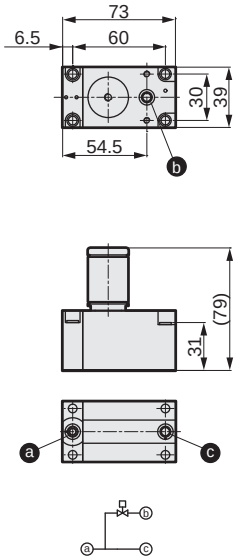
● MAGD4-R-01D



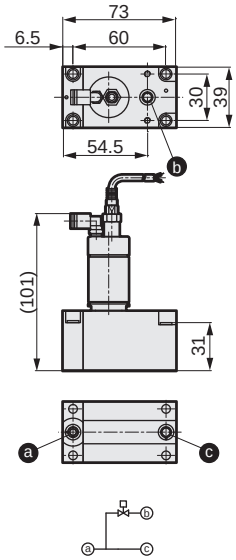
(With proximity sensor)



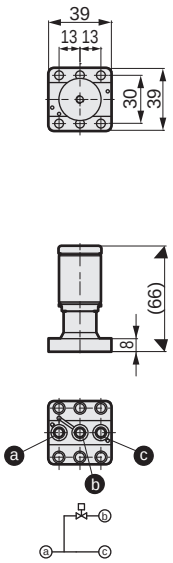
● MAGD4-R-01X



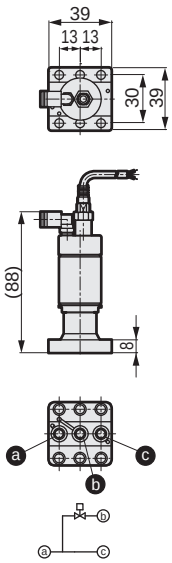
(With proximity sensor)



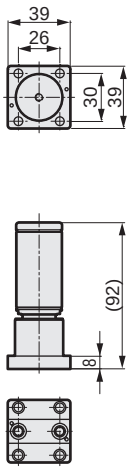
● MAGD4-R-01Y



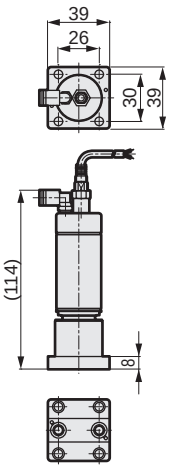
(With proximity sensor)



● MAGD4A-R-11D

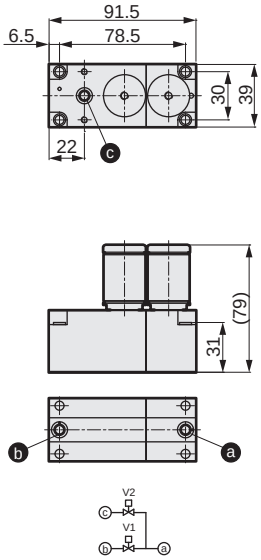


(With proximity sensor)

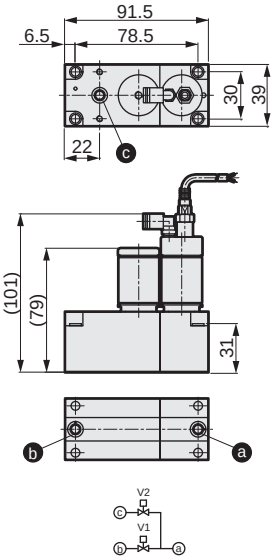


2-station block

● MAGD4-R-02A



(With proximity sensor)



Components for integrated gas supply system

Flow control adjustment valve for IAGD4

Custom order

Specifications

Descriptions		MFGD4-11D-W-1	MFGD4-11D-W-4
Working fluid		Inert gas/process gas	
Working pressure range Pa (abs)-MPa (G)		1.3×10^{-6} to 0.7	
Fluid temperature ℃		-10 to 80	
Ambient temperature ℃		-10 to 80	
Valve seat leakage Pa·m³/s(He)		1/100 or less of maximum Cv flow factor	
External leakage Pa·m³/s(He)		2.8×10^{-12}	
Cv flow factor (adjusting range)		0.003 to 0.03	0.02 to 0.2
Connection		W seal (nominal 6.35)	
Material	Body	SUS316L	
	Diaphragm	Ni-Co alloy	

∗The product has a cover.

How to order

MFGD4 - 11D - W - 1

- A Series
- B Valve shape
- C Seal shape
- D Cv flow factor (adjusting range)

Symbol	Descriptions
A Series	
MFGD4	Flow adjusting valve for IAGD4
B Valve shape	
11D	Shape: 1-station block D type valve (2-port)
C Seal shape	
W	Seal shape: W seal (nominal 6.35)
D Cv flow factor (adjusting range)	
1	Cv flow factor (adjusting range) 0.003 to 0.03
4	Cv flow factor (adjusting range) 0.02 to 0.2

Note 1: Installation bolts and gasket are not included. Please purchase them separately.
Note 2: Contact with our sales office if a type with installation bolts is required.

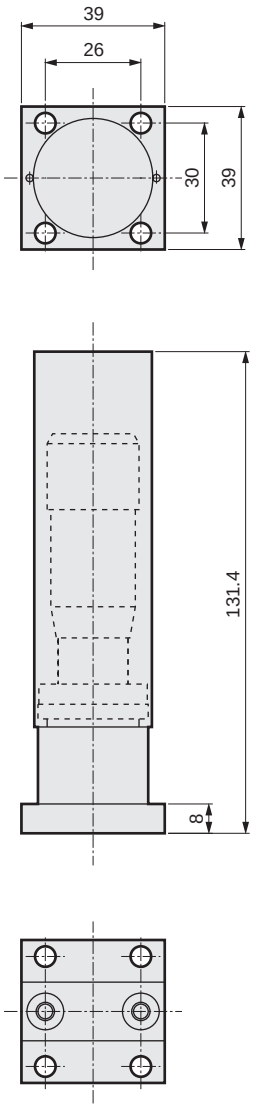
<Example of model number>

MFGD4-11D-W-1

- A Series : Flow control adjustment valve for IAGD4
- B Valve shape : 1-station block D type valve (2-port)
- C Seal shape : W seal (nominal 6.35)
- D Other : Cv flow factor (adjusting range) 0.003 to 0.03

Dimensions

●MFGD4



Components for integrated gas supply system

Check valve for IAGD4

Custom order

Specifications

Descriptions		MCGP4-01D	MCGP4-F
Working fluid		Inert gas/process gas	
Working pressure range Pa (abs)-MPa (G)		1.3×10^{-6} to 0.7	
Fluid temperature ℃		-10 to 80	
Ambient temperature ℃		-10 to 80	
Valve seat leakage Pa·m³/s(He)		4.7×10^{-8}	
External leakage Pa·m³/s(He)		2.8×10^{-12}	
Cv flow factor (max.)		0.25	
Connection		W seal (nominal 6.35)	
Material	Body	SUS316L	
	Sheet	Kalrez®	
	Spring	SUS316-WPA	
	Gasket	PTFE	

How to order

MCGP4 - 01D - W - 023 - KA

- A Series
- B Shape
- C Seal shape
- D Cranking pressure
- E Seat material

Symbol	Descriptions
A Series	
MCGP4	Check valve for IAGD4
B Shape	
01D	1-station block D type valve (2-port)
F1	Flow direction JXR fitting side to W seal side
F2	Flow direction W seal side to JXR fitting side
C Seal shape	
W	W seal (nominal 6.35)
L	1/4 inch JXR male fitting
D Cranking pressure	
023	Cranking pressure 2.3 kPa
E Seat material	
KA	Seat material Kalrez®

Note 1: Installation bolts and gasket are not included. Please purchase them separately.
Note 2: Contact with our sales office if a type with installation bolts is required.

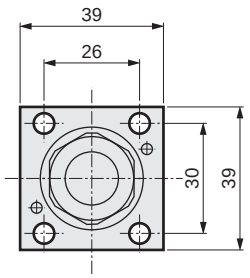
<Example of model number>

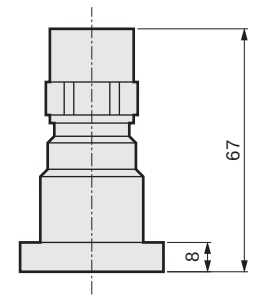
MCGP4-01D-W-023-KA

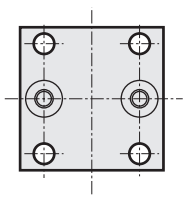
- A Series : Check valve for IAGD4
- B Shape : 1-station block D type valve (2-port)
- C Seal shape : W seal (nominal 6.35)
- D Cranking pressure : 2.3 kPa
- E Seat material : Kalrez®

Dimensions

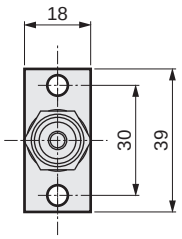
●MCGP4-01D

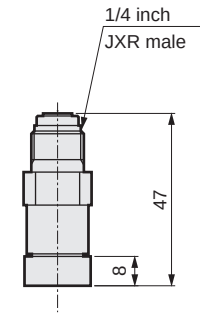


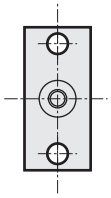




●MCGP4-F∗







Kalrez® is a registered trademark of DuPont.

Components for integrated gas supply system

Other components for IAGD4

Gasket

Name	Model no.
W seal gasket (nominal 6.35)	IAGD4-UGF-6.35GR

W seal mounting bolt

Name	Model no.	Applicable parts
Hexagon socket head cap bolt for W seal (M5 × 12, 4 pieces)	IAGD4-BOLT-M5 × 12-4	MAGD4-01D MAGD4A-11D MOGD4-11D MFGD4-11D MCGP4-01D MCGP4-F∗ Bypass block (for 26 mm pitch between surfaces) Bypass piping block (for 79.8 mm pitch between MFC surfaces) Sealing flange SEC-G111∗-W-1.5 (STEC MFC)
Hexagon socket head cap bolt for W seal (M5 × 35, 4 pieces)	IAGD4-BOLT-M5 × 35-4	MAGD4-01X MAGD4-02A MOGD4-01X FC-785 (Hitachi Metals MFC) FC-786 (Hitachi Metals MFC) FC-985 (Hitachi Metals MFC)
Hexagon socket head cap bolt for W seal (M5 × 40, 4 pieces)	IAGD4-BOLT-M5 × 40-4	SEC-7330∗-800A (STEC MFC) SEC-7340∗-800A (STEC MFC) SEC-F730∗-800A (STEC MFC) SEC-F740∗-800A (STEC MFC)
Hexagon socket head cap bolt for W seal (M5 × 43, 4 pieces)	IAGD4-BOLT-M5 × 43-4	SEC-7350∗-800A (STEC MFC) SEC-F750∗-800A (STEC MFC) FC-986 (Hitachi Metals MFC)

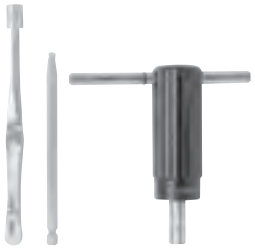
Contact CKD for details on applicable parts.

Maintenance tool

Maintenance tools (1 each: torque driver, torque driver bit, tweezers (gasket mounting tool))

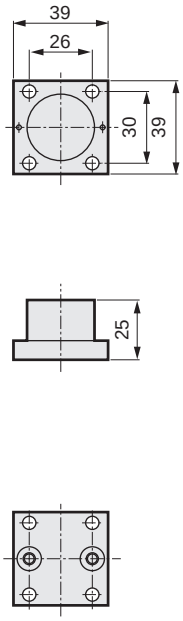
Name	Model no.
Maintenance tool set	IAGD4-MAINTENANCE

See the Instruction Manual for details on use.

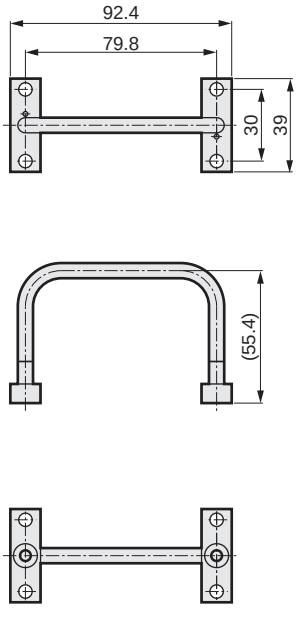


Top mount block

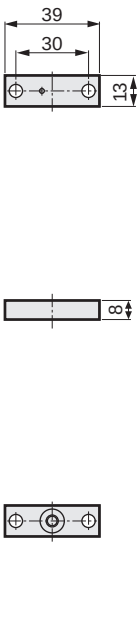
● Bypass block
(for 26 mm pitch between surfaces)



● Bypass piping block
(for 79.8 mm pitch between MFC surfaces)

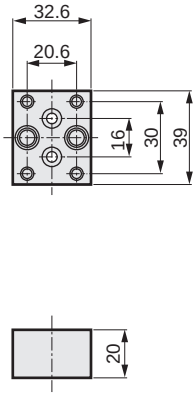


● Sealing flange

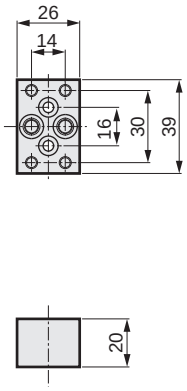


Base block

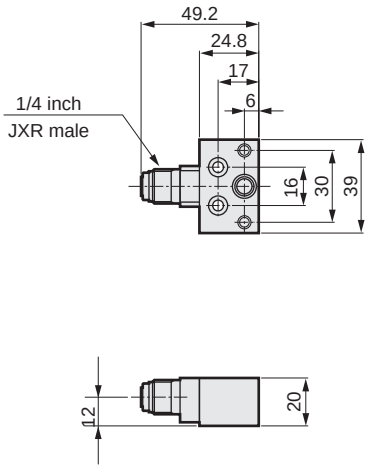
● Base block 1
(20.6 mm between surfaces)



● Base block 5
(14.0 mm between surfaces)



● 1/4 inch JXR male flange



Components for integrated gas supply system

Air operated valve for IAGD4

Custom order

Specifications

Descriptions		MAGD4-0	MAGD4-1
Working fluid		Inert gas/process gas	
Working pressure range Pa (abs)-MPa (G)		1.3×10^{-6} to 0.7	
Fluid temperature ℃		-10 to 80	
Ambient temperature ℃		-10 to 80	
Valve seat leakage Pa·m³/s (He)		1.3×10^{-9}	
External leakage Pa·m³/s (He)		2.8×10^{-12}	
Cv flow factor		0.1	0.26
Connection		W seal (nominal 6.35)	
Operating pressure MPa	NC	0.4 to 0.6	
	NO	0.4 to 0.5	
Operating pressure connection port		M5	
Material	Body	SUS316L	
	Diaphragm	Ni-Co alloy	
	Sheet	PCTFE	

How to order

MAGD4 - 02A - W - 1 2

Ⓐ Series
Ⓑ Valve shape
Ⓒ Seal shape
Ⓓ Actuation (V1)
Ⓔ Actuation (V2)

Symbol	Descriptions	Cv value
Ⓐ Series		
MAGD4	Air operated valve for IAGD4	
MAGD4A	Air operated valve for IAGD4 (Upgraded version type, for MAGD4A-11D only)	
Ⓑ Valve shape		**Cv value**
01D	1-station block D type valve (2-port)	0.1
01X	1-station block X type valve (3-port)	
01Y	1-station block Y type valve (3-port)	
02A	2-station block A type valve (3-port)	
11D	1-station block D type valve (2-port)	0.26
Ⓒ Seal shape		
W	W seal (nominal 6.35)	
Ⓓ Actuation (V1)		
1	NC	
2	NO	
3	NC (with proximity sensor (energized when valve closed))	
4	NO (with proximity sensor (energized when valve opened))	
5	NC (with proximity sensor (energized when valve opened))	
6	NO (with proximity sensor (energized when valve closed))	
Ⓔ Actuation (V2)		
1	NC	
2	NO	
3	NC (with proximity sensor (energized when valve closed))	
4	NO (with proximity sensor (energized when valve opened))	
5	NC (with proximity sensor (energized when valve opened))	
6	NO (with proximity sensor (energized when valve closed))	

<Example of model number>

MAGD4-02A-W-12

Ⓐ Series : Air operated valve for IAGD4
Ⓑ Valve shape : 2-station block A type valve (3-port)
Ⓒ Seal shape : W seal (nominal 6.35)
Ⓓ Actuation (V1) : NC
Ⓔ Actuation (V2) : NO

Note 1: Installation bolts, gasket, actuator and drive air fitting are not included. Please purchase them separately.
Note 2: Contact with the CKD Sales Office if a type with installation bolts is required.

Components for integrated gas supply system

Manual valve for IAGD4

Custom order

Specifications

Descriptions		MOGD4-01	MOGD4-11
Working fluid		Inert gas/process gas	
Working pressure range Pa (abs)-MPa (G)		1.3×10^{-6} to 0.7	
Fluid temperature ℃		-10 to 80	
Ambient temperature ℃		-10 to 80	
Valve seat leakage Pa·m³/s (He)		1.3×10^{-9}	
External leakage Pa·m³/s (He)		2.8×10^{-12}	
Cv flow factor		0.1	0.26
Connection		W seal (nominal 6.35)	
Material	Body	SUS316L	
	Diaphragm	Ni-Co alloy	
	Sheet	PCTFE	

How to order

MOGD4 - 11D - W - K A - S1

Ⓐ Series
Ⓑ Valve shape
Ⓒ Seal shape
Ⓓ Handle color
Ⓔ Other

Symbol	Descriptions	
Ⓐ Series		
MOGD4	Manual valve for IAGD4	
Ⓑ Valve shape		Cv value
11D	1-station block D type valve (2-port)	0.26
01X	1-station block X type valve (3-port)	0.1
Ⓒ Seal shape		
W	W seal (nominal 6.35)	
Ⓓ Handle color		
K	Handle color Black	
R	Handle color Red	
B	Handle color Blue	
Y	Handle color Yellow	
G	Handle color Green	
Ⓔ Other		
S1	With handle lock (only when valve is closed)	
Blank	No key	

Note 1: Installation bolts and gasket are not included.
Please purchase them separately.
Note 2: Contact with our sales office if a type with installation bolts is required.

<Example of model number>

MOGD4-11D-W-KA-S1

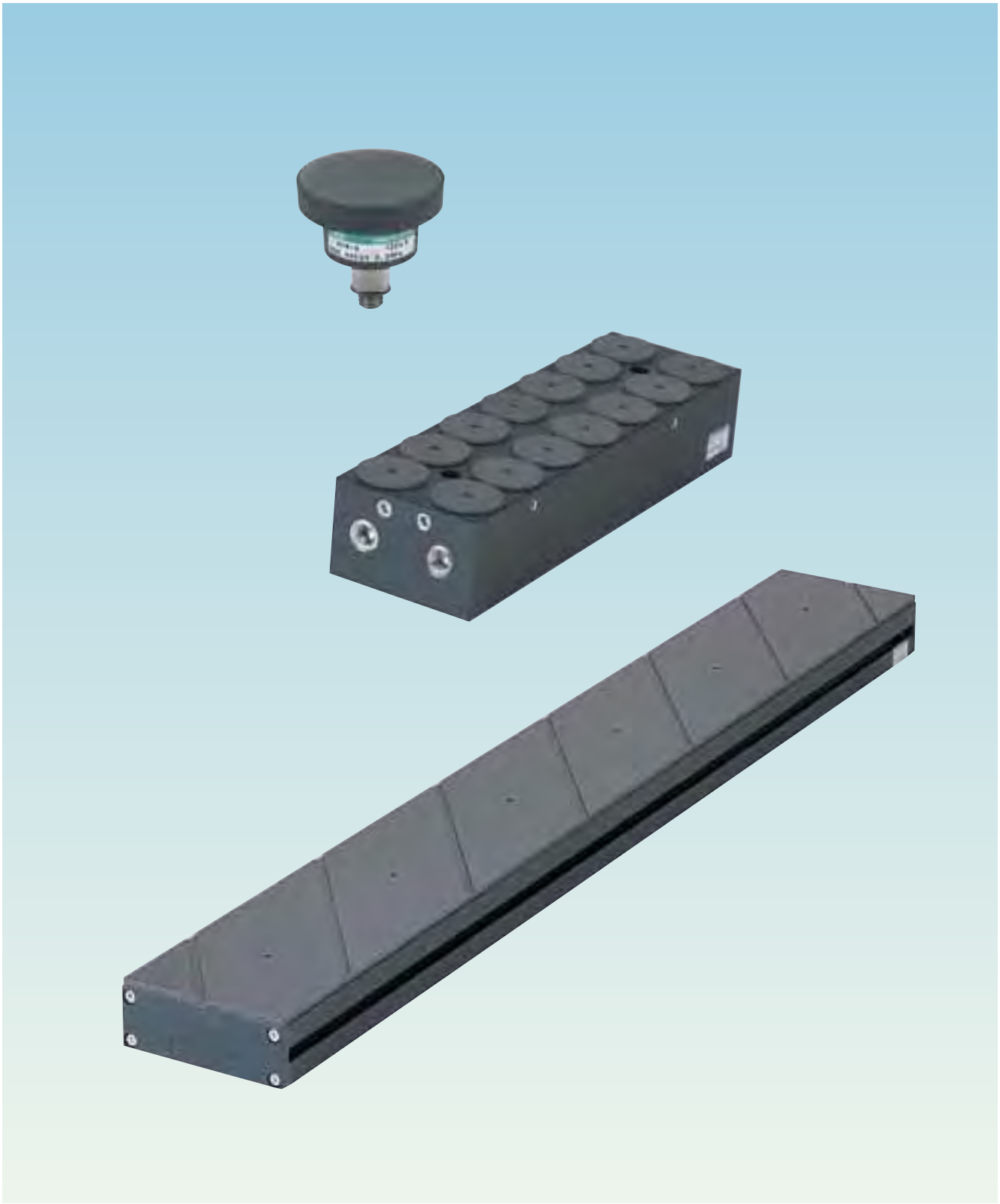
Ⓐ Series : Manual valve for IAGD4
Ⓑ Valve shape : 1-station block D type valve (2-port)
Ⓒ Seal shape : W seal (nominal 6.35)
Ⓓ Handle color : Black
Ⓔ Other : With handle lock (only when valve is closed)

CKD

Revolution in manufacturing lines to achieve defect-free and high yield production **New Product**

Glass float module
GFM Series

GLASS FLOAT MODULE



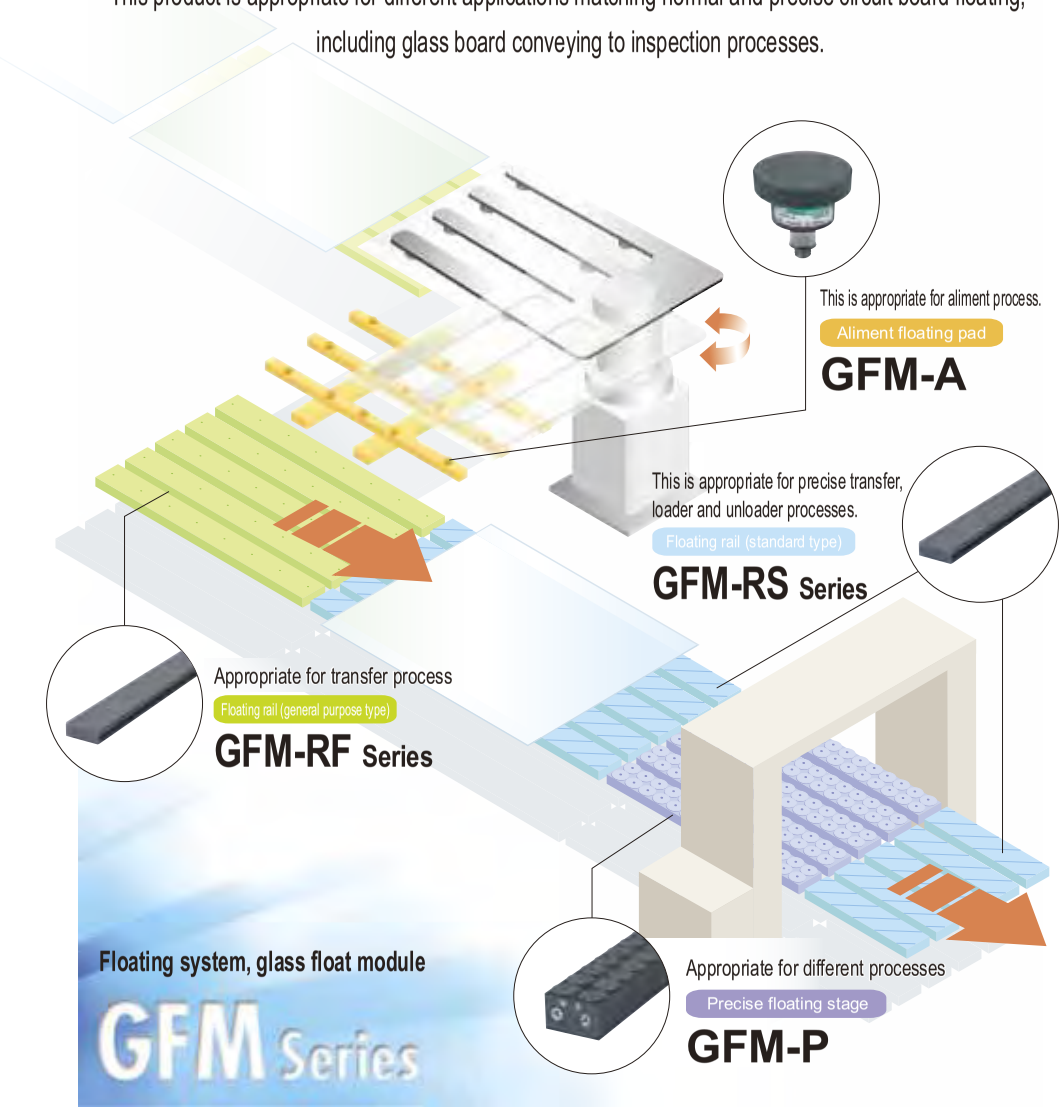
CKD Corporation
CC-883A

Revolution in manufacturing lines to achieve defect-free and high yield production

CKD Green Technology

Innovation in the glass conveying; a clean, non-contact and damage-free process achieved
Advanced **CKD Glass Float Module, GFM Series**
Using new materials, a high quality floating system is achieved, dramatically reducing air consumption, and suppressing static electricity and particle generations.

This product is appropriate for different applications matching normal and precise circuit board floating, including glass board conveying to inspection processes.



Non-contact, stable and precise floating

A new porous material realizes the stable floating, and reduces air consumption.

Static electricity of workpiece prevented

Static electricity is suppressed with a new antistatic material.

Clean level: Class 10※

Particles in floating air is suppressed with a new porous material.
※GFM Series, CKD test

This is appropriate for sensitive inspection.

Due to diffused reflection-free black body, workpieces are easily checked.

Great variety of applications

Proposing the best pneumatic components for floating.

GFM Series products

Series variation	Applications	Floating (μm)	Air consumption ℓ/min. (abs) (0.1MPa)*1	Page
GFM-A	Positioning	10μm and over	3–10	1
GFM-RF Series	Conveying	250μm and over	15–20	3
GFM-RS Series	Loader and unloader	150μm and over	15–20	3
GFM-P	Processes	30μm*2	2–3	7

*1 This flow is for reference.
*2 The number will changes based on combination of positive and negative pressure flows.

Safety precautions

Always read this section before starting use.

When designing and manufacturing a device using CKD products, the manufacturer is obligated to check that device safety mechanical mechanism, pneumatic control circuit, or water control circuit and the system operated by electrical control that controls the devices is secured.
It is important to select, use, handle, and maintain the product appropriately to ensure that the CKD product is used safely.
Observe warnings and precautions to ensure device safety.
Check that device safety is ensured, and manufacture a safe device.

⚠ WARNING

1 This product is designed and manufactured as a general industrial machine part.
It must be handled by an operator having sufficient knowledge and experience in handling.

2 Use this product in accordance of specifications.

This product must be used within its stated specifications. It must not be modified or machined.
This product is intended for use as a general-purpose industrial device or part. It is not intended for use outdoors or for use under the following conditions or environment.
(Note that this product can be used when CKD is consulted prior to use and the customer consents to CKD product specifications. The customer must provide safety measures to avoid risks in the event of problems.)

❶ Use for special applications requiring safety including nuclear energy, railroad, aviation, ship, vehicle, medical equipment, equipment, or applications coming into contact with beverage or food, amusement equipment, emergency shutoff circuits, press machine, brake circuits, or for safeguard.
❷ Use for applications where life or assets could be adversely affected, and special safety measures are required.

3 Observe corporate standards and regulations, etc., related to the safety of device design and control, etc.

ISO4414, JIS B8370 (pneumatic system rules)
JFPS2008 (principles for pneumatic cylinder selection and use)
Including High Pressure Gas Maintenance Law, Occupational Safety and Sanitation Laws, other safety rules, body standards and regulations, etc.

4 Do not handle, pipe, or remove devices before confirming safety.

❶ Inspect and service the machine and devices after confirming safety of the entire system related to this product.
❷ Note that there may be hot or charged sections even after operation is stopped.
❸ When inspecting or servicing the device, turn off the energy source (air supply or water supply), and turn off power to the facility. Discharge any compressed air from the system, and pay enough attention to possible water leakage and leakage of electricity.
❹ When starting or restarting a machine or device that incorporates pneumatic components, make sure that the system safety, such as pop-out prevention measures, is secured.

5 Observe warnings and cautions on the pages below to prevent accidents.

■ The safety cautions are ranked as "DANGER", "WARNING" and "CAUTION" in this section.

⚠ DANGER: When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries, or when there is a high degree of emergency to a warning.
⚠ WARNING: When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries.
⚠ CAUTION: When a dangerous situation may occur if handling is mistaken leading to minor injuries or physical damage.

Note that some items described as “CAUTION” may lead to serious results depending on the situation. In any case, important information that must be observed is explained.

Disclaimer

1. CKD cannot be held liable for any business interruption, loss of profit, personal injury, delay cost, or any other ancillary or indirect loss, cost, or damage resulting from the use of or faults in the use of CKD products.
2. CKD cannot be held responsible for the following damage:
   ① Damage resulting from failure of CKD parts due to fire from reasons not attributable to CKD, or by intentional or negligence of a third party or customer.
   ② When a CKD product is assembled into customer equipment, damage that could have been avoided if customer equipment were provided with functions and structure, etc., generally accepted in the industry.
   ③ Damage resulting from use exceeding the scope of specifications provided in CKD catalogs or instruction manuals, etc., or from actions not following precautions for installation, adjustment, or maintenance, etc.
   ④ Damage resulting from production modifications not approved by CKD, or from faults due to combination with other software or other connected devices.

Safety precautions

Always read this section before starting use.

Glass float module GFM Series

Design & Selection

1. Common

⚠WARNING

■ Use the product within the specifications range.
Do not use the product with exceeding the specifications range, otherwise a porous material could be damaged.

■ Avoid installation outdoors such as where high powder dust or direct sunlight contact with the product.
Do not use the product where corrosive or combustible gas contact with. Do not absorb such gases.

■ This product is used with compressed air. Do not use other fluids.

■ Do not machine the product additionally. Accuracy or strength could drop because of machining distortion, etc.

⚠CAUTION

■ Use dry clean compressed air Grade 1.6.2 -- solid particles: 0.1 μm; pressure dew point: 10°C; oil concentration: 0.1 mg/m^3.
(Based on compressed air quality grade; JIS B8392-1: 2000)
<Use of CKD dryer D Series or inline clean filter FCS Series is recommended.>

2. Swing type GFM-A

⚠WARNING

■ Pay attention when turning using the pad fixed with screws.
Screws could loosen during turning and cause problems.

■ When vacuuming and moving a part, note acceleration, impact, and wind pressure.
The vacuumed part could drop off during movement.

3. Rail type GFM-R*/precision type GFM-P

⚠CAUTION

■ Separately prepare a connection bracket to match your system's installing dimensions.
(Separate bracket kits are available, so contact CKD for details.).

■ Product installing threads pass through the air path, so air could leak from them.
<Only GFM-R Series>
This is prevented by using the installing bracket kit.

Export

⚠CAUTION

■ Products in this catalog include some subject to Export Trade Control Ordinances, indicated on each page. Observe laws and regulations when exporting these parts or devices containing these parts.

Installation & Adjustment

1. Common

⚠ WARNING

■ Before starting, check that load and joint connections are not loose or abnormal.

■ Confirm that the device runs properly before using.
After installing, repairing, or modifying the product, conduct a function inspection and confirm that the product is correctly installed.

■ Confirm that there is no machine interference and that the actuation system is normal.
Provide sufficient safety measures for this device so that the workpiece and this product do not interfere when the workpiece is moving.

⚠ CAUTION

■ Do not take the product out of the packing bag until just before piping.
Foreign matter entering from the piping port could cause problems.

■ When piping, flush pipes with air to remove foreign matter, swarf, etc.

■ Read the instruction manual before use.
Familiarize yourself with details before using the product.

■ Remove foreign matter from the installation surface or installation section by wiping with ethanol or scouring with air, etc.

2. Swing type GFM-A

⚠ WARNING

■ The porous section of this product tilts. To prevent interference with the workpiece, provide sufficient device safety measures, such as positioning this product away from the workpiece before the workpiece rises or before and after vacuuming.

⚠ CAUTION

■ When fixing the product in place, use an M5 screw for connecting the pipe at the lower end of the product, and tighten with the appropriate torque.
Use the across flat when tightening.
[Tightening torque: 1.0 to 1.5 (N·m)]
If transporting the system after installing, check that torque is appropriate after installing the device.

■ Due to the product structure, the porous surface may rise and fall slightly when the air supply is turned on and off.
Note workpiece floating and movement before and after vacuuming for this device.

3. Rail GFM-R*, precision GFM-P

⚠ WARNING

■ This product's carbon graphite is brittle and could break or scatter pieces on impact, resulting in injury.

⚠ CAUTION

■ Tighten the product's M screws with the appropriate torque.

Port thread	Tightening torque (N•m)
M4	0.5 to 0.6
M5	1.0 to 1.5

■ Do not use joints similar to small joints -- barbed or clamp joints -- when piping this product. The effective sectional area is small and flow may not be sufficient.

During Use & Maintenance

1. Common

⚠ WARNING

■ Refer to the instruction manual and conduct careful maintenance and inspection.
Incorrect handling could result in device or system damage or operation faults.

⚠ CAUTION

■ Conduct daily inspections and regular inspections to ensure that maintenance control is done correctly.
Insufficient maintenance could lower product functions, shorten product life, or result in damage or incorrect operations.

■ Stop use if leakage increases or if the device does not function correctly.
After installing, repairing, or modifying the product, conduct an appropriate function inspection and confirm that the product is installed correctly.

■ Release residual pressure before installing or removing the product.

■ When suspending use for a long time, place the product in a polyethylene bag and store it in a clean dry environment.

■ To ensure that product operation is optimum, conduct the following regular inspection once or twice a year.
① Check external leakage.
② Decrease of floating performance
③ Check appearance defectives (scratch, porous material defect or contamination on the surface) confirmation

Floating system/glass float module

Alignment floating pad **GFM-A**

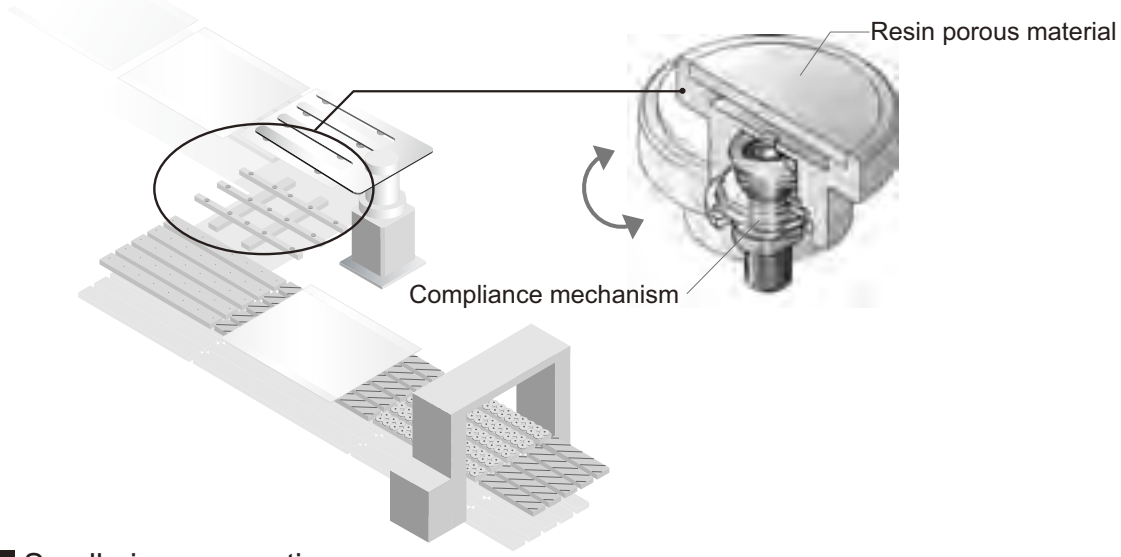
Swinging head type freely handles deflections.

● Reference floating: 10 µm and over ● Main applications: Alignment

Products subject to export trade control ordinances

The new resin porous material and CKD's original compliance mechanism enables deflections to be aligned.

■ CKD original "resin porous material + compliance mechanism" are provided. (PAT.P)



■ Small air consumption

Due to a porous material, the air consumption flow reduced to 1/2*.

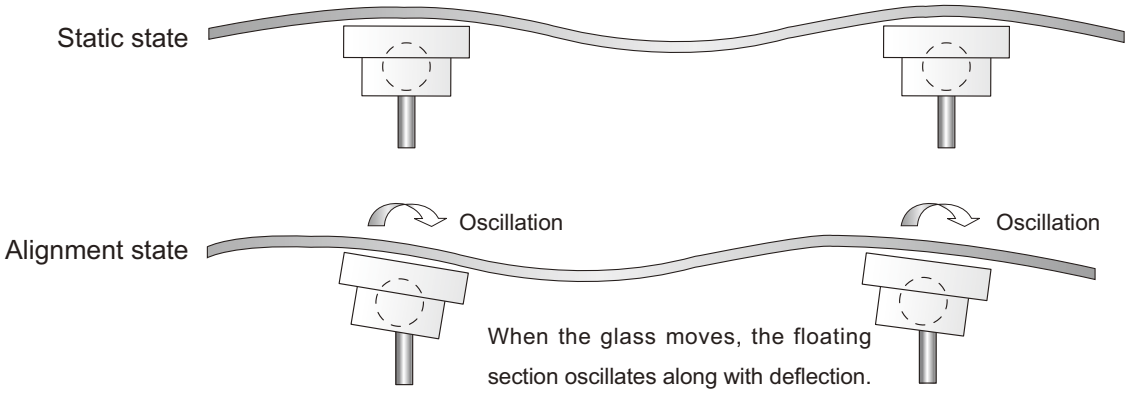
* Based on CKD test of GFM-A

■ Antistatic

Static electricity is suppressed by antistatic resin porous material.

■ Freely handle deflections

Non-contact floating is possible while tracking deflections on large glass substrates. (Image)

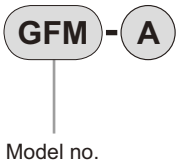


Specifications

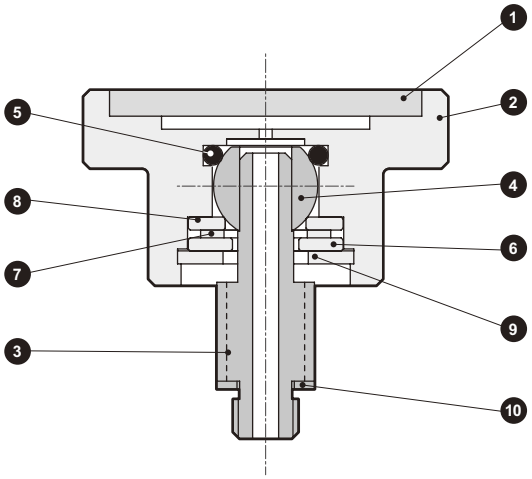
Descriptions		GFM-A
Working fluid		Clean compressed air (grade 1.6.2)
Working pressure range kPa	Floating	80 to 200
	Suction	-90 to -60
Ambient temperature °C		5 to 40
Mounting attitude		Facing porous material plane top only
Load N Note 1		1 to 5
Air consumption ℓ/min. Note 1		10 or less
Suction holding force N		5 or less (suction surface vertical)
Port size		M5
Weight g		Approx. 15

Note 1: This value applies at supply air pressure 100kPa.

How to order

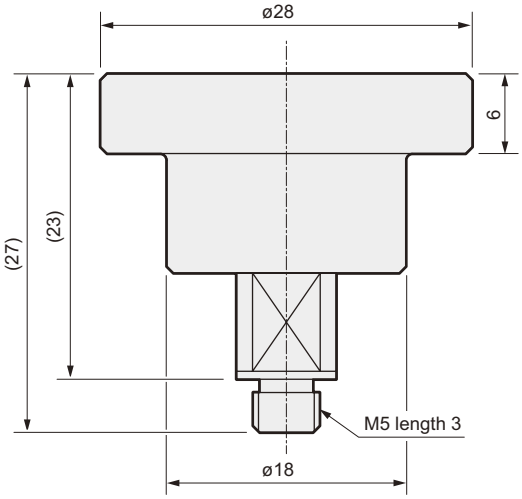


Internal structure and parts list



No.	Parts name	Material	Remarks
1	Porous material	Polyphenylene sulfide	With carbon fiber
2	Body	Polyphenylene sulfide	With carbon fiber
3	Shaft	Stainless steel	
4	Steel ball machined	Stainless steel	
5	O ring (S-7)	Nitrile rubber	
6	Metal washer	Stainless steel	
7	Wave washer for automobile	Stainless steel	
8	Metal washer	Iron steel	Electroless nickeling
9	C type snap ring for hole	Stainless steel	
10	Gasket	Nitrile rubber, steel	

Dimensions



Floating system/glass float module

Floating rail GFM-R$^{F}_{S}$ Series

● Floating: 150 μm and over ● Main applications: Transfer

Custom order

The new carbon graphite porous material and CKD's original design enables highly accurate floating transfer.

■ CKD original design (PAT.P)

Fluid technology accumulated over the years by CKD is applied.
A floating surface that floats accurately is realized.

■ Antistatic

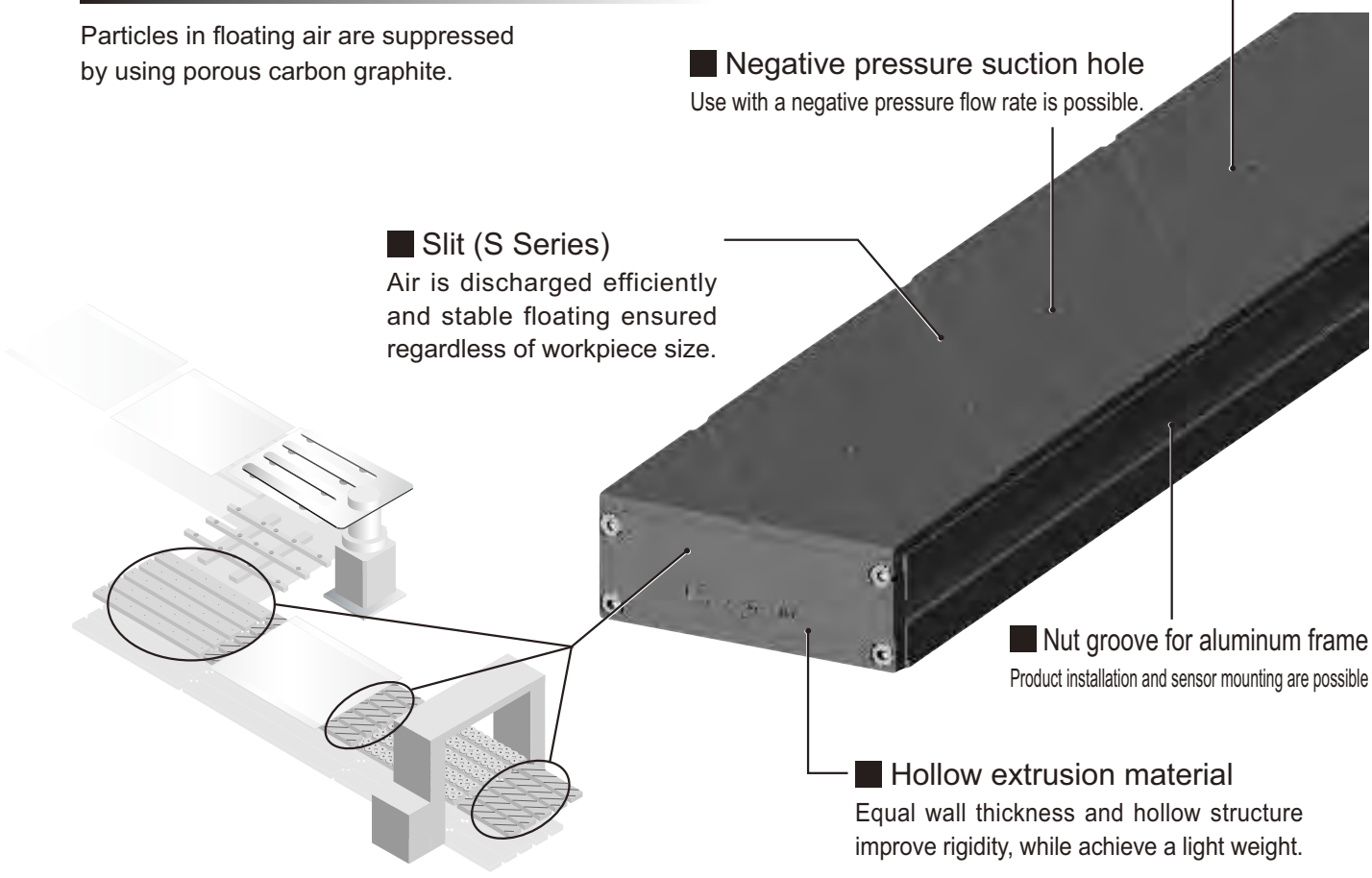
Using porous carbon graphite prevents static electricity.
Floating air entering porous material flows slowly and keeps the workpiece from being charged.

■ Stable floating

By incorporating porous material and optimally positioning the air path, stable floating is possible over a wide area.

■ Low particle occurrence

Particles in floating air are suppressed by using porous carbon graphite.



Specifications

Descriptions		GFM-RS-500 GFM-RF-500	GFM-RS-750 GFM-RF-750	GFM-RS-1000 GFM-RF-1000
Product size (L x W x H) mm		501 x 102 x 40	751 x 102 x 40	1001 x 102 x 40
Floating plane size (L x W) mm		500 x 100	750 x 100	1000 x 100
Working fluid		Clean compressed air (grade 1.6.2)		
Ambient temperature range °C		5 to 40		
Working pressure range	Positive pressure MPa	0 to 0.2		
	Negative pressure kPa	-50 to 0		
Consumption flow ℓ/min. Note 1		Approx. 12	Approx. 18	Approx. 24
Floating height μm Note 2		Approx. 150 (GFM-RS)/Approx. 250 (GFM-RF)		
Weight kg		Approx. 1.9	Approx. 2.7	Approx. 3.6

Note 1: The consumption flow is indicated when 0.1MPa is supplied. Consumption flow varies with the workpiece state and required floating rate. Use this as a guide for calculating the flow rate.
Note 2: When 0.1MPa is supplied. This is the value for when a 0.7 mm thick glass is floating. Use this as reference for floating height.

How to order

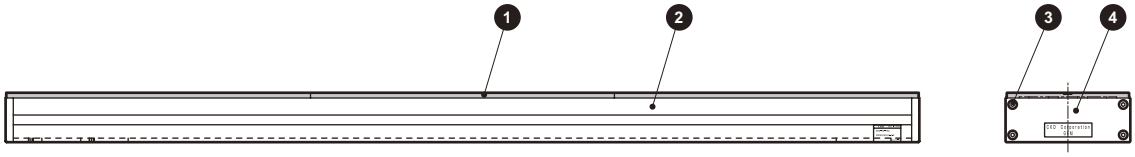
GFM - **RS** - **500**

- Model no.
- Ⓐ Surface shape
- Ⓑ Floating plane length

Symbol	Descriptions
Ⓐ Surface shape	
RS	With slit
RF	Without slit

Ⓑ Floating plane length (mm)
500
750
1000

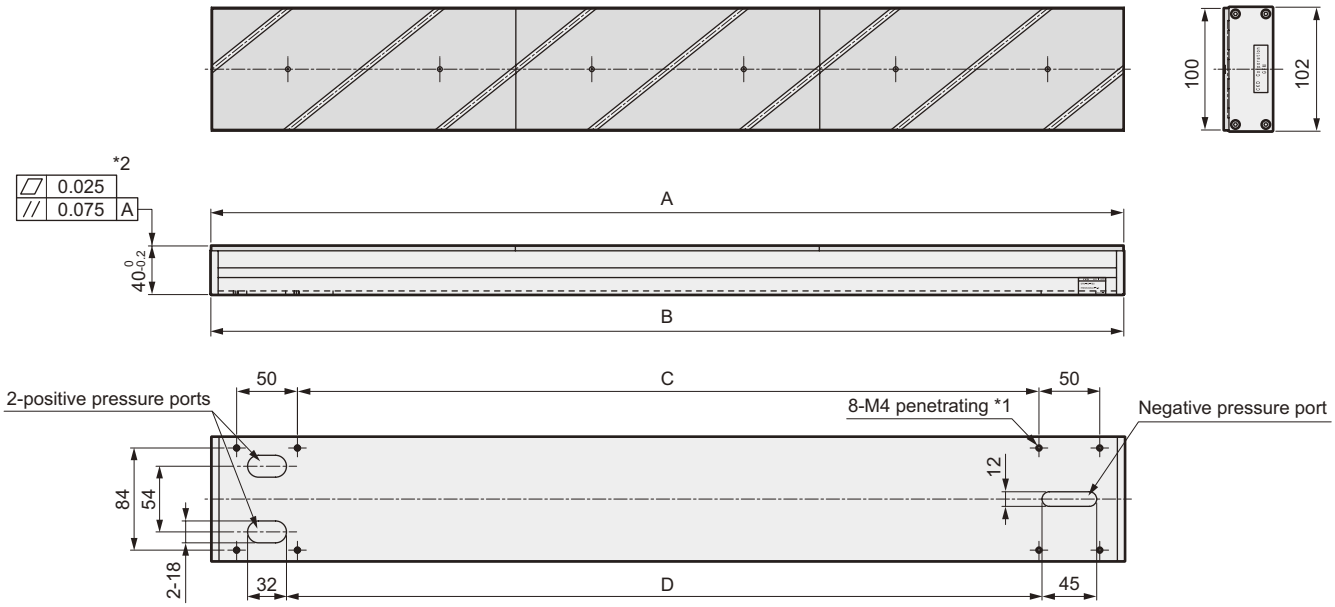
Appearance and parts list



No.	Parts name	Material	Remarks
1	Porous material	Carbon graphite	
2	Base	Aluminum alloy	Black alumite treatment
3	Hexagon socket bolt	Stainless steel	
4	Cover	ABS resin	

Dimensions

● With slit GFM-RS

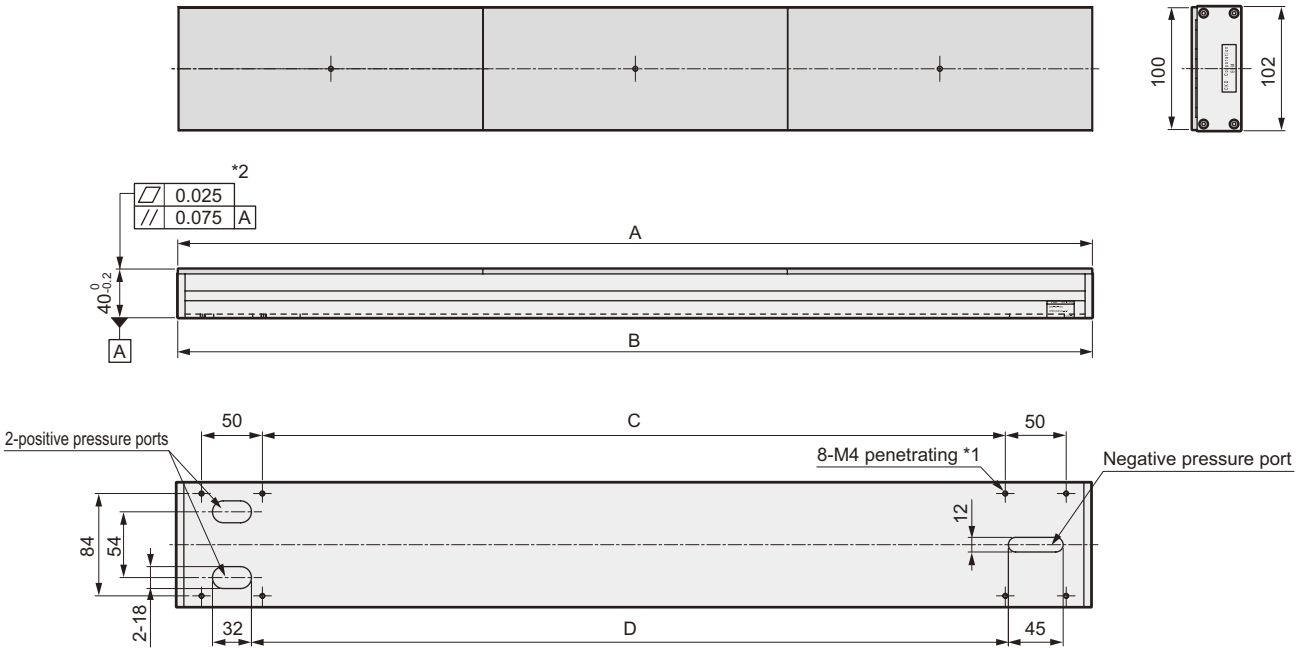


*1: Passes through the positive pressure port.
*2: Value measured at 25℃ constant temperature. Accuracy varies in an atmosphere other than 25℃.
GFM-RS-1000's flatness is 0.05 and parallelism is 0.1.

Model no.	A	B	C	D
GFM-RS-500	500	501	360	371.5
GFM-RS-750	750	751	610	621.5
GFM-RS-1000	1000	1001	860	871.5

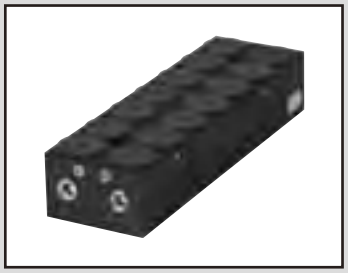
Dimensions

● Without slit GFM-RF



*1: Passes through the positive pressure port.
*2: Value measured at 25℃ constant temperature. Accuracy varies in an atmosphere other than 25℃.
GFM-RF-1000's flatness is 0.05 and parallelism is 0.1.

Model no.	A	B	C	D
GFM-RF-500	500	501	360	371.5
GFM-RF-750	750	751	610	621.5
GFM-RF-1000	1000	1001	860	871.5



Floating system/glass float module

Precise floating stage **GFM-P**

● Floating rate: 30±6 μm ● Main applications: Various inspection processes, work processes

Custom order

The new carbon graphite porous material and CKD's original design enables highly accurate floating.

■ CKD original design (PAT.P)

Fluid technology accumulated over the years by CKD is applied.
A floating plane is floated highly accurately.

■ High accuracy

Extra-precise machining ensures superb flatness and parallelism.

■ High floating accuracy

Highly accurate floating is enabled by using positive pressure and negative pressure flow.

■ Antistatic

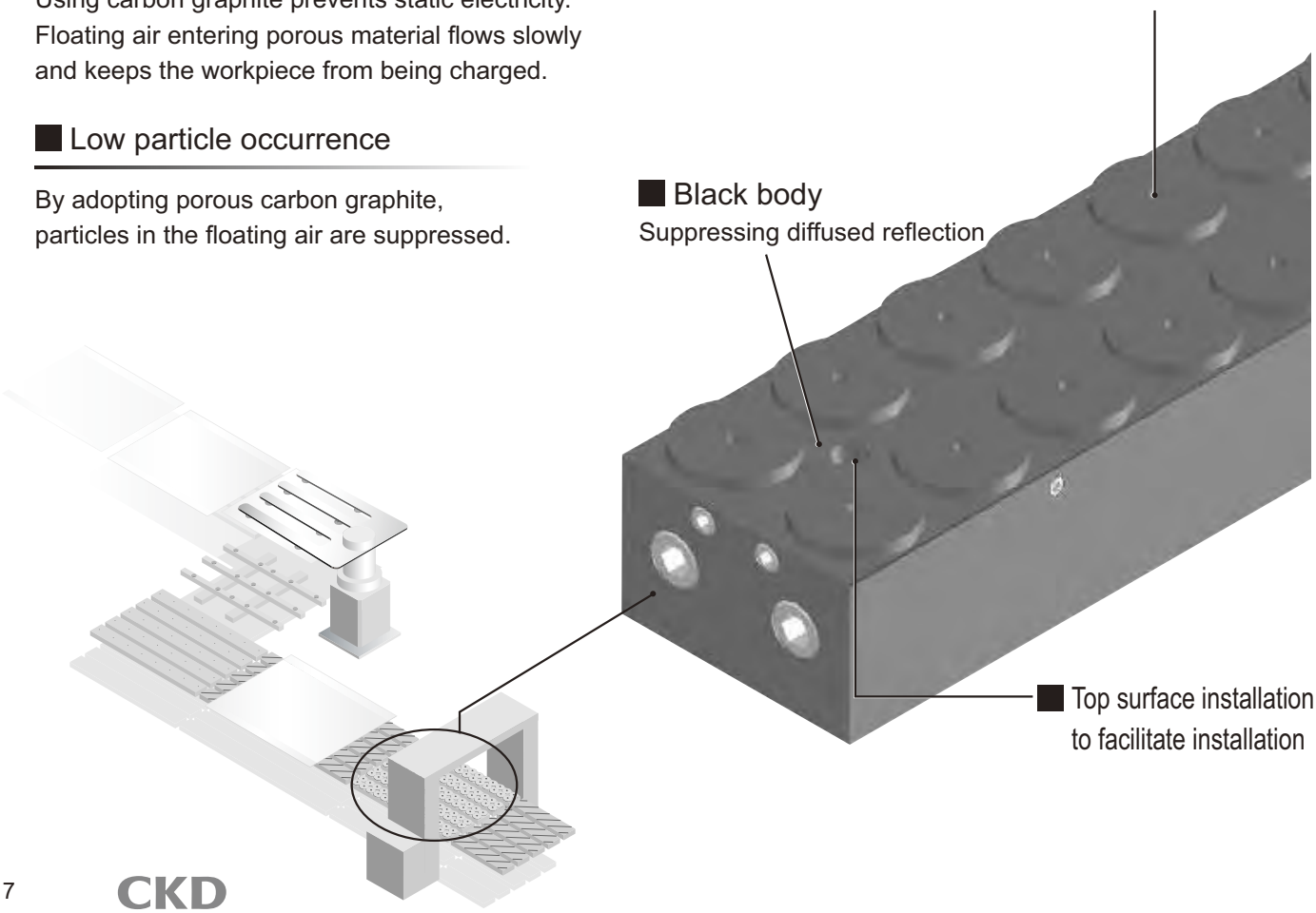
Using carbon graphite prevents static electricity.
Floating air entering porous material flows slowly and keeps the workpiece from being charged.

■ Low particle occurrence

By adopting porous carbon graphite, particles in the floating air are suppressed.

■ Negative pressure suction hole

Highly accurate floating is enabled by using positive pressure and negative pressure flow.

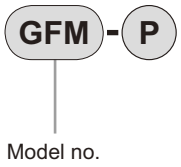


Specifications

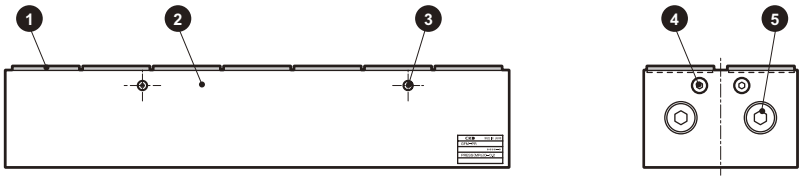
Descriptions		GFM-P
Product size (L x W x H) mm		250 x 76 x 50
Floating plane size (L x W) mm		250 x 76
Working fluid		Clean compressed air (grade 1.6.2)
Ambient temperature range °C		5 to 40
Working pressure range	Positive pressure MPa	0 to 0.2
	Negative pressure kPa	-50 to 0
Floating flatness µm Note 1		12 µm or less (30 µm floating)
Consumption flow ℓ/min. Note 2		Approx. 2 to 3
Floating height µm Note 3		Approx. 70
Weight kg		Approx. 2.2

Note 1: The difference of the floating plane's MAX-MIN is indicated. Supply flow rate conditions vary with the workpiece state and the user's working conditions. Use this as a guide for floating flatness.
Note 2: This indicates the consumption flow when 0.1MPa supply. Consumption flow varies with the workpiece state and required floating rate. Use this as a guide for calculating the flow rate.
Note 3: When 0.1MPa is supplied. This is the value for when a 0.7 mm thick glass is floating. Use this as reference for floating height.

How to order

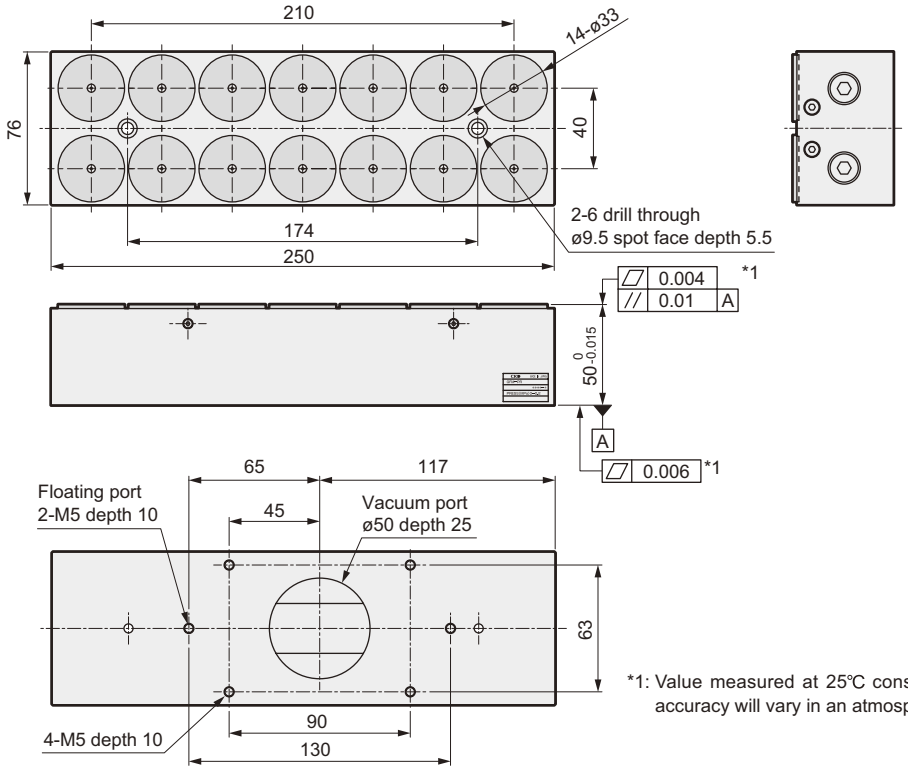


Appearance and parts list



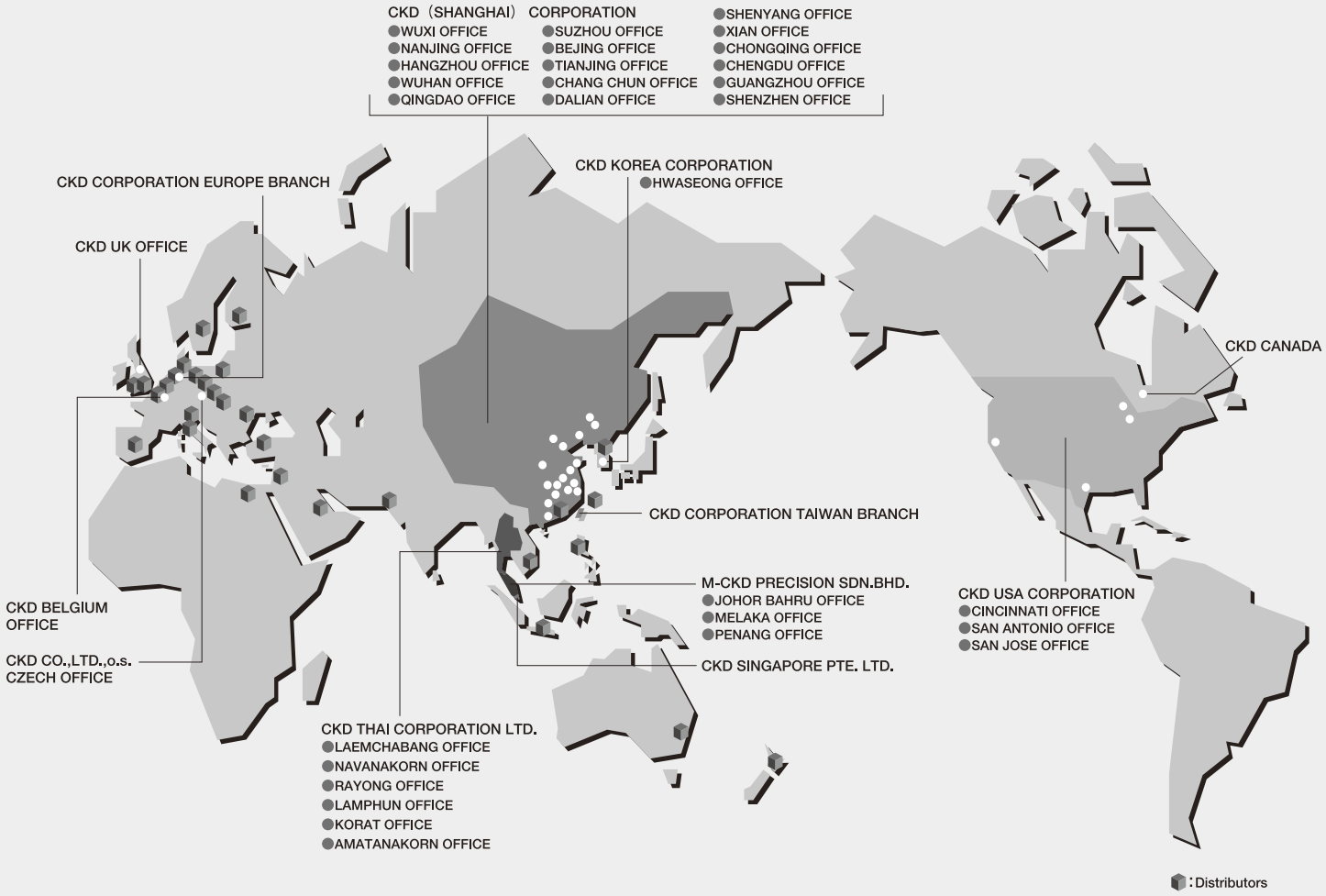
No.	Parts name	Material	Remarks
1	Porous material	Carbon graphite	
2	Base	Aluminum alloy	Black alumite treatment
3	Hexagon socket set screw	Stainless steel	
4	Hexagon socket set screw	Stainless steel	
5	Hexagon socket set screw	Stainless steel	

Dimensions



*1: Value measured at 25℃ constant temperature room. The accuracy will vary in an atmosphere that deviates from 25℃.

WORLD-NETWORK



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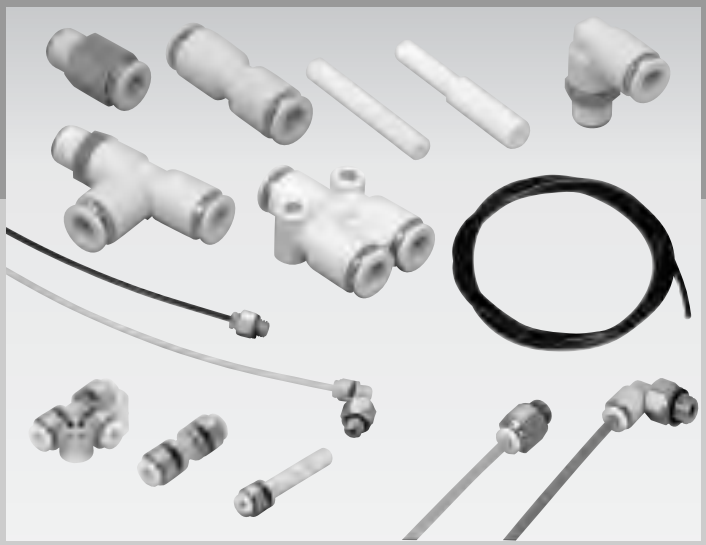
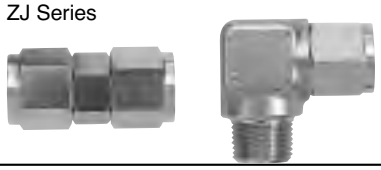
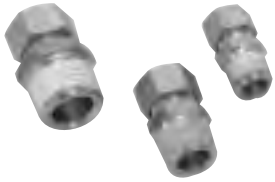
Joint / tube

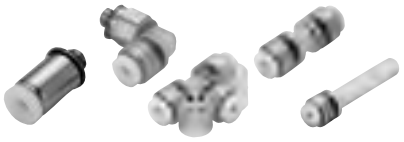
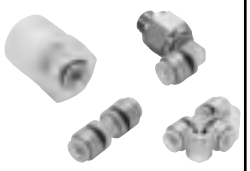
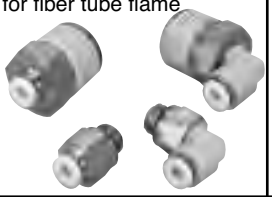
■ Pneumatics auxiliary components



CONTENTS

Joint

Model / product appearance	Feature	Applicable bore size	Port size						Page
			M3	M5	1/8	1/4	3/8	1/2	
● Miniature joint F Series 	Miniature type Barbed, clamp joint	ø3.2	●	●	●				922
		ø4	●	●	●				
		ø6		●	●				
● Joint GW Series 	Push-in joint For R screw, standard sealant is applied. Flame resistance resin is provided as standard.	ø3.2	●	●					930
		ø4	●	●	●	●			
		ø6		●	●	●	●		
		ø8			●	●	●		
		ø10			●	●	●	●	
		ø12				●	●	●	
		ø16					●	●	
● Joint mini-type GWJ Series 	Push-in joint Compact type For R screw, standard sealant is applied.	ø3.2	●	●	●				944
		ø4		●	●				
		ø6		●	●				
● Joint stainless steel type ZSP Series 	Push-in joint SUS303 or equivalent is used for body metal For R screw, standard sealant is applied.	ø4		●	●	●			950
		ø6		●	●	●	●		
		ø8			●	●	●		
		ø10			●	●	●	●	
		ø12				●	●	●	
● Joint stainless steel type ZW Series 	Push-in joint Flame resistance resin is provided as standard. SUS304 is used for body metal For R screw, standard sealant is applied.	ø4		●	●	●			959
		ø6		●	●	●	●		
		ø8			●	●	●		
		ø10				●	●	●	
		ø12					●	●	
● Female joint stainless steel type ZJ Series 	Easy Fit mechanism, tightening joint SUS316 is used for body metal	ø4			●	●			963
		ø6			●	●	●		
		ø8			●	●	●		
		ø10				●	●	●	
		ø12				●	●	●	
● Female joint MJ/JL Series 	Tightening joint Can be used for copper tube.	ø4			●	●	●		969
		ø6			●	●	●		
		ø8			●	●	●		
		ø10				●	●	●	
		ø12				●	●	●	
		ø15					●	●	
● Rotary joint RJF Series 	High rigidity and low sliding resistance achieved with built-in bearing Ample lineup includes 4, 6, 8, 12 or 16 circuits	–		●	●				976

Model / product appearance	Feature	Applicable bore size	Port size						Page
			M3	M5	1/8	1/4	3/8	1/2	
● Push-in joints for fiber tube standard type PG Series 	Push-in joint PP resin incorporated as standard to increase corrosion resistance For R screw, standard sealant is applied.	ø1.8	●	●	●				981
● Push-in joints for fiber tube clean type CG Series 	Push-in joint PP resin incorporated as standard to increase corrosion resistance SUS304 is used for body metal	ø1.8	●	●	●				981
● Push-in joints for fiber tube flame resistant type RG Series 	Push-in joint Flame resistance resin is provided. For R screw, standard sealant is applied.	ø1.8		●	●				996
● Dedicated joint for fiber tube PTN* Series 	With retainer collar For R screw, standard sealant is applied.	ø1.8	●	●	●				1002

Tube

Model	Feature	Tube outer diameter									Page
		ø1.8	ø3.2	ø4	ø6	ø8	ø10	ø12	ø15	ø16	
Fiber tube antistatic type (Push-in joint)	Extremely fine air tube as fine and flexible as lead wire. Appropriate where difficult to pipe or short piping such as narrow and tiny space, etc.	●									982
Fiber tube clean type (Push-in joint)	High corrosion resistant materials (special polyolefin) incorporated for use in cleanrooms. Ideal for fields a requiring clean environment, including semiconductor manufacturing, medicine, and foodstuff manufacturers.	●									982
Fiber tube flame resistant type (Push-in joint)	Push-in joint tubing using flame-resistant materials. Suitable for piping in narrow space while maintaining flexibility.	●									997
Fiber tube antistatic type	Extremely fine air tube as fine and flexible as lead wire. Outstanding flexibility and high piping freedom enable piping in difficult places such as small spaces.	●									1003
Antistatic tube	This tubing prevents electrostatic discharge and dust from accumulating. Outstanding flexibility and high piping freedom enable piping in difficult places such as small spaces.		●	●	●	●	●	●			1009
Soft nylon tube	Very flexible comparing to conventional nylon tube. Appropriate for piping in limited space or complicated piping.		●	●	●	●	●	●	●	●	1012
Urethane tube	Due to new manufacturing process, as same outer diameter as it was, while larger inner diameter and increased strength are realized. This piping tube is also used for larger than flow rate.			●	●	●	●	●			1013
Urethane tube	Durable and flexible due to high mechanical strength.		●	●	●	●	●	●			1014
Coiling tube	This is a coiling extensible tube.				●	●	●	●			1014
Flame resistant tube	Flame retardant material used epoch-making tube. When welding spark, etc., contact, tube does not last burning.			●	●	●	●	●			1015

Pneumatic components (joint / tube)

Safety precautions

Always read this section before starting use.
Refer to Intro 67 for general precautions, and to "⚠ Safety precautions" in this section for details on each series.

Design & Selection

⚠WARNING

■ Use the product within specifications.
Using this product with fluid other than compressed air or at a pressure or temperature exceeding the specifications could result in rupture, the tube coming off, or leakage.

■ Avoid installing this product outdoors or where it is exposed to direct sunlight.

■ Do not use the normal joint if electrostatic discharge could build up. Otherwise system faults or failure could occur. An antistatic joint and antistatic tubing should be used in such a case.

■ Do not constantly push down or apply a load onto the push-ring for the push-in joint.
- The tube may lose its ability to hold.
- When transporting an assembled product, avoid positions which constantly press down on the push ring.

⚠CAUTION

■ Confirm that the product will withstand the working environment.
- This product cannot be used in an environment where it could be functional damage could occur.
For example, a special environment reaching high temperatures, having a chemical atmosphere, or where vibration, humidity, moisture or gas are present. An environment where ozone is generated. Outdoors or where the product could be subject to direct sunlight. Where cutting oil, coolant or spatter could come in contact. Where static electricity is a problem.

■ Confirm that PTFE can be used.
- The sealant contains PTFE (polytetrafluoroethylene resin) powder. Check that this poses no problem during use.

■ Consult with CKD if ozone could occur in supplied air. (An ozone-resistant series is available.)

■ Avoid using this product in hot or humid places, or where it could be subject to direct sunlight. Install this product where the temperature is 40°C or less.

■ Flame-resistant resin (equivalent to UL94 Standard V-O) is provided for GW Series' push ring, but not for GWJ Series. Check specifications when selecting the product.

ZSP Series

■ The chemical resistance is SUS440 or equivalent. Use is not possible if higher chemical resistance is required.

■ Consult with CKD when using in a corrode environment. The joint body could be damaged under some conditions.

Installation & Adjustment

⚠WARNING

■ Securely insert the tube until it contacts the joint's tube end, and check that it does not come off the joint.

■ Stop air and confirm that there is no residual pressure before replacing the tube.

Piping

⚠CAUTION

■ Observe the following precautions when using nylon tubes or urethane tubes for piping material.
- Use the designated tube and CKD plastic plug (GWP Series). Do not use metal plugs.
Tube outer diameter precision
  - Polyamide tube : Within ±0.1mm
  - Polyurethane tube (up to ø6) : Within ±0.1mm
  (ø8 to) : Within $^{+0.1}_{-0.15}$mm

Use a tube with a hardness of 92° or more. If a tube that does not satisfy diameter accuracy or hardness is used, chucking force may drop or the tube may come off or be difficult to insert.
Consult with CKD when using a nondesignated tube or plug.
- Use a flame resistant tube or metal pipe where spatter could occur.
- When using the standard push-in joint on the spiral tube, fix the base of the tube with a hose band. Rotation occurs, and holding performance is decrease.
- Cut the tube at right angles using a dedicated cutting tool
- Do not use a worn or damaged tube. That could be crushed or rupture.
- Do not reuse a tube that could be deteriorated and deformed.
- Do not let the tube directly contact other surfaces, it could wear and break.

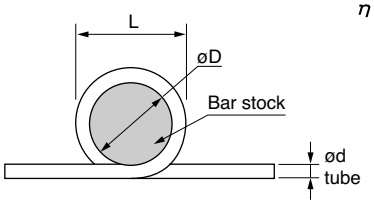
■ Do not use this product for applications that constantly rotate, vibrate or which have a tube that moves vigorously.
- The elbow type can be mounted by turning it, but must not be used for constant rotating or oscillating applications. Otherwise the joint could be damaged.
- Provide sufficient allowance in the tube so that it does not bent suddenly.

■ Use tubing within the minimum bending radius but long enough to avoid sharp bends.

- Consider changes in tubing length caused by pressure when tubing is connected, and provide sufficient length within the minimum tube bending radius.
- Measuring method

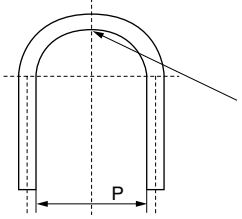
(1) Minimum bending radius (JIS B8381)
The values are based on JIS B8381.
If tubing is tightly wound around a round rod, indicate the rod radius when variation η reaches 25%.

$$\eta = \left(1 - \frac{L-D}{2d}\right) \times 100$$



η : Deforming ratio (%)
d : Tube outer diameter(mm)
L : Measuring volume (mm)
D : Round rod diameter (mm) (Minimum bending radius of 2 time)

(2) Minimum installation radius
To measure, simply bend the tube and confirm the radius when tube diameter deformation is 10%.



Shall be the minimum mounting pitch when the deformation rate is 10%. Min. installation radius = P/2

■ Always flush just before piping pneumatic component.

- Any foreign matter that has entered during piping must be removed so it does not enter the pneumatic component. Remove all swarf and foreign debris generated during piping and tube insertion before starting use.

■ When supplying compressed air for the first time after connecting pipes, do not apply high pressure suddenly.

- Piping connection could be dislocated or the piping tube fly off, leading to accidents.

■ After connecting piping, check pipe connections for air leaks before supplying compressed air.

- Apply a leakage detection agent on pipe connections with a brush, and check for air leaks.

■ Apply adequate torque when connecting pipes.

- To prevent air leakage and screw damage. First tighten the screw by hand to prevent threads, then use a tool. Check that the tool's hexagon face and wrench are the correct size.

(Reference value)

Port thread	Tightening torque N·m
M3	0.3 to 0.6
M5	1.0 to 1.5
Rc1/8	3 to 5
Rc1/4	6 to 8
Rc3/8	13 to 15
Rc1/2	16 to 18

* The above values apply when the mating screw is a JISB 0203 tapered female thread for piping (material: C3604BD).

■ Connect piping so that connections are not dislocated by system movement, vibration, or tension.

- Control of actuator speed will be disabled if piping on the exhaust side of the pneumatic circuit is disengaged.
- When using the chuck holding mechanism, the chuck will be released creating a hazardous state.
- Confirm that the tube has been inserted properly, and make sure that there is no tension during use. The tube could be dislocated or damaged if there is any tension.

■ Make sure that the joint and tube are not twisted or pulled, and that moment load is not applied.

■ Do not tighten while pressure is applied.

■ Observe the following precautions when using nylon tubes or urethane tubes for piping material.

- Use a flame resistant tube or metal pipe where spatter could occur.
- Use a hydraulic hose for common piping for hydraulic and pneumatic specifications.
- When using the standard push-in joint on the spiral tube, fix the base of the tube with a hose band. Rotation occurs, and holding performance is decrease.
- When using for hot liquids, use a soldered screw joint. The push-in join cannot be used.

■ Check that tubing is not worn or damaged.

- Tubing could be crushed, break, or be dislocated.

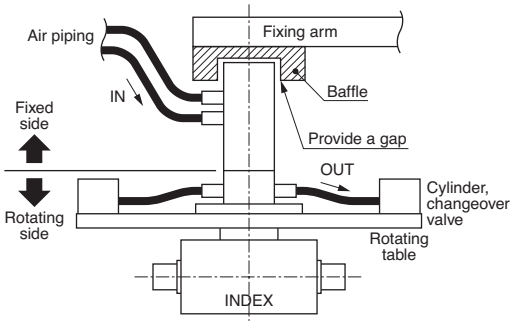
■ Use the designated tube.

■ Securely insert the tube to the tube end, and make sure that the tube cannot be pulled off.

RJF Series

⚠WARNING

■ Fixing method (fixed side)
Always provide a gap at the connection of the product (fixed side) and baffle to allow a slight axis deviation. Applying an excessive load on the rotating side axis could result in damage or air leaks.



■ Fixing method (rotating side)
When using this product (rotating side) in a place with a particularly high movement frequency, always use an accurate tightening method. If the product's moving sections could pose a risk to humans, devices or systems, provide a structure so that those sections cannot be directly touched.

■ Provide sufficient space for maintenance and inspection.

Safety precautions

Always read this section before starting use.
Refer to Intro 67 for general precautions, and to "⚠ Safety precautions" in this section for details on each series.

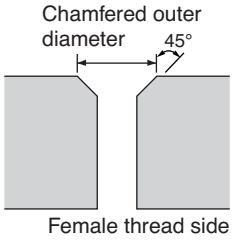
Installation & Adjustment

⚠CAUTION

■ Cut the tube with a dedicated cutter, and cut at a right angle.

■ If the set screw is M3 or M5 screw, the chamfered outer diameter of the female thread side must be within the following values.

Port thread	Chamfered outer diameter (mm)
M3	ø3.3 to 3.9
M5	ø5.4 to 5.8

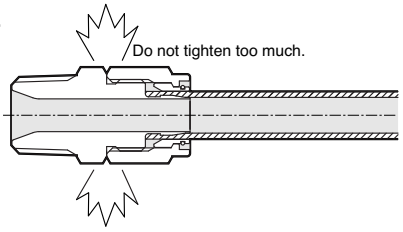


■ The effective sectional area of the turn elbow (GWL*-*-T, GWL*-*-2T) varies based on the direction.

ZJ Series

■ Except for separating the main body and nut, do not disassemble or modify joint components. Otherwise functions cannot be guaranteed.

■ This product and nuts are made of the same material (SUS316).
When tightening, stop as soon as the body and nut come in contact.
Tightening tubing too much could cause seizure at threads, making it difficult to remove tubing.



ZSP Series

■ When using a non-CKD tube, make sure that the tube's outer diameter tolerance satisfies the specifications given in Table 1.

Table 1 Tube outer diameter tolerance

Tube type	Outer diameter dimension tolerance
Urethane tube	Nominal diameter ±0.15
Nylon tube	Nominal diameter ±0.1

■ Use within the recommended tightening torque range given in Table 2.

Table 2 Recommended tightening torque

Port thread	Tightening torque N·m
M5	1.0 to 1.5
R1/8	7 to 9
R1/4	12 to 14
R3/8	22 to 24
R1/2	28 to 30

■ The joint can be rotated to a random direction and mounted. However, this product must not be used for constantly rotating or swaying applications.

Keeping

■ The joint is made of highly corrosion-resistant material, but rust could spread from another point. Avoid storing this part with products made of other materials, and store in a clean, dry place.

ZJ Series

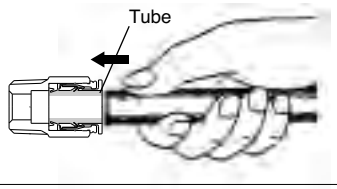
■ Store this product with nuts as a set. If parts are stored separately, the body and nut threads or body protrusions (seals) could be damaged or connection faults or leaks occur.

During Use & Maintenance

⚠CAUTION

Mounting and removal

Installation



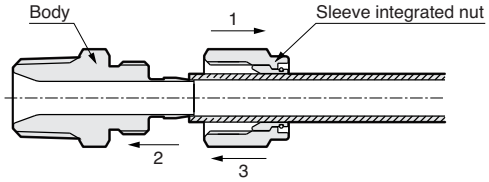
Push the tube in until it contacts the tube end.
Check that the tube is not dislocated from the joint. Tube goes in 15 to 21mm into the end of the joint body. The end of the mounted tube must be cut at a right angle.

Removal

While pushing the push ring with a finger, pull the tube to remove it.

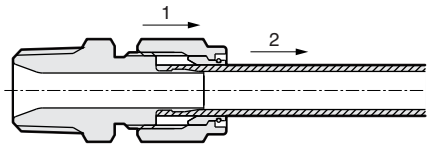
ZJ Series

Installation



Pass tubing through the sleeve integrated with the nut.
Insert tubing into the main body, and tighten the sleeve integrated with the nut until it contacts the body.
Stop tightening the sleeve integrated with the nut when the body and nut come in contact.
Tightening tubing too much could cause seizure at threads, making it difficult to remove tubing.

Removal



Loosen the sleeve integrated with the nut and pull out tubing.
The sleeve integrated with the nut can be reused.

F Miniature joint

Port sizeM3 to 1/8(Rc or R)

RoHS CAD

● 44 types of miniature joints are available with port size M3, M5, bore size ø3.2, ø4, ø6

■ Barbed joint

Straight/FTS

• Applicable tube O.D. : ø3.2 to ø6
• Page : 924

Elbow/FTL

• Applicable tube O.D. : ø3.2 to ø6
• Page : 924

Branch/FTT

• Applicable tube O.D. : ø3.2 to ø6
• Page : 924

Barbed nipple/FTS-0

• Applicable tube O.D. : ø3.2 to ø6
• Page : 924

■ Clamp joint

Straight/FCS

• Applicable tube O.D. : ø3.2 to ø6
• Page : 925

■ Double screw nipe

Elbow/FCL

• Applicable tube O.D. : ø3.2 to ø6
• Page : 925

Straight/FNS

• Page : 925

■ Socket

Straight/FSS

• Page : 925

Elbow/FSL

• Page : 926

Branch/FST

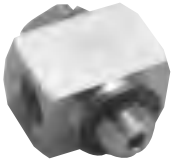
• Page : 926

■ AdjustableSocket

Elbow/FAL

• Page : 926

Branch/FAT



• Page : 926

Cross/FAX

• Page : 927

Deforming union Tee/FAY

• Page : 927

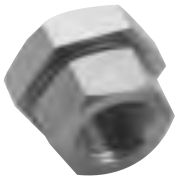
■ Bush

FBS

• Page : 927

■ Bulk head

FWS sales unit : 5 pieces



• Page : 927

■ Plug

FPL

• Page : 928

■ Extension

FLS

• Page : 928

■ Manifold

FMB sales unit : 1 piece

• Page : 928

FMH sales unit : 1 piece

• Page : 928

■ Gasket

FGS sales unit : 100 pieces

• Page : 928

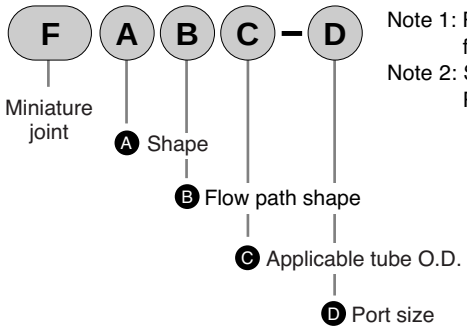
● If sales unit is not specified, the product is packed 10 pcs/1 bag.

Specifications

Descriptions	F
Working fluid	Compressed air
Max. working pressure MPa	0.7 or less
Ambient / fluid temperature ℃	-5 to 60 (no freezing)
Applicable tube	Soft nylon tube (model no. FH-3224, F-1504, F-1506) Urethane tube (model no. U-9504, U-9506) Note

Note: Use urethane tube within 0 to 60°C range.
(Refer to page 1008 for the dimensions of tube and working pressure.)

How to order



Note 1: Refer to model no. sections in dimensions (pages 924 to 928) for detailed combination of model no.
Note 2: Sales unit is 10 pieces/1 bag.
Refer to the system table on page 922 for model sales units.

Ozone specifications (Ending 5)

F –·····– P11

Clean room specifications (catalog No. CB-033SA)

F –·····– P80

Internal structure and parts list

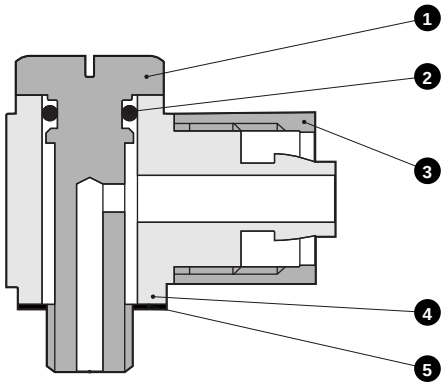


Figure shows FCL type.

No.	Parts name	Material	Treatment
1	Bolt	Brass	Electroless nickeling
2	O ring	Nitrile rubber	—
3	Clamp ring	Brass	Electroless nickeling
4	Body	Brass	Electroless nickeling
5	Gasket	Nitrile rubber, Steel	—

Safety Precautions

(1) If urethane tube is used with 40° and over, use a clamp joint.
(2) Use a nylon tube with tolerance of diameter within ±0.1, while urethane rubber tube within $^{+0.1}_{-0.15}$.
(3) Type with slit on clamp ring of clamp joint is for tube O.D. 3.2mm.
(4) If elbow, branch, cross, deforming branch or barbed joint is used at frequently moving tube section, trouble may occur. So please avoid use in such place.
(5) Bending radius of tube is to be the right value and over near a joint.

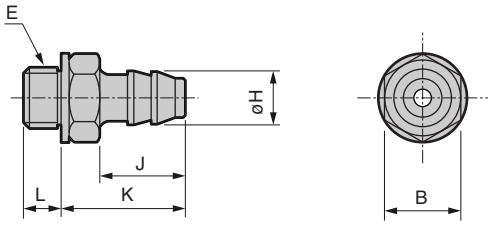
Minimum bending radius mm		Barbed joint	Clamp joint
ø3.2	Soft nylon	20	10
ø4	Soft nylon	20	10
	Urethane	20	10
ø6	Soft nylon	40	20
	Urethane	40	20

Dimensions: Barbed joint (straight, elbow, branch, barbed nipple)

CAD

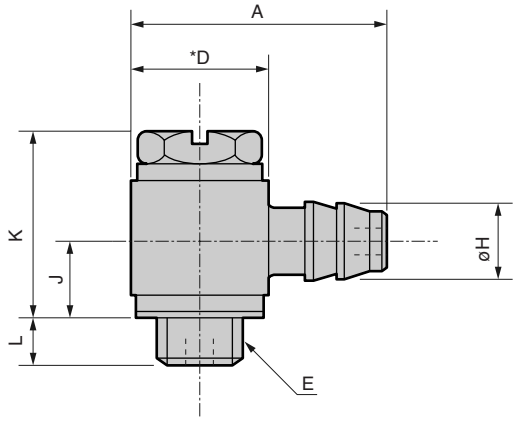
Barbed joint

● Straight/FTS



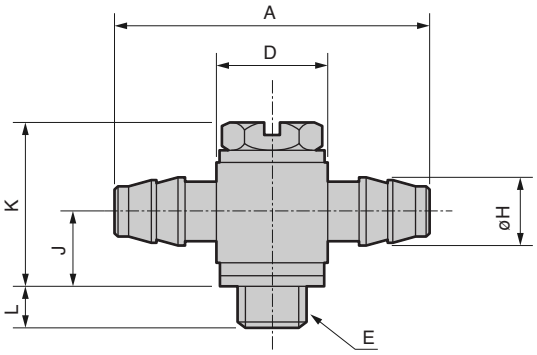
Model no.	Applicable tube O.D.ø	B	E	Min. bore size	H	J	K	L	Effective sectional area (mm²)
FTS4-M3	ø3.2, ø4	4.5	M3×0.5	0.8	2.9	5.5	7.9	2.6	0.4
FTS4-M5	ø3.2, ø4	7	M5×0.8	1.8	2.9	5.5	8.6	2.9	2.1
FTS4-6	ø3.2, ø4	10	R1/8	1.8	2.9	5.5	9.5	8	2.1
FTS6-M5	ø6	7	M5×0.8	2.5	4.7	7	10.1	2.9	4.1
FTS6-6	ø6	10	R1/8	2.5	4.7	7	11	8	4.1

● Elbow/FTL



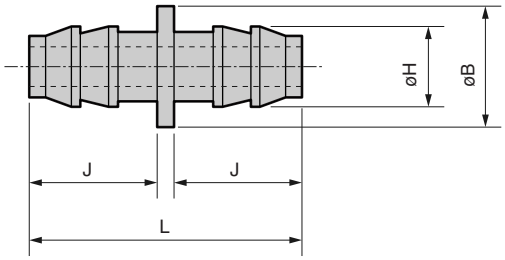
Model no.	Applicable tube O.D.ø	A	D	E	Min. bore size	H	J	K	L	Effective sectional area (mm²)
FTL4-M3	ø3.2, ø4	10.5	5	M3×0.5	1	2.9	2.9	6.8	2.6	0.4
FTL4-M5	ø3.2, ø4	13.5	8	M5×0.8	1.8	2.9	5.1	11.6	2.9	1.3
FTL6-M5	ø6	15	8	M5×0.8	1.8	4.7	5.1	11.6	2.9	1.5

● Branch/FTT



Model no.	Applicable tube O.D.ø	A	D	E	Min. bore size	H	J	K	L	Effective sectional area (mm²)
FTT4-M3	ø3.2, ø4	16	5	M3×0.5	1	2.9	2.9	6.8	2.6	0.4
FTT4-M5	ø3.2, ø4	19	8	M5×0.8	1.8	2.9	5.1	11.6	2.9	1.3
FTT6-M5	ø6	22	8	M5×0.8	1.8	4.7	5.1	11.6	2.9	1.5

● Barbed nipple/FTS* –0

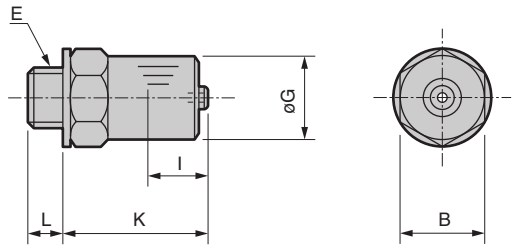


Model no.	Applicable tube O.D.ø	B	Min. bore size	H	J	L	Effective sectional area (mm²)
FTS4-0	ø3.2, ø4	5	1.8	2.9	5.5	12	2.1
FTS6-0	ø6	7	2.5	4.7	7	15	4.1

Dimensions: Clamp joint (straight, elbow), double screw nipple (straight), socket (straight)

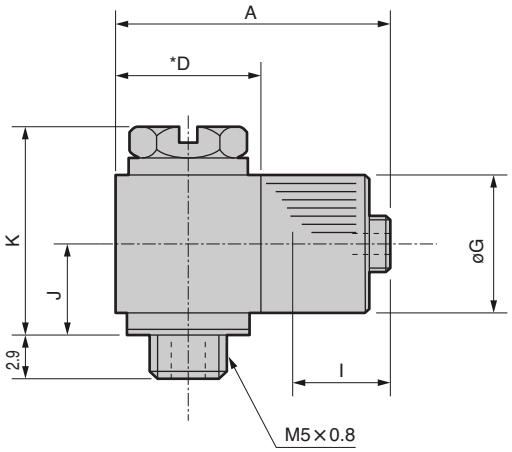
Clamp joint

● Straight/FCS



Model no.	Applicable tube O.D.ø	B	E	Min. bore size	G	I	K	L	Effective sectional area (mm²)
FCS3-M5	ø3.2	7	M5×0.8	1.8	7	4.3	11.7	2.9	2.1
FCS3-6	ø3.2	10	R1/8	1.8	7	4.3	12.1	8	2.1
FCS4-M5	ø4	7	M5×0.8	1.8	7	4.3	11.7	2.9	2.1
FCS4-6	ø4	10	R1/8	1.8	7	4.3	12.1	8	2.1
FCS6-M5	ø6	8	M5×0.8	2.5	9	5	12.4	2.9	4.1
FCS6-6	ø6	10	R1/8	2.5	9	5	12.8	8	4.1

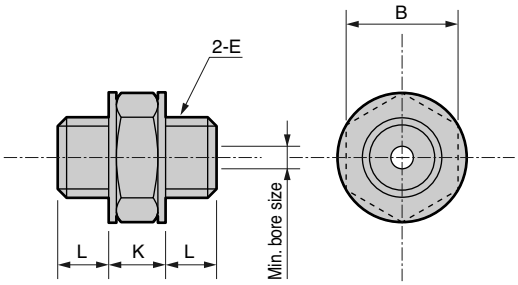
● Elbow/FCL



Model no.	Applicable tube O.D.ø	A	D	Min. bore size	G	I	K	L	Effective sectional area (mm²)
FCL3-M5	ø3.2	16.1	8	1.8	7	4.3	5.1	11.6	1.3
FCL4-M5	ø4	16.1	8	1.8	7	4.3	5.1	11.6	1.3
FCL6-M5	ø6	17.8	9	1.8	9	5	6.1	13.6	1.5

Double screw nipple

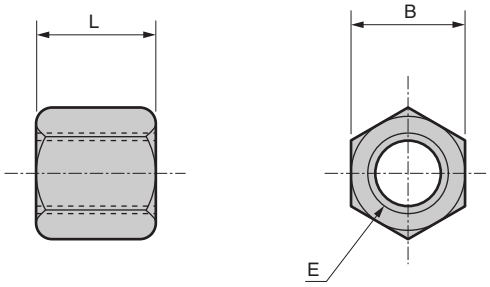
● Straight/FNS



Model no.	B	E	Min. bore size	K	L	Effective sectional area (mm²)
FNS-M3	4.5	M3×0.5	0.8	2.8	2.6	0.4
FNS-M5	7	M5×0.8	1.8	3.7	2.9	2.1

Socket

● Straight/FSS

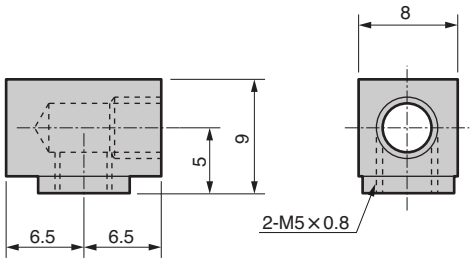


Model no.	B	E	L	Effective sectional area (mm²)
FSS-M3	4.5	M3×0.5	7	4
FSS-M5	7	M5×0.8	8	9

Dimensions: Double screw nipple (elbow), Socket (branch), Adjustable socket (elbow, branch)

Double screw nipple

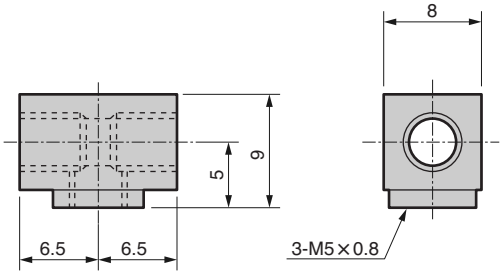
● Elbow/FSL-M5



Effective sectional area 8mm²

Socket

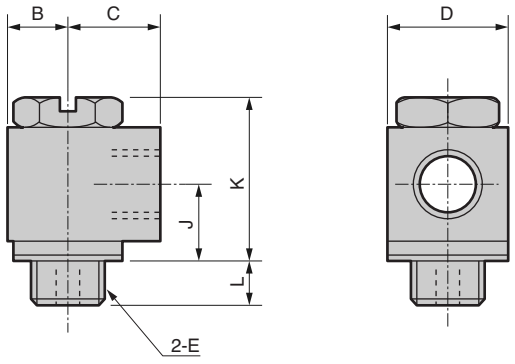
● Branch/FST-M5



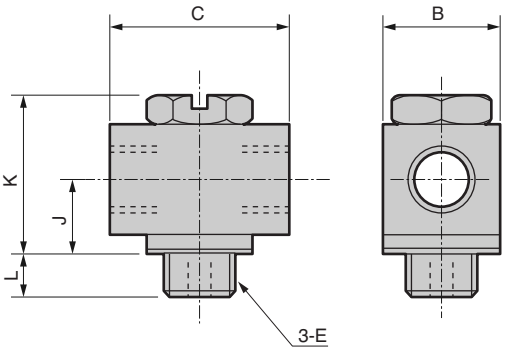
Effective sectional area 8mm²

Adjustable socket

● Elbow/FAL



● Branch/FST



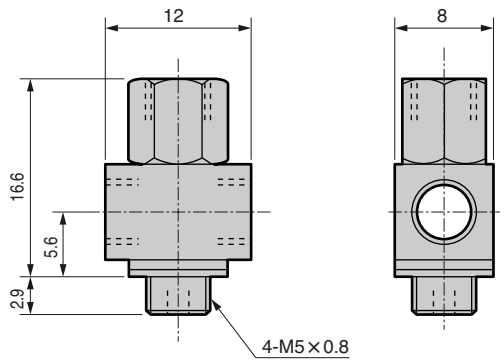
Model no.	B	C	D	E	Min. bore size	J	K	L	Effective sectional area (mm²)
FAL-M3	2.5	4.5	5	M3×0.5	1	2.9	6.8	2.6	0.5
FAL-M5	4	6.5	8	M5×0.8	1.8	5.6	11.6	2.9	1.7

Model no.	B	C	E	Min. bore size	J	K	L	Effective sectional area (mm²)
FAT-M3	5	9	M3×0.5	1	2.9	6.8	2.6	0.5
FAT-M5	8	12	M5×0.8	1.8	5.6	11.6	2.9	1.7

Dimensions: Adjustable socket (cross, deforming tee union), bush, bulk head

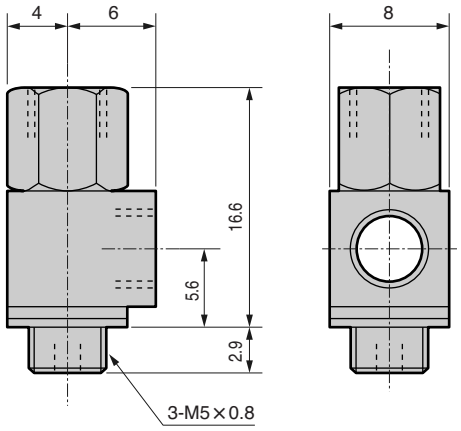
Adjustable socket

● Cross/FAX-M5



Min. bore size 1.8mm
Effective sectional area 1.7mm²

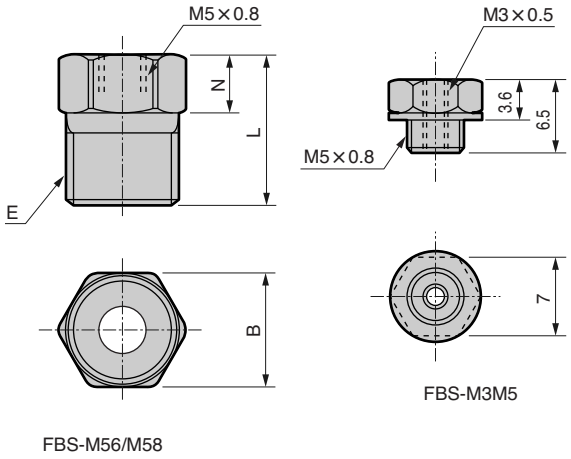
● Deforming tee union/FAY-M5



Min. bore size 1.8mm
Effective sectional area 1.7mm²

Bush

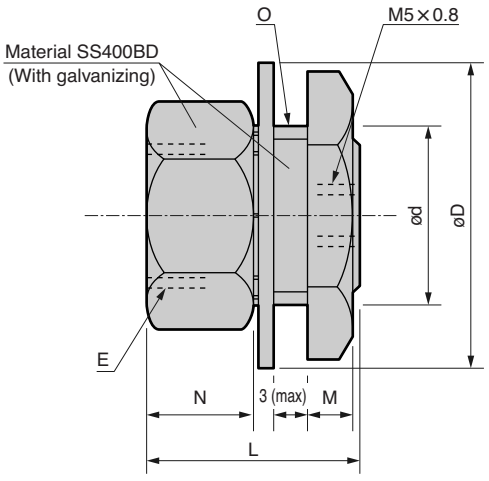
● FBS



Effective sectional area 4mm²

Bulk head

● FWS



Model no.	B	E	L	N	Effective sectional area (mm²)
FBS-M56	10	R1/8	12	4	9
FBS-M58	14	R1/4	16	5	9

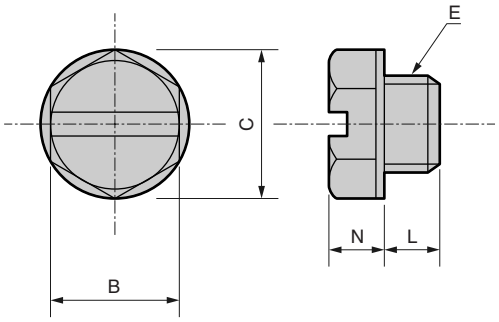
Model no.	D	d	E	L	M	N	O	Effective sectional area (mm²)
FWS-M5	14.7	8	M5×0.8	11	3	4	M8×1	9
FWS-M56	15.2	12	Rc1/8	16	5	7	M12×1	9

Dimensions: Plug, extension, manifold, gasket

CAD

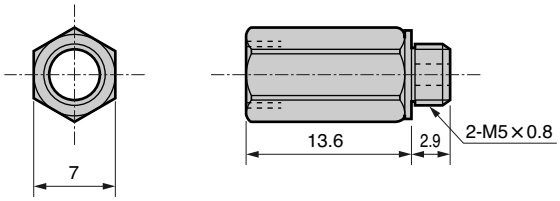
Plug

● FPL



Extension

● FLS-M5

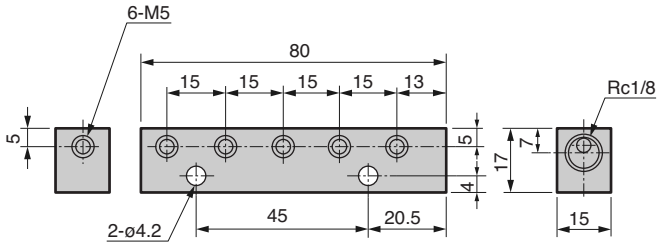


Effective sectional area 2.1mm²

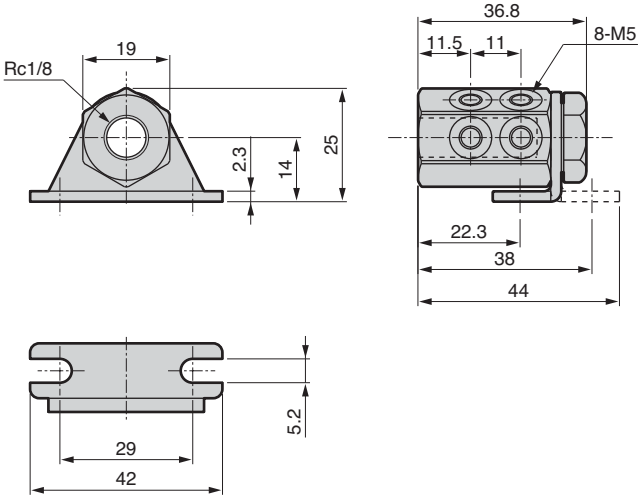
Model no.	B	C	E	N	L
FPL-M3	4.5	4.9	M3×0.5	2.4	2.6
FPL-M5	7	7.8	M5×0.8	3.1	2.9

Manifold

● FMB-M56

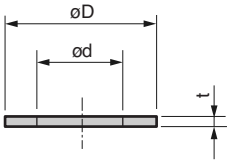


● FMH-M56



Gasket

● FGS



Model no.	D	d	t
FGS-M3	4.8	2.8	0.4
FGS-M5	7.8	4.8	0.6

MEMO

GW Joint

Port size M3 to 1/2 (Rc or R)

● Wide connection joints and models

CAD

■ Straight type

Single straight GWS*-*

Applicable tube O.D.ø
4
6
8
10
12
16

• Page : 934

Single straight GWS*-*-S

Applicable tube O.D.ø
3.2
4
6
8
10
12

• Page : 934

Female, straight GWS*-*-M

Applicable tube O.D.ø
4
6
8
10
12

• Page : 934

Bulk head female GWS*-*-E

Applicable tube O.D.ø
4
6
8
10
12

• Page : 934

Bulk head GWS*-*-X

Applicable tube O.D.ø
4
6
8
10
12

• Page : 935

Bulk head female connector GWM*-*-X

Applicable tube O.D.ø
4
6
8
10
12

• Page : 935

Straight GWS*-0

Applicable tube O.D.ø
4
6
8
10
12
16

• Page : 935

Different diameter straight GWS*-0

Applicable tube O.D.ø
4 / 6
6 /8
8 / 10
10 /12

• Page : 935

Plug reducer GWS*-*P

Applicable tube O.D.ø
4
6
8
10

• Page : 936

Plug GWP*-0

Connecting joint diameter ø
4
6
8
10
12

• Page : 936

■ Elbow type

Plug reducer GWP*-0

Connecting joint diameter ø
4 / 6
6 / 8
8 / 10
10 / 12

• Page : 936

Single elbow GWL*-*

Applicable tube O.D.ø
4
6
8
10
12
16

• Page : 936

Long elbow GWL*-*-L

Applicable tube O.D.ø
4
6
8
10
12

• Page : 937

Single 45° elbow GWL*-*-45

Applicable tube O.D.ø
4
6
8
10
12

• Page : 937

Turn elbow GWL*-*-T

Applicable tube O.D.ø
4
6
8
10
12

• Page : 937

■ Tee union type

Elbow GWL*-0

Applicable tube O.D.ø
4
6
8
10
12
16

• Page : 937

Both push-in branch GWT*-*

Applicable tube O.D.ø
4
6
8
10
12

• Page : 938

D type union Tee GWT*-*-D

Applicable tube O.D.ø
4
6
8
10
12

• Page : 938

Union Tee GWT-0

Applicable tube O.D.ø
4
6
8
10
12

• Page : 938

Y type union Tee GWY*-0

Applicable tube O.D.ø
4 / 4
6 / 6
8 / 8
10 / 10
12 / 12
6 / 4
8 / 6
10 / 8
12 / 10

• Page : 938

● Sales unit is 10 pieces/1 box.

Refrigerating type dryer
Desiccant type dryer
High polymer membrane type dryer
Air filter
Auto. drain / others
F.R.L. (Module unit)
F.R.L. (Separate)
Compact F.R.
Precise regulator
F.R.L. (Related products)
Clean F.R.
Electro pneumatic regulator
Air booster
Speed control valve
Silencer
Check valve / others
Joint / tube
Vacuum filter
Vacuum regulator
Suction plate
Magnetic spring buffer
Mechanical pressure SW
Electronic pressure SW
Contact / close contact conf. SW
Air sensor
Pressure SW for coolant
Small flow sensor
Small flow controller
Flow sensor for air
Flow sensor for water
Total air system
Total air system (Gamma)
Ending

Product introduction: Page 932
Specifications, model no., internal structure: Page 933

Both ports Y tee union GWY*-*

Applicable tube O.D.ø
4
6
8
10
12

• Page : 939

Cross shaped GWCR*-0

Applicable tube O.D.ø
8
10
12

• Page : 939

2 port turn elbow GWL*-*-2T

Applicable tube O.D.ø
4
6
8
10
12

• Page : 939

Tetrapod shaped (with R) GWTR*-*

Applicable tube O.D.ø
4
6
8
10
12

• Page : 939

FY type (with R) GWFY*-*

Applicable tube O.D.ø
4
6
8
10
12

• Page : 940

Double Y type (with R) GWWY*-*

Applicable tube O.D.ø
4
6

• Page : 940

Tetrapod shaped GWTR*-0

Applicable tube O.D.ø
4
6
8
10
12

• Page : 940

FY type GWFY*-0

Applicable tube O.D.ø
4
6
8
10
12

• Page : 940

Double Y type GWWY*-0

Applicable tube O.D.ø
6 / 4
8 / 6

• Page : 941

Blanking plug GWP*-B

Connecting joint diameter ø
4
6
8
10
12
16

• Page : 941

L type plug GWP*-L

Applicable tube O.D.ø
4
6
8
10
12

• Page : 941

C type plug GWP*-C

Applicable tube O.D.ø
4
6
8
10
12

• Page : 941

Y type plug GWP*-Y

Applicable tube O.D.ø
4
6
8
10
12

• Page : 942

Cap GWC*

Applicable tube O.D.ø
4
6
8
10
12

• Page : 942

Manifold (single/with R) GWMF*-*

Applicable tube O.D.ø
4 / 6
4 / 8
6 / 8
6 / 10
8 / 10

• Page : 942

Manifold (single solenoid) GWMF*-0

Applicable tube O.D.ø
4 / 6
4 / 8
6 / 8
6 / 10
8 / 10

• Page : 942

Manifold (double/with R) GWMF*-*-W

Applicable tube O.D.ø
4 / 8
6 / 10
8 / 12

• Page : 943

Manifold (double solenoid) GWMF*-0-W

Applicable tube O.D.ø
4 / 8
6 / 10
8 / 12

• Page : 943

Insert ring Custom order

Applicable tube O.D.ø
4
6
8
10
12

• Page : 943

● Sales unit is 10 pieces/1 box.

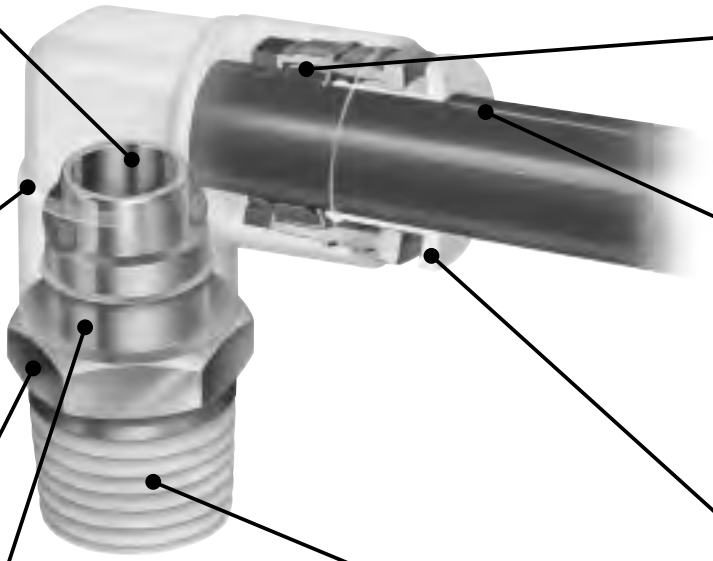
GW Joint

Port size M3 to 1/2 (Rc or R)

Work environment and device-friendly flame-resistant white body

Joint series for greatly reducing piping space

1. Push in joint for pneumatic piping.
2. Compact size for space saving.
3. V shaped packing seal to realize smooth insertion and accurate seal.
4. Freely rotating elbow union to make piping and removal work easier.
5. White body blends into working environment. Electroless nickel used for brass sections.
6. Flame resistant resin (equivalent to UL94 Standards V-0) used for GW Series body and push ring.



Full flow within bore size

- There are no sections narrower than the bore size.
- A flow equivalent to the bore size can be run.

White color Flame resistance resin (GW series)

- White body blends into the work environment.
- Flame resistance PBT (Equivalent to UL94 standards V-O) is provided as standard.

Electroless nickel used for brass sections

- Electroless nickel is used as standard for all brass parts to improve corrosion resistance and appearance.

Easy piping work

- The section of the pipe connected with the main unit rotates freely, so the piping removal direction can be set as needed.

Accurate tube holding

- The chuck bracket acts in the direction in which the tube is dislocated, ensuring highly reliable holding.

Push-in installation

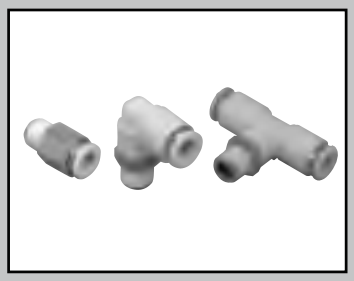
- The tube can be connected to the piping joint by pushing the tube in.
- V shaped packing is used for the seal between the tube and joint. The tube can be inserted with light force while obtaining a sure seal.

Easy tube removal

- The push evenly pushes and opens the chuck, so the tube is completely released from the chuck and can be removed smoothly.

Sealant applied on threads as standard

- Teflon resin is coated on threads.
- Sealing tape is not needed, reducing work hours.
- An even seal is attached and there is no worry of leakage, etc.



Joint

GW Series

- Port size M3 to R1/2
- Applicable tube ø3.2 to ø12

RoHS

Specifications

Descriptions		GW
Working fluid		Compressed air
Max. working pressure	MPa	1.0
Negative pressure	KPa	-100 Note2
Working temperature	°C	-10 to 60 (no freezing)
Applicable tube		Soft nylon tube (F-15**)
		Urethane tube (U-95**, NU-**) Note1

Note 1: Refer to page 1008 for tube dimensions, ambient temperature and working pressure.
Note 2: Use a urethane tube (U95-* */NU-* *) and an insert ring together.

Ozone specifications (Ending 5)

GW –·····– P11

Clean room specifications

(catalog No. CB-033SA)

GW –·····– P7*

GW –·····– P80

How to order

* Refer to model no. sections on dimensions page (pages 934 to 943) for combination of model no.

GW L 6 - 8 - 45 - ( )
A B C D E

A Shape	
S	Straight
L	Elbow
T	Union Tee
TR	Tetrapod shaped
Y	Y type union Tee
FY	FY type
WY	Double Y types
CR	Cross shaped
P	Plug
C	Cap
M	Bulkhead female connector
MF	Manifold

B Applicable tube O.D.	
4	ø4
6	ø6
8	ø8
10	ø10
12	ø12
16	ø16
44	ø4, ø4
46	ø4, ø6
48	ø4, ø8
64	ø6, ø4
66	ø6, ø6
68	ø6, ø8
610	ø6, ø10
86	ø8, ø6
88	ø8, ø8
810	ø8, ø10
812	ø8, ø12
108	ø10, ø8
1010	ø10, ø10
1012	ø10, ø12
1210	ø12, ø10
1212	ø12, ø12

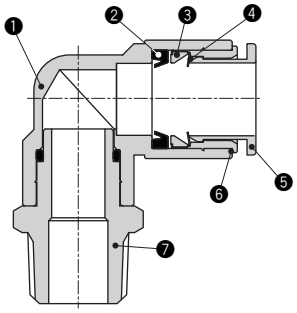
C Port size	
M3	M3×0.5
M5	M5×0.8
6	R1/8
8	R1/4
10	R3/8
15	R1/2
0	No thread
4P	Plug for ø4
6P	Plug for ø6
8P	Plug for ø8
10P	Plug for ø10
12P	Plug for ø12
B	Blanking plug
C	C type plug
L	L type plug
Y	Y type plug

D Other combinations	
L	Long
T	Turn
D	D type
X	Bulk head
S	Round
M	Female type
E	Bulk head female
W	Double solenoid
2T	2-port turn
45	Single 45°

Note: Sales unit is 10 pcs. /1 bag.

E Option	
Blank	None
P6	Copper and PTFE free

Internal structure and parts list



No.	Parts name	Material
1	Body *1	Brass (electroless nickeling treatment)
		PBT (flame resistance resin *2)
2	Packing seal	Nitrile rubber
3	Chuck holder	Polyetherimide
4	Chuck	Stainless steel
5	Push ring	PBT (flame resistance resin *2)
6	Outer ring	Brass (electroless nickeling treatment)
7	Drive nipple	Brass (electroless nickeling treatment)

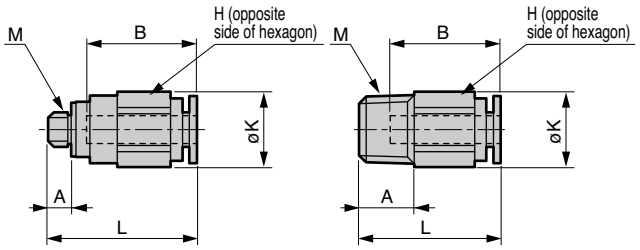
*1: The body of the single-ended straight, single-ended straight (round), female straight, bulkhead female, bulkhead, and bulkhead female connector is brass (electroless nickel plated).
*2: Equivalent to UL94 standards V-0

Dimensions: Single straight, single straight (round), female straight, bulk head female

CAD

Single straight

● GWS*-*

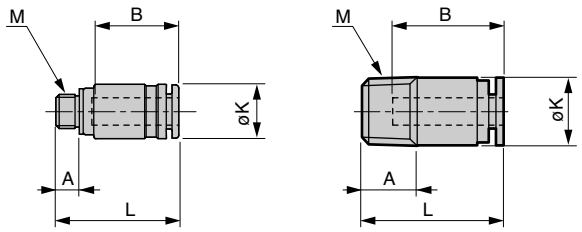


M5 type

Model no.	Applicable tube O.D.ø	M	H	K	L	A	B	Min. bore size	Effective sectional area mm²
GWS 4-M5	4	M5×0.8	10	11	21.5	3.4	16	2.5	4
GWS 4- 6		R1/8	10	11	20.5	8	16	2.5	4
GWS 4- 8		R1/4	14	15.8	19.5	11	16	2.5	4
GWS 6-M5	6	M5×0.8	12	13.5	23	3.4	17.5	2.5	4.4
GWS 6- 6		R1/8	12	13.5	23	8	17.5	4	10.3
GWS 6- 8		R1/4	14	15.8	23.5	11	17.5	4	10.3
GWS 6-10		R3/8	17	19.1	21.5	12	17.5	4	10.3
GWS 8- 6	8	R1/8	14	15.8	28	8	19	5	17.5
GWS 8- 8		R1/4	14	15.8	27	11	19	6	22.4
GWS 8-10		R3/8	17	19.1	22.5	12	19	6	22.4
GWS10- 6	10	R1/8	17	19.1	31	8	21.5	5	17.5
GWS10- 8		R1/4	17	19.1	32.5	11	21.5	8	30.5
GWS10-10		R3/8	17	19.1	28.5	12	21.5	8	30.5
GWS10-15		R1/2	22	24	26.5	15	21.5	8	30.5
GWS12- 8	12	R1/4	19	21.4	35.5	11	23	8	35.5
GWS12-10		R3/8	19	21.4	30.5	12	23	10	40
GWS12-15		R1/2	22	24	29.5	15	23	10	40
GWS16-10	16	R3/8	24	26.5	42	12	28	12	90
GWS16-15		R1/2	24	26.5	37.5	15	28	13	90

Single straight (round)

● GWS*-*-S

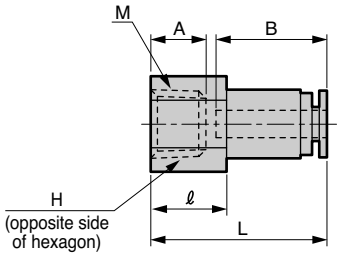


M3,M5 type

Model no.	Applicable tube O.D.ø	M	K	L	A	B	Hexagon head hole diameter	Effective sectional area mm²
GWS 3-M3-S	3.2	M3×0.5	6.9	15.7	2.4	11.7	1.5	1.4
GWS 3-M5-S		M5×0.8	6.9	16.7	3.4	11.7	2	2.7
GWS 4-M3-S	4	M3×0.5	7.9	16.9	2.4	12.9	1.5	1.6
GWS 4-M5-S		M5×0.8	7.9	17.9	3.4	12.9	2	2.7
GWS 4- 6-S		R1/8	9.8	20.5	8	16	2.5	4.1
GWS 6-M5-S	6	M5×0.8	9.9	19.2	3.4	14.2	2.5	4.4
GWS 6- 6-S		R1/8	11.8	23	8	17.5	4	10.6
GWS 6- 8-S		R1/4	13.8	23	11	17.5	4	10.6
GWS 8- 6-S	8	R1/8	14	28	8	19	5	20.4
GWS 8- 8-S		R1/4	14	27	11	19	6	22
GWS 8-10-S		R3/8	17	22.5	12	19	6	22
GWS10- 6-S	10	R1/8	17.5	30.5	8	21.5	5	20.1
GWS10- 8-S		R1/4	17.5	28.5	11	21.5	6	26.3
GWS10-10-S		R3/8	17.5	28.5	12	21.5	8	30.1
GWS10-15-S		R1/2	22	26.5	15	21.5	8	30.1
GWS12- 8-S	12	R1/4	19.5	34	11	23	6	26.3
GWS12-10-S		R3/8	19.5	29.5	12	23	8	37.9
GWS12-15-S		R1/2	22	28.5	15	23	8	37.9

Female straight

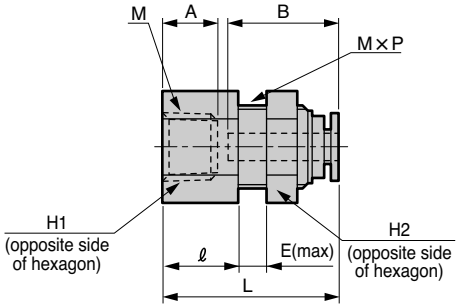
● GWS*-*-M



Model no.	Applicable tube O.D.ø	M	H	L	ℓ	A	B	Min. bore size	Effective sectional area mm²
GWS 4- 6-M	4	Rc1/8	12	25.5	11	8	16	2.5	4
GWS 4- 8-M		Rc1/4	17	28.5	14	11	16	2.5	4
GWS 6- 6-M	6	Rc1/8	14	27	11	8	17.5	4	10.3
GWS 6- 8-M		Rc1/4	17	30	14	11	17.5	4	10.3
GWS 6-10-M		Rc3/8	19	31	15	12	17.5	4	10.3
GWS 8- 6-M	8	Rc1/8	17	28.5	11	8	19	6	22.4
GWS 8- 8-M		Rc1/4	17	31.5	14	11	19	6	22.4
GWS 8-10-M		Rc3/8	19	32.5	15	12	19	6	22.4
GWS10- 8-M	10	Rc1/4	19	34.5	14	11	21.5	8	30.5
GWS10-10-M		Rc3/8	19	35.5	15	12	21.5	8	30.5
GWS12- 8-M	12	Rc1/4	22	36	14	11	23	10	35.5
GWS12-10-M		Rc3/8	22	37	15	12	23	10	35.5
GWS12-15-M		Rc1/2	24	40	18	15	23	10	35.5

Bulk head female

● GWS*-*-E

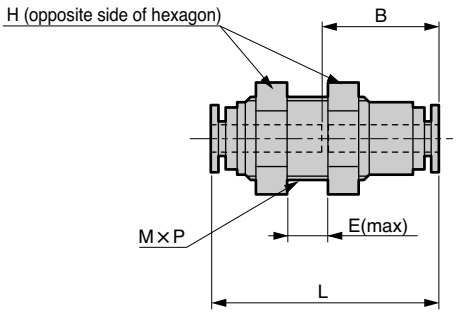


Model no.	Applicable tube O.D.ø	M	H1	H2	L	ℓ	A	B	E	M×P	Hexagon hole dia.	Min. hole dia.	Effective sectional area mm²
GWS 4- 6-E	4	Rc1/8	14	14	25.5	11	8	16	5	M12x1	13	2.5	4
GWS 4- 8-E		Rc1/4	17	14	28.5	14	11	16	5	M12x1	13	2.5	4
GWS 6- 6-E	6	Rc1/8	17	17	27	11	8	17.5	5	M14x1	15	4	10.3
GWS 6- 8-E		Rc1/4	17	17	30	14	11	17.5	5	M14x1	15	4	10.3
GWS 6-10-E		Rc3/8	19	17	31.5	15	12	17.5	5	M14x1	15	4	10.3
GWS 8- 6-E	8	Rc1/8	19	19	28.5	11	8	19	6	M16x1	17	6	22.4
GWS 8- 8-E		Rc1/4	19	19	31.5	14	11	19	6	M16x1	17	6	22.4
GWS 8-10-E		Rc3/8	19	19	32.5	15	12	19	6	M16x1	17	6	22.4
GWS10- 8-E	10	Rc1/4	22	23	34.5	14	11	21.5	9	M20x1	21	8	30.5
GWS10-10-E		Rc3/8	22	23	35.5	15	12	21.5	9	M20x1	21	8	30.5
GWS12-10-E	12	Rc3/8	24	26	37.5	15	12	23	10	M22x1	23	9	35.5
GWS12-15-E		Rc1/2	24	26	40.5	18	15	23	10	M22x1	23	9	35.5

Dimensions: Bulk head, bulk head female connector, straight, different diameter straight

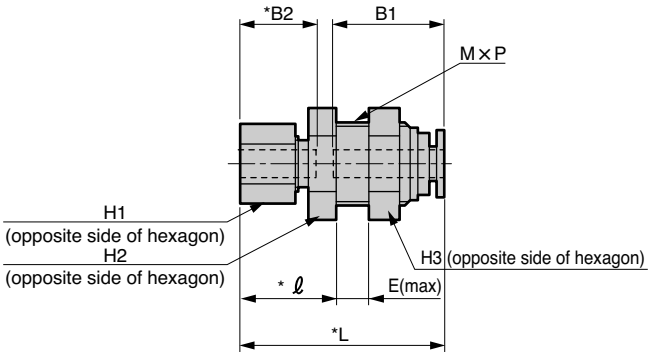
Bulk head

● GWS*-*-X



Bulk head female connector

● GWM*-*-X



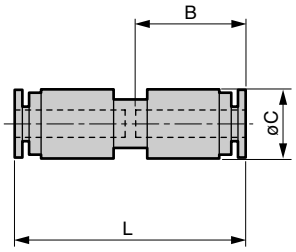
Model no.	Applicable tube O.D.ø	H	L	B	E	M×P	Installation hole dia.	Min. bore size	Effective sectional area mm²
GWS 4-0-X	4	14	33	16	7.5	M12×1	13	2.5	4
GWS 6-0-X	6	17	36	17.5	9.5	M14×1	15	4	10
GWS 8-0-X	8	19	39	19	12.5	M16×1	17	6	22
GWS10-0-X	10	23	44.5	21.5	18	M20×1	21	8	30
GWS12-0-X	12	26	47	23	20.5	M22×1	23	9	35

Note: An insert ring (MJU) is required for urethane tube on tightening joint side.
* dimension shows a rough dimension before tightening a nut.

Model no.	Applicable tube O.D.ø	H1	H2	H3	L	ℓ	B1	B2	E	M×P	Installation hole dia.	Min. hole dia.	Effective sectional area mm²
GWM 4-0-X	4	10	14	14	29.5	15	16	11	5	M12×1	13	2.5	4
GWM 6-0-X	6	12	17	17	33	16	17.5	11.5	5	M14×1	15	4	10
GWM 8-0-X	8	14	19	19	35	17.5	19	13	6	M16×1	17	6	22
GWM10-0-X	10	17	22	23	40	19.5	21.5	14.5	9	M20×1	21	8	30
GWM12-0-X	12	19	24	26	43.5	21	23	16	10	M22×1	23	9	35

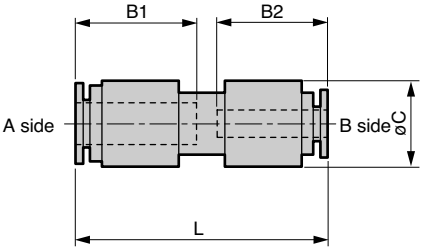
Straight

● GWS*-0



Different diameter straight

● GWS*-0



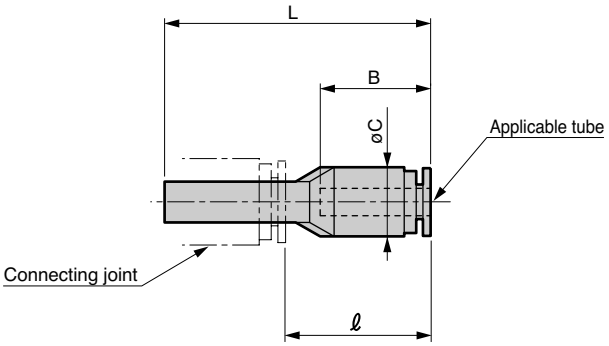
Model no.	Applicable tube O.D.ø	L	B	C	Min. bore size	Effective sectional area mm²
GWS 4-0	4	33.5	16	10	2.5	4
GWS 6-0	6	36.5	17.5	12.5	4	10
GWS 8-0	8	39.5	19	14.5	6	22
GWS10-0	10	45	21.5	17.5	8	30
GWS12-0	12	47.5	23	20	10	35
GWS16-0	16	58	28	26.5	13.2	90

Model no.	Applicable tube O.D.ø		L	B1	B2	C	Min. bore size	Effective sectional area mm²
	A side	B side						
GWS 46-0	6	4	36.5	17.5	16	12.5	2.5	4
GWS 68-0	8	6	39.5	19	17.5	14.5	4	10
GWS 810-0	10	8	45	21.5	19	17.5	6	22
GWS1012-0	12	10	47.5	23	21.5	20	8	30

Dimensions: Plug reducer, plug, plug reducer, single elbow

CAD

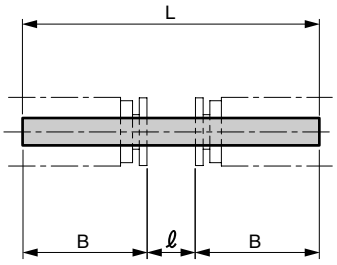
Plug reducer
● GWS*-*-P



Model no.	Applicable tube O.D. ø	Connecting joint diameter ø	L	ℓ *	B	C	Min. bore size	Effective sectional area mm²
GWS 4- 6P	4	6	38.5	21	16	10	2.3	3.5
GWS 6- 4P	6	4	42	26	17.5	12.5	2.3	3.5
GWS 6- 8P		8	41	22	17.5	12.5	4	10
GWS 6-10P		10	42	20	17.5	12.5	4	10
GWS 8-10P	8	10	44.5	22.5	19	14.5	6	22
GWS 8-12P		12	44	21	19	14.5	6	22
GWS10-12P	10	12	48	25	21.5	17.5	8	30

* For connecting joint, dimension of CKD (GW Series) are shown.

Plug
● GWP*-0

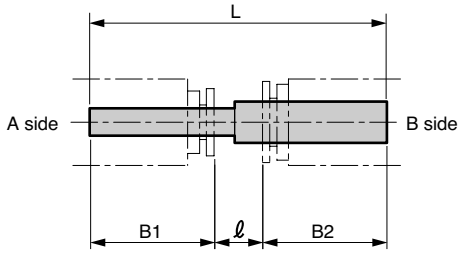


Material: Polyamide resin

Model no.	Connecting joint diameter ø	L	B *	ℓ *	Min. bore size	Effective sectional area mm²
GWP 4-0	4	43	16	11	2.5	4
GWP 6-0	6	43	17.5	8	4	10.3
GWP 8-0	8	47	19	9	6	22.4
GWP10-0	10	56	21.5	13	7.5	30
GWP12-0	12	61	23	15	9.2	35.5

* For connecting joint, dimension of CKD (GW Series) are shown.

Plug reducer
● GWP*-0

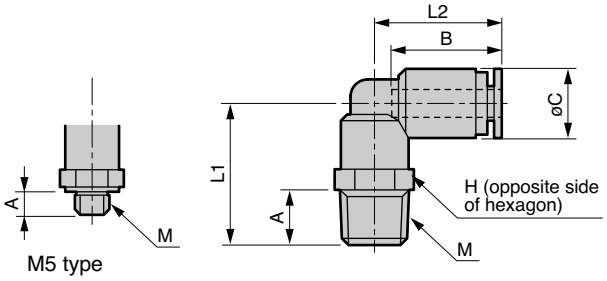


Material: Polyamide resin

Model no.	Joint port size ø		L	ℓ *	B1 *	B2 *	Min. bore size	Effective sectional area mm²
	A side	B side						
GWP 46-0	4	6	43	9.5	16	17.5	2.3	4
GWP 68-0	6	8	45	8.5	17.5	19	4	10.3
GWP 810-0	8	10	50.5	10	19	21.5	6	22.4
GWP1012-0	10	12	58	13.5	21.5	23	7.5	30

* For connecting joint, dimension of CKD (GW Series) are shown.

Single elbow
● GWL*-*

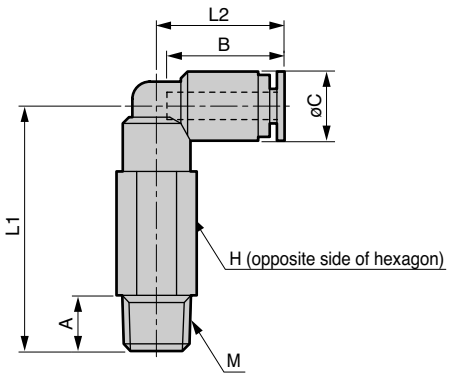


Model no.	Applicable tube O.D. ø	M	H	L1	L2	A	B	C	Min. bore size	Effective sectional area mm²
GWL 4-M5	4	M5×0.8	8	15	18	3.4	16	10	2.5	3.2
GWL 4- 6		R1/8	10	20.5	18.5	8	16	10	2.5	3.2
GWL 4- 8		R1/4	14	24	18.5	11	16	10	2.5	3.2
GWL 6-M5	6	M5×0.8	10	15	20	3.4	17.5	12.5	2.5	4.2
GWL 6- 6		R1/8	12	24	21	8	17.5	12.5	4	8
GWL 6- 8		R1/4	14	27.5	21	11	17.5	12.5	4	8
GWL 6-10		R3/8	17	29	21	12	17.5	12.5	4	8
GWL 8- 6	8	R1/8	14	25.5	23.5	8	19	14.5	6	18
GWL 8- 8		R1/4	14	28.5	23.5	11	19	14.5	6	18
GWL 8-10		R3/8	17	30	23.5	12	19	14.5	6	18
GWL10- 6	10	R1/8	17	28	27	8	21.5	17.5	6.5	24.3
GWL10- 8		R1/4	17	31	27	11	21.5	17.5	8	27
GWL10-10		R3/8	17	32.5	27	12	21.5	17.5	8	27
GWL10-15		R1/2	22	35.5	27	15	21.5	17.5	8	27
GWL12- 8	12	R1/4	19	33	29.5	11	23	20	8.5	33
GWL12-10		R3/8	19	34.5	29.5	12	23	20	9	35
GWL12-15		R1/2	22	37.5	29.5	15	23	20	9	35.5
GWL16-10	16	R3/8	22	41	35.5	12	28	26.5	12	80
GWL16-15		R1/2	22	44	35.5	15	28	26.5	12	80

Dimensions:Long elbow, single 45° elbow, turn elbow, elbow

Long elbow

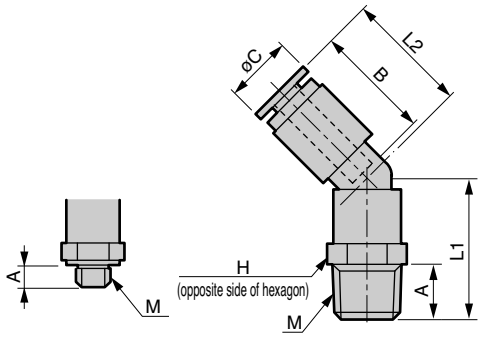
● GWL*-*-L



Model no.	Applicable tube O.D. ø	M	H	L1	L2	A	B	C	Min. bore size	Effective sectional area mm²
GWL 4- 6-L	4	R1/8	10	35.5	18.5	8	16	10	2.5	3.2
GWL 4- 8-L		R1/4	14	39	18.5	11	16	10	2.5	3.2
GWL 6- 6-L	6	R1/8	12	40	21	8	17.5	12.5	4	8
GWL 6- 8-L		R1/4	14	43.5	21	11	17.5	12.5	4	8
GWL 8- 6-L	8	R1/8	14	44.5	23.5	8	19	14.5	6	18
GWL 8- 8-L		R1/4	14	47.5	23.5	11	19	14.5	6	18
GWL 8-10-L		R3/8	17	49	23.5	12	19	14.5	6	18
GWL10- 8-L	10	R1/4	17	56	27	11	21.5	17.5	8	27
GWL10-10-L		R3/8	17	57.5	27	12	21.5	17.5	8	27
GWL10-15-L		R1/2	22	60.5	27	15	21.5	17.5	8	27
GWL12- 8-L	12	R1/4	19	60	29.5	11	23	20	8.5	33
GWL12-10-L		R3/8	19	61.5	29.5	12	23	20	9	34.5
GWL12-15-L		R1/2	22	64.5	29.5	15	23	20	9	34.5

Single 45° Elbow

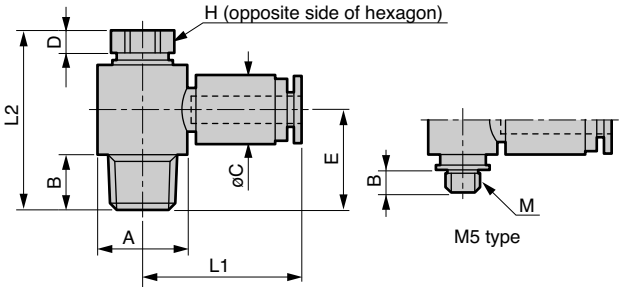
● GWL*-*-45



Model no.	Applicable tube O.D. ø	M	H	L1	L2	A	B	C	Min. bore size	Effective sectional area mm²
GWL 4-M5-45	4	M5×0.8	8	14.5	18	3.4	16	10	2.5	3.6
GWL 4- 6-45		R1/8	10	20.5	18	8	16	10	2.5	3.6
GWL 4- 8-45		R1/4	14	24	18	11	16	10	2.5	3.6
GWL 6-M5-45	6	M5×0.8	10	15	18.5	3.4	17.5	12.5	2.5	4.3
GWL 6- 6-45		R1/8	12	23.5	20	8	17.5	12.5	4	9.2
GWL 6- 8-45		R1/4	14	27	20	11	17.5	12.5	4	9.2
GWL 6-10-45		R3/8	17	28.5	20	12	17.5	12.5	4	9.2
GWL 8- 6-45	8	R1/8	14	25	22	8	19	14.5	6	20
GWL 8- 8-45		R1/4	14	28	22	11	19	14.5	6	20
GWL 8-10-45		R3/8	17	29.5	22	12	19	14.5	6	20
GWL10- 6-45	10	R1/8	17	26	25	8	21.5	17.5	6.5	25.5
GWL10- 8-45		R1/4	17	29	25	11	21.5	17.5	8	29
GWL10-10-45		R3/8	17	30.5	25	12	21.5	17.5	8	29
GWL10-15-45		R1/2	22	33.5	25	15	21.5	17.5	8	29
GWL12- 8-45	12	R1/4	19	30.5	27	11	23	20	8.5	35.5
GWL12-10-45		R3/8	19	32	27	12	23	20	9	39
GWL12-15-45		R1/2	22	35	27	15	23	20	9	39

Turn elbow

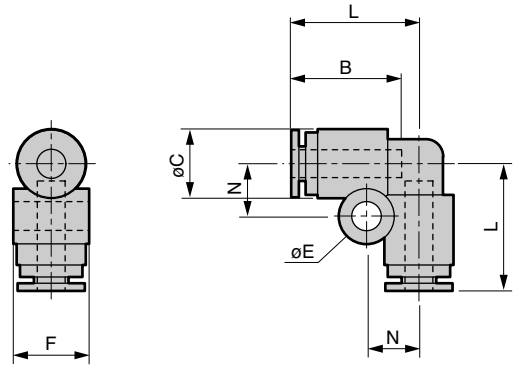
● GWL*-*-T



Model no.	Applicable tube O.D. ø	M	H	L1	L2	A	B	C	D	E	Effective sectional area mm²
GWL 4-M5-T	4	M5×0.8	8	21.5	18.5	10	3.4	10	3	10.5	2.8
GWL 4- 6-T		R1/8	8	23	26	13	8	10	3	15	3.7
GWL 4- 8-T		R1/4	10	24	30	15	11	10	3.5	18	3.7
GWL 6-M5-T	6	M5×0.8	8	22.5	18.5	10	3.4	12.5	3	10.5	3.4
GWL 6- 6-T		R1/8	8	24	26	13	8	12.5	3	15	7.5
GWL 6- 8-T		R1/4	10	25	30	15	11	12.5	3.5	18	8
GWL 6-10-T		R3/8	14	27.5	36.5	20	12	12.5	4	21.5	9
GWL 8- 6-T	8	R1/8	10	26.5	29	15	8	14.5	4	16	16.5
GWL 8- 8-T		R1/4	12	28	32	17.6	11	14.5	4	19	17
GWL 8-10-T		R3/8	14	29	36.5	20	12	14.5	4	21.5	19
GWL10- 8-T	10	R1/4	14	31.5	35.5	20	11	17.5	4	20.5	24
GWL10-10-T		R3/8	14	31.5	36.5	20	12	17.5	4	21.5	24
GWL10-15-T		R1/2	17	34	42.5	25	15	17.5	4	25.7	27
GWL12- 8-T	12	R1/4	17	35.5	38.5	25	11	20	4	21.7	32
GWL12-10-T		R3/8	17	35.5	39.5	25	12	20	4	22.7	32
GWL12-15-T		R1/2	17	35.5	42.5	25	15	20	4	25.7	32

Elbow

● GWL*-0

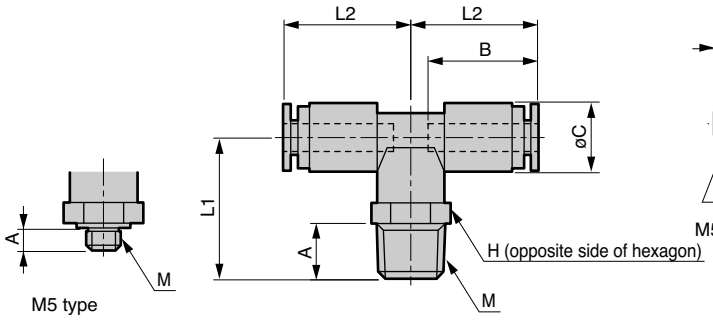


Model no.	Applicable tube O.D. ø	L	B	C	N	E	F	Min. bore size	Effective sectional area mm²
GWL 4-0	4	18.5	16	10	7.5	4.2	11	2.5	3
GWL 6-0	6	21	17.5	12.5	8.5	4.2	13.5	4	7.5
GWL 8-0	8	23.5	19	14.5	9.5	4.2	15.5	6	17
GWL10-0	10	27	21.5	17.5	11	4.2	18.5	8	25.5
GWL12-0	12	29.5	23	20	12	4.2	21	10	34
GWL16-0	16	37	28	26.5	12.5	4.2	28	13.2	80

Dimensions: Both push-in branch, D type union Tee, Union Tee, Y type union Tee CAD

Both push-in branch

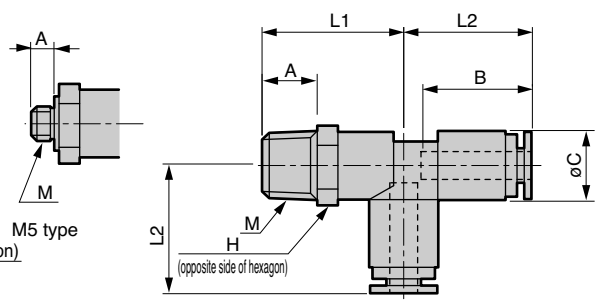
● GWT*-*



Model no.	Applicable tube O.D. ø	M	H	L1	L2	A	B	C	Min. bore size	Effective sectional area mm²
GWT 4-M5	4	M5×0.8	10	16.5	18.5	3.4	16	10	2.5	4.3
GWT 4- 6		R1/8	10	20.5	18.5	8	16	10	2.5	4.3
GWT 4- 8		R1/4	14	24	18.5	11	16	10	2.5	4.3
GWT 6-M5	6	M5×0.8	12	20	21	3.4	17.5	12.5	2.5	4.3
GWT 6- 6		R1/8	12	24	21	8	17.5	12.5	4	10.5
GWT 6- 8		R1/4	14	27.5	21	11	17.5	12.5	4	10.5
GWT 6-10		R3/8	17	29	21	12	17.5	12.5	4	10.5
GWT 8- 6	8	R1/8	14	25.5	23.5	8	19	14.5	6	23.5
GWT 8- 8		R1/4	14	28.5	23.5	11	19	14.5	6	23.5
GWT 8-10		R3/8	17	30	23.5	12	19	14.5	6	23.5
GWT10- 8	10	R1/4	17	31	27	11	21.5	17.5	8	33.5
GWT10-10		R3/8	17	32.5	27	12	21.5	17.5	8	33.5
GWT10-15		R1/2	22	35.5	27	15	21.5	17.5	8	33.5
GWT12- 8	12	R1/4	19	33	29.5	11	23	20	8.5	37
GWT12-10		R3/8	19	34.5	29.5	12	23	20	9	41
GWT12-15		R1/2	22	37.5	29.5	15	23	20	9	41

D type union Tee

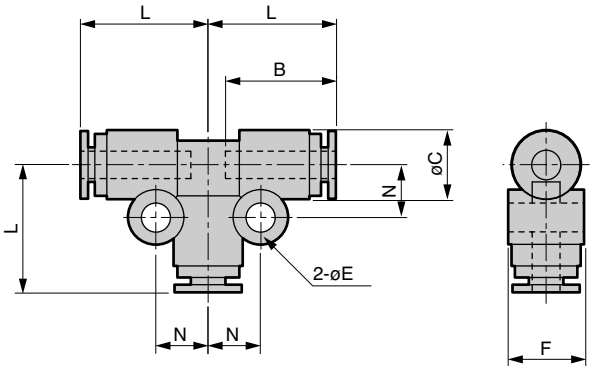
● GWT*-*-D



Model no.	Applicable tube O.D. ø	M	H	L1	L2	A	B	C	Min. bore size	Effective sectional area mm²
GWT 4-M5-D	4	M5×0.8	10	16.5	18.5	3.4	16	10	2.5	4.3
GWT 4- 6-D		R1/8	10	20.5	18.5	8	16	10	2.5	4.3
GWT 4- 8-D		R1/4	14	24	18.5	11	16	10	2.5	4.3
GWT 6-M5-D	6	M5×0.8	12	19.5	21	3.4	17.5	12.5	2.5	4.3
GWT 6- 6-D		R1/8	12	24	21	8	17.5	12.5	4	10.5
GWT 6- 8-D		R1/4	14	27.5	21	11	17.5	12.5	4	10.5
GWT 6-10-D		R3/8	17	29	21	12	17.5	12.5	4	10.5
GWT 8- 6-D	8	R1/8	14	25.5	23.5	8	19	14.5	6	23.5
GWT 8- 8-D		R1/4	14	28.5	23.5	11	19	14.5	6	23.5
GWT 8-10-D		R3/8	17	30	23.5	12	19	14.5	6	23.5
GWT10- 8-D	10	R1/4	17	31	27	11	21.5	17.5	8	33.5
GWT10-10-D		R3/8	17	32.5	27	12	21.5	17.5	8	33.5
GWT10-15-D		R1/2	22	35.5	27	15	21.5	17.5	8	33.5
GWT12- 8-D	12	R1/4	19	33	29.5	11	23	20	8.5	37
GWT12-10-D		R3/8	19	34.5	29.5	12	23	20	9	41
GWT12-15-D		R1/2	22	37.5	29.5	15	23	20	9	41

Union Tee

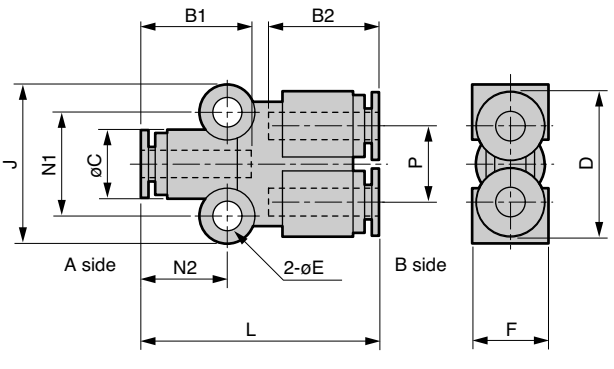
● GWT*-0



Model no.	Applicable tube O.D. ø	L	B	C	E	F	N	Min. bore size	Effective sectional area mm²
GWT 4-0	4	18.5	16	10	4.2	11	7.5	2.5	3.6
GWT 6-0	6	21	17.5	12.5	4.2	13.5	8.5	4	9.7
GWT 8-0	8	23.5	19	14.5	4.2	15.5	9.5	6	22
GWT10-0	10	27	21.5	17.5	4.2	18.5	11	8	30
GWT12-0	12	29.5	23	20	4.2	21	12	10	35.5

Y type union Tee

● GWY*-0

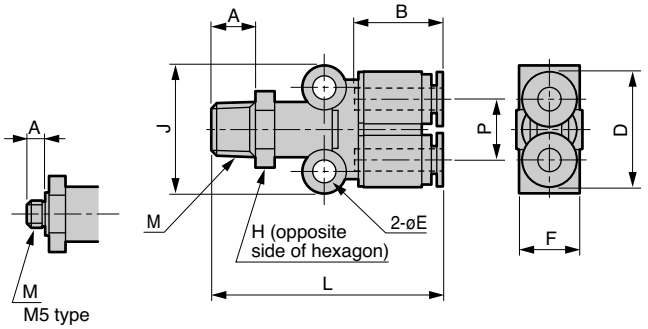


Model no.	Applicable tube O.D.ø		L	B1	B2	C	D	E	F	J	N1	N2	P	Effective sectional area mm²
	A side	B side												
GWY 44-0	4	4	34.5	16	16	10	21	4.2	11	23	15	12.5	11	3.6
GWY 66-0	6	6	37.5	17.5	17.5	12.5	26	4.2	13.5	25.5	17.5	14	13.5	10.5
GWY 88-0	8	8	40.5	19	19	14.5	30	4.2	15.5	27	19	15	15.5	23
GWY1010-0	10	10	48	21.5	21.5	17.5	36	4.2	18.5	30	22	18	18.5	38
GWY1212-0	12	12	53	23	23	20	41	4.2	21	32	24	19.5	21	50
GWY 64-0	6	4	37.5	17.5	16	12.5	26	4.2	13.5	25.5	17.5	14	13.5	5.4
GWY 86-0	8	6	40.5	19	17.5	14.5	30	4.2	15.5	27	19	15	15.5	14.3
GWY 108-0	10	8	48	21.5	19	17.5	36	4.2	18.5	30	22	18	18.5	21.1
GWY1210-0	12	10	53	23	21.5	20	41	4.2	21	32	24	19.5	21	35.5

Dimensions: Both ports Y union Tee, cross shaped, 2 port turn elbow, tetrapod shaped (with R)

Both ports Y union Tee

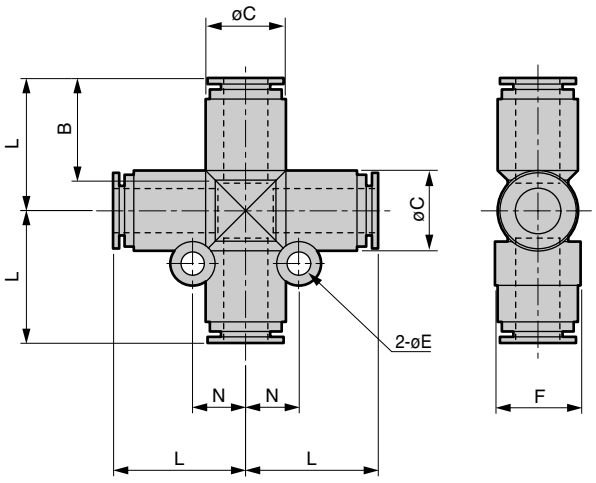
● GWY*-*



Model no.	Applicable tube O.D. ø	M	H	L	A	B	D	E	F	J	P	Effective sectional area mm²
GWY 4-M5	4	M5×0.8	12	38	3.4	16	21	4.2	11	23	11	4.5
GWY 4- 6		R1/8	12	42	8	16	21	4.2	11	23	11	5.5
GWY 4- 8		R1/4	14	45.5	11	16	21	4.2	11	23	11	5.5
GWY 6-M5	6	M5×0.8	14	41	3.4	17.5	26	4.2	13.5	25.5	13.5	4.5
GWY 6- 6		R1/8	14	46	8	17.5	26	4.2	13.5	25.5	13.5	17.5
GWY 6- 8		R1/4	14	49	11	17.5	26	4.2	13.5	25.5	13.5	17.5
GWY 6-10		R3/8	17	50.5	12	17.5	26	4.2	13.5	25.5	13.5	17.5
GWY 8- 6	8	R1/8	17	49	8	19	30	4.2	15.5	27	15.5	25.5
GWY 8- 8		R1/4	17	52	11	19	30	4.2	15.5	27	15.5	25.5
GWY 8-10		R3/8	17	53.5	12	19	30	4.2	15.5	27	15.5	25.5
GWY10- 8	10	R1/4	19	59.5	11	21.5	36	4.2	18.5	30	18.5	35
GWY10-10		R3/8	19	61	12	21.5	36	4.2	18.5	30	18.5	38.5
GWY10-15		R1/2	22	64	15	21.5	36	4.2	18.5	30	18.5	38
GWY12- 8	12	R1/4	22	64.5	11	23	41	4.2	21	32	21	37
GWY12-10		R3/8	22	66	12	23	41	4.2	21	32	21	37
GWY12-15		R1/2	22	69	15	23	41	4.2	21	32	21	40.5

Cross shaped

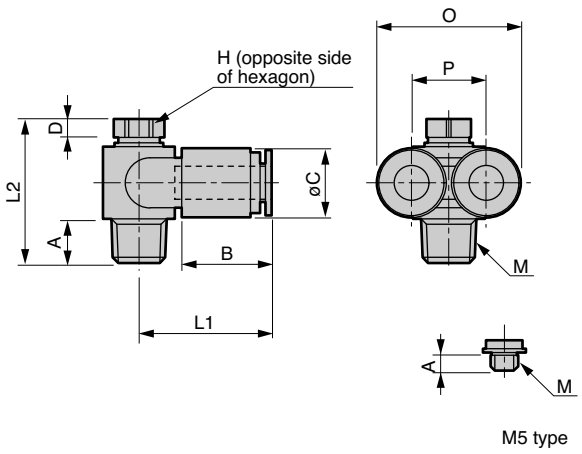
● GWCR*-0



Model no.	Applicable tube O.D. ø	L	B	C	E	F	N	Min. bore size	Effective sectional area mm²
GWCR 8-0	8	24	19	14.5	4.2	15.5	9.5	6	22
GWCR10-0	10	27.5	21.5	17.5	4.2	18.5	11	8	30.5
GWCR12-0	12	30	23	20	4.2	21	12	10	35.9

2 port turn elbow

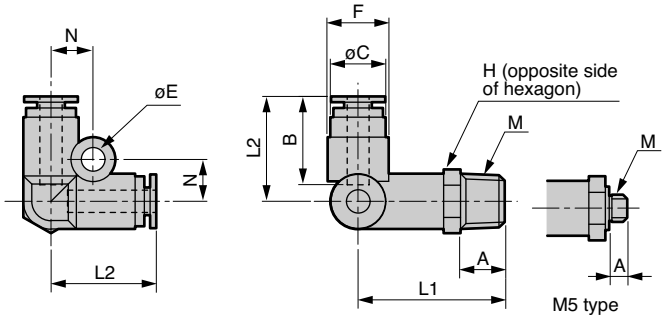
● GWL*-*-2T



Model no.	Applicable tube O.D. ø	M	H	L1	L2	A	B	C	D	O	P	Effective sectional area mm²
GWL 4-M5-2T	4	M5×0.8	8	21.5	18.5	3.4	16	10	3	21	11	3.6
GWL 6- 6-2T	6	R1/8	8	24	26	8	17.5	12.5	3	26	13.5	8.5
GWL 8- 8-2T	8	R1/4	12	28	32	11	19	14.5	4	30	15.5	19
GWL10-10-2T	10	R3/8	14	31.5	36.5	12	21.5	17.5	4	36	18.5	26
GWL12-15-2T	12	R1/2	17	35.5	42.5	15	23	20	4	41	21	34

Tetrapod shaped (with R)

● GWTR*-*



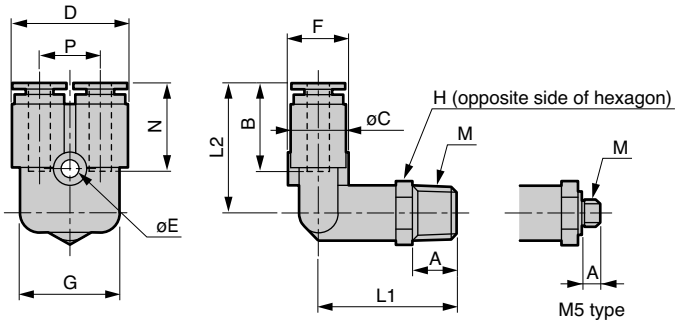
Model no.	Applicable tube O.D. ø	M	H	L1	L2	A	B	C	E	F	N	Min. bore size	Effective sectional area mm²
GWTR 4-M5	4	M5×0.8	10	22.5	19	3.4	16	10	4.2	11	7.5	2.5	4.3
GWTR 4- 6		R1/8	10	26.5	19	8	16	10	4.2	11	7.5	2.5	4.5
GWTR 4- 8		R1/4	14	30	19	11	16	10	4.2	11	7.5	2.5	4.5
GWTR 6-M5	6	M5×0.8	14	25	21.5	3.4	17.5	12.5	4.2	13.5	8.5	2.5	4.3
GWTR 6- 6		R1/8	14	30	21.5	8	17.5	12.5	4.2	13.5	8.5	4	10.5
GWTR 6- 8		R1/4	14	33	21.5	11	17.5	12.5	4.2	13.5	8.5	4	10.5
GWTR 6-10		R3/8	17	34.5	21.5	12	17.5	12.5	4.2	13.5	8.5	4	10.5
GWTR 8- 6	8	R1/8	17	32.5	24	8	19	14.5	4.2	15.5	9.5	6	23.5
GWTR 8- 8		R1/4	17	35.5	24	11	19	14.5	4.2	15.5	9.5	6	23.5
GWTR 8-10		R3/8	17	37	24	12	19	14.5	4.2	15.5	9.5	6	23.5
GWTR10- 8	10	R1/4	19	39.5	27.5	11	21.5	17.5	4.2	18.5	13	8	35.5
GWTR10-10		R3/8	19	41	27.5	12	21.5	17.5	4.2	18.5	13	8	35.5
GWTR10-15		R1/2	22	44	27.5	15	21.5	17.5	4.2	18.5	13	8	35.5
GWTR12- 8	12	R1/4	22	41.5	30	11	23	20	4.2	21	14	8.5	37.5
GWTR12-10		R3/8	22	43	30	12	23	20	4.2	21	14	8.5	37.5
GWTR12-15		R1/2	22	46	30	15	23	20	4.2	21	14	8.5	37.5

Dimensions: FY type (with R), double Y type (with R), terapod shaped, FY type

CAD

FY type(with R)

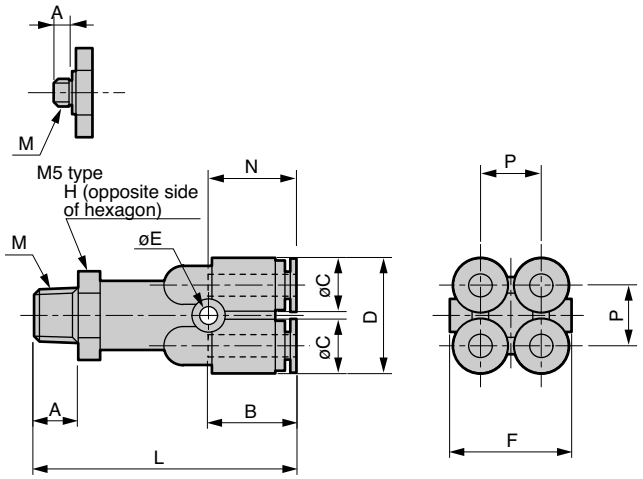
● GWFY*-*



Model no.	Applicable tube O.D. ø	M	H	L1	L2	A	B	C	D	E	F	G	N	P	Min. bore size	Effective sectional area mm²
GWFY 4-M5	4	M5×0.8	10	21	23.5	3.4	16	10	21	3.2	11	18	15.5	11	2.5	4.5
GWFY 4- 6		R1/8	10	25	23.5	8	16	10	21	3.2	11	18	15.5	11	2.5	4.6
GWFY 4- 8		R1/4	14	28.5	23.5	11	16	10	21	3.2	11	18	15.5	11	2.5	4.6
GWFY 6-M5	6	M5×0.8	14	23	27	3.4	17.5	12.5	26	4.2	13.5	22.5	17	13.5	2.5	4.5
GWFY 6- 6		R1/8	14	28	27	8	17.5	12.5	26	4.2	13.5	22.5	17	13.5	4	10.5
GWFY 6- 8		R1/4	14	31	27	11	17.5	12.5	26	4.2	13.5	22.5	17	13.5	4	10.5
GWFY 6-10		R3/8	17	32.5	27	12	17.5	12.5	26	4.2	13.5	22.5	17	13.5	4	10.5
GWFY 8- 6	8	R1/8	17	30.5	29	8	19	14.5	30	4.2	15.5	26.5	18	15.5	6	23
GWFY 8- 8		R1/4	17	33.5	29	11	19	14.5	30	4.2	15.5	26.5	18	15.5	6	23
GWFY 8-10		R3/8	17	35	29	12	19	14.5	30	4.2	15.5	26.5	18	15.5	6	23
GWFY10- 8	10	R1/4	19	37.5	33	11	21.5	17.5	36	4.2	18.5	31.5	20	18.5	8	34.4
GWFY10-10		R3/8	19	39	33	12	21.5	17.5	36	4.2	18.5	31.5	20	18.5	8	34.4
GWFY10-15		R1/2	22	42	33	15	21.5	17.5	36	4.2	18.5	32.5	20	18.5	8	34.4
GWFY12- 8	12	R1/4	22	39.5	35.5	11	23	20	41	4.2	21	37	21.5	21	8.5	37.5
GWFY12-10		R3/8	22	41	35.5	12	23	20	41	4.2	21	37	21.5	21	8.5	37.5
GWFY12-15		R1/2	22	44	35.5	15	23	20	41	4.2	21	37	21.5	21	8.5	37.5

Double Y types(with R)

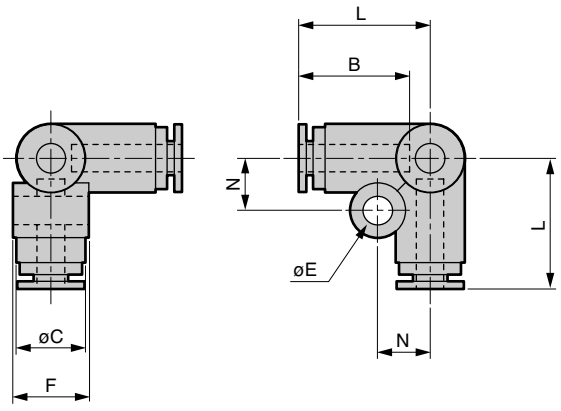
● GWWY*-*



Model no.	Applicable tube O.D. ø	M	H	L	A	B	C	D	E	F	N	P	Effective sectional area mm²
GWWY4-M5	4	M5×0.8	14	42.5	3.4	16	10	21	3.2	22	15.5	11	4.3
GWWY4- 6		R1/8	14	47.5	8	16	10	21	3.2	22	15.5	11	9.7
GWWY4- 8		R1/4	14	50.5	11	16	10	21	3.2	22	15.5	11	9.7
GWWY6-M5	6	M5×0.8	17	46.5	3.4	17.5	12.5	26	3.2	27	17	13.5	4.3
GWWY6- 6		R1/8	17	51.5	8	17.5	12.5	26	3.2	27	17	13.5	23
GWWY6- 8		R1/4	17	54.5	11	17.5	12.5	26	3.2	27	17	13.5	23
GWWY6-10		R3/8	17	56	12	17.5	12.5	26	3.2	27	17	13.5	23

Tetrapod shaped

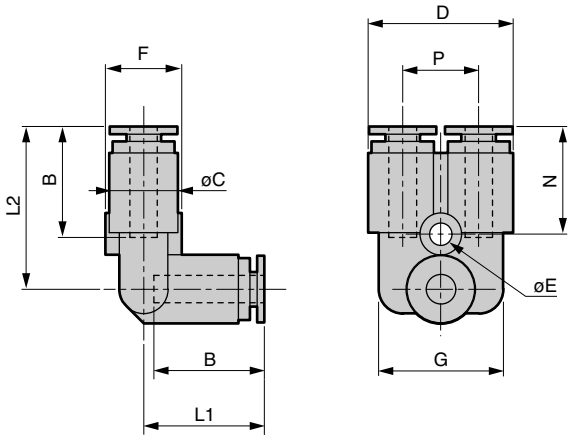
● GWTR*-0



Model no.	Applicable tube O.D. ø	L	B	C	E	F	N	Min. bore size	Effective sectional area mm²
GWTR 4-0	4	19	16	10	4.2	11	7.5	2.5	4
GWTR 6-0	6	21.5	17.5	12.5	4.2	13.5	8.5	4	9.5
GWTR 8-0	8	24	19	14.5	4.2	15.5	9.5	6	12.5
GWTR10-0	10	27.5	21.5	17.5	4.2	18.5	13	8	29.5
GWTR12-0	12	30	23	20	4.2	21	14	10	35.5

FY type

● GWFY*-0

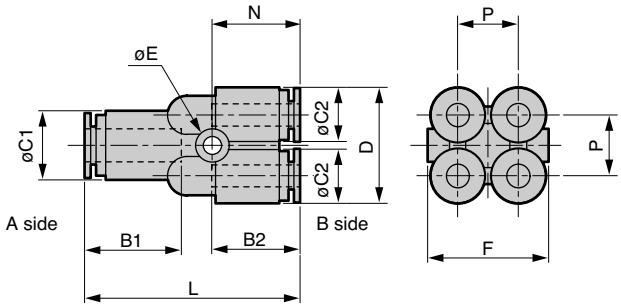


Model no.	Applicable tube O.D. ø	L1	L2	B	C	D	E	F	G	N	P	Min. bore size	Effective sectional area mm²
GWFY 4-0	4	17.5	23.5	16	10	21	3.2	11	18	15.5	11	2.5	4
GWFY 6-0	6	19.5	27	17.5	12.5	26	4.2	13.5	22.5	17	13.5	4	10
GWFY 8-0	8	22	29	19	14.5	30	4.2	15.5	26.5	18	15.5	6	21
GWFY10-0	10	25.5	33	21.5	17.5	36	4.2	18.5	31.5	20	18.5	8	29
GWFY12-0	12	28	35.5	23	20	41	4.2	21	37	21.5	21	10	35.5

Dimensions: Double Y, blanking plug, L plug, C types plug

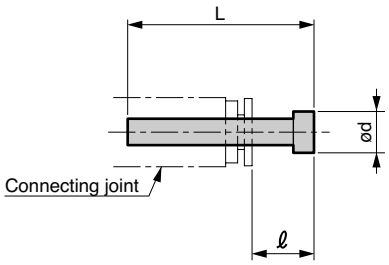
CAD

Double Y types
● GWWY*-0



Model no.	Applicable tube O.D. ø		L	B1	B2	C1	C2	D	E	F	N	P	Effective sectional area mm²
	A side	B side											
GWWY64-0	6	4	39	17.5	16	12.5	10	21	3.2	22	15.5	11	9
GWWY86-0	8	6	43	19	17.5	14.5	12.5	26	3.2	27	17	13.5	22

Blanking plug
● GWP*-B

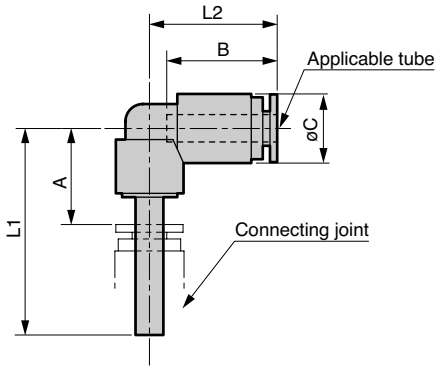


Material: Polyamide resin

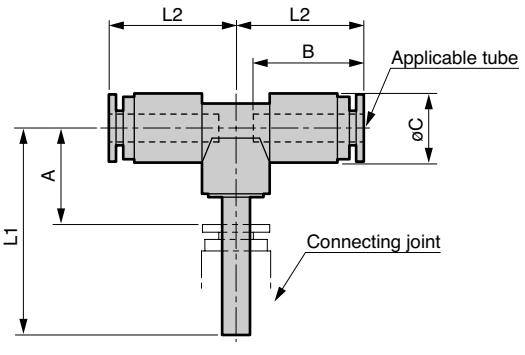
Model no.	Joint port size ø	L	ℓ*	d
GWJP 3-B	3.2	23.5	11	5
GWP 4-B	4	27	11	6
GWP 6-B	6	29	11.5	8
GWP 8-B	8	33	14	10
GWP10-B	10	40	18.5	12
GWP12-B	12	43	20	14
GWP16-B	16	51	23	21

* For connecting joint, dimension of CKD (GW Series) are shown.

L type plug
● GWP*-L



C type plug
● GWP*-C



Model no.	Applicable tube O.D. ø	Connecting joint diameter ø	L1	L2	A*	B	C	Min. bore size	Effective sectional area mm²
GWP 44-L	4	4	30	18.5	14	16	10	1.7	2.1
GWP 46-L		6	31	18.5	13.5	16	10	1.7	2.1
GWP 48-L		8	32.5	18.5	13.5	16	10	1.7	2.1
GWP 66-L	6	6	34	21	16.5	17.5	12.5	3.4	6.7
GWP 68-L		8	35.5	21	16.5	17.5	12.5	3.4	6.7
GWP 610-L		10	38	21	16.5	17.5	12.5	3.4	6.7
GWP 88-L	8	8	36.5	23.5	17.5	19	14.5	5.4	16.6
GWP 810-L		10	39	23.5	17.5	19	14.5	5.4	16.6
GWP 812-L		12	40	23.5	17	19	14.5	5.4	16.6
GWP1010-L	10	10	41.5	27	20	21.5	17.5	6.8	24.7
GWP1012-L		12	42.5	27	19.5	21.5	17.5	6.8	24.7
GWP1212-L	12	12	44.5	29.5	21.5	23	20	8.8	34

* For connecting joint, dimension of CKD (GW Series) are shown.

Model no.	Applicable tube O.D. ø	Connecting joint diameter ø	L1	L2	A*	B	C	Min. bore size	Effective sectional area mm²
GWP 44-C	4	4	30	18.5	14	16	10	1.7	2.4
GWP 46-C		6	31	18.5	13.5	16	10	1.7	2.4
GWP 48-C		8	32.5	18.5	13.5	16	10	1.7	2.4
GWP 66-C	6	6	34	21	16.5	17.5	12.5	3.4	7.3
GWP 68-C		8	35.5	21	16.5	17.5	12.5	3.4	7.3
GWP 610-C		10	38	21	16.5	17.5	12.5	3.4	7.3
GWP 88-C	8	8	36.5	23.5	17.5	19	14.5	5.4	19.3
GWP 810-C		10	39	23.5	17.5	19	14.5	5.4	19.3
GWP 812-C		12	40	23.5	17	19	14.5	5.4	19.3
GWP1010-C	10	10	41.5	27	20	21.5	17.5	6.8	28.6
GWP1012-C		12	42.5	27	19.5	21.5	17.5	6.8	28.6
GWP1212-C	12	12	44.5	29.5	21.5	23	20	8.8	35.5

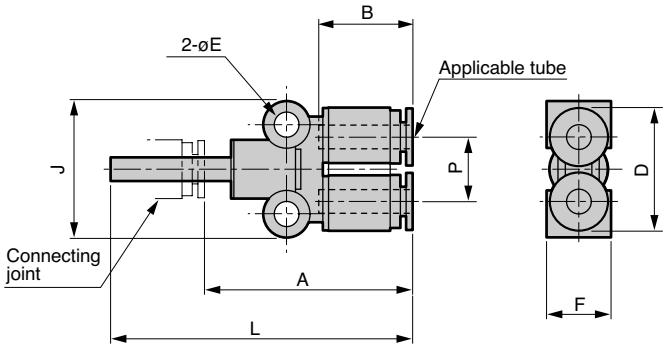
* For connecting joint, dimension of CKD (GW Series) are shown.

Dimensions: Y type plug, cap, manifold (single with R), manifold (single)

CAD

Y type plug

● GWP*-Y

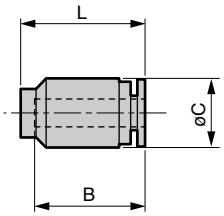


Model no.	Applicable tube O.D. ø	Connecting joint diameter ø	L	A*	B	D	E	F	J	P	Min. bore size	Effective sectional area mm²
GWP 44-Y	4	4	51.5	35.5	16	21	4.2	11	23	11	1.7	2.1
GWP 46-Y		6	52.5	35	16	21	4.2	11	23	11	2.5	5.8
GWP 48-Y		8	54	35	16	21	4.2	11	23	11	2.5	5.8
GWP 66-Y	6	6	55.5	38	17.5	26	4.2	13.5	25.5	13.5	3.9	9.1
GWP 68-Y		8	57	38	17.5	26	4.2	13.5	25.5	13.5	4	15.9
GWP 610-Y		10	59.5	38	17.5	26	4.2	13.5	25.5	13.5	4	15.9
GWP 88-Y	8	8	60	41	19	30	4.2	15.5	27	15.5	5.9	22.2
GWP 810-Y		10	62.5	41	19	30	4.2	15.5	27	15.5	6	24.9
GWP 812-Y		12	63.5	40.5	19	30	4.2	15.5	27	15.5	6	24.9
GWP1010-Y	10	10	70	48.5	21.5	36	4.2	18.5	30	18.5	6.8	28.2
GWP1012-Y		12	71	48	21.5	36	4.2	18.5	30	18.5	8	35.5
GWP1212-Y	12	12	76	53	23	41	4.2	21	32	21	8.8	36.3

* For connecting joint, dimension of CKD (GW Series) are shown.

Cap

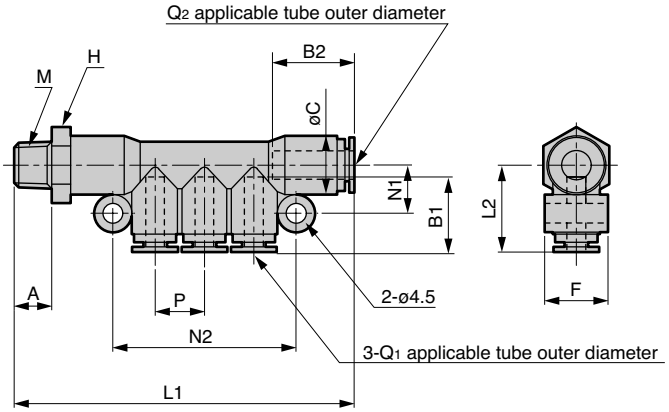
● GWC*



Model no.	Applicable tube O.D. ø	B	øC	L
GWC 4	4	16	10	18
GWC 6	6	17.5	12.5	19.5
GWC 8	8	19	14.5	21
GWC10	10	21.5	17.5	24
GWC12	12	23	20	26

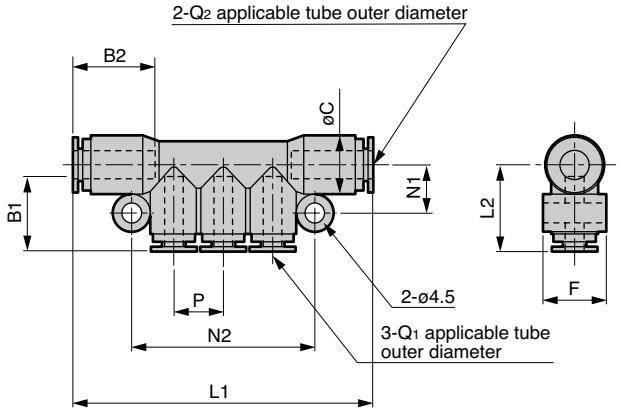
Manifold (single with R)

● GWMF*-*



Manifold (single solenoid)

● GWMF*-0

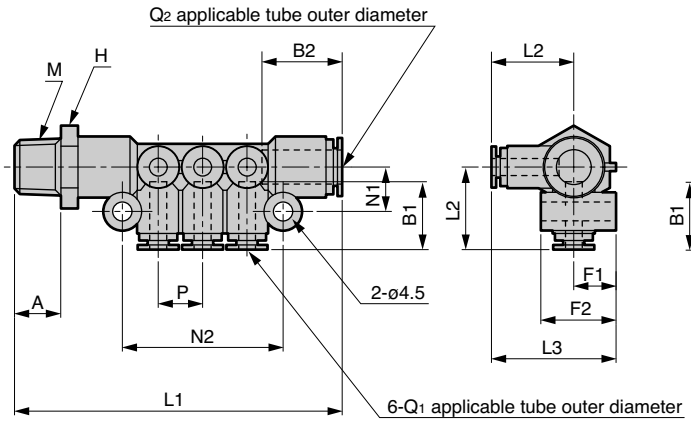


Model no.	Applicable tube O.D.ø		M	H	L1	L2	A	B1	B2	C	F	N1	N2	P	Effective sectional area mm²
	Q1	Q2													
GWMF 46- 6	4	6	R1/8	14	72.5	18.5	8	16	17.5	12.5	13.5	10.5	39	10.5	8.3
GWMF 48- 8	4	8	R1/4	17	77.5	19.5	11	16	19	14.5	15.5	11.5	39	10.5	24.2
GWMF 68- 8	6	8	R1/4	17	84.5	21	11	17.5	19	14.5	15.5	11.5	46.5	13	24.2
GWMF610-10	6	10	R3/8	19	91.5	22	12	17.5	21.5	17.5	18.5	13	46.5	13	35.5
GWMF810-10	8	10	R3/8	19	97.5	23.5	12	19	21.5	17.5	18.5	13	52.5	15	35.5

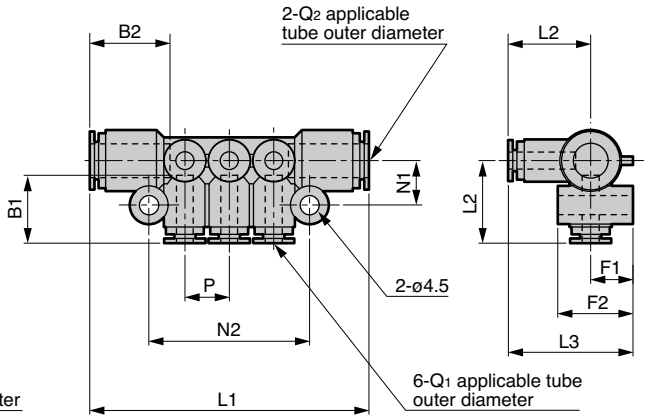
Model no.	Applicable tube O.D.ø		L1	L2	B1	B2	C	F	N1	N2	P	Effective sectional area mm²
	Q1	Q2										
GWMF 46-0	4	6	64	18.5	16	18.5	12.5	13.5	10.5	39	10.5	7.9
GWMF 48-0	4	8	66	19.5	16	19.5	14.5	15.5	11.5	39	10.5	22
GWMF 68-0	6	8	73	21	17.5	21	14.5	15.5	11.5	46.5	13	22
GWMF610-0	6	10	78.5	22	17.5	22	17.5	18.5	13	46.5	13	30
GWMF810-0	8	10	84.5	23.5	19	23.5	17.5	18.5	13	52.5	15	30

Dimensions: Manifold (double with R), manifold (double), insert ring

Manifold (double with R)
● GWMF*-*-W



Manifold (double solenoid)
● GWMF*-0-W

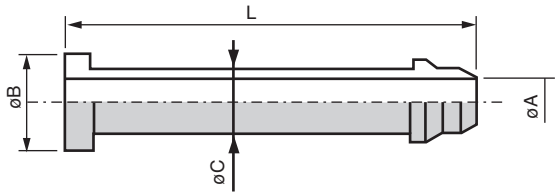


Model no.	Applicable tube O.D.ø		M	H	L1	L2	L3	A	B1	B2	F1	F2	N1	N2	P	Effective sectional area mm²
	Q1	Q2														
GWMF 48- 8-W	4	8	R1/4	17	77.5	19.5	29.5	11	16	19	10	17.5	10.5	38	10.5	24.3
GWMF 48-10-W	4	8	R3/8	17	79	19.5	29.5	12	16	19	10	17.5	10.5	38	10.5	23.5
GWMF610-10-W	6	10	R3/8	19	91.5	22	32	12	17.5	21.5	10	19.5	12	45	13	35.8
GWMF610-15-W	6	10	R1/2	19	94.5	22	32	15	17.5	21.5	10	19.5	12	45	13	35.8
GWMF812-10-W	8	12	R3/8	22	100	24.5	36	12	19	23	11.5	22	13	51	15	38.2
GWMF812-15-W	8	12	R1/2	22	103	24.5	36	15	19	23	11.5	22	13	51	15	38.2

Model no.	Applicable tube O.D.ø		L1	L2	L3	B1	B2	F1	F2	N1	N2	P	Effective sectional area mm²
	Q1	Q2											
GWMF4 8-0-W	4	8	66	19.5	29.5	16	19	10	17.5	10.5	38	10.5	22
GWMF610-0-W	6	10	78.5	22	32	17.5	21.5	10	19.5	12	45	13	30.4
GWMF812-0-W	8	12	87	24.5	36	19	23	11.5	22	13	51	15	36

Insert ring (tube U-92* / U-95*) (custom order)
● INS-U*-1

Material: Brass + electroless nickeling



● Tube U-92* / U-95*

Model no.	øA	øB	øC	L
INS-U32-1	1.1	2.2	1.7	12.7
INS-U04-1	1.1	3	1.8	17
INS-U06-1	3	5	3.8	18
INS-U08-1	4	7	4.8	21
INS-U10-1	5.5	9	6.3	23.5
INS-U12-1	7	11	7.8	25

* Tube for NU is available as custom-order.
* Use insert ring if tube U-92*, U-95* or NU is used for a vacuum circuit.

GWJ Joint (mini-type)

Port size M3 to 1/8 (Rc or R)

RoHS CAD

● Small push-in joint with wide variation

Space saving type with smaller body. Dead space of pipe can be decreased dramatically.

■ Straight type

Single straight GWJS*-*

Applicable tube O.D.ø
3.2
4
6

• Page : 946

Female, straight GWJS3-*-M

Applicable tube O.D.ø
3.2

• Page : 946

Bulk head GWJS3-0-X

Applicable tube O.D.ø
3.2

• Page : 946

Straight GWJS3-0

Applicable tube O.D.ø
3.2

• Page : 946

■ Elbow type

Different diameter straight GWJS*-0

Applicable tube O.D.ø
3.2 / 4
3.2 / 6

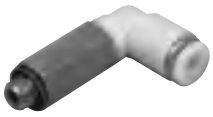
• Page : 946

Single elbow GWJL*-*

Applicable tube O.D.ø
3.2
4
6

• Page : 946

Long elbow GWJL*-*-L



Applicable tube O.D.ø
3.2
4
6

• Page : 947

Elbow GWJL3-0

Applicable tube O.D.ø
3.2

• Page : 947

■ Union Tee type

Both push-in branch GWJT3-*

Applicable tube O.D.ø
3.2

• Page : 947

D type union Tee GWJT3-*-D

Applicable tube O.D.ø
3.2

• Page : 947

Union Tee GWJT3-0

Applicable tube O.D.ø
3.2

• Page : 947

Y type union Tee GWJY*-0

Applicable tube O.D.ø
3.2 / 3.2
3.2 / 4

• Page : 947

■ Plug

Blanking plug GWJP3-B

Applicable tube O.D.ø
3.2

• Page : 948

●Sales unit is 10 pieces/1 box.

Specifications

Descriptions	GWJ
Working fluid	Compressed air
Max. working pressure MPa	1.0
Working temperature °C	-10 to 60 (no freezing)
Applicable tube	Soft nylon tube (Model no. F-1532, F-1504, F-1506) Urethane tube (Model no. U-9532, U-9504, U-9506, NU-04, NU-06) Note

Note: Refer to page 1008 for tube dimensions, ambient temperature and working pressure.

How to order

* Refer to model no. selections in dimensions (pages 946 to 948) for combination of model no.

GWJ S 3 - 6 - M
A B C D

A Shape	
S	Straight
L	Elbow
Y	Y type union Tee
T	Union Tee
P	Plug

B Applicable tube O.D.	
3	ø3.2
4	ø4
6	ø6

C Port size	
M3	M3×0.5
M5	M5×0.8
6	R1/8
0	No thread
4P	Plug for ø4
6P	Plug for ø6
B	Blanking plug

D Other combinations	
L	Long
D	D type
X	Bulk head
M	Female type

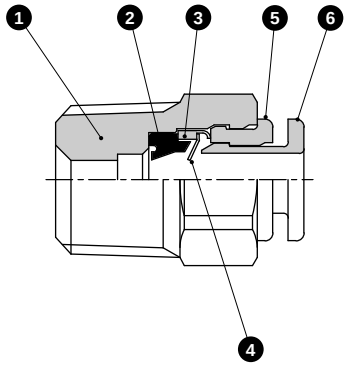
Note:Sales unit is 10 pieces/1 box.

Clean room specifications (catalog No. CB-033SA)

GWJ –·····–P7*

GWJ –·····–P80

Internal structure and main parts list



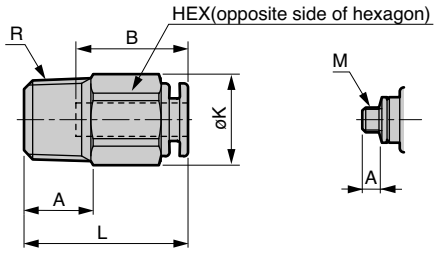
No.	Name	Material
1	Body *1	Brass (electroless nickeling treatment)
		PBT
2	Packing seal	Nitrile rubber
3	Holder	Brass (electroless nickeling treatment)
4	Chuck	Stainless steel
5	Outer ring	Metal type ¦ polyacetal
		Resin type ¦ brass (electroless nickeling treatment)
6	Push ring	Polyacetal

*1: The body of the single-ended straight, female straight, and bulkhead is brass (electroless nickel plated).

Dimensions: Single straight, female straight, bulk head, straight, different diameter straight, single elbow

Single straight

● GWJS*-*

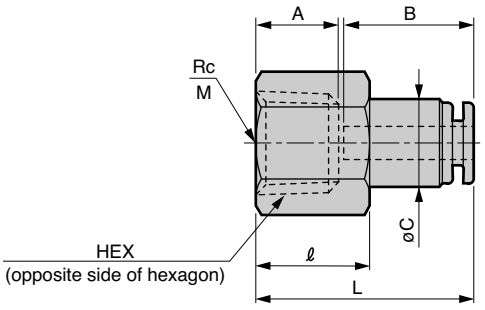


* dimension is for model with punched hexagon hole.

Model no.	Applicable tube O.D. ø	R M	HEX	K	L	A	B	Min. bore size	Effective sectional area mm²
GWJS3-M3	3.2	M3×0.5	8	8.8	17	2.4	12.5	1.2	0.9
GWJS3-M5		M5×0.8	8	8.8	18	3.4	12.5	2.5	2.5
GWJS3- 6		1/8	10	11	16.5	8	12.5	2.5 *	2.5
GWJS4-M3	4	M3×0.5	10	11	18	2.4	13.5	1.2	0.9
GWJS4-M5		M5×0.8	10	11	19	3.4	13.5	2.5	4
GWJS4- 6		1/8	10	11	20	8	13.5	2.5 *	4
GWJS6-M5	6	M5×0.8	11	12.1	20	3.4	14.5	2.5	4
GWJS6- 6		1/8	11	12.1	21.5	8	14.5	4 *	11

Female, straight

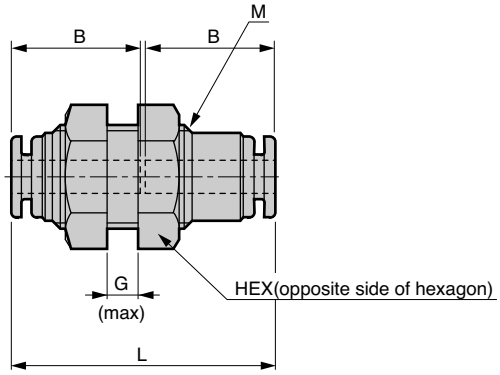
● GWJS3-*-M



Model no.	Applicable tube O.D. ø	Rc M	HEX	L	A	B	C	ℓ	Min. bore size	Effective sectional area mm²
GWJS3-M3-M	3.2	M3×0.5	8	17.5	4	12.5	7.8	7.0	2.5	2.5
GWJS3-M5-M		M5×0.8	8	18.5	5	12.5	7.8	8.0	2.5	2.5
GWJS3-6-M		1/8	12	21.5	8	12.5	8.5	11.0	2.5	2.5

Bulk head

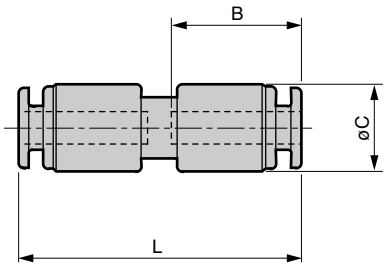
● GWJS3-0-X



Model no.	Applicable tube O.D. ø	L	B	HEX	Min. bore size	M	Panel thickness / G	Panel Hole diameter	Effective sectional area mm²
GWJS3-0-X	3.2	26.5	12.5	12	2.5	M10×1.0	5	10.5	2.5

Straight

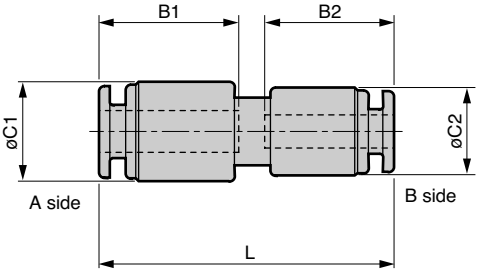
● GWJS3-0



Model no.	Applicable tube O.D. ø	L	B	C	Min. bore size	Effective sectional area mm²
GWJS3-0	3.2	27.5	12.5	8.5	2.2	2.5

Different diameter straight

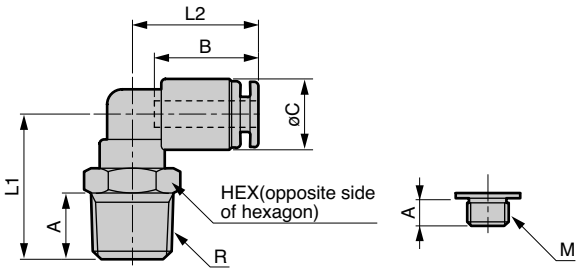
● GWJS*-0



Model no.	Applicable tube O.D.ø		L	B1	B2	C1	C2	Panel Hole diameter	Effective sectional area mm²
	A side	B side							
GWJS34-0	4	3.2	28.5	13.5	12.5	9.6	8.5	2.2	2.5
GWJS36-0	6	3.2	28.5	14.5	12.5	11.8	8.8	2.2	2.5

Single elbow

● GWJL*-*

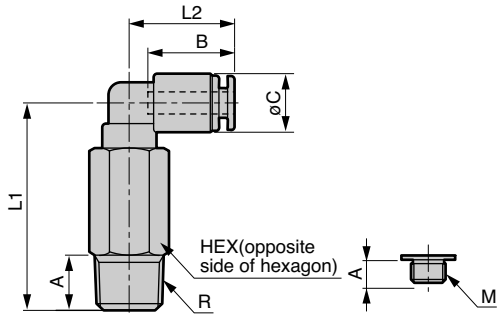


Model no.	Applicable tube O.D. ø	R M	HEX	L1	L2	A	B	C	Min. bore size	Effective sectional area mm²
GWJL3-M3	3.2	M3×0.5	8	13	15.5	2.4	12.5	8.5	1.2	0.8
GWJL3-M5		M5×0.8	8	13	15.5	3.4	12.5	8.5	2.2	2.5
GWJL3- 6		1/8	10	17.5	15.5	8	12.5	8.5	2.2	2.3
GWJL4-M3	4	M3×0.5	8	13	16.5	2.4	13.5	9.6	1.2	0.8
GWJL4-M5		M5×0.8	8	13	16.5	3.4	13.5	9.6	2.5	3
GWJL4- 6		1/8	10	17.5	16.5	8	13.5	9.6	2.5	3
GWJL6-M5	6	M5×0.8	10	15.5	18.5	3.4	14.5	11.8	2.5	3.5
GWJL6- 6		1/8	10	18.5	18.5	8	14.5	11.8	4	9.5

Dimensions: Long elbow, elbow, both push-in branch, D type union Tee, Union Tee, Y type union Tee

Long elbow

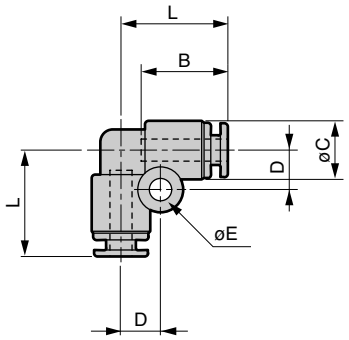
● GWJL*-*-L



Model no.	Applicable tube O.D. ø	R M	HEX	L1	L2	A	B	C	Min. bore size	Effective sectional area mm²
GWJL3-M3-L	3.2	M3×0.5	8	25.5	15.5	2.4	12.5	8.5	1.2	0.8
GWJL3-M5-L		M5×0.8	8	25.5	15.5	3.4	12.5	8.5	2.2	2.3
GWJL3- 6-L		1/8	10	30	15.5	8	12.5	8.5	2.2	2.3
GWJL4-M5-L	4	M5×0.8	8	25.5	16.5	3.4	13.5	9.6	2.5	3
GWJL4- 6-L		1/8	10	30	16.5	8	13.5	9.6	2.5	3
GWJL6-M5-L	6	M5×0.8	10	30.5	18.5	3.4	14.5	11.8	2.5	3.5
GWJL6- 6-L		1/8	10	33.5	18.5	8	14.5	11.8	4	8.5

Elbow

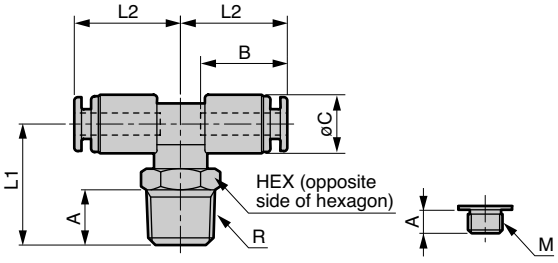
● GWJL3-0



Model no.	Applicable tube O.D. ø	L	B	C	D	E	Min. bore size	Effective sectional area mm²
GWJL3-0	3.2	15.5	12.5	8.5	5.7	3.2	2.2	2.3

Both push-in branch

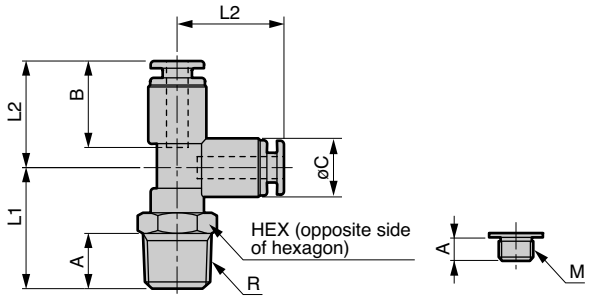
● GWJT3-*



Model no.	Applicable tube O.D. ø	R M	HEX	L1	L2	A	B	C	Min. bore size	Effective sectional area mm²
GWJT3-M3	3.2	M3×0.5	8	13	15.5	2.4	12.5	8.5	1.2	0.9
GWJT3-M5		M5×0.8	8	13	15.5	3.4	12.5	8.5	2.2	2.7
GWJT3-6		1/8	10	17.5	15.5	8	12.5	8.5	2.2	2.7

D type union Tee

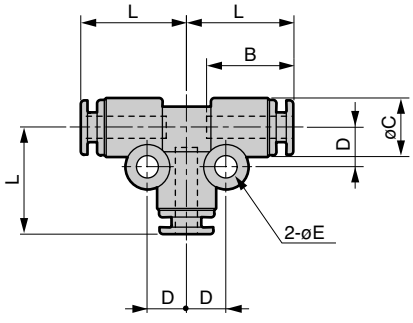
● GWJT3-*-D



Model no.	Applicable tube O.D. ø	R M	HEX	L1	L2	A	B	C	Min. bore size	Effective sectional area mm²
GWJT3-M3-D	3.2	M3×0.5	8	13	15.5	2.4	12.5	8.5	1.2	0.9
GWJT3-M5-D		M5×0.8	8	13	15.5	3.4	12.5	8.5	2.2	2.7
GWJT3-6-D		1/8	10	17.5	15.5	8	12.5	8.5	2.2	2.7

Union Tee

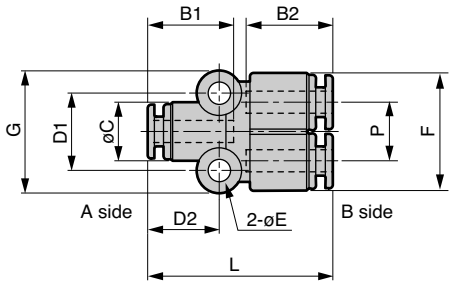
● GWJT3-0



Model no.	Applicable tube O.D. ø	L	B	C	D	E	Min. bore size	Effective sectional area mm²
GWJT3-0	3.2	15.5	12.5	8.5	5.7	3.2	2.2	2.7

Y type union Tee

● GWJY*-0



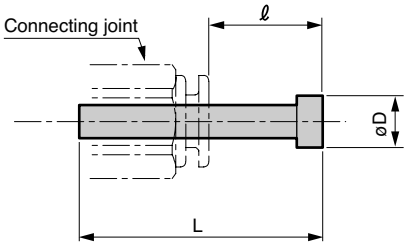
Model no.	Applicable tube O.D.ø		L	B1	B2	C	D1	D2	E	F	P	G	Effective sectional area mm²
	A side	B side											
GWJY33-0	3.2	3.2	27	12.5	12.5	8.5	11.2	10.5	3.2	17	8.5	17.7	2.7
GWJY43-0	4	3.2	28.5	13.5	12.5	9.6	12.2	12	3.2	17	8.5	18.7	2.7

Dimensions: Blanking plug

CAD

Blanking plug

- GWJP3-B
- GWP*-B



Material: Polyamide

Model no.	Connecting joint diameter ø	L	ℓ *	D
GWJP3-B	3.2	23.5	11	5
GWP 4-B	4	27	11	6
GWP 6-B	6	29	11.5	8

* Dimension of CKD connecting joints (GW and GWJ series) are shown.

MEMO

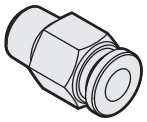
ZSP

Joint Stainless steel type

Port size M5, R1/8 to R1/2

CAD

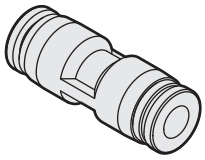
Straight
ZSP-C*-*



Applicable tube O.D.ø
4
6
8
10
12

• Page : 953

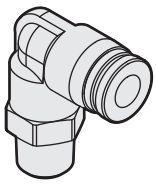
Straight union
ZSP-U*



Applicable tube O.D.ø
4
6
8
10
12

• Page : 953

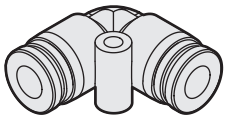
Elbow
ZSP-L*-*



Applicable tube O.D.ø
4
6
8
10
12

• Page : 953

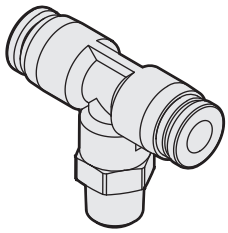
Union elbow
ZSP-V*



Applicable tube O.D.ø
4
6
8
10
12

• Page : 953

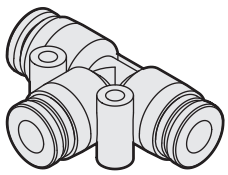
Tee
ZSP-B*-*



Applicable tube O.D.ø
4
6
8
10
12

• Page : 954

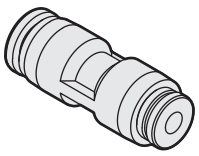
Union tee
ZSP-E*



Applicable tube O.D.ø
4
6
8
10
12

• Page : 954

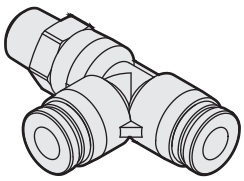
Irregular diameter straight union
ZSP-G*-*



Applicable tube O.D.ø
6 / 4
8 / 6
10 / 8
12 / 10

• Page : 954

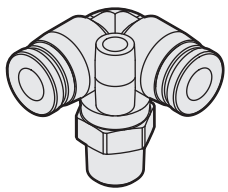
Branch Tee
ZSP-D*-*



Applicable tube O.D.ø
4
6
8
10
12

• Page : 954

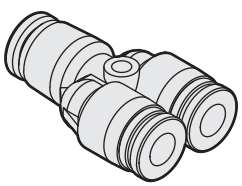
Tripod elbow
ZSP-VX*-*



Applicable tube O.D.ø
4
6
8
10
12

• Page : 954

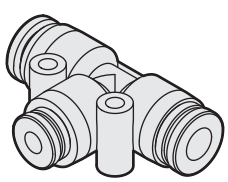
Union Y
ZSP-Y*



Applicable tube O.D.ø
4
6
8
10
12

• Page : 955

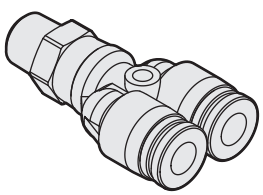
Irregular diameter union Tee
ZSP-EG*-*



Applicable tube O.D.ø
6 / 4
8 / 6
10 / 8
12 / 10

• Page : 955

Branch Y
ZSP-X*-*

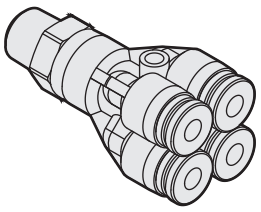


Applicable tube O.D.ø
4
6
8
10
12

• Page : 955

• Sales unit is 10 pieces per bag.

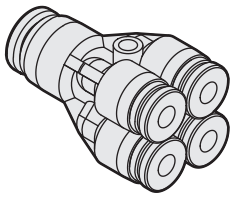
Branch double Y
ZSP-RX*-*



Applicable tube O.D.ø
4
6

• Page : 956

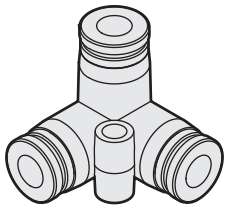
Irregular diameter double Y
ZSP-RG*-*



Applicable tube O.D.ø
6 / 4
8 / 6

• Page : 956

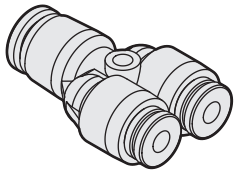
Tripod union
ZSP-VU*



Applicable tube O.D.ø
4
6
8
10
12

• Page : 956

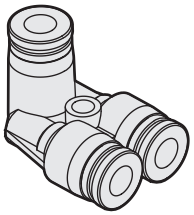
Irregular diameter union Y
ZSP-W*-*



Applicable tube O.D.ø
6 / 4
8 / 6
10 / 8
12 / 10

• Page : 956

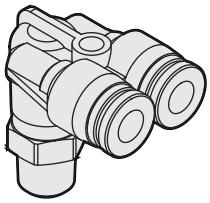
Union A
ZSP-AU*



Applicable tube O.D.ø
4
6
8
10
12

• Page : 957

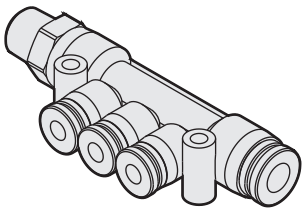
Branch elbow
ZSP-AX*-*



Applicable tube O.D.ø
4
6
8
10
12

• Page : 957

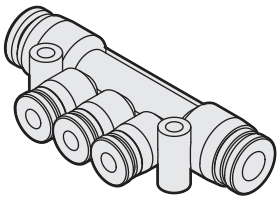
Branch triple
ZSP-KD*-*-*



Applicable tube O.D.ø
6 / 4
8 / 4
8 / 6
10 / 8

• Page : 957

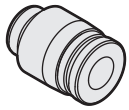
Irregular diameter triple
ZSP-KG*-*



Applicable tube O.D.ø
6 / 4
8 / 4
8 / 6
10 / 6
10 / 8

• Page : 957

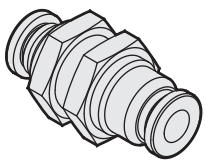
Cap
ZSP-RF*



Applicable tube O.D.ø
4
6
8
10
12

• Page : 958

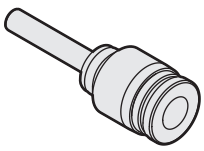
Barrier union
ZSP-M*



Applicable tube O.D.ø
4
6
8
10
12

• Page : 958

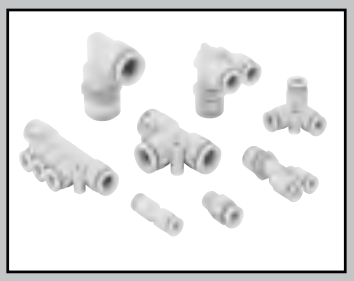
Reducer
ZSP-J*-*



Applicable tube O.D.ø
6 / 4
4 / 6
4 / 8
6 / 8
4 / 10
6 / 10
8 / 10
6 / 12
8 / 12
10 / 12

• Page : 958

•Sales unit is 10 pieces per bag.



Joint stainless steel type

ZSP Series

- Port size: M5, R1/8 to R1/2
- Applicable tube: ø4 to ø12

RoHS CAD

Features

- Stainless steel (SUS303 or equivalent) metal body
  Perfect for use in corrosive environments, or places susceptible to copper ion
- Diverse range of model variations
  A diverse range of variations support various pneumatic piping
- Environment compatible products
  With this RoHS Directive compatible product, all substances which adversely affect the global environment have been eliminated from the materials

Specifications

Descriptions	ZSP
Working fluid	Air
Max. working pressure MPa	1.0
Use vacuum kPa	-100
Ambient temperature range °C	0 to 60 (no freezing Note 1)

Note1: Freezing could occur by adiabatic expansion depending on air quality (dew point).

How to order

* Refer to model no. selections in dimensions (pages 953 to 958) for combination of model no.

ZSP - C 4 - 6
(A) (B) (C)

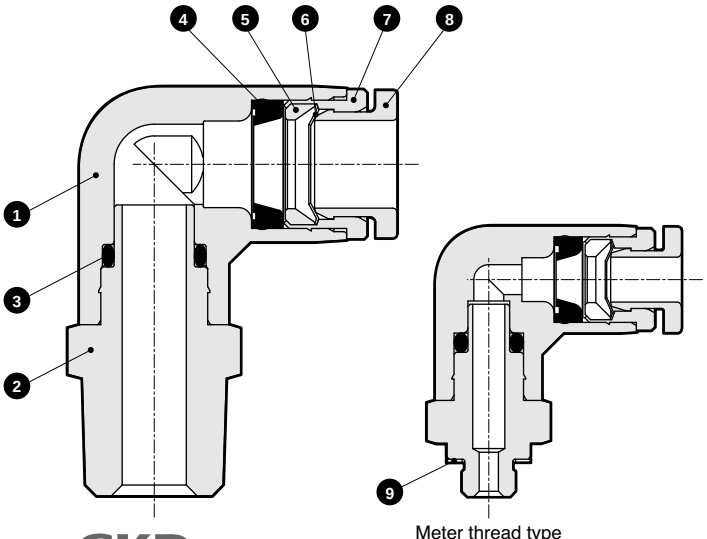
(A) Shape			
C	Straight	RX	Branch double Y
U	Straight union	RG	Irregular diameter double Y
L	Elbow	VU	Tripod union
V	Union elbow	W	Irregular diameter union Y
B	Tee	AU	Union A
E	Union Tee	AX	Branch elbow
G	Irregular diameter straight union	KD	Branch triple
D	Branch Tee	KG	Irregular diameter triple
VX	Tripod elbow	PF	Cap
Y	Union Y	M	Barrier union
EG	Irregular diameter union tee	J	Reducer
X	Branch Y		

(B) Applicable tube O.D.	
4	ø4
6	ø6
8	ø8
10	ø10
12	ø12

(C) Port sizeNote1	
M5	M5×0.8
M5S	M5×0.5 (fine outline type)
6	R1/8
8	R1/4
10	R3/8
15	R1/2

Note 1: If “C” is the tube size, select from the table for “B”.

Internal structure and parts list

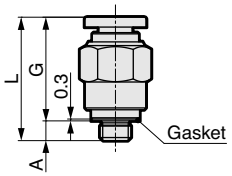


Meter thread type

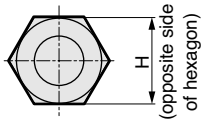
No.	Parts name	Material
1	Resin body	PBT
2	Metal body	Stainless steel (SUS303 or equivalent)
3	O ring	Hydrogen nitrile rubber
4	Rubber sleeve	Hydrogen nitrile rubber
5	Lock ring	Stainless steel (SUS303 or equivalent)
6	Lock jaw	Stainless steel (SUS301)
7	Guide ring	Stainless steel (SUS303 or equivalent)
8	Release ring	Polyacetal
9	Gasket	Polyacetal

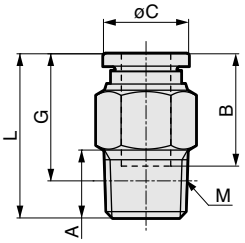
Dimensions

Straight
● ZSP-C*-*



Meter thread type

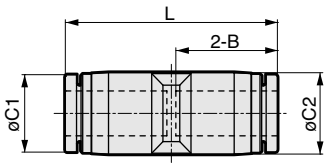




Model no.	Applicable tube O.D. ø	M	A	L	G	B	C	H	Effective sectional area mm²	Weight g
ZSP-C4-M5	4	M5×0.8	3.2	20	16.8	14.9	9.9	10	1.9	5.6
ZSP-C4-M5S		M5×0.8	3.2	22.9	19.7	14.9	9.9	8	1.9	5.9
ZSP-C4-6		R1/8	8	21	17	14.9	9.9	10	5.3	7.5
ZSP-C4-8		R1/4	11	21	15	14.9	9.9	14	5.3	15
ZSP-C6-M5	6	M5×0.8	3.2	22.1	18.9	17	11.8	12	1.9	8.1
ZSP-C6-6		R1/8	8	22.6	18.6	17	11.8	12	12.5	8.3
ZSP-C6-8		R1/4	11	24.6	18.5	17	11.8	14	12.5	16
ZSP-C6-10		R3/8	12	23.6	17.2	17	11.8	17	12.5	25
ZSP-C8-6	8	R1/8	8	27.9	23.9	18.2	13.8	14	20	14
ZSP-C8-8		R1/4	11	26.6	20.6	18.2	13.8	14	20	14
ZSP-C8-10		R3/8	12	23.9	17.6	18.2	13.8	17	20	21
ZSP-C10-6	10	R1/8	8	30.3	26.3	20.7	16.8	17	22.9	21
ZSP-C10-8		R1/4	11	29.8	23.8	20.7	16.8	17	35	19
ZSP-C10-10		R3/8	12	29.3	23	20.7	16.8	17	35	24
ZSP-C10-15		R1/2	15	30.3	22.1	20.7	16.8	21	35	46
ZSP-C12-8	12	R1/4	11	35.9	29.9	23.3	19.8	21	35	40
ZSP-C12-10		R3/8	12	31.9	25.6	23.3	19.8	21	59	32
ZSP-C12-15		R1/2	15	33.9	25.7	23.3	19.8	21	59	45

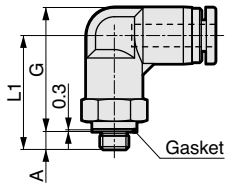
Note) The L dimensions for the taper screw type are reference dimensions after tightening.

Straight union
● ZSP-U*-*

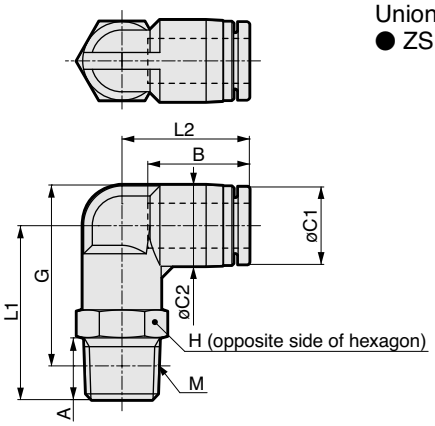


Model no.	Applicable tube O.D. ø	L	C1	C2	B	Effective sectional area mm²	Weight g
ZSP-U4	4	30.8	9.9	10	14.9	5.3	4.4
ZSP-U6	6	34.9	11.8	12.5	17	12.5	6.2
ZSP-U8	8	37.8	13.8	14.5	18.1	20	8.8
ZSP-U10	10	43.4	16.8	17.5	20.2	35	15
ZSP-U12	12	47.8	19.8	21	23.4	59	21

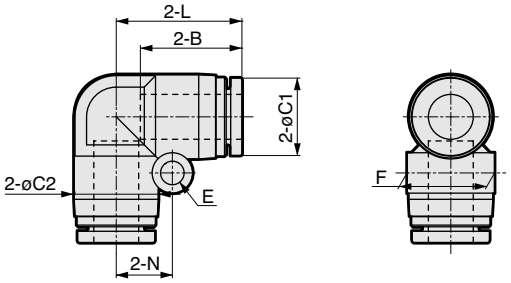
Elbow
● ZSP-L*-*



Meter thread type



Union elbow
● ZSP-V*



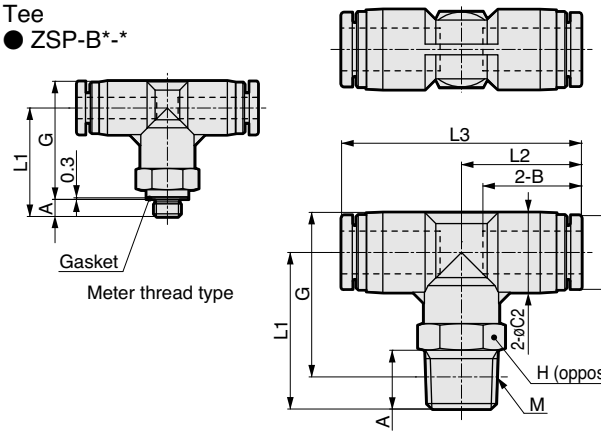
Model no.	Applicable tube O.D. ø	M	A	L1	G	C1	C2	B	L2	H	Effective sectional area mm²	Weight g
ZSP-L4-M5	4	M5×0.8	3.2	20.3	22.1	9.9	10	14.9	18	10	1.5	7.3
ZSP-L4-6		R1/8	8	23.3	24.3	9.9	10	14.9	18	10	4.2	10
ZSP-L4-8		R1/4	11	26.3	25.3	9.9	10	14.9	18	14	4.2	19
ZSP-L6-M5	6	M5×0.8	3.2	22	25.1	11.8	12.5	16.8	19.8	12	1.5	11
ZSP-L6-6		R1/8	8	25	27.3	11.8	12.5	16.8	19.8	12	10	13
ZSP-L6-8		R1/4	11	28	28.2	11.8	12.5	16.8	19.8	14	10	20
ZSP-L6-10		R3/8	12	29.8	29.7	11.8	12.5	16.8	19.8	17	10	32
ZSP-L8-6	8	R1/8	8	28	31.3	13.8	14.5	18.1	22.7	14	16.5	17
ZSP-L8-8		R1/4	11	31	32.2	13.8	14.5	18.1	22.7	14	16.5	22
ZSP-L8-10		R3/8	12	32.8	33.7	13.8	14.5	18.1	22.7	17	16.5	34
ZSP-L10-6	10	R1/8	8	33	37.8	16.8	17.5	20.2	26.2	17	22.4	29
ZSP-L10-8		R1/4	11	36	38.7	16.8	17.5	20.2	26.2	17	30	31
ZSP-L10-10		R3/8	12	37	39.4	16.8	17.5	20.2	26.2	17	30	39
ZSP-L10-15		R1/2	15	40	40.6	16.8	17.5	20.2	26.2	21	30	59
ZSP-L12-8	12	R1/4	11	38	42.5	19.8	21	23.4	29.4	21	30	47
ZSP-L12-10		R3/8	12	39	43.2	19.8	21	23.4	29.4	21	47	48
ZSP-L12-15		R1/2	15	42	44.3	19.8	21	23.4	29.4	21	47	63

Note) The L dimensions for the taper screw type are reference dimensions after tightening.

Model no.	Applicable tube O.D. ø	C1	C2	B	L	E	N	F	Effective sectional area mm²	Weight g
ZSP-V4	4	9.9	10	14.9	16.9	3.2	6.5	10	4.2	4.7
ZSP-V6	6	11.8	12.5	16.9	20.1	3.2	8	12.5	10	6.9
ZSP-V8	8	13.8	15	18.1	22.4	4.2	10	15.6	16.5	11
ZSP-V10	10	16.8	17.5	20.7	26.2	4.2	12	18.2	30	16
ZSP-V12	12	19.8	21	23.4	29.4	4.2	14	21.7	47	24

Dimensions CAD

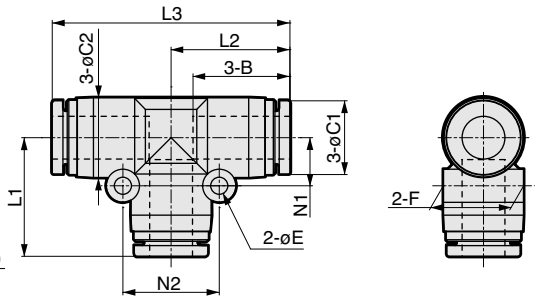
Tee
● ZSP-B*-*



Model no.	Applicable tube O.D.ø	M	A	L1	G	C1	C2	B	L2	L3	H	Effective sectional area mm²	Weight g
ZSP-B4-M5	4	M5×0.8	3.2	20.2	22	9.9	10	14.9	16.9	33.8	10	1.5	9.4
ZSP-B4-6		R1/8	8	23.2	24.2	9.9	10	14.9	16.9	33.8	10	4.1	13
ZSP-B4-8		R1/4	11	26.2	25.2	9.9	10	14.9	16.9	33.8	14	4.1	21
ZSP-B6-M5	6	M5×0.8	3.2	23	26.3	11.8	13	17	20.15	40.3	12	1.5	15
ZSP-B6-6		R1/8	8	26	28.5	11.8	13	17	20.15	40.3	12	10	17
ZSP-B6-8		R1/4	11	29	29.5	11.8	13	17	20.15	40.3	14	10	24
ZSP-B6-10		R3/8	12	30.8	31	11.8	13	17	20.15	40.3	17	10	36
ZSP-B8-6	8	R1/8	8	26.3	29.8	13.8	15	18.4	22.4	44.8	14	16.5	21
ZSP-B8-8		R1/4	11	29.3	30.8	13.8	15	18.4	22.4	44.8	14	16.5	26
ZSP-B8-10		R3/8	12	31.1	32.3	13.8	15	18.4	22.4	44.8	17	16.5	38
ZSP-B10-6	10	R1/8	8	33	37.8	16.8	17.5	20.2	25.2	50.4	17	30	36
ZSP-B10-8		R1/4	11	36	38.7	16.8	17.5	20.2	25.2	50.4	17	30	38
ZSP-B10-10		R3/8	12	37	39.4	16.8	17.5	20.2	25.2	50.4	17	30	46
ZSP-B10-15		R1/2	15	40	40.6	16.8	17.5	20.2	25.2	50.4	21	30	65
ZSP-B12-8	12	R1/4	11	38	42.5	19.8	21	22.9	28.4	56.8	21	30	56
ZSP-B12-10		R3/8	12	39	43.2	19.8	21	22.9	28.4	56.8	21	47	58
ZSP-B12-15		R1/2	15	42	44.3	19.8	21	22.9	28.4	56.8	21	47	73

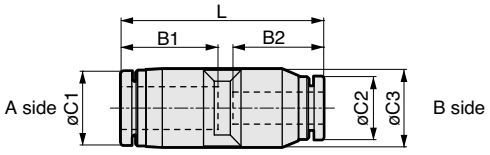
Note) The L dimensions for the taper screw type are reference dimensions after tightening.

Union Tee
● ZSP-E*



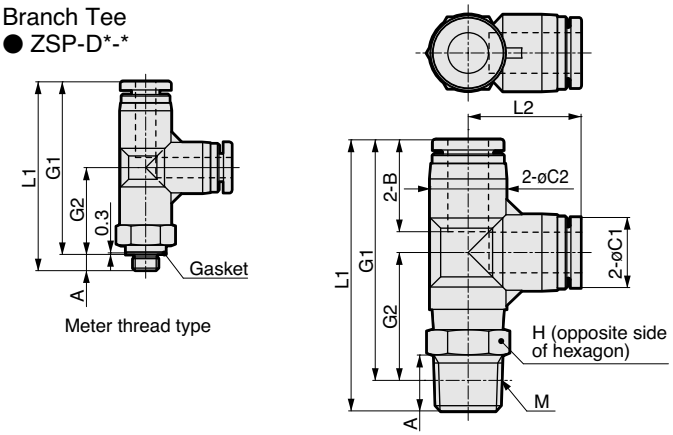
Model no.	Applicable tube O.D.ø	C1	C2	B	L2	L3	E	N1	N2	L1	F	Effective sectional area mm²	Weight g
ZSP-E4	4	9.9	10	14.9	16.9	33.8	3.2	6.5	13	16.9	10	5.3	7.1
ZSP-E6	6	11.8	13	17	20.05	40.1	3.2	8	16	20.1	13.5	12.5	11
ZSP-E8	8	13.8	15.6	18.1	22.2	44.4	3.2	9	18	22.2	15	20	15
ZSP-E10	10	16.8	18.2	19.6	25.2	50.4	4.2	12	24	25.2	17.5	35	24
ZSP-E12	12	19.8	21	22.9	28.4	56.8	4.2	14	28	28.2	21.7	59	34

Irregular diameter straight union
● ZSP-G*-*



Model no.	Applicable tube O.D.ø		L	C1	C2	C3	B1	B2	Effective sectional area mm²	Weight g
	A side	B side								
ZSP-G6-4	6	4	34.4	11.8	9.9	12.5	17	14.9	5.3	6
ZSP-G8-6	8	6	37.9	13.8	11.8	14.5	18.1	17	12.5	8.3
ZSP-G10-8	10	8	43.1	16.8	13.8	17.5	20.2	18.4	20	14
ZSP-G12-10	12	10	47.6	19.8	16.8	21	23.4	20.2	35	20

Branch Tee
● ZSP-D*-*

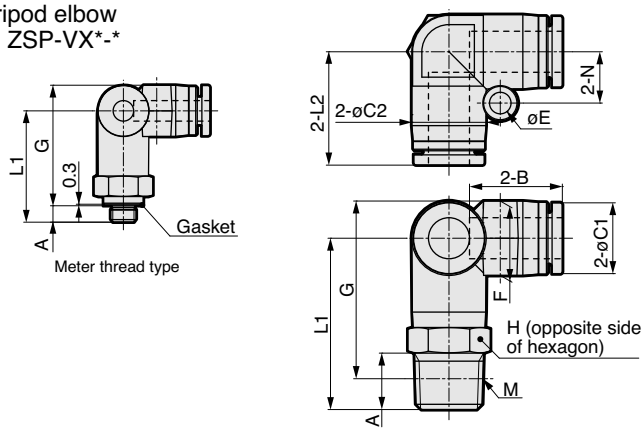


Model no.	Applicable tube O.D.ø	M	A	L1	G1	G2	C1	C2	B	L2	H	Effective sectional area mm²	Weight g
ZSP-D4-M5	4	M5×0.8	3.2	37.1	33.9	17	9.9	10	14.9	16.9	10	1.9	9.4
ZSP-D4-6		R1/8	8	40.1	36.1	19.2	9.9	10	14.9	16.9	10	5.3	13
ZSP-D4-8		R1/4	11	43.1	37.1	20.2	9.9	10	14.9	16.9	14	5.3	21
ZSP-D6-M5	6	M5×0.8	3.2	43.2	40	19.8	11.8	13	17	20.1	12	1.9	15
ZSP-D6-6		R1/8	8	46.2	42.2	22	11.8	13	17	20.1	12	12.5	17
ZSP-D6-8		R1/4	11	49.2	43.1	23	11.8	13	17	20.1	14	12.5	24
ZSP-D6-10		R3/8	12	51	44.6	24.5	11.8	13	17	20.1	17	12.5	35
ZSP-D8-6	8	R1/8	8	50.4	46.4	24.2	13.8	15	18.1	22.2	14	20	21
ZSP-D8-8		R1/4	11	53.4	47.4	25.2	13.8	15	18.1	22.2	14	20	27
ZSP-D8-10		R3/8	12	55.2	48.9	26.7	13.8	15	18.1	22.2	17	20	38
ZSP-D10-6	10	R1/8	8	58.2	54.2	29	16.8	17.5	20.2	25.2	17	35	36
ZSP-D10-8		R1/4	11	61.2	55.2	30	16.8	17.5	20.2	25.2	17	35	38
ZSP-D10-10		R3/8	12	62.2	55.9	30.7	16.8	17.5	20.2	25.2	17	35	46
ZSP-D10-15		R1/2	15	65.2	57	31.8	16.8	17.5	20.2	25.2	21	35	65
ZSP-D12-8	12	R1/4	11	66.6	60.6	32.2	19.8	21	22.9	28.2	21	35	57
ZSP-D12-10		R3/8	12	67.6	61.3	32.9	19.8	21	22.9	28.2	21	59	58
ZSP-D12-15		R1/2	15	70.6	62.4	34	19.8	21	22.9	28.2	21	59	72

Note) The L1 and L2 dimensions for the taper screw type are reference dimensions after tightening.

Dimensions CAD

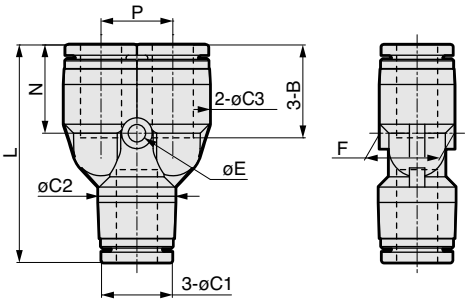
Tripod elbow
● ZSP-VX*-*



Model no.	Applicable tube O.D. ø	M	A	L1	G	C1	C2	B	L2	H	E	N	F	Effective sectional area mm²	Weight g
ZSP-VX4-M5	4	M5×0.8	3.2	21.7	23.5	9.9	10	14.9	16.9	10	3.2	6.5	10	2.3	11
ZSP-VX4-6		R1/8	8	24.7	25.7	9.9	10	14.9	16.9	10	3.2	6.5	10	4	14
ZSP-VX4-8		R1/4	11	27.7	26.7	9.9	10	14.9	16.9	14	3.2	6.5	10	3.5	23
ZSP-VX6-M5	6	M5×0.8	3.2	25.3	28.4	11.8	12.5	17	20.1	12	4.2	8	12.5	2.3	17
ZSP-VX6-6		R1/8	8	28.3	30.6	11.8	12.5	17	20.1	12	4.2	8	12.5	8.5	18
ZSP-VX6-8		R1/4	11	31.3	31.5	11.8	12.5	17	20.1	14	4.2	8	12.5	8	26
ZSP-VX6-10		R3/8	12	33.1	33	11.8	12.5	17	20.1	17	4.2	8	12.5	8.4	39
ZSP-VX8-6	8	R1/8	8	30.4	33.7	13.8	14.5	18.1	22.1	14	4.2	10	14.5	17.1	24
ZSP-VX8-8		R1/4	11	33.4	34.6	13.8	14.5	18.1	22.1	14	4.2	10	14.5	17.5	30
ZSP-VX8-10		R3/8	12	35.2	36.1	13.8	14.5	18.1	22.1	17	4.2	10	14.5	17.4	42
ZSP-VX10-6	10	R1/8	8	35.2	40	16.8	17.5	20.2	26.2	17	4.2	12	17.5	17.4	38
ZSP-VX10-8		R1/4	11	38.2	40.9	16.8	17.5	20.2	26.2	17	4.2	12	17.5	31.5	44
ZSP-VX10-10		R3/8	12	39.2	41.6	16.8	17.5	20.2	26.2	17	4.2	12	17.5	28.1	52
ZSP-VX10-15		R1/2	15	42.2	42.8	16.8	17.5	20.2	26.2	21	4.2	12	17.5	24.3	74
ZSP-VX12-8	12	R1/4	11	41.2	45.7	19.8	21	23.4	29.4	21	4.2	14	21	40.9	64
ZSP-VX12-10		R3/8	12	42.2	46.4	19.8	21	23.4	29.4	21	4.2	14	21	45	65
ZSP-VX12-15		R1/2	15	45.2	47.5	19.8	21	23.4	29.4	21	4.2	14	21	44.8	81

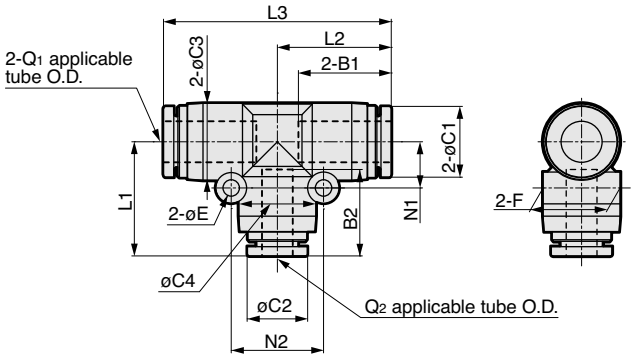
Note) The L dimensions for the taper screw type are reference dimensions after tightening.

Union Y
● ZSP-Y*



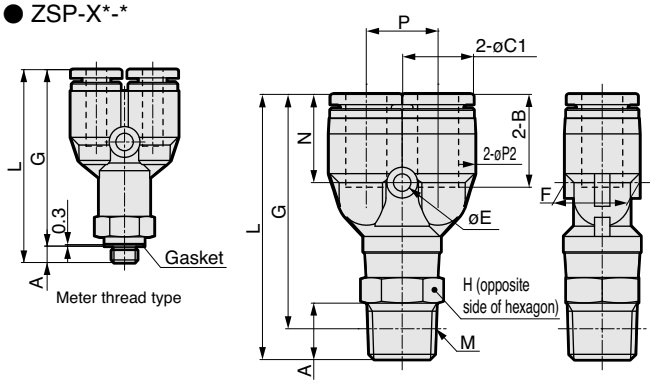
Model no.	Applicable tube O.D. ø	L	C1	C2	C3	B	P	E	N	F	Effective sectional area mm²	Weight g
ZSP-Y4	4	32.8	9.9	10	10	14.9	11	3.4	14.1	10.4	4.2	7.6
ZSP-Y6	6	37.7	11.8	13	12.5	17	12	3.4	15.8	13.5	10	10
ZSP-Y8	8	42.4	13.8	15	14.5	18.1	14	3.4	17.2	15.1	16.5	15
ZSP-Y10	10	48.4	16.8	18	18	20.7	18	4.5	19.5	18	27	25
ZSP-Y12	12	54.8	19.8	21.5	21	23.4	20	4.2	22.2	21	38	35

Irregular diameter union Tee
● ZSP-EG*-*



Model no.	Applicable tube O.D. ø		C1	C2	C3	C4	B1	B2	L2	L3	E	N1	N2	L1	F	Effective sectional area mm²	Weight g
	Q1	Q2															
ZSP-EG6-4	6	4	11.8	9.9	13	13	17	14.9	20.05	40.1	3.2	8	16	19.5	13.5	4.1	11
ZSP-EG8-6	8	6	13.8	11.8	14.5	12.5	18.1	17	22.2	44.4	3.2	9	18	22.3	15.1	9.5	14
ZSP-EG10-8	10	8	16.8	13.8	17.5	14.5	20.2	18.1	25.2	50.4	4.2	12	24	24.9	18.2	18.5	23
ZSP-EG12-10	12	10	19.8	16.8	21	17.5	23.4	20.2	28.4	56.8	4.2	14	28	28	21.7	29.5	34

Branch Y
● ZSP-X*-*

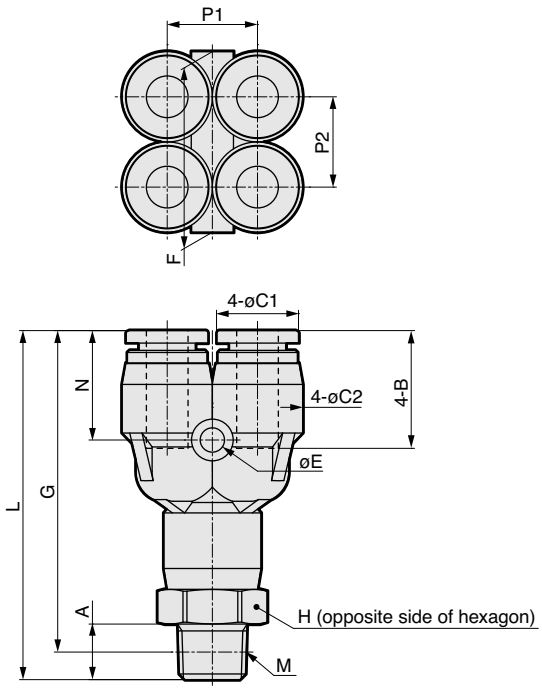


Model no.	Applicable tube O.D. ø	M	A	L	G	C1	C2	B	P	E	N	H	F	Effective sectional area mm²	Weight g
ZSP-X4-M5	4	M5×0.8	3.2	37.6	34.4	9.9	10	14.9	11	3.4	14.1	10	10.4	1.5	9.9
ZSP-X4-6		R1/8	8	40.6	36.6	9.9	10	14.9	11	3.4	14.1	10	10.4	4.2	13
ZSP-X4-8		R1/4	11	43.6	37.6	9.9	10	14.9	11	3.4	14.1	14	10.4	4.2	21
ZSP-X6-M5	6	M5×0.8	3.2	41.4	38.2	11.8	12.5	17	12	3.4	15.8	12	13.5	1.5	15
ZSP-X6-6		R1/8	8	44.4	40.4	11.8	12.5	17	12	3.4	15.8	12	13.5	10	17
ZSP-X6-8		R1/4	11	47.4	41.3	11.8	12.5	17	12	3.4	15.8	14	13.5	10	24
ZSP-X6-10		R3/8	12	49.2	42.8	11.8	12.5	17	12	3.4	15.8	17	13.5	10	36
ZSP-X8-6	8	R1/8	8	48.7	44.7	13.8	14.5	18.1	14	3.4	17.2	14	15.1	16.5	22
ZSP-X8-8		R1/4	11	51.7	45.7	13.8	14.5	18.1	14	3.4	17.2	14	15.1	16.5	27
ZSP-X8-10		R3/8	12	53.5	47.2	13.8	14.5	18.1	14	3.4	17.2	17	15.1	16.5	39
ZSP-X10-6	10	R1/8	8	55.3	51.3	16.8	18	20.7	18	4.5	19.5	17	18	30	38
ZSP-X10-8		R1/4	11	58.3	52.3	16.8	18	20.7	18	4.5	19.5	17	18	30	40
ZSP-X10-10		R3/8	12	59.3	53	16.8	18	20.7	18	4.5	19.5	17	18	30	48
ZSP-X10-15		R1/2	15	62.3	54.1	16.8	18	20.7	18	4.5	19.5	21	18	30	67
ZSP-X12-8	12	R1/4	11	63.5	57.5	19.8	21	23.4	20	4.2	22.2	21	21	37	59
ZSP-X12-10		R3/8	12	64.5	58.2	19.8	21	23.4	20	4.2	22.2	21	21	37	61
ZSP-X12-15		R1/2	15	67.5	59.3	19.8	21	23.4	20	4.2	22.2	21	21	37	75

Note) The L dimensions for the taper screw type are reference dimensions after tightening.

Dimensions CAD

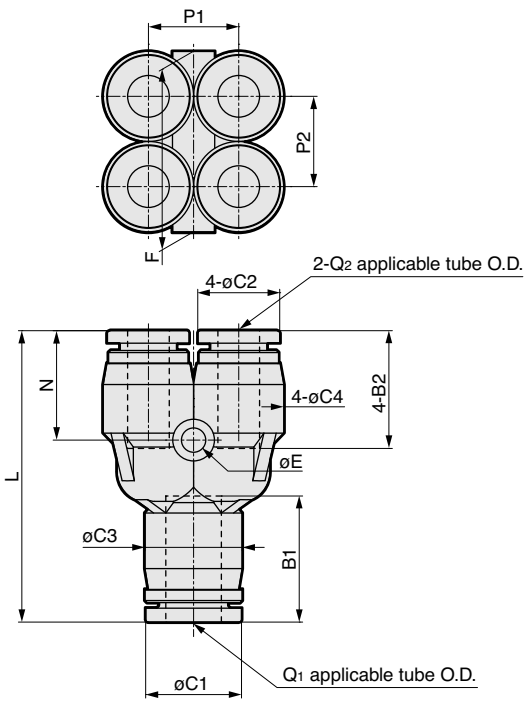
Branch double Y
● ZSP-RX*-*



Model no.	Applicable tube O.D. ø	M	A	L	G	C1	C2	B	P1	P2	H	E	N	F	Effective sectional area mm²	Weight g
ZSP-RX4-6	4	R1/8	8	45.7	41.7	9.9	10.5	14.9	10	10	12	3.2	14.2	20.5	1.5	20
ZSP-RX4-8	4	R1/4	11	48.7	42.7	9.9	10.5	14.9	10	10	14	3.2	14.2	20.5	1.4	27
ZSP-RX6-6	6	R1/8	8	50.3	46.3	11.8	13	17	13	13	14	3.2	15.8	26	9	27

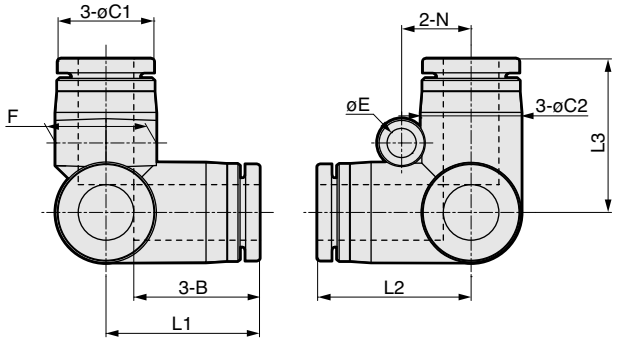
Note) The L1 dimensions are reference dimensions after tightening.

Irregular diameter double Y
● ZSP-RG*-*



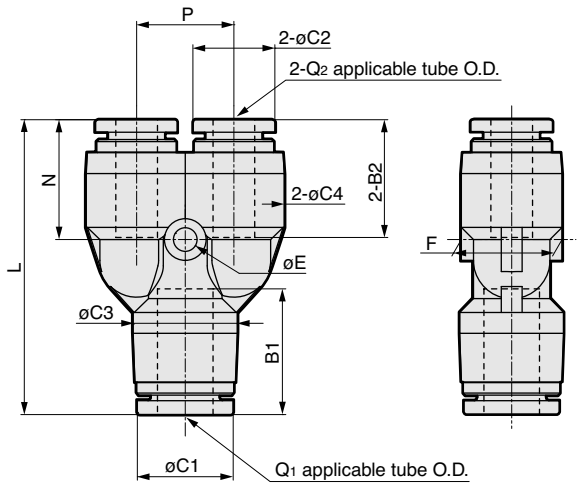
Model no.	Applicable tube O.D. ø		L	C1	C2	C3	C4	B1	B2	P1	P2	E	N	F	Effective sectional area mm²	Weight g
	Q1	Q2														
ZSP-RG6-4	6	4	37.5	11.8	9.9	13	10.5	17	14.9	10	10	3.2	14.2	20.5	1.5	13
ZSP-RG8-6	8	6	42	13.8	11.8	14	13	18.2	17	13	13	3.5	15.8	26	8.2	20

Tripod union
● ZSP-VU*



Model no.	Applicable tube O.D. ø	C1	C2	B	L1	L2	L3	E	N	F	Effective sectional area mm²	Weight g
ZSP-VU4	4	9.9	10	14.9	16.9	16.9	16.9	3.2	6.5	10	3.7	7
ZSP-VU6	6	11.8	12.5	17	20.1	20.1	20.1	4.2	8	12.5	8.3	9.8
ZSP-VU8	8	13.8	14.5	18.1	22.1	22.1	22.1	4.2	10	14.5	16	15
ZSP-VU10	10	16.8	17.5	20.2	26.2	26.2	26.2	4.2	12	17.5	30.2	24
ZSP-VU12	12	19.8	21	23.4	29.4	29.4	29.4	4.2	14	21	40.2	34

Irregular diameter union Y
● ZSP-W*-*

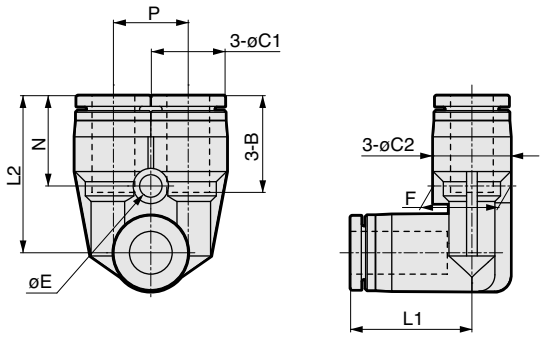


Model no.	Applicable tube O.D. ø		L	C1	C2	C3	C4	B1	B2	P	E	N	F	Effective sectional area mm²	Weight g
	Q1	Q2													
ZSP-W6-4	6	4	37.2	11.8	9.9	13	12.5	17	14.9	12	3.4	15.2	13.5	4.2	9.7
ZSP-W8-6	8	6	42.5	13.8	11.8	14.5	12.5	18.1	17	14	3.4	17.3	15.1	10	13
ZSP-W10-8	10	8	48.1	16.8	13.8	17.5	14.5	20.7	18.2	18	4.5	19.2	18.2	17	20
ZSP-W12-10	12	10	54.6	19.8	16.8	21	17.5	23.4	20.2	20	4.5	22	21.7	27	30

Dimensions

Union A

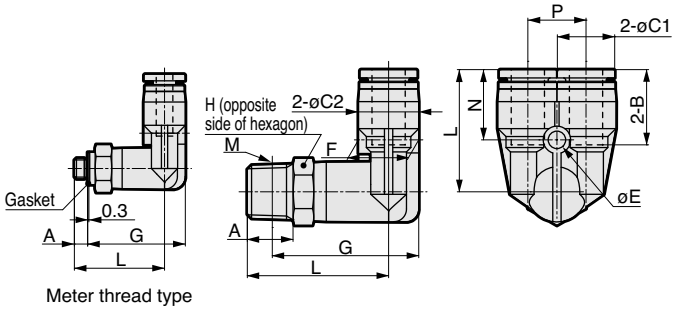
● ZSP-AU*



Model no.	Applicable tube O.D.ø	L1	C1	C2	B	P	L2	E	N	F	Effective sectional area mm²	Weight g
ZSP-AU4	4	16.9	9.9	10	14.9	11	22.7	3.2	14.2	10	2.5	7.8
ZSP-AU6	6	19.8	11.8	12.5	17	12	26.2	4.2	15.5	12.5	7.2	11
ZSP-AU8	8	22.7	13.8	14.5	18.1	14	29.4	4.2	16.9	14.5	16.3	16
ZSP-AU10	10	25	16.8	17.5	20.2	18	33.5	4.2	18.5	17.5	27.9	26
ZSP-AU12	12	29.4	19.8	21	23.4	20	35.2	4.2	20.4	21	40	37

Branch elbow

● ZSP-AX*-*

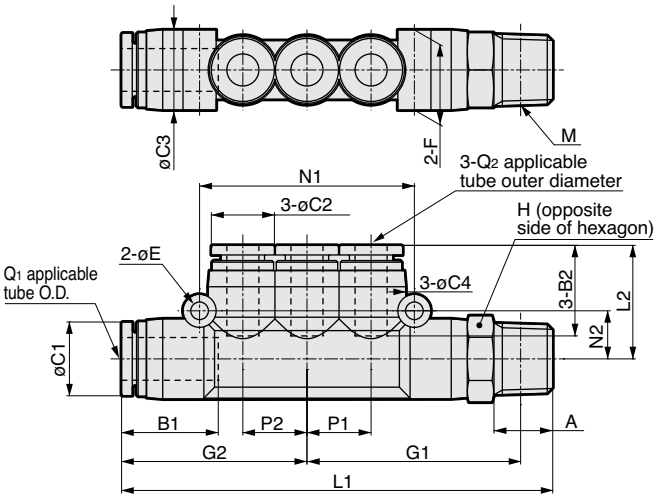


Model no.	Applicable tube O.D.ø	M	A	L	G	C1	C2	B	P	L	H	E	N	F	Effective sectional area mm²	Weight g
ZSP-AX4-M5	4	M5×0.8	3.2	21.7	23.5	9.9	10	14.9	11	22.7	10	3.2	14.2	10	2.2	11
ZSP-AX4-6		R1/8	8	24.7	25.7	9.9	10	14.9	11	22.7	10	3.2	14.2	10	2.7	14
ZSP-AX4-8		R1/4	11	27.7	26.7	9.9	10	14.9	11	22.7	14	3.2	14.2	10	2.5	22
ZSP-AX6-M5	6	M5×0.8	3.2	25	28.1	11.8	12.5	17	12	26.2	12	4.2	15.5	12.5	2.2	16
ZSP-AX6-6		R1/8	8	28	30.3	11.8	12.5	17	12	26.2	12	4.2	15.5	12.5	6.9	18
ZSP-AX6-8		R1/4	11	31	31.2	11.8	12.5	17	12	26.2	14	4.2	15.5	12.5	6.6	25
ZSP-AX6-10		R3/8	12	32.8	32.7	11.8	12.5	17	12	26.2	17	4.2	15.5	12.5	6.8	37
ZSP-AX8-6	8	R1/8	8	31	34.3	13.8	14.5	18.1	14	29.4	14	4.2	16.9	14.5	14.6	23
ZSP-AX8-8		R1/4	11	34	35.2	13.8	14.5	18.1	14	29.4	14	4.2	16.9	14.5	14.5	29
ZSP-AX8-10		R3/8	12	35.8	36.7	13.8	14.5	18.1	14	29.4	17	4.2	16.9	14.5	15	40
ZSP-AX10-6	10	R1/8	8	34	38.8	16.8	17.5	20.2	18	33.5	17	4.2	18.5	17.5	15	40
ZSP-AX10-8		R1/4	11	37	39.7	16.8	17.5	20.2	18	33.5	17	4.2	18.5	17.5	26.1	42
ZSP-AX10-10		R3/8	12	38	40.4	16.8	17.5	20.2	18	33.5	17	4.2	18.5	17.5	27.2	49
ZSP-AX10-15		R1/2	15	41	41.6	16.8	17.5	20.2	18	33.5	21	4.2	18.5	17.5	29.9	69
ZSP-AX12-8	12	R1/4	11	41.2	45.7	19.8	21	23.4	20	35.2	21	4.2	20.4	21	38.2	62
ZSP-AX12-10		R3/8	12	42.2	46.4	19.8	21	23.4	20	35.2	21	4.2	20.4	21	43.1	63
ZSP-AX12-15		R1/2	15	45.2	47.5	19.8	21	23.4	20	35.2	21	4.2	20.4	21	42.1	78

Note) The L dimensions for the taper screw type are reference dimensions after tightening.

Branch triple

● ZSP-KD*-*-*



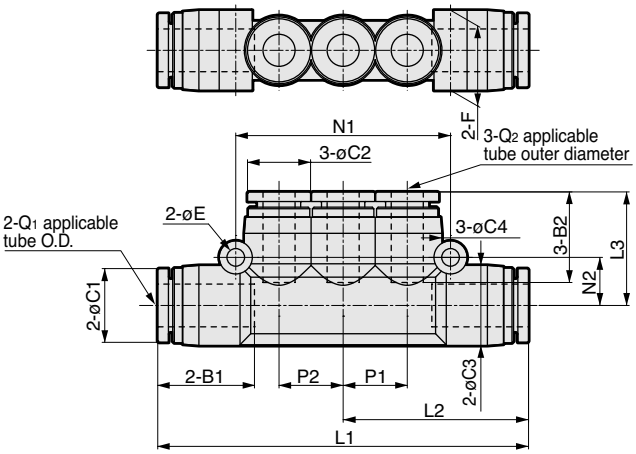
Model no.	Applicable tube O.D.ø		M	A	L1	L2	G1	G2	P1	P2	C1	C2
	Q1	Q2										
ZSP-KD6-4-6	6	4	R1/8	8	68.4	18.4	34.3	30.1	10	10	11.8	9.9
ZSP-KD8-4-8	8	4	R1/4	11	73.7	19.2	36.5	31.2	10	10	13.8	9.9
ZSP-KD8-6-8	8	6	R1/4	11	80.7	21.3	40	34.7	12	12	13.8	11.8
ZSP-KD10-8-10	10	8	R3/8	12	93	23.7	46.7	40	14	14	16.8	13.8

Model no.	C3	C4	B1	B2	N1	N2	E	H	F	Effective sectional area mm²	Weight g
ZSP-KD6-4-6	13	10	17	14.9	34	8	3.3	12	13	5	22
ZSP-KD8-4-8	15	10	18.1	14.9	34	9.2	3.3	14	15	5.2	31
ZSP-KD8-6-8	15	13	18.1	17	40.2	9	3.3	14	15	9.6	34
ZSP-KD10-8-10	17.5	15	20.7	18.1	46.2	10.5	3.3	17	17.5	19.1	55

Note) The L1 dimensions are reference dimensions after tightening.

Irregular diameter triple

● ZSP-KG*-*

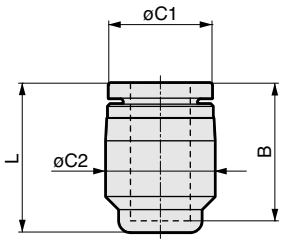


Model no.	Applicable tube O.D.ø		L1	L2	L3	P1	P2	C1	C2	C3
	Q1	Q2								
ZSP-KG6-4	6	4	60.1	30.05	18.4	10	10	11.8	9.9	13
ZSP-KG8-4	8	4	62.4	31.2	19.2	10	10	13.8	9.9	15
ZSP-KG8-6	8	6	69.4	34.7	21.3	12	12	13.8	11.8	15
ZSP-KG10-6	10	6	80	40	23.8	14	14	16.8	11.8	17.5
ZSP-KG10-8	10	8	80	40	23.7	14	14	16.8	13.8	17.5

Model no.	C4	B1	B2	N1	N2	E	2-F	Effective sectional area mm²	Weight g
ZSP-KG6-4	10	17	14.9	34	8	3.3	13	5	15
ZSP-KG8-4	10	18.1	14.9	34	9.2	3.3	15	6	19
ZSP-KG8-6	13	18.1	17	40.2	9	3.3	15	10.1	22
ZSP-KG10-6	15	20.7	17	46.2	10.5	3.3	17.5	11.2	30
ZSP-KG10-8	15	20.7	18.1	46.2	10.5	3.3	17.5	19.1	32

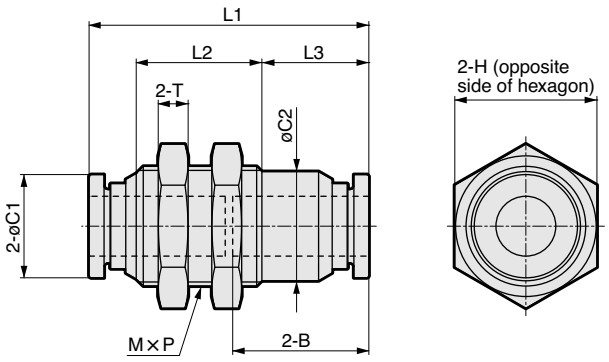
Dimensions CAD

Cap
● ZSP-PF*



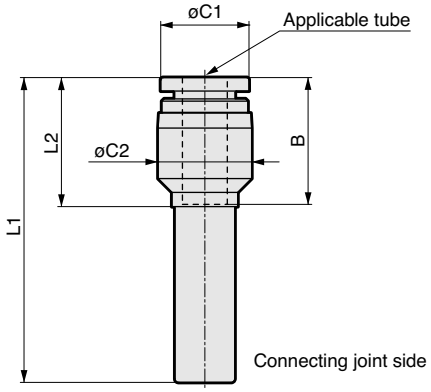
Model no.	Applicable tube O.D.ø	L	C1	C2	B	Weight g
ZSP-PF4	4	16.4	9.9	10	14.9	2.2
ZSP-PF6	6	18.5	11.8	12.5	17	3.1
ZSP-PF8	8	19.9	13.8	14.5	18.4	4.4
ZSP-PF10	10	22.3	16.8	17.5	20.7	7.3
ZSP-PF12	12	24.9	19.8	21	22.9	11

Barrier union
● ZSP-M*



Model no.	Applicable tube O.D.ø	M×P	L1	L3	L2	C1	C2	B	H	T	Effective sectional area mm²	Weight g
ZSP-M4	4	M12x1	30.8	10.4	15	9.9	10.8	14.9	14	4	5.3	16
ZSP-M6	6	M14x1	34.9	11	18	11.8	12.5	17	17	4	12.5	24
ZSP-M8	8	M16x1	37.4	14.3	16.8	13.8	14.6	18.2	19	4	20	30
ZSP-M10	10	M20x1	42.4	12.7	23	16.8	18.5	20.7	24	5	35	56
ZSP-M12	12	M22x1	47.6	12.3	29	19.8	20.4	23.3	27	6	71	81

Reducer
● ZSP-J*-*



Model no.	Applicable tube O.D.ø	Connecting joint diameter ø	L1	L2	C1	C2	B	Effective sectional area mm²	Weight g
ZSP-J4-6	6	4	38.8	19.8	11.8	12.5	17	4	3.5
ZSP-J6-4	4	6	37.7	15.2	9.9	10	14.9	5	2.9
ZSP-J8-4	4	8	40.2	16.7	9.9	12.5	14.9	4.5	3.8
ZSP-J8-6	6	8	40.8	17.3	11.8	12.5	17	11.5	4
ZSP-J10-4	4	10	42.2	17.2	9.9	12.5	14.9	4.5	4.3
ZSP-J10-6	6	10	43.8	18.8	11.8	12.5	17	11.5	4.5
ZSP-J10-8	8	10	43.7	18.7	13.8	14.5	18.1	22.5	5.8
ZSP-J12-6	6	12	48.8	19.8	11.8	14.5	17	10.5	6
ZSP-J12-8	8	12	49.7	20.7	13.8	14.5	18.1	23	6.7
ZSP-J12-10	10	12	50	21	16.8	17.5	20.2	31.5	9.6

ZW Joint Stainless steel Series

Port size M5 to R1/2

Single straight
ZW-S*-*

Applicable tube O.D.ø
4
6
8
10
12

• Page : 962

Single elbow
ZW-L*-*

Applicable tube O.D.ø
4
6
8
10
12

• Page : 962

Elbow
ZW-L*-0

Applicable tube O.D.ø
4
6
8
10
12

• Page : 962

Union Tee
ZW-T*-0

Applicable tube O.D.ø
4
6
8
10
12

• Page : 962

Straight
ZW-S*-0

Applicable tube O.D.ø
4
6
8
10
12

• Page : 962

• Sales unit is 1 piece per bag.

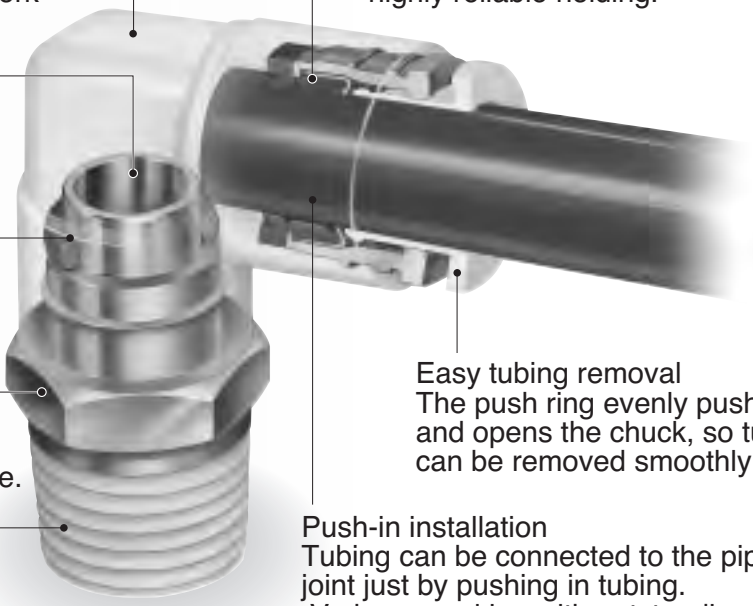
Frame resistant resin & stainless steel Joint ZW series

High efficient, clean-feeling white body

Port size: M5 to R1/2

Applicable bore size: ø4 to ø12

- Compact size saves space.
- Smooth insertion and accurate sealing.
- Flame-resistant resin incorporated for white body and push ring. (Equivalent to UL94 standards V-O)
- Stainless steel incorporated for all metal parts.



White flame-resistant resin body
Flame-resistant PBT (UL94 Standards V-0 or equivalent) used as standard for a white body blending in with any work environment.

Full flow rate
By eliminating sections narrower than the tubing's bore, a flow equivalent to the tubing's bore can be passed.

Easy piping work
The section of the pipe connected with the body rotates freely, so piping removal can be set freely.

Standard stainless steel
As a standard, all metal parts are made of stainless steel to increase corrosion resistance and appearance.

Sealing agent applied on threads
Teflon resin is coated on threads, eliminating the need to wind sealing tape.
The even seal prevents leaks, etc.

Secure tubing holding
Chuck fitting acts in the direction that the tubing dislocates, ensuring highly reliable holding.

Easy tubing removal
The push ring evenly pushes and opens the chuck, so tubing can be removed smoothly.

Push-in installation
Tubing can be connected to the piping joint just by pushing in tubing.
V-shape packing with outstanding accuracy is used for the seal.

ZW Series
Flame resistant resin & stainless steel Joint

Joint Stainless steel series

ZW Series

- Port size: M5 to R1/2
- Applicable tube: ø4 to ø12

RoHS

Specifications

Descriptions	ZW
Working fluid	Compressed air
Max. working pressure MPa	1.0
Negative pressure kPa	-100 Note2
Working temperature °C	-10 to 60 (no freezing)
Applicable tube	Soft nylon tube (F-15**)
	Urethane tube (U-92**,U-95**,NU-**)Note1

Note 1: Refer to page 1008 for tube dimensions, ambient temperature and working pressure.
Note 2: Use an insert ring when using urethane tubing (U-92**, U-95**, NU-**) under vacuum pressure.
(This is a customized order. Contact CKD for details.)

How to order

* Refer to model no. sections on dimensions page (page 962) for combination of model no.

ZW - L 6 - 8 - ( )
A B C D

A Shape	
S	Straight
L	Elbow
T	Union Tee

B Applicable tube O.D.	
4	ø4
6	ø6
8	ø8
10	ø10
12	ø12

C Port size	
M5	M5×0.8
6	R1/8
8	R1/4
10	R3/8
15	R1/2
0	No thread

D Option	
Blank	None
P11	Ozone proof

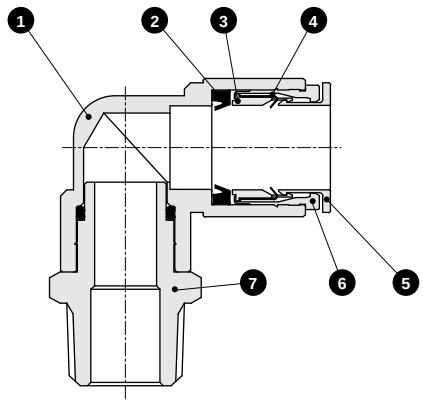
* Consult with CKD for other models.

Note: Sales unit is 1 piece per bag.

Clean room specifications (catalog No. CB-033SA)

ZW—·····— P80

Internal structure and main parts list



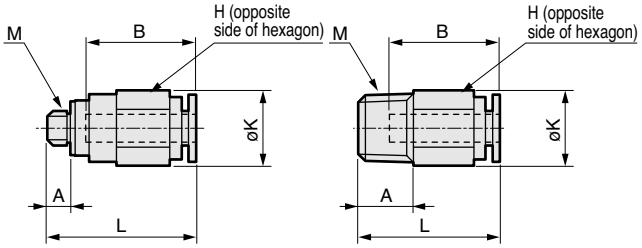
No.	Parts name	Material
1	Body *1	Stainless steel (SUS304)
		PBT (flame resistance resin *2)
2	Packing seal	Nitrile rubber
3	Chuck holder	Polyacetal
4	Chuck	Stainless steel (SUS301)
5	Push ring	PBT (flame resistance resin *2)
6	Outer ring	Stainless steel (SUS304)
7	Drive nipple	Stainless steel (SUS304)

*1: The single-ended straight body is stainless steel (SUS304).
*2: Equivalent to UL94 standards V-O
Note: For the stainless steel series, the (5) push ring color is identified with pure white.

Dimensions

Single straight

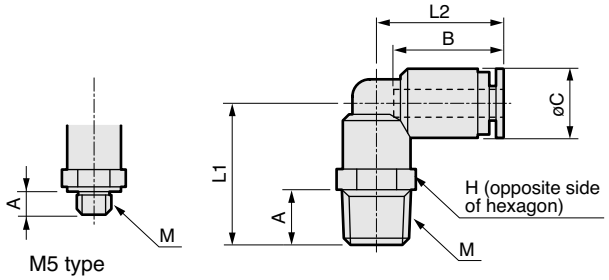
● ZW-S*-*



Model no.	Applicable tube O.D.ø	M	H	K	L	A	B	Min. bore size	Effective sectional area mm²
ZW-S 4-M5	4	M5×0.8	10	11	21.5	4	16	2.5	4
ZW-S 4- 6		R1/8	10	11	20.5	8	16	2.5	4
ZW-S 4- 8		R1/4	14	15	19.5	11	16	2.5	4
ZW-S 6-M5	6	M5×0.8	12	13	23	4	17.5	2.5	4.4
ZW-S 6- 6		R1/8	12	13	23	8	17.5	4	10.3
ZW-S 6- 8		R1/4	14	15	23.5	11	17.5	4	10.3
ZW-S 6-10		R3/8	17	19.6	21.5	12	17.5	4	10.3
ZW-S 8- 6	8	R1/8	14	15.8	28	8	19	5	17.5
ZW-S 8- 8		R1/4	14	15.8	27	11	19	6	22.4
ZW-S 8-10		R3/8	17	19.6	22.5	12	19	6	22.4
ZW-S10- 8	10	R1/4	17	19.6	32.5	11	21.5	8	30.5
ZW-S10-10		R3/8	17	19.6	28.5	12	21.5	8	30.5
ZW-S10-15		R1/2	22	24	26.5	15	21.5	8	30.5
ZW-S12-10	12	R3/8	19	21	30.5	12	23	10	40
ZW-S12-15		R1/2	22	24	29.5	15	23	10	40

Single elbow

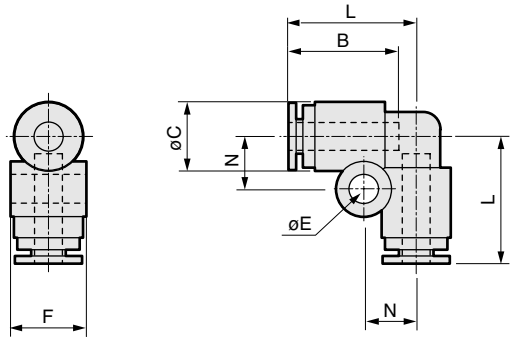
● ZW-L*-*



Model no.	Applicable tube O.D.ø	M	H	L1	L2	A	B	C	Min. bore size	Effective sectional area mm²
ZW-L 4-M5	4	M5×0.8	8	15	18	4	16	10	2.5	3.2
ZW-L 4- 6		R1/8	10	20.5	18.5	8	16	10	2.5	3.2
ZW-L 4- 8		R1/4	14	24	18.5	11	16	10	2.5	3.2
ZW-L 6-M5	6	M5×0.8	10	15	20	4	17.5	12.5	2.5	4.2
ZW-L 6- 6		R1/8	12	24	21	8	17.5	12.5	4	8
ZW-L 6- 8		R1/4	14	27.5	21	11	17.5	12.5	4	8
ZW-L 6-10		R3/8	17	29	21	12	17.5	12.5	4	8
ZW-L 8- 6	8	R1/8	14	25.5	23.5	8	19	14.5	6	18
ZW-L 8- 8		R1/4	14	28.5	23.5	11	19	14.5	6	18
ZW-L 8-10		R3/8	17	30	23.5	12	19	14.5	6	18
ZW-L10- 8	10	R1/4	17	31	27	11	21.5	17.5	8	27
ZW-L10-10		R3/8	17	32.5	27	12	21.5	17.5	8	27
ZW-L10-15		R1/2	22	35.5	27	15	21.5	17.5	8	27
ZW-L12-10	12	R3/8	19	34.5	29.5	12	23	20	9	35
ZW-L12-15		R1/2	22	37.5	29.5	15	23	20	9	35.5

Elbow

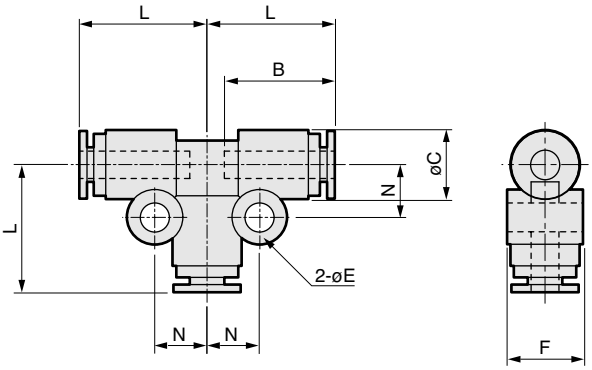
● ZW-L*-*-0



Model no.	Applicable tube O.D.ø	L	B	C	N	E	F	Min. bore size	Effective sectional area mm²
ZW-L 4-0	4	18.5	16	10	7.5	4.2	11	2.5	3
ZW-L 6-0	6	21	17.5	12.5	8.5	4.2	13.5	4	7.5
ZW-L 8-0	8	23.5	19	14.5	9.5	4.2	15.5	6	17
ZW-L10-0	10	27	21.5	17.5	11	4.2	18.5	8	25.5
ZW-L12-0	12	29.5	23	20	12	4.2	21	10	34

Union Tee

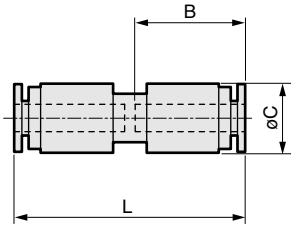
● ZW-T*-0



Model no.	Applicable tube O.D.ø	L	B	C	E	F	N	Min. bore size	Effective sectional area mm²
ZW-T 4-0	4	18.5	16	10	4.2	11	7.5	2.5	3.6
ZW-T 6-0	6	21	17.5	12.5	4.2	13.5	8.5	4	9.7
ZW-T 8-0	8	23.5	19	14.5	4.2	15.5	9.5	6	22
ZW-T10-0	10	27	21.5	17.5	4.2	18.5	11	8	30
ZW-T12-0	12	29.5	23	20	4.2	21	12	10	35.5

Straight

● ZW-S*-0



Model no.	Applicable tube O.D.ø	L	B	C	Min. bore size	Effective sectional area mm²
ZW-S 4-0	4	33.5	16	10	2.5	4
ZW-S 6-0	6	36.5	17.5	12.5	4	10
ZW-S 8-0	8	39.5	19	14.5	6	22
ZW-S10-0	10	45	21.5	17.5	8	30
ZW-S12-0	12	47.5	23	20	10	35

ZJ

Female joint Stainless steel Series

Port size R1/8 to R1/2

Single straight
ZJ-S*-*

Applicable tube O.D.ø
4
6
8
10
12

• Page : 966

Single elbow
ZJ-L*-*

Applicable tube O.D.ø
4
6
8
10
12

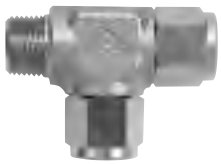
• Page : 966

Both push-in branch
ZJ-T*-*

Applicable tube O.D.ø
4
6
8
10
12

• Page : 967

D type union Tee
ZJ-T*-*-D



Applicable tube O.D.ø
4
6
8
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12

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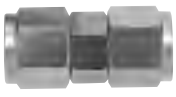
Straight
ZJ-S*-0



Applicable tube O.D.ø
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• Page : 968

Union Tee
ZJ-T*-0

Applicable tube O.D.ø
4
6
8
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12

• Page : 968

Sleeve integrated nut
ZJ-N*

Applicable tube O.D.ø
4
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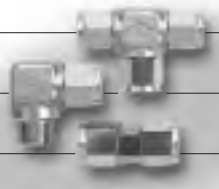
12

• Page : 968

• Sales unit is 1 piece per bag.

Stainless steel, tightening type Female joint ZJ Series

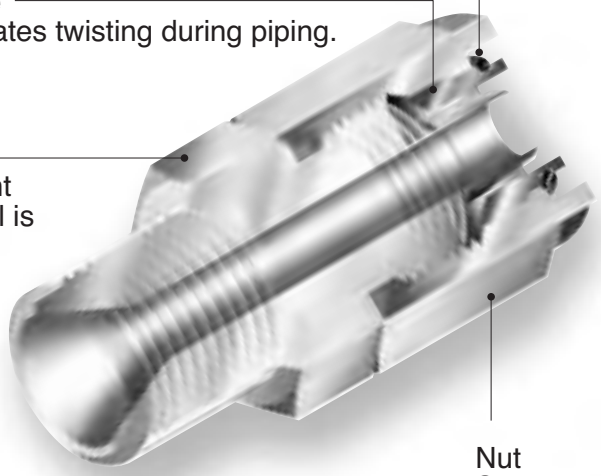


High sealing performance; repeated use possible.

Port size: R1/8 to R1/2

Applicable bore size: ø4 to ø12

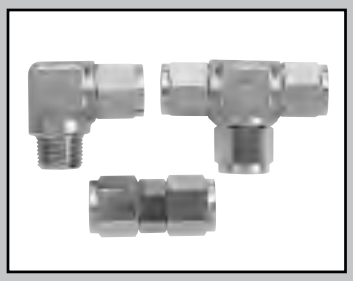
- Easy Fit mechanism (integrated nut and sleeve) improves work efficiency.
- Original sleeve eliminates tubing twisting during piping.
- Sleeve need not be replaced even when using repeatedly.
- Smooth inner bore surface.
- Ample size variations fit various tubing.
- All oil is washed and removed.



ZJ Series

Stainless steel, tightening type female joint

CKD



Female joint Stainless steel series

ZJ Series

- Port size: R1/8 to R1/2
- Applicable tube: ø4 to ø12

RoHS

Specifications

Descriptions	Descriptions
Working fluid	Compressed air, inert gas
Working pressure MPa	1.0 or less
Negative pressure kPa	-100
Working temperature °C	-10 to 60
Applicable tube Note1	Urethane tube (U-92**,U-95**,NU-**)
	Eco-flex tube (ecos-*×*,ecoh-*×*)

Note1: Refer to page 1008 for details on tube.

How to order

* Refer to model no. sections on dimensions page for combination of model no.

ZJ - T 06 04 - O - D
(A) (B) (C) (D) (E)

(A) Shape	
S	Straight
L	Elbow
T	Union Tee
N	Sleeve integrated nut

(B) Applicable tube O.D.	
04	ø4
06	ø6
08	ø8
10	ø10
12	ø12

(C) Applicable tube bore size	
25	ø2.5
04	ø4
05	ø5
06	ø6
65	ø6.5
75	ø7.5
08	ø8
09	ø9
10	ø10

(D) Port size	
6	R1/8
8	R1/4
10	R3/8
15	R1/2
0	Without screw

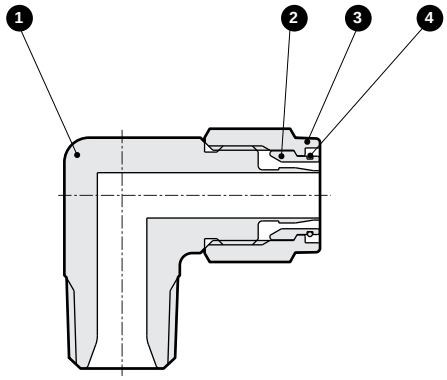
(E) Other combinations	
D	D type

Note:Sales unit is 1 piece per bag.

Clean room specifications (catalog No. CB-033SA)

ZJ–·····–P90

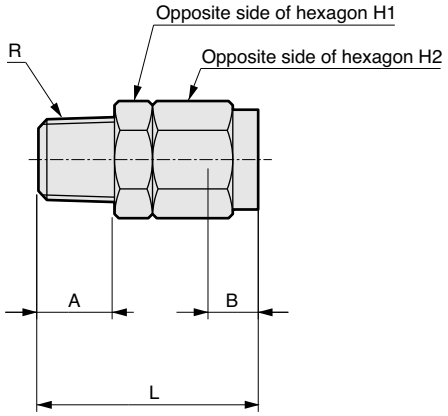
Internal structure and main parts list



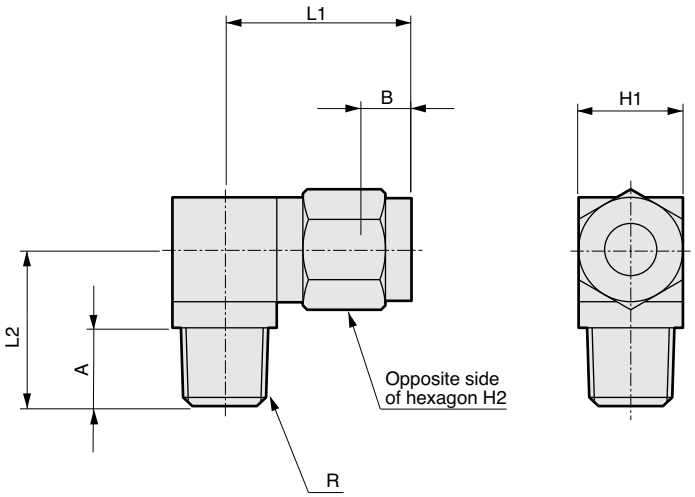
No.	Parts name	Material
1	Body	Stainless steel (SUS316)
2	Sleeve	Stainless steel (SUS316)
3	Nut	Stainless steel (SUS316) (electroless nickeling treatment)
4	Stop ring	Stainless steel (SUS304)

Dimensions

Single straight
● ZJ-S**-*



Single elbow
● ZJ-L**-*



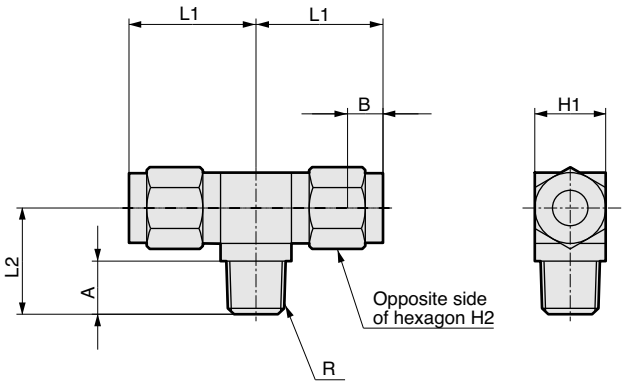
Model no.	Applicable tube O.D.ø	R	L	A	B	Min. bore size	H1	H2
ZJ-S0425- 6	4	1/8	24	9	6	1.9	10	10
ZJ-S0425- 8		1/4	26	11	6	1.9	14	10
ZJ-S0604- 6	6	1/8	26	9	7	3.4	12	12
ZJ-S0604- 8		1/4	28.5	11	7	3.4	14	12
ZJ-S0604-10		3/8	30	12	7	3.4	17	12
ZJ-S0805- 6	8	1/8	28	9	7.5	4.4	14	14
ZJ-S0806- 6		1/8	28	9	7.5	5.4	14	14
ZJ-S0805- 8		1/4	30	11	7.5	4.4	14	14
ZJ-S0806- 8		1/4	30	11	7.5	5.4	14	14
ZJ-S0805-10		3/8	31	12	7.5	4.4	17	14
ZJ-S0806-10		3/8	31	12	7.5	5.4	17	14
ZJ-S1065- 8	10	1/4	32	11	8	5.9	17	17
ZJ-S1075- 8		1/4	32	11	8	6.9	17	17
ZJ-S1008- 8		1/4	32	11	8	7.4	17	17
ZJ-S1065-10		3/8	33	12	8	5.9	17	17
ZJ-S1075-10		3/8	33	12	8	6.9	17	17
ZJ-S1008-10		3/8	33	12	8	7.4	17	17
ZJ-S1065-15		1/2	36	15	8	5.9	22	17
ZJ-S1075-15		1/2	36	15	8	6.9	22	17
ZJ-S1008-15		1/2	36	15	8	7.4	22	17
ZJ-S1208- 8	12	1/4	34	11	9.5	7.2	17	19
ZJ-S1209- 8		1/4	34	11	9.5	7.9	17	19
ZJ-S1210- 8		1/4	34	11	9.5	7.9	17	19
ZJ-S1208-10		3/8	35	12	9.5	7.2	17	19
ZJ-S1209-10		3/8	35	12	9.5	8.2	17	19
ZJ-S1210-10		3/8	35	12	9.5	9.2	17	19
ZJ-S1208-15		1/2	38	15	9.5	7.2	22	19
ZJ-S1209-15		1/2	38	15	9.5	8.2	22	19
ZJ-S1210-15		1/2	38	15	9.5	9.2	22	19

Model no.	Applicable tube O.D.ø	R	L1	L2	A	B	Min. bore size	H1	H2
ZJ-L0425- 6	4	1/8	20	18	9	6	1.9	12	10
ZJ-L0425- 8		1/4	21	21	11	6	1.9	14	10
ZJ-L0604- 6	6	1/8	21.5	18	9	7	3.4	12	12
ZJ-L0604- 8		1/4	22.5	21	11	7	3.4	14	12
ZJ-L0604-10		3/8	23.5	23	12	7	3.4	17	12
ZJ-L0805- 6	8	1/8	24	19	9	7.5	4.4	14	14
ZJ-L0806- 6		1/8	24	19	9	7.5	5.4	14	14
ZJ-L0805- 8		1/4	24	21	11	7.5	4.4	14	14
ZJ-L0806- 8		1/4	24	21	11	7.5	5.4	14	14
ZJ-L0805-10		3/8	25	23	12	7.5	4.4	17	14
ZJ-L0806-10		3/8	25	23	12	7.5	5.4	17	14
ZJ-L1065- 8	10	1/4	26.5	22	11	8	5.9	17	17
ZJ-L1075- 8		1/4	26.5	22	11	8	6.9	17	17
ZJ-L1008- 8		1/4	26.5	22	11	8	7.4	17	17
ZJ-L1065-10		3/8	26.5	23	12	8	5.9	17	17
ZJ-L1075-10		3/8	26.5	23	12	8	6.9	17	17
ZJ-L1008-10		3/8	26.5	23	12	8	7.4	17	17
ZJ-L1065-15		1/2	28.5	29	15	8	5.9	22	17
ZJ-L1075-15		1/2	28.5	29	15	8	6.9	22	17
ZJ-L1008-15		1/2	28.5	29	15	8	7.4	22	17
ZJ-L1208- 8	12	1/4	27.5	23	11	9.5	7.2	17	19
ZJ-L1209- 8		1/4	27.5	23	11	9.5	7.9	17	19
ZJ-S1210- 8		1/4	27.5	23	11	9.5	7.9	17	19
ZJ-L1208-10		3/8	30	27	12	9.5	7.2	22	19
ZJ-L1209-10		3/8	30	27	12	9.5	8.2	22	19
ZJ-L1210-10		3/8	30	27	12	9.5	9.2	22	19
ZJ-L1208-15		1/2	30	30	15	9.5	7.2	22	19
ZJ-L1209-15		1/2	30	30	15	9.5	8.2	22	19
ZJ-L1210-15		1/2	30	30	15	9.5	9.2	22	19

Dimensions

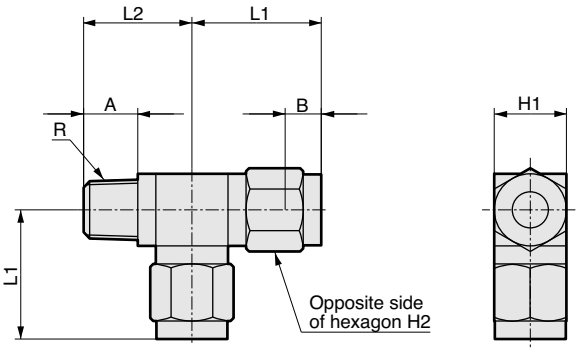
Both push-in branch

● ZJ-T**-*



D type union Tee

● ZJ-T**-*-D



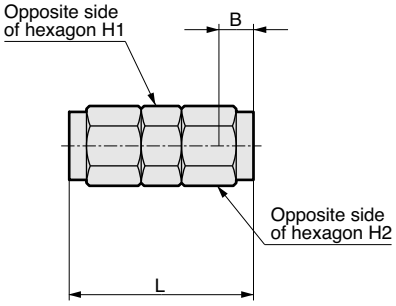
Model no.	Applicable tube O.D.ø	R	L1	L2	A	B	Min. bore size	H1	H2
ZJ-T0425- 6	4	1/8	20	18	9	6	1.9	12	10
ZJ-T0425- 8		1/4	21	21	11	6	1.9	14	10
ZJ-T0604- 6	6	1/8	21.5	18	9	7	3.4	12	12
ZJ-T0604- 8		1/4	22.5	21	11	7	3.4	14	12
ZJ-T0604-10		3/8	23.5	23	12	7	3.4	17	12
ZJ-T0805- 6	8	1/8	23.5	19	9	7.5	4.4	14	14
ZJ-T0806- 6		1/8	23.5	19	9	7.5	5.4	14	14
ZJ-T0805- 8		1/4	23.5	21	11	7.5	4.4	14	14
ZJ-T0806- 8		1/4	23.5	21	11	7.5	5.4	14	14
ZJ-T0805-10		3/8	25	23	12	7.5	4.4	17	14
ZJ-T0806-10		3/8	25	23	12	7.5	5.4	17	14
ZJ-T1065- 8	10	1/4	28.5	25	11	8	5.9	22	17
ZJ-T1075- 8		1/4	28.5	25	11	8	6.9	22	17
ZJ-T1008- 8		1/4	28.5	25	11	8	7.4	22	17
ZJ-T1065-10		3/8	28.5	26	12	8	5.9	22	17
ZJ-T1075-10		3/8	28.5	26	12	8	6.9	22	17
ZJ-T1008-10		3/8	28.5	26	12	8	7.4	22	17
ZJ-T1065-15		1/2	28.5	29	15	8	5.9	22	17
ZJ-T1075-15		1/2	28.5	29	15	8	6.9	22	17
ZJ-T1008-15		1/2	28.5	29	15	8	7.4	22	17
ZJ-T1208- 8	12	1/4	30	26	11	9.5	7.2	22	19
ZJ-T1209- 8		1/4	30	26	11	9.5	7.9	22	19
ZJ-T1210- 8		1/4	30	26	11	9.5	7.9	22	19
ZJ-T1208-10		3/8	30	27	12	9.5	7.2	22	19
ZJ-T1209-10		3/8	30	27	12	9.5	8.2	22	19
ZJ-T1210-10		3/8	30	27	12	9.5	9.2	22	19
ZJ-T1208-15		1/2	30	30	15	9.5	7.2	22	19
ZJ-T1209-15		1/2	30	30	15	9.5	8.2	22	19
ZJ-T1210-15		1/2	30	30	15	9.5	9.2	22	19

Model no.	Applicable tube O.D.ø	R	L1	L2	A	B	Min. bore size	H1	H2
ZJ-T0425- 6-D	4	1/8	20	18	9	6	1.9	12	10
ZJ-T0425- 8-D		1/4	21	21	11	6	1.9	14	10
ZJ-T0604- 6-D	6	1/8	21.5	18	9	7	3.4	12	12
ZJ-T0604- 8-D		1/4	22.5	21	11	7	3.4	14	12
ZJ-T0604-10-D		3/8	23.5	23	12	7	3.4	17	12
ZJ-T0805- 6-D	8	1/8	23.5	19	9	7.5	4.4	14	14
ZJ-T0806- 6-D		1/8	23.5	19	9	7.5	5.4	14	14
ZJ-T0805- 8-D		1/4	23.5	21	11	7.5	4.4	14	14
ZJ-T0806- 8-D		1/4	23.5	21	11	7.5	5.4	14	14
ZJ-T0805-10-D		3/8	25	23	12	7.5	4.4	17	14
ZJ-T0806-10-D		3/8	25	23	12	7.5	5.4	17	14
ZJ-T1065- 8-D	10	1/4	28.5	25	11	8	5.9	22	17
ZJ-T1075- 8-D		1/4	28.5	25	11	8	6.9	22	17
ZJ-T1008- 8-D		1/4	28.5	25	11	8	7.4	22	17
ZJ-T1065-10-D		3/8	28.5	26	12	8	5.9	22	17
ZJ-T1075-10-D		3/8	28.5	26	12	8	6.9	22	17
ZJ-T1008-10-D		3/8	28.5	26	12	8	7.4	22	17
ZJ-T1065-15-D		1/2	28.5	29	15	8	5.9	22	17
ZJ-T1075-15-D		1/2	28.5	29	15	8	6.9	22	17
ZJ-T1008-15-D		1/2	28.5	29	15	8	7.4	22	17
ZJ-T1208- 8-D	12	1/4	30	26	11	9.5	7.2	22	19
ZJ-T1209- 8-D		1/4	30	26	11	9.5	7.9	22	19
ZJ-T1210- 8-D		1/4	30	26	11	9.5	7.9	22	19
ZJ-T1208-10-D		3/8	30	27	12	9.5	7.2	22	19
ZJ-T1209-10-D		3/8	30	27	12	9.5	8.2	22	19
ZJ-T1210-10-D		3/8	30	27	12	9.5	9.2	22	19
ZJ-T1208-15-D		1/2	30	30	15	9.5	7.2	22	19
ZJ-T1209-15-D		1/2	30	30	15	9.5	8.2	22	19
ZJ-T1210-15-D		1/2	30	30	15	9.5	9.2	22	19

Dimensions

Straight

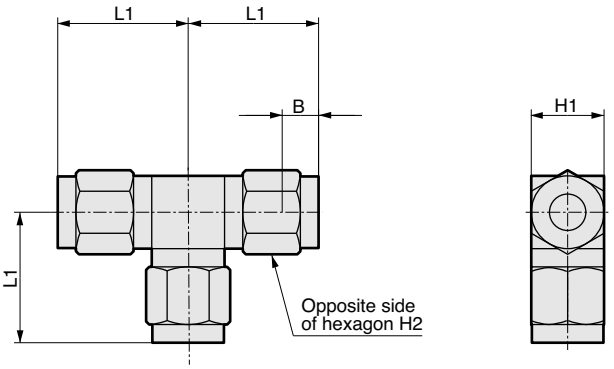
● ZJ-S**-0



Model no.	Applicable tube O.D.ø	L	B	Min. bore size	H1	H2
ZJ-S0425-0	4	28	6	1.9	10	10
ZJ-S0604-0	6	32	7	3.2	12	12
ZJ-S0805-0	8	36	7.5	4.2	14	14
ZJ-S0806-0		36	7.5	5.2	14	14
ZJ-S1065-0	10	40	8	5.9	17	17
ZJ-S1075-0		40	8	6.9	17	17
ZJ-S1008-0		40	8	7.4	17	17
ZJ-S1208-0	12	44	9.5	7.2	17	19
ZJ-S1209-0		44	9.5	8.2	17	19
ZJ-S1210-0		44	9.5	9.2	17	19

Union Tee

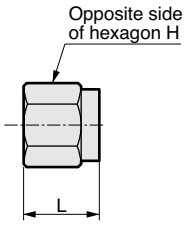
● ZJ-T**-0



Model no.	Applicable tube O.D.ø	L1	B	Min. bore size	H1	H2
ZJ-T0425-0	4	20	6	1.9	12	10
ZJ-T0604-0	6	21.5	7	3.4	12	12
ZJ-T0805-0	8	23.5	7.5	4.4	14	14
ZJ-T0806-0		28.5	7.5	5.4	14	14
ZJ-T1065-0	10	28.5	8	5.9	22	17
ZJ-T1075-0		28.5	8	6.9	22	17
ZJ-T1008-0		28.5	8	7.4	22	17
ZJ-T1208-0	12	30	9.5	7.2	22	19
ZJ-T1209-0		30	9.5	8.2	22	19
ZJ-T1210-0		30	9.5	9.2	22	19

Sleeve integrated nut

● ZJ-N*



Model no.	Applicable tube O.D.ø	L	H2
ZJ-N04	ø4	11	10
ZJ-N06	ø6	12.5	12
ZJ-N08	ø8	14	14
ZJ-N10	ø10	15.5	17
ZJ-N12	ø12	17	19

MJ.JL

Female joint / joint

Port size 1/8 to 1/2 (Rc or R)

CAD

● Stable and secure piping due to double chuck. This is an excellent tightening joint with high reliability.

AOI Co, Ltd.

Female joint MJ Series

■ Straight type

Single straight MJS*-*

Applicable tube O.D.ø
4
6
8
10
12
15

• Page : 971

Straight MJS*-0

Applicable tube O.D.ø
4
6
8
10
12
15

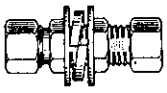
• Page : 971

Female, straight MJS*-*-M

Applicable tube O.D.ø
4
6
8
10
12
15

• Page : 971

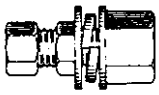
Bulk head MJS*-0-X



Applicable tube O.D.ø
4
6
8
10
12
15

• Page : 971

Bulk head female MJS*-*-E

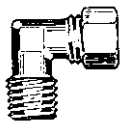


Applicable tube O.D.ø
4
6
8
10

• Page : 972

■ Elbow type

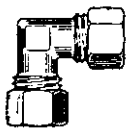
Single elbow MJL*-*



Applicable tube O.D.ø
4
6
8
10
12
15

• Page : 972

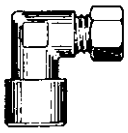
Elbow MJL*-0



Applicable tube O.D.ø
4
6
8
10
12
15

• Page : 972

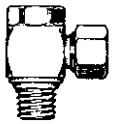
Female, elbow MJL*-*-M



Applicable tube O.D.ø
4
6
8
10
12

• Page : 972

Turn elbow MJL*-*-T

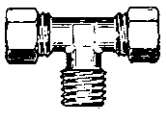


Applicable tube O.D.ø
4
6
8
10
12
15

• Page : 973

■ Tee union type

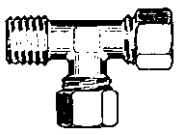
Both push-in branch MJT*-*



Applicable tube O.D.ø
4
6
8
10
12
15

• Page : 973

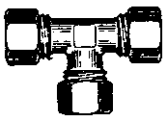
D type union Tee MJT*-*-D



Applicable tube O.D.ø
4
6
8
10
12
15

• Page : 973

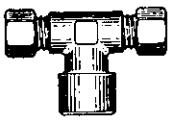
Union Tee MJT*-0



Applicable tube O.D.ø
4
6
8
10
12
15

• Page : 973

Female, union Tee MJT*-*-M



Applicable tube O.D.ø
4
6
8
10
12

• Page : 974

Sleeve MJN*-0

Applicable tube O.D.ø
4
6
8
10
12
15

• Page : 974

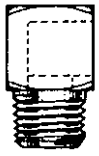
Insert ring MJU*-0

Applicable tube O.D.ø
4
6
8
10
12

• Page : 974

Joint

Elbow/JL



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

• Page : 975

●Sales unit is 10 pieces/1 bag.

Specifications

Descriptions	MJ
Working fluid	Compressed air
Max. working pressure MPa	1.0
Working temperature °C	-10 to 60 (no freezing)
Applicable tube	Soft nylon tube (F-15**), Urethane tube (U-95**) Note Coiling tube (KX-12**)

Note: Refer to page 1008 for tube dimensions, ambient temperature and working pressure.

How to order

MJ S 4 – 6 – M

* Refer to model no. sections on dimensions page (pages 971 to 974) for combination of model no.

Ⓐ Shape

Ⓐ Shape	
S	Straight
L	Elbow
T	Union Tee
N	Sleep
U	Insert ring

Ⓑ Applicable tube O.D.

Ⓑ Applicable tube O.D.	
4	ø4
6	ø6
8	ø8
10	ø10
12	ø12
15	ø15

Ⓒ Port size

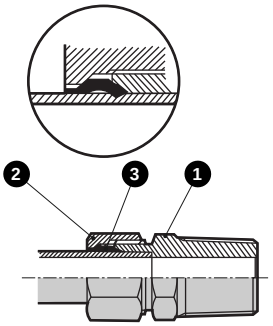
Ⓒ Port size	
6	R1/8
8	R1/4
10	R3/8
15	R1/2
0	Without screw

Ⓓ Other combinations

Ⓓ Other combinations	
D	D type
E	Bulk head female
M	Female
T	Turn
X	Bulk head

Note: Sales unit is 10 pieces /1 bag.

Internal structure and parts list

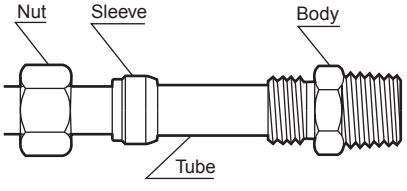


No.	Parts name	Material
1	Body	Brass
2	Nut	Brass
3	Sleep	Brass

Safety Precautions

- If urethane or soft nylon tube is used in high working temperature, use insert ring (Refer to page 974). If an insert ring is not used, tube may come off from a joint.
- For copper tube, use a tube with class 1/2H (heat treatment) or less and tube wall thickness 1mm or less.
- If a tube is used where a tube mo ves frequently, troubles may occur. So, avoid use in such place.

Mounting and removal



(1) Couple the nut and sleeve plastic tube or cupper tube as shown in the figure, insert the tube until hitting the joint (tube end), then tighten the nut by hand.

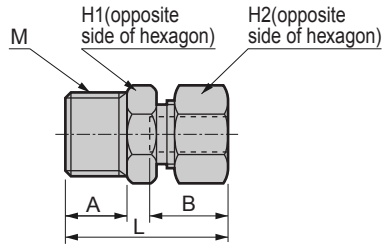
(2) Tighten the nut by spanner, etc. Applicable tightening turn is 1 3/4 for plastic tube, while 1 1/4 to 1 1/2 for copper tube (1/2H and wall thickness 1mm).

(3) Cut tube as right angle as possible, please eliminate burr and foreign matter, etc.

(4) For temporally tightening, turn should be 1/4 turn less than applicable tightening turn, while to tighten securely, tighten 1/4 turn more. For retightening, also 1/4 turn more.

Dimensions: Single straight, straight, female straight, bulk head

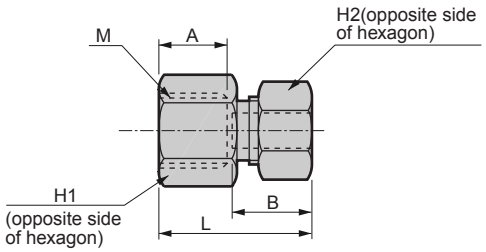
● Single straight MJS*-*



* L and B dimensions show rough dimensions before fixing nut.

Model no.	Applicable tube O.D.ø	M	H1	H2	L	A	B	Min. bore size	Effective sectional area (mm²)
MJS4-6	4	R1/8	10	10	22.5	8	11	3	4.1
MJS4-8	4	R1/4	14	10	26	11	11	3	3.9
MJS6-6	6	R1/8	10	12	23.5	8	11.5	4.5	7.9
MJS6-8	6	R1/4	14	12	27	11	11.5	4.5	7.8
MJS6-10	6	R3/8	17	12	28.5	12	11.5	4.5	7.9
MJS8-6	8	R1/8	12	14	25.5	8	13	6	19.5
MJS8-8	8	R1/4	14	14	28.5	11	13	6	20.1
MJS8-10	8	R3/8	17	14	30	12	13	6	19.5
MJS10-8	10	R1/4	14	17	30.5	11	14.5	8	36.1
MJS10-10	10	R3/8	17	17	31.5	12	14.5	8	36.1
MJS10-15	10	R1/2	22	17	34.5	15	14.5	8	36.1
MJS12-8	12	R1/4	16	19	32	11	16	9	57.8
MJS12-10	12	R3/8	17	19	33	12	16	10	55.5
MJS12-15	12	R1/2	22	19	36	15	16	10	57.8
MJS15-10	15	R3/8	20	23	37	12	19	12	113.3
MJS15-15	15	R1/2	23	23	40	15	19	12	115.2

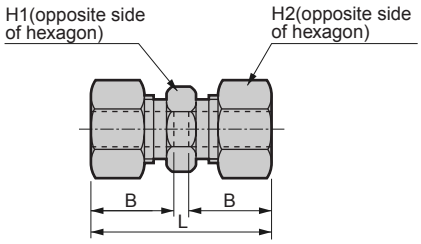
● Female, straight MJS*-*-M



* L and B dimensions show rough dimensions before fixing nut.

Model no.	Applicable tube O.D.ø	M	H1	H2	L	A	B	Min. bore size	Effective sectional area (mm²)
MJS4-6-M	4	Rc1/8	13	10	20	8	11	3	4.0
MJS4-8-M	4	Rc1/4	17	10	23	11	11	3	4.8
MJS6-6-M	6	Rc1/8	13	12	21	8	11.5	4.5	8.1
MJS6-8-M	6	Rc1/4	17	12	24	11	11.5	4.5	8.6
MJS6-10-M	6	Rc3/8	20	12	25	12	11.5	4.5	14.4
MJS8-6-M	8	Rc1/8	13	14	22.5	8	13	6	15.1
MJS8-8-M	8	Rc1/4	17	14	25.5	11	13	6	20.1
MJS8-10-M	8	Rc3/8	20	14	26.5	12	13	6	25.1
MJS10-8-M	10	Rc1/4	17	17	27	11	14.5	8	36.1
MJS10-10-M	10	Rc3/8	20	17	28	12	14.5	8	34.4
MJS10-15-M	10	Rc1/2	26	17	31	15	14.5	8	34.4
MJS12-8-M	12	Rc1/4	17	19	28.5	11	16	10	55.2
MJS12-10-M	12	Rc3/8	20	19	29.5	12	16	10	55.5
MJS12-15-M	12	Rc1/2	26	19	33	15	16	10	55.5
MJS15-10-M	15	Rc3/8	20	23	33	12	19	12	73.7
MJS15-15-M	15	Rc1/2	26	23	36	15	19	12	103.3

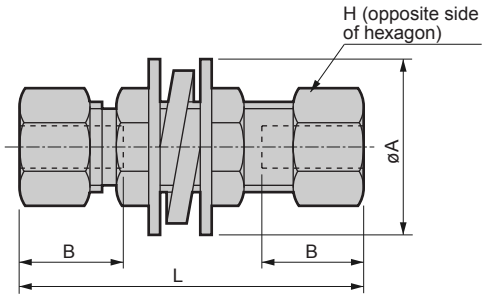
● Straight MJS*-0



* L and B dimensions show rough dimensions before fixing nut.

Model no.	Applicable tube O.D.ø	H1	H2	L	B	Min. bore size	Effective sectional area (mm²)
MJS4-0	4	8	10	25.5	11	3	4.3
MJS6-0	6	10	12	27.5	11.5	4.5	8.1
MJS8-0	8	12	14	31	13	6	25.2
MJS10-0	10	14	17	34	14.5	8	43.2
MJS12-0	12	16	19	37	16	10	68.6
MJS15-0	15	20	23	44	19	12	106.0

● Bulk head MJS*-0 X

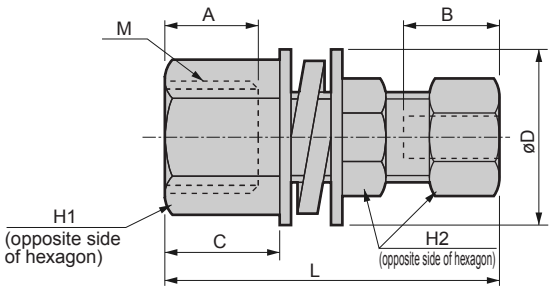


* L and B dimensions show rough dimensions before fixing nut. Mounting plate thickness 4mm or less

Model no.	Applicable tube O.D.ø	H	L	B	Installation hole diameter	Min. bore size	Effective sectional area (mm²)	A
MJS4-0-X	4	10	39	11	9	3	3.9	18
MJS6-0-X	6	12	43	11.5	11	4.5	7.7	22
MJS8-0-X	8	14	47	13	13	6	25.9	24
MJS10-0-X	10	17	51	14.5	15	8	41.1	28
MJS12-0-X	12	19	54	16	17	10	67.6	32
MJS15-0-X	15	23	63	19	21	12	97.0	40

Dimensions: Bulk head female, single elbow, female, elbow, elbow CAD

● Bulk head female MJS*-*-E

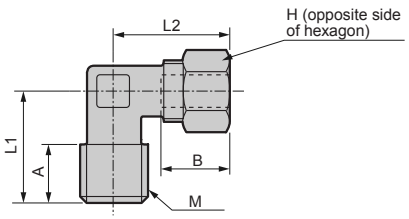


* L and B dimensions show rough dimensions before fixing nut. Mounting plate thickness 4mm or less

	Model no.	Applicable tube O.D.ø	M	H11	H2	L	A	B	C	Installation hole diameter	Min. bore size	Effective sectional area (mm²)	D
★	MJS4-6-E	4	Rc1/8	12	10	34	8	11	9.5	9	3	5.2	18
	MJS6-8-E	6	Rc1/4	17	12	40	11	11.5	13	11	4.5	13.2	22
	MJS8-8-E	8	Rc1/4	17	14	42.5	11	13	13	13	6	25.6	24
★	MJS10-10-E	10	Rc3/8	20	17	45.5	12	14.5	14	15	8	40.1	28

Model No. with "*" is available as custom order. Consult with CKD.

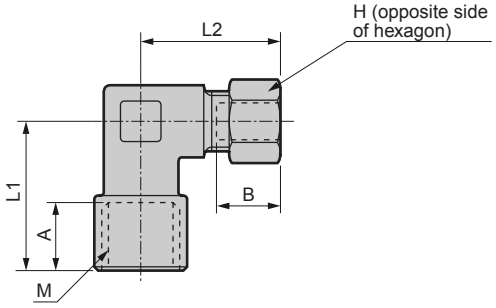
● Single elbow MJL*-*



* L2 and B dimensions show rough dimensions before fixing nut.

Model no.	Applicable tube O.D.ø	M	H	L1	L2	A	B	Min. bore size	Effective sectional area (mm²)
MJL4-6	4	R1/8	10	17	20	8	11	3	3.7
MJL4-8	4	R1/4	10	20	20	11	11	3	4.0
MJL6-6	6	R1/8	12	17	20.5	8	11.5	4.5	7.8
MJL6-8	6	R1/4	12	20	20.5	11	11.5	4.5	7.8
MJL6-10	6	R3/8	12	24	23.5	12	11.5	4.5	8.1
MJL8-6	8	R1/8	14	18	23	8	13	6	18.1
MJL8-8	8	R1/4	14	21	23	11	13	6	16.8
MJL8-10	8	R3/8	14	24	25	12	13	6	18.5
MJL10-8	10	R1/4	17	23	26.5	11	14.5	8	31.4
MJL10-10	10	R3/8	17	24	26.5	12	14.5	8	31.4
MJL10-15	10	R1/2	17	28	28.5	15	14.5	8	32.8
MJL12-8	12	R1/4	19	24	29	11	16	9	46.6
MJL12-10	12	R3/8	19	25	29	12	16	10	48.1
MJL12-15	12	R1/2	19	28	29	15	16	10	49.8
MJL15-10	15	R3/8	23	26	34	12	19	12	88.3
MJL15-15	15	R1/2	23	29	34	15	19	12	92.2

● Female, elbow MJL*-*-M

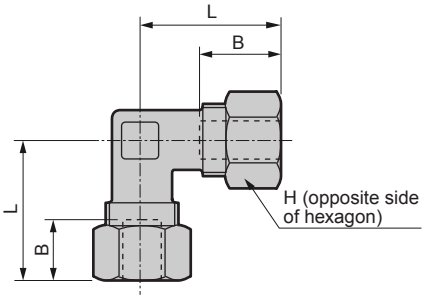


* L2 and B dimensions show rough dimensions before fixing nut.

	Model no.	Applicable tube O.D.ø	M	H	L1	L2	A	B	Min. bore size	Effective sectional area (mm²)
★	MJL4-6-M	4	Rc1/8	10	18.5	20	8	11	3	4.1
★	MJL4-8-M	4	Rc1/4	10	24	22.5	11	11	3	4.7
	MJL6-6-M	6	Rc1/8	12	18.5	20.5	8	11.5	4.5	9.4
	MJL6-8-M	6	Rc1/4	12	24	23.5	11	11.5	4.5	12.8
★	MJL6-10-M	6	Rc3/8	12	27	25.5	12	11.5	4.5	13.6
★	MJL8-6-M	8	Rc1/8	14	19.5	23	8	13	6	13.6
	MJL8-8-M	8	Rc1/4	14	24	25	11	13	6	21.0
★	MJL8-10-M	8	Rc3/8	14	27	27	12	13	6	22.8
★	MJL10-8-M	10	Rc1/4	17	24	26.5	11	14.5	8	29.3
★	MJL10-10-M	10	Rc3/8	17	27	28.5	12	14.5	8	35.7
★	MJL12-8-M	12	Rc1/4	19	25	29	11	16	10	29.3
★	MJL12-10-M	12	Rc3/8	19	27	29	12	16	10	51.4

Model No. with "*" is available as custom order. Consult with CKD.

● Elbow MJL*-0

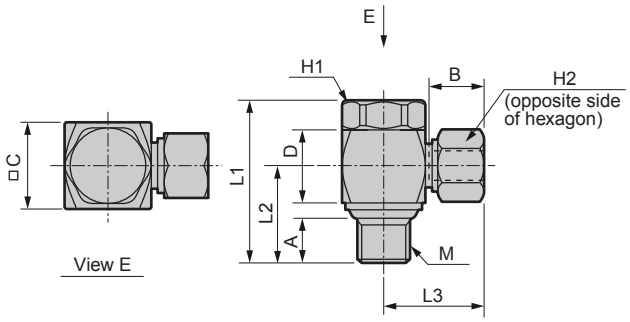


* L and B dimensions show rough dimensions before fixing nut.

Model no.	Applicable tube O.D.ø	H	L	B	Min. bore size	Effective sectional area (mm²)
MJL4-0	4	10	20	11	3	3.6
MJL6-0	6	12	20.5	11.5	4.5	9.4
MJL8-0	8	14	23	13	6	20.7
MJL10-0	10	17	26.5	14.5	8	33.1
MJL12-0	12	19	29	16	10	49.5
MJL15-0	15	23	34	19	12	85.4

Dimensions: Turn elbow, both push-in branch, D type union Tee, Union Tee

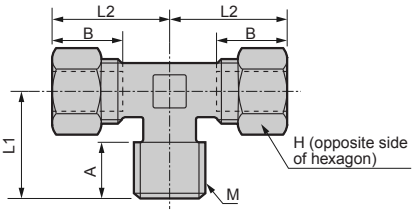
● Turn elbow MJL*-*-T



* L3 and B dimensions show rough dimensions before fixing nut.

Model no.	Applicable tube O.D.ø	M	H1	H2	L1	L2	L3	A	B	C	D	Effective sectional area (mm²)
MJL4-6-T	4	R1/8	14	10	29.5	17.6	18	8	11	15	13.5	3.9
MJL6-6-T	6	R1/8	14	12	29.5	17.6	19	8	11.5	15	13.5	8.3
MJL6-8-T	6	R1/4	19	12	36.5	22.1	21.5	11	11.5	20	16.5	9.7
MJL8-6-T	8	R1/8	14	14	29.5	17.6	20.5	8	13	15	13.5	13.7
MJL8-8-T	8	R1/4	19	14	36.5	22.1	23	11	13	20	16.5	18.0
MJL10-8-T	10	R1/4	19	17	36.5	22.1	24.5	11	14.5	20	16.5	27.4
MJL10-10-T	10	R3/8	22	17	42	25	26.5	12	14.5	24	20	33.9
MJL12-10-T	12	R3/8	22	19	42	25	28	12	16	24	20	42.4
MJL12-15-T	12	R1/2	24	19	52.5	32	29.5	15	16	27	27	45.5
MJL15-15-T	15	R1/2	24	23	52.5	32	32.5	15	19	27	27	64.5

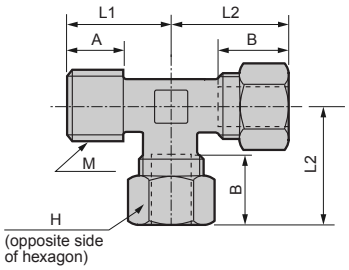
● Both push-in branch MJT*-*



* L2 and B dimensions show rough dimensions before fixing nut.

Model no.	Applicable tube O.D.ø	M	H	L1	L2	A	B	Min. bore size	Effective sectional area (mm²)
MJT4-6	4	R1/8	10	17	20	8	11	3	6.7
MJT4-8	4	R1/4	10	20	20	11	11	3	6.6
MJT6-6	6	R1/8	12	17	20.5	8	11.5	4.5	12.4
MJT6-8	6	R1/4	12	20	20.5	11	11.5	4.5	14.4
MJT6-10	6	R3/8	12	24	23.5	12	11.5	4.5	15.0
MJT8-6	8	R1/8	14	18	23	8	13	6	27.8
MJT8-8	8	R1/4	14	21	23	11	13	6	28.9
MJT8-10	8	R3/8	14	24	25	12	13	6	32.8
MJT10-8	10	R1/4	17	23	26.5	11	14.5	8	46.6
MJT10-10	10	R3/8	17	24	26.5	12	14.5	8	46.6
MJT10-15	10	R1/2	17	28	28.5	15	14.5	8	66.2
MJT12-8	12	R1/4	19	24	29	11	16	10	61.1
MJT12-10	12	R3/8	19	25	29	12	16	10	80.5
MJT12-15	12	R1/2	19	28	29	15	16	10	76.0
MJT15-10	15	R3/8	23	26	34	12	19	12	105.4
MJT15-15	15	R1/2	23	29	34	15	19	12	105.4

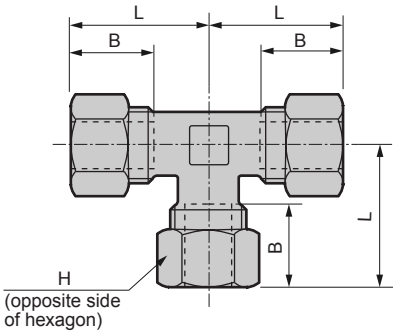
● D type union Tee MJT*-*-D



* L2 and B dimensions show rough dimensions before fixing nut.

Model no.	Applicable tube O.D.ø	M	H	L1	L2	A	B	Min. bore size	Effective sectional area (mm²)
MJT4-6-D	4	R1/8	10	17	20	8	11	3	7.6
MJT4-8-D	4	R1/4	10	20	20	11	11	3	7.8
MJT6-6-D	6	R1/8	12	17	20.5	8	11.5	4.5	13.1
MJT6-8-D	6	R1/4	12	20	20.5	11	11.5	4.5	15.7
MJT6-10-D	6	R3/8	12	24	23.5	12	11.5	4.5	14.4
MJT8-6-D	8	R1/8	14	18	23	8	13	6	27.3
MJT8-8-D	8	R1/4	14	21	23	11	13	6	28.9
MJT8-10-D	8	R3/8	14	24	25	12	13	6	36.1
MJT10-8-D	10	R1/4	17	23	26.5	11	14.5	8	48.1
MJT10-10-D	10	R3/8	17	24	26.5	12	14.5	8	49.8
MJT10-15-D	10	R1/2	17	28	28.5	15	14.5	8	68.1
MJT12-8-D	12	R1/4	19	24	29	11	16	10	65.6
MJT12-10-D	12	R3/8	19	25	29	12	16	10	76.0
MJT12-15-D	12	R1/2	19	28	29	15	16	10	80.3
MJT15-10-D	15	R3/8	23	26	34	12	19	12	110.4
MJT15-15-D	15	R1/2	23	29	34	15	19	12	110.4

● Union Tee MJT*-0

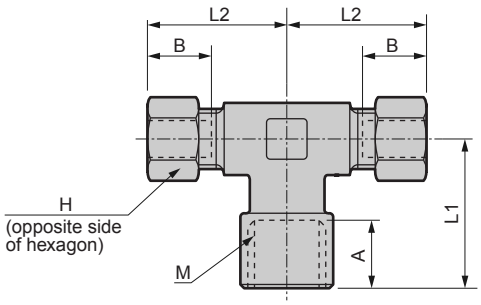


* L and B dimensions show rough dimensions before fixing nut.

Model no.	Applicable tube O.D.ø	H	L	B	Min. bore size	Effective sectional area (mm²)
MJT4-0	4	10	20	11	3	4.4
MJT6-0	6	12	20.5	11.5	4.5	7.2
MJT8-0	8	14	23	13	6	19.0
MJT10-0	10	17	26.5	14.5	8	36.1
MJT12-0	12	19	29	16	10	52.6
MJT15-0	15	23	34	19	12	100.8

Dimensions: Female union Tee, sleeve, insert ring

● Female, union Tee MJT*-*-M

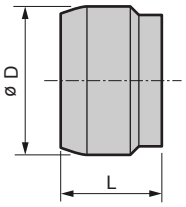


* L2 and B dimensions show rough dimensions before fixing nut.

	Model no.	Applicable tube O.D.ø	M	H	L1	L2	A	B	Min. bore size	Effective sectional area (mm²)
★	MJT4-6-M	4	Rc1/8	10	18.5	20	8	11	3	7.6
★	MJT4-8-M	4	Rc1/4	10	24	22.5	11	11	3	8.6
	MJT6-6-M	6	Rc1/8	12	18.5	20.5	8	11.5	4.5	13.9
	MJT6-8-M	6	Rc1/4	12	24	23.5	11	11.5	4.5	22.9
★	MJT6-10-M	6	Rc3/8	12	27	25.5	12	11.5	4.5	24.3
★	MJT8-6-M	8	Rc1/8	14	19.5	23	8	13	6	14.3
	MJT8-8-M	8	Rc1/4	14	24	25	11	13	6	29.2
★	MJT8-10-M	8	Rc3/8	14	27	27	12	13	6	40.0
★	MJT10-8-M	10	Rc1/4	17	24	26.5	11	14.5	8	29.2
★	MJT10-10-M	10	Rc3/8	17	27	28.5	12	14.5	8	53.7
★	MJT12-8-M	12	Rc1/4	19	26	29	11	16	10	29.5
★	MJT12-10-M	12	Rc3/8	19	27	29	12	16	10	63.8

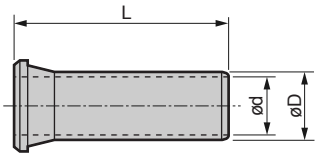
Model No. with "*" is available as custom order. Consult with CKD.

● Sleeve MJN*-0
Material C3604BD



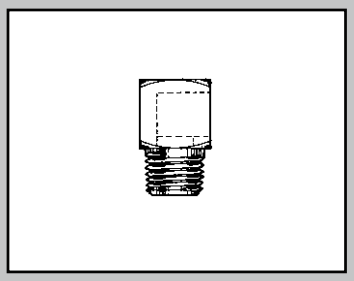
Model no.	Applicable tube O.D.ø	øD	L
MJN4-0	4	6	6
MJN6-0	6	8	6
MJN8-0	8	10	7
MJN10-0	10	12	8
MJN12-0	12	14	8.5
MJN15-0	15	18	10.5

● Insert ring MJ**-O
Material C3604BD



Installation procedures
Insert the tube into the cap nut and the sleeve in this turn, then insert the insert ring into the root of tube. Insert the tube into the joint until it stops, then couple the cap nut and the joint.

Model no.	L	øD	ød (Bore size)	Comformity tube
MJU4-0	12	1.8	1.1	U-9504
MJU6-0	15	3.6	2.8	U-9506
MJU8-0	16	4.8	4	U-9508
MJU10-0	17	6.3	5.5	U-9510
MJU12-0	18	7.8	7	U-9512
MJF4-0	12	2.3	1.5	F-1504
MJF6-0	15	3.8	3	F-1506
MJF8-0	16	5.6	4.5	F-1508
MJF10-0	17	7.1	6.2	F-1510
MJF12-0	18	8.8	8	F-1512
MJF15-0	20	11.3	10.3	F-1515



Joint

JL Series

● Port size: 1/8 to 1/2

CAD

AOI Co, Ltd.

How to order

JL – 8 – 6

Elbow joint

Ⓐ Male port size

Ⓐ Male port size	
6	R1/8
8	R1/4
10	R3/8
15	R1/2

Ⓑ Female port size

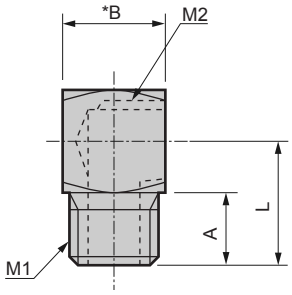
Ⓑ Female port size	
6	Rc1/8

No symbol when male and female have the same diameter.

Note: Sales unit is 10 pieces /1 bag.

Dimensions CAD

● Elbow joint/JL



Material C3604BD

For model with * mark, consult with CKD for delivery lead time.

Model no.	M1	M2	L	A	B	Min. bore size
JL-6	R1/8	Rc1/8	15	8	14	6
JL-8-6	R1/4	Rc1/8	18	11	14	8
JL-8	R1/4	Rc1/4	19	11	16	8
JL-10	R3/8	Rc3/8	22	12	20	10
JL-15 *	R1/2	Rc1/2	27.5	15	25	13

Rotary Joint

RJF Series

● Port size: M5, Rc1/8

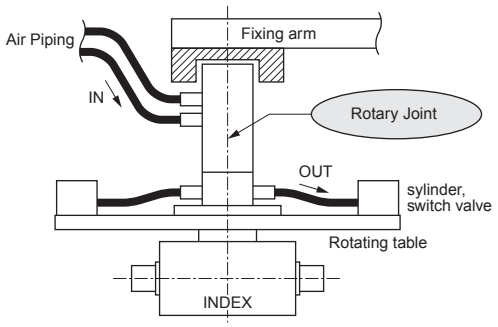
RoHS

Features

- High rigidity and low sliding resistance achieved with built-in bearing
- Ample lineup includes 4, 6, 8, 12 or 16 circuits
- Space saving type is also available for 12 and 16 circuits
- M5 and Rc1/8 port sizes available (4, 6, 8 circuits)

Applications

This joint supplies compressed air to the air cylinder for rotating members such as an indexing table, rotary table or rotary drum, and for air blowing or changeover valves.



Specifications

Descriptions	RJF-M5-04	RJF-6A-04	RJF-M5-06	RJF-6A-06	RJF-M5-08	RJF-6A-08	RJF-M5-12	RJF-M5-16	RJF-M5-12-S	RJF-M5-16-S
Working fluid	Compressed air									
Working pressure range	-100kPa (Note 1) to 0.7MPa									
Working temperature range	5 to 60									
Number of circuits	4		6		8		12	16	12	16
Port size	M5	Rc 1/8	M5	Rc 1/8	M5	Rc 1/8	M5	M5	M5	M5
Tolerable revolutions (Note 2)	350	240	240	170	200	140	175	155	100	90
Rotation resistance	0.05	0.07	0.12	0.17	0.2	0.4	0.85	1.5	0.85	1.3
Air port minimum sectional-area	4.9	12.5	4.9	12.5	4.9	12.5	4.9	4.9	4.9	4.9
Product weight	0.11	0.28	0.16	0.50	0.38	0.90	0.70	1.30	0.93	1.23

Note 1: The vacuum cannot be held.
Note 2: Revolutions per minute.

How to order

RJF - M5 - 04 - ( )

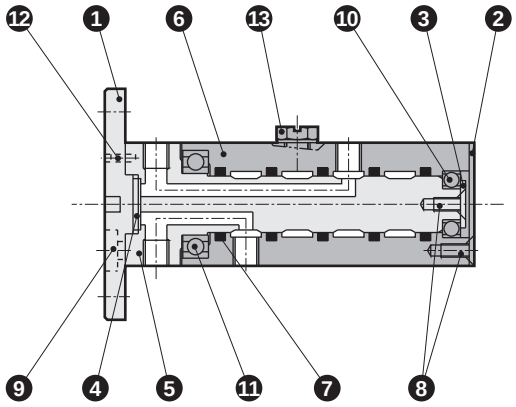
- RJF: Model no.
- M5: Ⓐ Port size
- 04: Ⓑ Number of circuits
- ( ): Ⓒ Shape

Symbol	Description
Ⓐ Port size	
M5	M5
6A Note 1	Rc 1/8
Ⓑ Number of circuits	
04	4 circuits
06	6 circuits
08	8 circuits
12	12 circuits
16	16 circuits
Ⓒ Shape	
Blank	Basic type
S Note 2	Space saving type

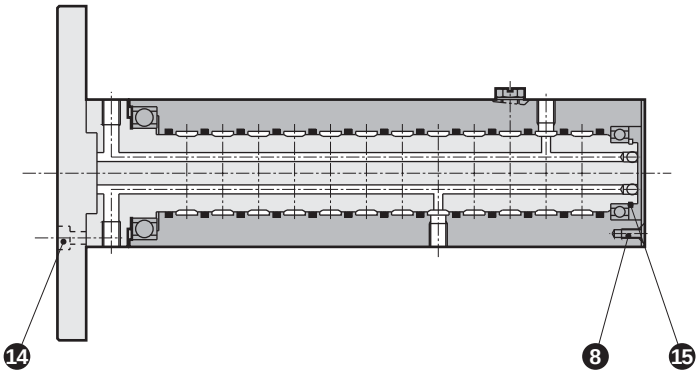
Note 1: Supported with number of circuits 04, 06 and 08.
Note 2: Supported with number of circuits 12 and 16.

Internal structure and parts list

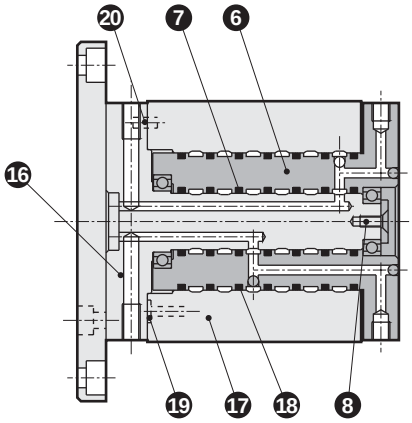
● RJF-M5-04
06
08
6A-04
06
08



● RJF-M5-12
16



● RJF-M5-12-S
16-S

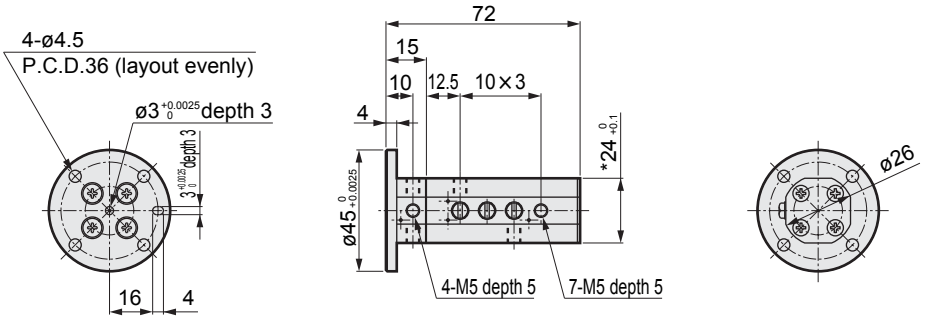


Parts list

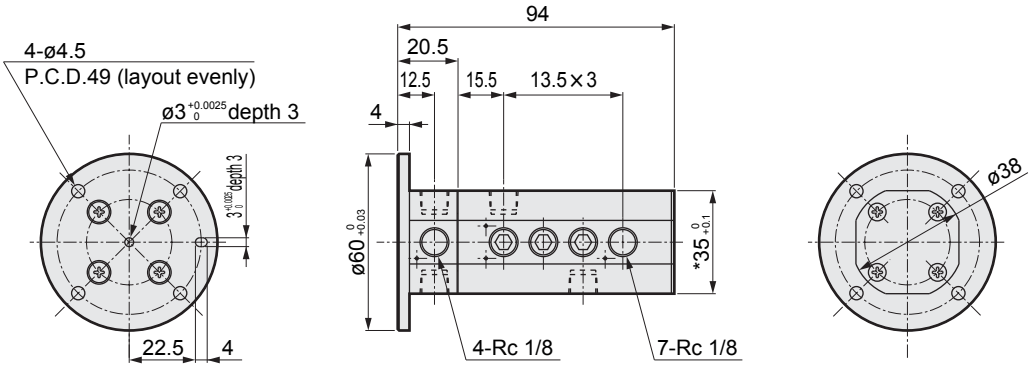
No.	Parts name	Material	No.	Parts name	Material
1	Mounting flange	Aluminum alloy	11	Single row deep groove ball bearing	Bearing steel
2	Fixed side body cover	Stainless steel	12	Parallel pin	Bearing steel
3	Bearing retainer	Stainless steel	13	Plug	Brass, Stainless steel
4	Gasket	Nitrile rubber	14	Hexagon socket bolt	Stainless steel
5	Rotation side body	Aluminum alloy	15	C type snap ring	Stainless steel
6	Fixed side body	Aluminum alloy	16	Rotation side body 1	Aluminum alloy
7	Packing seal	Nitrile rubber	17	Rotation side body 2	Aluminum alloy
8	Small cross headed pan screw	Stainless steel	18	Packing seal	Nitrile rubber
9	Small truss screw	Stainless steel	19	Gasket	Nitrile rubber
10	Single row deep groove ball bearing	Bearing steel	20	Parallel pin	Bearing steel

Dimensions (basic type)

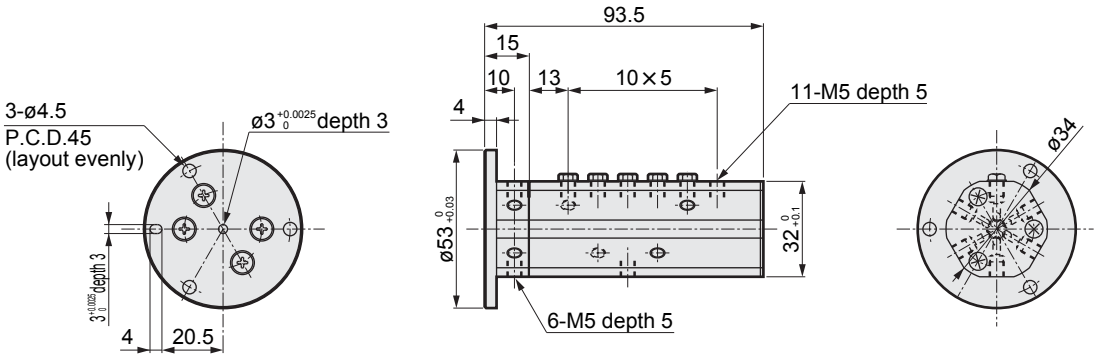
● RJF-M5-04



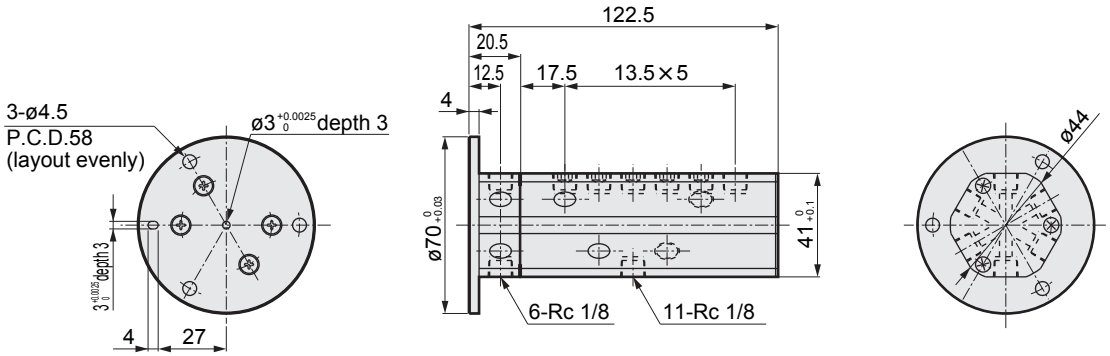
● RJF-6A-04



● RJF-M5-06

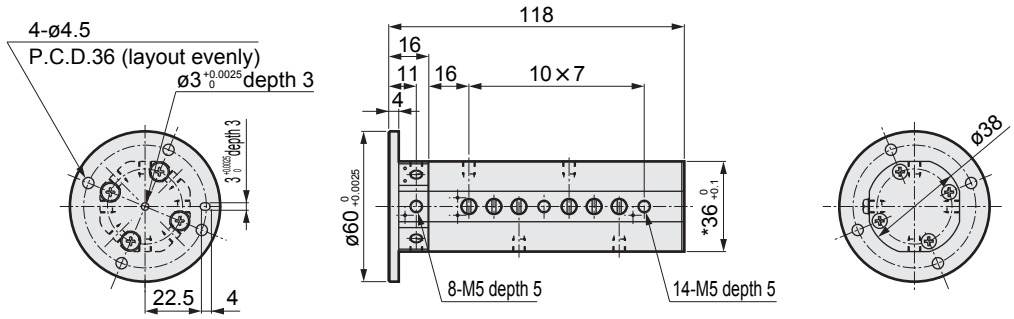


● RJF-6A-06

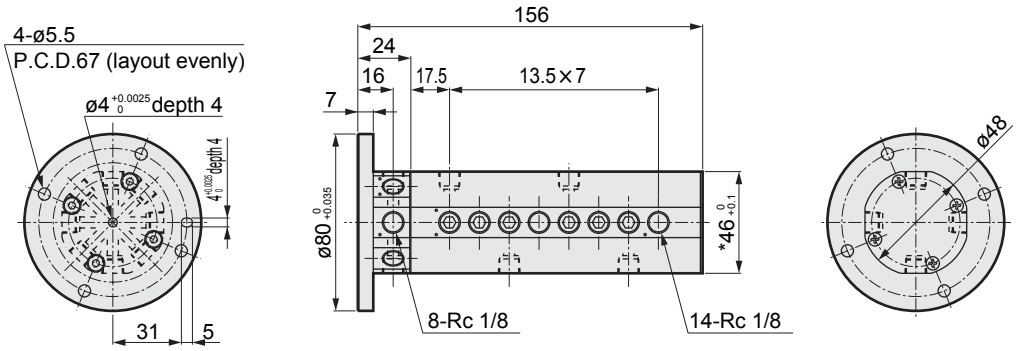


Dimensions (basic type)

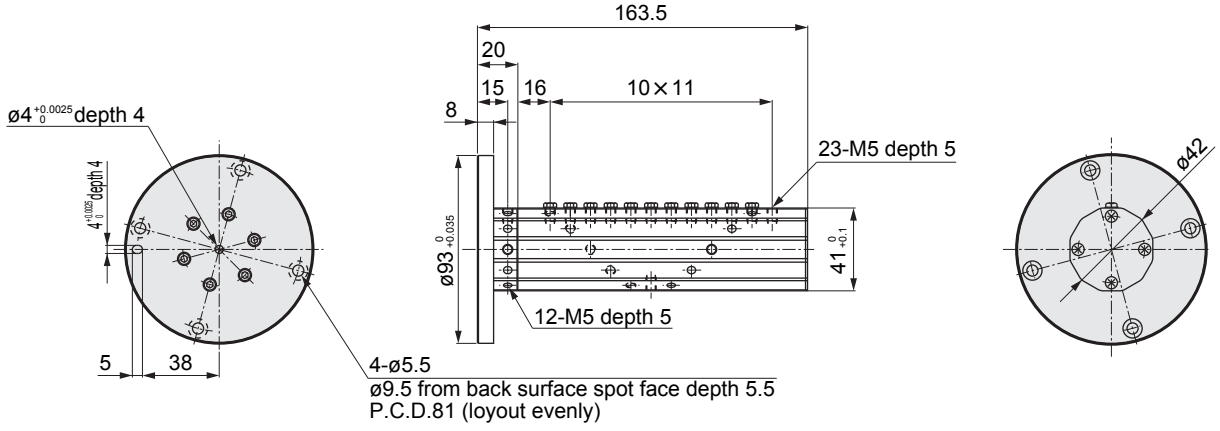
● RJF-M5-08



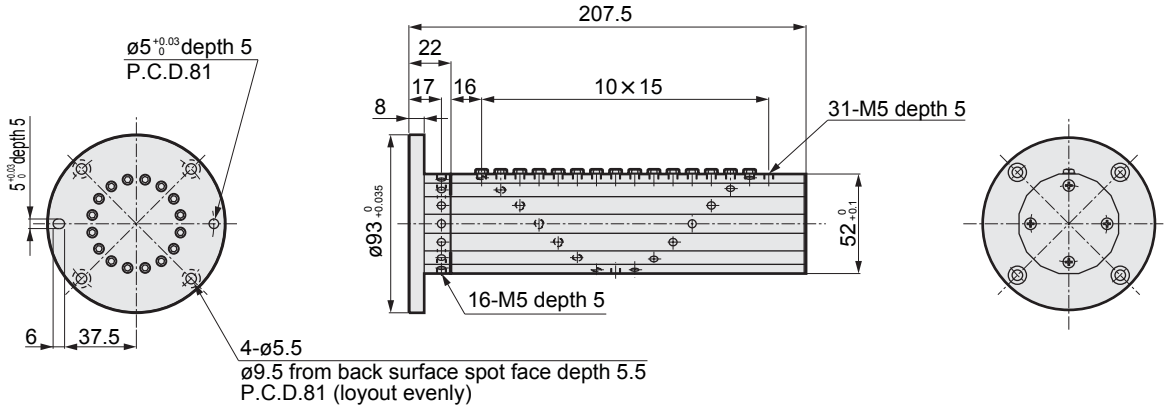
● RJF-6A-08



● RJF-M5-12

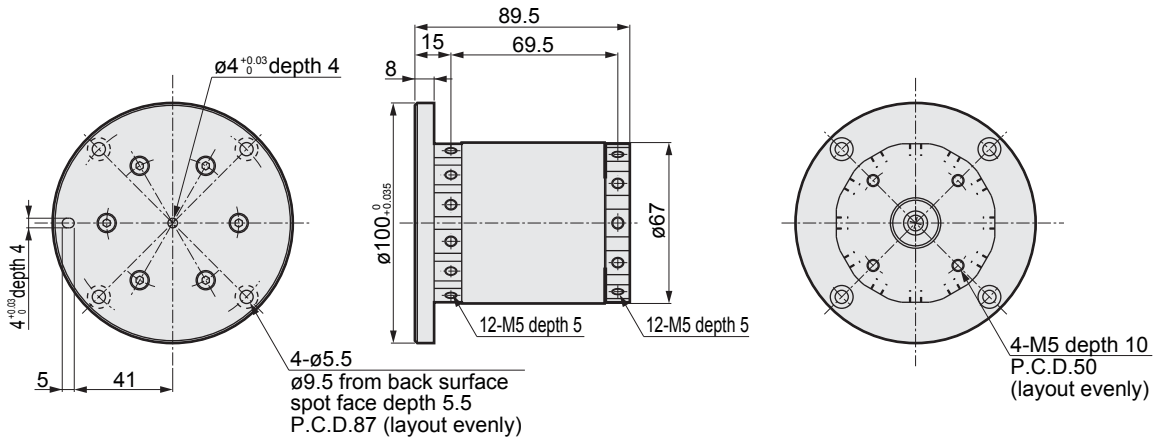


● RJF-M5-16

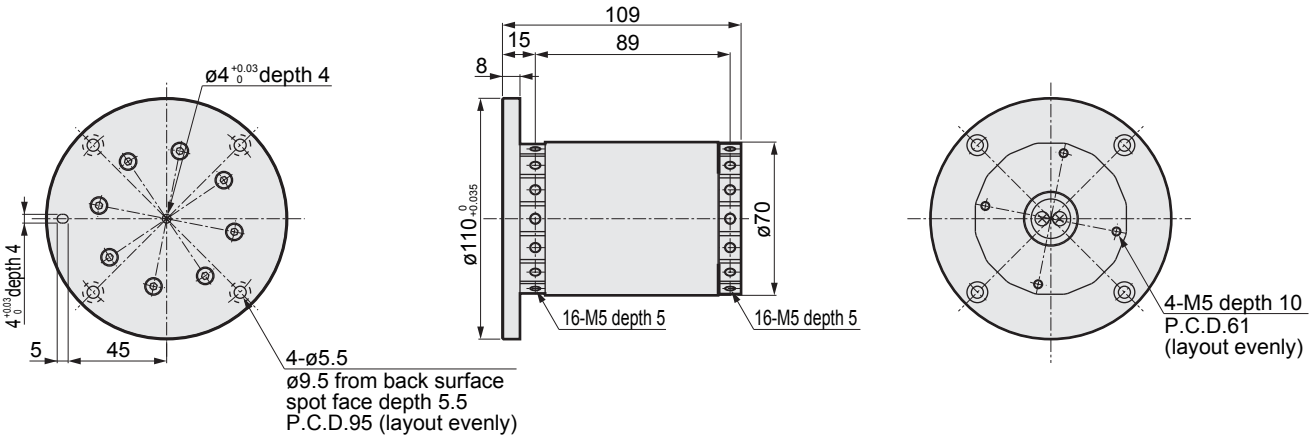


Dimensions (space saving type)

● RJF-M5-12-S



● RJF-M5-16-S



Series variation

Fiber tube antistatic type, clean type (push-in joint)

bore size ø1.8×ø1.2

Push-in joints for fiber

Port size M3, M5, R1/8, ø4

Fiber tube antistatic type (push-in joint) UP

O.D. x I.D. (mm)
ø1.8×ø1.2
Color
Black
White
Transparent
Transparent blue
Transparent green
Yellow (custom order)
Red (custom order)

Fiber tube clean type (push-in joint) EH

O.D. x I.D. (mm)
ø1.8×ø1.2
Color
Black
Transparent

Push-in joints for fiber tube (standard type)

■ Straight type

Single straight
PG-S2-*

Port size
M3
M5
R1/8

• Page : 987

Single straight (round)
PG-S2-M3-S

Port size
M3

• Page : 987

Straight
PG-S2-0

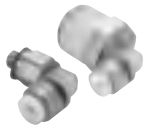
• Page : 987

Bulk head
PG-S2-0-X

• Page : 987

■ Elbow type

Single elbow
PG-L2-*



Port size
M3
M5
R1/8

• Page : 988

■ Union Tee type

Both push-in branch
PG-T2-*

Port size
M3
M5

• Page : 988

Union Tee
PG-T2-0

• Page : 988

D type union Tee
PG-T2-*-D

Port size
M3
M5

• Page : 989

■ Plug type

Plug reducer
PG-S2-4P

Port size
ø4

• Page : 989

Blanking plug
PG-P2-B

• Page : 989

●Sales unit of standard type is 10 pieces/1 box.

Push-in joints for fiber tube (clean type)

■ Straight type

Single straight
CG-S2-*

Port size
M3
M5
R1/8

• Page : 991

Straight
CG-S2-0

• Page : 991

Bulk head
CG-S2-0-X

• Page : 991

■ Elbow type

Single elbow
CG-L2-*

Port size
M3
M5
R1/8

• Page : 992

■Tee union type

Both push-in branch
CG-T2-*

Port size
M3
M5

• Page : 992

■ Union Tee type

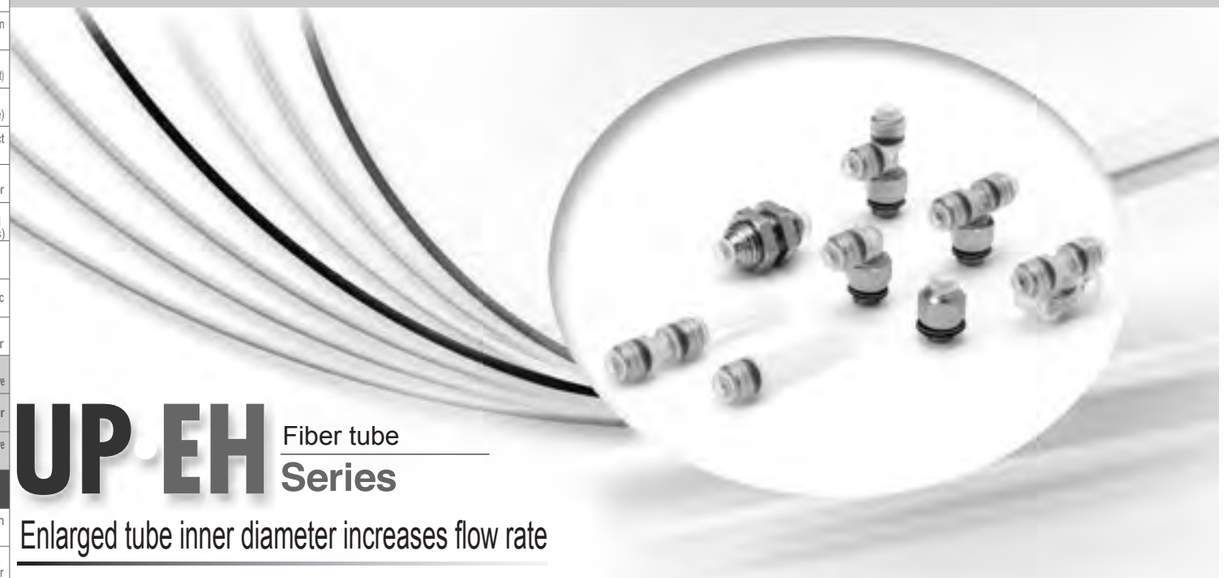
Union Tee
CG-T2-0

• Page : 992

● Sales unit of a clean type is 1 piece/unit.

Fiber tube push-in joint

- Antistatic type **UP Series**
- Clean type **EH Series**
- Outer diameter: ø1.8



UP EH Series
Fiber tube

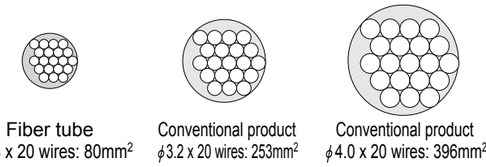
Enlarged tube inner diameter increases flow rate

"A new structure with outer diameter holding method has been incorporated.
The inner diameter has been increased from the conventional ϕ1.0 to ϕ1.2 while maintaining the original tube outer diameter ϕ1.8, thus increasing the flow rate by approx. three-fold."

Enlarged from conventional ϕ1.0 to ϕ1.2

Energy and space saving

This O.D. ϕ1.8 x I.D. ϕ1.2 tube is extremely thin, making it possible to greatly reduce piping space.
The tube piping volume is also small, thereby saving energy.



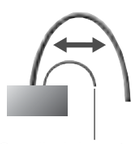
Fiber tube
ϕ1.8 x 20 wires: 80mm²

Conventional product
ϕ3.2 x 20 wires: 253mm²

Conventional product
ϕ4.0 x 20 wires: 396mm²

Eliminate adverse effect onto device accuracy

Stress applied to the tube by piping is greatly reduced. The bounce is equivalent to a lead wire, so adverse effects on device accuracy are minimized.



Small piping stress

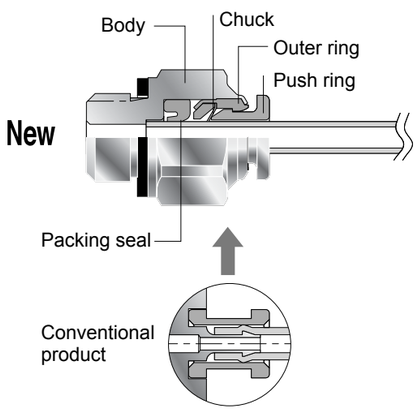
Clean models available

Clean models (tube: special polyolefin, joint: stainless steel, etc.) using highly corrosion resistant materials have been added to the series for use in clean rooms. These models are perfect in fields which require a high cleanliness, such as semiconductor manufacturing, pharmaceutical and food handling systems.

PG CG Series
Push-in joints for fiber tube

One-touch attachment

Attachment is easier than before, and can be completed just by holding down the joint's push ring and inserting or removing the tube.
Polypropylene (PP) resin is incorporated as a standard for the resin parts, thus enhancing the corrosion-resistance.



Eco-friendly products

All substances which can adversely affect the global environment, have been eliminated from the materials.

CKD Green Technology

Free piping

Outstanding flexibility and extremely high piping freedom makes it easy to pipe difficult areas such as small spaces and short distances of approx. 200 to 300mm.

Resistant to static electricity and dust build-up

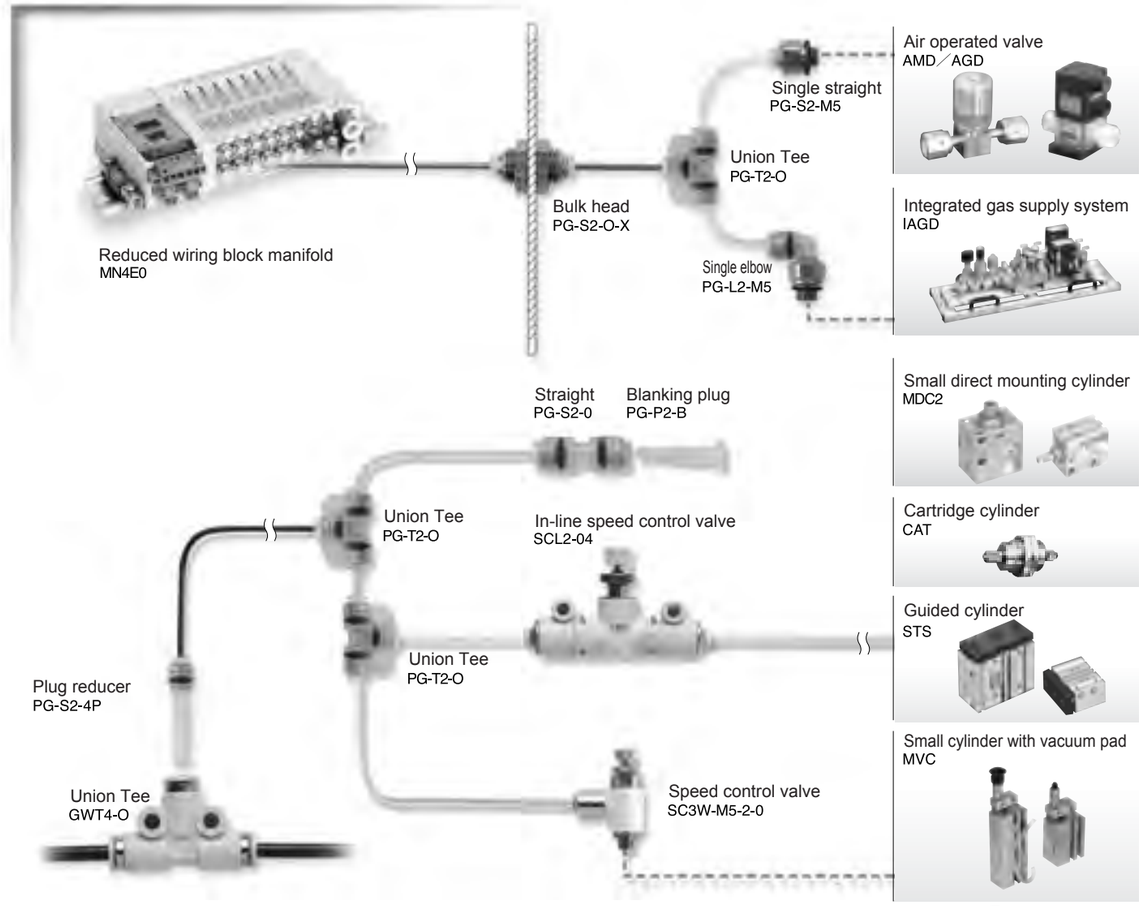
The fiber tube (UP Series) is provided with static-preventing measures, and can prevent the static electricity and the adherence of dust.

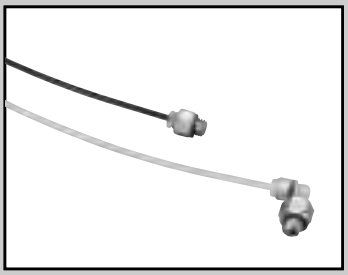
Series variation

Model	Variation	Series	Tube material	Color
Fiber tube	Standard specifications	**UP Series**	Urethane (antistatic)	7 colors ●○○○○○●
	Clean room specifications	**EH Series**	Special polyolefin	2 colors ●○

Model	Variation	Series	Material	Variation
Push-in joint	Standard specifications	**PG Series**	Brass + electroless nickeling, PP	10 types, 16 models
	Clean room specifications	**CG Series**	Stainless steel (oil-prohibited), PP	6 types, 11 models

Miniature air system components connected with fiber tubes





Fiber tube (push-in joint)

- Outer diameter: ø1.8 × Inner diameter: ø1.2
- Antistatic type (UP-9402-F1)
- Clean type (EH-5802)

RoHS

Specifications

Model no.		Antistatic type UP-9402-F1	Clean type EH-5802
Working fluid		Compressed air (Note 1)	
Working pressure range (20°C) (Note 2)		-100kPa to 0.8MPa	-100kPa to 1.0MPa
Ambient temperature range	°C	-10 to 60 (no freezing)	
O.D. × I.D.	mm	ø1.8×ø1.2	
Bore size precision	mm	±0.1	
Outer diameter precision	mm	±0.1	
Durometer hardness		HDA 94	HDD 58
Min. bending radius (JIS B 8381)	mm	4	5
Min. installation radius	mm	4	7
Burst pressure (20°C)	MPa	2.5	3.8
Volume resistance ratio	Ω·cm	10^{10} to 10^{12}	–
Material		Antistatic urethane	Special polyolefin
Color		Black, white, clear, clear blue, clear green, yellow (Note 3), red (Note 3)	Black, transparent
Applicable joint		PG, CG Series (push-in type) Note4	

Note 1: Consult with CKD when using other working fluids.
Note 2: Refer to the graph of "Relevant of working temperature and pressure (constant vacuum break)" for details on working pressure range.
Note 3: Yellow and red are custom-ordered parts.
Note 4: This cannot be used with a barbed joint (PTN*).

How to order

● Antistatic type

UP-94 **02** - **20** - **W** - **F1**

- **02**: Tube size ø1.8×ø1.2 (O.D. × I.D.)
- **20**: Length per roll 20m roll
- **W**: Tube color
- **F1**: Antistatic

Tube color	
Blank	Black
W	White
C	Transparent
CB	Transparent blue
CG	Transparent green
Y	Yellow (Note)
R	Red (Note)

Note: Custom order.

● Clean type

EH-58 **02** - **20** - **C**

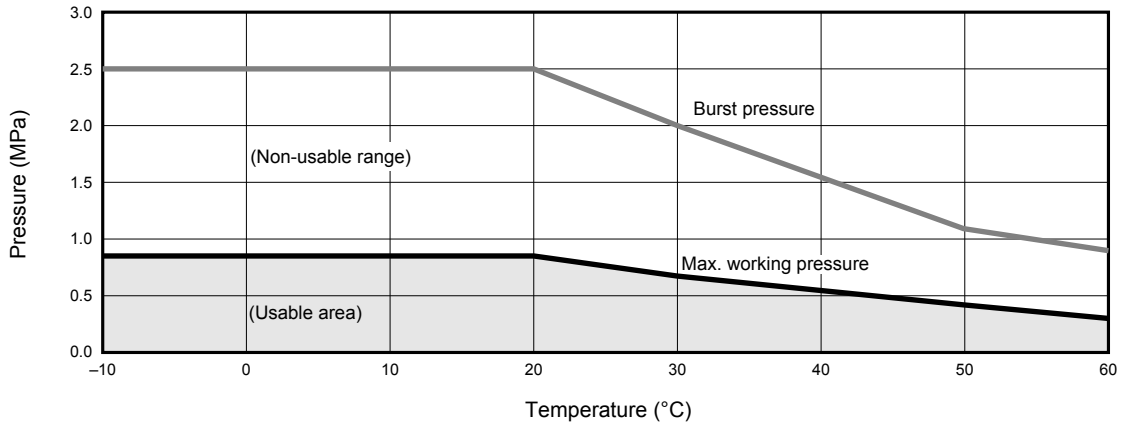
- **02**: Tube size ø1.8×ø1.2 (O.D. × I.D.)
- **20**: Length per roll 20m roll
- **C**: Tube color

Tube color	
Blank	Black
C	Transparent

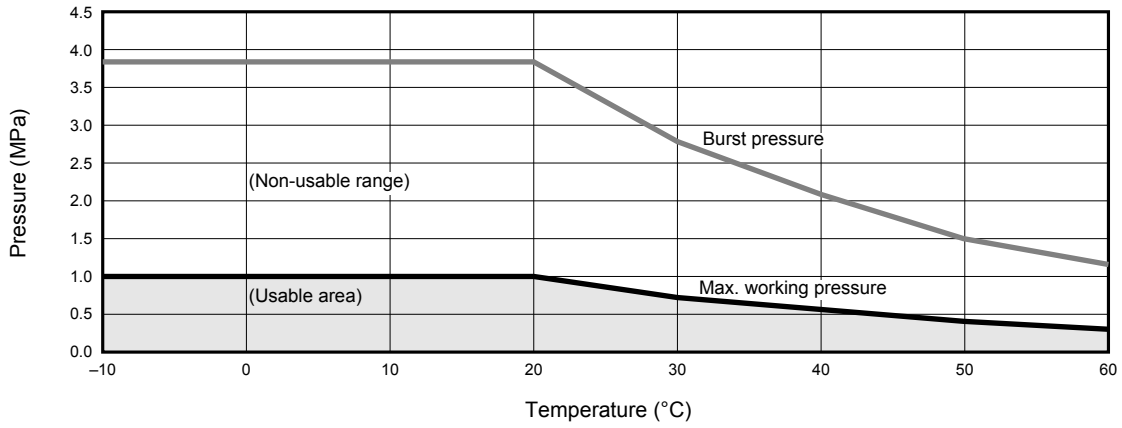
Characteristics graph

● Relevant of working temperature and pressure (normal destruction)

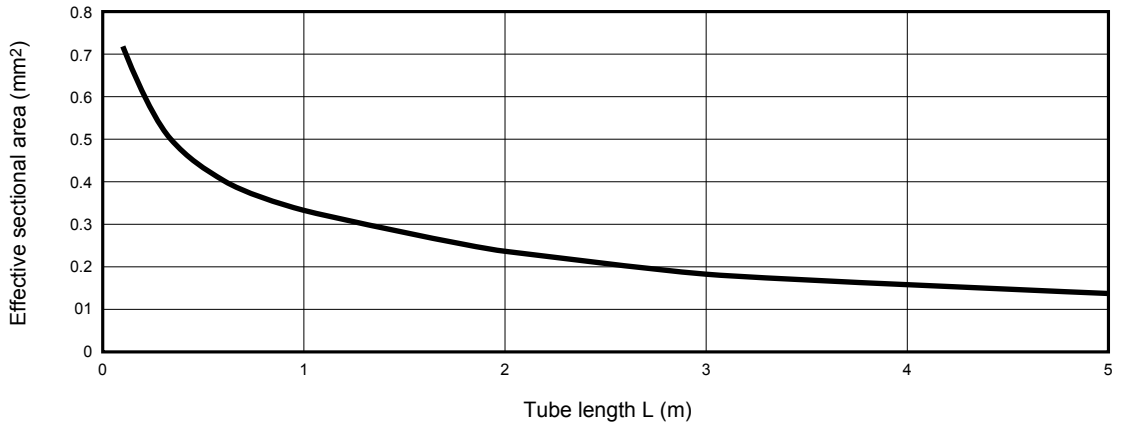
UP-9402-F1



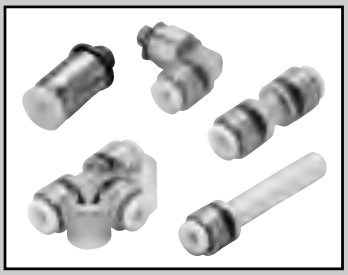
EH-5802



● Relevant of tube length and effective sectional area



The tubing inlet and outlet are measured with a single-ended straight (PG-S2-M5) attached.



Push-in joints for fiber tube

Standard type PG Series

- Applicable tube outer diameter: ø1.8
- Port size: M3 to R1/8

RoHS CAD

Specifications

Model no.	PG Series
Working fluid	Compressed air (Note 1)
Working pressure range	-100kPa to 1.0MPa
Ambient temperature range °C	-10 to 60 (no freezing)
Applicable tube	Fiber tube (UP-9402-F1, EH-5802) Note 2

Note 1: Consult with CKD when using other working fluids.
Note 2: Fiber tube for barbed joint (UP-9102-F1) is not available.
Note 3: Sales unit is 1 set (10 pieces).

How to order

* Refer to the model no. on the dimensions page (pages 987 to 989) for the model no. combination.

● Standard type

PG - S 2 - M3 - S

Ⓓ Other combinations
Ⓐ Shape
Ⓒ Port size
Ⓑ Applicable tube O.D. ø1.8

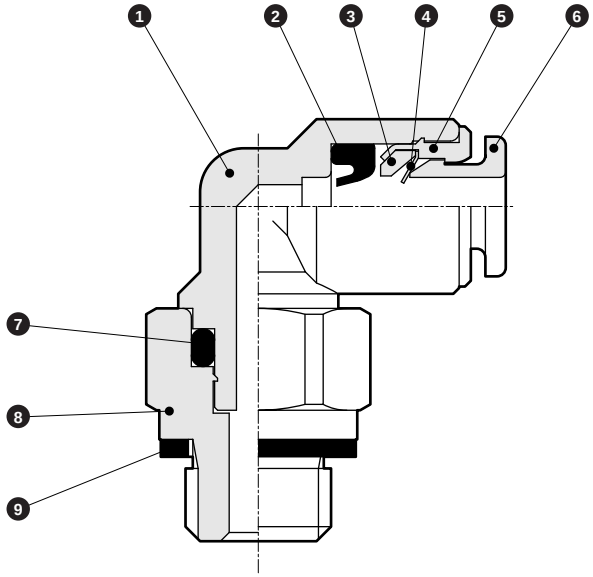
Ⓐ Shape	
S	Straight
L	Elbow
T	Union Tee
P	Plug

Ⓒ Port size	
M3	M3×0.5
M5	M5×0.8
6	R1/8
0	No thread
4P	Plug for ø4
B	Blanking plug

Ⓓ Other combinations	
S	Round
D	D type
X	Bulk head

Note: Sales unit is 10 pcs./box.

Internal structure and parts list



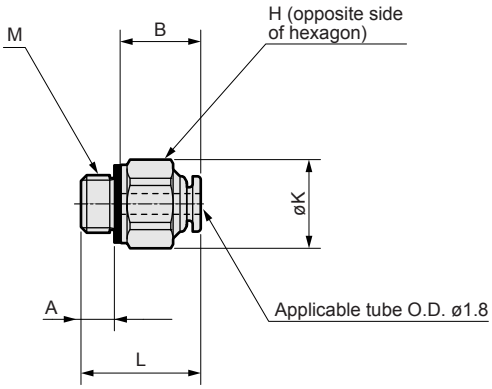
No.	Parts name	Material
1	Body *1	Polypropylene (semitransparent)
		Brass (electroless nickeling)
2	Packing seal	Hydrogen nitrile rubber
3	Chuck holder	Polypropylene (semitransparent)
4	Chuck	Stainless steel
5	Outer ring	Brass (electroless nickeling)
6	Push ring *2	Polypropylene (white)
7	O ring	Nitrile rubber
8	Nipple	Brass (electroless nickeling) (R1/8 is with sealant)
9	Gasket	Stainless steel + Nitrile rubber

*1: The body of the single-ended straight, single-ended straight (round), and bulkhead is brass (electroless nickel-plated).
*2: The PG Series is white.

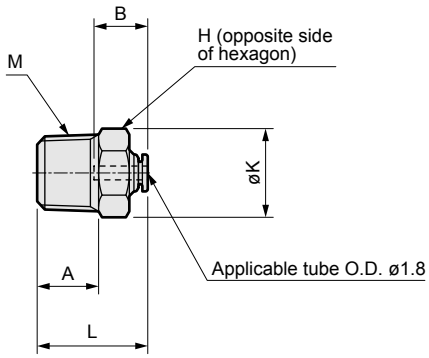
Dimensions: Single straight, single straight (round), bulk head

Single straight

● PG-S2-*



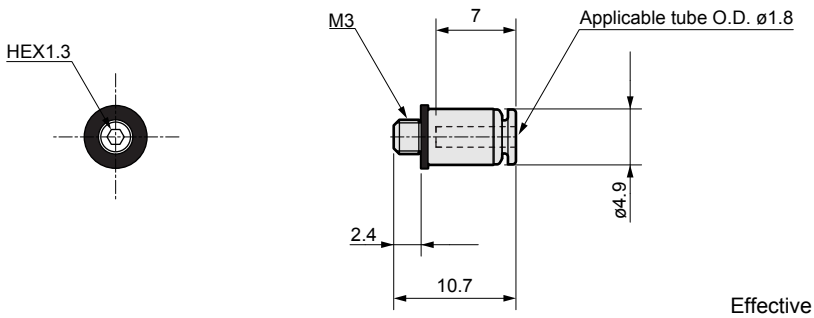
● PG-S2-6



Model no.	M	H	K	L	A	B	Min. bore size	Effective sectional area mm²
PG-S2-M3	M3×0.5	5.5	6	10.7	2.4	7	1.5	0.92
PG-S2-M5	M5×0.8	7	7.7	10.4	2.9	7	1.5	0.92
PG-S2-6	R1/8	10	11.6	14.4	8	7	1.5	0.97

Single straight (round)

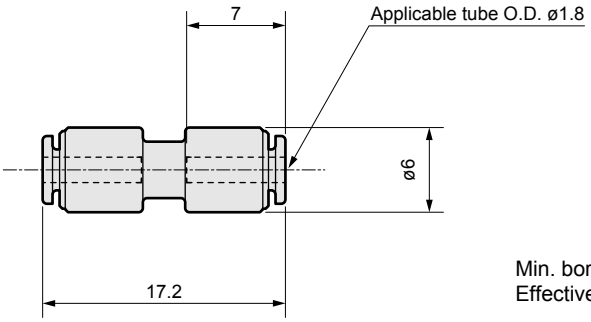
● PG-S2-M3-S



Effective sectional area: 0.92mm²

Straight

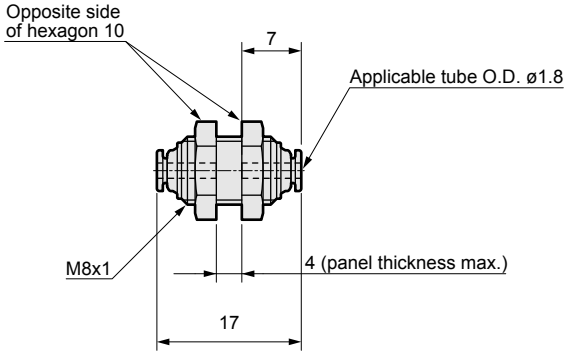
● PG-S2-0



Min. bore size: ø1.5
Effective sectional area: 0.82mm²

Bulk head

● PG-S2-0-X

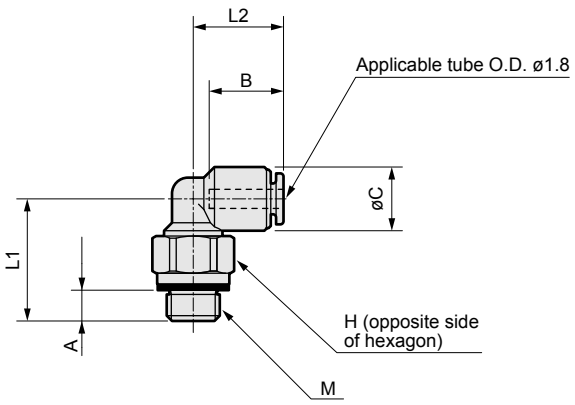


Min. bore size: ø1.5
Effective sectional area: 0.85mm²

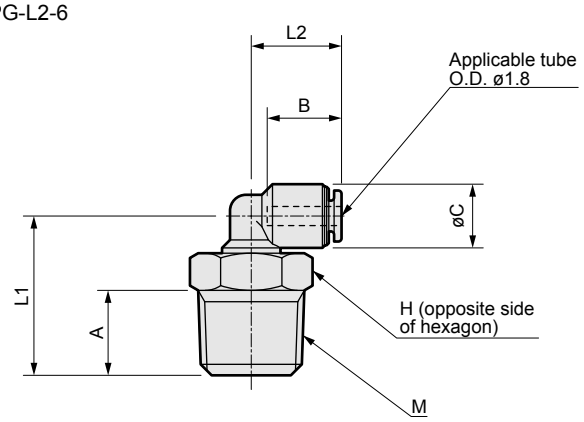
Dimensions: Single elbow, both push-in branch, Union Tee CAD

Single elbow

● PG-L2-*



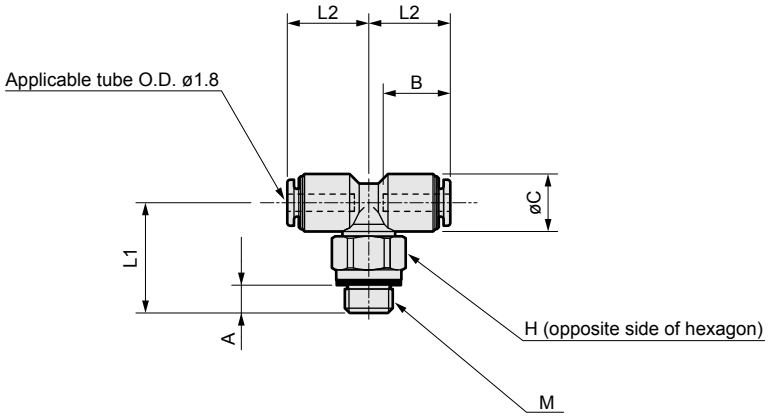
● PG-L2-6



Model no.	M	H	L1	L2	A	B	C	Min. bore size	Effective sectional area mm²
PG-L2-M3	M3×0.5	5.5	11	8.5	2.4	7	6	1.5	0.83
PG-L2-M5	M5×0.8	7	11.5	8.5	2.9	7	6	1.5	0.83
PG-L2-6	R1/8	10	15	8.5	8	7	6	1.5	0.70

Both push-in branch

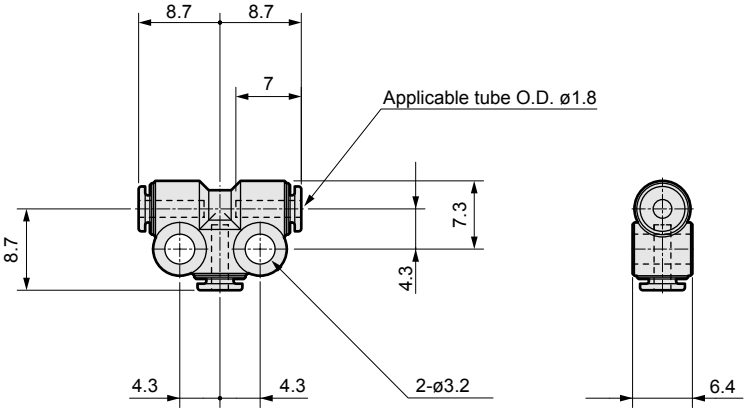
● PG-T2-*



Model no.	M	H	L1	L2	A	B	C	Min. bore size	Effective sectional area mm²
PG-T2-M3	M3×0.5	5.5	11	8.5	2.4	7	6	1.5	1.10
PG-T2-M5	M5×0.8	7	11.5	8.5	2.9	7	6	1.5	1.25

Union Tee

● PG-T2-0



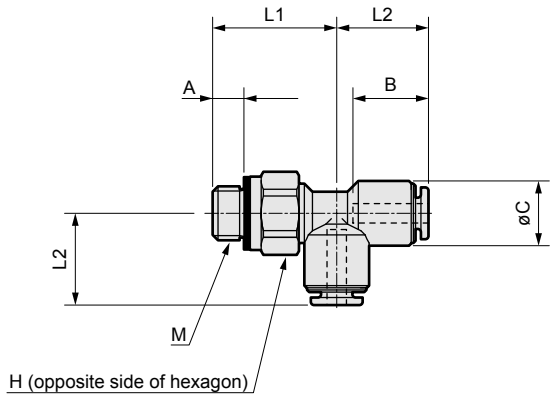
Min. bore size: ø1.5

Effective sectional area: 0.90mm²

Dimensions: D type tee union, plug reducer, blanking plug

D type tee union

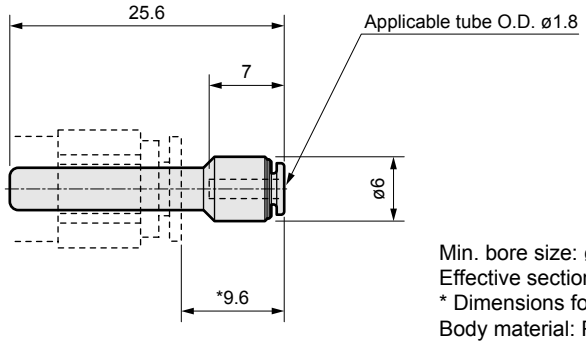
● PG-T2-*-D



Model no.	M	H	L1	L2	A	B	C	Min. bore size	Effective sectional area mm²
PG-T2-M3-D	M3×0.5	5.5	11	8.5	2.4	7	6	1.5	1.05
PG-T2-M5-D	M5×0.8	7	11.5	8.5	2.9	7	6	1.5	1.40

Plug reducer

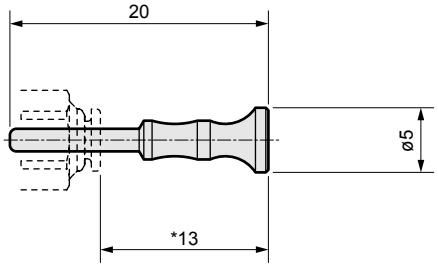
● PG-S2-4P



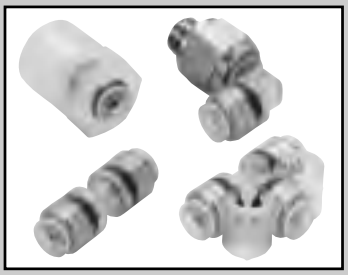
Min. bore size: ø1.5
Effective sectional area: 0.97mm²
* Dimensions for GWS4-M5 connection joint
Body material: Polyamide (PA)
* Body material: Polyamide (PA)

Blanking plug

● PG-P2-B



Material: Polypropylene (PP)
* Dimensions for PG or CG Series connection joint



Push-in joints for fiber tube

Clean type CG Series

- Applicable tube outer diameter: ø1.8
- Port size: M3 to R1/8

RoHS CAD

Overview

CG Series is the joint for clean environment to semiconductor manufacturing, medical equipment, and foods.
P.P. resin, stainless steel and EPDM rubber are provided for improving corrosion resistance.
This product is assembled with oil-prohibited specifications and shipped in clean packaging.

Specifications

Model no.	CG Series
Working fluid	Clean air (Note 1)
Working pressure range	-100kPa to 1.0MPa
Ambient temperature range °C	-10 to 60 (no freezing)
Lubricant	Oil-prohibition
Applicable tube	Fiber tube (UP-9402-F1, EH-5802) Note 2

Note 1: Rubber EPDM material is used, so this product cannot be used with fluids that contain mineral oil. Consult with CKD when using other working fluids.
Note 2: Fiber tube for barbed joint (UP-9102-F1) is not available.
Note 3: Sales unit is each.

How to order

* Refer to the model no. on the dimensions page (pages 991 to 992) for the model no. combination.

● Clean type

CG - S 2 - 0 - X

Ⓓ Other combinations
Ⓐ Shape
Ⓒ Port size
Ⓑ Applicable tube O.D. ø1.8

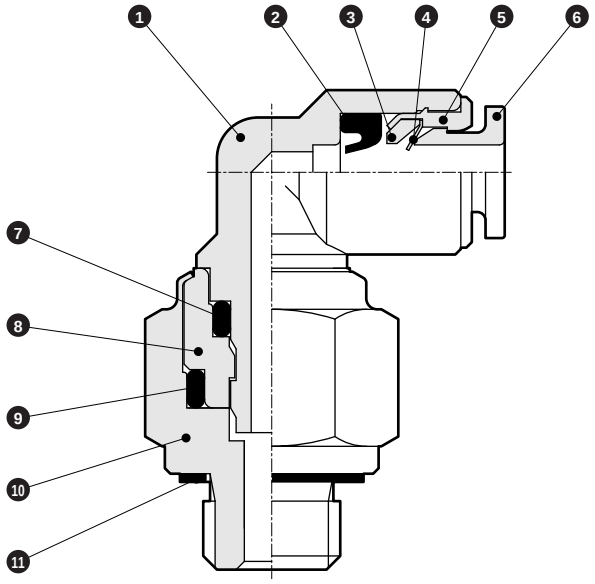
Ⓐ Shape	
S	Straight
L	Elbow
T	Union Tee

Note:Sales unit is 1 piece per bag.

Ⓒ Port size	
M3	M3×0.5
M5	M5×0.8
6	R1/8
0	No thread

Ⓓ Other combinations	
X	Bulk head

Internal structure and parts list



No.	Parts name		Material
1	Body *1		Polypropylene (semitransparent)
			Stainless steel (SUS304)
2	Packing seal		Ethylene propylene diene rubber
3	Chuck holder		Polypropylene (semitransparent)
4	Chuck		Stainless steel (SUS301)
5	Outer ring		Stainless steel (SUS304)
6	Push ring		Polypropylene (semitransparent)
7	O ring		Ethylene propylene diene rubber
8	Stopper		Stainless steel (SUS304)
9	O ring		Ethylene propylene diene rubber
10	Nipple	M3,M5	Stainless steel (SUS304)
		R1/8	Polypropylene (semitransparent)
11	Gasket		Stainless steel + fluoro rubber

*1: The body of the single-ended straight (M3, M5) and bulkhead is stainless steel.

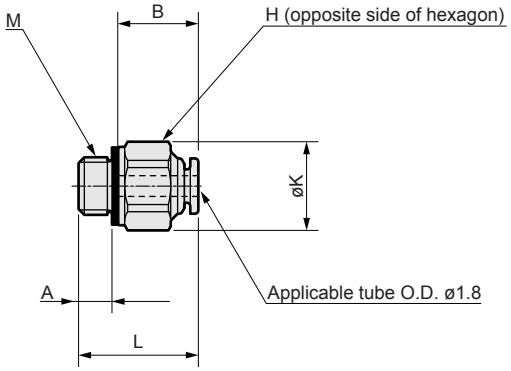
⚠ CAUTION

The durability of the CG Series packing (material: EPDM) is susceptible to mineral oil, so it cannot be used to pipe general pneumatic components.
The R1/8 thread does not have a sealing agent on the threads.
Use the PG Series for piping to general pneumatic components.

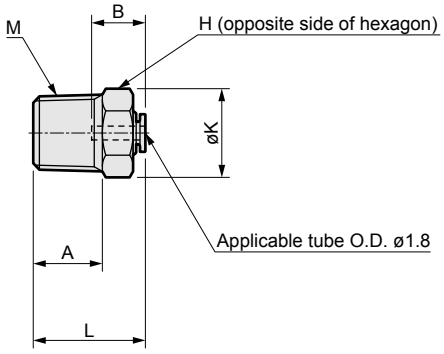
Dimensions: Single-straight, straight, bulk head

Single straight

● CG-S2-*



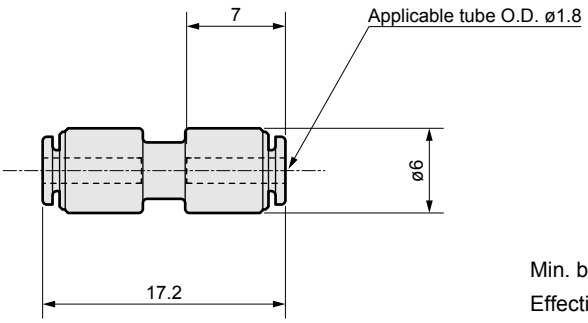
● CG-S2-6



Model no.	M	H	K	L	A	B	Min. bore size	Effective sectional area mm²
CG-S2-M3	M3×0.5	5.5	6	10.7	2.7	7	1.5	0.92
CG-S2-M5	M5×0.8	7	7.7	10.4	3.2	7	1.5	0.92
CG-S2-6	R1/8	10	11.6	14.6	9	7	1.5	0.97

Straight

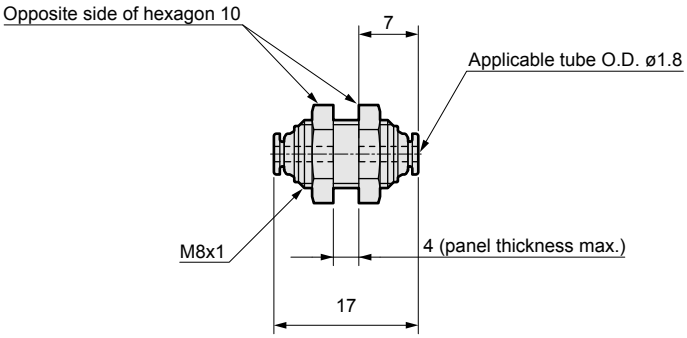
● CG-S2-0



Min. bore size: ø1.5
Effective sectional area: 0.82mm²

Bulk head

● CG-S2-0-X

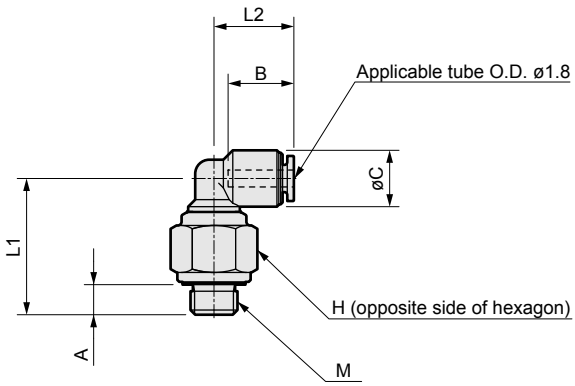


Min. bore size: ø1.5
Effective sectional area: 0.85mm²

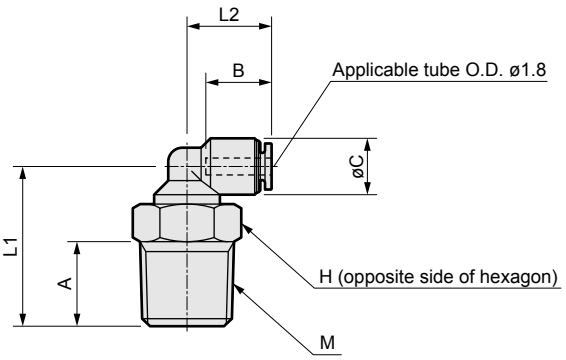
Dimensions: Single elbow, both push-in branch, tee union

Single elbow

● CG-L2-*



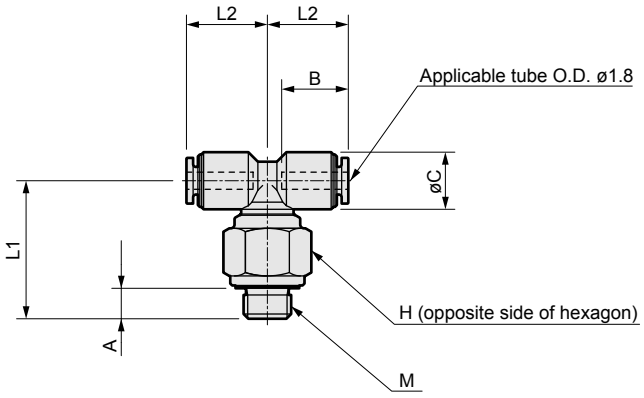
● CG-L2-6



Model no.	M	H	L1	L2	A	B	C	Min. bore size	Effective sectional area mm²
CG-L2-M3	M3×0.5	8	14	8.5	2.7	7	6	1.5	0.81
CG-L2-M5	M5×0.8	8	14.5	8.5	3.2	7	6	1.5	0.81
CG-L2-6	R1/8	10	17	9	9	7	6	1.5	0.84

Both push-in branch

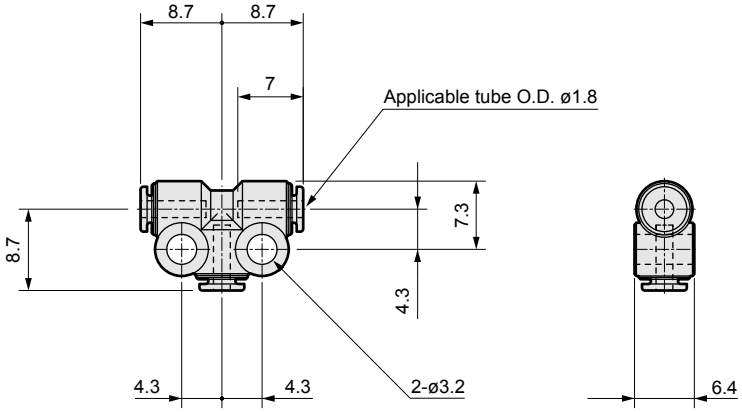
● CG-T2-*



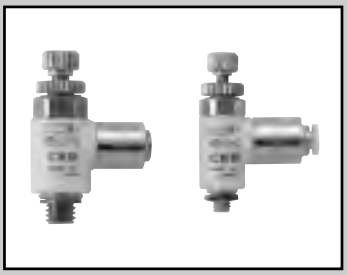
Model no.	M	H	L1	L2	A	B	C	Min. bore size	Effective sectional area mm²
CG-T2-M3	M3×0.5	8	14	8.5	2.7	7	6	1.5	0.96
CG-T2-M5	M5×0.8	8	14.5	8.5	3.2	7	6	1.5	1.25

Union Tee

● CG-T2-0



Min. bore size: ø1.5
Effective sectional area: 0.90mm²



Speed control valve Elbow type with push-in joint

SC3W Series (Low speed type fiber tube push-in specifications)

- Applicable tube outer diameter: ø1.8
- Port size: M3, M5

JIS symbol 

RoHS Custom order

Specifications

Model no.			SC3W	
Applicable tube outer diameter			ø1.8	
Working fluid			Compressed air	
Max. working pressure		MPa	1.0	
Min. working pressure		MPa	0.05	
Withstanding pressure		MPa	1.5	
Fluid temperature		°C	5 to 60 (no freezing)	
Ambient temperature		°C	0 to 60 (no freezing)	
Port size			M3	M5
Number of needle turn		time	14 and over	16 and over
Free flow	Flow	ℓ/min. (ANR)	20	54
	Effective sectional area	mm²	0.3	0.8
Controlled flow	Flow	ℓ/min. (ANR)	5.9	6.7
	Effective sectional area	mm²	0.08	0.1
Applicable tube			Fiber tube (UP-9402-F1, EH-5802)	Note1

Note1: Fiber tube for barbed joint (UP-9102-F1) is not available.

How to order

- Port size:M3

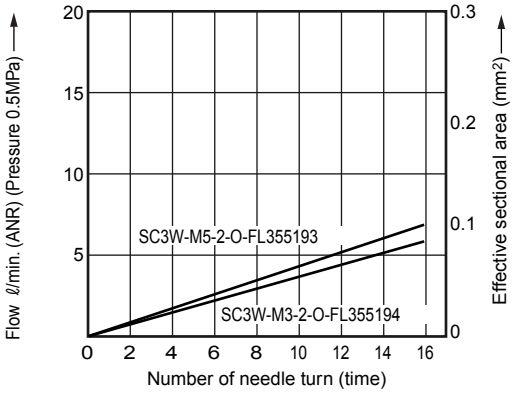
SC3W-M3-2-O-FL355193

- Port size:M5

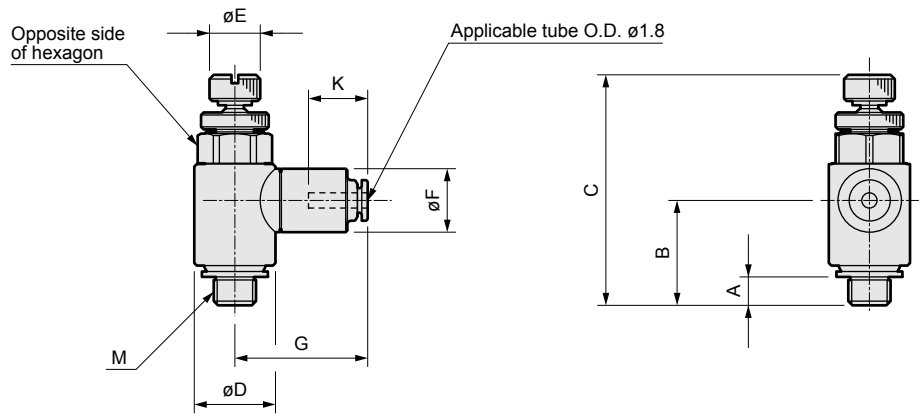
SC3W-M5-2-O-FL355194

Flow characteristics

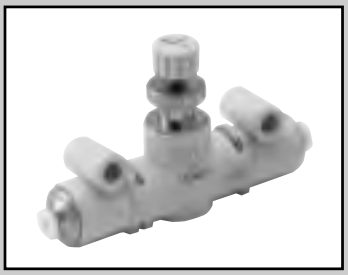
- Low speed type



Dimensions



Model no.	M	A	B	C		D	E	F	G	K	Opposite side of hexagon
				MIN	MAX						
SC3W-M3-2-O-FL355193	M3×0.5	2.4	11.4	25.1	27.6	7.4	5	7.5	15.3	7	7
SC3W-M5-2-O-FL355194	M5×0.8	3.4	12.4	27.2	30.2	9.6	6	7.5	15.5	7	8



Speed control valve Line type with push-in joint

SCL2 Series (Fine speed type fiber tube push-in specifications)

● Applicable tube outer diameter: ø1.8, ø4

JIS symbol 

RoHS **Custom order**

Specifications

Model no.			SCL2	
Applicable tube outer diameter			ø1.8	
Working fluid			Compressed air	
Max. working pressure		MPa	1.0	
Min. working pressure		MPa	0.1	
Withstanding pressure		MPa	1.5	
Fluid temperature		°C	5 to 60 (no freezing)	
Ambient temperature		°C	0 to 60 (no freezing)	
Number of needle turn		time	15 and over	
Free flow	Flow	ℓ/min.(ANR)	50	
	Effective sectional area	mm²	0.7	
Controlled flow	Flow	ℓ/min.(ANR)	13	
	Effective sectional area	mm²	0.2	
Applicable tube			Fiber tube (UP-9402-F1, EH-5802)	Note1

Note1:Fiber tube for barbed joint (UP-9102-F1) is not available.

How to order

● Port size: ø1.8

SCL2-04-H22-F-FL355195

● Port size: A side ø4, B side ø1.8

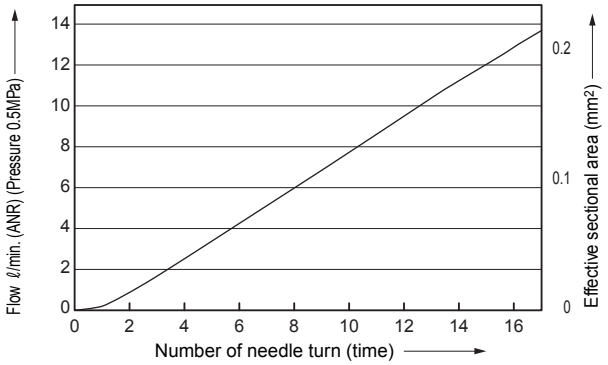
SCL2-04-H42-F-FL355196

● Port size: A side ø1.8, B side ø4

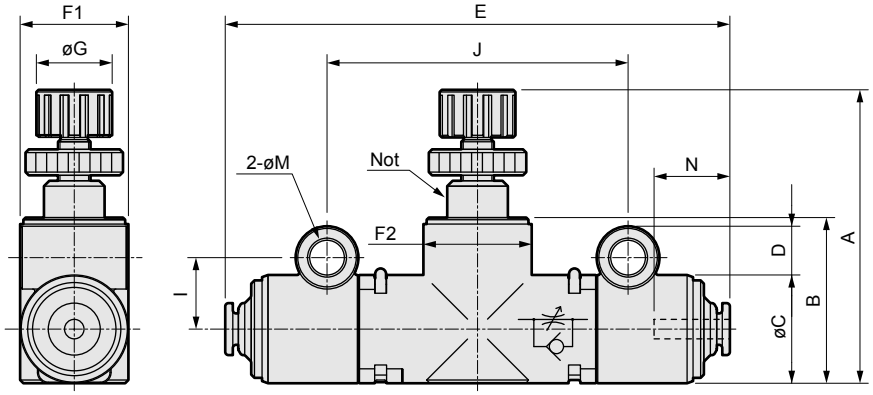
SCL2-04-H24-F-FL355197

Flow characteristics

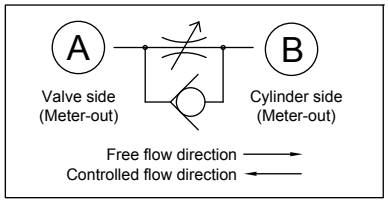
● Fine speed type



Dimensions



Explanatory drawing of applicable outer tubing (Only H24/H42)



Model no.	Piping tube outer diameter		A		B	C	D	E	F1	F2	G	I	J	M (installation hole diameter)	N (tube insertion length)	
	A side	B side	MAX	MIN											A side	B side
SCL2-04-H22-F-FL355195	ø1.8	ø1.8	27	32	15	10	4.5	47	10	11	7	6.6	28	3.3	7	7
SCL2-04-H42-F-FL355196	ø4	ø1.8						46							12.9	7
SCL2-04-H24-F-FL355197	ø1.8	ø4													7	12.9

Note: F1 and F2 dimensions are oval.

⚠ Safety Precautions

■ Design & Selection

⚠ CAUTION

- The PG and CG Series are not made of flame-resistant resin so use care in selection.
- This is an extremely fine tube, so the effective sectional area is extremely small. Use with a standard cylinder may cause problems such as failure to obtain set speed, delayed response, or knocking.
  The piping length should be at 1m or less and fine speed cylinder (catalog no. CC-N-360) used.
- Fiber tubing is thin, so vacuum in the vacuum device increases and delays the response of the vacuum switch during vacuum break
- The CG Series is for clean blow and washing lines.
  Check with CKD for use in other applications.
  The CG Series packing (material: EPDM) is susceptible to mineral oil, so it is not suitable for piping general pneumatic components.
  Use the PG Series for piping to general pneumatic components.

■ Installation & Adjustment

⚠ CAUTION

- Use fiber tubing for push in joints (UP-9402-F1, EH-5802) with the push in joint for fiber tubing (PG, CG Series). Tubing could dislocate if fiber tubing for CKD barbed joint (UP-9102-F1), barbed joint for fiber tubing (PTN Series), or other brands of tubing and joints are used.
- Cut tubing with a dedicated cutter at a right angle. Do not use worn or damaged tubing. Tubing could be crushed or break. If cut with a dull knife, tubing could be crushed and block the flow path.
- Do not reuse a tube that could be deteriorated and deformed.
- Inspect CG-*2-6 regularly.
  Threads on CG-*2-6 are made of PP, so leaks could occur if threads come loose.
  Inspect regularly and tighten to stop any leaks.
  If leaks do not stop after tightening, replace the joint with a new one.
- Use of oil is prohibited with the CG Series, so force required to insert tubing increases.
  Hold tubing at the base and securely insert until contact is felt - 7 mm.
- Apply adequate torque when connecting pipes.
  - To prevent air leakage or damage of screw. First tighten the screw by hand to prevent threads, then use a tool.
    Check that the tool's hexagon face and wrench are the correct size.
- CG-*2-6 threads are made of PP. Tighten as follows: Leave 1.5 to 2 threads at the end of tapered threads open, and wrap 2 to 2.5 times with sealing tape.
  Tighten lightly by hand, then tighten two to three turns with a tightening tool.
  The part is made of resin so it could deform or break if tightened too much.

(Reference value)

Port thread	Tightening torque N·m
M3	0.3 to 0.6
M5	1.0 to 1.5
Rc1/8 *	3 to 5

The above values apply when partner threads are JIS B 0203 piping tapered female threads (material C3604DB).
* Applies only when joint threads are metal.

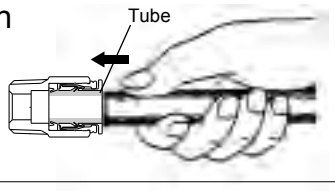
- Check that tubing is not worn or damaged.
  - Tubing could be crushed, break, or be dislocated.
  - Do not let the tube directly contact other surfaces, it could wear and break.
- On devices requiring antistatic measures, ground the member to which the joint is connected.
  Electrostatic discharge could build up in tubing if the member is not grounded.
- CG-*2-6 (R1/8) does not have sealing agent. Prepare sealing tape, etc., separately.

■ During Use & Maintenance

⚠ CAUTION

Mounting and removal

Installation



Push the tube in until it contacts the tube end.
Check that the tube is not dislocated from the joint. Tubing fits 7 mm from the end of the joint. The end of the mounted tube must be cut at a right angle.

Removal

While pushing the push ring with a finger, pull the tube to remove it. Tubing could deform (stretch) if pulled too hard. Correctly press the push ring while removing tubing. Replace deformed tubing with new tubing.

Series variation

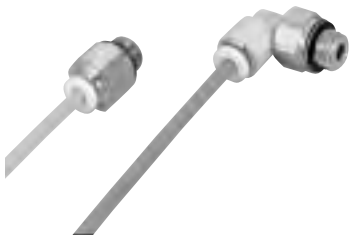
Fiber tube flame resistant type (Push-in joint)

bore size ø1.8×ø1.0

Push-in joints for fiber tube

Port size M5, R1/8

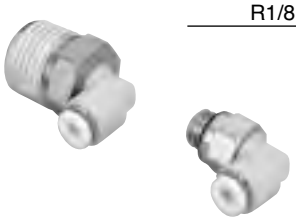
Fiber tube flame resistant type (Push-in joint)

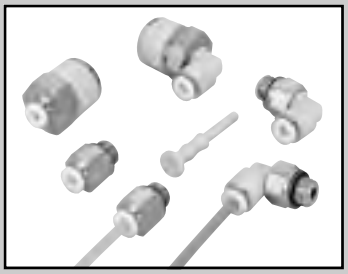


O.D. x I.D.
ø1.8×ø1.0

Color
Red
Green

Push-in joints for fiber tube

■ Straight	■ Elbow	■ Plug type
Single straight RG-S2-*	Single elbow RG-L2-*	Blanking plug PG-P2-B
		
Port size: M5, R1/8	Port size: M5, R1/8	
• Page: 1000	• Page: 1000	• Page: 1000



Fiber tube flame resistant type

(Push-in joint)

● Outer diameter: ø1.8 × Inner diameter: ø1.0

RoHS

Features

● Flame-resistant
Flame-resistant resin is used for fiber tubing and pushin joints.

● Flexibility retained
Fiber tubing remains flexible even with flame-resistant resin. (Minimum installation radius: 4 mm)

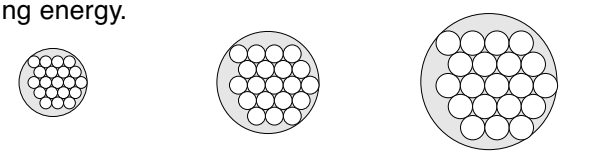
● Protection against naturally occurring ozone
Ozone-resistant material (HNBR) is used for pushin joint packing adversely affected by ozone.

Flame-resistant

Flame-resistant resin (UL94 Standards V-0 or equivalent) is used for fiber tubing and joints (push ring and elbow).

Energy saving and space saving

Ultra thin size is just ø1.8 in outer diameter × ø1.0 in inner diameter.
Piping space is greatly reduced. Tubing piping is small, saving energy.



Fiber tube ø1.8×20 wires: 80mm²
Conventional products ø3.2×20 wires: 253mm²
Conventional products ø4.0×20 wires: 396mm²

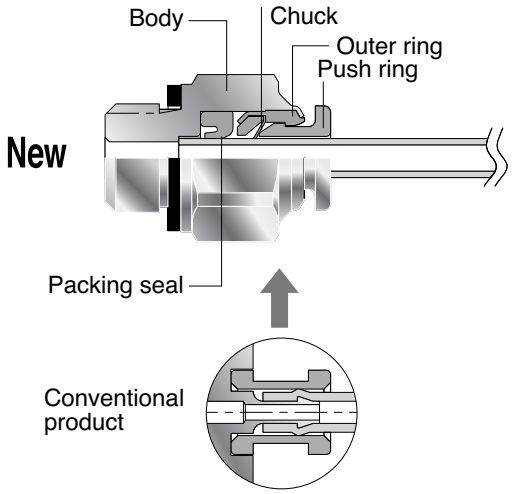
Eliminate adverse effect onto device accuracy

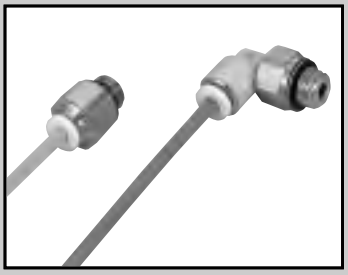
Tubing reaction after piping is similar to leads, greatly reducing the effect on device accuracy.

Small piping stress

Push-in mounting and removal

Tubing is easily inserted or removed by pressing down on the joint push ring. Operations are simpler than for conventional models.





Flame-resistant fiber tube (push-in joint)

- Outer diameter: ø1.8 × Inner diameter: ø1.0
- Flame resistance type (UP-9102-SR)

RoHS

Specifications

Model no.		Flame resistance type UP-9102-SR
Working fluid		Compressed air (Note 1)
Working pressure range (20°C) (Note 2)		-100kPa to 0.7MPa
Ambient temperature range	°C	-10 to 60 (no freezing)
O.D. × I.D.	mm	ø1.8×ø1.0
Bore size precision	mm	±0.1
Outer diameter precision	mm	±0.1
Durometer hardness		HDA 90
Min. bending radius (JIS B 8381)	mm	3
Min. installation radius	mm	4
Burst pressure (20°C)	MPa	2.1
Material		Flame resistance polyurethane rubber
Color		Green/red (Note3)
Applicable joint		RG Series (Push-in type)

Note1: Consult with CKD when using other working fluids.
Note2: Refer to the graph of "Relevant of working temperature and pressure (constant vacuum break)" for details on working pressure range.
Note3: When flame retardant is added, the hue will be lighter instead of bright red or green.

How to order

● Antistatic type

UP-91 **02** - **20** - **R** - **SR**

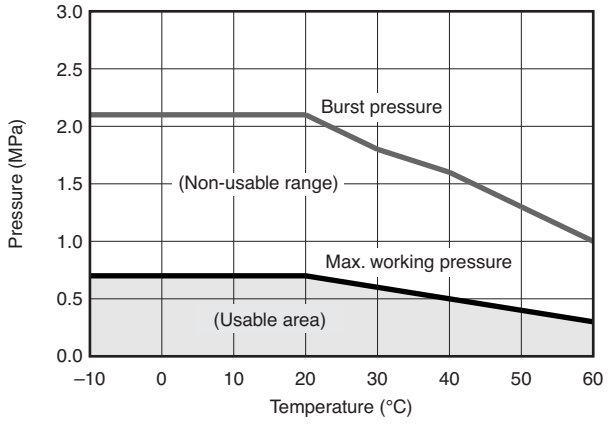
- **02**: Tube size ø1.8×ø1.0 (O.D. × I.D.)
- **20**: Length per roll 20m roll
- **R**: Tube color*
- **SR**: Flame resistance type

Tube color*	
R	Red
G	Green

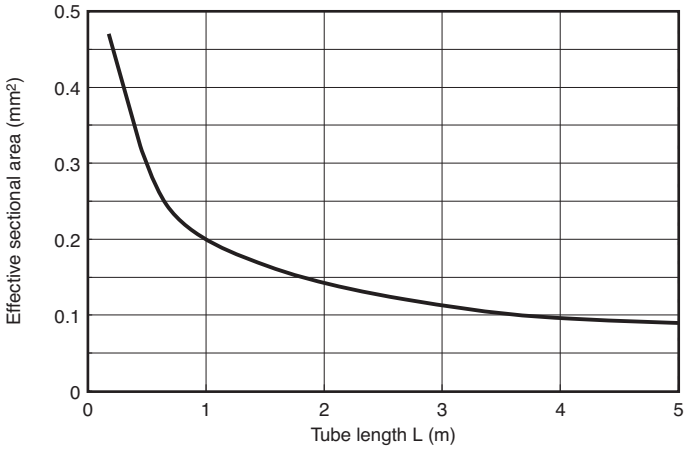
* When flame retardant is added, the hue will be lighter instead of bright red or green.

Characteristics graph

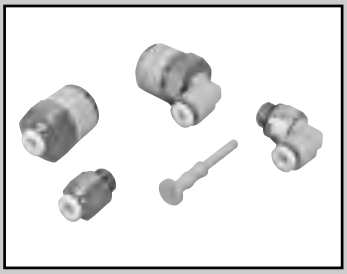
● Relevant of working temperature and pressure (normal destruction)



● Relevant of tube length and effective sectional area



The tubing inlet and outlet are measured with a single-ended straight (RG-S2-M5) attached.



Push-in joints for fiber tube

Flame resistance type **RG** Series

- Applicable tube outer diameter ø1.8
- Port size M5 to R1/8

RoHS CAD

Specifications

Model no.	RG Series
Working fluid	Compressed air (Note 1)
Working pressure range	-100kPa to 1.0MPa
Ambient temperature range °C	-10 to 60 (no freezing)
Applicable tube	Flame resistant fiber tube (UP-9102-SR) (Note2)

Note1: Consult with CKD when using other working fluids.
Note2: Fiber tube for barbed joint (UP-9102-F1) is not available.
Note3: Sales unit is 1 set (10 pieces).

How to order

Refer to the model no. on the dimensions page for the model no. combination.

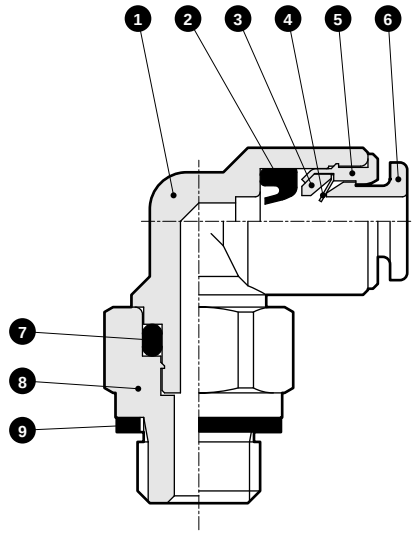
RG - S 2 - M5

Ⓐ Shape
Ⓒ Port size
Ⓑ Applicable tube O.D.:ø1.8

Ⓐ Shape	
S	Straight
L	Elbow
P	Plug

Ⓒ Port size	
M5	M5×0.8
6	R1/8
B	Blanking plug

Internal structure and parts list



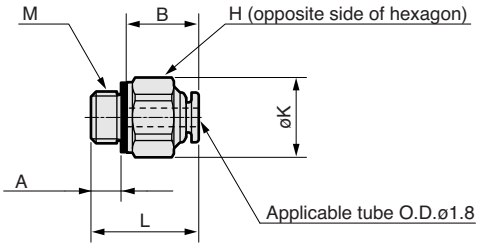
No.	Parts name	Material
1	Body *1 (Single elbow)	PBT (flame resistance resin *2)
	(Single straight)	Brass (electroless nickeling)
2	Packing seal	Hydrogen nitrile rubber
3	Chuck holder	Polypropylene
4	Chuck	Stainless steel
5	Outer ring	Brass (electroless nickeling)
6	Push ring *1	Polyamide (flame resistance resin *2)
7	O ring	Nitrile rubber
8	Nipple	Brass (electroless nickeling) (R1/8 is with sealant)
9	Gasket	Stainless steel + nitrile rubber

*1: The RG Series push ring and body (single-ended elbow) is light gray (CKD standard color).
*2: Equivalent to UL94 standards V-0

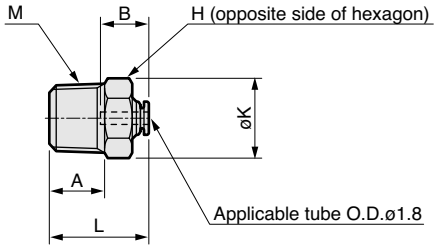
Dimensions:Single straight, single elbow, blanking plug

Single straight

● RG-S2-M5



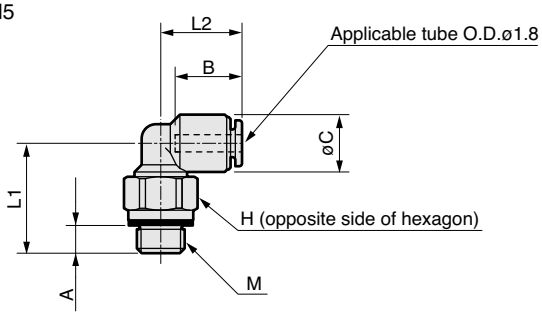
● RG-S2-6



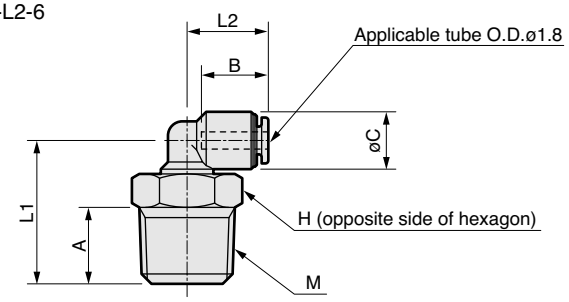
Model no.	M	H	K	L	A	B	Min. bore size	Effective sectional area mm²
RG-S2-M5	M5×0.8	7	7.7	10.4	2.9	7	1.5	0.56
RG-S2-6	R1/8	10	11.6	14.4	8	7	1.5	0.56

Single elbow

● RG-L2-M5



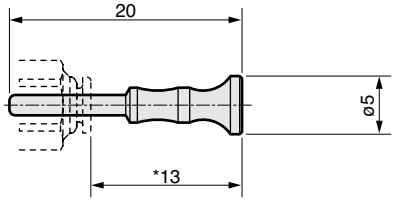
● RG-L2-6



Model no.	M	H	L1	L2	A	B	C	Min. bore size	Effective sectional area mm²
RG-L2-M5	M5×0.8	7	11.5	8.5	2.9	7	6	1.5	0.54
RG-L2-6	R1/8	10	15	8.5	8	7	6	1.5	0.54

Blanking plug

● RG-P2-B



Material: PBT/light gray (CKD standard)
(Equivalent to UL94 standards V-0)
* Dimensions for RG Series connection joint

Safety precautions

CAUTION

■ Use flame resistant fiber tubing (UP-9102-SR) with a flame resistant push-in joint for fiber tubing (RG Series).

■ Do not use in an atmosphere with possible contact with welding sparks, etc.
This product is made of flame resistant resin, but is not resistant to spatter.

■ Tubing is soft and thin and could be dislocated if too much force is applied.

MEMO

Series variation

Fiber tube antistatic type

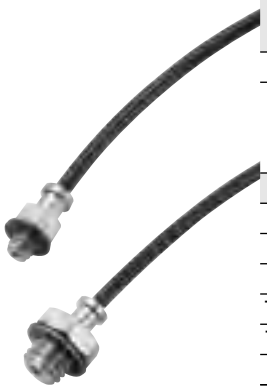
tubediameter ø1.8×ø1.0

Dedicated joint

Port siz M3, M5, R1/8, ø4, ø6

CAD

Fiber tube antistatic type



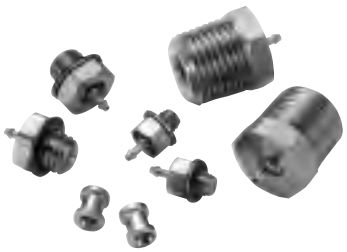
O.D. × I.D. (mm)
ø1.8×ø1.0

Color
Black
White
Transparent
Transparent blue
Transparent green
Red (custom order)
Yellow (custom order)

Dedicated joint

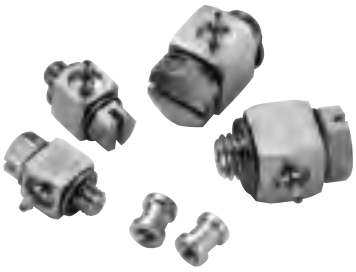
■ Straight

Applicable tube O.D.ø
1.8



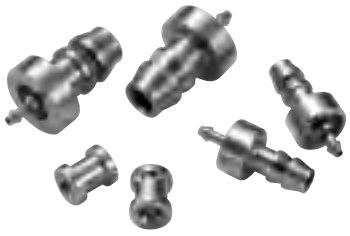
■ Elbow

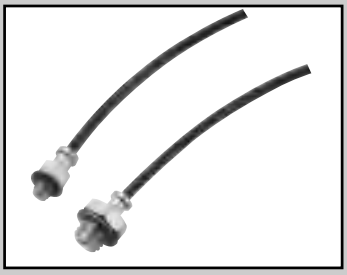
Applicable tube O.D.ø
1.8



■ Barbed nipple

Applicable tube O.D.ø
1.8/3.2
1.8/4
1.8/6

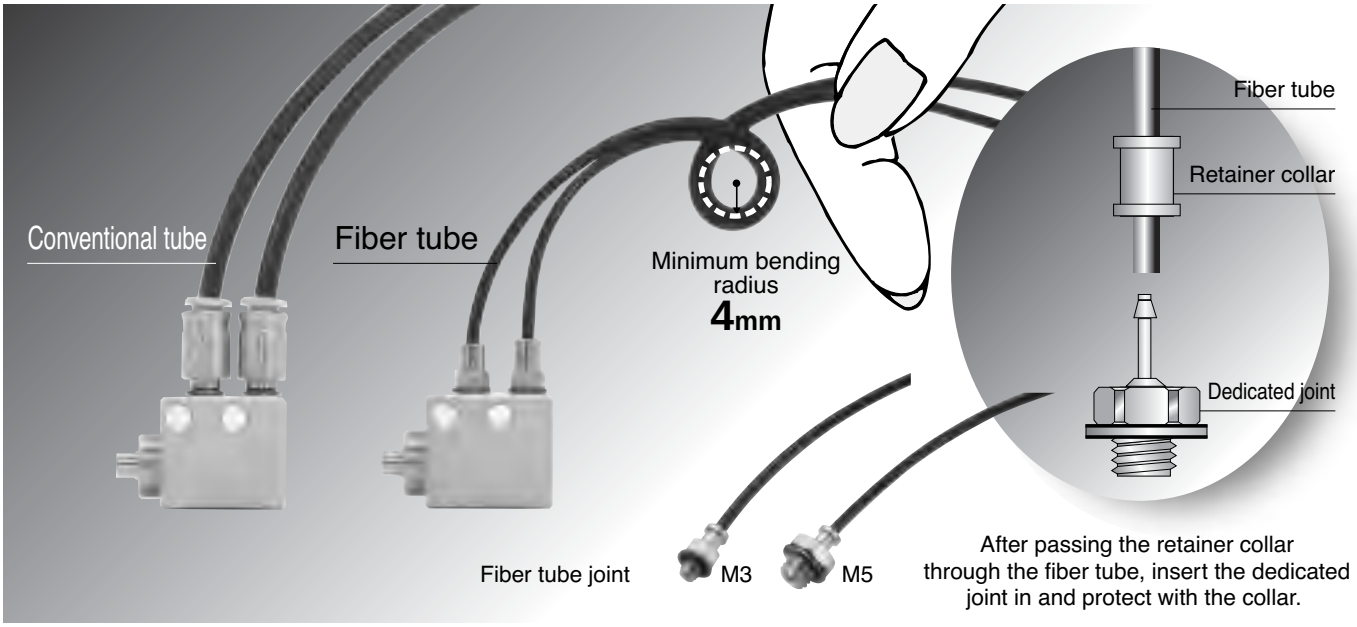




Fiber tube antistatic type

● Outer diameter: 1.8mm

RoHS



Introducing an easy-to-pipe ultra-thin tube.

An ultra-thin fiber tube with a ø1.8mm outer diameter and 4mm minimum bending radius is now available.
Short distances are laid easily and stress applied on the laid tube greatly reduced.

The fiber tube is an extremely fine air tube as thin and flexible as a lead wire. This tube is laid easily in difficult areas such as narrow spaces and for short distance. The resistance applied on the laid tube (tube stress) is extremely small compared to conventional types, so adverse effects on the device accuracy can be eliminated. This fiber tube is suitable for small bore air cylinder piping, and contributes to device downsizing.

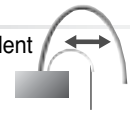
■ Main features

Appropriate for air cylinder piping of small bore size

- Semiconductor related small part transfer unit
- Suitable for stable control of fine speed cylinder speed
  (Since there is little piping loss, the fine speed cylinder's speed is stable.
- Piping tube to small part vacuum pad

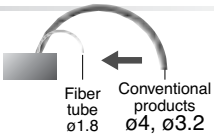
● Eliminate adverse effect onto device accuracy

Stress applied to the tube by piping is greatly reduced. The bounce is equivalent to a lead wire, so adverse effects on device accuracy are minimized.



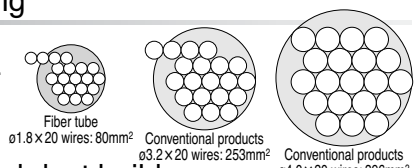
● Easy piping

The fiber tube is extremely flexible, and the minimum bending radius is a mere 4mm. In piping, the tube is easily laid in difficult areas such as small spaces and for short distances of only 200 to 300mm.



● Energy saving and space saving

This 1.8 x 1.0 diameter tube is extremely thin, making it possible to greatly reduce piping space. The tube piping volume is also small, thereby saving energy.



● Resistant to static electricity and dust build-up

The fiber tube's volume resistivity is approx. 1 x $10^8\Omega$·cm. (Black) Superior antistatic measures are taken to prevent static electricity and dust gathering.

● Dedicated joint available

The dedicated joint is provided with a retainer collar, and is available in three screw sizes: M3, M5, and R1/8 (only straight).
This joint is available in the straight, elbow, or barbed nipple type.

● Seven tube colors

Tubing is available in black, white, clear, clear blue, clear green, yellow, or red.

Fiber tube

Specifications

● Tube

Descriptions	UP-9102-20-*-F1
Working fluid	Compressed air
Working pressure range (20°C) (Note1)	-100kPa to 0.7MPa
Ambient temperature range °C	-10 to 60 (no freezing)
O.D. × I.D. mm	1.8×1.0
Bore size precision	±0.1
Outer diameter precision	±0.1
Min. bending radius (JIS B 8381) mm	2
Min. installation radius mm	4
Burst pressure (20°C) MPa	2.1(reference value)
Volume resistance ratio Ω·cm	1 × 10^8 or less (black) 1 × 10^{12} or less (other than black)
Material	Conductive urethane
Color	Black, white, clear, clear blue, clear green, yellow (Note2), red (Note2)
Applicable joint	PTN* Series (barbed type) (Note5)

● Dedicated joint

Descriptions	PTN*
Port size	M3, M5, R 1/8, ø3.2(Note 4), ø4(Note 4), ø6(Note 4)
Working fluid	Compressed air
Working pressure range	-100kPa to 0.7MPa
Ambient temperature range °C	-10 to 60 (no freezing)
Applicable tube	UP-9102-20-*-F1 (Note 6)
Effective sectional area mm^2	Straight, Barbed nipple:0.3 elbow: 0.2
Flow (Note 3) ℓ/min. (ANR)	Straight, Barbed nipple:20 elbow: 13

Note 1 Refer to the graph of "Relevant of working temperature and pressure (constant vacuum break)" for details on working pressure range.
Note 2 Custom order.
Note 3 Flow rate is the atmospheric pressure conversion value at pressure 0.5MPa.
Note 4 Applicable tube:Soft nylon tube (Model no. FH-3224,F-1504,F-1506)
Urethane tube (Model no. U-9504,U-9506)
Note 5 Not available for PG, CG, RG Series (push-in type).
Note 6 Fiber tube for push-in joint (UP-9402, EH-5802) is not available.

How to order

● Tube

UP-91 | 02 | - | 20 | - | W (A) | - | F1

- 02: Tube size ø1.8×ø1.0 (O.D. × I.D.)
- 20: Length per roll 20m roll
- W (A): Tube color
- F1: Antistatic

A Tube color	
Blank	Black
W	White
C	Clear
CB	Clear blue
CG	Clear green
Y	Yellow (Note)
R	Red (Note)

Note: Custom order.

● Dedicated joint Sales unit 10 pcs./set

<Straight>

PTN2 - M3 (A)

A Port size	
M3	M3×0.5
M5	M5×0.8
6	R 1/8

<Elbow>

PTNL2 - M3 (A)

A Port size	
M3	M3×0.5
M5	M5×0.8

<Barbed nipple>

PTN2 4 - 0 (A)

A Applicable tube O.D. (Note)	
4	ø3.2, ø4
6	ø6

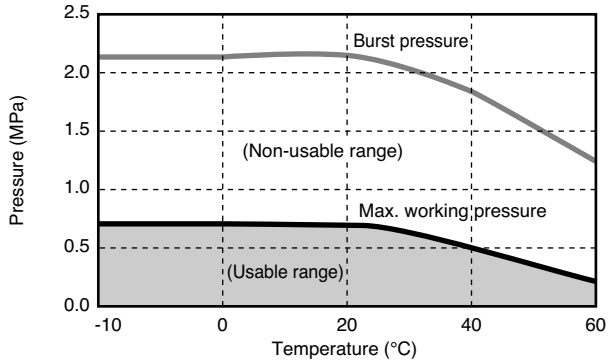
Note: Applicable tube
Soft nylon tube (Model no. FH-3224, F-1504, F-1506)
Urethane tube (Model no. U-9504,U-9506)

Clean room specifications (catalog No. CB-033SA)

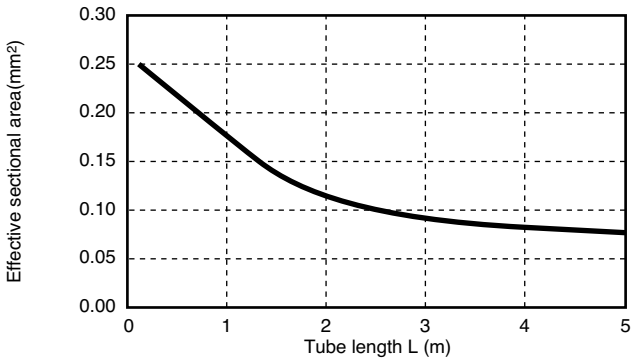
PTN2 ····· P80
UP-91 ····· P80

Characteristics graph

● Relevant of working temperature and pressure (normal destruction)

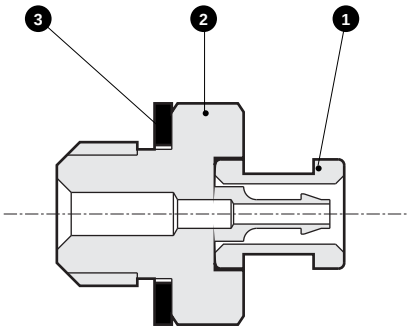


● Relevant of tube length and effective sectional area

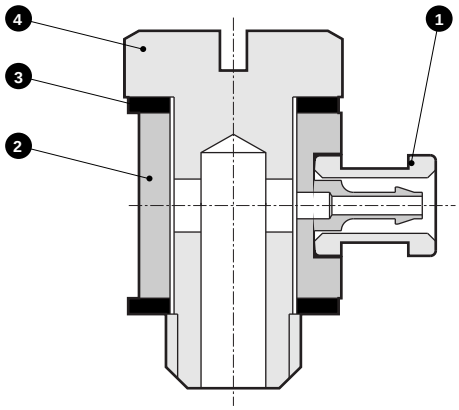


Internal structure and parts list

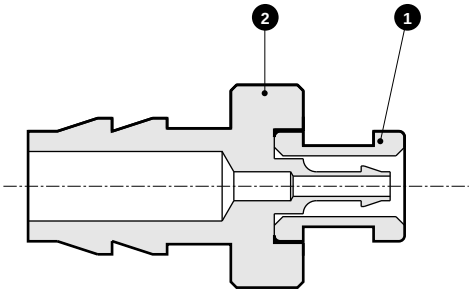
● Straight



● Elbow



● Barbed nipple



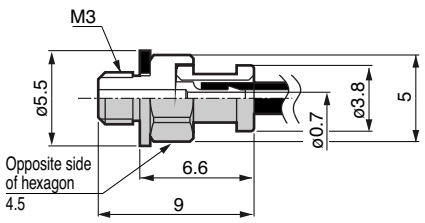
● Parts list

No.	Name	Material
1	Collar	Brass (with electroless nickeling)
2	Body	Brass (with electroless nickeling)
3	Gasket	Stainless steel + Nitrile rubber
4	Shaft	Brass (with electroless nickeling)

Dimensions

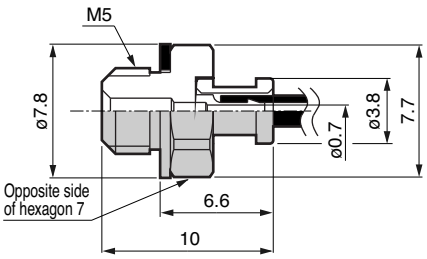
● Straight

<PTN2-M3>



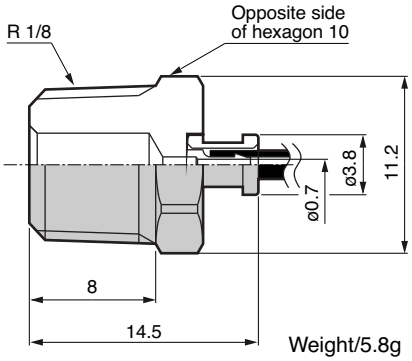
Weight/0.7g

<PTN2-M5>



Weight/1.6g

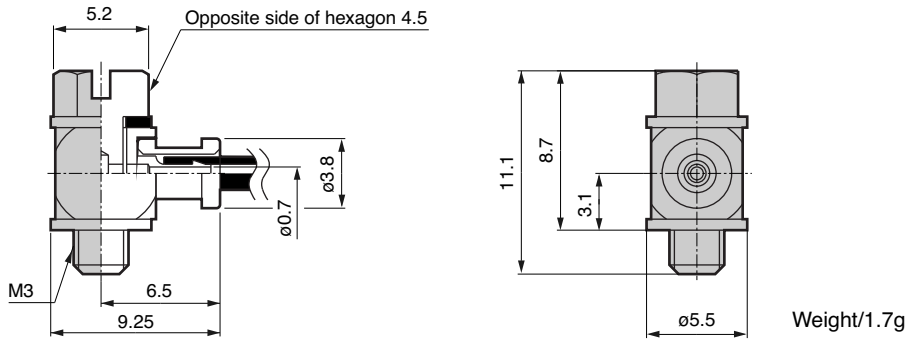
<PTN2-6>



Weight/5.8g

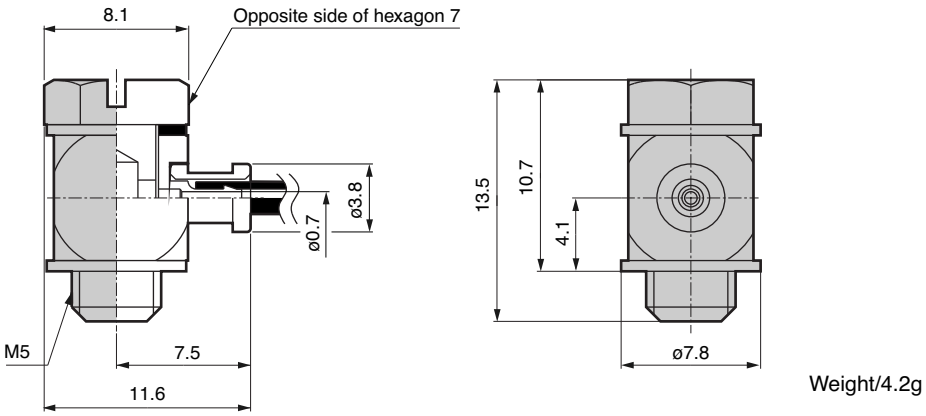
● Elbow

<PTNL2-M3>



Weight/1.7g

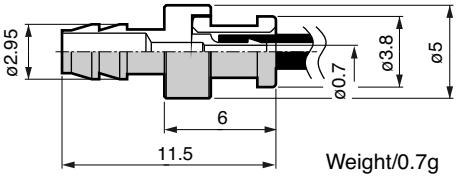
<PTNL2-M5>



Weight/4.2g

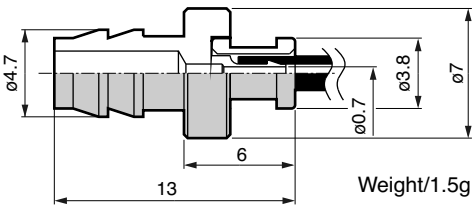
● Barbed nipple

<PTN24-0>



Weight/0.7g

<PTN26-0>



Weight/1.5g

Safety precautions

■ Design & Selection

● This is an extremely fine tube, so the effective sectional area is extremely small. Use with a standard cylinder may cause problems such as failure to obtain set speed, delayed response, or knocking.
The piping length should be at 1m or less and fine speed cylinder (catalog no. CC-N-360) used.

● Fiber tubing is thin, so vacuum in the vacuum device increases and delays the response of the vacuum switch during vacuum break.

■ Installation & Adjustment (piping)

● Apply adequate torque when connecting pipes.
To prevent air leak and to protect thread. Tighten by hand at first so that threads are not damaged, then use a tool. Use a tool with a suitable hexagon face and wrench size.
(Reference value)

Port thread	Tightening torque N·m
M3	0.3 to 0.5
M5	1 to 1.5
R 1/8	3 to 5

* The M3 screw could be damaged by excessive tightening torque.

● On devices requiring antistatic measures, ground the member to which the joint is connected.
Electrostatic discharge could build up in tubing if the member is not grounded.

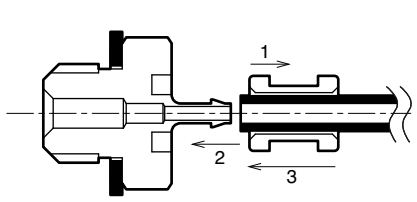
● The elbow can be rotated randomly and installed, but cannot be rotated after assembly.

● R1/8 does not have sealing material. Prepare sealing tape, etc., separately.

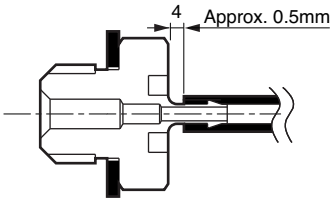
■ During Use & Maintenance

● Mounting and removal

Installation



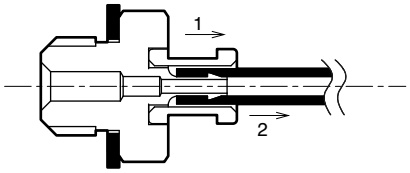
<Fig. 1>



<Fig. 2>

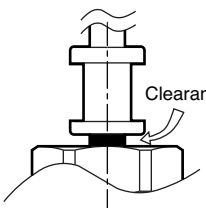
(1) Insert the collar into the tube. (Fig. 1)
(2) Insert the tube to position 4. (Fig. 2)
(3) Insert the collar into the joint. (Fig. 1)
(4) Check that the tube is not dislocated from the joint.
Note: Do not incline the tube when inserting it into the bottom of the joint. The barbed joint is thin, and could be damaged by a lateral load.

Removal

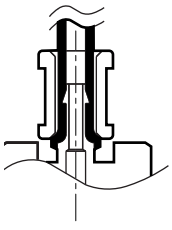


(1) Pull the collar out with a pair of needle-nosed pliers, etc.
(2) Pull out the tube.
(3) When reusing the tube, cut the end off 10mm and over.
Note: If the tube is pulled forcefully while the collar is attached, the tube could be deformed, the flow obstructed, or the tube dislocated during use.

● Precautions after mounting



(1) Check that there is no gap between the collar and joint.
(The joint could break or the tube could be dislocated.)



(2) If the collar does not go in, the tube may rid up on it as shown above. Follow mounting and removal procedures and assemble the collar at a position 0.5mm from the tube.

UP.F.U.NU.KX.SR Tube

O.D. 1.8, 3.2, 4, 6, 8, 10, 12, 15mm

● Wide tube variation
A great variety of tube is available according to purpose and applications.
High reliable, and meeting needs of space saving and complex piping etc.

■ Antistatic tube

O.D. x I.D. (mm)
3.2×1.8
4×2.5
6×4
8×5
10×6.5
12×8

• Page : 1009

■ Soft nylon tube

Manufacturer of colors other than white: Aoi Co., Ltd.

O.D. x I.D. (mm)
3.2×2.0
3.2×2.4
4×2.5
6×4
8×5.7
10×7.2
12×8.9
15×11.5
16×12

• Page : 1012

■ Urethane tube

O.D. x I.D. (mm)
4×2.5
6×4.5
8×6
10×7.5
12×9

• Page : 1013

■ Urethane tube

AOI Co., Ltd.

O.D. x I.D. (mm)
3.2×1.8
4×2
6×4
8×5
10×6.5
12×8

• Page : 1014

■ Coiling tube

AOI Co., Ltd.

O.D. x I.D. (mm)
6×4
8×6
10×7.5
12×9.2

• Page : 1014

■ Flame resistant tube

AOI Co., Ltd.

O.D. x I.D. (mm)
4×2.3
6×3.8
8×5.5
10×7
12×8.5

• Page : 1015

■ Tube knife

AOI Co., Ltd.

Tube knife

AOI Co., Ltd.
AZ-1200

Feature
(1) Preventing cutting plane from air trouble by right angle cut.
(2) Extremely light weight and compact.
(3) Easy edge replacing.

Applicable material
- Nylon tube
- Urethane tube
- PTFE tube
- Other plastic tubes

Shape knife

Antistatic tube

● Outer diameter: 3.2mm, 4mm, 6mm, 8mm, 10mm, 12mm

RoHS

Features

● Resistant to static electricity and dust build-up

● Variety of colors
Tubing is available in black, white, clear, clear blue, or clear green.
Colors can be used for the application.

● Standard clean specifications (F2 Series)

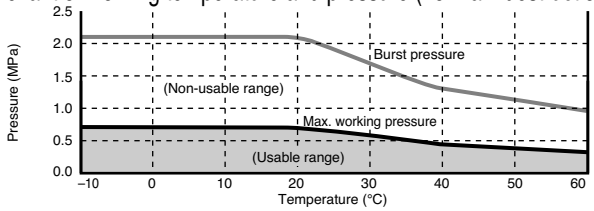
● Diverse lineup
• Six diameters are available: 3.2, 4, 6, 8, 10, and 12.

UP-F2 Series(ø3.2 to ø6)

Specifications

Descriptions	UP-91**-F2-P80		
O.D. × I.D. mm×mm	ø3.2×ø1.8 (Note)	ø4×ø2.5	ø6×ø4
Working fluid	Compressed air		
Max. working pressure MPa	0.7 (20°C)		
Ambient temperature range °C	0 to 60 (no freezing)		
Durometer hardness (JIS K 7215)	HDA94 (reference)		
Mini. bending radius (JIS B 8381) mm	4	6	12
Min. installation radius mm	8	11	18
Burst pressure MPa	2.1 (20°C)		
Volume resistance ratio (JIS K 6911) Ω·cm	Black: 10^4 to 10^5, other colors: 10^{10} to 10^{11} (referential value)		
Material	Antistatic urethane		
Color	Black, white, clear, clear blue, clear green, clear red (Note)		

Relevant of working temperature and pressure (normal / destruction)



How to order

UP - 91 32 - 20 - W - F2 - P80

Clean room specifications

Antistatic

Symbol	Descriptions
Ⓐ Tube hardness	
91	94°
Ⓑ Tube size	
32	ø3.2 (Note)
04	ø4
06	ø6
Ⓒ Length per roll	
20	20m
Ⓓ Tube color	
Blank	Black
W	White
C	Clear
CB	Clear blue
CG	Clear green
CR	Clear red (Note)

Ⓐ Tube hardness
Ⓑ Tube size
Ⓒ Length per roll
Ⓓ Tube color

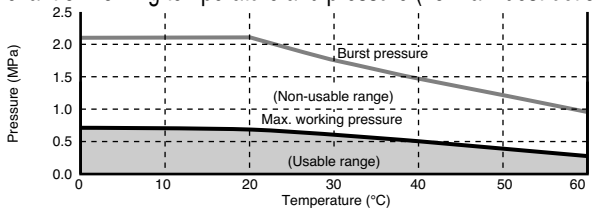
Note: All outer diameter ø3.2 tubes and the clear red ø4 and ø6 tubes are available as custom orders.

UP-F1 Series (ø8 to ø12)

Specifications

Descriptions	UP-92**-F1		
O.D. × I.D. mm×mm	ø8×ø5	ø10×ø6.5	ø12×ø8
Working fluid	Compressed air		
Max. working pressure MPa	0.7 (20°C)		
Ambient temperature range °C	0 to 60 (no freezing)		
Durometer hardness (JIS K 7215)	HDA92 (reference)		
Mini. bending radius (JIS B 8381) mm	10	13	16.5
Min. installation radius mm	25	30	36
Burst pressure MPa	2.1(20°C)		
Volume resistance ratio (JIS K 6911) Ω·cm	Black: 10^4 to 10^8, other colors: 10^8 to 10^{12} (referential value)		
Material	Antistatic urethane		
Color	Black, white, clear, clear blue, clear green		

Relevant of working temperature and pressure (normal / destruction)



How to order

UP - 92 08 - 20 - W - F1

Antistatic

Symbol	Descriptions
Ⓐ Tube hardness	
92	92°
Ⓑ Tube size	
08	ø8
10	ø10
12	ø12
Ⓒ Length per roll	
20	20m
Ⓓ Tube color	
Blank	Black
W	White
C	Clear
CB	Clear blue
CG	Clear green

Ⓐ Tube hardness
Ⓑ Tube size
Ⓒ Length per roll
Ⓓ Tube color

Clean room specifications (catalog No. CB-033SA)

● Dust generation preventing structure for use in cleanrooms

UP - 92** - F1 - P80

Dedicated joint / speed control valve (Custom order)

Specifications

Descriptions		Descriptions
Volume resistance ratio	Ω·cm	10^4 to 10^6 or less (reference value)
Resin		Antistatic PBT (black)
Lubricant		Oil-prohibited

Note: Other specifications are the same as the standard products. Refer to the specifications of joint GW Series or speed control valve SC3W Series.

How to order

● Dedicated joint

GW S 6 - 8 - S - F1

Antistatic + Oil-prohibited

Ⓐ Shape

Ⓐ Shape	
S	Straight
M	Bulkhead female connector

Ⓑ Applicable tube outer diameter

Ⓑ Applicable tube outer diameter
Same as standard products

Ⓒ Port size

Ⓒ Port size
Same as standard products

Ⓓ Other combinations

Ⓓ Other combinations	
X	Bulk head
S	Round
M	Female type
E	Bulk head female

* "-F1" is selected for the end of the new joint GW series model.
Refer to How to order for joint GW Series for model details.
* Consult with CKD for models other than above.

● Speed control valve

SC3W - M5 - 4 - I - F1

Antistatic + Oil-prohibited

Ⓐ Port size

Ⓐ Port size
M5×0.8

Ⓑ Applicable tube outer diameter

Ⓑ Applicable tube outer diameter	
4	ø4
6	ø6

Ⓒ Option

Ⓒ Option
Same as standard products

* "-F1" is selected for the end of the speed control valve SC3W series model.
Refer to How to order for speed control valve SC3W Series for model details.
* Consult with CKD for models other than above.

● Insert ring

INS - UP 32 - 1

Ⓐ

Ⓐ Applicable tube

Ⓐ Applicable tube	
32	UP-9132
04	UP-9104
06	UP-9106

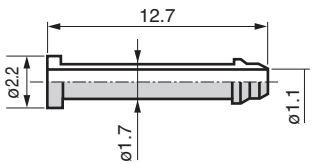
Sales unit is 10 pieces/1 bag.

Dimensions

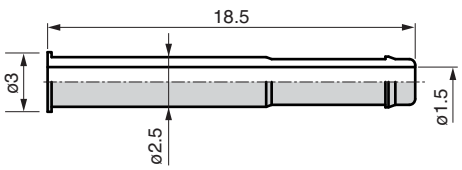
● Dedicated joint / speed control valve
Refer to the dimensions for joint GW Series (pages 930 to 943) and speed control valve SC3W Series (pages 842 to 845).

● Insert ring <custom order>

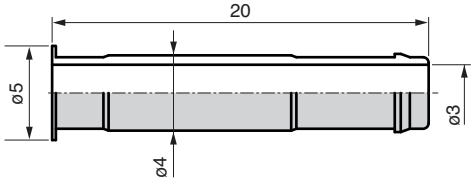
• INS-UP32-1



• INS-UP04-1



• INS-UP06-1



Material: Brass + electroless nickeling

Safety precautions

⚠ CAUTION

■ Design & Selection

- Be sure to ground the member connected to the joint. Otherwise electrostatic discharge could build up in tubing.
- When using tubing where electrostatic discharge must be prevented, select “black” tubing.
- Use the same size of urethane tubing, pushin joint, and insertion ring.
- When using with vacuum pressure with a push-in joint, use the insert ring.
- Use CKD brand joints and tubes.
- Do not apply a pulling force exceeding the values given on the right onto the joint or tube.

(N)

Tube outer diameter	Pulling force
ø3.2	30
ø4	30
ø6	55
ø8	110
ø10	150
ø12	180

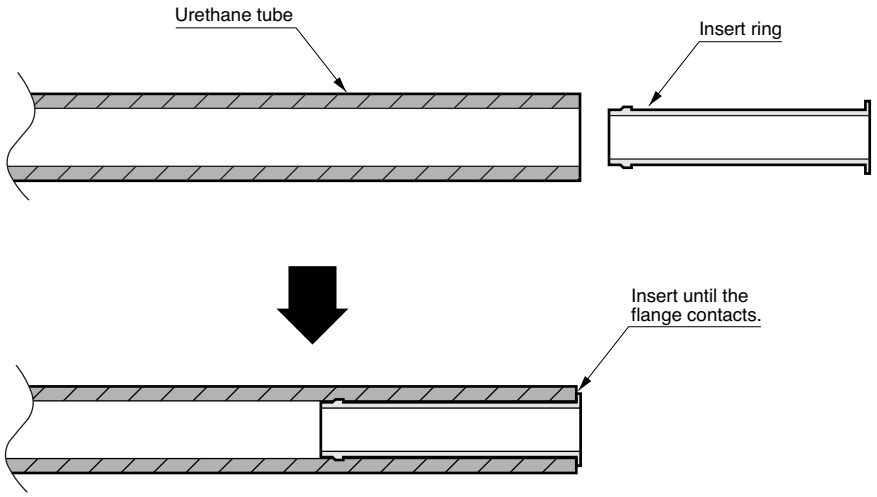
■ Installation & Adjustment

- The insertion ring is pulled out of urethane tubing with a finger when changing or modifying after piping is connected. The insertion ring need not be discarded.

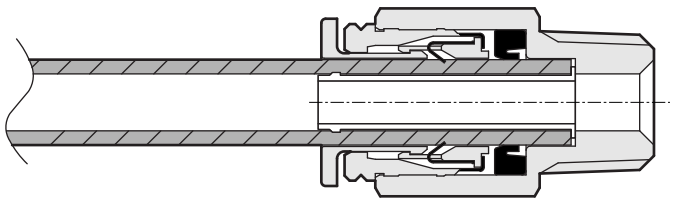
■ During Use & Maintenance

- Insert the insertion ring by hand. Otherwise it could deform or break and cause vacuum leakage if inserted with a tool.
- How to install the product

1. Insert the insertion ring into urethane tubing with a finger.



2. Insert into the pushin joint (GW Series).



Tube

F.U.NU.KX.SR Series

Wide bore size available according to purposes and applications.
High reliable piping tubes
● Outer diameter: 3.2, 4, 6, 8, 10, 12, 15mm

Soft nylon tube

Manufacturer of colors other than white: Aoi Co., Ltd.

Soft nylon tube is very flexible comparing to conventional nylon tube, and optimum for piping in the limited space. The tube also has sufficient characteristics such as cold resistance, weather ability, oil resistance and chemical resistance, etc.

How to order

FH-3224 – W

- FH-3224: Soft nylon tube, Tube size ø3.2 × ø2.4
- W: Ⓐ Tube color

Ⓐ Tube color	
Blank	Black
W	White

For miniature joint (F) (page 940)

F-15 04 – 20 – W

- F-15: Soft nylon tube
- 04: Ⓐ Tube size (O.D.)
- 20: Ⓑ Length per roll
- W: Ⓒ Tube color

Ⓐ Tube size (O.D.)				Ⓑ Length per roll		Ⓒ Tube color	
32	ø3.2	10	ø10	20	20m	Blank	Black (Standard)
04	ø4	12	ø12	100	100m	W	White (standard)
06	ø6	15	ø15			R	Red
08	ø8	16	ø16			BU	Blue
						Y	Yellow
						G	Green
						O	Orange

Note: If tube color is white "W", length per roll 100m is not available.
Note: Use the FH-3224 for miniature joint. F-1532 can not be used.

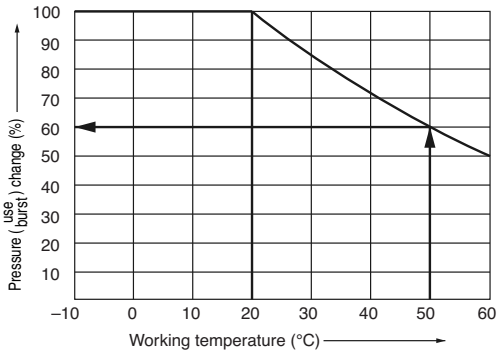
Specifications

This table indicates the value at 20°C.

Descriptions	FH-3224	F-1532	F-1504	F-1506	F-1508	F-1510	F-1512	F-1515	F-1516
Working fluid	Compressed air								
O.D. × I.D. mm × mm	3.2×2.4	3.2×2.0	4×2.5	6×4	8×6	10×7.5	12×9	15×11.5	16×12
Ambient temperature range °C	–10 to 60 (no freezing)								
Burst pressure MPa	5.39			4.9	3.9	3.43		2.94	3.3
Max. working pressure MPa	1.76			1.67	1.27	1.18		1	1.1
Durometer hardness	HDD 63	HDD 52							
Min. bending radius (JIS B 8381) mm	13	4.5	5	8	15	20	26	43	46
Min. installation radius mm	21	7	10	20	30	40	55	80	90
Standard color	White, black		White (20m only), black, red, blue, yellow, green, orange			White, black			Black
Standard length per roll m	20		20/100			20/100 (only black)			20/100

* Outer diameter dimension tolerance may vary within ±0.1 mm.

Relevant of working temperature and pressure (use / burst)



Working pressure = burst pressure × $\frac{1}{3}$

(Example) Tube F-1504 (ø4 × ø2.5)

If temperature is 50°C, working pressure is 60% of working pressure of 20°C.

$1.76 \times \frac{60}{100} \fallingdotseq 1.06$ (MPa)

Urethane tube

RoHS

Realizing magnified bore size and strength increases but still same outer diameter due to new manufacturing process. Meeting needs of large flow rate. Also economical.

Common specifications

Descriptions	Descriptions
Working fluid	Air
Ambient temperature range °C	0 to 60
Burst pressure MPa	4 (20°C)
Working pressure MPa	1.0 (20°C)
Use vacuum kPa	-100

How to order

NU – 04 – 20 – W
(A) (B) (C)

(A) Tube size (O.D.)		(B) Length per roll		(C) Tube color	
04	ø4	20	20m	Blank	Black (standard)
06	ø6	100	100m	W	White (standard)
08	ø8				
10	ø10				
12	ø12				

Note: If tube color is white "W", length per roll 100m is not available.

Note: Consult with CKD of other color.

Clean room specifications (catalog No. CB-033SA)

● Dust generation preventing structure for use in cleanrooms

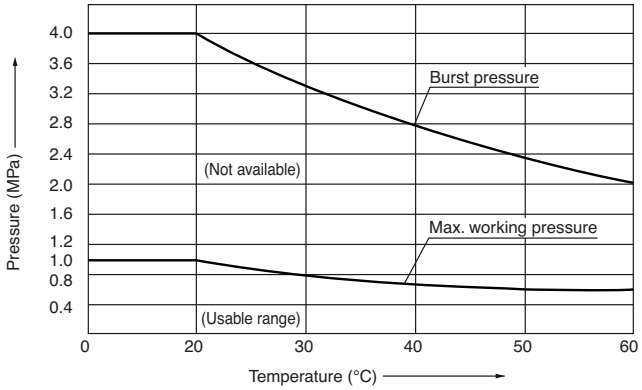
NU–·····– P80

Specifications

Descriptions	NU-04	NU-06	NU-08	NU-10	NU-12
O.D. × I.D. mm × mm	4×2.5	6×4.5	8×6	10×7.5	12×9
Burst pressure MPa	4 to 2.4				
Ambient temperature range °C	0 to 60 (no freezing)				
Durometer hardness (JIS K 7215)	HDD 64				
Min. bending radius (JIS B 8381) mm	8	16	24	30	36
Min. installation radius mm	12	26	36	42	52
Outer diameter precision mm	+0.1 −0.1			+0.1 −0.15	
Weight g/m	10	15	28	42	62
Tube color	Black, white				
Length per roll m	20/100 (only black)				

Note: Refer to Intro 63 for relation of tube length and effective sectional area.

Relevant of working temperature and pressure (use / burst)



Soft urethane tube

AOI Co., Ltd.

How to order

U-92 06 – 20 – N
Soft urethane tube
(A) (B) (C)

(A) Applicable tube O.D. size		(B) Length per roll		(C) Tube color	
04	ø4	20	20m	Blank	Black
06	ø6	100	100m	N	Clear
08	ø8			PW	White pure
10	ø10			R	Red
12	ø12			BU	Blue
				Y	Yellow
				G	Green
				O	Orange

Clean room specifications
(catalog No. CB-033SA)

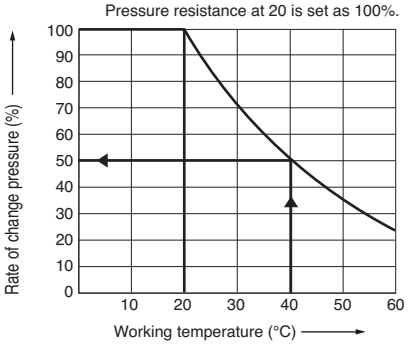
U-92–·····– P80

Specifications

This table indicates the value at 20°C.

Descriptions	U-9204	U-9206	U-9208	U-9210	U-9212
Working fluid	Compressed air				
O.D. x I.D. mm × mm	4×2	6×3.7	8×5	10×6.5	12×8
Burst pressure MPa	4.1	2.9	2.8	2.6	2.6
Working pressure MPa	1.3	0.9	0.9	0.8	0.8
Durometer hardness JIS K7215	HDA 92				
Min. bending radius mm	4	10	11	13	16.5
Min. installation radius mm	8	17	25	30	36
Standard color	Black, clear, red, blue, yellow, green, orange, white pure				
Standard length per roll m	20/100				

■ Relevant of working temperature and working pressure



Working pressure = Vacuum breaker pressure × variation rate × 1/3 at 20°C

When the temperature rises, the constant pressure gradually drops. Special care must be taken for temperature in use.

Example) U-9208, working temperature 40°C
Working pressure = Vacuum breaker pressure × variation rate × 1/3

$$=2.0\times\frac{50}{100}\times 1/3$$
$$=0.33\text{MPa}$$

Urethane tube

AOI Co., Ltd.

Since urethane tube has high mechanical strength, the tube strongly endures external force, and also has flexibility. This is widely used in general pneumatic lines, etc.

How to order

U-95 04 – N

- U-95: Urethane tube
- 04 (A): Applicable tube O.D. size
- N (B): Tube color

A Applicable tube O.D. size		B Tube color	
32	ø3.2	Blank	Black
04	ø4	N	Clear
06	ø6		
08	ø8		
10	ø10		
12	ø12		

Note: Indicate tube color in the remarks on the order slip.

Clean room specifications (catalog No. CB-033SA)

U-95–·····–P80

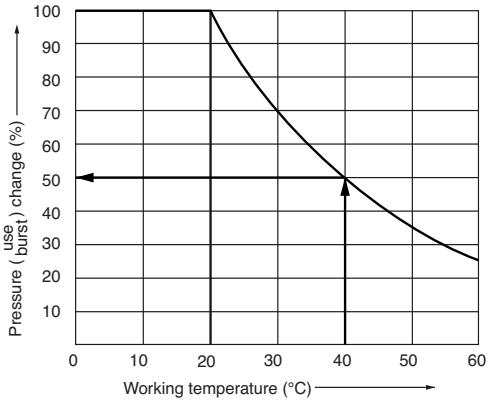
Specifications

This table indicates the value at 20°C.

Descriptions	U-9532	U-9504	U-9506	U-9508	U-9510	U-9512
Working fluid	Compressed air					
O.D. × I.D. mm×mm	3.2×1.8	4×2	6×4	8×5	10×6.5	12×8
Ambient temperature range °C	0 to 60 (no freezing)					
Burst pressure MPa	6.1	5.2	3.2	3.6	3.4	3.2
Max. working pressure MPa	2.0	1.7	1.0	1.2	1.1	1.0
Durometer hardness JIS K 7215	HDA 97					
Min. bending radius (JIS B 8381) mm	4	5	13	14	16	20
Min. installation radius mm	7	10	20	30	40	50
Standard color	Clear and black					
Standard length per roll m	20	20/100			20	

* IF U-9506 or less, tolerance of outer diameter may vary within $^{+0.1}_{-0.15}$ mm, U-9508 over, may vary within $^{+0.1}_{-0.2}$ mm.

Relevant of working temperature and pressure (use / burst)



Working pressure =Vacuum breaker pressure × variation rate × 1/3 at 20°C

When the temperature rises, the constant pressure gradually drops. Special care must be taken for temperature in use.

Example)
U-9506, working temperature 40°C

Working pressure = Vacuum breaker pressure × variation rate × 1/3

$=3.2\times\frac{50}{100}\times 1/3$

=0.53MPa

Coiling tube

AOI Co., Ltd.

A coiling tube is a coil-like manufactured extensible tube. Differing from the conventional way, a joint is easily installed, since a straight section is provided with the specified length to the extensible direction from end of the coil, and the coil shrinks and extends very smoothly. Durability of coil end is also excellent.

How to order

KX-12 06

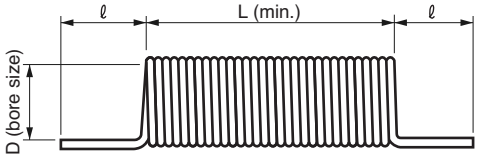
- KX-12: Coiling tube
- 06 (A): O.D. size

A O.D. size	
06	ø6
08	ø8
10	ø10
12	ø12

Specifications

Descriptions	KX-1206	KX-1208	KX-1210	KX-1212
O.D. × I.D. mm×mm	6×4	8×6	10×7.5	12×9.2
Ambient temperature range °C	-10 to 60 (no freezing)			
Use extension m	2.5			
D mm	50	70		90
L mm	250	240	290	275
ℓ	100			
Color	Orange			

* Tolerance of outer diameter may vary within $^{+0.07}_{-0.1}$ mm.
* Tubing is made of hard nylon. Consult with CKD for urethane tubing.



Flame resistant tube

AOI Co., Ltd.

Flame retardant material used epoch-making tube. If welding spatter, etc. contact, the tube is not burning.
(Equivalent to UL standards 94V-0: Self extinguish)

How to order

SR – 04 – 100 – (A) (B)

Flame resistant tube

Ⓐ Applicable tube O.D. size		Ⓑ Tube color	
04	ø4	Blank	Black
06	ø6	R	Red
08	ø8	BU	Blue
10	ø10	G	Green
12	ø12		

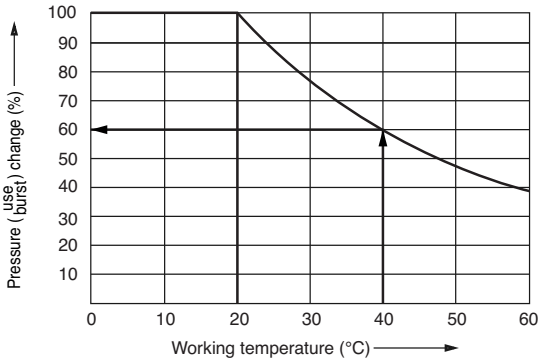
Note: Indicate tube color in the remarks on the order slip.

Specifications

Descriptions	SR-04	SR-06	SR-08	SR-10	SR-12
O.D. × I.D. mm×mm	4×2	6×3.8	8×5.5	10×7	12×8.5
Ambient temperature range °C	0 to 60 (no freezing)				
Burst pressure MPa	4.8	4.3	3.4	3.3	3.3
Max. working pressure MPa	1.6	1.4	1.1	1.1	1.1
Min. bending radius mm	15	22	30	40	50
Standard color	Black, red, blue, green				
Standard length per roll m	100				

This table indicates the value at 20°C.

Relevant of working temperature and pressure (use / burst)



Working pressure = Vacuum breaker pressure × variation rate × 1/3 at 20°C

When the temperature rises, the constant pressure gradually drops. Special care must be taken for temperature in use.

Example)

SR-06, working temperature 40°C

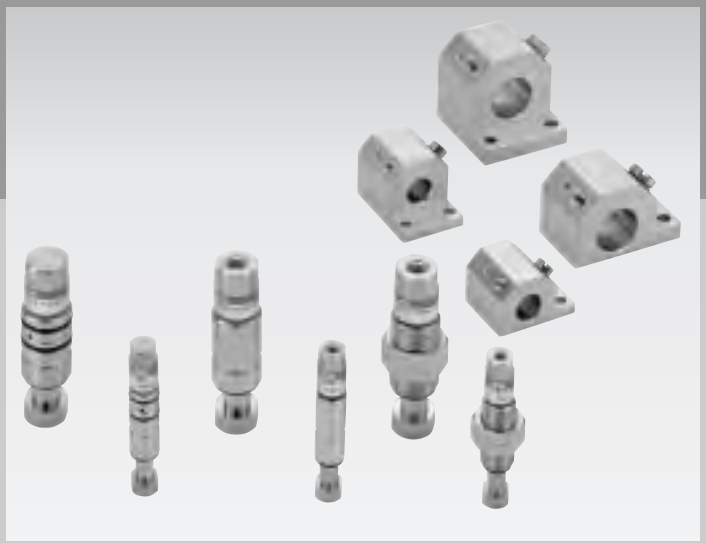
Working pressure = Vacuum breaker pressure × variation rate × 1/3

$=4.3 \times \frac{60}{100} \times 1/3$

=0.86MPa

Magnetic spring buffer
FBU2

■ **Vacuum component**



CONTENTS

Attaining constant pressing with a magnetic spring.

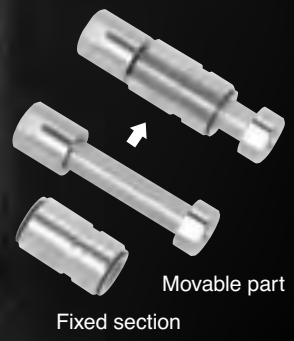
Ideal for handling miniature devices and fragile workpieces undamaged

Problems with metal springs solved

Fine buffer is targeted for popular damage-free handling used in semiconductor manufacturing fields. This completely new cushioning unit uses suction of a magnet at the buffer. Soft contact and stable pressing leave workpieces damage-free. This can be used for a variety of miniature parts and fragile workpieces such as LCD glass, semiconductor chips, substrates, CDs, and DVDs.

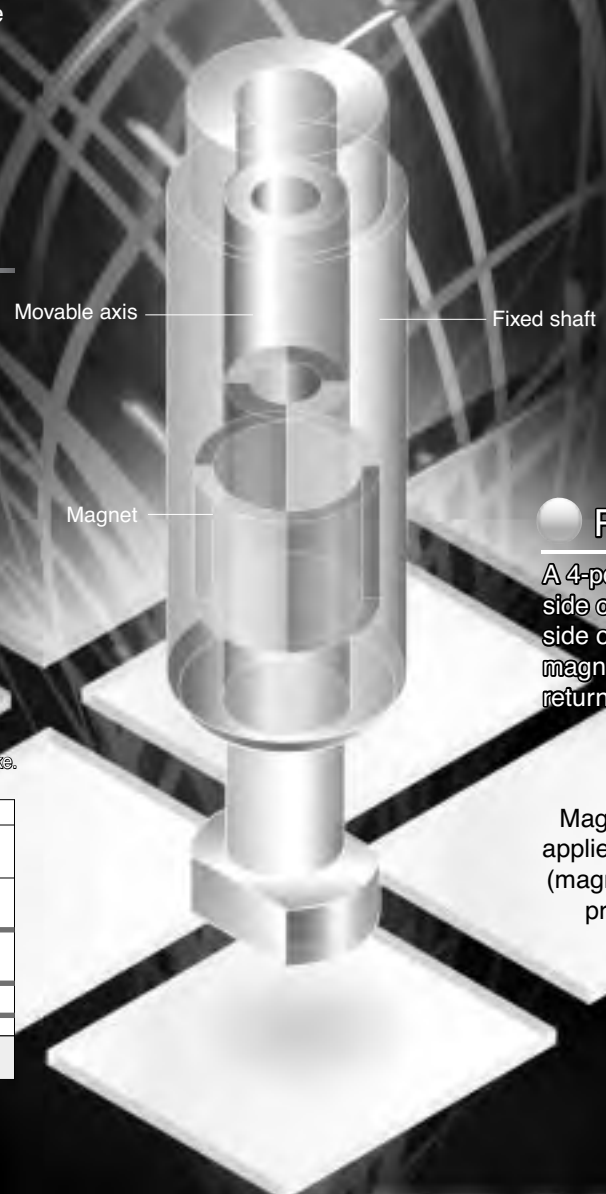
Compact and lightweight

Using just two components – a movable section and a fixed section – achieves compact ultra light weight – 5 g or less = FBU2-7D. The light movable section touches workpieces gently and reduces shock.



Continuous pressing

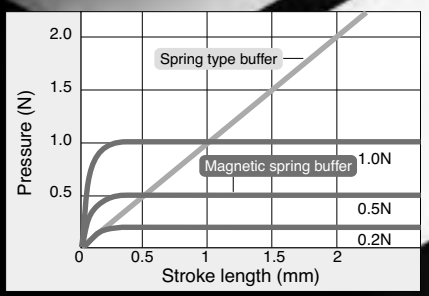
If the magnet assembled in the movable or fixed shaft deviates, an inclined magnetic line is generated to counter the axial section's force.



Continuous magnetic return applied axially

Pressure characteristics

Pressure generated by magnetic force can be selected from 0.2 N, 0.5 N, or 1.0 N depending on the model. Pressure is constant regardless of stroke.



Rotation prevention

A 4-pole spline magnet on the inner side of the fixed shaft and the outer side of the movable shaft generates magnetic attraction to function and return to the origin.

Magnetic return applied rotationally (magnetic rotation prevention)

Fine Buffer FBU2 Series

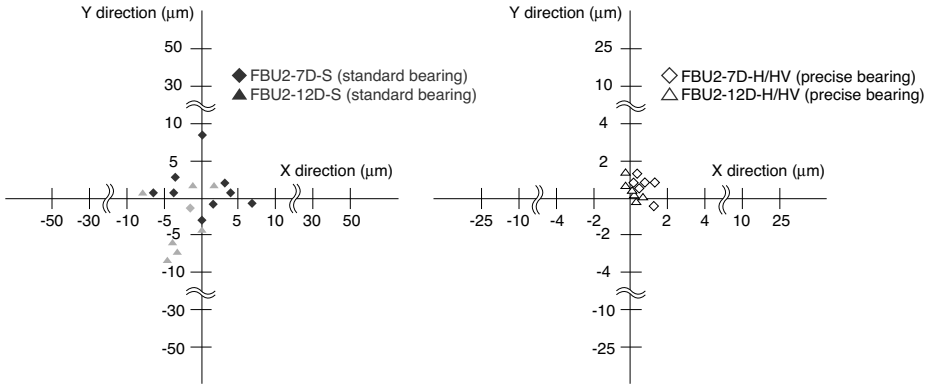
CKD's original absorption magnetic spring uses magnetic attraction realizing stable pushing, low particle generation, and long life in this compact, highly accurate fine buffer FBU2 Series.

CKD Green Technology

Highly accurate bearing added to lineup

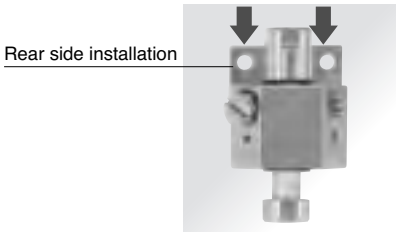
Standard and high-accuracy types are available for the rod guide. The bearing type can be selected based on repeated X-Y return accuracy of the movable shaft.

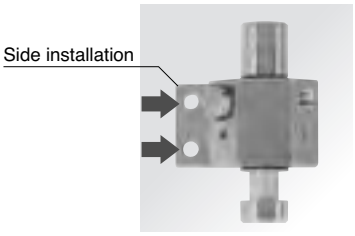
● S: Standard/precision ±100 μm or less ● H/HV: Precise/precision ±50 μm or less



Vacuum supply brackets available

Standard and high-accuracy brackets are available.
The high-accuracy HV can be used to supply vacuum from the bracket. Reaction from piping tubing, etc., is eliminated, further improving pressing stability.



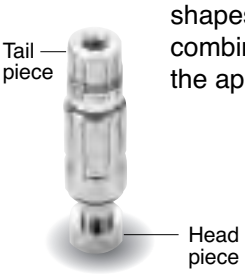


Clean and long life

Fewer particles than generated in conventional metal spring use because there is no metal contact and movable contact area is small. Thrust is generated magnetically, eliminating metal spring fatigue and lengthening life and stable performance.

Free head and tail combination

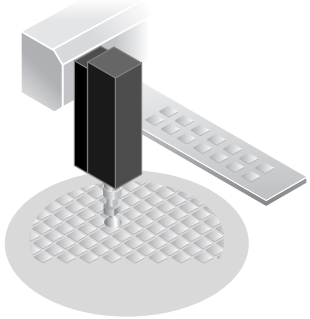
The fine buffer's head and tail shapes can be combined to suit the application.



Diverse applications

Wide variety of uses including vacuum parts pick-and- place, transport, and transfer enables this product to be used to fix or hold workpiece positioning and to pressfit or insert stoppers and parts.

● Device transfer



● CD, DVD transfer
● Flexible PCB suction transfer
● Liquid crystal device suction transfer
● Part insertion
● Portable button pressure inspection

FBU2 Series variation

	O.D.	Bearing precision		
FBU2-7	ø7 h7	S	Standard	
		H	Precise type	
	M8×0.75	HV	Internal flow path precise type	
FBU2-12	ø12 h7	S	Standard	
		H	Precise type	
	M12×1	HV	Internal flow path precise type	

Pressure (N)			Stroke length (mm)			Tail piece shape			Head piece shape		
0.2	0.5	1.0	2	6	16	No hole	M3	M5	No hole	M3	M5
●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●	●
	●	●		●	●		●	●		●	●
	●	●		●	●		●	●		●	●
	●	●		●	●		●	●		●	●

Safety precautions

Always read this section before starting use.
Refer to Intro 67 for general precautions.

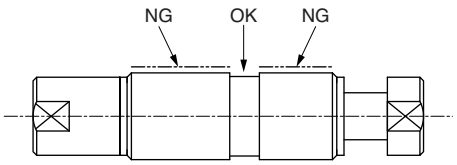
Design & Selection

⚠ WARNING

■ The working temperature range differs with the bearing type. Be sure to use within the specified range.
- Standard bearing type (S): 5 to 50°C
- Precise bearing (H/HV) : 5 to 40°C

■ This product has a built-in magnet.
Do not use this product where magnetic swarf or dust is present.
Otherwise it could be damaged or malfunction.

■ Fix the product in place with a nut (full thread: 8M, 12M) or hexagon socket set screw (brazed: 7D, 12D). When using the set screw, use the groove on the fixed shaft.



■ After installing the product and piping, confirm that it operates smoothly. Connection of hard tubes or piping with a small bending R can cause malfunctions or faults.

■ Mount the product vertically.
A lateral load or moment force on the moving axis can change the characteristics and affect the life.

⚠ CAUTION

■ When using for vacuum applications, use a tube with small piping tension as the tension resulting from the piping tube is added to the pressure.
Recommended tube: UP Series
(Antistatic tube, air fiber)

■ The load (jig and workpiece) on the movable shaft must not exceed the allowable weight.
- FBU2-7/8M: 30g or less
- FBU2-12/12M: 80g or less

■ When used for a rotating application, note the maximum holding torque of the magnet.
If force exceeding maximum holding torque is applied, the shaft could run out and reverse by 180°.

■ The internal flow path high accuracy (HV) product has a leak.
Clearance sealing improves pressure stability and return accuracy. This causes the vacuum to leak. (Pressure drop within 10 kPa compared to -80 kPa initial pressure.)

Installation & Adjustment

⚠ WARNING

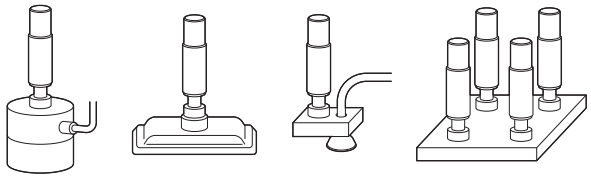
■ Before starting operation, check for loosening or problems at load or joint connections.

■ Start operation after confirming that devices operate correctly.
After installing, repairing, or modifying the product, conduct a function inspection and confirm that the product is correctly installed.

■ Confirm that there is no machine interference and that the actuation system is normal.

■ Do not apply impact on the product by dropping it, etc. The impact load can damage the product.

■ Using the product in the following method can cause a moment force on the moving axis even with the load capacity, and lead to malfunctions of faults.
1. When large jig other than vacuum pad is attached to head piece.
2. When large or irregularly shaped vacuum pad is attached.
3. When using in ways that applies a deflected load onto the moving axis.
4. When holding one jig or workpiece with several FBU2 units.



Installation & Adjustment

⚠ CAUTION

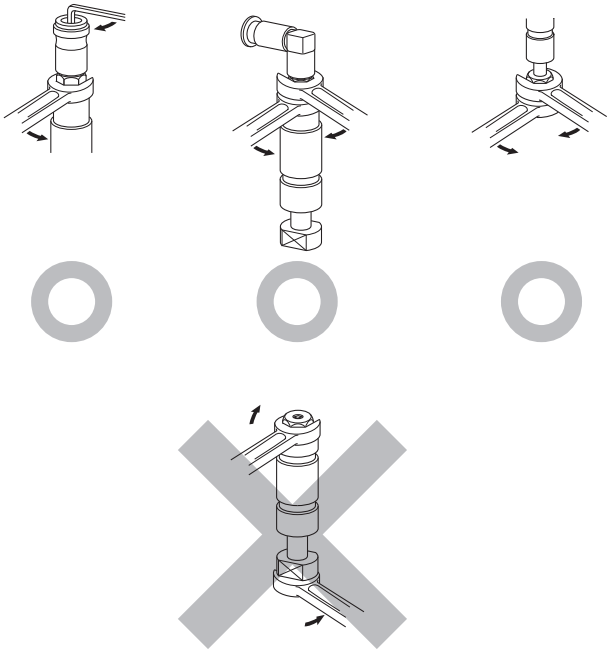
■ Do not remove the product from the package until just before piping. Foreign matter could enter from the piping port or shaft clearance and cause faults or malfunctions.

■ When piping, flush pipes with air to remove foreign matter, swarf, etc.

■ Apply adequate torque when connecting pipes.

Port thread	Tightening torque (N·m)
M3	0.3 to 0.6
M5	1 to 1.5

When tightening, be sure to use the width across flats at the section to be tightened.
Using the width across flats for a different section could cause structural damage.



■ Do not apply lubricant to the guide tube. Functions could be changed.

■ Do not hit the guide tube or cause scratches or indents.
The guide tube is thin-walled copper that deforms easily. Handle it with care.
Scratches or indents on the guide tube could damage bearings and lead to faults or malfunctions.

■ Read the instruction manual before use.
Familiarize yourself with details before using the product.

■ Use a hexagon socket set screw to fix the outer diameter brazed type (7D, 12D) in place and tighten with proper torque.
Excessive tightening could damage the main unit or bearings and lead to faults or malfunctions.

Product nominal	Set screw size	Tightening torque (N·m)
FBU2-7	M2 hexagon socket head set screw	0.10 to 0.12
FBU2-12	M2.5 hexagon socket head set screw	0.18 to 0.20

During Use & Maintenance

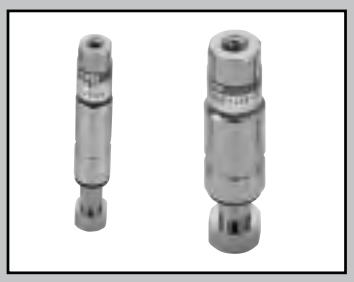
⚠ WARNING

■ Refer to the instruction manual and conduct careful maintenance and inspection.
Incorrect handling could result in device or system damage or operation faults.

⚠ CAUTION

■ Conduct daily inspections and regular inspections to ensure that maintenance control is done correctly.
Insufficient maintenance could lower product functions, shorten product life, or result in damage or incorrect operations.

■ Stop use if leakage increases or if the device does not function correctly.
After installing, repairing, or modifying the product, conduct a function inspection and confirm that the product is correctly installed.



Magnetic spring buffer

FBU2 Series

Outer diameter: M8, M12, ø7, ø12

RoHS

Specifications

Values at room temperature of 23°C

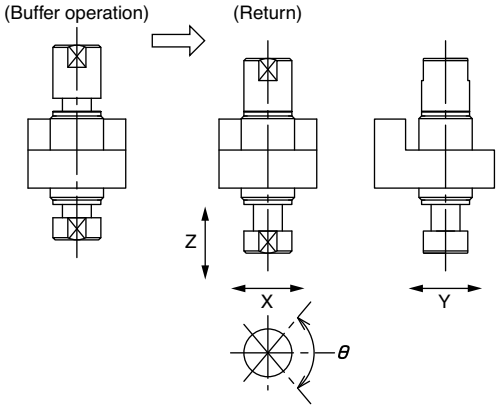
Descriptions			FBU2-7D				FBU2-8M		FBU2-12D					FBU2-12M		
			S		H/HV		S		S			H/HV		S		
O.D.			ø7h7				M8×0.75		ø12h7					M12×1		
Appearance			S/H 		HV 				S/H 			HV 				
Buffer pressure		N	0.1 to 0.2				0.1 to 0.2		0.4 to 0.6, 0.9 to 1.1					0.4 to 0.6, 0.9 to 1.1		
Pressure displacement	Note1		±15% or less													
Buffer stroke			2	6	2	6	2	6	2	6	16	2	6	2	6	16
Ambient temperature range		°C	5 to 50		5 to 40		5 to 50		5 to 50			5 to 40		5 to 50		
Bearing clearance		mm	0.2 or less		0.05 or less		0.2 or less		0.2 or less			0.05 or less		0.2 or less		
Max. holding torque	Note 2	N·cm	0.25 and over (reference value)						Note 3					Note 3		
Return position	X-Y	mm	±0.1 or less		±0.05 or less		±0.1 or less		±0.1 or less			±0.05 or less		±0.1 or less		
precision	Z	mm	±0.1 or less													
Note4	θ	°	3 or less													
Load capacity		g	30 or less						80 or less							

Note 1: Indicates pressure variation within the stroke. Pressure cannot be proportional to the stroke.
Note 2: If a rotary torque exceeding the maximum holding torque is applied on the moving axis, the moving axis will step out and rotate 180°.
*Holding torque: Force which can return to the original position even if force is applied in θ direction (Fig. 1) and moving axis position deviates.
Note 3: Refer to the table at right for FBU2-12M/12D holding torque.
Note 4: Refer to Fig. 1 for return positioning accuracy.
The figure shows buffer return accuracy.
Note 5: Consult with CKD for requirements not complying with specifications.
Note 6: Load capacity indicates the maximum load (jig and object picked up) mounted on the head piece.

(FBU2-12M/12D maximum holding torque (reference value))

Pressure (N)	Stroke length (mm)	Holding torque (N·cm)
0.5	2	0.5 and over
	6	0.5 and over
	16	1.2 and over
1	2	1.2 and over
	6	1.2 and over
	16	2.5 and over

Indicates the holding torque at the outer end.



(Fig. 1) Recovery detailed drawing

How to order

FBU2 - 12D - S - 10 - 6 - T3 - H3

- FBU2 — Model no.
- 12D — Ⓐ Outer diameter
- S — Ⓑ Bearing precision
- 10 — Ⓒ Pressure
- 6 — Ⓓ Buffer stroke
- T3 — Ⓔ Tail piece shape
- H3 — Ⓕ Head piece shape

Symbol	Descriptions	Model no. FBU2-7D	FBU2-8M	FBU2-12D	FBU2-12M
Ⓐ Outer diameter					
7D	ø7h7 socket and spigot type	●			
8M	M8×0.75 full thread type		●		
12D	ø12h7 socket and spigot type			●	
12M	M12×1 full thread type				●
Ⓑ Bearing precision					
S	Standard (bearing clearance 0.2mm or less)	●	●	●	●
H	Precise (bearing clearance 0.05mm or less)	●		●	
HV	Internal flow path type precise (Bearing clearance 0.05mm or less)	●		●	
Ⓒ Pressure (N)					
02	0.2	●	●		
05	0.5			●	●
10	1.0			●	●
Ⓓ Buffer stroke (mm)					
2	2	●	●	●	●
6	6	●	●	●	●
16	16			●	●
Ⓔ Tail piece shape					
TB	No hole	●	●	●	●
T3	M3 female thread depth 3	●	●	●	●
T5	M5 female thread depth 4			●	●
Ⓕ Head piece shape					
HB	No hole	●	●	●	●
H3	M3 female thread depth 3	●	●	●	●
H5	M5 female thread depth 4			●	●

<Example of model number>

O.D. ø12 h7 socket and spigot type

FBU2-12D-HV-05-6-TB-H5

- Ⓐ Outer diameter : ø12h7 socket and spigot type
- Ⓑ Bearing precision : Internal flow path type precise
- Ⓒ Pressure (N) : 0.5N
- Ⓓ Buffer stroke : 6mm
- Ⓔ Tail piece shape : No hole
- Ⓕ Head piece shape : M5 female thread depth 4

Combination of bearing precision, buffer stroke, tail piece shape, and head peace shaped

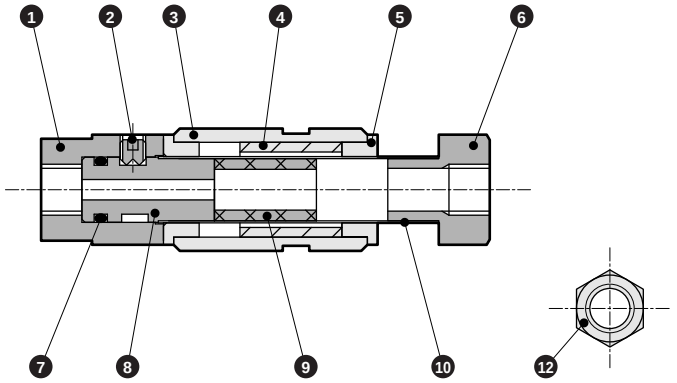
		Ⓑ Bearing precision S	H	HV
Ⓓ Buffer stroke	2	●	●	●
	6	●	●	●
	16	●		
Ⓔ Tail piece shape	TB	●	●	●
	T3	●	●	
	T5	●	●	
Ⓕ Head piece Shape	HB	●	●	
	H3	●	●	●
	H5	●	●	●

Mounting bracket for socket and spigot type model no.

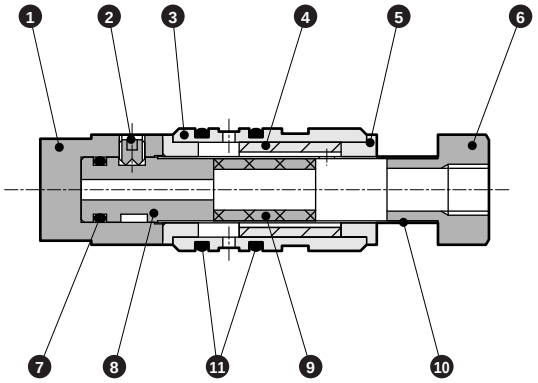
Ⓐ O.D.	Discrete bracket model no.	
	L type installation	Straight installation
7D	FBU2- 7D -B1	FBU2- 7D -B2
12D	FBU2-12D -B1	FBU2-12D -B2

Internal structure and parts list

● FBU2-*-S (standard)
-*-H (precise)



● FBU2-*-HV (precise internal flow path type)



No.	Parts name	Material	Remarks
1	Tail piece	Aluminum alloy	Electroless nickeling
2	Hexagon socket head set screw	Stainless steel	
3	Fixed shaft	Stainless steel	
4	Ring magnet	Plastic magnet	
5	Bearing	Fluorine resin	Standard bearing type
		Polyester-based resin	Internal flow path type
6	Head piece	Aluminum alloy	Electroless nickeling

No.	Parts name	Material	Remarks
7	O ring	Nitrile rubber	
8	Tail joint	Aluminum alloy	Trivalent chromate treatment
9	Ring magnet	Plastic magnet	
10	Guide tube	Stainless steel	
11	O ring	Nitrile rubber	Internal flow path type
12	Hexagon nut	Carbon steel	Electroless nickeling (only full thread)

Bracket material

Model no.	Material	Remarks
FBU2- 7D-B1	Aluminum alloy	Electroless nickeling
FBU2- 7D-B2		
FBU2-12D-B1		
FBU2-12D-B2		

Weight

● FBU2-8M /7D

(Unit: g)

Model no.	Fixed section	Movable part (Note 1)	Tail piece (movable part)		Head piece (movable part)		Bracket (Note 2)	
			TB	T3	HB	H3	B1	B2
FBU2-8M-S-02-2	5.5	1.2	0.7	0.7	0.4	0.3	–	–
FBU2-8M-S-02-6		1.3						
FBU2-7D-S-02-2	2.2	1.2					8.9	13.1
FBU2-7D-S-02-6		1.3						
FBU2-7D-H-02-2		1.0						
FBU2-7D-H-02-6								
FBU2-7D-HV-02-2	2.1							
FBU2-7D-HV-02-6								

Note 1: Total weight of movable part = movable part + tail piece + head piece, product weight = fixing section + movable part + tail piece + head piece
Note 2: Plug and fixing screw are included to bracket.

● FBU2-12M/12D

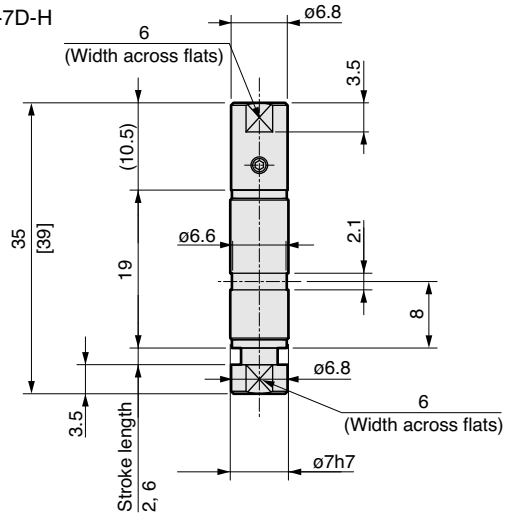
(Unit: g)

Model no.	Fixed section	Movable part (Note 1)	Tail piece (movable part)			Head piece (movable part)			Bracket (Note 2)	
			TB	T3	T5	HB	H3	H5	B1	B2
FBU2-12M-S-05/10-2	10.2	2.4	2.2	2.2	2.0	1.2	1.2	1.1	–	–
FBU2-12M-S-05/10-6		2.5								
FBU2-12M-S-05/10-16	14.0	3.9								
FBU2-12D-S-05/10-2	8.3	2.4							18.3	28.6
FBU2-12D-S-05/10-6		2.5								
FBU2-12D-S-05/10-16	12.9	3.9								
FBU2-12D-H-05/10-2	8.1	2.4								
FBU2-12D-H-05/10-6		2.5								
FBU2-12D-HV-05/10-2	7.1	2.4								
FBU2-12D-HV-05/10-6		2.5								

Note 1: Total weight of movable part = movable part + tail piece + head piece, product weight = fixing section + movable part + tail piece + head piece
Note 2: Plug and fixing screw are included to bracket.

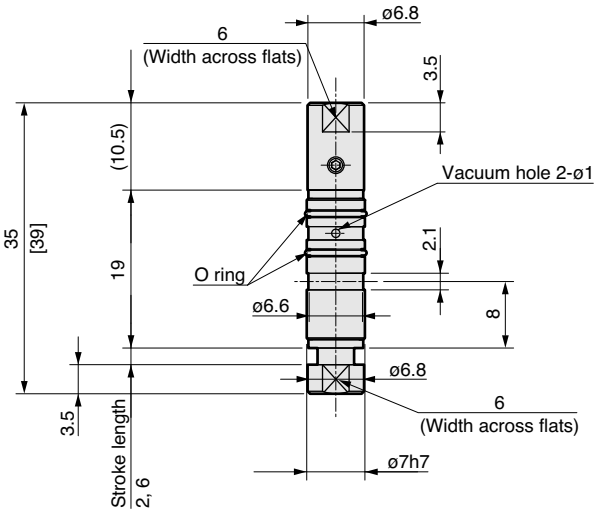
Dimensions (FBU2-7D, FBU2-8M)

● FBU2-7D-S
● FBU2-7D-H



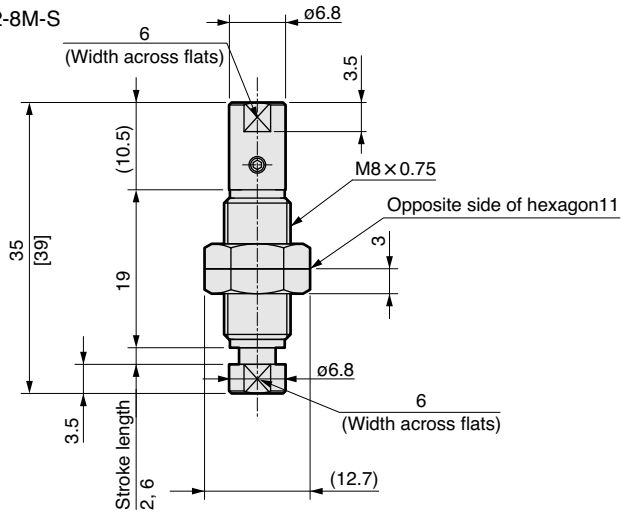
Note: Values in parentheses are dimensions for the 6 strokes.

● FBU2-7D-HV



Note: Values in parentheses are dimensions for the 6 strokes.
Note: The O ring is shipped installed.
Apply a light coat of lubricant, such as grease, to the O ring to maintain sealing.
Note: Drawing dimensions are the same regardless of head and tail shape.

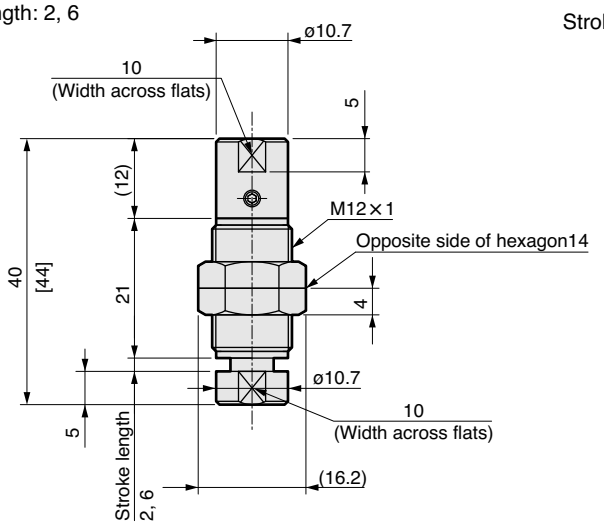
● FBU2-8M-S



Note: Values in parentheses are dimensions for the 6 strokes.

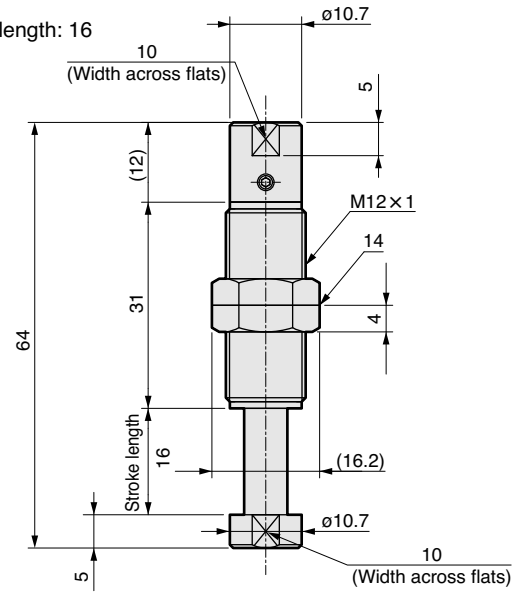
Dimensions (FBU2-12M, FBU2-12D)

● FBU2-12M-S
Stroke length: 2, 6

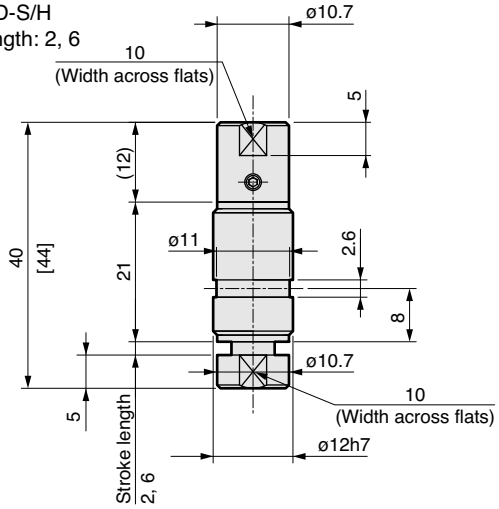


Note: Values in parentheses are dimensions for the 6 strokes.

Stroke length: 16

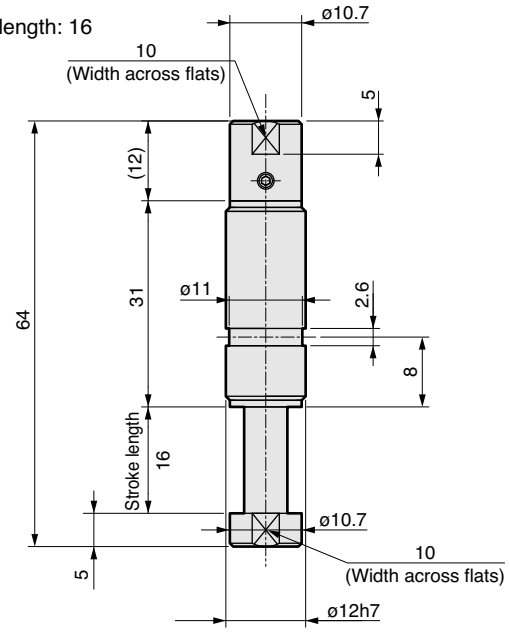


● FBU2-12D-S/H
Stroke length: 2, 6

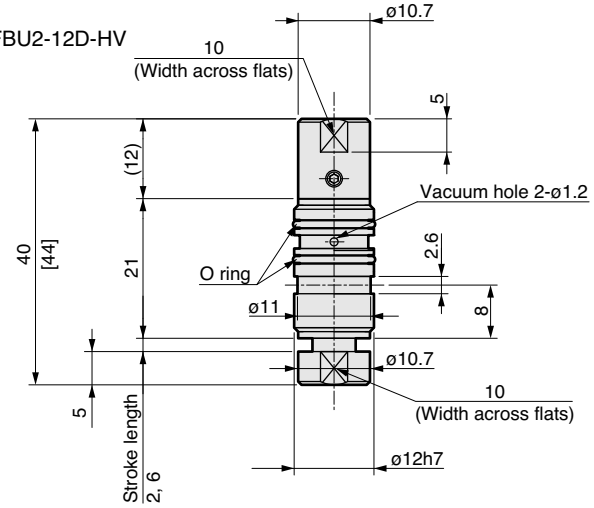


Note: Values in parentheses are dimensions for the 6 strokes.

Stroke length: 16



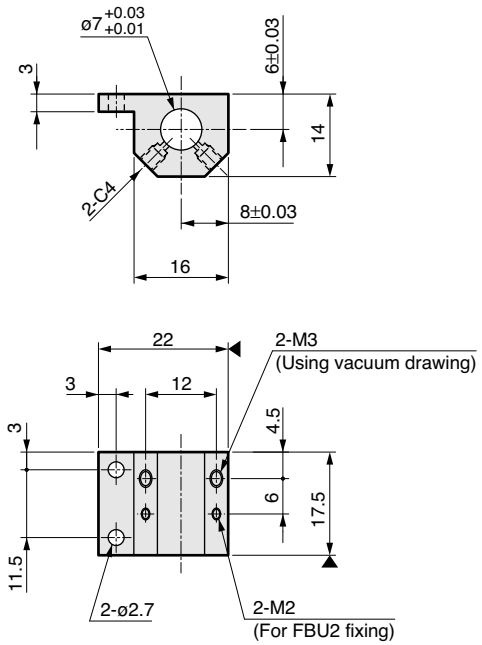
● FBU2-12D-HV



Note: Values in parentheses are dimensions for the 6 strokes.
Note: The O ring is shipped installed. Apply a light coat of lubricant, such as grease, to the O ring to maintain sealing.
Note: Drawing dimensions are the same regardless of head and tail shape.

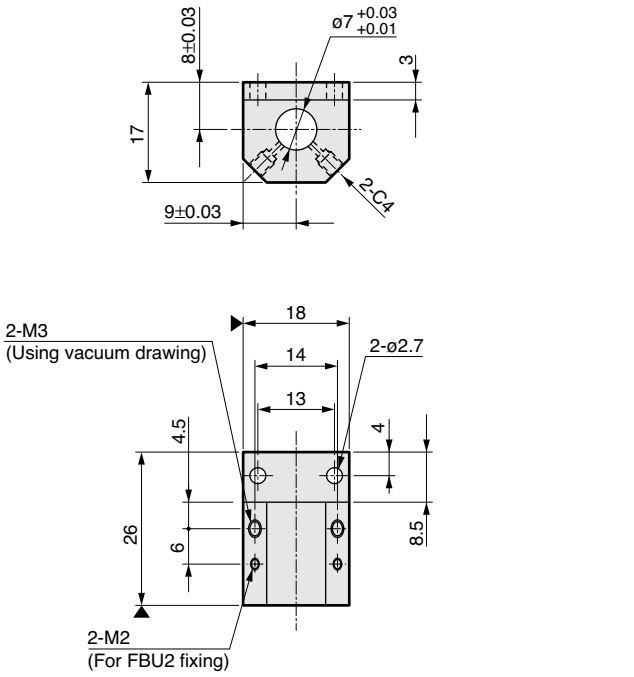
Bracket dimensions

● FBU2-7D-B1
(Attachment: FPL-M3, set screw M2×2)



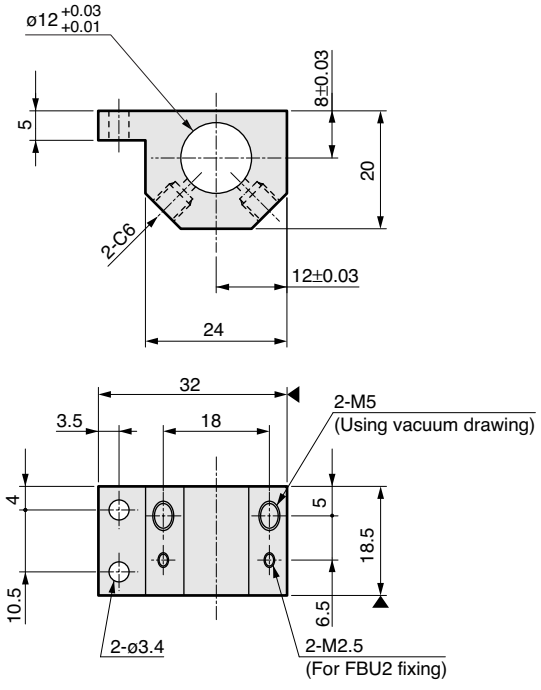
▶ indicates the FBU2 installation reference surface.

● FBU2-7D-B2
(Attachment: FPL-M3, set screw M2×2)



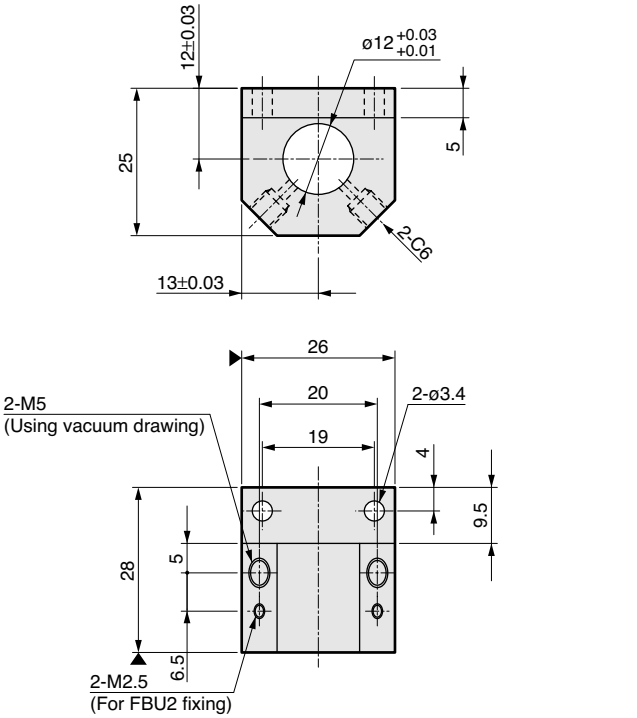
▶ indicates the FBU2 installation reference surface.

● FBU2-12D-B1
(Attachment: FPL-M5, set screw M2.5×2.5)



▶ indicates the FBU2 installation reference surface.

● FBU2-12D-B2
(Attachment: FPL-M5, set screw M2.5×2.5)



▶ indicates the FBU2 installation reference surface.

Note: When using for a vacuum drawing, tighten plugs (FPL-M3, M5) in empty screw holes (M3, M5).

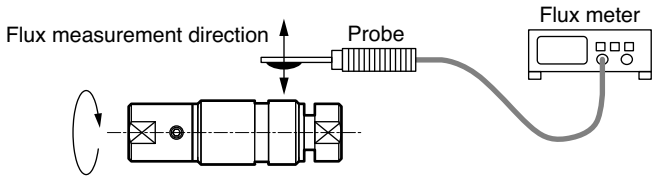
1 Leakage flux

[Measuring instrument]

Flux meter
Probe

[Measurement procedure]

(1) Touch the probe to each measurement point on the FBU2.
(2) Rotate the FBU2 at center shaft standards, and measure maximum flux density.



[Target]

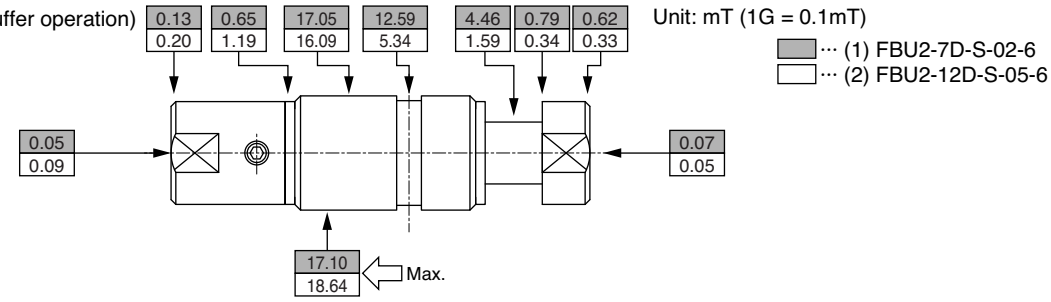
(1) FBU2-7D-S-02-6
(2) FBU2-12D-S-05-6
(3) FBU2-12D-S-05-16

[Result]

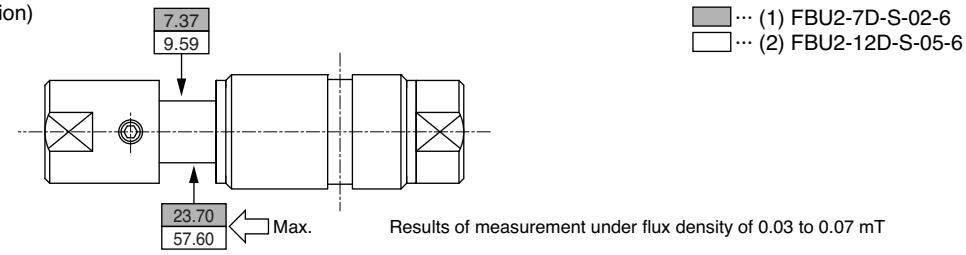
• Magnetic flux at each position

(1) FBU2-7D-S-02-6
(2) FBU2-12D-S-05-6

(Before buffer operation)

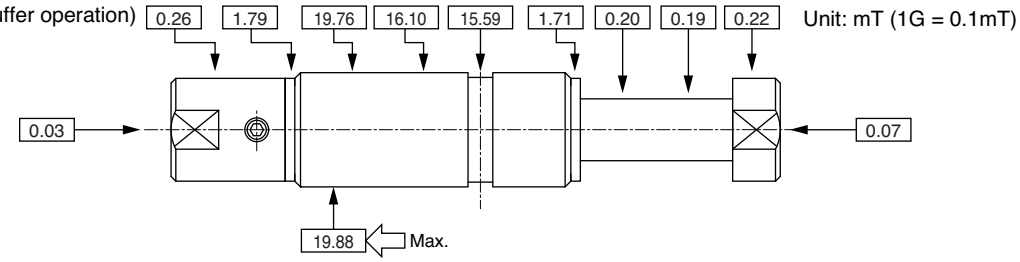


(After buffer operation)

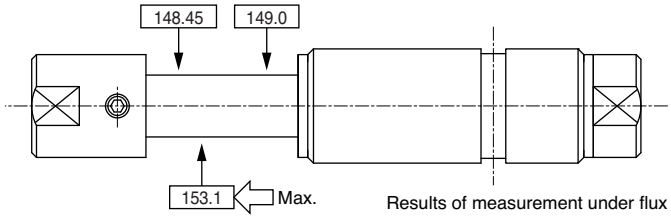


(3) FBU2-12D-S-05-16

(Before buffer operation)



(After buffer operation)

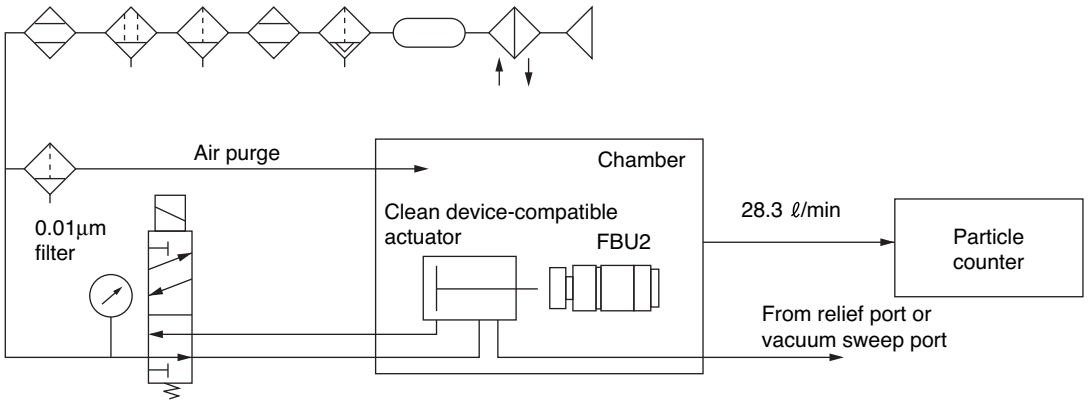


2 Particle occurrence rate

[Measuring instrument]

Particle counter : Laser dust monitor
Minimum measurable particle diameter : 0.1μm
Suction rate : 28.3 ℓ/min.

[Test circuit]



[Measurement procedure]

(1) Set a test sample in a stainless steel antistatic chamber.
(2) Send clean air passed through a 0.01 μm filter at the same flow rate as the particle counter suction rate (28.3 ℓ/min.).
(3) Confirm that the particle counter value is 0 in the immobile state.
(4) Move the test sample, and measure particles generated during movement.

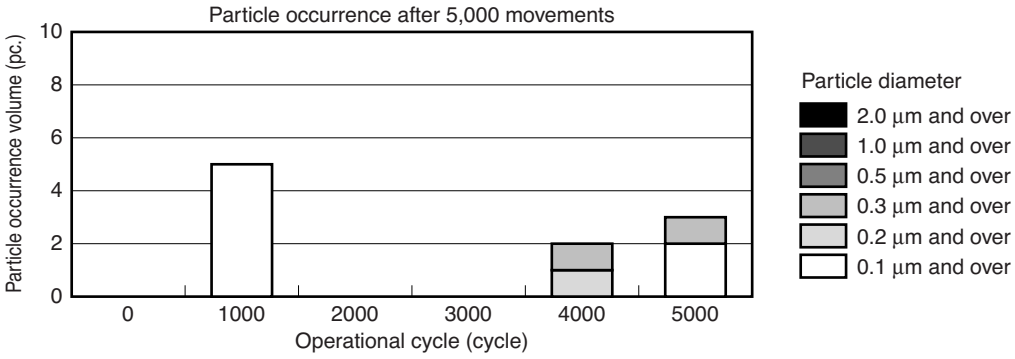
*A sealed chamber is used so that particles other than those generated from the test sample do not enter the chamber.
*Confirm that the particle occurrence rate of the clean device-compatible actuator (vacuum sweep) to be used is 0 before starting.

[Measuring condition]

・Quality of air
Purge : "grade 1.2.1" + 0.01 μm gas filter
・FBU2 operation speed : 50 mm/s
・Operation conditions : Install with no load parallel to the purge flow
・Measuring frequency : One minute measurement /1,000 movements

[Result]

Model: FBU2-12D-S-10-16



Particle diameter	Operational cycle					
	0	1000	2000	3000	4000	5000
0.1 μm and over	0	5	0	0	0	2
0.2 μm and over	0	0	0	0	1	0
0.3 μm and over	0	0	0	0	1	1
0.5 μm and over	0	0	0	0	0	0
1.0 μm and over	0	0	0	0	0	0
2.0 μm and over	0	0	0	0	0	0
Total particle occurence volume	0	5	0	0	2	3

3 Stop position precision (X-Y)

[Measuring instrument]

Laser position sensor

[Measurement procedure]

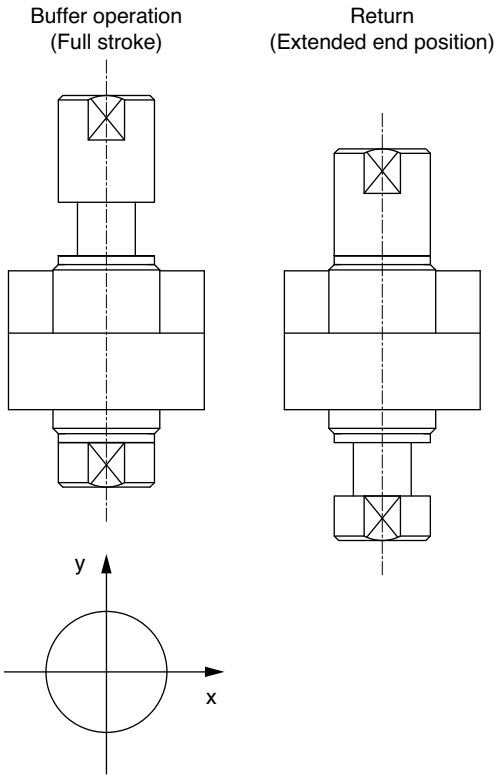
Measure X-Y positioning accuracy when manually moving the full stroke

Load : Loadless
Installation attitude : Downward
Degree of vacuum : Non vacuum
Piping : None

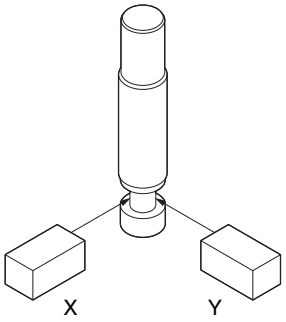
[Target]

FBU2-7D-S-02-6
FBU2-7D-HV-02-6
FBU2-12D-S-05-16
FBU2-12D-HV-05-6

(Measuring overview fig.)



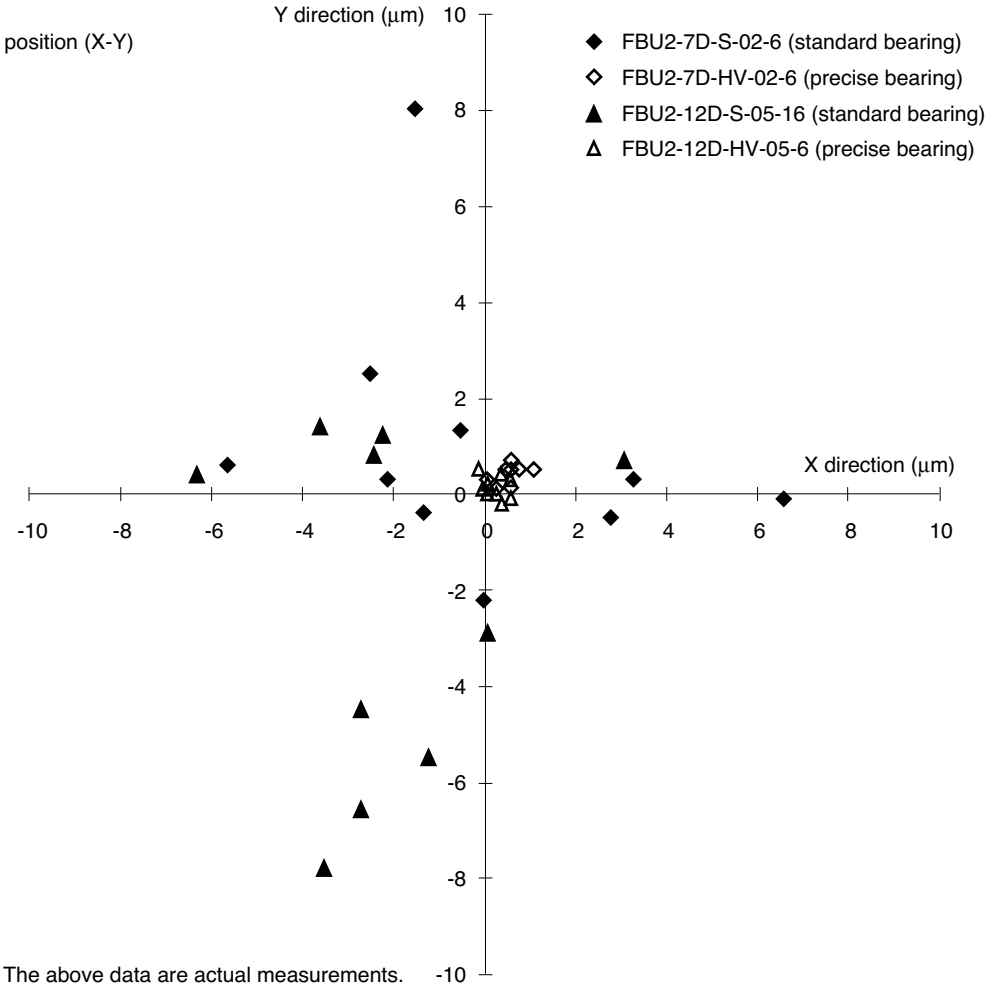
(Measurement procedure)



Laser position sensor

[Result]

Repeat stop position (X-Y)



* The above data are actual measurements.

Systems

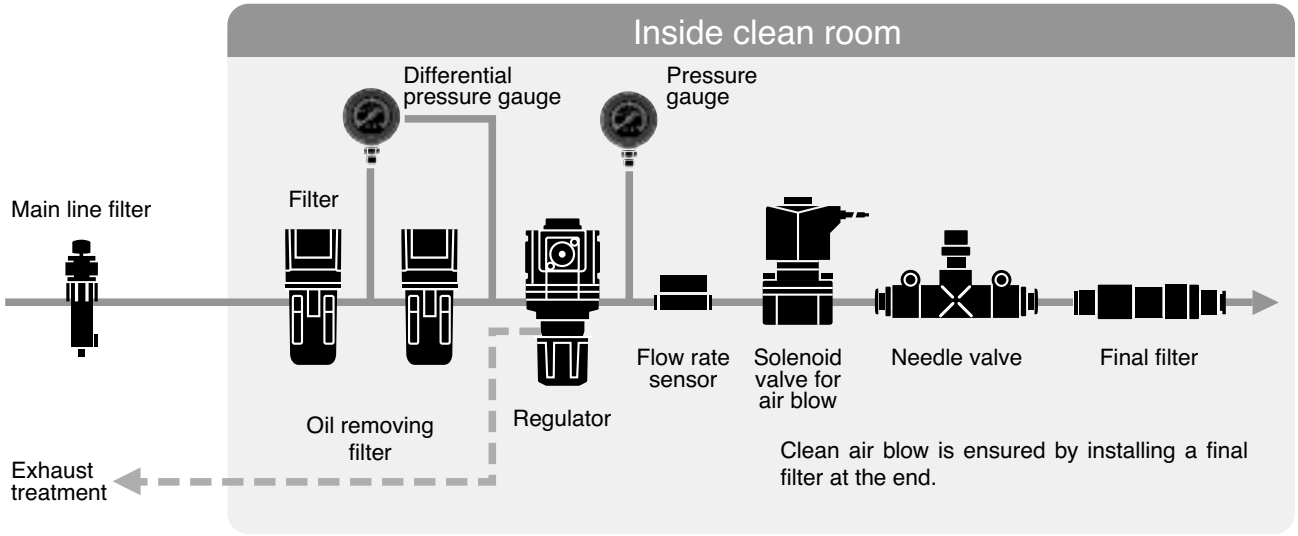
Pneumatic components for clean room specifications

Catalog No. CB-033SA

Compatible with a diverse range and level of clean room cleanliness

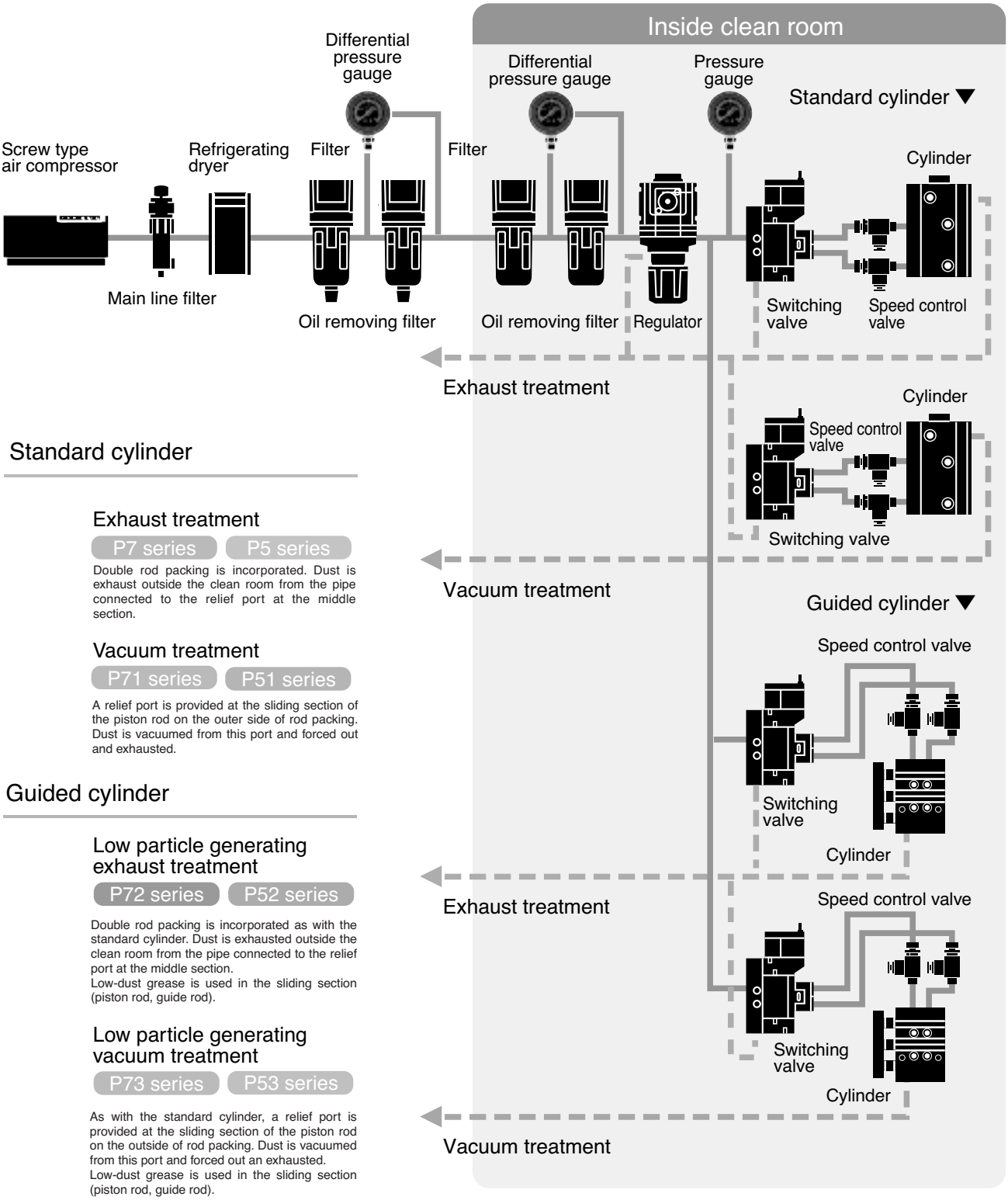
● Accurately producing ultra clean air

Model circuit for clean blow system



● Zero particle generation with vacuum and exhaust treatment

Circuit configuration for pneumatic actuators



Standard cylinder

Exhaust treatment

P7 series P5 series

Double rod packing is incorporated. Dust is exhaust outside the clean room from the pipe connected to the relief port at the middle section.

Vacuum treatment

P71 series P51 series

A relief port is provided at the sliding section of the piston rod on the outer side of rod packing. Dust is vacuumed from this port and forced out and exhausted.

Guided cylinder

Low particle generating exhaust treatment

P72 series P52 series

Double rod packing is incorporated as with the standard cylinder. Dust is exhausted outside the clean room from the pipe connected to the relief port at the middle section.
Low-dust grease is used in the sliding section (piston rod, guide rod).

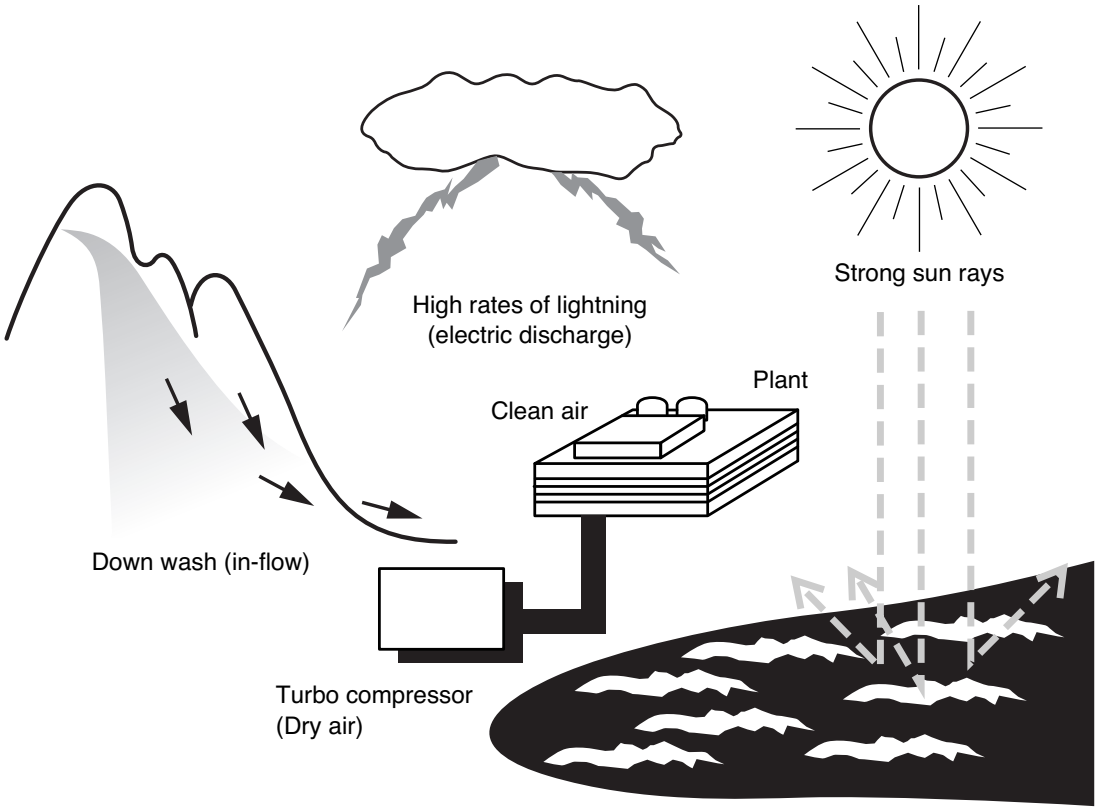
Low particle generating vacuum treatment

P73 series P53 series

As with the standard cylinder, a relief port is provided at the sliding section of the piston rod on the outside of rod packing. Dust is vacuumed from this port and forced out an exhausted.
Low-dust grease is used in the sliding section (piston rod, guide rod).

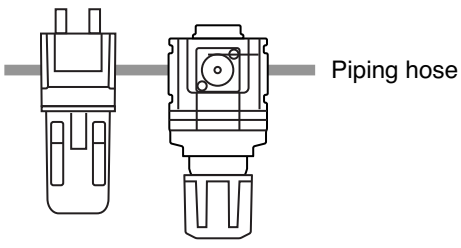
Ozone proof components

Factory environments easily affected by ozone



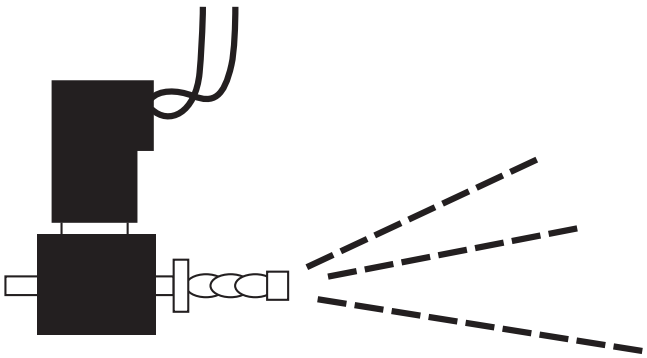
Pneumatic components affected by ozone

Diaphragm and valve seat of regulator



Repeated stress accelerates rubber deterioration

Valve seat of air blow valve

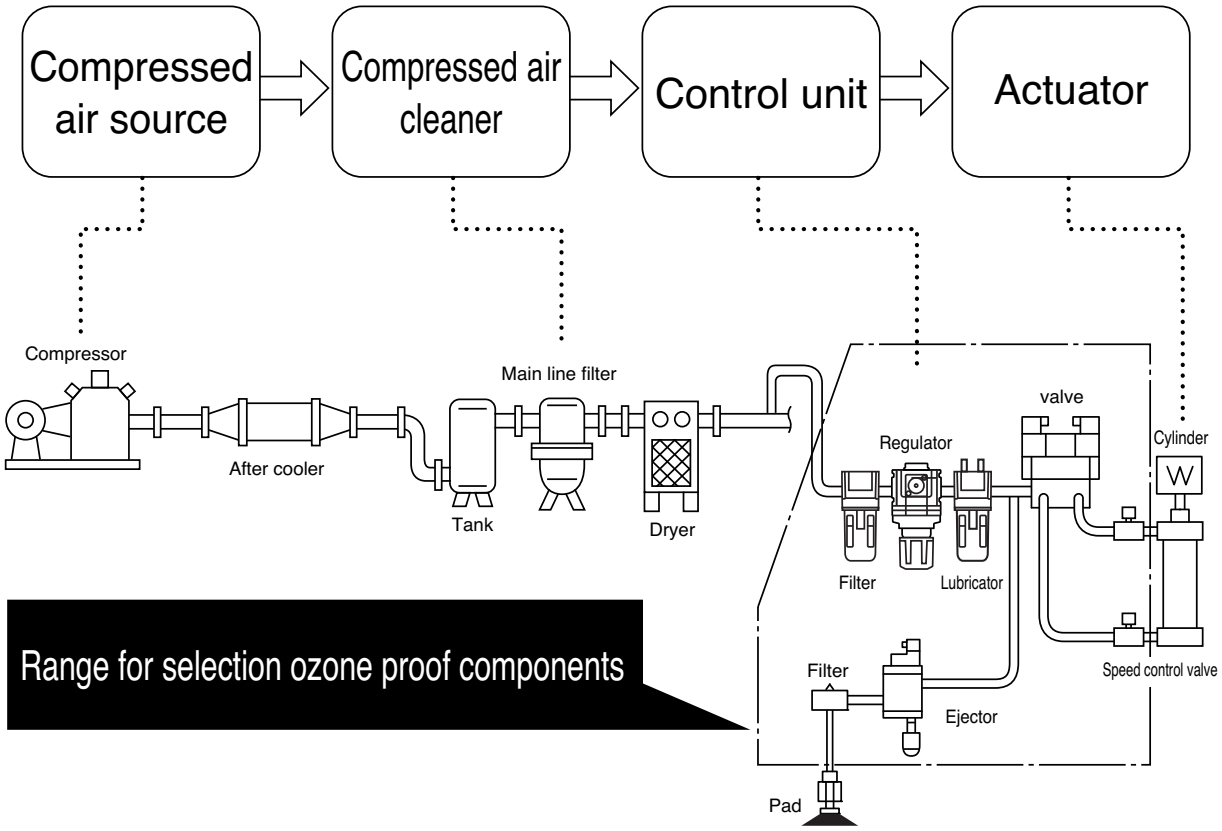


High air flow at orifice

Ozone proof component selection guide

A typical pneumatic component consist of the following devices.

Devices in the dotted box require ozone measures.



⚠Safety precautions

Ozone-proof components use fluorine rubber or hydrogen nitrile rubber for rubber parts.
Special working environment and working conditions different from the standard part are considered when evaluating performance and life.

Compliance of product groups

1. Pneumatic cylinder

Available as standard.

2. Pneumatic valves

Pneumatic valves are available as indicated below.

● Option
Ozone-proof specifications are available as an option.

● -P11
Parts are available as ozone-proof specifications by adding -P11 to the end of the model. (Custom order)

Ozone countermeasures
The material of rubber parts differs from standard parts.
(Dimensions are same as standard.)

Option applicable model

Series		Model no.	How to order
4G Series	4, 5 port valve	4G$^{A}_{B}$* M4G$^{A}_{B}$* MN4G$^{A}_{B}$*	Selectable with option symbol A Example) Discrete [Model No.] [Solenoid position] - [Port size] - [Electric connection] [Option] A - [Voltage]
	3 port valve	3G$^{A}_{B}$* M3G$^{A}_{B}$* MN3G$^{A}_{B}$*	
W4G2 Series	4, 5 port valve	W4GB2* MW4G$^{B}_{Z}$2*	Example) Manifold [Model No.] [Solenoid position] - [Port size] - [Electric connection] [Option] A - [Station No.] - [Voltage]
	3 port valve	MW3GA2*	
MN4E0 Series	4 port valve	MN4E0*	
	3 port valve	MN3E0*	

-P11 applicable model

Series		Model no.	How to order
4S0 Series	5 port valve	4S$^{A}_{B}$0* M4S$^{A}_{B}$0*	Available by adding -P11 to the end of the model. (Custom order) Example) Discrete [Model No.] [Solenoid position] - [Port size] - [Manual override] [Electric connection] [Option] - [Voltage] -P11 Example) Manifold [Model No.] [Solenoid position] - [Port size] - [Manual override] [Electric connection] [Option] - [Station No.] - [Voltage] -P11
4S1 Series	5 port valve	4S$^{A}_{B}$1* M(D)4S$^{A}_{B}$1*	
	3 port valve	3SA1* M(D)3SA1*	
MN4S0 Series	4 port valve	MN4S0* MT4S0*	
	3 port valve	MN3S0* MT3S0*	
4K Series	4, 5 port valve	4K$^{A}_{B}$* M4K$^{A}_{B}$* MN4KB*	
	3 port valve	3KA* M3KA*	
3M Series	3 port valve	3M$^{A}_{B}$0* M3M$^{A}_{B}$0*	
3P Series	3 port valve	3P$^{A}_{B}$* M3P$^{A}_{B}$*	

3.Refining and Pressure Adjusting Components (F.R.L.)

Refer to How to order for each device (Ending 10 to 19).

4. Pneumatic auxiliary components

Pneumatic auxiliary components are available as follows:

● Option
Ozone-proof specifications are available as an option.

● -P11
Parts are available as ozone-proof specifications by adding -P11 to the end of the model. (Custom order)

Ozone countermeasures

The material of rubber parts differs from standard parts.
(Dimensions are the same as standard parts.)

Option applicable model

Series	Model no.	How to order
Speed control valve Medium bore size type	SC1	Can be selected with option symbol "X1". SC1- (port size) -X1

-P11 applicable model

Series	Model no.	How to order
Speed control valve Direct piping, elbow type	SC3R	SC3R - [Port size] - [Option] P11
Speed control valve Elbow type, push-in joint	SC3W	SC3W - [Port size] - [Applicable tube] - [Option] P11
Miniature joint	F	F [Shape] [Flow path shape] [Applicable tube] - [Port size] - P11
Joint	GW	GW [Shape] [Applicable tube] - [Port size] - [Other combination] - P11
Joint stainless steel type	ZW	ZW - [Shape] [Applicable tube] - [Port size] - P11

* The following models are available as standard parts.
Speed control valve SCL2/SCD2 Series, silencer SLM/SLW Series, stainless type joint ZJ Series, tube F.U.KX

5. Sensors

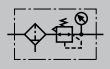
* The following models are available as standard parts.
· Mechanical pressure switch (reed type small pressure switch) P*100-W Series
· Pressure switch P4000-W Series

Filter regulator standard white series: Ozone proof

W1000-W/W3000-W W4000-W/W8000-W-P11 Series

Fluoro rubber and hydrogenated nitrile rubber, etc., used for rubber part materials.

· Port size: Rc1/8 to Rc1

JIS symbol 

RoHS CAD

How to order

W1000 – 6 ( ) – W – Z P11 – ( ) – A6W G49P

- Ⓐ Model no.
- Ⓑ Port size
- Ozone proof specifications
- Ⓒ Port thread type
- Ⓓ Option
  - Note 2
  - Note 3
  - Note 4
  - Note 5
  - Note 6
- Ⓔ Display unit
- Ⓕ Piping adapter set (Attached)
  - Note 7
  - Note 8
- Ⓖ Attachment (Attached)

Symbol		Descriptions	Ⓐ Model no. W1000	W3000	W4000	W8000
Ⓑ Port size						
6		1/8	●			
8		1/4	●	●	●	
10		3/8		●	●	
15		1/2			●	
20		3/4				●
25		1				●
Ⓒ Port thread type		**Note 9**				
Blank		Rc thread	●	●	●	●
N		NPT thread	●	●	●	●
G		G thread	●	●	●	●
Ⓓ Option						
Drainage	Blank	With manual drain cock	●	●	●	●
	F	Automatic drain with manual override (NO type)		●	●	●
	F1	Automatic drain with manual override (NC type)		●	●	●
	FF	Large automatic drain with manual override (NO type)				●
	FF1	Large automatic drain with manual override (NC type)				●
Bowl material	Blank	Polycarbonate bowl	●	●	●	●
	Z	Nylon bowl	●	●	●	●
	M	Metal bowl		●	●	●
Element	Blank	5μm	●	●	●	●
	Y	0.3μm (submicron)		●	●	●
Pressure range	Blank	0.05 to 0.85MPa	●	●	●	●
	L	0.05 to 0.35MPa	●	●	●	●
Relief	Blank	With relief mechanism	●	●	●	●
	N	Nonrelief type	●	●	●	●
Pressure gauge	Blank	With standard pressure gauge (G401)	●	●	●	●
	T	Without pressure gauge (a gauge port is assembled with sealed)	●	●	●	●
	T8	Pressure gauge attached option (a gauge port is assembled ventilated)	●	●	●	●
X1		IN/OUT reverse flow (right → left)	●	●	●	●
Ⓔ Display unit						
Blank		MPa display, Rc thread	●	●	●	●
J1		MPa display, NPT, G thread	●	●	●	●
Ⓕ Piping adapter set (attached)		**Note 10**				
Blank		Without attachment	●	●	●	●
A6*W		1/8 piping adapter set	●			
A8*W		1/4 piping adapter set	●	●	●	
A10*W		3/8 piping adapter set	●	●	●	
A15*W		1/2 piping adapter set		●	●	
A20*W		3/4 piping adapter set			●	●
A25*W		1 piping adapter set				●
A32*W		1 1/4 piping adapter set				●
***Adaptor screw type**						
Blank		Rc thread	●	●	●	●
N		NPT thread	●	●	●	●
G		G thread	●	●	●	●
Ⓖ Attachment (attached)		**Note 11**				
Blank		Without attachment	●	●	●	●
BW		C type bracket	●	●	●	●
B3W		L type bracket	●	●	●	
G49P		Pressure gauge: G49D-8-P10	●	●	●	●
G59P		Pressure gauge: G59D-8-P10	●	●	●	●
G40P		Pressure gauge: G40D-8-P10	●	●	●	●
G50P		Pressure gauge: G50D-8-P10	●	●	●	●
G41P		Pressure gauge: G41D-8-P10	●	●	●	●

⚠Note on model no. selection

Note 1: Refer to pages 334 and 335 for specifications and attachment.

Note 2: Select options per drainage, bowl material, element, and regulator sections.
When selecting options for several items, list options in order from the top.

Note 3: If "L" is selected for pressure range, a low pressure gauge (0 to 0.4MPa) is used.

Note 4: Minimum operating pressure of automatic drain is 0.1MPa for option symbol "F".
Initially generated drainage and air are purged until pressure reaches 0.1 MPa.

Note 5: Minimum operating pressure of automatic drain is 0.15MPa for option symbol "F1".

Note 6: For "T", a gauge plug is assembled instead of a pressure gauge.

Note 7: A piping adaptor set A*00-**-W is attached.

Note 8: The piping adapter set and C bracket cannot be used together.

Note 9: G threads and NPT threads are available for IN, OUT, gauge port and drain discharge port (metal bowl with automatic drain).

Note 10: The adapter port size can be selected from Rc, NPT or G.
Blank: Rc thread, N: NPT thread, G: G thread.
(example) A8G

Note 11: If NPT is selected for the Ⓒ piping thread, an NPT pressure gauge is enclosed. If an Rc or G thread is selected, an R thread pressure gauge is enclosed.

Dimensions

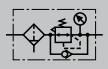
Same as standard products. Refer to pages 338 to 340.

Reverse filter and regulator standard white series: Ozone proof

W1100-W/W3100-W W4100-W/W8100-W-P11 Series

Fluoro rubber and hydrogenated nitrile rubber, etc., used for rubber part materials.

· Port size: Rc1/8 to Rc1

JIS symbol 

RoHS CAD

How to order

W1100 – 6 ( ) -W- Z P11– ( ) – A6W G49P

- A Model no.
- B Port size
- Ozone proof specifications
- C Port thread type
- D Option
  - Note 2
  - Note 3
  - Note 4
  - Note 5
  - Note 6
  - Note 7
  - * Refer to "Pneumatic, Vacuum and Auxiliary Components" for option.
- E Display unit
- F Piping adapter set (Attached)
  - Note 8
  - Note 9
- G Attachment (Attached)

Symbol		Descriptions	A Model no. W1100	W3100	W4100	W8100
B Port size						
6		1/8	●			
8		1/4	●	●	●	
10		3/8		●	●	
15		1/2			●	
20		3/4				●
25		1				●
C Port thread type		**Note 10**				
Blank		Rc thread	●	●	●	●
N		NPT thread	●	●	●	●
G		G thread	●	●	●	●
D Option						
Drainage	Blank	With manual drain cock	●	●	●	●
	F	Automatic drain with manual override (NO type)		●	●	●
	F1	Automatic drain with manual override (NC type)		●	●	●
	FF	Large automatic drain with manual override (NO type)				●
	FF1	Large automatic drain with manual override (NC type)				●
Bowl material	Blank	Polycarbonate bowl	●	●	●	●
	Z	Nylon bowl	●	●	●	●
	M	Metal bowl		●	●	●
Element	Blank	5µm	●	●	●	●
	Y	0.3µm (submicron)		●	●	●
Pressure range	Blank	0.05 to 0.85MPa	●	●	●	●
	L	0.05 to 0.35MPa	●	●	●	●
Relief	Blank	With relief mechanism	●	●	●	●
	N	Nonrelief type	●	●	●	●
Pressure gauge	Blank	With standard pressure gauge (G401)	●	●	●	●
	T	Without pressure gauge (a gauge port is assembled with sealed)	●	●	●	●
	T8	Pressure gauge attached option (a gauge port is assembled ventilated)	●	●	●	●
X1		IN/OUT reverse flow (right → left)	●	●	●	●
E Display unit						
Blank		MPa display, Rc thread	●	●	●	●
J1		MPa display, NPT, G thread	●	●	●	●
F Piping adapter set (attached)		**Note 11**				
Blank		Without attachment	●	●	●	●
A6*W		1/8 piping adapter set	●			
A8*W		1/4 piping adapter set	●	●	●	
A10*W		3/8 piping adapter set	●	●	●	
A15*W		1/2 piping adapter set		●	●	
A20*W		3/4 piping adapter set			●	●
A25*W		1 piping adapter set				●
A32*W		1 1/4 piping adapter set				●
***Adaptor screw type**						
Blank		Rc thread	●	●	●	●
N		NPT thread	●	●	●	●
G		G thread	●	●	●	●
G Attachment (attached)		**Note 12**				
Blank		Without attachment	●	●	●	●
BW		C type bracket	●	●	●	●
B3W		L type bracket	●	●	●	
G49P		Pressure gauge: G49D-8-P10	●	●	●	●
G59P		Pressure gauge: G59D-8-P10	●	●	●	●
G40P		Pressure gauge: G40D-8-P10	●	●	●	●
G50P		Pressure gauge: G50D-8-P10	●	●	●	●
G41P		Pressure gauge: G41D-8-P10	●	●	●	●

⚠Note on model no. selection

Note 1: Refer to pages 342 and 343 for specifications and attachment.

Note 2: Select options per drainage, bowl material, element, and regulator sections.
When selecting options for several items, list options in order from the top.

Note 3: If "L" is selected for pressure range, a low pressure gauge (0 to 0.4MPa) is used.

Note 4: **Positions of a check valve and pressure gauge can not be changed.**
If the reverse direction of IN and OUT are required, indicate "X1" in the end of optional section.

Note 5: Min. operating pressure of automatic drain is 0.1MPa for option symbol " F ".
Initially generated drainage and air are purged until pressure reaches 0.1 MPa.

Note 6: Minimum operating pressure of automatic drain is 0.15MPa for option symbol "F1".

Note 7: For "T", a gauge plug is assembled instead of a pressure gauge.

Note 8: A piping adaptor set A*00-**-W is attached.

Note 9: The piping adapter set and C bracket cannot be used together.

Note 10: G threads and NPT threads are available for IN, OUT, gauge port, and drain discharge port (metal bowl with automatic drain).

Note 11: The adapter port size can be selected from Rc, NPT or G.
Blank: Rc thread, N: NPT thread, G: G thread.
(example) A8G

Note 12: If NPT is selected for the Ⓒ piping thread, an NPT pressure gauge is enclosed. If an Rc or G thread is selected, an R thread pressure gauge is enclosed.

Dimensions

Same as standard products. Refer to pages 346 to 348.

Regulator standard white series: Ozone proof

R1000-W/R2000-W·R3000-W R4000-W/R6000-W·R8000-W-P11 Series

Fluoro rubber and hydrogenated nitrile rubber, etc., used for rubber part materials.

Port size: Rc1/8 to Rc1

JIS symbol 

RoHS CAD

How to order

R1000 – 6 ( ) -W- L P11 – ( ) – A6W BW

- Ⓐ Model no.
- Ⓑ Port size
- Ⓒ Port thread type
- Ⓓ Option
  - Note 2
  - Note 3
  - Note 4
  - *Refer to "Pneumatic, Vacuum and Auxiliary Components" for option.
- Ⓔ Display unit
- Ⓕ Piping adapter set (Attached) Note 5 Note 6
- Ⓖ Attachment (attached)
- Ozone proof specifications

Symbol	Descriptions	Ⓐ Model no. R1000	R2000	R3000	R4000	R6000	R8000
Ⓑ Port size							
6	1/8	●					
8	1/4	●	●	●	●		
10	3/8		●	●	●		
15	1/2				●		
20	3/4					●	●
25	1					●	●
Ⓒ Port thread type	**Note 7**						
Blank	Rc thread	●	●	●	●	●	●
N	NPT thread	●	●	●	●	●	●
G	G thread	●	●	●	●	●	●
Ⓓ Option							
Pressure range: Blank	0.05 to 0.85MPa	●	●	●	●	●	●
Pressure range: L	0.05 to 0.35MPa	●	●	●	●	●	●
Relief: Blank	With relief mechanism	●	●	●	●	●	●
Relief: N	Nonrelief type	●	●	●	●	●	●
Pressure gauge: Blank	With standard pressure gauge (G401)	●	●	●	●	●	●
Pressure gauge: T	Without pressure gauge (a gauge port is assembled with sealed)	●	●	●	●	●	●
Pressure gauge: T8	Pressure gauge attached option (a gauge port is assembled ventilated)	●	●	●	●	●	●
X1	IN/OUT reverse flow (right → left)	●	●	●	●	●	●
Ⓔ Display unit							
Blank	MPa display, Rc thread	●	●	●	●	●	●
J1	MPa display, NPT, G thread	●	●	●	●	●	●
Ⓕ Piping adapter set (attached)	**Note 7**						
Blank	Without attachment	●	●	●	●	●	●
A6*W	1/8 piping adapter set	●					
A8*W	1/4 piping adapter set	●	●	●	●		
A10*W	3/8 piping adapter set	●	●	●	●		
A15*W	1/2 piping adapter set		●	●	●		
A20*W	3/4 piping adapter set				●	●	●
A25*W	1 piping adapter set					●	●
A32*W	1 1/4 piping adapter set					●	●
***Adaptor screw type**							
Blank	Rc thread	●	●	●	●	●	●
N	NPT thread	●	●	●	●	●	●
G	G thread	●	●	●	●	●	●
Ⓖ Attachment (attached)	**Note 8**						
Blank	Without attachment	●	●	●	●	●	●
BW	C type bracket	●	●	●	●	●	●
B3W	L type bracket	●	●	●	●	●	
B4W	B type bracket		●				
G49P	Pressure gauge: G49D-8-P10	●	●	●	●	●	●
G59P	Pressure gauge: G59D-8-P10	●	●	●	●	●	●
G40P	Pressure gauge: G40D-8-P10	●	●	●	●	●	●
G50P	Pressure gauge: G50D-8-P10	●	●	●	●	●	●
G41P	Pressure gauge: G41D-8-P10	●	●	●	●	●	●

⚠Note on model no. selection

Note 1: Refer to pages 378 and 379 for specifications and attachment.
Note 2: When selecting options for several items, list options in order from the top.
Note 3: If "L" is selected for pressure range, a low pressure gauge (0 to 0.4MPa) is used.
Note 4: For "T", a gauge plug is assembled instead of a pressure gauge.
Working temperature becomes 5 to 50°C.
Note 5: A piping adaptor set A*00-**-W is attached.
Note 6: The piping adapter set and C bracket cannot be used together.
Note 7: G and NPT threads are available for IN, OUT, and gauge ports.
Note 8: The adapter port size can be selected from Rc, NPT or G. Blank: Rc thread, N: NPT thread, G: G thread.
(example) A8G
Note 9: If NPT is selected for the Ⓒ piping thread, an NPT pressure gauge is enclosed. If an Rc or G thread is selected, an R thread pressure gauge is enclosed.

Dimensions

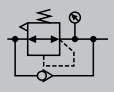
Same as standard products. Refer to pages 382 to 384.

Reverse regulator standard white series: Ozone proof

R1100-W/R2100-W/R3100-W R4100-W/R6100-W/R8100-W-P11 Series

Fluoro rubber and hydrogenated nitrile rubber, etc., used for rubber part materials.

Port size: Rc1/8 to Rc1

JIS symbol 

RoHS CAD

How to order

R1100 – 6 ( ) – W – L P11 – ( ) – A6W BW

- Ⓐ Model no.
- Ⓑ Port size
- Ⓒ Port thread type
- Ⓓ Option
  Note 2
  Note 3
  Note 4
  * Refer to "Pneumatic, vacuum and Auxiliary components" for option.
- Ozone proof specifications
- Ⓔ Display unit
- Ⓕ Piping adapter set (attached)
  Note 5
  Note 6
- Ⓖ Attachment (attached)

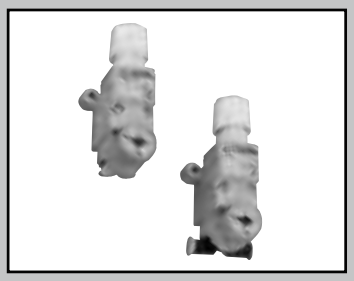
Symbol		Descriptions	Ⓐ Model no. R1100	R2100	R3100	R4100	R6100	R8100
Ⓑ Port size								
6		1/8	●					
8		1/4	●	●	●	●		
10		3/8		●	●	●		
15		1/2				●		
20		3/4					●	●
25		1					●	●
Ⓒ Port thread type		**Note 7**						
Blank		Rc thread	●	●	●	●	●	●
N		NPT thread	●	●	●	●	●	●
G		G thread	●	●	●	●	●	●
Ⓓ Option								
Pressure range	Blank	0.05 to 0.85MPa	●	●	●	●	●	●
	L	0.05 to 0.35MPa	●	●	●	●	●	●
Relief	Blank	With relief mechanism	●	●	●	●	●	●
	N	Nonrelief type	●	●	●	●	●	●
Pressure gauge	Blank	With standard pressure gauge (G401)	●	●	●	●	●	●
	T	Without pressure gauge (a gauge port is assembled with sealed)	●	●	●	●	●	●
	T8	Pressure gauge attached option (a gauge port is assembled ventilated)	●	●	●	●	●	●
X1		IN/OUT reverse flow (right → left)	●	●	●	●	●	●
Ⓔ Display unit								
Blank		MPa display, Rc thread	●	●	●	●	●	●
J1		MPa display, NPT, G thread	●	●	●	●	●	●
Ⓕ Piping adapter set (attached)		**Note 8**						
Blank		Without attachment	●	●	●	●	●	●
A6*W		1/8 piping adapter set	●					
A8*W		1/4 piping adapter set	●	●	●	●		
A10*W		3/8 piping adapter set	●	●	●	●		
A15*W		1/2 piping adapter set		●	●	●		
A20*W		3/4 piping adapter set				●	●	●
A25*W		1 piping adapter set					●	●
A32*W		1 1/4 piping adapter set					●	●
***Adaptor screw type**								
Blank		Rc thread	●	●	●	●	●	●
N		NPT thread	●	●	●	●	●	●
G		G thread	●	●	●	●	●	●
Ⓖ Attachment (attached)		**Note 9**						
Blank		Without attachment	●	●	●	●	●	●
BW		C type bracket			●	●		
B3W		L type bracket			●	●		
B4W		B type bracket		●				
G49P		Pressure gauge: G49D-8-P10	●	●	●	●	●	●
G59P		Pressure gauge: G59D-8-P10	●	●	●	●	●	●
G40P		Pressure gauge: G40D-8-P10	●	●	●	●	●	●
G50P		Pressure gauge: G50D-8-P10	●	●	●	●	●	●
G41P		Pressure gauge: G41D-8-P10	●	●	●	●	●	●

⚠Note on model no. selection

Note 1: Refer to pages 386 and 387 for specifications and attachment.
Note 2: When selecting options for several items, list options in order from the top.
Note 3: If "L" is selected for pressure range, a low pressure gauge (0 to 0.4MPa) is used.
Note 4: Positions of a check valve and pressure gauge can not be changed. If the reverse direction of IN and OUT are required, indicate "X1" in the end of optional section.
For "T", a gauge plug is assembled instead of a pressure gauge.
Note 5: A piping adaptor set A*00-**-W is attached.
Note 6: The piping adapter set and C bracket cannot be used together.
Note 7: G and NPT threads are available for IN, OUT, and gauge ports.
Note 8: The adapter port size can be selected from Rc, NPT or G. Blank: Rc thread, N: NPT thread, G: G thread. (example) A8G
Note 9: If NPT is selected for the Ⓒ piping thread, an NPT pressure gauge is enclosed. If an Rc or G thread is selected, an R thread pressure gauge is enclosed.

Dimensions

Same as standard products. Refer to pages 390 to 392.



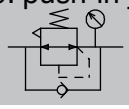
Small regulator: Ozone proof

RB500-P11 Series

Fluoro rubber and hydrogenated nitrile rubber, etc., used for rubber part materials.

Port size: push-in joint ø4, ø6

JIS symbol



How to order

RB500 - SSC4 - P G39 P11

- Model no.
- Ⓐ Connection
- Ozone proof specifications
- Ⓑ Option
- Ⓒ Pressure gauge

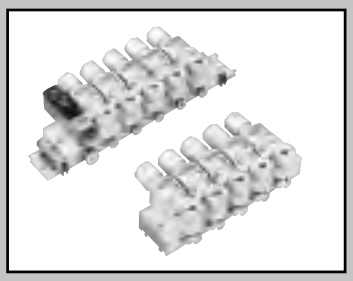
Symbol			Descriptions
Ⓐ Connection			
Direction	IN	S	Straight
		L	Elbow
	OUT	S	Straight
		L	Elbow
Port size		C4	ø4
		C6	ø6
Ⓑ Option			
Panel mount		Blank	Without nut
		P	With nut
Pressure range		Blank	0.05 to 0.7MPa
		L	0.05 to 0.35MPa
Relief		Blank	Relief type
		N	Nonrelief type
Ⓒ Pressure gauge			
T			Without pressure gauge
Blank (pressure range: blank)			With pressure gauge (G29D-6-P10)
Blank (pressure range: L)			With pressure gauge (G39D-6-P04)
G39D			With pressure gauge (G39D-6-P10)

Note on model no. selection

Note 1: Refer to page 590 for specifications.
Note 2: ø21 0 to 1.0MPa a pressure gauge is standard.
For low pressure, ø27 0 to 0.4 MPa low pressure gauge is provided.
Note 3: Indicate option symbol "P" for panel installation.

Dimensions

Same as standard products. Refer to page 591.



Block manifold regulator: Ozone proof

MNRB500-P11 Series

Fluoro rubber and hydrogenated nitrile rubber, etc., used for rubber part materials.
Port size: push-in joint ø4, ø6, ø8

RoHS CAD

How to order

MNRB500A - SSC64 - 5 - N G39 - D P11

- Ⓐ Model no. Note 1
- Ⓑ Joint type
- Ⓒ Port size
- Ⓓ Station number Note 2
- Ⓔ Option Note 3
- Ⓕ Pressure gauge Note 4
- Ⓖ Installation method
- Ozone proof specifications

Symbol	Descriptions
Ⓐ Model no.	
MNRB500A	Common supply type
MNRB500B	Individual supply type
Ⓑ Joint type	
IN direction	
S	Straight
L	Elbow
OUT direction	
S	Straight
L	Elbow

Ⓒ Port size IN-OUT		MNRB500A	MNRB500B
C64	IN;ø6, OUT;ø4	●	
C66	IN;ø6, OUT;ø6	●	
C84	IN;ø8, OUT;ø4	●	
C86	IN;ø8, OUT;ø6	●	
C4	IN, OUT;ø4		●
C6	IN, OUT;ø6		●

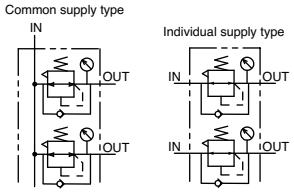
Ⓓ Station number	
1	1 station
2	2 stations
3	3 stations
4	4 stations
5	5 stations

Ⓔ Option		MNRB500A	MNRB500B
Blank	Standard products	●	
L	For low pressure	●	
N	Nonrelief	●	
T	Without pressure gauge	●	
X1	Right IN	●	

Ⓕ Pressure gauge	
Blank	Pressure gauge (G29D-6-P10)
	Low pressure gauge (for option "L") G39D-6-P04
G39	Pressure gauge (G39D-6-P10)

Ⓖ Installation method	
Blank	DIN rail installation
D	Direct mount

JIS symbol



⚠ Note on model no. selection

Note 1: Refer to page 596 for specifications.
Note 2: The air supply block is one station.
When using three or more stations simultaneously with the common supply, increase one supply block station for every three stations.
Designate with mixed manifold specifications.
Note 3: Up to five direct mounting stations can be used.
Note 4: Options and pressure gauges for each regulator block are the same.
Note 5: ø21; 0 to 1.0 MPa pressure gauge is provided as standard. Note that in use with low pressure, the ø27: 0 to 0.4 MPa low-pressure gauge is selected.
Note 6: Complete mixed manifold specifications on the page 609 when selecting specifications other than the basic model.

Dimensions

Same as standard products. Refer to pages 598 and 599.

Precision F.R. unit: Ozone proof

7170 Series

Fluoro rubber and hydrogenated nitrile rubber, etc., used for rubber part materials.
Port size: Rc1/4, 3/8

RoHS

How to order

7170 – **2C** – **EZXGB** **LP11**

- 7170: Ⓐ Model no.
- 2C: Ⓑ Port size (Note 2)
- EZXGB: Ⓒ Option (Note 1, Note 3, Note 4, Note 5)
- LP11: Ozone proof specifications

Symbol		Descriptions
Ⓑ Port size		
2C		Rc1/4
3C		Rc3/8
Ⓒ Option		
Drainage	**Blank**	Manual cock
	E	Flexible drain
Bowl material	**Blank**	Polycarbonate bowl
	Z	Nylon bowl
	M	Metal bowl
	MG	Metal bowl with gauge
Element	**Blank**	5μm
	X	3μm
	Y	0.3μm
Regulator	**Blank**	Standard
	K	Plastic knob
	L	For low pressure (0.01 to 0.25)
Attachment	**Blank**	Without attachment
	G	Pressure gauge (G59D-8-P02)
	B	Bracket

⚠ Note on model no. selection

Note 1: Refer to page 534 for specifications and attachment.
Note 2: If port size NPT screw is required, do not indicate nominal size C. (example) 7170-2
If a pressure gauge is selected, the NPT thread pressure gauge is enclosed.
Note 3: Two or more symbols can be selected each for "Regulator" and "Accessories."
Note 4: Drainage "E" and bowl material "M" or "MG" can not be combined.
Note 5: Indicate "M-G" or "MG-G" when selecting the bowl material "M" or "MG" and accessory "G".

Dimensions

Same as standard products. Refer to page 537.

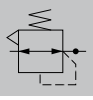
Regulator: Ozone proof

B2019/A2000-P11 Series

Fluoro rubber or hydrogenated nitrile rubber, etc., used for rubber part materials.

Port size: Rc1/8, Rc1/4

JIS symbol



RoHS CAD

How to order

B2019 – **1C** – **NPB** **P11**

- **P11**: Ozone proof specifications
- **B2019**: Ⓐ Model no.
- **1C**: Ⓑ Port size (Note 2)
- **NPB**: Ⓒ Option (Note 1, Note 3)

Symbol		Descriptions	Ⓐ Model no. Small B2019	Ⓐ Model no. Compact A2000
Ⓑ Port size				
1C		Rc1/8	●	
2C		Rc1/4	●	●
3C		Rc3/8		●
Ⓒ Option				
Regulator	**Blank**	Standard	●	●
	N	Nonrelief	●	●
	L	Low pressure (0.02 to 0.34MPa)	●	●
	K	Plastic knob		●
	P	Panel mount	●	●
Attachment	**Blank**	Without attachment	●	●
	G	Pressure gauge	●	●
	B	Bracket	●	●

⚠Note on model no. selection

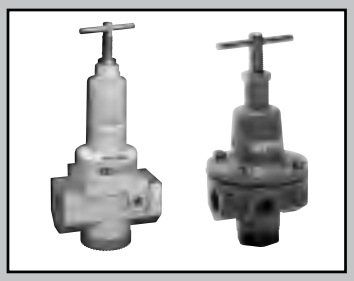
Note 1: Refer to pages 552 and 553 for specifications and attachment.

Note 2: If port size NPT screw is required, do not indicate nominal size C. Example) B2019-1

Note 3: For the B2019, the G49D-6-P10 (G49D-6-P04 for low-pressure) pressure gauge is enclosed, and for the A2000 type, the G59D-8-P10 (G59D-8-P04 for low-pressure) is enclosed.

Dimensions

Same as standard products. Refer to page 555.

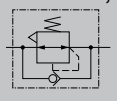


Reverse regulator (check valve integrated): Ozone proof

2400/2415-P11 Series

Fluoro rubber and hydrogenated nitrile rubber, etc., used for rubber part materials.

Port size: Rc1/8, Rc1/4

JIS symbol 

RoHS

How to order

2400 - 2C - NLGB P11

- 2400: Ⓐ Model no.
- 2C: Ⓑ Port size Note 2
- NLGB: Ⓒ Option Note 1 Note 3
- P11: Ozone proof specifications

Symbol		Descriptions	Ⓐ Model no. Compact 2400	Ⓐ Model no. Large 2415
Ⓑ Port size				
2C		Rc1/4	●	
3C		Rc3/8	●	
6C		Rc3/4		●
8C		Rc1		●
10C		Rc11/2		●
Ⓒ Option				
Regulator	**Blank**	Standard	●	●
	N	Nonrelief	●	●
	L	Low pressure (0.02 to 0.34MPa)	●	
	K	Plastic knob	●	●
	P	Panel mount	●	
Attachment	**Blank**	Without attachment	●	●
	G	Pressure gauge (G59D-8-P02)	●	●
	B	Bracket	●	

⚠Note on model no. selection

Note 1: Refer to pages 556 and 557 for specifications and attachment.
Note 2: If port size NPT screw is required, do not indicate nominal size C. Example) 2400-2
Note 3: The G59D-8-P10 (G59D-8-P04 for low pressure) pressure gauge is enclosed.

Dimensions

Same as standard products. Refer to page 559.

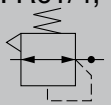
Precision regulator: Ozone proof

2100-P11 Series

Fluoro rubber and hydrogenated nitrile rubber, etc., used for rubber part materials.

Port size: Rc1/4, Rc3/8

JIS symbol



RoHS

How to order

2100 – 2C – L K P11

- 2100: Model no.
- 2C: Ⓐ Port size (Note 2)
- K: Ⓑ Option (Note 3)
- P11: Ozone proof specifications

Symbol		Descriptions
Ⓐ **Port size**		
2C		Rc1/4
3C		Rc3/8
Ⓑ **Option**		
Regulator	**K**	Plastic knob
	P	Panel mount
Attachment	**Blank**	Without attachment
	G	Pressure gauge (G59D-8-P02)
	B	Bracket

⚠Note on model no. selection

Note 1: Refer to page 656 for specifications and attachment.

Note 2: If port size NPT screw is required, do not indicate nominal size C. Example) 2100-2-L

Dimensions

Same as standard products. Refer to page 657.

International unit system (SI unit)

■ Conversion of SI units and conventional units

SI units (International units) are referred in this catalog.
Conversion for SI and conventional units is shown below.

■ SI unit conversion table (unit of a heavy line is SI unit.)

Conversion example (for pressure) $1kgf/cm^2 \Rightarrow 9.80665 \times 10^{-2}MPa$ $1MPa \Rightarrow 1.01972 \times 10 kgf/cm^2$

● Force

N	dyn	kgf
1	1×10^5	1.01972×10^{-1}
1×10^{-5}	1	1.01972×10^{-6}
9.80665	9.80665×10^5	1

● Viscosity

Pa/s	cP	P
1	1×10^3	1×10
1×10^{-3}	1	1×10^{-2}
1×10^{-1}	1×10^2	1

Note: 1P=1dyn/s/cm²=1g/cm/s,
1Pa/s=1N/s/m², 1cP=1mPa/S

● Stress

Pa or N/m²	MPa or N/mm²	kgf/mm²	kgf/cm²
1	1×10^{-6}	1.01972×10^{-7}	1.01972×10^{-5}
1×10^6	1	1.01972×10^{-1}	1.01972×10
9.80665×10^6	9.80665	1	1×10^2
9.80665×10^4	9.80665×10^{-2}	1×10^{-2}	1

Note: 1Pa=1N/m², 1MPa=1N/mm²

● Dynamic viscosity

m²/s	cSt	St
1	1×10^6	1×10^4
1×10^{-6}	1	1×10^{-2}
1×10^{-4}	1×10^2	1

Note: 1St=1cm²/s, 1cSt=1mm²/s

● Pressure

Pa	kPa	MPa	bar	kgf/cm²	atm	mmH₂O or mmAg	mmHg to Torr
1	1×10^{-3}	1×10^{-6}	1×10^{-5}	1.01972×10^{-5}	9.86923×10^{-6}	1.01972×10^{-1}	7.50062×10^{-3}
1×10^3	1	1×10^{-3}	1×10^{-2}	1.01972×10^{-2}	9.86923×10^{-3}	1.01972×10^2	7.50062
1×10^6	1×10^3	1	1×10	1.01972×10	9.86923	1.01972×10^5	7.50062×10^3
1×10^5	1×10^2	1×10^{-1}	1	1.01972	9.86923×10^{-1}	1.01972×10^4	7.50062×10^2
9.80665×10^4	9.80665×10	9.80665×10^{-2}	9.80665×10^{-1}	1	9.67841×10^{-1}	1×10^4	7.35559×10^2
1.01325×10^5	1.01325×10^2	1.01325×10^{-1}	1.01325	1.03323	1	1.03323×10^4	7.60000×10^2
9.80665	9.80665×10^{-3}	9.80665×10^{-6}	9.80665×10^{-5}	1×10^{-4}	9.67841×10^{-5}	1	7.35559×10^{-2}
1.33322×10^2	1.33322×10^{-1}	1.33322×10^{-4}	1.33322×10^{-3}	1.35951×10^{-3}	1.31579×10^{-3}	1.35951×10	1

Note: 1Pa=1N/m²

● Job, energy, calorie

J	kW/h	kgf/m	kcal
1	2.77778×10^{-7}	1.01972×10^{-1}	2.38889×10^{-4}
3.600×10^6	1	3.67098×10^5	8.6000×10^2
9.80665	2.72407×10^{-6}	1	2.34270×10^{-3}
4.18605×10^3	1.16279×10^{-3}	4.26858×10^2	1

Note: 1J=1W/s, 1J=1N/m, 1cal=4.18605J (according to the Measurement Law)

● Thermal conduction ratio

W/(m·k)	kcal/ (h·m·°C)
1	8.6000×10^{-1}
1.16279	1

Note: 1cal=4.18605J (according to the Measurement Law)

● Coefficient of heat transfer

W/(m²·k)	kcal/(h·m²·°C)
1	8.6000×10^{-1}
1.16279	1

Note: 1cal=4.18605J (according to the Measurement Law)

● Power, heat flow

W	kgf/m/s	PS	kcal/h
1	1.01972×10^{-1}	1.35962×10^{-3}	8.6000×10^{-1}
9.80665	1	1.33333×10^{-2}	8.43371
7.355×10^2	7.5×10	1	6.32529×10^2
1.16279	1.18572×10^{-1}	1.58095×10^{-3}	1

Note: 1W=1J/s, PS: French horsepower
1PS=0.7355kW (according to the Measurement Law construction law)
1cal=4.18605J (according to the Measurement Law)

● Specific heat

J/(kg·k)	kcal/(kg·°C) cal/(g·°C)
1	2.38889×10^{-4}
4.18605×10^3	1

Note: 1cal=4.18605J (according to the Measurement Law)

JIS symbol

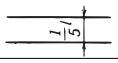
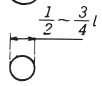
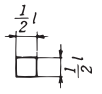
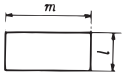
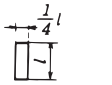
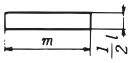
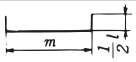
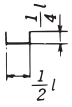
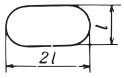
JIS symbols used in this catalog are old symbols following JISB0125-1: 2001.
Refer to JISB0125-1: 2007 or JFPS2011: 2006 for new symbols.

CAD data is available.

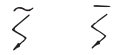
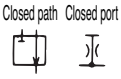
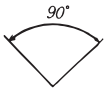
JIS symbol list

1 Element of symbol

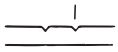
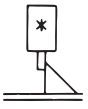
(a) Symbol element

Name	Symbol	Applications	Remarks
Line			
Continuous line		(1) Main line (2) Supply line to pilot valve (3) Electric signals line	· Return line included · Others: Indicate the electrical symbol to identify from the piping path
Broken line		(1) Pilot operation line (2) Drain line (3) Filter (4) Valve switching position	· Internal pilot · External pilot
Dashed line		Envelopment line	· Envelopment line indicating unit with more than one function
Double line		Mechanical connection	· Rotary shaft, lever, piston rod, etc.
Circle			
Large circle		Energy converter	· Pump, compressor, electric motor, etc.
Medium circle		(1) Measuring instrument (2) Rotary joint	
Small circle		(1) Check valve (2) Link (3) Roller	· Roller: Put a point on the center.
Point		(1) Line connection (2) Roller shaft	
Half circle		Pump or actuator whose turning angle is limited	
Square		(1) Fluid control components (2) Driving motor other than electric motor	· The port intersects vertically with the side.
		Fluid adjustment components	· The port intersects with the corner. · Filter, drain separator, lubricator, heat exchanger etc.
		(1) Cushion in cylinder (2) Weight in accumulator	
Rectangle		(1) Cylinder (2) Valve	· $m>l$
		Piston	
		Specific operations	· $l \leqq m \leqq 2l$ · Refer to No. 3 (a)
Other			
Hollow type (large)		Oil tank (ventilation type)	· $m>l$
Hollow type (small)		Local display of oil tank (ventilation type)	
Capsule type		(1) Oil tank (closed type) (2) Pneumatics tank (3) Accumulator (4) Auxiliary gas vessel	

(b) Functional element

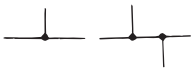
Name	Symbol	Applications	Remarks
Equilateral triangle			· Direction of fluid energy · Fluid type · Energy source display
Painted		Hydraulics	
White		Compressed air and other gas pressure	· Including emission to atmosphere
Arrow display Straight or oblique line		(1) Linear movement (2) Fluid flow path and direction in valve (3) Direction of heat flow	
Curve		Rotary motion	· Arrow indicates the rotational direction viewed from a free end of a shaft
Oblique line		Variable operation or adjustment method	· Draw oblique line with appropriate length · Pump, spring, variable solenoid etc.
Other		Electric	
			· Use the following symbols when AC and DC identification is required: 
		Closed path or closed port	
		Solenoid	
		Temperature instruction or adjustment	
		Driving motor	
		Spring	· Refer to 7 · The number of crests should be two.
		Needle valve	
		Mnemonic symbol of valve seat of check valve	

(c) Mechanical element

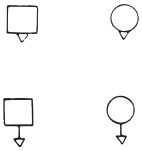
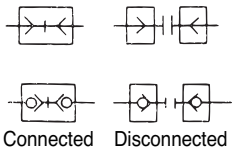
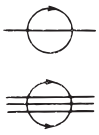
Name	Symbol	Remarks
Rod		· 2 way operation · Arrow indication is optional
Rotary shaft		· 2 way operation · Arrow indication is optional
Detent		· 2 way operation · Vertical line on notch indicates clamp
Latch		· 1 way operation · *Symbol shows release method.

Name	Symbol	Remarks
Over center mechanism		• 2 way operation

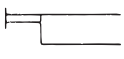
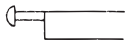
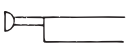
2 Line and connecting port
(a) Line

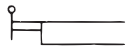
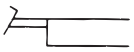
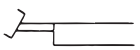
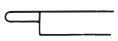
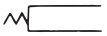
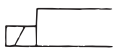
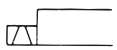
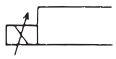
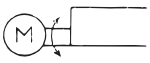
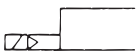
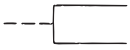
Name	Symbol	Remarks
Connection		
Cross		• Not connected
Flexible line		• Hose (normally connected to movable portion)

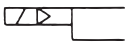
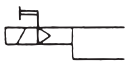
(b) Connecting port

Name	Symbol	Remarks
Air vent		• Performing air vent continuously • Performing air vent in the specified period, then closes. • Performing air vent by using check mechanism, if required
Exhaust port		• Pneumatics dedicated • Without connecting port • With connecting port
Quick joint	 Connected Disconnected	• Without check valve • With check valve (Self seal joint)
Rotary joint 1 line 3 lines		• Swivel and rotary joint • 1 way rotation • 2 way rotation

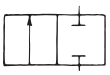
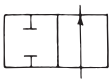
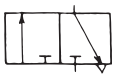
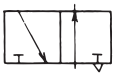
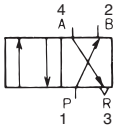
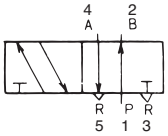
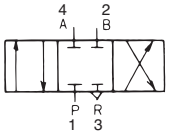
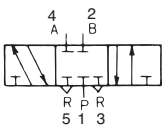
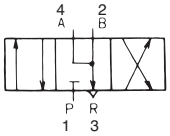
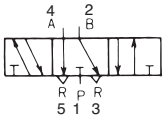
3 directional control valve
(a) Operation method

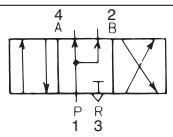
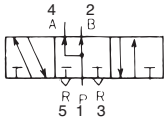
Name	No.	Symbol	Remarks
Manual control	⑩		• General symbols when the operation method is not indicated or when the number of operation directions is not specified
Pushbutton	⑪		• 1 way operation
Pull-button	⑫		• 1 way operation
Push/pull button	⑬		• 2 way operation

Name	No.	Symbol	Remarks
Lever	⑭		• 2 way operation (including rotary motion)
Pedal	⑮		• 1 way operation (including rotary motion)
Pedal for both foot	⑯		• 2 way operation (including rotary motion)
Mechanical control plunger	⑳ ㉑		• 1 way operation
Variable stroke length limiter	㉒		• 2 way operation
Spring	㉓		• 1 way operation
Roller	㉔		• 2 way operation
Pull roller	㉕		• Arrow shows operation direction. Indication may be omitted. • 1 way operation
Electrical control	㉚		• Solenoid, torque motor, etc.
Direct electric actuator Single acting solenoid	㉛		• 1 way operation • The oblique line can slant downward to the right.
Double acting solenoid	㉜		• 2 way operation • The oblique line can spread upward.
Single-acting variable solenoid actuator	㉝		• 1 way operation • Proportional solenoid • Force motor etc.
Double acting variable solenoid actuator	㉞		• 2 way operation • Torque motor
Rotary electric actuator	㉟		• 2 way operation • Electric motor
Indirect electric actuator Single acting solenoid	㊱		* JIS categorize this as pilot operation, but the valve is typically used as a solenoid valve, so the transfer symbol (36) and (37) has been used for the electric operation classification.
Double acting solenoid	㊲		
Pilot operation	㊵		
Direct pilot operation	㊶		• If pressurized areas differ, indicate numbers indicating the area ratio in the rectangle if necessary.
Internal pilot	㊸		• The operation flow path is inside of device.
External pilot	㊹		• The operation flow path is outside of device.

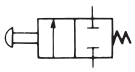
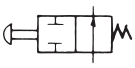
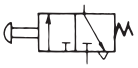
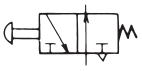
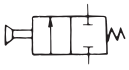
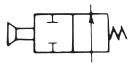
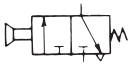
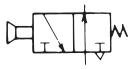
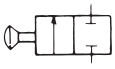
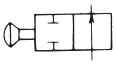
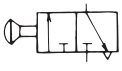
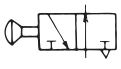
Name	No.	Symbol	Remarks
Indirect pressure control operation Pressurized operation method Pneumatics pilot	㊷		• Internal pilot • No primary operation
Electromagnetic, pneumatics pilot	㊱		• Primary operation by single-acting solenoid • Internal pilot * Since this is generally used as solenoid valve, categorized as electric operation code. Signs are arranged as ㉚'s.
Electromagnetic, pneumatics pilot with manual override	㊱ ⑩		• Valve with manual override added to the above operation

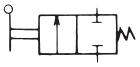
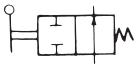
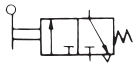
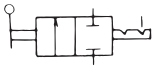
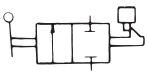
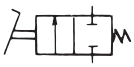
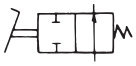
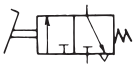
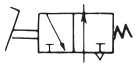
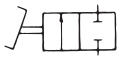
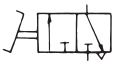
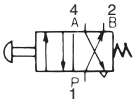
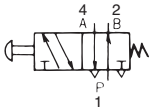
(b) Directional control valve basic type

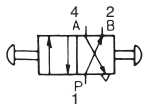
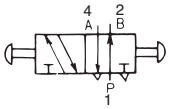
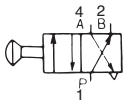
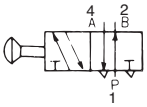
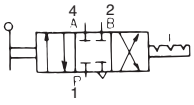
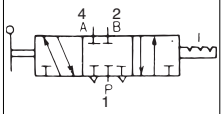
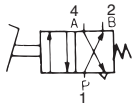
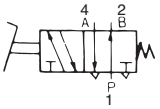
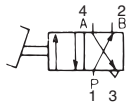
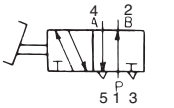
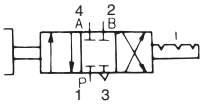
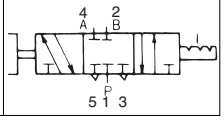
No. of port	No. of position	Status of normal position	No.	Symbol	Remarks
2	2	Normally closed	Ⓐ		Normally closed
2	2	Normally open	Ⓑ		Normally open
3	2	Normally closed	Ⓒ		
3	2	Normally open	Ⓓ		
4	2	PB connection	Ⓔ		
				Note) Numerals indicate of JISB8375 (ISO5599).	
5	2	PB connection	Ⓕ		
4	3	All ports closed	Ⓖ		
5	3	All ports closed	Ⓗ		
4	3	A/B/R connection	Ⓘ		
5	3	A/B/R connection	Ⓙ		

No. of port	No. of position	Status of normal position	No.	Symbol	Remarks
4	3	P/A/B connection	Ⓚ		
5	3	P/A/B connection	Ⓛ		
				Note: Numerals indicate JISB8375 (ISO5599).	

(c) Manual control valve

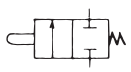
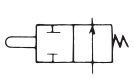
Name			Combination symbol			Symbol
Basic type and operation method	No. of port	No. of position	Operation mechanism	Basic type	Operation mechanism	
Direct acting normally closed pushbutton, spring and return	2	2	⑪	Ⓐ	㉓	
Direct acting normally open pushbutton, spring and return	2	2	⑪	Ⓑ	㉓	
Direct acting normally closed pushbutton, spring and return	3	2	⑪	Ⓒ	㉓	
Direct acting normally open pushbutton, spring and return	3	2	⑪	Ⓓ	㉓	
Direct acting normally closed pull-button, spring and return	2	2	⑫	Ⓐ	㉓	
Direct acting normally open pull-button, spring and return	2	2	⑫	Ⓑ	㉓	
Direct acting normally closed pull-button, spring and return	3	2	⑫	Ⓒ	㉓	
Direct acting normally open pull-button, spring and return	3	2	⑫	Ⓓ	㉓	
Direct acting normally closed push/pull button	2	2	⑬	Ⓐ		
Direct acting normally open push/pull button	2	2	⑬	Ⓑ		
Direct acting normally closed push/pull button	3	2	⑬	Ⓒ		
Direct acting normally open push/pull button	3	2	⑬	Ⓓ		

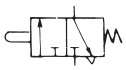
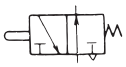
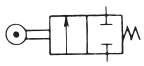
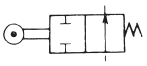
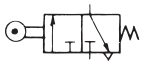
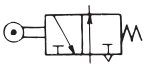
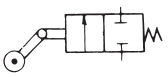
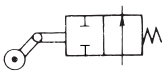
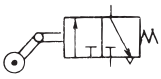
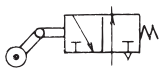
Name	No. of port	No. of position	Combination symbol: Operation mechanism	Combination symbol: Basic type	Combination symbol: Operation mechanism	Symbol
Direct acting normally closed lever, spring and return	2	2	⑭	Ⓐ	㉓	
Direct acting normally open lever, spring and return	2	2	⑭	Ⓑ	㉓	
Direct acting normally closed lever, spring and return	3	2	⑭	Ⓒ	㉓	
Direct acting normally open lever, spring and return	3	2	⑭	Ⓓ	㉓	
Direct acting lever with detent	2	2	⑭	Ⓐ	③	
Direct acting lever with detent	3	2	⑭	Ⓒ	③	(3) Detent 1 (c) (4) Latch 1 (c) Generally, key selector valve
Direct acting lever with latch	2	2	⑭	Ⓐ	④	
Direct acting lever with latch	3	2	⑭	Ⓒ	④	
Direct acting normally closed pedal, spring and return (foot valve)	2	2	⑮	Ⓐ	㉓	
Direct acting normally open pedal, spring and return	2	2	⑮	Ⓑ	㉓	
Direct acting normally closed pedal	3	2	⑮	Ⓒ	㉓	
Direct acting normally open pedal	3	2	⑮	Ⓓ	㉓	
Direct acting double pedal (foot valve for both foot)	2	2	⑯	Ⓐ		
Direct acting double pedal (foot valve for both foot)	3	2	⑯	Ⓒ		
Direct acting pushbutton spring and return	4	2	⑪	Ⓔ	㉓	
Direct acting pushbutton spring and return	5	2	⑪	Ⓕ	㉓	

Name	No. of port	No. of position	Combination symbol: Operation mechanism	Combination symbol: Basic type	Combination symbol: Operation mechanism	Symbol
Direct acting both sides operation pushbutton	4	2	⑪	Ⓔ	⑪	
Direct acting both sides operation pushbutton	5	2	⑪	Ⓕ	⑪	
Direct acting push/pull button	4	2	⑬	Ⓔ		
Direct acting push/pull button	5	2	⑬	Ⓕ		
Direct acting closed center lever with detent	4	3	⑭	Ⓖ	③	
Direct acting closed center lever with detent	5	3	⑭	Ⓗ	③	
Direct acting pedal spring and return (foot valve)	4	2	⑮	Ⓔ	㉓	
Direct acting pedal spring and return (foot valve)	5	2	⑮	Ⓕ	㉓	
Direct acting double pedal (foot valve)	4	2	⑯	Ⓔ		
Direct acting double pedal (foot valve)	5	2	⑯	Ⓕ		
Direct acting double pedal all ports closed with detent	4	3	⑯	Ⓖ	③	
Direct acting double pedal all ports closed with detent	5	3	⑯	Ⓗ	③	

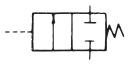
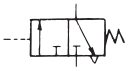
Note: Numerals indicate JISB8375 (ISO5599).

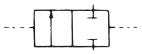
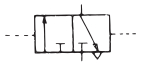
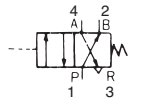
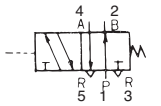
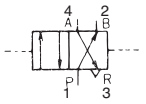
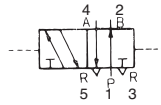
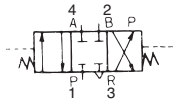
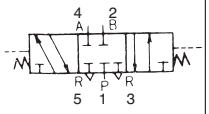
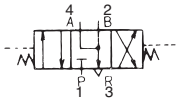
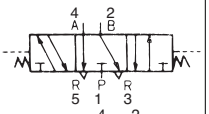
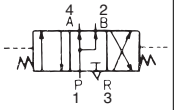
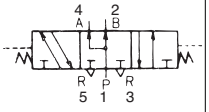
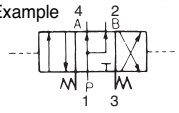
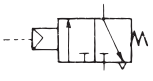
(d) Mechanical control valve

Name	No. of port	No. of position	Combination symbol: Operation mechanism	Combination symbol: Basic type	Combination symbol: Operation mechanism	Symbol
Direct acting normally closed plunger spring and return	2	2	㉑	Ⓐ	㉓	
Direct acting normally open plunger spring and return	2	2	㉑	Ⓑ	㉓	

Name	No. of port	No. of position	Combination symbol: Operation mechanism	Combination symbol: Basic type	Combination symbol: Operation mechanism	Symbol
Direct acting normally closed plunger	3	2	㉑	Ⓒ	㉓	
Direct acting normally open plunger	3	2	㉑	Ⓓ	㉓	
Direct acting normally closed roller spring and return	2	2	㉔	Ⓐ	㉓	
Direct acting normally open roller spring and return	2	2	㉔	Ⓑ	㉓	
Direct acting normally closed roller spring and return	3	2	㉔	Ⓒ	㉓	
Direct acting normally open roller spring and return	3	2	㉔	Ⓓ	㉓	
Direct acting normally closed single roller spring and return	2	2	㉕	Ⓐ	㉓	
Direct acting normally open single roller spring and return	2	2	㉕	Ⓑ	㉓	
Direct acting normally closed single roller spring and return	3	2	㉕	Ⓒ	㉓	
Direct acting normally open single roller spring and return	3	2	㉕	Ⓓ	㉓	

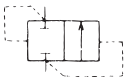
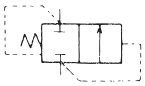
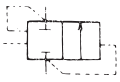
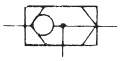
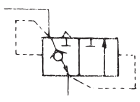
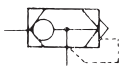
(e) Pilot operated valve

Name	No. of port	No. of position	Combination symbol: Operation mechanism	Combination symbol: Basic type	Combination symbol: Operation mechanism	Symbol
Direct acting pilot normally closed spring and return	2	2	㊶	Ⓐ	㉓	
Direct acting pilot normally open spring and return	2	2	㊶	Ⓑ	㉓	
Direct acting pilot normally closed spring and return	3	2	㊶	Ⓒ	㉓	
Direct acting pilot normally open pilot	3	2	㊶	Ⓓ	㉓	

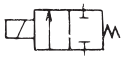
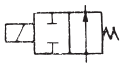
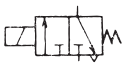
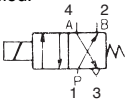
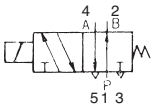
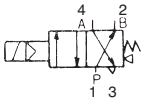
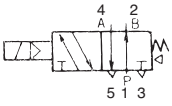
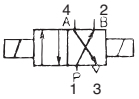
Name	No. of port	No. of position	Combination symbol: Operation mechanism	Combination symbol: Basic type	Combination symbol: Operation mechanism	Symbol
Direct acting both sides pilot	2	2	㊶	Ⓐ	㊶	
Direct acting both sides pilot	3	2	㊶	Ⓒ	㊶	
Direct acting pilot spring and return	4	2	㊶	Ⓔ	㉓	
Direct acting pilot spring and return	5	2	㊶	Ⓕ	㉓	
Direct acting both sides pilot	4	2	㊶	Ⓔ	㊶	
Direct acting both sides pilot	5	2	㊶	Ⓕ	㊶	
Direct acting all ports closed both sides pilot spring and center	4	3	㊶ ㉓	Ⓖ	㊶ ㉓	
Direct acting all ports closed both sides pilot spring and center	5	3	㊶ ㉓	Ⓗ	㊶ ㉓	
Direct acting A/B/R connection both sides pilot spring and center						
Direct acting both sides pilot A/B/R connection spring and center						
Direct acting P/A/B connection both sides pilot spring and center						* 
Direct acting P/A/B connection both sides pilot spring and center						
						* The basic valve's center position operation symbol can be written with a leader line to the basic valve center position in the drawing. Example 
Indirect acting normally closed pilot spring and return						

Note: Numerals indicate JISB8375 (ISO5599).

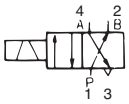
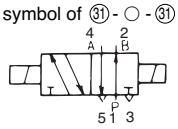
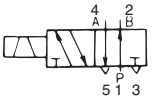
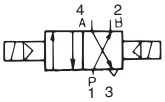
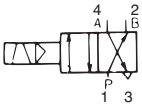
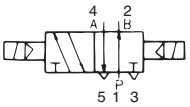
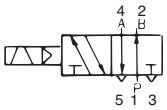
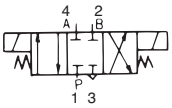
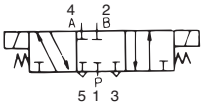
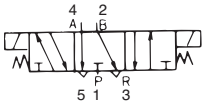
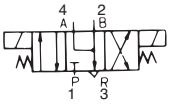
(f) Check, shuttle and exhaust valve

Name	Combination symbol: Operation mechanism	Combination symbol: Basic type	Combination symbol: Operation mechanism	Symbol (Details and simple symbol)	No.
Check valve without spring	㊸	Ⓐ	㊸	 Simple symbol 	ⓐ
Check valve with spring	㊸ ㉓	Ⓐ	㊸	 Simple symbol 	ⓐ'
Pilot operation check valve	㊶ ㊸	Ⓐ	㊸	 Valve is closed by external pilot Simple symbol 	ⓑ
High pressure priority type shuttle valve	㊸	Ⓒ	㊸	 Simple symbol 	ⓒ
Low pressure priority type shuttle valve				 The low pressure inlet is connected to the low-pressure priority output, and the high-pressure inlet is closed. Simple symbol 	ⓓ
Quick exhaust valve				 Simple symbol 	ⓔ

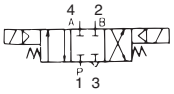
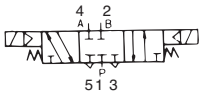
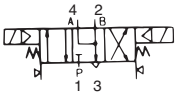
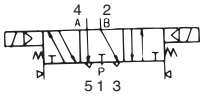
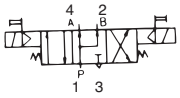
(g) Solenoid valve

Name: Basic type and operation method	No. of port	No. of position	Combination symbol: Operation mechanism	Combination symbol: Basic type	Combination symbol: Operation mechanism	Symbol
Direct acting normally closed single acting solenoid spring and return	2	2	㉛	Ⓐ	㉓	
Direct acting normally open single acting solenoid spring and return	2	2	㉛	Ⓑ	㉓	
Direct acting normally closed single acting solenoid	3	2	㉛	Ⓒ	㉓	
Direct acting normally open single acting solenoid	3	2	㉛	Ⓓ	㉓	
Direct acting both sides solenoid	2	2	㉛	Ⓐ	㉛	
Direct acting both sides solenoid	3	2	㉛	Ⓒ	㉛	
Direct acting double acting solenoid * Use this when the relationship to the electric signal need not be indicated.	3	2	㉜	Ⓒ		 * Position and functions of valving element is specified.
Direct acting single acting solenoid	4	2	㉛	Ⓔ	㉓	
Direct acting single acting solenoid	5	2	㉛	Ⓕ	㉓	
Indirect acting single acting solenoid spring and return * Pressure and return	4	2	㊱	Ⓔ	㉓ ㊸	
Indirect acting single acting solenoid spring and return * Pressure and return	5	2	㊱	Ⓕ	㉓	 * For the pressure and return operation symbol, indicate the function element triangle at the edge.
Direct acting both sides solenoid	4	2	㉛	Ⓔ	㉛	

Note: Numerals indicate JISB8375 (ISO5599).

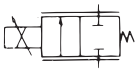
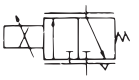
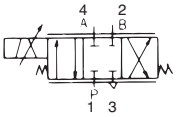
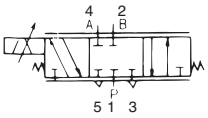
Name	No. of port	No. of position	Combination symbol: Operation mechanism	Combination symbol: Basic type	Combination symbol: Operation mechanism	Symbol
Direct acting double acting solenoid	4	2	㉜	Ⓔ		
Direct acting both sides solenoid	5	2	㉛	Ⓕ	㉛	
Direct acting double acting solenoid	5	2	㉜	Ⓕ		
Indirect operation both sides solenoid	4	2	㊱	Ⓔ	㊱	
Indirect operation double acting solenoid	4	2	㊲	Ⓔ		
Indirect operation both sides solenoid	5	2	㊱	Ⓕ	㊱	
Indirect operation double acting solenoid	5	2	㊲	Ⓕ		
Direct acting all ports closed both sides solenoid spring center	4	3	㉛ ㉓	Ⓖ	㉛ ㉓	
Direct acting all ports closed both sides solenoid spring center	5	3	㉛ ㉓	Ⓗ	㉛ ㉓	
Direct acting A/B/R connection both sides solenoid spring center	4	3	㉛ ㉓	Ⓘ	㉛ ㉓	
Direct acting A/B/R connection both sides solenoid spring center	5	3	㉛ ㉓	Ⓙ	㉛ ㉓	
Direct acting P/A/B connection both sides solenoid spring center	4	3	㉛	Ⓚ	㉛	

* As stated above, JIS stipulates that this is not required if the relationship to the electrical signal need not be indicated. If it is specified, ㉜ may be used as mnemonic symbol of ㉛ - ○ - ㉛.

Name	No. of port	No. of position	Combination symbol: Operation mechanism	Combination symbol: Basic type	Combination symbol: Operation mechanism	Symbol
Direct acting PAB both sides solenoid spring center pressure center used together	5	3	㉛ ㉓ ㊸	Ⓛ	㉛ ㊸ ㉓	
Direct acting P/A/B connection both sides solenoid with manual override			㉛ ⑩ ㉓ ㊸	Ⓛ	㉛ ⑩ ㊸ ㉓	
Indirect operation all ports closed both sides solenoid spring center	4	3	㊱ ㉓	Ⓖ	㊱ ㉓	
Indirect operation all ports closed both sides solenoid spring center	5	3	㊱ ㉓ ㊸	Ⓗ	㊱ ㉓	
Indirect operation A/B/R connection both sides solenoid spring center pressure center used together	4	3	㊱ ㉓ ㊸	Ⓘ	㊱ ㊸ ㉓	
Indirect operation A/B/R connection both sides solenoid spring center pressure center used together	5	3	㊱ ㉓ ㊸	Ⓙ	㊱ ㊸ ㉓	
Indirect operation P/A/B connection both sides solenoid spring center pilot manual with override	4	3	㊱ ⑩ ㉓	Ⓚ	㊱ ⑩ ㉓	
Indirect acting P/A/B connection both sides solenoid spring center with manual override	5	3	㊱ ⑩ ㉓	Ⓛ	㊱ ⑩ ㉓	

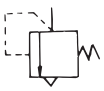
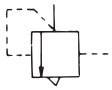
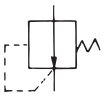
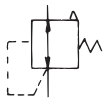
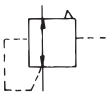
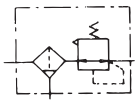
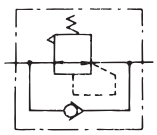
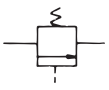
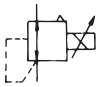
* If the diagram is difficult to read when all symbols are indicated on both ends, separate symbols.

Note: Numerals are indication of JISB8375 (ISO5599).

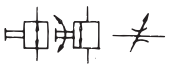
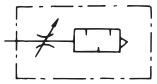
Name			Combination symbol			Symbol
Basic type and operation method	No. of port	No. of position	Operation mechanism	Basic type	Operation mechanism	
(Proportional control valve) Direct acting electromagnetic proportional flow control valve	2		㉝	Ⓐ	㉓	
Direct acting electromagnetic proportional flow control valve	3		㉝	Ⓒ	㉓	
(Servo valve) Direct acting electromagnetic servo control spring center	4		㉞ ㉓	Ⓖ	㉓	
Direct acting electromagnetic servo control spring center	5		㊱ ㉓	Ⓗ	㉓	

Note: Numerals are indication of JISB8375 (ISO5599).

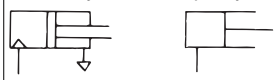
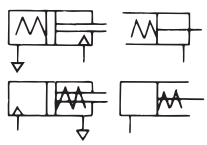
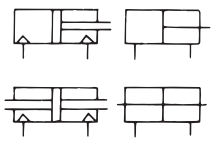
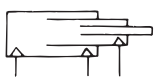
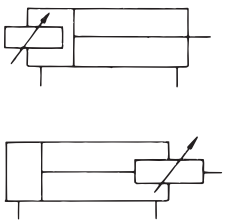
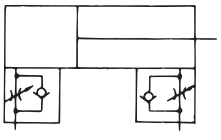
4 Pressure control valve

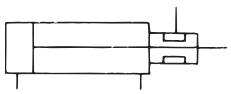
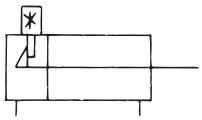
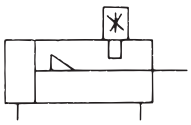
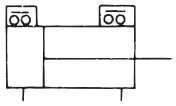
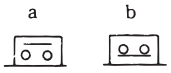
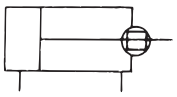
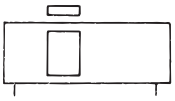
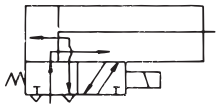
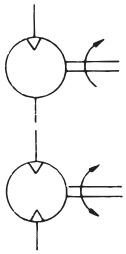
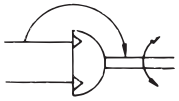
Name	Symbol	Remarks
Relief valve		Direct acting or general symbol
Pilot operated relief valve		
Regulator		Non-relief type
Regulator with relief		
Pilot operated regulator		
Regulator with filter		
Regulator with check valve		
Sequence valve		
Proportional electromagnetic pressure control valve		

5 Flow control valve

Name	Symbol	Remarks
Metering valve Variable metering valve	Details symbol Mnemonic symbol 	• In mnemonic symbols, operation method and valve's state are not indicated • The fully closed state is not usually used.
Stop valve		
Speed control valve		• With variable needle valve • One direction is free flow, while the other direction is controlled flow
Metering valve		
Metering valve with silencer		

6 Cylinder and motor

Name	Symbol	Remarks
Single acting cylinder	Details symbol Simple symbol 	• Extend type • Single rod type • Exhaust to atmosphere
Single acting cylinder (with spring)	(1) (2) 	• Single rod type (1) Rod extended by spring force (2) Rod retracted by spring force
Double acting cylinder	(1) (2) 	(1) Single rod type (2) Double rod type
Double acting telescope type cylinder	◎ 	
Cylinder with adjustable stroke (Head end) Cylinder with adjustable stroke (Rod end)	◎ 	Reference: Followed JISB8368 names In JISB01421984, the head is on the cap side and the rod side is on the head side.
Cylinder with speed control valve		• Example of meter-out

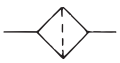
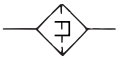
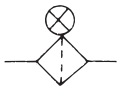
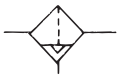
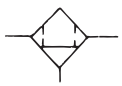
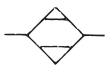
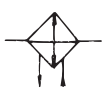
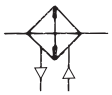
Name	Symbol	Remarks
Cylinder with brake	◎ 	• Describe the braking method if required.
Cylinder with end lock	(1)◎  (2)◎ 	* Symbol showing how to release Symbol (1) Head end (2) Rod end Note: Nominal values follow JISB83681999.
Cylinder with switch	◎ 	• Specify a and b contact 
Non-rotating cylinder	◎ 	
Rodless cylinder	◎ 	
Cylinder with valve		• Example of push type during energizing
Air motor		• 1 direction flow • 1 direction rotation type • 2 direction flow • 2 direction rotation type
Oscillator		• Pneumatics • Constant angle • 2 direction oscillation type • Drawings of arrows to indicate relationship of the shaft rotation direction and flow direction are optional.

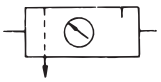
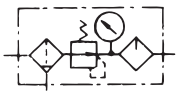
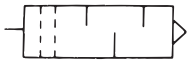
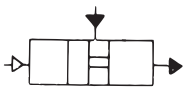
7 Power source and tank

Name	Symbol	Remarks
Hydraulics (power) source		• General symbols
Pneumatics (power) source		• General symbols
Electric motor		

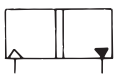
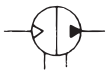
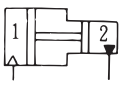
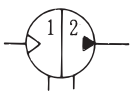
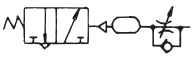
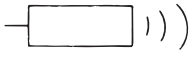
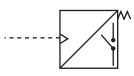
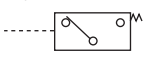
Name	Symbol	Remarks
Driving motor		(Excluding electric motor)
Air tank		

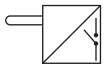
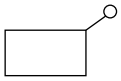
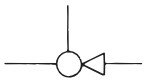
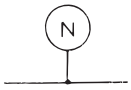
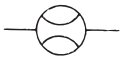
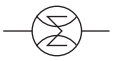
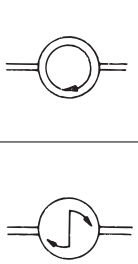
8 Clean air unit

Name	Symbol	Remarks
Filter	(1)  (2)  (3) 	(1) General symbols (2) With magnet (3) With clogging indicator
Filter with drain discharger	(1)  (2) 	(1) Manual discharge (2) Automatic discharge
Oil mist separator	(1)  (2) 	(1) Manual discharge (2) Automatic discharge
Micro mist separator	(1)◎  (2)◎  (3)◎ 	(1) Manual discharge (2) Automatic discharge (3) Deodorization filter
Drainage	(1)  (2) 	(1) Manual discharge (2) Automatic discharge
Air dryer		
After cooler	(1)  (2)  (3) 	(1) Water cooling type (When not showing the coolant pipe path) (2) Water cooling type (When showing the coolant pipe path) (3) Air cooling type

Name	Symbol	Remarks
Lubricator		All volume type Selection type
Pneumatics adjustment unit	Mnemonic symbol  Details symbol 	The vertical arrow indicates a discharger. Details symbol • Filter with manual discharge valve • Nonrelief type regulator • An example of direct type lubricator is indicated.
Oil mist separator for exhaust air	◎ 	
Noise reduction device		
Oil injector	◎ 	

9. Auxiliary components and other components

Name	Symbol	Remarks
Pneumatic - hydraulic transducer	(1)  (2) 	(1) Single acting (2) Continuous type
Booster	(1)  (2) 	• When pressure ratio 1:2 • For two fluid types (1) Single acting (2) Continuous type
Booster valve	◎ 	Pressure ratio 1: 2
Delay valve	(example) 	• Indicate with a compound symbol based on the mechanism
Alarm		
Pressure switch		Can be indicated as follows if drawing could not be misread: 

Name	Symbol	Remarks
Limit switch		Can be indicated as follows if drawing could not be misread: 
Air ejector		• Since JIS Z 8207
Pneumatics counter		
Pressure indicator		• Simple indicator without measurement
Pressure gauge		
Differential pressure gauge		
Thermometer		
Galvanoscope		
Flow meter		
Integrated flow meter		
Tachometer		
Torque gauge		

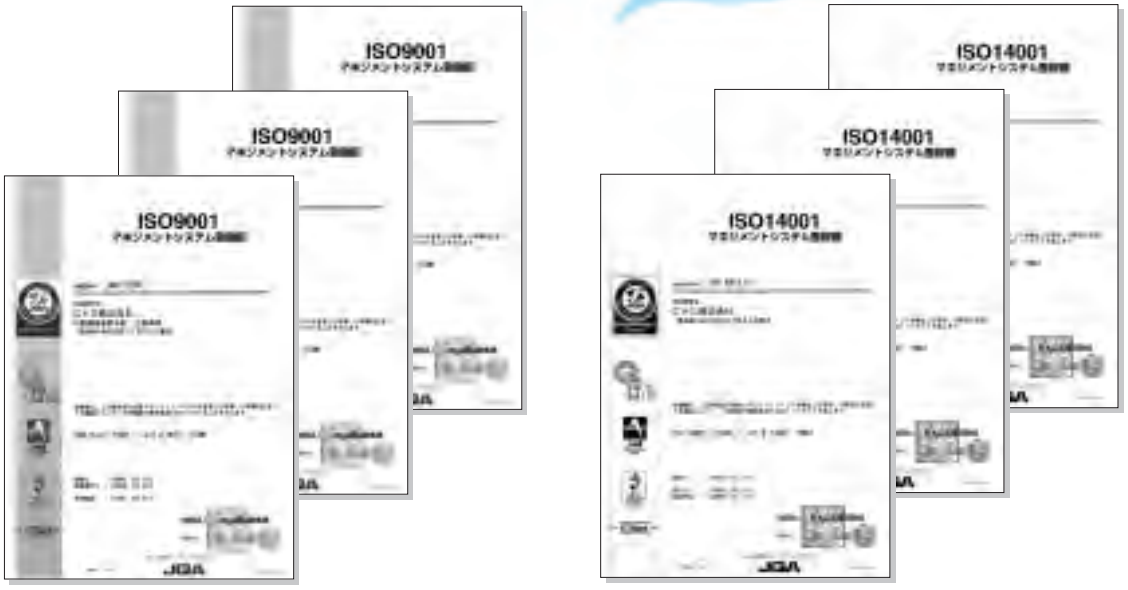
(Refer to JISB0125-1: 2001 and JPAS010.)

Note: ◎mark is an original JPAS010 symbol.
Use is limited to those indicated.

Acquisition of ISO9001 and ISO14001 Certification

Providing a safe quality, friendly to users, machines and environment

CKD has acquired International Standard ISO9001 and ISO14001 certification and structured a quality and environment management system.
With safety, environment, an energy conservation as our most important priorities, we are working company-wide to promote safe product and quality creation friendly to users, machines, society, and the global environment.



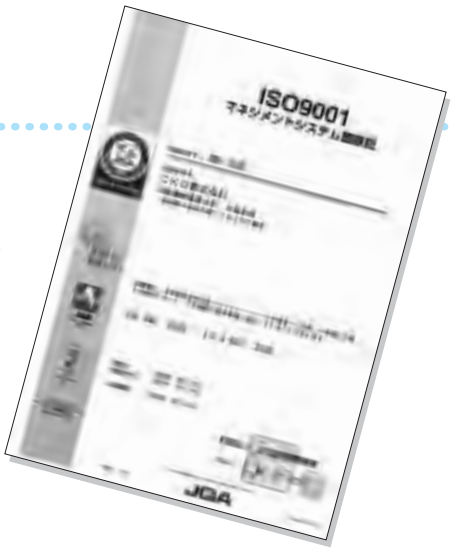
International Standard ISO 9001 Certification

International Standard for quality management systems

CKD acquired certification for our pneumatic division and control division in 1994. Currently, our automated machine division headquarters and production headquarters have acquired ISO9001:2000.

Approach to quality system

To respond to diverse product needs, CKD develops products individualized for each industry and which are easy to use. We are conducting quality management activities to increase customer satisfaction.



International Standard ISO14001 Certification

International Standard for environment management systems. CKD's production division acquired certification in 2000, and all CKD divisions, including the Sales Division, acquired certification in 2003.

Approach to environment and energy conservation

CKD is aware that preserving the global environment is a global priority. We conduct environment management activities based on CKD Environment Policy.

The latest catalog introduction

Realize visible flow adjustment and control.

Needle valve with adjusting dial DVL Series

Catalog No. CC-860A

- Linear flow characteristics
- Visible control of flow rates
- Use as a speed control valve
- Oil-prohibited specifications available
- Unrestricted installation

MEMO

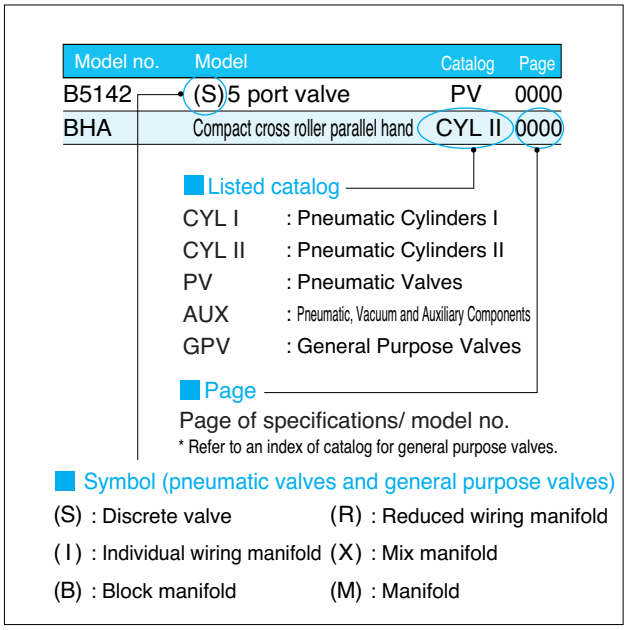
MEMO

MEMO

MEMO

MEMO

Model no. (index in alphabetic order)



Model no. (index in alphabetic order)

B

Listed catalog

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Symbol (pneumatic valves and general purpose valves)

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(B) : Block manifold
(R) : Reduced wiring manifold
(X) : Mix manifold
(M) : Manifold

Model no. (index in alphabetic order)

D

■ Listed catalog

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(B) : Block manifold
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Model no. (index in alphabetic order)

G

Listed catalog

CYL I : Pneumatic Cylinders I
CYL II : Pneumatic Cylinders II
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AUX : Pneumatic, Vacuum and Auxiliary Components
GPV : General Purpose Valves
* Refer to an index of catalog for general purpose valves.

Symbol (pneumatic valves and general purpose valves)

(S) : Discrete valve
(R) : Reduced wiring manifold
(I) : Individual wiring manifold
(X) : Mix manifold
(B) : Block manifold
(M) : Manifold

Model no. (index in alphabetic order)

Model no.	Model	Catalog	Page
G			
GAG44*	3 port direct acting solenoid valve actuator	GPV	-
GAG44*-Z	3 port direct acting solenoid valve actuator for dry air	GPV	-
GAG45*	3 port direct acting solenoid valve, manifold and actuator	GPV	-
GAG45*-Z	3 port direct acting solenoid valve for dry air, manifold and actuator	GPV	-
GASB	Ball valve for automatic emergency shutdown	GPV	-
GAV	Low pressure gas combination valve	GPV	-
GDJ	Governor for gas combustion system	GPV	-
GFAB	2 port direct acting solenoid valve for compressed air, manifold	GPV	-
GFAG	3 port direct acting solenoid valve for compressed air, manifold	GPV	-
GFGB	2 port direct acting solenoid valve for dry air, manifold	GPV	-
GFGG	3 port direct acting solenoid valve for dry air, manifold	GPV	-
GFK	Filter for gas combustion system	GPV	-
GFLB	2 port solenoid direct acting valve for oil, manifold	GPV	-
GFVB	2 port solenoid direct acting valve for medium vacuum, manifold	GPV	-
GFWB	2 port solenoid direct acting valve for water, manifold	GPV	-
GFWG	3 port solenoid direct acting valve for water, manifold	GPV	-
GK3100D	Refrigerating air dryer / compact for installation / inlet air (35°C)	AUX	32
GK5100	Refrigerating air dryer / high temp. inlet (55°C) / compact compressor directly connected	AUX	36
GLC	High rigid guideless cylinder / double acting	CYL I	2374
GNAB*	2 port air operated valve, manifold (compact cylinder valve)	GPV	-
GNAB*V	2 port air operated valve for low vacuum, manifold (compact cylinder valve)	GPV	-
GPS2	Contact confirmation switch / discrete	AUX	1172
GRC	Table type rotary actuator / basic type	CYL II	26
GRC-F	Table type rotary actuator / fine speed type	CYL II	40
GRC-K	Table type rotary actuator / high accuracy type	CYL II	26
GRC-KF	Table type rotary actuator / precise / fine speed type	CYL II	40
GSB	Electric ball valve for gas combustion system	GPV	-
GSV	Solenoid valve for automatic watering control	GPV	-
GT5055, 5075	Refrigerating type air dryer / air cooling type High temperature inlet air (55°C) type	AUX	68
GT7055 to 7075	Refrigerating type air dryer / air cooling type Standard inlet air (40°C) type	AUX	72
GT7055W to 7075W	Refrigerating type air dryer / water cooling type Standard inlet air (40°C) type	AUX	76
GT9000	Refrigerating type air dryer / air cooling type large standard inlet air (40°C) type	AUX	90
GT9000W	Refrigerating type air dryer / water cooling type large standard inlet air (40°C) type	AUX	94
GT9000WV	Refrigerating type air dryer / Inverter control water-cooled type / large standard inlet air (40°C) type	AUX	98
GWC*	Joint / cap	AUX	930
GWCR*	Joint / cross shaped type	AUX	930
GWFY*	Joint / FY type	AUX	930
GWJL*	Small size joint / elbow type	AUX	944
GWJP*	Small size joint / plug	AUX	944
GWJS*	Small size joint / axial	AUX	944
GWJT*	Small size joint / tee union type	AUX	944
GWJY*	Small size joint / Y type tee union type	AUX	944
GWL*	Joint / elbow type	AUX	930
GWM*	Joint / joint for tightening	AUX	930
GWMF*	Joint / manifold	AUX	930
GWP*-B	Joint / blanking plug	AUX	930
GWP*-L	Joint / L type plug	AUX	930
GWP*-O	Joint / plug	AUX	930
GWS*	Joint / straight	AUX	930
GWT*	Joint / tee union type	AUX	930
GWTR*	Joint / tetrapod shaped type	AUX	930
GWWY*	Joint / double Y type types	AUX	930
GWY*	Joint / Y type tee union type	AUX	930
GX3208 to 3237	Refrigerating type air dryer / Compact for installation / inlet air (35°C)	AUX	48
GX5203 to 5237	Refrigerating type air dryer / high temp. inlet (55°C) / compact compressor directly connected	AUX	52
H			
H0	Cylinder switch / 1 color indicator, reed	CYL I, II	Ending 26
H0Y	Cylinder switch / 2 color indicator, reed	CYL I, II	Ending 26
HAP-1C	Parallel hand	CYL II	270
HAP-2 to 4CS	Parallel hand	CYL II	272
HB	High corrosion direct acting 2 port solenoid valve	GPV	-
HBL	Fulcrum hand	CYL II	382

Listed catalog

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Model no. (index in alphabetic order)

PCP	Pre-set counter	AUX	1539
PD2	Dust collector valve / 2 port air operated valve	GPV	-
PD3	Dust collector valve / 2 port air operated valve	GPV	-
PDV2	Dust collector valve / 2 port solenoid valve	GPV	-
PDV3	Dust collector valve / 2 port solenoid valve	GPV	-
PDVE4	Dust collector valve / explosion proof 2 port solenoid valve (Explosion proof type dust collector valve)	GPV	-
PE	Pressure switch / logic valve	AUX	1527
PF500 to 4000F	Flow sensor for compressed air / medium flow	AUX	1414
PF8000 to 16000F	Flow sensor for compressed air / large flow rate	AUX	1418
PFD	Flow sensor for compressed air / display separate type	AUX	1440
PFK	Flow sensor for compressed air / tester kit	AUX	1446
PFU500 to 2000F	Flow sensor for compressed air / modular design type	AUX	1422
PG	Fiber tube push-in joint (standard type)	AUX	986
PGM	Regulator for process gas	GPV	-
PG-P2-B	Blanking plug	AUX	986
PI	Interface	AUX	808
PJ	High frequency 2 port valve for compressed air	GPV	-
PJVB	Control box type manifold solenoid valve (2 port solenoid valve for dust collector control)	GPV	-
PKA	2 port pilot kick type solenoid valve for air	GPV	-
PKS	2 port pilot kick type solenoid valve for steam	GPV	-
PKW	2 port pilot kick type solenoid valve for water	GPV	-
PL	PL switch	AUX	1232
PLE-B12	Side block / integrated type	AUX	1536
PLJ-C12	YES element / relay type	AUX	1533
PLK-A11	OR element / line type	AUX	1537
PLK-B12	OR element / integrated type	AUX	1536
PLK-C12	OR element / relay type	AUX	1533
PLL-A11	AND element / line type	AUX	1537
PLL-B12	AND element / integrated type	AUX	1536
PLL-C12	AND element / relay type	AUX	1533
PLM	Memory element / relay type	AUX	1533
PLN-B12	NOT element / integrated type	AUX	1536
PLN-C12	NOT element / relay type	AUX	1533
PLN-D12	Threshold element / relay type	AUX	1533
PMM	Fine regulator	GPV	-
PPD	Electronic pressure switch / sensor, amplifier integrated type with display	AUX	1140
PPD3	Electronic pressure switch / sensor, amplifier integrated type with display	AUX	1124
PPD3-S	Electric pressure switch, stainless steel diaphragm sensor / sensor, amplifier integrated type with display	AUX	1124
PPD-A	Electric pressure switch with protection box / sensor, amplifier integrated type with display	AUX	1146
PPD-S	Electric pressure switch, stainless steel diaphragm sensor / sensor, amplifier integrated type with display	AUX	1144
PPE	Compact electronic pressure switch / sensor, amplifier integrated type without display	AUX	1090
PPE-*A	Compact electronic pressure switch / sensor, amplifier integrated type without display, analog output type	AUX	1093
PPS2	Electronic pressure switch / sensor, amplifier integrated type / separated type with display	AUX	1154
PPS2	Pressure controller	AUX	1154
PPX	Digital pressure sensor	AUX	1100
PRD	Amplifier / element and sensor	AUX	1541
PRE-A12	Pressure switch / relay type	AUX	1533
PRF-A2	Booster / element and sensor	AUX	1541
PRS-A12	Solenoid valve / relay type	AUX	1533
PRT	Timer / relay type	AUX	1533
PSD	PLC branch block	AUX	1532
PSE	PLC I/O block	AUX	1532
PSL	PLC AND element	AUX	1532
PSM	PLC element	AUX	1532
PSV	PLC sub-base V type	AUX	1532
PSW	Electronic pressure switch / sensor, amplifier integrated type without display	AUX	1096
PTN2	Fiber tube dedicate joint	AUX	1004
PV5-6R	(S) 5 port pilot operated valve ISO conformed valve / I/O connector type / ISO size (1)	PV	1170
PV5-8R	(S) 5 port pilot operated valve ISO conformed valve / I/O connector type / ISO size (2)	PV	1176
PV5G-6	(S) 5 port pilot operated valve ISO conformed valve / DIN terminal box type / ISO size (1)	PV	1136
PV5G-8	(S) 5 port pilot operated valve ISO conformed valve / DIN terminal box type / ISO size (2)	PV	1142

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Model no. (index in alphabetic order)

S

Listed catalog

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T

■ Listed catalog

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I N D E X

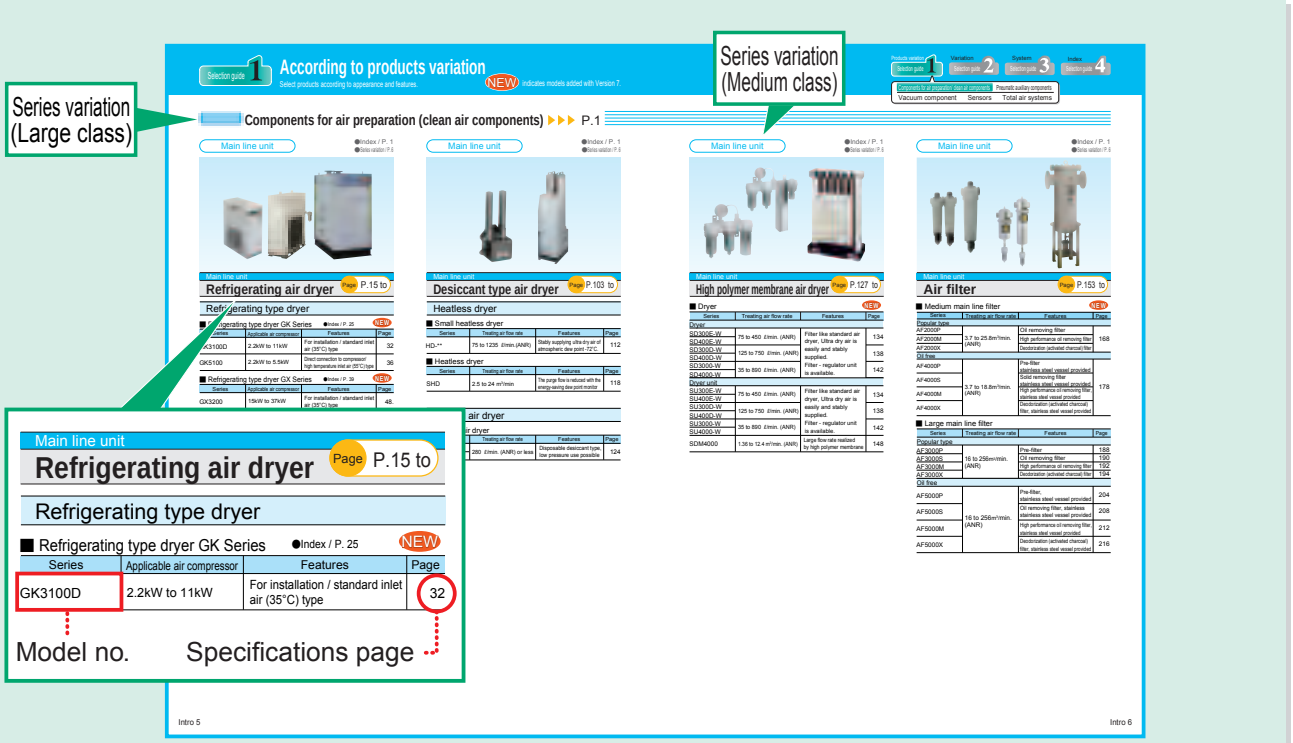
User's guide (Reading and Using the Catalog)

Product selection methods (1) to (4) have been prepared to facilitate product selection and search.

Selection guide 1 According to products variation

Intro 5 to 29

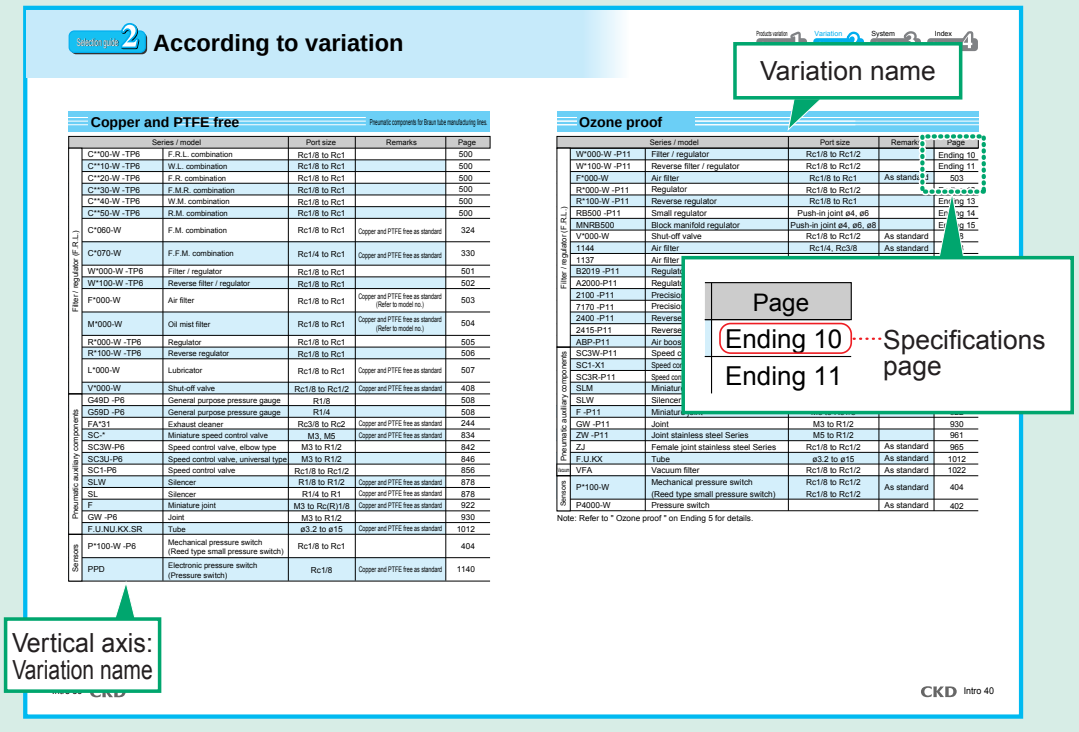
If the product series name is already decided, search for the required series' page.



Selection guide 2 According to variation

Intro 39 to 44

If the variation model is already decided, search for the required product.

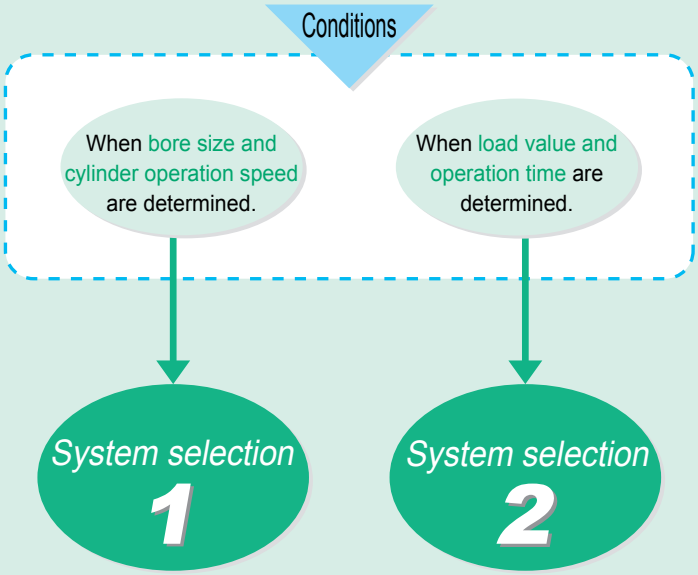


Selection guide 3 According to system

Intro 45 to 63

Even beginners can select a model easily.

Optimum model is selected from predetermined conditions.

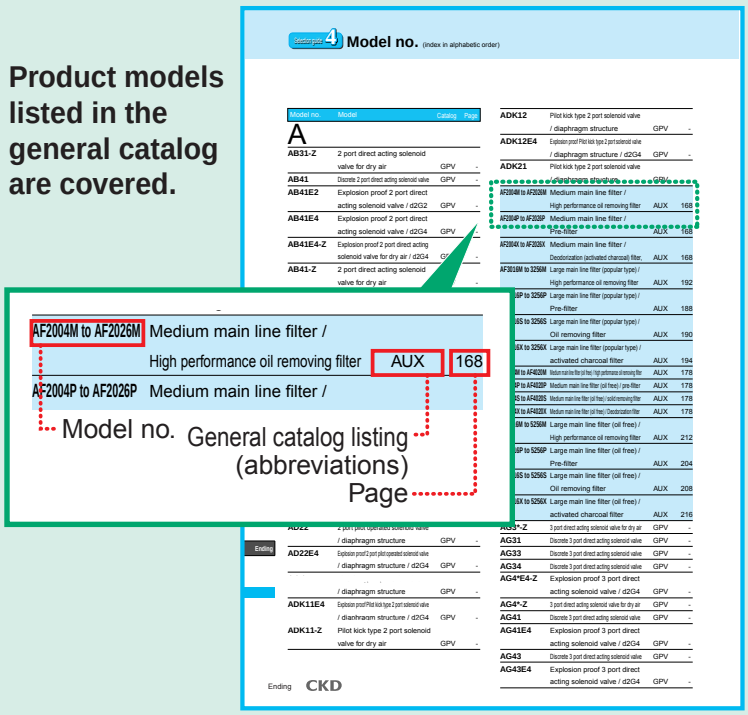


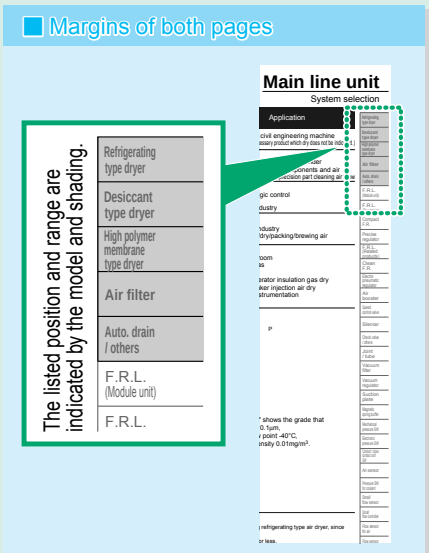
Selection guide 4 According to model no. Index in alphabetic order

Ending 40 to 63

The general catalog name and corresponding page can be searched for with the product model.

Product models listed in the general catalog are covered.





According to products variation

Select products according to appearance and features.

NEW indicates models added with Version 7.

Components for air preparation (clean air components) ▶▶▶ P.1

Main line unit

●Index / P. 1
●Series variation / P. 6

Main line unit

Refrigerating air dryer

Page P.15 -

Refrigerating type dryer

■ Refrigerating type dryer GK Series ●Index / P. 25 NEW

Series	Applicable air compressor	Features	Page
GK3100D	2.2kW to 11kW	For installation / standard inlet air (35°C) type	32
GK5100	2.2kW to 5.5kW	Direct connection to compressor/ high temperature inlet air (55°C) type	36

■ Refrigerating type dryer GX Series ●Index / P. 39 NEW

Series	Applicable air compressor	Features	Page
GX3200	15kW to 37kW	For installation / standard inlet air (35°C) type	48
GX5200	7.5kW to 37kW	Direct connection to compressor/ high temperature inlet air (55°C) type	52

■ Refrigerating type dryer GT5000/7000 Series ●Index / P. 57

Series	Applicable air compressor	Features	Page
GT5000 (D)	55kW / 75kW	High temperature inlet air (55°C) type, air cooling type	68
GT7000 (D)	55kW / 75kW	Standard inlet air (40°C) type, air cooling type	72
GT7000W (D)	55kW / 75kW	Standard inlet air (40°C) type, water cooling type	76

■ Refrigerating type dryer GT9000 Series ●Index / P. 81 NEW

Series	Applicable air compressor	Features	Page
GT9000	90kW to 450kW	Standard inlet air (40°C) type, air cooling type	90
GT9000W	90kW to 450kW	Standard inlet air (40°C) type, water cooling type	94
GT9000WV	710kW / 960kW	Standard inlet air (40°C) type, Inverter control water-cooled type	98

Main line unit

●Index / P. 1
●Series variation / P. 6

Main line unit

Desiccant type air dryer

Page P.103 -

Heatless dryer

■ Small heatless dryer

Series	Treating air flow rate	Features	Page
HD-**	75 to 1235 ℓ/min.(ANR)	Stably supplying ultra dry air of atmospheric dew point -72°C.	112

■ Heatless dryer

Series	Treating air flow rate	Features	Page
SHD	2.5 to 24 m³/min	The purge flow is reduced with the energy-saving dew point monitor	118

Manual air dryer

■ Manual air dryer

Series	Treating air flow rate	Features	Page
4001 4002	280 ℓ/min. (ANR) or less	Disposable desiccant type, low pressure use possible	124

Main line unit

●Index / P. 1
●Series variation / P. 6

Main line unit

High polymer membrane air dryer

Page P.127 -

■ Dryer

NEW

Series	Treating air flow rate	Features	Page
Dryer			
SD300E-W	75 to 450 ℓ/min. (ANR)	Filter like standard air dryer, Ultra dry air is easily and stably supplied. Filter - regulator unit is available.	134
SD400E-W			
SD300D-W	125 to 750 ℓ/min. (ANR)		138
SD400D-W			
SD3000-W	35 to 890 ℓ/min. (ANR)		142
SD4000-W			
Dryer unit			
SU300E-W	75 to 450 ℓ/min. (ANR)	Filter like standard air dryer, Ultra dry air is easily and stably supplied. Filter - regulator unit is available.	134
SU400E-W			
SU300D-W	125 to 750 ℓ/min. (ANR)		138
SU400D-W			
SU3000-W	35 to 890 ℓ/min. (ANR)		142
SU4000-W			
SDM4000	1.36 to 12.4 m³/min. (ANR)	Large flow rate realized by high polymer membrane	148

Main line unit

●Index / P. 1
●Series variation / P. 6

Main line unit

Air filter

Page P.153 -

■ Medium main line filter

NEW

Series	Treating air flow rate	Features	Page
Popular type			
AF2000P	3.7 to 25.8m³/min. (ANR)	Oil removing filter	168
AF2000M		High performance oil removing filter	
AF2000X		Deodorization (activated charcoal) filter	
Oil free			
AF4000P	3.7 to 18.8m³/min. (ANR)	Pre-filter stainless steel vessel provided	178
AF4000S		Solid removing filter stainless steel vessel provided	
AF4000M		High performance oil removing filter, stainless steel vessel provided	
AF4000X		Deodorization (activated charcoal) filter, stainless steel vessel provided	

■ Large main line filter

Series	Treating air flow rate	Features	Page
Popular type			
AF3000P	16 to 256m³/min. (ANR)	Pre-filter	188
AF3000S		Oil removing filter	190
AF3000M		High performance oil removing filter	192
AF3000X		Deodorization (activated charcoal) filter	194
Oil free			
AF5000P	16 to 256m³/min. (ANR)	Pre-filter, stainless steel vessel provided	204
AF5000S		Oil removing filter, stainless steel vessel provided	208
AF5000M		High performance oil removing filter, stainless steel vessel provided	212
AF5000X		Deodorization (activated charcoal) filter, stainless steel vessel provided	216

According to products variation

Select products according to appearance and features.

NEW indicates models added with Version 7.

Components for air preparation (clean air components) ▶▶▶ P.1

Main line unit

●Index / P. 1
●Series variation / P. 6

Main line unit

Drainage

Page P.221-

■ Automatic drain

Series	Applicable compressor	Features	Page
DT3000-W	0.75 to 15kW	Light weight / compact automatic drain	228
DT4000-W	0.75 to 75kW		
DT3010-W	15kW or less		
DT4010-W	75kW or less		

■ Heavy duty drain

Series	Port size	Features	Page
5100	Rc1/2	Appropriate for circuits generating large drain	241

■ Automatic drain with manual cock

Series	Port size	Features	Page
B5102	Rc3/8, 1/2	Quick connection for drain discharge in pneumatic circuit	242

■ Automatic drain

Series	Port size	Features	Page
DB1000	G1/2"	Compressor discharge flow rate 1.5 to 1000 m³/min. (ANR) High reliability level sensor is used.	236
DB3000			
DBS1006	G1/2"	Detecting drain entrained into pneumatic circuit by high reliable level sensor	239

■ Tank drain

Series	Port size	Features	Page
5002	Rc1/4	Automatic discharge type by external pilot signal	240

Main line unit

●Index / P. 1
●Series variation / P. 6

Main line unit

Exhaust cleaner

Page P.244-

■ Exhaust cleaner

Series	Port size	Features	Page
FA*31	Rc3/8 to 2	Exhaust noise and oil mist are removed by 99.9%.	244

F.R.L. unit | Standard Series

●Index / P. 247
●Series variation / P. 250

F.R.L. unit

Modular design (rotary actuator F.R.L.)

Page P.269 -

Combination

■ F.R.L. combination

Series	Port size (Rc, G, NPT)	Features	Page
C1000-W	1/8, 1/4	Filter, regulator, and lubricator integrated	286
C2000-W	1/4, 3/8		
C2500-W	1/4, 3/8		
C3000-W	1/4, 3/8		
C4000-W	1/4, 3/8, 1/2		
C6500-W	3/4, 1		
C8000-W	3/4, 1		

■ W.L. combination

Series	Port size (Rc, G, NPT)	Features	Page
C1010-W	1/8, 1/4	Filter, regulator, and lubricator integrated	294
C2010-W	1/4, 3/8		
C3010-W	1/4, 3/8		
C4010-W	1/4, 3/8, 1/2		
C8010-W	3/4, 1		

■ F.R. combination

Series	Port size (Rc, G, NPT)	Features	Page
C1020-W	1/8, 1/4	Filter and regulator integrated	300
C2020-W	1/4, 3/8		
C2520-W	1/4, 3/8		
C3020-W	1/4, 3/8		
C4020-W	1/4, 3/8, 1/2		
C6020-W	3/4, 1		
C8020-W	3/4, 1		

■ F.M.R. combination

Series	Port size (Rc, G, NPT)	Features	Page
C1030-W	1/8, 1/4	Filter, oil mist filter, and regulator integrated	306
C2030-W	1/4, 3/8		
C2530-W	1/4, 3/8		
C3030-W	1/4, 3/8		
C4030-W	1/4, 3/8, 1/2		
C6030-W	3/4, 1		
C8030-W	3/4, 1		

■ W.M. combination

Series	Port size (Rc, G, NPT)	Features	Page
C1040-W	1/8, 1/4	Filter, regulator and oil mist filter integrated	312
C2040-W	1/4, 3/8		
C3040-W	1/4, 3/8		
C4040-W	1/4, 3/8, 1/2		
C8040-W	3/4, 1		

■ R.M. combination

Series	Port size (Rc, G, NPT)	Features	Page
C1050-W	1/8, 1/4	Regulator and oil mist filter integrated	318
C2050-W	1/4, 3/8		
C2550-W	1/4, 3/8		
C3050-W	1/4, 3/8		
C4050-W	1/4, 3/8, 1/2		
C6050-W	3/4, 1		
C8050-W	3/4, 1		

■ F.M. combination

Series	Port size (Rc, G, NPT)	Features	Page
C1060-W	1/8, 1/4	Filter and oil mist filter integrated	324
C2060-W	1/4, 3/8		
C3060-W	1/4, 3/8		
C4060-W	1/4, 3/8, 1/2		
C6060-W	3/4, 1		
C8060-W	3/4, 1		

■ F.F.M. combination

Series	Port size (Rc, G, NPT)	Features	Page
C3070-W	1/4, 3/8	Filter (5μm), filter (0.3μm), and oil mist filter integrated	330
C4070-W	1/4, 3/8, 1/2		
C6070-W	3/4, 1		
C8070-W	3/4, 1		

According to products variation

Select products according to appearance and features.

NEW indicates models added with Version 7.

Components for air preparation (clean air components) ▶▶▶ P.1

Filter / regulator

■ Filter / regulator

Series	Port size (Rc, G, NPT)	Features	Page
W1000-W	1/8, 1/4	Dust removing 5μm and tar removing 0.3μm of elements are available.	334
W2000-W	1/4, 3/8		
W3000-W	1/4, 3/8		
W4000-W	1/4, 3/8, 1/2		
W8000-W	3/4, 1		

■ Reverse filter / regulator

Series	Port size (Rc, G, NPT)	Features	Page
W1100-W	1/8, 1/4	Reverse flow function integrated	342
W2100-W	1/4, 3/8		
W3100-W	1/4, 3/8		
W4100-W	1/4, 3/8, 1/2		
W8100-W	3/4, 1		

F.R.L. unit | Standard white series

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F.R.L. unit

Modular design (rotary actuator F.R.L.)

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Air filter

■ Air filter

Series	Port size (Rc, G, NPT)	Features	Page
F1000-W	1/8, 1/4	Dust removing 5μm and tar removing 0.3μm of elements are available.	350
F2000-W	1/4, 3/8		
F3000-W	1/4, 3/8		
F4000-W	1/4, 3/8, 1/2		
F6000-W	3/4, 1		
F8000-W	3/4, 1		

■ Oil mist filter

Series	Treating flow rate ℓ/min. (ANR)			Features	Page
	M type	S type	X type		
M1000-W	150	150	150	Appropriate for measurement / instrumentation, etc. in oil inhibited circuits.	360
M2000-W	250	310	310		
M3000-W	360	450	450		
M4000-W	825	1000	1000		
M6000-W	1270	1400	1400		
M8000-W	2600	2900	2900		

■ High performance oil mist filter

Series	Treating flow rate	Features	Page
MX1000-W	75 ℓ/min. (ANR)	Secondary side oil content density 0.001mg/m³ Perfect for optical systems such as optical type positioning device and laser processing machines 0.001mg/m³	370
MX3000-W	180 ℓ/min. (ANR)		
MX4000-W	370 ℓ/min. (ANR)		
MX6000-W	670 ℓ/min. (ANR)		
MX8000-W	1480 ℓ/min. (ANR)		

F.R.L. unit | Standard white series

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F.R.L. unit

Modular design (rotary actuator F.R.L.)

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Regulator

■ Regulator

Series	Port size (Rc, G, NPT)	Features	Page
R1000-W	1/8, 1/4	Compact pressure gauge embedded type	378
R2000-W	1/4, 3/8		
R3000-W	1/4, 3/8		
R4000-W	1/4, 3/8, 1/2		
R6000-W	3/4, 1		
R8000-W	3/4, 1		

■ Reverse regulator

Series	Port size (Rc, G, NPT)	Features	Page
R1100-W	1/8, 1/4	Reverse flow function integrated	386
R2100-W	1/4, 3/8		
R3100-W	1/4, 3/8		
R4100-W	1/4, 3/8, 1/2		
R6100-W	3/4, 1		
R8100-W	3/4, 1		

Lubricator

■ Lubricator

Series	Port size (Rc, G, NPT)	Features	Page
L1000-W	1/8, 1/4	Supplying fine oil mist	394
L3000-W	1/4, 3/8		
L4000-W	1/4, 3/8, 1/2		
L8000-W	3/4, 1		

According to products variation

Select products according to appearance and features.

NEW indicates models added with Version 7.

Components for air preparation (clean air components) ▶▶▶ P.1

F.R.L. unit | Standard white series

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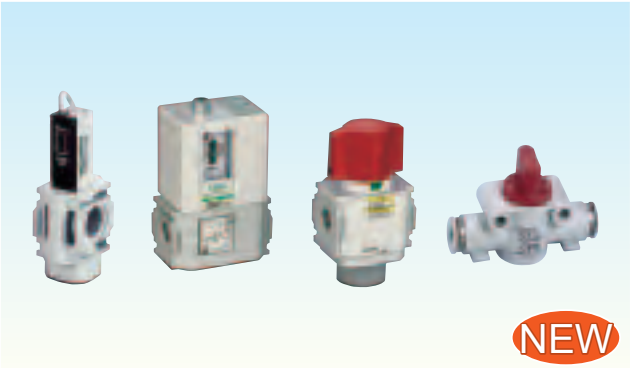

F.R.L. unit

Related products

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Mechanical pressure switch

■ Pressure switch

Series	Port size	Features	Page
P4000-W	Rc1/4, 3/8, 1/2	Pressure setting of 0.1 to 0.8MPa wide range possible	402

■ Reed type small pressure switch

Series	Port size	Features	Page
P1100-W	Rc1/8, 1/4	Space saving and wide pressure range	404
P4100-W	Rc1/4, 3/8, 1/2		
P8100-W	Rc3/4, 1		

Shut-off valve

■ Shut-off valve

Series	Port size (Rc, G, NPT)	Features	Page
V1000-W	1/8, 1/4	Appropriate for preventing accidents caused by residual pressure	408
V3000-W	1/4, 3/8, 1/2		

■ Lock out (OSHA conformed)

Series	Port size (Rc, G, NPT)	Features	Page
V3010-W	1/4, 3/8, 1/2	OSHA conformed	411
V6010-W	3/4, 1		

■ Push-in joint (quick exhaust valve)

Series	Applicable tube outer diameter	Features	Page
2QV	R1/8, 1/4	2 way valve	414
3QV	ø4, 6, 8, 10, 12	3 way valve	

Slow start valve

■ Slow start valve

Series	Port size	Features	Page
V3301-W	Rc1/4, 3/8, 1/2	To maintain safety at starting / stopping	422
V3321-W			

F.R.L. unit | Standard white series

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F.R.L. unit

Auxiliary components

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Bracket / joiner

■ Bracket

Series	Applications	Features	Page
B***-w	Modular design bracket	T, C, L types	425

■ Joiner

Series	Applications	Page
J***-w	Modular design connection bracket	425

Distributor

■ Distributor

Series	Applications	Features	Page
D*01-00-w	Modular design pipe branch bracket	Piping port branch	426

Piping adapter

■ Piping adapter

Series	Applications	Features	Page
A***-w	Modular design piping adapter	Piping adaptor set	428

According to products variation

Select products according to appearance and features.

NEW indicates models added with Version 7.

Components for air preparation (clean air components) ▶▶▶ P.1

F.R.L. unit | Flame resistant Series

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F.R.L. unit

Modular design (rotary actuator F.R.L.)

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Filter / regulator

■ Filter / regulator

Series	Port size (Rc, G, NPT)	Features	Page
W3000-G4	1/4, 3/8	Dust removing 5µm and tar removing 0.3µm of elements are available.	432
W4000-G4	1/4, 3/8, 1/2		
W8000-G4	3/4, 1		

■ Reverse filter / regulator

Series	Port size (Rc, G, NPT)	Features	Page
W3100-G4	1/4, 3/8	Reverse flow function integrated	438
W4100-G4	1/4, 3/8, 1/2		
W8100-G4	3/4, 1		

Air filter

■ Air filter

Series	Port size (Rc, G, NPT)	Features	Page
F3000-G4	1/4, 3/8	Dust removing 5µm and tar removing 0.3µm of elements are available.	446
F4000-G4	1/4, 3/8, 1/2		
F8000-G4	3/4, 1		

Regulator

■ Regulator

Series	Port size (Rc, G, NPT)	Features	Page
R3000-G4	1/4, 3/8	Compact pressure gauge embedded type	454
R4000-G4	1/4, 3/8, 1/2		
R8000-G4	3/4, 1		

■ Reverse regulator

Series	Port size (Rc, G, NPT)	Features	Page
R3100-G4	1/4, 3/8	Reverse flow function integrated	460
R4100-G4	1/4, 3/8, 1/2		
R8100-G4	3/4, 1		

F.R.L. unit | Flame resistant Series

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F.R.L. unit

Auxiliary components

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Bracket / joiner

■ Bracket

Series	Applications	Features	Page
B***-W	Modular design bracket	T, C, L types	467

■ Joiner

Series	Applications	Page
J***-W	Modular design connection bracket	467

Distributor

■ Distributor

Series	Applications	Features	Page
D*01-00-W	Modular design pipe branch bracket	Piping port branch	468

Piping adaptor

■ Piping adapter

Series	Applications	Features	Page
A***-W	Modular design piping adaptor	Piping adaptor set	470

F.R.L. unit | Oil-prohibition Series

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F.R.L. unit

Modular design (rotary actuator F.R.L.)

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Regulator

■ Regulator

Series	Port size	Features	Page
RN3000	Rc1/4, Rc3/8	Modular type regulator with oil-prohibited fluid passage section	474
RN4000	Rc1/4, Rc3/8, Rc1/2		
RN8000	Rc3/4, Rc1		

F.R.L. unit | Medium pressure Series

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F.R.L. unit

Modular design (rotary actuator F.R.L.)

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Air filter

■ Air filter

Series	Port size (Rc, G, NPT)	Features	Page
FM3000-W	1/4, 3/8	Air filter F3000 to F8000 Series medium pressure specifications	484
FM4000-W	1/4, 3/8, 1/2		
FM6000-W	3/4, 1		
FM8000-W	3/4, 1		

Oil mist

■ Oil mist filter

Series	Treating flow rate ℓ/min. (ANR)			Features	Page
	M type	S type	X type		
MM3000-W	490	610	610	Oil mist filter M3000 to M8000 Series medium pressure specifications	490
MM4000-W	1130	1370	1370		
MM6000-W	1740	1920	1920		
MM8000-W	3560	3980	3980		

Regulator

■ Regulator

Series	Port size (Rc, G, NPT)	Features	Page
RM3000-W	1/4, 3/8	Regulator R3000, R4000 Series medium pressure specifications	496
RM4000-W	1/4, 3/8, 1/2		

According to products variation

Select products according to appearance and features.

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Components for air preparation (clean air components) ▶▶▶ P.1

F.R.L. unit | Copper and PTFE free series

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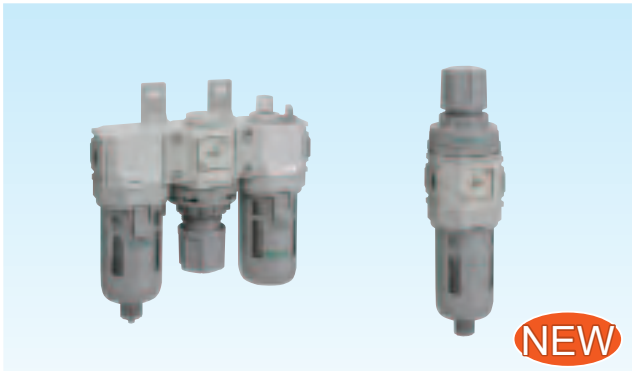

F.R.L. unit

Modular design (rotary actuator F.R.L.)

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Combination

■ F.R.L. combination

Series	Port size (Rc, G, NPT)	Features	Page
C1000 to 8000-W-P6	1/8 to 1	Filter, regulator, and lubricator integrated	500

Filter / regulator

■ Filter / regulator

Series	Port size (Rc, G, NPT)	Features	Page
W1000 to 8000-W-P6	1/8 to 1	Dust removing 5µm and tar removing 0.3µm of elements are available.	501

■ Reverse filter / regulator

Series	Port size (Rc, G, NPT)	Features	Page
W1100 to 8100-W-P6	1/8 to 1	Reverse flow function integrated	502

F.R.L. unit | Copper and PTFE free series

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F.R.L. unit

Modular design (rotary actuator F.R.L.)

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Air filter

■ Air filter

Series	Port size (Rc, G, NPT)	Features	Page
F1000 to 8000-W	1/8 to 1	Dust removing 5µm and tar removing 0.3µm of elements are available.	503

■ Oil mist filter

Series	Port size (Rc, G, NPT)	Features	Page
M1000 to 8000-W	1/8 to 1	Appropriate for measurement / instrumentation, etc. in oil inhibited circuits	504

Regulator

■ Regulator

Series	Port size (Rc, G, NPT)	Features	Page
R1000 to 8000-W-P6	1/8 to 1	Compact pressure gauge embedded type	505

■ Reverse regulator

Series	Port size (Rc, G, NPT)	Features	Page
R1100 to 8100-W-P6	1/8 to 1	Reverse flow function integrated	506

Lubricator

■ Lubricator

Series	Port size (Rc, G, NPT)	Features	Page
L1000 to 8000-W	1/8 to 1	Supplying fine oil mist	507

Pressure gauge

■ General purpose

Series	Port size	Features	Page
G49D-P6 G59D-P6	R1/8, 1/4	Glass lens used	508

F.R.L. unit

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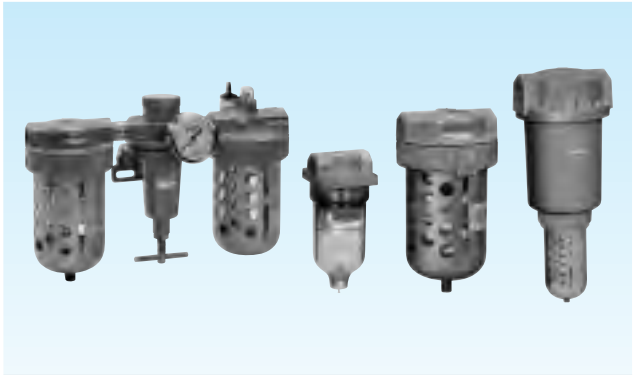

F.R.L. unit

Separate type

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Combination

F.R.L. kit

Series	Port size	Features	Page
K60570	Rc1/8, 1/4	Set type of filter, regulator and lubricator	526
K614*0E	Rc1/4, 3/8, 1/2, 3/4		

F.R. unit 7000 Series

Series	Port size	Features	Page
B7019	Rc1/8, 1/4	Air filter and regulator integrated	530
A7070	Rc1/4, 3/8		
7080	Rc3/8, 1/2, 3/4		

Precision F.R. unit

Series	Port size	Features	Page
7170	Rc1/4, 3/8	High precision pressure control is enabled within 0.01 to 0.25MPa range.	534

Filter

Air filter

Series	Port size	Features	Page
A1019	Rc1/8, 1/4	Filtration rating 5μm	538
1144	Rc1/4, 3/8		
1137	Rc1/4, 3/8, 1/2, 3/4		
1138	Rc3/4, 1		
1126	Rc1 1/4, 1 1/2, 2		

Heavy duty air filter

Series	Port size	Features	Page
A1338	Rc3/4, 1	Float type special drain is used, and large volume of drain removed powerfully.	542
1326	Rc1 1/4, 1 1/2, 2		

Submicron air filter (tar removal)

Series	Port size	Features	Page
1144	Rc1/4, 3/8	Solid substance such as tar / carbon, etc. up to 0.3μ size removed 99%	544
1137	Rc1/4, 3/8, 1/2, 3/4		
1138, A1338	Rc3/4, 1		
1126, 1326	Rc1 1/4, 1 1/2, 2		

Micro alescer micro naught type (oil removing)

Series	Port size	Features	Page
1219, 1244	Rc1/4	Reducing oil content by 0.1PPMw/w or less	546
1237	Rc1/4, 3/8, 1/2		
1238	Rc3/4		
1226	Rc1		
1226J	Rc1 1/2, 2		

Micro alescer odor naught type (odor removing)

Series	Port size	Features	Page
1237	Rc1/4, 3/8, 1/2	Absorbs the particles of odor to deodorize the compressed air.	549
1238	Rc3/4		
1226	Rc1		
1226J	Rc1 1/2, 2		

F.R.L. unit

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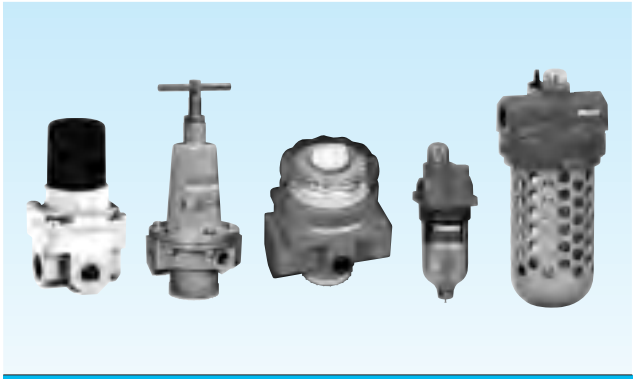

F.R.L. unit

Separate type

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Regulator

Regulator

Series	Port size	Features	Page
B2019	Rc1/8, 1/4	Relief mechanism integrated	552
A2000	Rc1/4, 3/8		
2001	Rc1/4, 3/8, 1/2, 3/4		
2215	Rc3/4, 1, 1 1/4		
2216	Rc11/2, 2		

Reverse regulator (check valve integrated)

Series	Port size	Features	Page
2419	Rc1/8, 1/4	Check valve mechanism integrated	556
2400, 2401	Rc1/4 to 3/4		
2415	Rc3/4, 1, 1 1/4		

Dial air regulator

Series	Port size	Features	Page
2302-*C	Rc1/4, 3/8, 1/2, 3/4	With dial enabling easy pressure adjustment	560
2303-*C	Rc3/4, 1, 1 1/4		
2304-*C	Rc1 1/2, 2		

Remote control dial air regulator

Series	Port size	Features	Page
2302-*C	Rc1/4, 3/8, 1/2, 3/4	With pilot port for pressure setting. Remote control is enable.	563
2303-*C	Rc3/4, 1, 1 1/4		
2304-*C	Rc1 1/2, 2		

Relief valve

Series	Port size	Features	Page
B6061	Rc1/8, 1/4	If pressure increases, compressed air released to atmosphere to maintain set pressure.	566
6062	Rc1/4, 3/8		

Lubricator

Lubricator econo-mist type

Series	Port size	Features	Page
A3019	Rc1/8, 1/4	Supply fine oil mist (oil fog)	568
3000E to 3005E	Rc1/4 to 2		

Lubricator auto-fill type

Series	Port size	Features	Page
3002E	Rc1/4, 3/8, 1/2, 3/4	Only installing an oil tank enables automatic lubrication to multiple lubricators.	572
3003E	Rc3/4, 1		

According to products variation

Select products according to appearance and features.

NEW indicates models added with Version 7.

Components for air preparation (clean air components) ▶▶▶ P.1

F.R.L. unit

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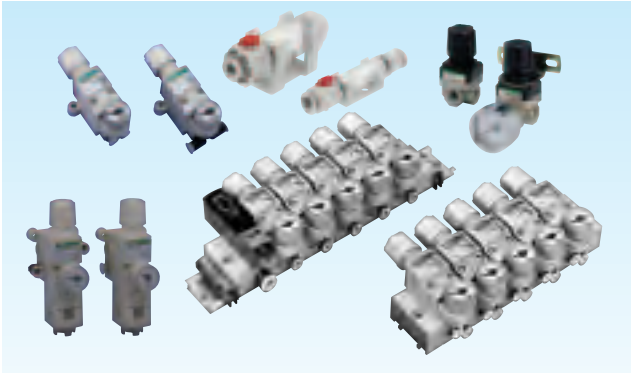

F.R.L. unit

Compact regulator, filter / regulator

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Regulator

■ Miniature regulator

Series	Port size	Features	Page
RA-050	Rc1/8	Appropriate for semiconductor manufacturing lines in precise processing fields.	586
RA-060	Rc1/8		

■ Compact piston type

Series	Port size	Features	Page
RA800	Rc1/8, 1/4	Simple regulator with small size / light weight / improved operationability	588

■ Compact regulator

Series	Port size	Features	Page
RB500	Push-in joint ø4, 6	Compact / space saving design	590

Filter / regulator

■ Compact filter / regulator

Series	Port size	Features	Page
WB500	Push-in joint ø4, 6	Compact / space saving design	592

Block manifold regulator

■ Block manifold regulator

Series	Port size	Features	Page
MNRB500A	Push-in joint ø6, 8	Block manifold enables flexible increase and decrease of station no.	596
MNRB500B	Push-in joint ø4, 6		

Inline filter

■ Inline filter NEW

Series	Port size	Features	Page
FSL100	Push-in joint ø4, 6	Compact, lightweight, space saving inline type Compatible with both positive and negative pressures	610
FSL200	Push-in joint ø4, 6		
FSL500	Push-in joint ø6, 8, 10		

F.R.L. unit

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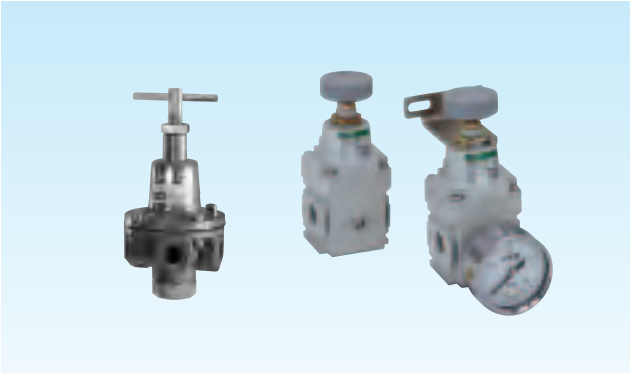

F.R.L. unit

Precision regulator

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Regulator

■ Precision regulator (modular design)

Series	Port size	Features	Page
RP1000	Rc1/4	Superior in extremely low pressure / low pressure zone from 0.003MPa	646
RP2000	Rc1/4, 3/8	Large exhaust flow, appropriate for balancer	650

■ Precision regulator (separate type)

Series	Port size	Features	Page
2100	Rc1/4, 3/8	High precision pressure control is enabled within 0.01 to 0.25MPa range.	656

■ Compact direct acting precision regulator

Series	Port size	Features	Page
RJB500	Push-in joint ø4, 6	Compact size of face to face 25mm Min. setting pressure 0.01MPa.	624

Block manifold regulator

■ Block manifold regulator

Series	Port size	Features	Page
MNRJB500A	Push-in joint ø6, 8	Block manifold enables flexible increase and decrease of station no.	626
MNRJB500B	Push-in joint ø4, 6		

F.R.L. unit

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F.R.L. unit

Related products

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Pressure gauge

■ Pressure gauge assembly

Series	Connection method	Features	Page
G401	O ring sealant	Appropriate thin type for components integrated in devices	660

■ With safety mark / limit mark

Series	Port size	Features	Page
G40D G50D	R1/8, 1/4	Easy visual inspection due to green and red zone color indicator	661
G45D NEW			662
G41D	R1/8, 1/4	With green arrow	663

■ General purpose

Series	Port size	Features	Page
G49D, G59D	R1/8, 1/4	Glass lens used	664

■ Pressure gauge for panel mount / pressure gauge with switch

Series	Connection method	Features	Page
G53D NEW	R1/8, 1/4	Panel mount plus	665
G52D NEW	R1/4	Pressure switch plus	667

■ Miniature / round

Series	Port size	Features	Page
G29D	R1/16, 1/8	Pressure display section ø21 *custom order	669
G39D	R1/8	Facing practical, *custom order	670

■ Vacuum pressure gauge

Series	Differential pressure measuring range	Features	Page
VG41D NEW	R1/8	Green color arrow	671

■ Differential pressure gauge

Series	Differential pressure measuring range	Features	Page
GA400-8-P02	0 to 0.2MPa	Service life control of air filter	673

F.R.L. unit

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F.R.L. unit

Indicator

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■ Moisture indicator

Series	Port size	Features	Page
6119	Rc1/4	Dew point monitor for desiccant type air dryer	674

F.R.L. unit

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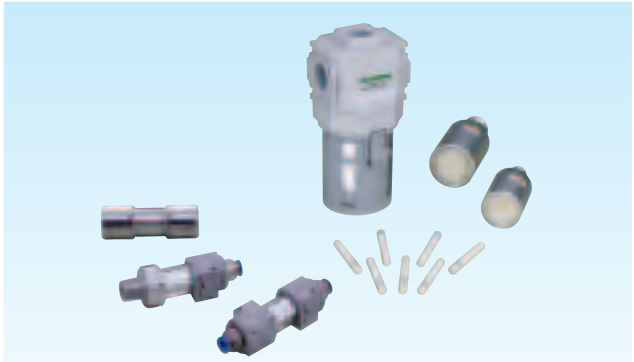

F.R.L. unit

Clean filter and regulator

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Filter

■ Inline clean filter

Series	Port size	Features	Page
FCS500	ø4, ø6, ø8 R1/8, R1/4	High filtration rating precision 0.01µm and removal ratio 99.99%	682
FCS1000 NEW	ø8, ø10, ø12 R1/4, R3/8, Rc1/4, Rc3/8		686

■ Clean exhaust filter NEW

Series	Port size	Features	Page
FAC10	ø4, ø6, ø8, ø10	High filtration rating precision 0.01µm and removal ratio 99.99% Provide direct exhaust within a clean room	692
FAC100	R1/8, R1/4		
FAC200	R3/8, R1/2		
FAC3000	Rc3/8, Rc1/2		

Regulator

■ Clean regulator

Series	Port size	Features	Page
RC2000	Rc1/4, Rc3/8, Rc1/2	Oil-prohibited specifications / stainless steel body provided	704

■ Regulator

Series	Port size	Features	Page
2619	Rc1/8, Rc1/4	Oil-prohibited specifications	708

According to products variation

Select products according to appearance and features.

NEW indicates models added with Version 7.

Components for air preparation (clean air components) ▶▶▶ P.1

F.R.L. unit

●Index / P. 247
●Series variation / P. 250

F.R.L. unit

Electro pneumatic regulator

Page P.713 -

■ Digital electro-pneumatic regulator NEW

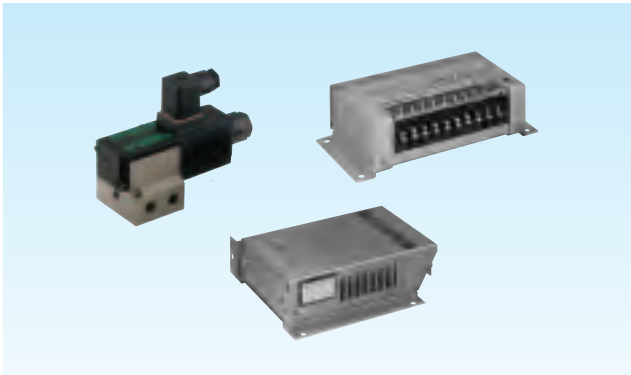
Series	Max. flow rate	Features	Page
EVD-1100	60 ℓ/min. (ANR)	Compact / high-function digital control	736
EVD-1500	400 ℓ/min. (ANR)		
EVD-1900			
EVD-3100	700 ℓ/min. (ANR)		740
EVD-3500	1500 ℓ/min. (ANR)		
EVD-3900			

■ Electro pneumatic regulator

Series	Max. flow rate	Features	Page
EV2500	800 ℓ/min. (ANR)	Medium flow rate type	760
EV2509	800 ℓ/min. (ANR)		
EV0100	2 ℓ/min. (ANR)	Small flow rate type	765
EV0500	6 ℓ/min. (ANR)		
EVS100	2 ℓ/min. (ANR)	Compact	768
EVS500	6 ℓ/min. (ANR)		
EV2100V	150 ℓ/min. (ANR)	Vacuum	771
EV2109V	120 ℓ/min. (ANR)		

■ Thin type electro pneumatic regulator

Series	Port size	Features	Page
MEVT	2 to 6 ℓ/min. (ANR)	Thin type	778



■ Proportional control valve

Series	Control range	Features	Page
3AP	50k to 590kPa	Pressure control	800
2AF/3AF	Max. effective sectional area 3 to 20mm²	Flow rate control	

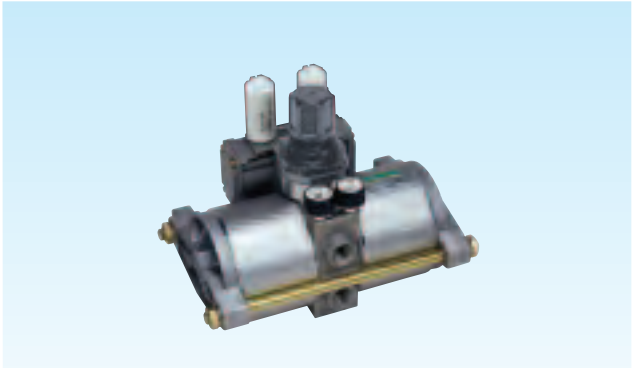
■ Controller

Series	Input potential	Features	Page
APC	0 to 10V	Proportional valve control	804

■ Interface

Series	Input signal	Features	Page
PI-EV	Voltage, current, digital	EV	808
PI		ER	

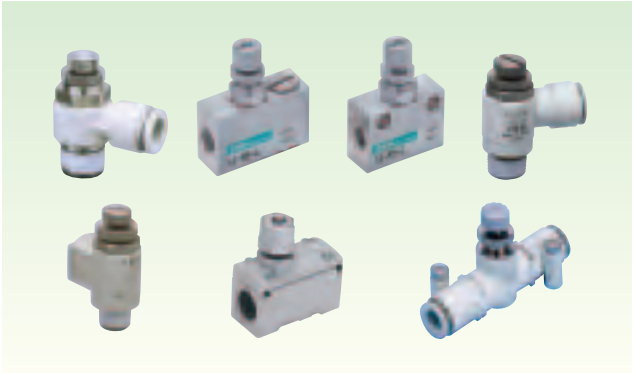
Air booster



Air booster

Page P.811 -

Series	Applicable	Page
ABP	Air booster	816



Speed control valve

Page P.827 -

■ Miniature

Series	Port size	Features	Page
SC	M3, M5	Small, light weight and space saving	834

■ Miniature fine speed type

Series	Port size	Features	Page
SC-M5-*-F	M5	Speed fine adjustment of fine speed cylinder and air operated valve	834

■ Miniature in-out type

Series	Port size	Features	Page
SCD	M3, M5	Flow rate control for both intake and exhaust is enabled	836

■ Direct piping / elbow type

Series	Port size	Features	Page
SC3R	M5, Rc1/8, 1/4, 3/8, 1/2	Direct piping and L type rotation type M5 to Rc1/2	840

■ Elbow type with push-in joint

Series	Port size	Features	Page
SC3W	M3, M5, R1/8, 1/4, 3/8, 1/2	Push-in joint ø3.2 to ø12	842

■ Universal type with push-in joint

Series	Port size	Features	Page
SC3U	M3, M5, R1/8, 1/4, 3/8, 1/2	Push-in joint ø3.2 to ø12	846

■ Stainless steel corrosion-resistant type

Series	Port size	Features	Page
SC3P NEW	M5, R1/8, R1/4, R3/8, R1/2	Speed control valve with anti-corrosive stainless steel body.	852

■ Medium bore size type

Series	Port size	Features	Page
SC1	Rc1/8, 1/4, 3/8, 1/2	For general purpose medium bore size	856

■ Large bore size type

Series	Port size	Features	Page
SC	Rc3/4, 1, 1 1/4, 1 1/2, 2	For general purpose large bore size	858

■ Line type with push-in joint

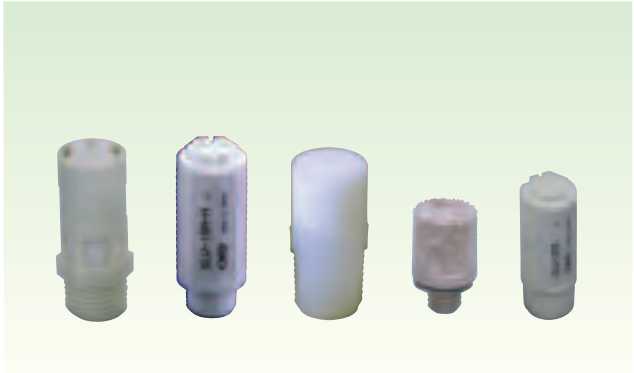
Series	Port size	Features	Page
SCL2	ø1.8, ø4, ø6, ø8, ø10, ø12	Applicable for remote central control of actuators	860

■ In-out line type with push-in joint

Series	Port size	Features	Page
SCD2	ø1.8, ø4, ø6, ø8, ø10, ø12	Control the flow rate in the air supply and exhaust directions	860

■ Needle valve, line type with push-in joint

Series	Port size	Features	Page
SCL2-N	ø4, ø6, ø8	Flow control needle valve of no splash grease use Available for clean room / oil-prohibited specifications	864



Silencer

Page P.869 -

■ Metering valve with silencer

Series	Port size	Features	Page
SMW2	R1/8, 1/4	Equipped with speed control valve and silencer function	874
FMS	M5		876
SMW	R3/8, 1/2		

■ Small bore size type

Series	Port size	Features	Page
SL	M5	Thread size M5, small type	878

■ Resin body type

Series	Port size	Features	Page
SLW	R1/8, 1/4, 3/8, 1/2	Damping effect 30dB (A) and over	878
SLW-*A-H	R1/4, 3/8, 1/2	High noise reduction / small bore size	880

■ Large flow rate small bore size / resin body type

Series	Port size	Features	Page
SLW-*L	R1/4, 3/8	Damping effect 30dB (A) and over	881

■ High noise reduction compact type

Series	Port size	Features	Page
SLW-*S	R1/8,1/4	Damping effect 25 to 30dB (A) and over	882
	R3/4		883

■ Push-in type

Series	Port size	Features	Page
SLW-H	R1/4, 3/8, 1/2	Damping effect 40dB (A) and over	884

■ Miniature type

Series	Port size	Features	Page
SLM	M3, M5	Damping effect 20dB (A) and over	885

■ Aluminum body type

Series	Port size	Features	Page
SL	R1/4 to 2	Damping effect 20dB (A) and over	886

According to products variation

Select products according to appearance and features.

NEW indicates models added with Version 7.

Pneumatic auxiliary components P.849

Auxiliary valve Page P.889 -

■ Quick exhaust valve NEW

Series	Port size	Features	Page
QEL	ø4, ø6	Small / space saving inline type	894
QEV2	Rc1/8 to 1	Increased exhaust speed of cylinder, etc.	896

■ Shuttle valve NEW

Series	Port size	Features	Page
SHV2	Rc1/8 to 1	Multiple pneumatic signals can be selected.	900

■ Small check valve with push-in joint

Series	Port size	Features	Page
CHL	M5, ø4, ø6	Small / space saving inline type	904

■ Check valve

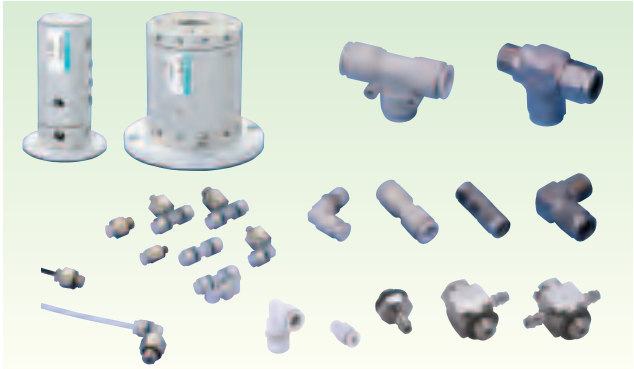
Series	Port size	Features	Page
CHV2	Rc1/8 to 1 1/2	Perfectly preventing compressed air from flowing backward.	906

■ Block valve

Series	Port size	Features	Page
FPV	M5, R1/8, 1/4, 3/8, 1/2	Cylinder can be stopped at a random position and freely mounted	908

■ Threshold sensor

Series	Port size	Features	Page
PWS	M5, R(Rc)1/8, 1/4, 3/8, 1/2	Detect exhaust pressure near stroke ends with a high accuracy	912



Joint / tube Page P.915 -

■ Miniature joint

Series	Port size	Features	Page
F	M3 to R(Rc)1/8	For tube ø3.2, 4, 6	922

■ Joint

Series	Port size	Features	Page
GW	M3 to R(Rc)1/2	For push-in joint ø3.2 to 16	930

■ Joint / stainless steel type

Series	Port size	Features	Page
ZW	M5 to R1/2	Flame resistant resin and stainless steel push-in joint	959

■ Joint / mini-type

Series	Port size	Features	Page
GWJ	M3 to R(Rc)1/8	For compact push-in joint ø3.2 to 6	944

■ Joint / stainless steel type NEW

Series	Port size	Features	Page
ZSP	M5 to R1/2	Push-in joint with stainless steel metal body. SUS303 or equivalent material used.	963

■ Female joint / stainless steel type

Series	Port size	Features	Page
ZJ	R1/8 to R1/2	Tightening method using stainless steel materials Tightening type joint	963

■ Female joint / joint

Series	Port size	Features	Page
MJ	R(Rc)1/8 to 1/2	Female joint	969
JL	Rc1/8, 1/4, 3/8, 1/2	Joint	

■ Rotary joint NEW

Series	Port size	Features	Page
RJF	M5, Rc1/8	High rigidity and low sliding resistance achieved with built-in bearings Number of circuits: 4, 6, 8, 12, 16	976

Pneumatic auxiliary components P.825

■ Fiber tube

● Antistatic type (push-in joint) NEW

Series	Bore size	Features	Page
UP-9402-20-F1	ø1.8×ø1.2	Extra-fine air tube with increased flow rate	984
PG	M3, M5, 1/8	Dedicated push-in joint	986

● Clean type (push-in joint) NEW

Series	Bore size	Features	Page
EH-5802-20	ø1.8×ø1.2	Clean specifications incorporate high corrosion resistant materials	984
CG	M3, M5, 1/8	Clean type dedicated push-in joint	990

● Flame resistant type (push-in joint) NEW

Series	Bore size	Features	Page
UP-9102-20-*-SR	ø1.8×ø1.0	Flame resistant resin is provided	998
RG	M5, 1/8	Flame resistant type dedicated push-in joint	999

● Antistatic type

Series	Bore size	Features	Page
UP-9102-20-F1	ø1.8×ø1.0	Joint dedicated for extra-fine air tube	1004
PTN2	M3, M5, 1/8, ø3.2, ø4, ø6	Dedicated joint	

Joint / tube

Page P.1008 -

■ Antistatic tube

Series	Bore size	Features	Page
UP-9***-F1/F2	3.2, 4, 6, 8, 10, 12	Adhesion prevention tube of static electricity and dirt	1009

■ Tube (F. U. KX. SR)

Series	Bore size	Features	Page
F,U,NU,KX,SR	ø3.2 to ø15	Soft nylon, urethane tube	1012

According to products variation

Select products according to appearance and features.

NEW indicates models added with Version 7.

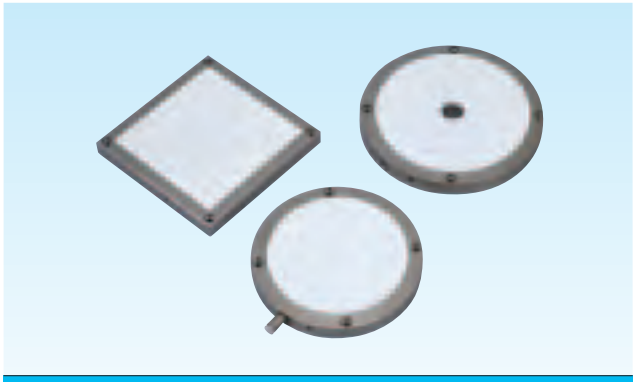
Vacuum components ▶▶▶ P.1017

Vacuum filter

Page P.1019 -

■ Vacuum filter

Series	Port size	Features	Page
VFA1000	Rc1/8, 1/4	Long service life, and moisture can be removed.	1022
VFA3000	Rc1/4, 3/8		
VFA4000	Rc3/8, 1/2		



Precise suction plate

Page P.1031 -

Series	Features	Page
PVP-R (donut shaped)	Precision suction plate incorporates multi-porous sintered fluorine resin with 40% porosity	1036
PVP-C (round)		
PVP-S (square shape)		

Vacuum regulator

Page P.1025 -

■ Vacuum regulator

Series	Port size	Features	Page
VRA2000	1/4, 3/8	Compact and large flow rate (200 ℓ/min.(ANR))	1026

NEW

Magnetic spring buffer

Page P.1043 -

■ Magnetic spring buffer

Series	Features	Page
FBU2-7D (socket and spigot type)	Stable pressing force, low particle generation and long life are realized with original cushioning mechanism and magnetic spring	1048
FBU2-8M (full thread type)		
FBU2-12D (socket and spigot type)		
FBU2-12M (full thread type)		

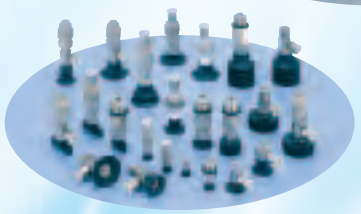
CC-796

Vacuum system components SELVACS

SELVACS
Selex Vacuum System

Use for transfer of various products and parts, transfer, movement, insertion, positioning and packaging, etc.

Vacuum ejector
Vacuum unit



Vacuum pad

Related vacuum products

NEW

New models and variations added to lineup!

Wide variation meeting different applications!

Broad series of models and variations enable use in different fields and applications.

Compact design

Compact components save space.

Unit and module

The core vacuum ejector and vacuum unit is designed with unitization and modularization to save space and facilitate use.

According to products variation

Select products according to appearance and features.

NEW indicates models added with Version 7.

Sensors P.1057

Pressure sensor for air / coolant

Pressure sensor for air / coolant

Mechanical pressure switch Page P.1059 -

■ Pressure switch

Series	Port size	Features	Page
APE	Rc1/4	Setting accuracy: within 0.02MPa Setting range: 1 to 0.8MPa	1062
CPE	Rc1/4	Pressure can be set over a wide range from 0.05 to 0.8MPa for coolant to air	1252

■ Reed type small pressure switch

Series	Port size	Features	Page
APS-W	Rc1/8 flange	Space saving and wide pressure range	1066

Pressure sensor for air / coolant

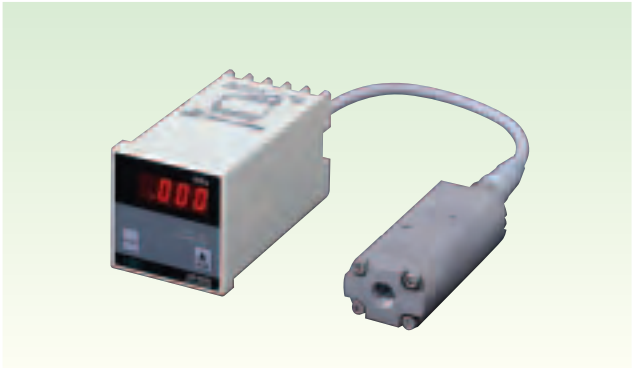
Pressure sensor for air / coolant

Electronic pressure switch Page P.1069 -

■ Pressure switch

Series	Pressure range	Features	Page
PPE	-100kPa to 980kPa	Sensor-amplifier integrated type without display miniature easy installation	1090
PSW	-100kPa to 980kPa	Sensor-amplifier integrated type without display	1096
PPX NEW	-100kPa to 1000kPa	Standard type, high-function type available Twin display shows pressure's "Current value" and "Setting value". 3 color digital display	1100
PPD3	-100kPa to 980kPa	Sensor-amplifier integrated with display 30*	1124
PPD3-S	-100kPa to 980kPa	Stainless steel diaphragm sensor type	1124
PPD	-100kPa to 980kPa	Sensor-amplifier integrated with display 28*	1140
PPD-S	-100kPa to 980kPa	Stainless steel diaphragm sensor type	1144
PPD-A	-100kPa to 980kPa	With protective BOX	1146
PPS2	-100kPa to 500kPa	Sensor-amplifier integrated type / separated type with display	1154
CPD	0 to 7MPa	For coolant / other liquid sensor-amplifier integrated with display	1254

Pressure sensor for air



Pressure sensor for air

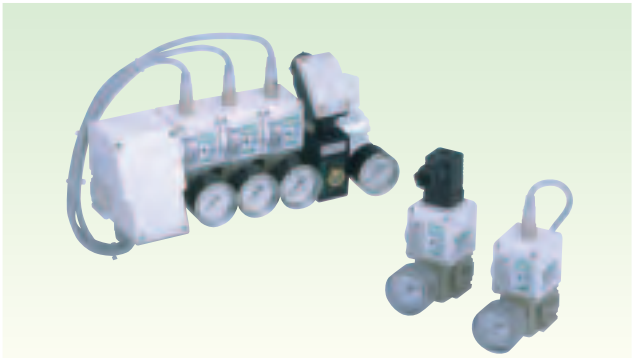
Electronic differential pressure switch

Page P.1158

■ Electronic differential pressure switch

Series	Measuring range	Features	Page
DP1000	0 to 0.2MPa ±3%F.S.	Appropriate for preventive maintenance of pneumatics system	1158

Pressure sensor for air



Pressure sensor for air

Contact / close contact conf. / cutting tool broken detecting switch

Page P.1165 -

■ Contact confirmation switch (gap switch)

Series	Orifice	Features	Page
GPS2	ø0.5, 0.7	Discrete	1172
MGPS2	ø0.5, 0.7	Manifold type (2 stations to 5 stations)	1177
UGPS2	ø0.5, 0.7	Solenoid valve with needle, regulator integrated general purpose unit type	1180

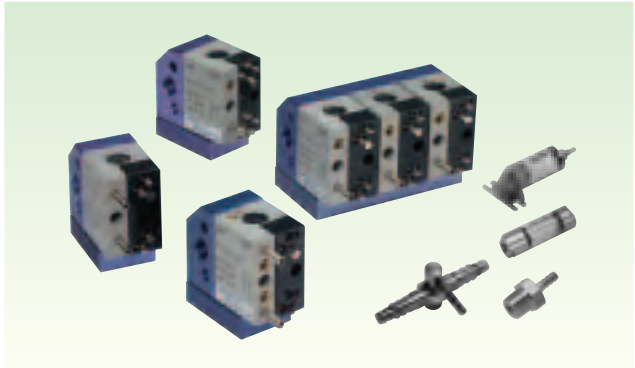
■ Close contact confirmation switch

Series	Orifice	Features	Page
HPS	ø0.5, 0.7, 1.0	Discrete	1186
MHPS	ø0.5, 0.7, 1.0	Manifold type (2 stations to 5 stations)	1190
UHPS	ø0.5, 0.7, 1.0	Solenoid valve with needle, regulator integrated general purpose unit type	1194

■ Cutting tool broken detecting switch

Series	Orifice	Features	Page
TLPS	ø0.3	Discrete	1200
MTLPS	ø0.3	Manifold type (2 stations to 5 stations)	1204
UTLPS	ø0.3	Solenoid valve with needle, regulator integrated general purpose unit type	1208

Pressure sensor for air



Pressure sensor for air

Air sensor (PEL systems)

Page P.1221 -

■ Switching element

Series	Fixed orifice diameter	Features	Page
APA1	Without to 1.4mm	Stable detection by ultra low pressure	1226

■ Switching element, manifold

Series	Element set	Features	Page
APA3	2, 3, 4, 5	Depending on manifold A system is compact.	1226

■ Detection nozzle

Series	Nozzle port size	Features	Page
APA4-BA	0.3 to 2.0mm	Gauge	1229
APA4-DA	1, 2mm	Back pressure type	
APA4-VS	1mm	Reflection type	
APA4-GA	1, 2, 3.2mm	Facing type	

■ PL switch

Series	Features	Page
PL	PEL switching element and electric wiring connection terminal, pneumatic piping terminal or power circuit are stored in box.	1232

■ SEPEL switch

Series	Differential pressure	Features	Page
DPS	5kPa	Fine differential pressure switch combines pneumatic bridge circuit and electric comparison circuit	1240

■ Related products (filter)

Series	Features	Page
K-005	Related products when using air sensor	1242

■ Related products (piping instrument)

Series	Features	Page
APA6	Related products when using air sensor	1243

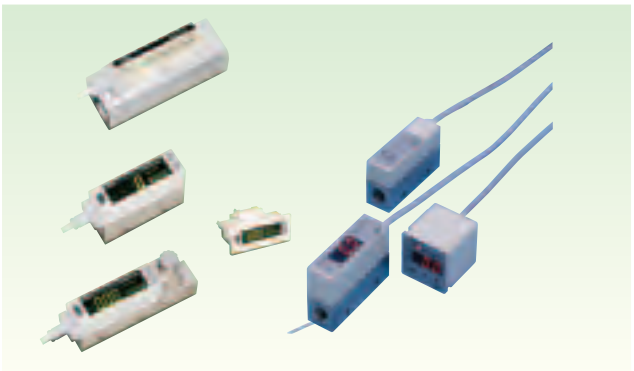
According to products variation

Select products according to appearance and features.

NEW indicates models added with Version 7.

Sensors ▶▶▶ P.1057

Flow sensor for air



Flow sensor for air

Small size flow sensor FSM2, FSM

Page P.1267 -

■ Miniature, high speed response display integrated/display separated type FSM2 NEW

Series	Flow range Uni-direction / Bi-direction	Features	Page
FSM2-*005	0 to 500/-500 to 500m ℓ/min.	Compact outstanding Quick response Needle valve integrated type. Display separator available. Twin display/bi-color display function Panel mounting possible. Any installation attitude.	1278
FSM2-*010	0 to 1000/-1000 to 1000m ℓ/min.		
FSM2-*020	0 to 2.00/-2.00 to 2.00 ℓ/min.		
FSM2-*050	0 to 5.00/-5.00 to 5.00 ℓ/min.		
FSM2-*100	0 to 10.00/-10.00 to 10.00 ℓ/min.		
FSM2-*200	0 to 20.0/-20.0 to 20.0 ℓ/min.		
FSM2-*500	0 to 50.0/-50.0 to 50.0 ℓ/min.		
FSM2-*101	0 to 100.0/-100.0 to 100.0 ℓ/min.		
FSM2-*201	0 to 200/-200 to 200 ℓ/min.		
FSM2-*501	0 to 500/-500 to 500 ℓ/min.		
FSM2-*102	0 to 1000/-1000 to 1000 ℓ/min.		

■ Compact/high speed, extremely small flow indicator type/analog output type FSM-H NEW

Series	Flow rate range	Features	Page
FSM-H-*-005ML	0.25 to 5m ℓ/min.	Detect fine flow rates of 1m ℓ/min. or less at a high speed. Perfect for leakage inspections and pinhole inspection	1330
FSM-H-*-010ML	0.5 to 10m ℓ/min.		
FSM-H-*-050ML	2.5 to 50m ℓ/min.		
FSM-H-*-100ML	5 to 100m ℓ/min.		

■ Miniature analog output type/switch output type FSM-V

Series	Flow rate range	Features	Page
FSM-V-*-R0005	-0.05 to +0.05 ℓ/min.	Easily measure forward and reverse flows. Appropriate for detection control of vacuum suction and vacuum break	1340
FSM-V-*-R0010	-0.1 to 0.1 ℓ/min.		
FSM-V-*-R0050	-0.5 to 0.5 ℓ/min.		
FSM-V-*-R0100	-1 to 1 ℓ/min.		
FSM-V-*-R0500	-5 to 5 ℓ/min.		
FSM-V-*-R1000	-10 to 10 ℓ/min.		

■ Miniature inline filter FSM-VFM

Series	Flow rate range	Features	Page
FSM-VFM	ø1.8, ø4, M5	Inline filter dedicated for miniature and space saving FSM series	1362

Flow controller for air

Flow controller for air

Small size flow controller FCM

Page P.1365 -

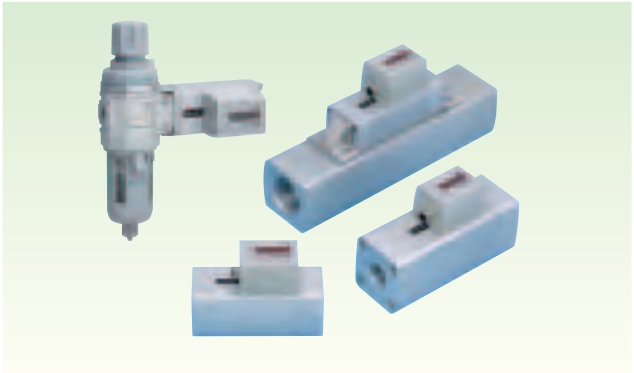
■ Standard model

Series	Flow rate range	Features	Page
FCM-9500	0 to 0.5 ℓ/min.	Compact, high-speed, high-function flow controller. Applicable flow: Air, nitrogen, argon, oxygen, city gas, methane, propane, hydrogen, helium	1376
FCM-0001	0 to 1 ℓ/min.		
FCM-0002	0 to 2 ℓ/min.		
FCM-0005	0 to 5 ℓ/min.		
FCM-0010	0 to 10 ℓ/min.		
FCM-0020	0 to 20 ℓ/min.		
FCM-0050	0 to 50 ℓ/min.		
FCM-0100	0 to 100 ℓ/min.		

■ Low pressure differential model

Series	Flow rate range	Features	Page
FCM-L9500	0 to 0.5 ℓ/min.	Control the flow of combustion gases having a low supply pressure, such as for burner flame control.	1376
FCM-L0001	0 to 1 ℓ/min.		
FCM-L0002	0 to 2 ℓ/min.		
FCM-L0005	0 to 5 ℓ/min.		
FCM-L0010	0 to 10 ℓ/min.		

Flow sensor for air



Flow sensor for air
Flow sensor for compressed air (FLUEREX)
Page P.1405 -

■ Display integrated type PF-F

Series	Flow rate range	Features	Page
PF500F	25 to 500 ℓ/min.(normal)	Integrated display can be turned to match mounting posture. Safe design can withstand water drops.	1414
PF1000F	50 to 1000 ℓ/min.(normal)		
PF2000F	100 to 2000 ℓ/min.(normal)		
PF4000F	200 to 4000 ℓ/min.(normal)		
PF8000F	400 to 8000 ℓ/min.(normal)		1418
PF16000F	800 to 16000 ℓ/min.(normal)		

■ Display integrated type modular design type PFU-F

Series	Flow rate range	Features	Page
PFU500F	25 to 500 ℓ/min.(normal)	Dock filter and regulator to this unit type with module connections.	1422
PFU1000F	50 to 1000 ℓ/min.(normal)		
PFU2000F	100 to 2000 ℓ/min.(normal)		

Flow sensor for air

Flow sensor for air
Flow sensor for compressed air (FLUEREX)
Page P.1431 -

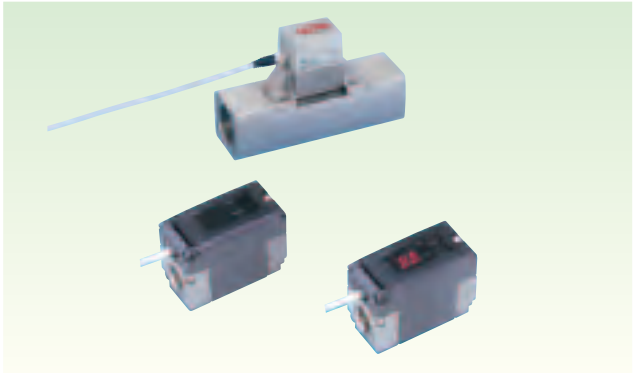
■ Display separate type PFD

Series	Flow rate range	Features	Page
PFD-501	25 to 500 ℓ/min.(normal)	Easily detect the flow of compressed air with total accuracy ±4%F.S. and easily measure forward and reverse flows.	1440
PFD-102	50 to 1000 ℓ/min.(normal)		
PFD-202	100 to 2000 ℓ/min.(normal)		
PFD-402	200 to 4000 ℓ/min.(normal)		
PFD-802	400 to 8000 ℓ/min.(normal)		
PFD-163	800 to 16000 ℓ/min.(normal)		

■ Display separate type tester kit PFK

Series	Flow rate range	Features	Page
PFK-501	25 to 500 ℓ/min.(normal)	Measuring component with air flow rate immediate flow measuring possible in kit field	1446
PFK-102	50 to 1000 ℓ/min.(normal)		
PFK-202	100 to 2000 ℓ/min.(normal)		
PFK-402	200 to 4000 ℓ/min.(normal)		
PFK-802	400 to 8000 ℓ/min.(normal)		

Flow sensor for water



Flow sensor for water
Page P.1455

■ Karman's vortex type

Series	Flow measuring range	Features	Page
WFK3000	0.5 to 40, 1.5 to 12 ℓ/min.	Compact / component integrated type	1470
WFK5000	1.0 to 8.0, 3.0 to 27 ℓ/min.	Standard type	1474
WFK6000	1.0 to 8.0, 3.0 to 27 ℓ/min.	Modular design type	1478
WFK7000	10 to 50, 20 to 100, 40 to 200 ℓ/min.	Large flow rate type	1482

According to products variation

Select products according to appearance and features.

NEW indicates models added with Version 7.

Total air systems P.1487

Total air system

Total air system

Detector Page P.1490 -

■ Small mechanical valve

Series	Port size	Features	Page
MS	ø4, Rc1/8	Compact, large flow	1494

■ Medium mechanical valve

Series	Port size	Features	Page
MM	ø4, Rc1/8	No intermediate bleeding	1508

■ Large mechanical valve

Series	Port size	Features	Page
MAVL	Rc1/4	Pressurized from 3 directions, and used as NO, NC,or distributor	1520

Total air system

Circuit device Page P.1491 -

■ Air timer

Series	Working pressure range	Features	Page
RTD-3A	0.25 to 0.8MPa	Delay time MAX. 30 seconds	1526

■ Pressure switch

Series	Working pressure range	Features	Page
PE-1	0.2 to 0.7MPa	ø4 nylon tube used for piping	1527

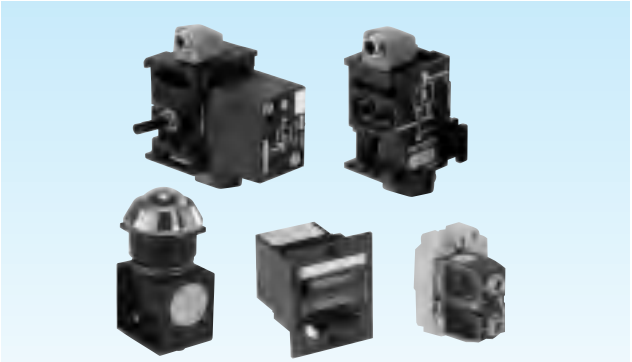
■ Air light

Series	Working pressure range	Features	Page
AL-*	0.05 to 0.8MPa	ø4 nylon tube used for piping	1527

■ Small air light

Series	Working pressure range	Features	Page
SAL-*	0.25 to 0.8MPa	Insert into ø4 push-in joint	1528

Total air system (gamma system)



Total air system (gamma system)

PLC Page P.1529 -

Series	Type	Page
PS*	PLC	1532
PR*,PL*	Relay type	1533
PZU	Relay type sub-base	1534
PL*	Integrated type (logic element)	1536
PL*,PZM	Line type (logic element)	1537

Total air system (gamma system)

Signal controllers Page P.1538 -

Series	Type	Page
PXV	Air light	1538
PC*	Air counter	1539
PXP	Foot switch	1539
PR*,PX*	Element and sensor	1541
PXB-M	Pushbutton switch, switch body (set screw type)	1542
ZB2,ZB4	Switch head	1543
PXB-B	Pushbutton switch, switch body (separate type)	1544
PXC	Miniature limit switch	1546
PXC	Compact limit switch	1547
PXC	Limit switch	1548
ZCK	Rotary head lever actuator	1549

Guide in model change

The series listed in this catalog have undergone a model changeover with this new series. Consider using the new series when making a selection.

■ Refrigerating type dryer
GX3100, GX5100, GX8100

Old Series

■ Refrigerating type dryer
GX3100D, GX3200, GX5200, GT5000

New Series

■ Medium main line filter
AF1000

Old Series

■ Medium main line filter
AF2000

New Series

■ Quick exhaust valve
QEV

Old Series

■ Quick exhaust valve
QEV2

New Series

■ Shuttle valve
SHV

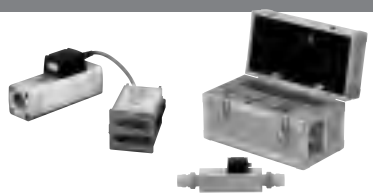
Old Series

■ Shuttle valve
SHV2

New Series

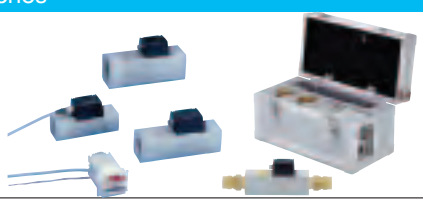
■ Flow sensor for compressed air
PF-D

Old Series



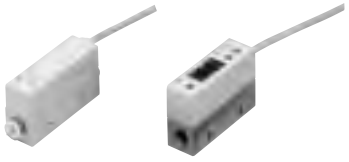
■ Flow sensor for compressed air
PFD

New Series



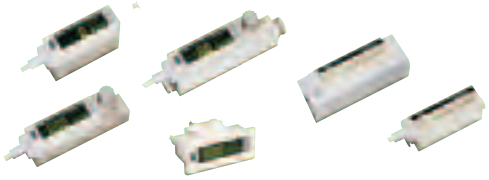
■ Small size flow sensor
FSM

Old Series



■ Small size flow sensor
FSM2

New Series



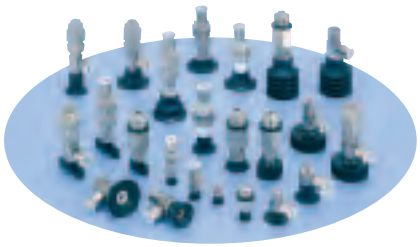
Guide in recommended substitute part

Production of the following series listed in this catalog has been discontinued. Please consider using the recommended substitute part when making a selection.

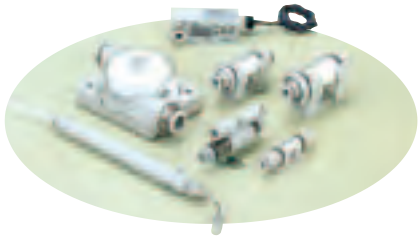
Discontinued	Recommended substitute part
Vacuum components Vacuum devices	Vacuum components SELVACS

Vacuum System Components (CatalogNo.CC-796)

■ Vacuum ejector
Vacuum unit



■ Vacuum pad



■ Related vacuum products

Production of the following series listed in this catalog has been discontinued. Please consider using the recommended substitute part when making a selection.

Discontinued	Recommended substitute part (Catalog)
Electronic regulator / nozzle flapper type ER150,170,310,350,380	Electro-pneumatic regulator EV/EVD Series

Discontinued	Recommended substitute part
Refrigerating air dryer RD (M) 2001 to 2015	Refrigerating air dryer GX5200 Series
Refrigerating air dryer RD (M) 1003 to 1011	Refrigerating air dryer GK3100D Series
Refrigerating air dryer RD (M) 1015	Refrigerating air dryer GK3200 Series
Refrigerating air dryer GX4103 (E) to 4106 (E)	Refrigerating air dryer GK5100 Series (No substitution products for E type)
Refrigerating air dryer GX4108 (E) to 4137 (E)	Refrigerating air dryer GX5200Series (No substitution products for E type)
Refrigerating air dryer GX6003 to 6015	Refrigerating air dryer GX5200Series (according to conditions)
Refrigerating air dryer GX5100 Series	Refrigerating air dryer GX5200 Series
Refrigerating air dryer GX3106 to 3111	Refrigerating air dryer GK3100D Series
Refrigerating air dryer GX3115 to 3137	Refrigerating air dryer GX3200 Series
Refrigerating air dryer GK3100 series	Refrigerating air dryer GK3100D series
Desiccant type air dryer 4112 to 4132-*C	Desiccant type air dryer SHD series
Automatic drain DB3002E	Automatic drain DB3003

Precision control dryer RD-*PRT Series	No substitution products
Refrigerating air dryer RD7000 Series	
Wilco-matic air filter 1404	
Interface valve / detector R-IF	
Circulation type water cooling refrigerator HYW Series	
Oil indicator 6509,6510	

Icons

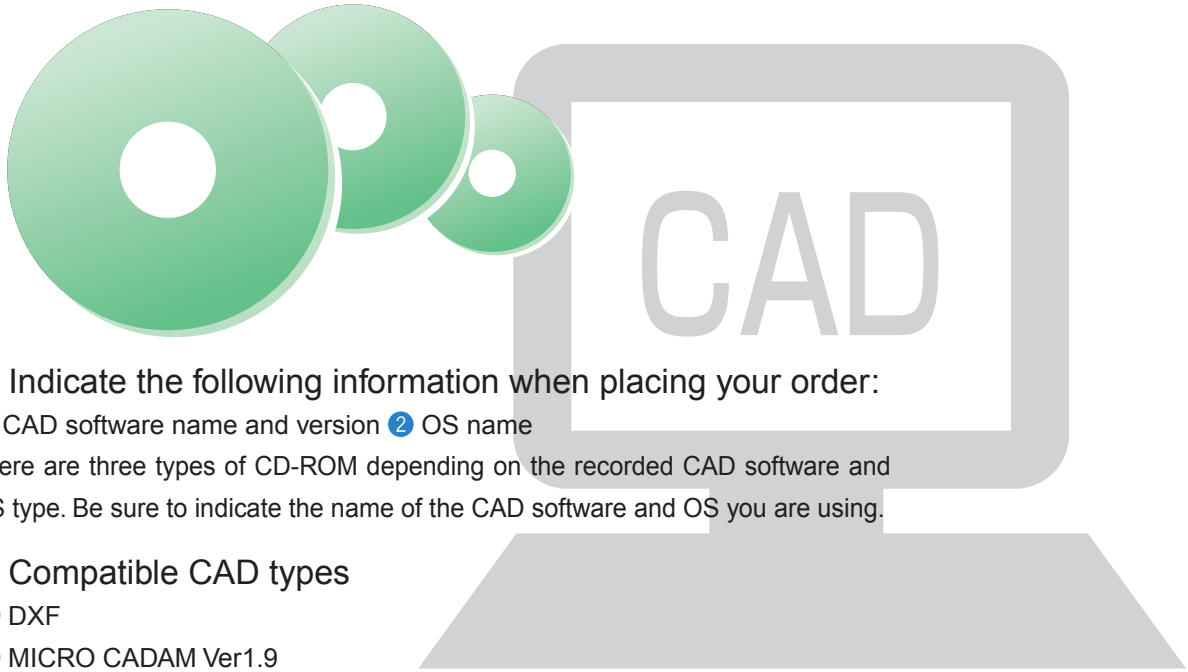
To simplify use of this catalog, we have prepared icons for each item, indicated in corresponding sections.

Mark	Meaning	Details
	A CAD mark in dimension drawings indicates that CAD data is available.	Intro 33
	EU standard-compliant product	Intro 35
	RoHS-compliant product	Intro 37

CKD Electronic Catalog Guide (CAD DATA)

Using and ordering the Electronic Catalog

The CKD Electronic Catalog is a collection of CAD drawings including dimensions drawings (CAD data) related to pneumatic components and control components. This data is provided on CD-ROM to aid in CAD design. Please contact your CKD Sales person or our nearest sales office to order this CD.



Indicate the following information when placing your order:

❶ CAD software name and version ❷ OS name

There are three types of CD-ROM depending on the recorded CAD software and OS type. Be sure to indicate the name of the CAD software and OS you are using.

Compatible CAD types

❶ DXF
❷ MICRO CADAM Ver1.9
❸ DMNDOS (MICRO CADAM DOS ver.)

Downloading from the internet

http://www.ckd.co.jp/

DXF data an be used from

CKD website Component Products > **Catalog/CAD data**

CKD Electronic Catalog Contents

The following data and software are recorded on CD-ROM "CAD DATA 2006".

- Pneumatic component and control component figure data (DXF / MICRO CADAM / DMNDOS)
- README. TXT (Use and precautions)
- Kensaku.exe (CAD drawing search program)
- List.xls (DXF CAD data list)
- List_mc.xls (MC CAD data list)

How to use Electronic Catalog

Operating the CAD

Contact the CAD maker for details on operating CAD -

- Reading files
- Creating graphics
- Usable data formats

Confirmation before use

Read the README.TXT file on the CD-ROM before starting use. Information on

- How to use the CKD Electronic Catalog
- Precaution
- For version information, confirm "README.txt" contained in CD-ROM.

Electronic Catalog file list

Refer to

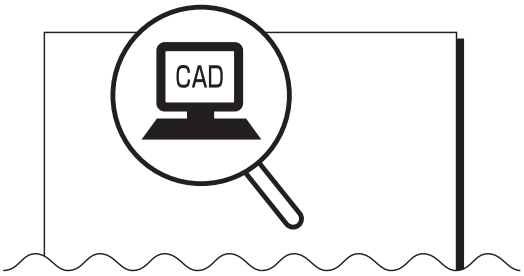
- List.xls
- List_mc.xls

on the CD-ROM for the latest files of Electronic Catalog files.

Searching the Electronic Catalog Filename

1 Searching from this catalog

CAD data is available for items with a CAD mark in dimensions.



2 Searching from CD-ROM

When the CD-ROM is set in the drive, the “CAD Data Search Software” will start up, and the search screen shown on the left will open. (*1) The required CAD data can be searched and saved onto the hard disk.

*1: If the automatic play function is not set, start up with “Kensaku.exe” on the CD-ROM. This software does not need to be installed.

CE Marking

CKD supports our customer's machine products CE Marking with a wide range of EU Standard-compatible components.

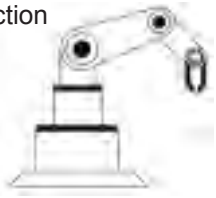
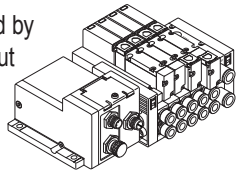
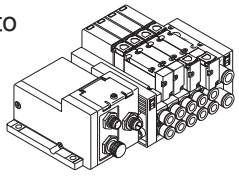
CE : Indicated on EU Standard-compatible products.

CE Marking

- The CE Marking attests that the product satisfies all EC Directive requirements to which it is subject.
- CE Marking is a passport for products to the EU Products with the CE Marking can be freely distributed within the EU.
- Machines exported to the EU must comply with Machinery Directives, EMS Directives, and Low-Voltage Directives, etc. In principle, CE marking must be indicated on the final product marketed and, basically, built-in components do not require CE Markings. If compliance of built-in parts (CKD products) with EU Standards can be verified, CE Marking of the final product (customer's machine product) can be easily obtained.

Details on EC Directives

CKD's main components, such as the solenoid valve, sensors, and direct drive actuator, must comply with the Directives below. Many models already comply with EU Standards.

Directive	Requirements	Application
Machinery Directives (89/392/EEC)	Requirements for Machine Safety	■ Machine having a drive section Components such as solenoid valves are not subject to this compliance, but the user obtains CE Marking certification easier by complying with Standards. 
EMC Directive (89/336/EEC)	Measures against electromagnetic interference emission (EMI emission) and electromagnetic interference elimination performance (EMS immunity).	■ Devices that generate electromagnetic interference or that are affected by electromagnetic interference Solenoid valves composed of a simple solenoid are not affected by electromagnetic interference, but the user can obtain CE Marking certification easier by complying with Standards. 
Low-Voltage Directive (73/23/EEC)	Safety regarding electricity, such as electrical shock	■ Machine operating at 50 to 1000 VAC and 75 to 1500 VDC 
Simple Pressure Vessel Directive (87/404/EEC)	Safety regarding vessel leakage and explosions	■ Welded vessel having sum (PV/S) of maximum working pressure and volume exceeding 50 bar/liter The CKD air tank (AT type) does not comply with this directive, and cannot be exported to the EU. 

A total of 28 countries require CE Marking compliance, including 25 European Union (EU) countries and three European Free Trade Association (EFTA) countries.

EU members: U.K., Ireland, France, Belgium, Denmark, Netherlands, Italy, Germany Luxembourg, Portugal, Spain, Greece, Sweden, Finland, Austria, Poland, Hungary, Czech, Slovakia, Lithuania, Latvia, Estonia, Slovenia, Malta, Cyprus (Only Southern Republic of Cyprus)

EFTA members: Norway, Iceland, Liechtenstein (Excluding Switzerland)

CKD EU standard-Compliant Parts

Depending on specifications and detailed model combinations, certified parts may not be available. Contact your CKD Sales Representative for details. Certified part model: Indicated with-ST at the end of the model.

Refer to the CKD web site for the latest information.
Home Page Address http://www.ckd.co.jp/

CKD RoHS Compliance

CKD's theme is to develop environmentally friendly products.

RoHS

RoHS is the abbreviation for Restriction Of the use of certain Hazardous Substances in electrical and electronic equipment. This is the directive prohibiting use of certain hazardous substances issued by the EU.

- CKD started compliance with RoHS Directives on July, 2006.
- RoHS-compliant products reduce the load on the environment and ensure distribution throughout the EU.

CKD's Environment Policy

Based on the CKD Environment Policy enacted in 2001, CKD has been promoting company-wide environment management activities to protect the global environment.

CKD's Environment Policy

1. Development of sales of environment load reducing products
2. Reduction of environment-polluting substances
3. Promotion of energy conservation and resource reduction
4. Waste reduction

CKD's compliance with RoHS

Products subject to RoHS Directions fall within the Applicable scope in 1, below. While CKD's components are not included in this applicable range, we have positioned the reduction of environment-polluting chemical s as high-priority. From July 2006, we have sequentially enforced RoHS Compliance of our key products. These products are indicated with the "RoHS-compliant" mark in this manual.

Note: Stock in distribution is being sequentially changed to RoHS Compliance.

Technical Data

Enactments of WEEE Directive and RoHS Directive

EU Directives related to Waste Electrical and Electronic Equipment (WEEE) and Restriction on Hazardous Substances Directive (RoHS) have been enacted by the EU.

WEEE Directive

(Directive 2002/96/EC of 27 January 2003 on waste electrical and electronic equipment)

This directive eliminates waste electrical and electronic equipment and reduces waste through reuse and recycling, etc.

RoHS Directive

(Directive 2002/95/EC of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment)

This directive assimilates laws related to limiting the use of hazardous substances in electrical and electronic devices set forth by each EU member state, contributes to the protection of human health, and provides sufficient means for processing and recycling waste electrical and electric products.

1 Applicable scope

1. Large household appliances
2. Small household appliances
3. IT and telecommunications equipment
4. Consumer equipment
5. Lighting equipment
6. Electric tools, excluding large fixed industrial tools
7. Toys, leisure and sporting goods
8. Vending machines

2 Details of Directive

Restricted substances

- Lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB)
- Polybrominated diphenyl ether (PBDE)

Import of electrical and electronic equipment containing the above substances into the EU was prohibited as a rule from July 1, 2006.

According to variation

Copper and PTFE free

Pneumatic components for Braun tube manufacturing lines.

Series / model			Port size	Remarks	Page
Filter / regulator (F.R.L.)	C**00-W -TP6	F.R.L. combination	Rc1/8 to Rc1		500
	C**10-W -TP6	W.L. combination	Rc1/8 to Rc1		500
	C**20-W -TP6	F.R. combination	Rc1/8 to Rc1		500
	C**30-W -TP6	F.M.R. combination	Rc1/8 to Rc1		500
	C**40-W -TP6	W.M. combination	Rc1/8 to Rc1		500
	C**50-W -TP6	R.M. combination	Rc1/8 to Rc1		500
	C*060-W	F.M. combination	Rc1/8 to Rc1	Copper and PTFE free as standard	324
	C*070-W	F.F.M. combination	Rc1/4 to Rc1	Copper and PTFE free as standard	330
	W*000-W -TP6	Filter / regulator	Rc1/8 to Rc1		501
	W*100-W -TP6	Reverse filter / regulator	Rc1/8 to Rc1		502
	F*000-W	Air filter	Rc1/8 to Rc1	Copper and PTFE free as standard (Refer to model no.)	503
	M*000-W	Oil mist filter	Rc1/8 to Rc1	Copper and PTFE free as standard (Refer to model no.)	504
	R*000-W -TP6	Regulator	Rc1/8 to Rc1		505
	R*100-W -TP6	Reverse regulator	Rc1/8 to Rc1		506
	L*000-W	Lubricator	Rc1/8 to Rc1	Copper and PTFE free as standard	507
	V*000-W	Shut-off valve	Rc1/8 to Rc1/2	Copper and PTFE free as standard	408
Pneumatic auxiliary components	G49D -P6	General purpose pressure gauge	R1/8		508
	G59D -P6	General purpose pressure gauge	R1/4		508
	FA*31	Exhaust cleaner	Rc3/8 to Rc2	Copper and PTFE free as standard	244
	SC-*	Miniature speed control valve	M3, M5	Copper and PTFE free as standard	834
	SC3W-P6	Speed control valve, elbow type	M3 to R1/2		842
	SC3U-P6	Speed control valve, universal type	M3 to R1/2		846
	SC1-P6	Speed control valve	Rc1/8 to Rc1/2		856
	SLW	Silencer	R1/8 to R1/2	Copper and PTFE free as standard	878
	SL	Silencer	R1/4 to R1	Copper and PTFE free as standard	878
	F	Miniature joint	M3 to Rc(R)1/8	Copper and PTFE free as standard	922
	GW -P6	Joint	M3 to R1/2		930
	F.U.NU.KX.SR	Tube	ø3.2 to ø15	Copper and PTFE free as standard	1012
Sensors	P*100-W -P6	Mechanical pressure switch (Reed type small pressure switch)	Rc1/8 to Rc1		404
	PPD	Electronic pressure switch (Pressure switch)	Rc1/8	Copper and PTFE free as standard	1140

Ozone proof

	Series / model		Port size	Remarks	Page
Filter / regulator (F.R.L.)	W*000-W -P11	Filter / regulator	Rc1/8 to Rc1/2		Ending 10
	W*100-W -P11	Reverse filter / regulator	Rc1/8 to Rc1/2		Ending 11
	F*000-W	Air filter	Rc1/8 to Rc1	As standard	503
	R*000-W -P11	Regulator	Rc1/8 to Rc1/2		Ending 12
	R*100-W -P11	Reverse regulator	Rc1/8 to Rc1		Ending 13
	RB500 -P11	Small regulator	Push-in joint ø4, ø6		Ending 14
	MNRB500	Block manifold regulator	Push-in joint ø4, ø6, ø8		Ending 15
	V*000-W	Shut-off valve	Rc1/8 to Rc1/2	As standard	408
	1144	Air filter	Rc1/4, Rc3/8	As standard	538
	1137	Air filter	Rc1/4, Rc3/8	As standard	538
	B2019 -P11	Regulator	Rc1/8, Rc1/4		Ending 17
	A2000-P11	Regulator	Rc1/4, Rc3/8		Ending 17
	2100 -P11	Precision regulator	Rc1/4, Rc3/8		Ending 19
	7170 -P11	Precision F.R. unit	Rc1/4, Rc3/8		Ending 16
	2400 -P11	Reverse regulator	Rc1/4, Rc3/8		Ending 18
	2415-P11	Reverse regulator	Rc3/4, 1, 1 1/2		Ending 18
	ABP-P11	Air booster	Rc1/2	Custom order	816
Pneumatic auxiliary components	SC3W-P11	Speed control valve, elbow type	M3 to R1/2		842
	SC1-X1	Speed control valve medium bore size type	Rc1/8 to Rc1/2		856
	SC3R-P11	Speed control valve, direct piping / elbow type	M5 to Rc1/2		840
	SLM	Miniature silencer	M3, M5	As standard	885
	SLW	Silencer	Rc1/8 to Rc1/2	As standard	878
	F -P11	Miniature joint	M3 to Rc1/8		922
	GW -P11	Joint	M3 to R1/2		930
	ZW -P11	Joint stainless steel Series	M5 to R1/2		961
	ZJ	Female joint stainless steel Series	Rc1/8 to Rc1/2	As standard	965
	F.U.KX	Tube	ø3.2 to ø15	As standard	1012
Vacuum	VFA	Vacuum filter	Rc1/8 to Rc1/2	As standard	1022
Sensors	P*100-W	Mechanical pressure switch (Reed type small pressure switch)	Rc1/8 to Rc1/2 Rc1/8 to Rc1/2	As standard	404
	P4000-W	Pressure switch		As standard	402

Note: Refer to " Ozone proof " on Ending 5 for details.

Clean room specifications

Particle occurrence prevented pneumatic components for clean room

	Series / model		Port size	Remarks	Catalog No./page
Filter / regulator (F.R.L.)	W*000-W -P7*	Filter regulator	Rc1/8 to Rc1/2		* CB-033SA
	W*100-W -P7*	Reverse filter / regulator	Rc1/8 to Rc1/2		
	F *000-W -P7*	Air filter	Rc1/8 to Rc1		
	M*000-W -P7*	Oil mist filter	Rc1/8 to Rc1		
	R *000-W -P7*	Regulator	Rc1/8 to Rc1		
	R *100-W -P7*	Reverse / regulator	Rc1/8 to Rc1		
	FCS500 -P9*	Inline clean filter	ø4 to ø8, Rc1/8, Rc1/4		
	FCS1000-P9*	Inline clean filter	ø8 to ø12, Rc1/4, Rc3/8, Rc1/4, Rc3/8		
	FAC	Clean exhaust filter	ø4 to ø10, R1/8 to R1/2, Rc3/8, Rc1/2		
	RC2000 -P90	Clean regulator	Rc1/4 to Rc1/2		
	1019/1144 -P80/P90	Air filter (5µm)	Rc1/8 to Rc3/8		
	1219/1244 -P80/P90	Micro alescer (0.1µm)	Rc1/8 to Rc3/8		
	2619-P80/P9*	Regulator	Rc1/8, Rc1/4		
	RP*000 -P70	Precision regulator	Rc1/4, Rc3/8		
	G49D-6 -P70/P9*	General purpose pressure gauge	R1/8		
	G59D-8 -P70/P9*	General purpose pressure gauge	R1/4		
	GA400-8 -P90	Differential pressure gauge	Rc1/4		
Pneumatic auxiliary components	F -P80	Miniature joint	M3 to Rc1/8		* CB-033SA
	GW -P7*/P80	Joint	M3 to R1/2		
	GWJ-P7*/P80	Small size joint	M3 to Rc (R)1/8		
	ZW -P80	Joint stainless steel type	M3 to R1/2		
	ZW -P90	Tightening joint stainless steel series	R1/8 to R1/2		
	SC3R-P7*	Speed control valve, direct piping / elbow type	M5 to Rc1/2		
	SC3W-P7*	Speed control valve, elbow type	M3 to R1/2		
	SC1-P7*	Speed control valve medium bore size type	Rc1/8 to Rc1/2		
	SCL2-P7*	Speed control valve line type (push-in joint)	ø1.8 to ø12		
	SCD2-P7*	In/out speed control valve, inline type (push-in joint)	ø1.8 to ø12		
	SCL2-N-P7*/P80	Needle valve (push-in joint)	ø4 to ø8		
	CHL -P7*	Small check valve with push-in joint	M5, ø4, ø6		
	CHV2 -P7*/P80	Check valve (check valve)	Rc1/8 to Rc1 1/2		
	2QV -P70	Quick exhaust valve	ø4 to ø12, R1/8 to R1/2		
	UP -9102 -P80	Fiber tube	ø1.8		
	UP -**** -P80 -F1	Antistatic tube	ø3.2 to ø12		
	NU	Urethane tube	ø3.2 to ø12		

* Refer to catalog No. CB-033SA Pneumatic components for clean room specifications.

Clean room specifications

Particle occurrence prevented pneumatic components for clean room

Series / model			Port size	Remarks	Catalog No./page
Sensors	PPD3 -P7*/P8*	Electronic pressure switch	Rc1/8, ø6 push-in joint		* CB-033SA
	PPD3 -S -P7*/P8*/P9*				
	PPE -P70/P80	Compact electronic pressure switch	R1/8, ø6 push-in joint		
	PPS2 -P70/P80	Electronic pressure switch	Rc1/8		
	PPS2 -P70/P80	Electronic pressure controller	Rc1/8		
	FSM2 -P70/P80	Small size flow sensor	ø1.8, ø4, ø6, Rc1/8, Rc1/4, M5		
Electro-pneumatic regulator	EV2000 -P7*/P8*	Electro pneumatic regulator	Rc1/4		
	EV0000 -P7*/P8*		M5		
	EVS -P7*/P8*		M5		
	EV2100V-P70	Electro pneumatic regulator	Rc1/4		
	MEVT -P7*/P8*	Thin electro pneumatic regulator	ø4, ø6 push-in joint		

* Refer to catalog No. CB-033SA Pneumatic components for clean room specifications.

Elector pneumatic components (proportional pressure controls)

Proportional pressure control is the generic name for the electronic pneumatic pressure application components.

Series / model			Features	Remarks	Page
Pressure control	EVD-1*00	Digital electro-pneumatic regulator	Max. flow rate 400 (ℓ/min.)	Pressure control	736
	EVD-3*00	Digital electro-pneumatic regulator	Max. flow rate 1500 (ℓ/min.)	Pressure control	740
	EV2000	Electro pneumatic regulator	Max. flow rate 800 (ℓ/min.)	Pressure control	760
	EV2100V	Electro pneumatic regulator	Max. flow rate 120, 150 (ℓ/min.)	Pressure control (vacuum)	771
	EV0000	Electro pneumatic regulator	Max. flow rate 2, 6 (ℓ/min.)	Pressure control	765
	EVS	Electro pneumatic regulator	Max. flow rate 2, 6 (ℓ/min.)	Pressure control	768
	MEVT	Thin electro pneumatic regulator	Max. flow rate 2, 6 (ℓ/min.)	Pressure control	778
	3AP	Proportional control valve		Pressure control	800
	2AF	Proportional control valve	Max. effective sectional area 5 to 20mm²	Flow rate control	800
	3AF	Proportional control valve	Max. effective sectional area 3 to 17mm²	Flow rate control	800
	APC	Controller		Dedicating control component for proportional valve	804
	PI	Interface		Interface for proportional valve	808
	PPS2 controller	Pressure controller		Controller for electro pneumatics	1154
Pressure detection	PPS2 switch	Electronic pressure switch (Pressure switch)	Pneumatics / vacuum	Sensor-amplifier integrated type / separated type with display	1150
	PSW		Pneumatics / vacuum	Sensor-amplifier integrated type without display	1096
	PPE		Pneumatics / vacuum	Sensor-amplifier integrated type without display	1090
	PPD		Pneumatics / vacuum	Sensor-amplifier integrated type with display	1140
	PPD3		Pneumatics / vacuum	Sensor-amplifier integrated type / separated type with display	1124

Vacuum components

Pneumatic components for vacuum equipment.

	Series / model		Port size / characteristics	Remarks	Catalog No. / Page
Filter / regulator	VFA1000,3000,4000	Vacuum filter	Rc1/8 to Rc1/2		1022
	K-005	Vacuum filter			1242
	VRA2000	Vacuum regulator	Rc1/4, 3/8		1026
	EV2100V	Electro pneumatic regulator	Max. flow rate 120 / 150 (mm^2)	Pressure control (vacuum)	
Refer to the "Vacuum System Components SELVACS" (No. CC-796A) catalog for details on the vacuum ejector/vacuum unit, vacuum pads and vacuum related components.					CC-796A
Sensors	APA1	Air sensor			1226
	DPS	SEPEL switch			1240
	PPS2	Electronic pressure switch (Pressure switch)	Pneumatics / vacuum	Sensor-amplifier integrated type / separated type with display	
	PSW		Pneumatics / vacuum	Sensor-amplifier integrated type without display	
	PPE		Pneumatics / vacuum	Sensor-amplifier integrated type without display	1090
	PPD		Pneumatics / vacuum	Sensor-amplifier integrated type with display	1140
	PPD3		Pneumatics / vacuum	Sensor-amplifier integrated type / separated type with display	1124

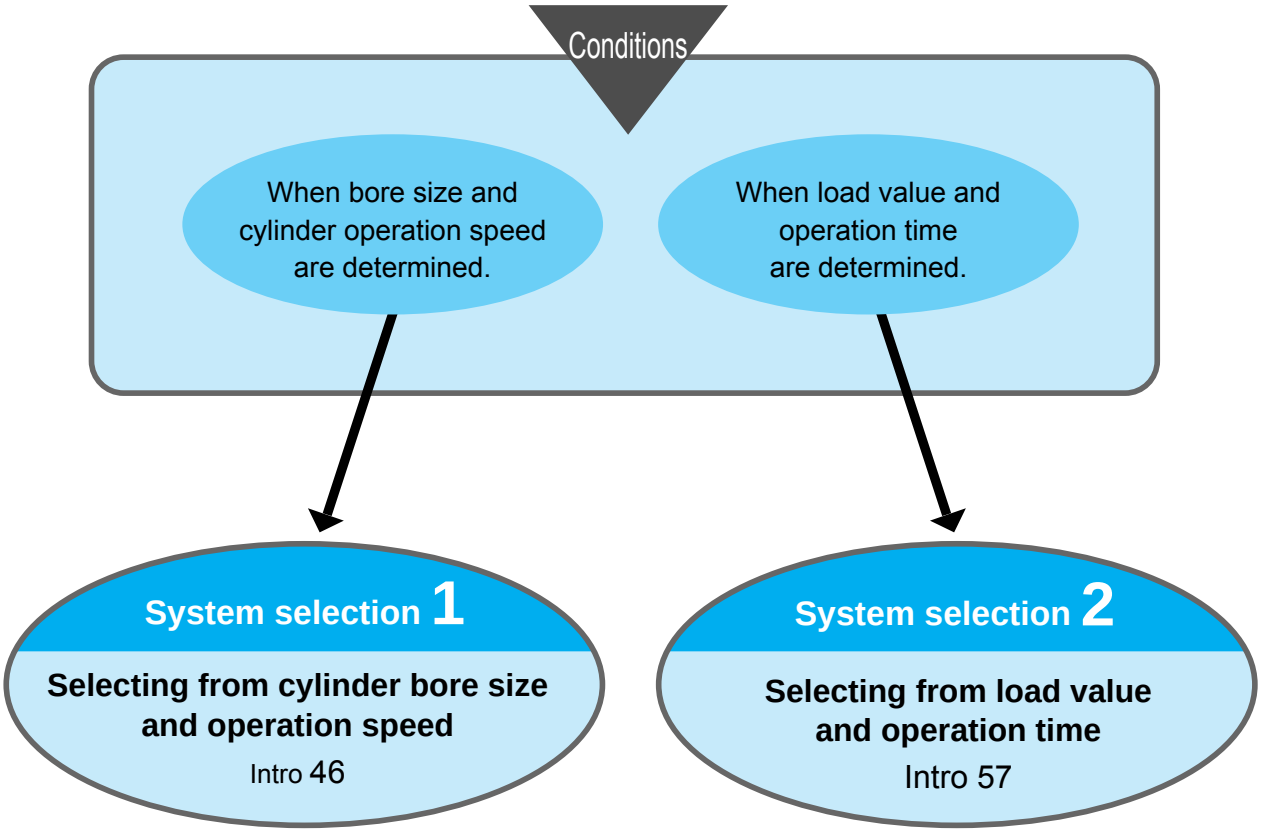
Selection guide 3

According to system

Conditions are set easily even by beginners.

■Selecting the selection method

In this section "Selection 3", the optimum model is selected from predetermined conditions.



System selection 1 Selecting from cylinder bore size and operation speed

■ Making a selection

<System selection 1> is used to select the optimum model at a glance.

STEP 1

<Checking conditions>
Check cylinder tube bore size and cylinder operation speed.

Refer to Table-1

Select the theoretical reference speed.

As a condition, it is predetermined whether cylinder tube bore size and cylinder are to be operated at a relatively high speed or at a relatively low speed.

Using Tabel-1 as a reference, select the theoretical reference speed of the cylinder.

(1) Tube bore size ø□
(2) Operation speed Low, medium, high, ultra high

↓

STEP 2

Refer to Table-2

Select appropriate fluid control components from bore size and theoretical reference speed, and select [required flow].

Refer to Table-2, and select appropriate fluid control components (valve, flow control valve, silencer, piping) and [required flow] for corresponding cylinder tube bore size and theoretical reference speed.

↓

STEP 3

Refer to Table-3

Select the clean air system components.

Refer to Table-3, and select a component having a [maximum flow rate] higher than the [required flow] value. When controlling multiple cylinders with a set of clean air system component having a [maximum flow rate] higher than the [total of required flow rates].

*The relationship of the cylinder tube's inner diameter and speed for the valve (4G Series, 4K Series) is shown with a graph.
Standard system combination for valve and cylinder (Example): (Intro 55 to 56)

System selection 1

STEP 1

<Checking conditions>
Check cylinder tube bore size and cylinder operation speed.

Refer to Table-1

Select the theoretical reference speed.

↓

STEP 2

Refer to Table-2

Select appropriate fluid control components from bore size and theoretical reference speed, and select [required flow].

↓

STEP 3

Refer to Table-3

Select the clean air system components.

(1) The cylinder average speed is obtained from the combination of the valve and piping system. This speed is expressed as the cylinder piston speed obtained by installing the cylinder rod facing upward, and dividing the time from when the piston starts moving the stroke by the time the rod moved. When the load ratio is 50%, the average speed should be the cylinder piston speed x 0.5. (Refer to Intro 59 for the relation of load ratio and theoretical reference speed.)
(2) The cylinder theoretical reference speed is the value for when one cylinder moves independently.
(3) The valve's effective sectional area used in the calculations for Table-2 is the 2-position value.
(4) This selection guide is for reference. Check the selection with actual conditions using the CKD sizing program.

STEP 1 Checking conditions and selecting the theoretical reference value

As a condition, it is predetermined whether cylinder bore size and cylinder are to be operated at a relatively high speed or at a relatively low speed.

Table-1

Degree of cylinder speed	Low	Medium	High	Ultra high
Theoretical reference speed (mm/s)	250	500	750	1,000

STEP2 Selecting fluid control components

Select appropriate fluid control components (valve, flow control valve, silencer, piping) and [required flow] for bore size and theoretical reference speed selected from Table-1.

Table-2

Note 1: Refer to Intro 63 for piping specifications.

Bore size (mm)	Theoretical reference speed (mm/s)	Required flow (ℓ/min.) (ANR)	Required composite effective sectional area (mm^2)	Applicable fluid control system				
				Valve		Pneumatic auxiliary components		Piping *Note 1
				Single solenoid	Double solenoid	Speed control valve	Silencer	Piping (between valve and cylinder)
ø6	500	5	0.1	MN4E010 4SA010 / 4SB010	MN4E020 4SA020 / 4SB020	SC3W-M5-4	SLM-M5, SLM-M3	ø4×ø2.5 nylon tube
ø10	500	14	0.2	MN4E010 4SA010 / 4SB010	MN4E020 4SA020 / 4SB020	SC3W-M5-4	SLM-M5, SLM-M3	ø4×ø2.5 nylon tube
ø16	500	36	0.5	MN4E010 4SA010 / 4SB010	MN4E020 4SA020 / 4SB020	SC3W-M5-4	SLM-M5, SLM-M3	ø4×ø2.5 nylon tube
ø20	250	29	0.5	4KA110 / 4KB110 4GA110 / 4GB110	4KA120 / 4KB120 4GA120 / 4GB120	SC3W-6-6 SCL2-06-H66	SLM-M5, SLW-6A	ø6×ø4 nylon tube
	500	56	0.9	4KA110 / 4KB110 4GA110 / 4GB110	4KA120 / 4KB120 4GA120 / 4GB120	SC3W-6-6 SCL2-06-H66	SLM-M5, SLW-6A	ø6×ø4 nylon tube
	750	84	1.4					
	1,000	112	1.8					
ø25	250	44	0.8	4KA110 / 4KB110	4KA120 / 4KB120	SC3W-6-6	SLM-M5, SLW-6A	ø6×ø4 nylon tube
	500	88	1.4	4GA110 / 4GB110	4GA120 / 4GB120	SCL2-06-H66		
	750	132	2.1	4KB110 / 4GB110	4KB120 / 4GB120	SC1-6	SLW-6A, SL-M5	ø8×ø5.7 nylon tube
	1,000	175	2.8	4KB210 / 4GB210	4KB220 / 4GB220	SCL2-08-H88	SLW-6S, SLW-6A	ø8×ø5.7 nylon tube
ø32	250	73	1.3	4KA110 / 4KB110 4GA110 / 4GB110	4KA120 / 4KB120 4GA120 / 4GB120	SC3W-6-6 SCL2-06-H66	SLM-M5, SLW-6A	ø6×ø4 nylon tube
	500	143	2.9	4KA210 / 4KB210 4GA210 / 4GB210	4KA220 / 4KB220 4GA220 / 4GB220	SC1-6 SCL2-08-H88	SLW-6S, SLW-6A	ø8×ø5.7 nylon tube
	750	215	3.5					
	1,000	286	4.6					
ø40	250	110	1.7			SC3W-6-6 SCL2-06-H66	SLM-M5, SLW-6A	ø6×ø4 nylon tube
	500	230	3.3	4KA210 / 4KB210 4GA210 / 4GB210	4KA220 / 4KB220 4GA220 / 4GB220	SC1-6 SCL2-08-H88	SLW-6S, SLW-6A	ø8×ø5.7 nylon tube
	750	340	5.0			SC1-8	SLW-8A, SLW-6A	ø10×ø7.2 nylon tube
	1,000	450	6.6			SC1-8	SLW-8A, SLW-8S	ø10×ø7.2 nylon tube
ø50	250	180	2.6	4KA210 / 4KB210 4GA210 / 4GB210	4KA220 / 4KB220 4GA220 / 4GB220	SC1-6 SCL2-08-H88	SLW-6A, SLW-6S	ø8×ø5.7 nylon tube
	500	350	5.2			SC1-8	SLW-8A, SLW-6A	ø10×ø7.2 nylon tube
	750	530	7.7	4GA310 / 4GB310	4GA320 / 4GB320	SCL-10-H1010	SLW-8A, SLW-8S	ø10×ø7.2 nylon tube
	1,000	710	10.4	4GA310 / 4GB310 4F310 / 4F410	4GA320 / 4GB320 4F320 / 4F420	SC1-10	SLW-10A	ø15×ø11.5 nylon tube or Rc3/8 steel pipe

Note: The above table shows the theoretical reference speed for cylinder inner diameters.
Refer to individual specifications for each model for details on the working piston speed range of each product.

According to system

System selection 1

STEP 1

<Checking conditions>
Check cylinder tube bore size and cylinder operation speed.

Refer to Table-1

Select the theoretical reference speed.

STEP 2

Refer to Table-2

Select appropriate fluid control components from bore size and theoretical reference speed, and select [required flow].

STEP 3

Refer to Table-3

Select the clean air system components.

(1) The cylinder average speed is obtained from the combination of the valve and piping system. This speed is expressed as the cylinder piston speed obtained by installing the cylinder rod facing upward, and dividing the time from when the piston starts moving the stroke by the time the rod moved. When the load ratio is 50%, the average speed should be the cylinder piston speed x 0.5. (Refer to Intro 59 for the relation of load ratio and theoretical reference speed.)

(2) The cylinder theoretical reference speed is the value for when one cylinder moves independently.

(3) The valve's effective sectional area used in the calculations for Table-2 is the 2-position value.

(4) This selection guide is for reference. Check the selection with actual conditions using the CKD sizing program.

Bore size (mm)	Theoretical reference speed (mm/s)	Required flow (ℓ/min.) (ANR)	Required composite effective sectional area (mm^2)		Applicable fluid control system				
					Valve		Pneumatic auxiliary components		Piping *Note 1
					Single solenoid	Double solenoid	Speed control valve	Silencer	Piping (between valve and cylinder)
ø63	250	280	4.1		4KA210 / 4KB210 4GA310 / 4GB310	4KA220 / 4KB220 4GA320 / 4GB320	SC1-6 SCL2-08-H88	SLW-6S, SLW-6A	ø8×ø5.7 nylon tube
	500	560	8.2		4GA310 / 4GB310	4GA320 / 4GB320	SC1-8 SCL-10-H1010	SLW-8A, SLW-8S	ø10×ø7.2 nylon tube
	750	840	12.3		4KA310 / 4KB310 4F310 / 4F410	4KA320 / 4KB320 4F320 / 4F420	SC1-10	SLW-10A	ø15×ø11.5 nylon tube or Rc3/8 steel pipe
	1,000	1,100	16.4		4F510	4F520	SC1-15	SLW-15A	Rc1/2 steel pipe
ø80	250	450	6.6		4KB210 / 4F210-08	4KB220 / 4F220-08	SC1-8 SCL-10-H1010	SLW-8A, SLW-8S	ø10×ø7.2 nylon tube
	500	910	13.2		4F410-10 / 4F310-10 4KB310-10	4F420-10 / 4F320-10 4KB320-10	SC1-10	SLW-10A	ø15×ø11.5 nylon tube or Rc3/8 steel pipe
	750	1,400	19.8		4KB410-15 / 4F510-15	4KB420-15 / 4F520-15	SC1-15	SLW-15A	Rc1/2 steel pipe
	1,000	1,800	26.4				SC-20A	SLW-15A	Rc1/2 steel pipe
ø100	250	710	10.3		4F410-10 / 4F310-10 4KB310-10	4F420-10 / 4F320-10 4KB320-10	SC1-10	SLW-10A	ø15×ø11.5 nylon tube or Rc3/8 steel pipe
	500	1,400	20.6		4KB410-15 / 4F510-15	4KB420-15 / 4F520-15	SC1-15	SLW-15A	Rc1/2 steel pipe
	750	2,100	30.9				SC-20A	SLW-15A	Rc1/2 steel pipe
	1,000	2,800	41.2		4F610-20	4F620-20	SC-20A	SL-20A, SLW-20S	Rc3/4 steel pipe
ø125	250	1,100	16.1		4KB410-15 / 4F510-15	4KB420-15 / 4F520-15	SC1-15	SLW-15A	Rc1/2 steel pipe
	500	2,200	32.2				SC-20A	SLW-15A	Rc1/2 steel pipe
	750	3,300	48.2		4F610-20	4F620-20	SC-20A	SL-20A, SLW-20S	Rc3/4 steel pipe
	1,000	4,400	64.4				SC-20A	SL-20A	Rc3/4 steel pipe
ø140	250	1,400	20.2		4KB410-15 / 4F510-15	4KB420-15 / 4F520-15	SC1-15	SLW-15A	Rc1/2 steel pipe
	500	2,800	40.4		4F610-20	4F620-20	SC-20A	SL-20A, SLW-20S	Rc3/4 steel pipe
	750	4,200	60.5					SL-20A	Rc3/4 steel pipe
	1,000	5,500	80.8		4F710-25	4F720-25	SC-20A	SL-25A	Rc1 steel pipe
ø160	250	1,800	26.3		4KB410-15 / 4F510-15	4KB420-15 / 4F520-15	SC-20A	SLW-15A	Rc1/2 steel pipe
	500	3,600	52.6		4F610-20	4F620-20	SC-20A	SL-20A	Rc3/4 steel pipe
	750	5,400	79.0		4F710-20	4F720-20	SC-20A	SL-20A	Rc3/4 steel pipe
	1,000	7,200	104.7		-	-	-	-	-

Note 1: Refer to Intro 63 for piping specifications.

System selection 1

STEP 1

<Checking conditions>
Check cylinder tube bore size and cylinder operation speed.

Refer to Table-1

Select the theoretical reference speed.

STEP 2

Refer to Table-2

Select appropriate fluid control components from bore size and theoretical reference speed, and select [required flow].

STEP 3

Refer to Table-3

Select the clean air system components.

Bore size (mm)	Theoretical reference speed (mm/s)	Required flow (ℓ/min.) (ANR)	Required composite effective sectional area (mm^2)		Applicable fluid control system				
					Valve		Pneumatic auxiliary components		Piping *Note 1
					Single solenoid	Double solenoid	Speed control valve	Silencer	Piping (between valve and cylinder)
ø180	250	2,300	33.3		4KB410-15 / 4F510-15	4KB420-15 / 4F520-15	SC-20A	SLW-15A	Rc1/2 steel pipe
	500	4,600	66.6		4F710-20	4F720-20	SC-20A	SL-20A	Rc3/4 steel pipe
	750	6,900	100.0		4F710-25	4F720-25	SC-25A	SL-25A	Rc1 steel pipe
	1,000	9,200	132.5		-	-	-	-	-
ø200	250	2,800	41.2		4F610-20	4F620-20	SC-20A	SL-20A,SLW-20S	Rc3/4 steel pipe
	500	5,600	82.4		4F710-25	4F720-25	SC-25A	SL-25A	Rc1 steel pipe
	750	8,400	122.7		-	-	-	-	-
	1,000	11,200	163.6		-	-	-	-	-
ø250	250	4,400	64.3		4F710-20	4F720-20	SC-20A	SL-20A	Rc3/4 steel pipe
	400	7,000	103.0		4F710-25	4F720-25	SC-25A	SL-25A	Rc1 steel pipe
	750	13,200	191.7		-	-	-	-	-
	1,000	17,600	255.6		-	-	-	-	-

Note 1: Refer to Intro 63 for piping specifications.

(1) The cylinder average speed is obtained from the combination of the valve and piping system. This speed is expressed as the cylinder piston speed obtained by installing the cylinder rod facing upward, and dividing the time from when the piston starts moving the stroke by the time the rod moved. When the load ratio is 50%, the average speed should be the cylinder piston speed x 0.5. (Refer to Intro 59 for the relation of load ratio and theoretical reference speed.)
(2) The cylinder theoretical reference speed is the value for when one cylinder moves independently.
(3) The valve's effective sectional area used in the calculations for Table-2 is the 2-position value.
(4) This selection guide is for reference. Check the selection with actual conditions using the CKD sizing program.

System selection 1

STEP 1

<Checking conditions>
Check cylinder tube bore size and cylinder operation speed.

Refer to Table-1
Selecting theoretical reference speed

STEP 2

Refer to Table-2
Select appropriate fluid control components from bore size and theoretical reference speed, and select [required flow].

STEP 3

Refer to Table-3
Select the clean air system components.

(1) The cylinder average speed is obtained from the combination of the valve and piping system. This speed is expressed as the cylinder piston speed obtained by installing the cylinder rod facing upward, and dividing the time from when the piston starts moving the stroke by the time the rod moved. When the load ratio is 50%, the average speed should be the cylinder piston speed x 0.5. (Refer to Intro 59 for the relation of load ratio and theoretical reference speed.)
(2) The cylinder theoretical reference speed is the value for when one cylinder moves independently.
(3) The valve's effective sectional area used in the calculations for Table-2 is the 2-position value.
(4) This selection guide is for reference. Check the selection with actual conditions using the CKD sizing program.

STEP 3 Selecting clean air system components

Select the components whose maximum flow rate is more than [required flow] on Table-2.
When operating cylinders with one set of clean air system components, select the components whose max. flow rate is more than total of required flow.

■ F.R.L. kit, unit, regulator
Primary pressure / 0.7 MPa Set pressure / 0.5 MPa
Pressure drop / 0.1 MPa

■ Air filter
Primary pressure / 0.7 MPa
Pressure drop / 0.02 MPa

■ Lubricator
Primary pressure / 0.5 MPa
Pressure drop / 0.03 MPa

Table-3

F.R.L. kit			F.R. unit		
Model no.	Port size	Max. flow rate (ℓ/min.) *	Model no.	Port size	Max. flow rate (ℓ/min.) *
C1000-6-W	Rc1/8	450	W1000-6-W	Rc1/8	800
C1000-8-W	Rc1/4	630	W1000-8-W	Rc1/4	1,150
C2500-8-W	Rc1/4	1,200	W3000-8-W	Rc1/4	2,150
C2500-10-W	Rc3/8	1,700	W3000-10-W	Rc3/8	2,430
C3000-8-W	Rc1/4	1,280	W4000-8-W	Rc1/4	2,500
C3000-10-W	Rc3/8	1,750	W4000-10-W	Rc3/8	4,350
C4000-8-W	Rc1/4	1,430	W4000-15-W	Rc1/2	4,750
C4000-10-W	Rc3/8	2,400	W8000-20-W	Rc3/4	10,000
C4000-15-W	Rc1/2	3,000	W8000-25-W	Rc1	10,000
C6500-20-W	Rc3/4	4,500	A7019-1C	Rc1/8	500
C6500-25-W	Rc1	5,000	A7019-2C	Rc1/4	900
C8000-20-W	Rc3/4	7,000	A7070-2C	Rc1/4	1,500
C8000-25-W	Rc1	7,500	A7070-3C	Rc3/8	2,100
K60570-1C-GB	Rc1/8	200	A7080-3C	Rc3/8	4,500
K60570-2C-GB	Rc1/4	300	A7080-4C	Rc1/2	5,000
K61440E-2C-EGB	Rc1/4	1,300	A7080-6C	Rc3/4	5,000
K61440E-3C-EGB	Rc3/8	1,500			
K61400E-2C-EGB	Rc1/4	1,000			
K61400E-3C-EGB	Rc3/8	2,200			
K61400E-4C-EGB	Rc1/2	3,700			
K61400E-6C-EGB	Rc3/4	3,700			

Air filter (F)			Regulator (R)			Lubricator (L)		
Model no.	Port size	Max. flow rate (ℓ/min.) *	Model no.	Port size	Max. flow rate (ℓ/min.) *	Model no.	Port size	Max. flow rate (ℓ/min.) *
F1000-6-W	Rc1/8	460	R1000-6-W	Rc1/8	770	L1000-6-W	Rc1/8	550
F1000-8-W	Rc1/4	610	R1000-8-W	Rc1/4	1,350	L1000-8-W	Rc1/4	700
F3000-8-W	Rc1/4	1,230	R2000-8-W	Rc1/4	1,750	L3000-8-W	Rc1/4	1,100
F3000-10-W	Rc3/8	1,500	R2000-10-W	Rc3/8	2,500	L3000-10-W	Rc3/8	2,250
F4000-8-W	Rc1/4	1,320	R3000-8-W	Rc1/4	2,000	L4000-8-W	Rc1/4	1000
F4000-10-W	Rc3/8	2,140	R3000-10-W	Rc3/8	2,600	L4000-10-W	Rc3/8	1,700
F4000-15-W	Rc1/2	3,000	R4000-8-W	Rc1/4	2,500	L4000-15-W	Rc1/2	2,700
F6000-20-W	Rc3/4	5,600	R4000-10-W	Rc3/8	4,400	L8000-20-W	Rc3/4	6,300
F6000-25-W	Rc1	6,200	R4000-15-W	Rc1/2	5,000	L8000-25-W	Rc1	10,000
F8000-20-W	Rc3/4	6,400	R6000-20-W	Rc3/4	7,000	A3019-1C	Rc1/8	100
F8000-25-W	Rc1	6,800	R6000-25-W	Rc1	7,700	A3019-2C	Rc1/4	400
A1019-1C	Rc1/8	550	R8000-20-W	Rc3/4	14,000	3000E-2C	Rc1/4	450
A1019-2C	Rc1/4	700	R8000-25-W	Rc1	11,000	3000E-3C	Rc3/8	900
1144-2C-E	Rc1/4	950	B2019-1C	Rc1/8	500	3002E-2C	Rc1/4	700
1144-3C-E	Rc3/8	1,250	B2019-2C	Rc1/4	500	3002E-3C	Rc3/8	900
1137-2C-E	Rc1/4	1,300	A2000-2C	Rc1/4	1,800	3002E-4C	Rc1/2	1,700
1137-3C-E	Rc3/8	1,800	A2000-3C	Rc3/8	2,200	3002E-6C	Rc3/4	1,700
1137-4C-E	Rc1/2	2,300	2001-2C	Rc1/4	5,000	3003E-6C	Rc3/4	3,500
1137-6C-E	Rc3/4	2,300	2001-3C	Rc3/8	5,000	3003E-8C	Rc1	4,000
1138-6C-E	Rc3/8	5,500	2001-4C	Rc1/2	6,000			
1138-8C-E	Rc1	7,000	2001-6C	Rc3/4	6,000			
			2215-6C	Rc3/4	14,000			
			2215-8C	Rc1	14,000			
			2215-10C	Rc1 1/4	14,000			

*: Atmospheric pressure conversion

Explanation of technical terms

[Theoretical reference speed]: means degree of cylinder speed, and expressed as the following formula. (This value coincides with speed of no load. Applied load quite decreases speed.)

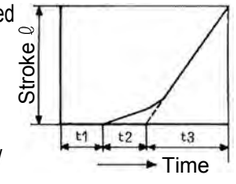
$$V_0 = 1920 \times \frac{S}{A} = 2445 \times \frac{S}{D^2} \quad (1)$$

V_0: Theoretical reference speed (mm/s)
A: Cylinder cross-section areas (cm^2)
S: Composite effective sectional area of circuit (exhaust air side) (mm^2)
D: Cylinder bore size (cm)

Graph shows the theoretical reference speed within the range of constant velocity,

$$V_0 = \frac{S}{t3} (mm/s)$$

t1 : Time until beginning of movement
t2 : Primary delay time
t3 : Operating time with constant velocity
ℓ : Stroke length



*Note: t1 and t2 differ depending on load. When no load, neglect the value.

[Required flow]: For operating a cylinder with Velocity v_0, this indicates instantaneous flow rate expressed with the following formula.
Table shows the value when P=0.5MPa. Required flow is the necessary value to select clean air system components.

$$Q \fallingdotseq \frac{A v_0 (P+0.101) \times 60}{0.101 \times 10^4} \quad (2)$$

Q: Required flow (ℓ/min.) (ANR)
P: Supply pressure (MPa)

[The required effective sectional area]: For operating a cylinder with Velocity v_0, this indicates the necessary composite effective sectional area of exhaust air side circuit.
(Composite effective sectional area of valve, flow control valve, silencer and piping)

[Proper standard system]: For operating a cylinder with Velocity v_0, this means the best combination of valve, flow control valve, silencer and pipe diameter. Table shows the value when pipe length is 1 m.

Standard system combination for valve and cylinder (example)

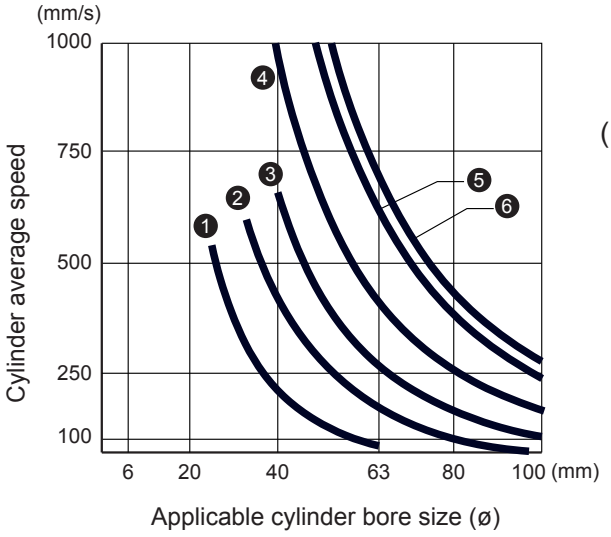
(1) The cylinder's average speed is calculated by the combined valve and piping system. To calculate, the cylinder's piston rod is mounted facing upward, and the time that the piston rod starts to move the stroke is divided by the time that it moved. At a 50% load factor, multiply the cylinder piston speed by 0.5. (Refer to page Intro 59 for the relationship of the load factor and theoretical reference speed.)
(2) The cylinder's average speed is the value when one cylinder is operated discretely.
(3) The effective sectional area of the solenoid valve used for the calculation below is the 2-position value.
(4) This selection guide is for reference. Check the selection with actual conditions using a sizing program.
(5) The graph for the 4G and 4K series valve (2 position single, base piping) is shown as an example.

4G Series (Check valve integrated)

(Example) The connection component system No.❷ is for the 4G1 with C6 port size.

Series	Sub-base porting type						System No.
	Model no.	Solenoid valve Port size	Speed control valve	Silencer	Piping (1 m)	Composite effective sectional area (mm^2) Pipe length (1 m)	
4G1	M4GB110	C4	SC3W-6-4	SLW-6S	ø4×ø2.5	1.4	❶
	M4GB110	C6	SC1-6	SLW-6S	ø6×ø4	2.8	❷
4G2	M4GB210	C6	SC1-8	SLW-8S	ø6×ø4	4.5	❸
	M4GB210	C8	SC1-10	SLW-8S	ø8×ø5.7	6.7	❹
4G3	M4GB310	C10	SC1-10	SLW-10L	ø10×ø7.2	10.1	❺
	M4GB310	C10	SC1-15	SLW-10L	ø12×ø8.9	11.5	❻

* The system No. is indicated in the graph below.



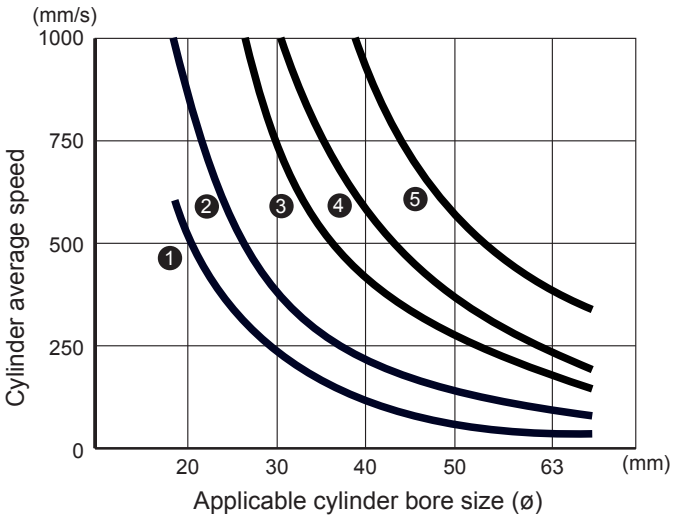
(Example) When using system ❷ with a ø40 cylinder diameter, the cylinder's average speed is 450 mm/s.
(Note that this differs with working conditions.)

MN4G Series

(Check valve integrated)

Series	Solenoid valve Port size	Speed control valve	Piping (1 m)	Common exhaust piping	Composite effective sectional area (mm^2)	System No.
MN4G1	C4	SC3W-M5-4	ø4×ø2.5	ø6×ø4×3m	0.9	❶
	C4	SC3W-6-4	ø4×ø2.5	ø6×ø4×3m	1.4	❷
	C6	SC1-6	ø6×ø4	ø8×ø5.7×3m	2.8	❸
MN4G2	C6	SC1-6	ø6×ø4	ø8×ø5.7×3m	3.8	❹
	C8	SC1-8	ø8×ø5.7	ø10×ø7.2×3m	6.0	❺

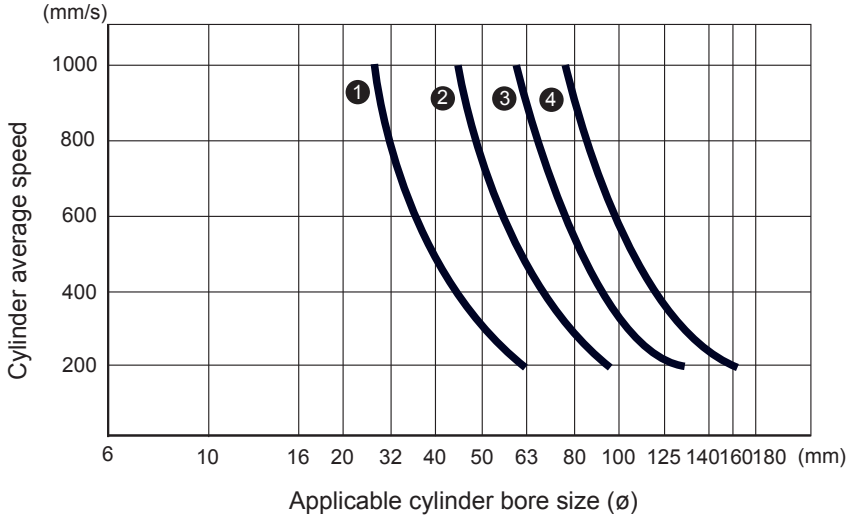
* The system No. is indicated in the graph below.
* This graph applies to the common exhaust type.



4K Series

Series	Solenoid valve Port size	Speed control valve	Silencer	Piping (1 m)	Composite effective sectional area (mm^2)	System No.
4KB110	C6	SC1-6	SLW-6S	ø6×ø4	3.2	❶
4KB210	C8	SC1-8	SLW-8S	ø8×ø5.7	7.7	❷
4KB310	C10	SC1-10	SLW-10L	ø10×ø7.2	14.1	❸
4KB410	C15	SC1-15	SLW-15A	ø12×ø8.9	23.6	❹

* The system No. is indicated in the graph below.



System selection 2 Selecting from load value and operation time

■ Making a selection

When Load (N) and cylinder operation time (S) are already decided, use ≪System selection 2≫ to select appropriate model. Follow the following procedures.

STEP 1
<Checking conditions>
Load (N),
Required operation time (S)

↓

STEP 2
Refer to Graph-1
Selecting cylinder bore size

↓

STEP 3
Refer to Graph-2
Selecting theoretical reference speed

↓

STEP 4
Refer to Graph-3
Selecting proper system

↓

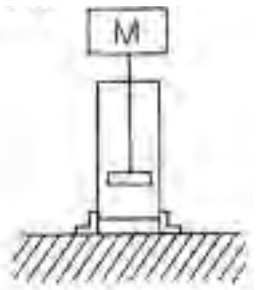
STEP 5
Refer to Table-1
Selecting proper component

STEP 1 Checking

(1) Load	F = * (N)
(2) Objective values of operation time	t = * (s)
(3) Stroke length	L = * (mm)
(4) Pressure	P = * (MPa)

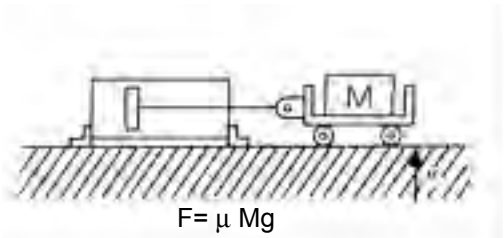
M : Weight of body (kg)
μ : Friction coefficient (normally μ ≒ 0.3)
F : Load (N)
g : 9.8m/s²

● Vertical



F=Mg

● Horizontal

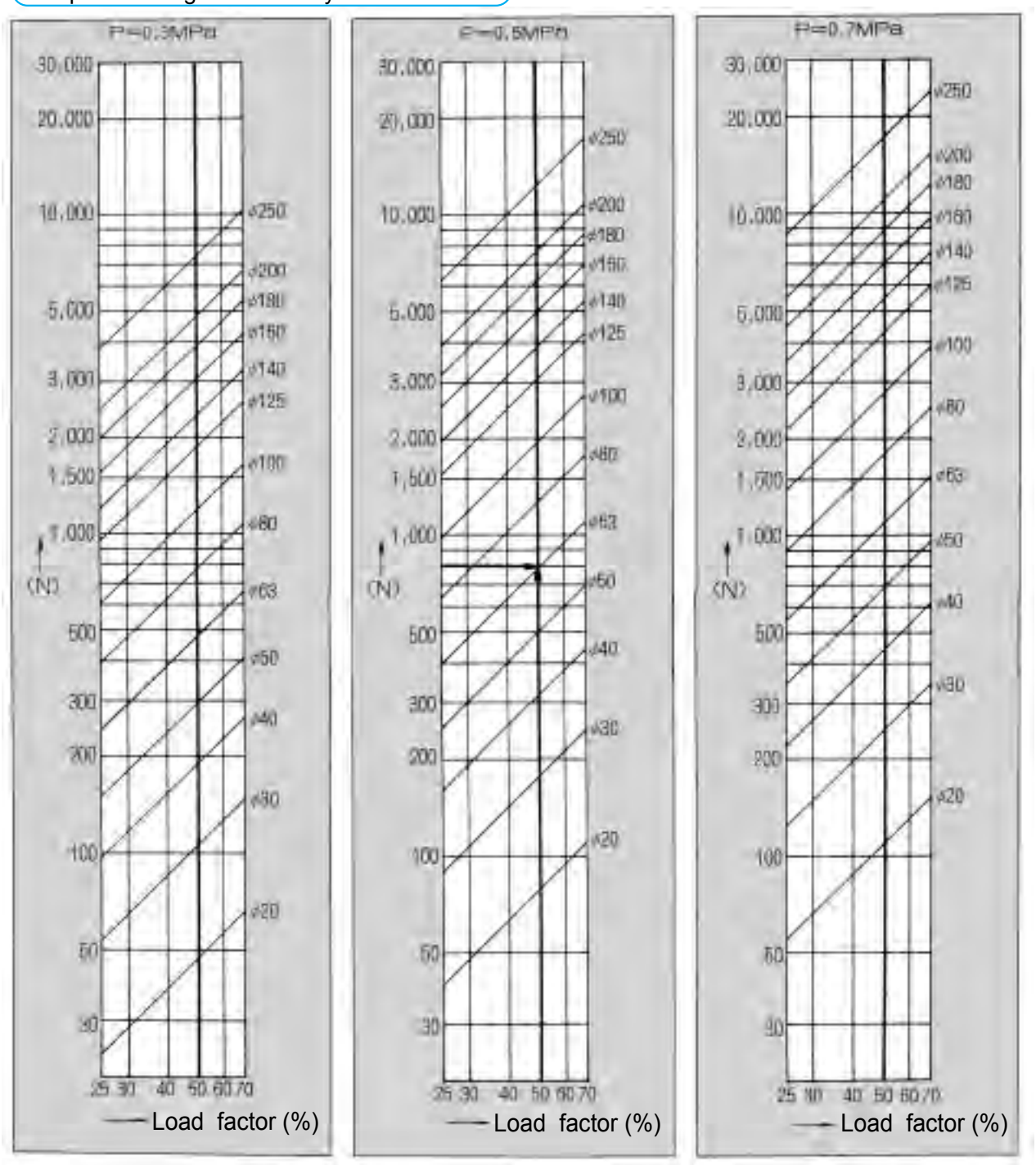


F= μ Mg

STEP 2 Selecting cylinder bore size

According to monogram, select the cylinder bore size and read the load factor at the same time. (Normally, for Value F of "STEP 1 Confirming conditions", read the cylinder bore size whose load factor is close to 50%.)
Cylinder bore size D = ø□
(E.g.) When F=800N, P=0.5MPa and load factor 50%, 63 mm of cylinder bore size is read.

Graph-1 Nomogram to find cylinder bore size



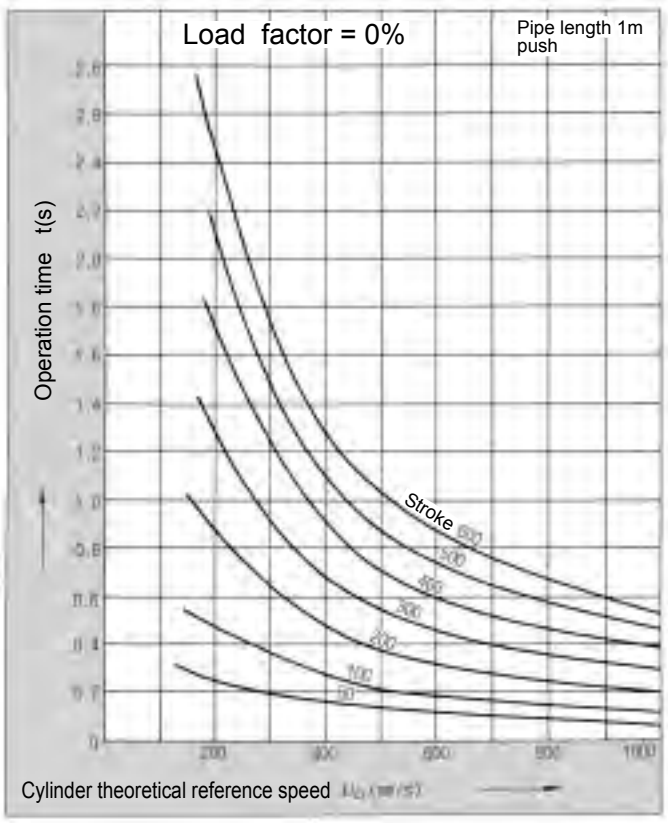
STEP 3 Selecting theoretical reference speed

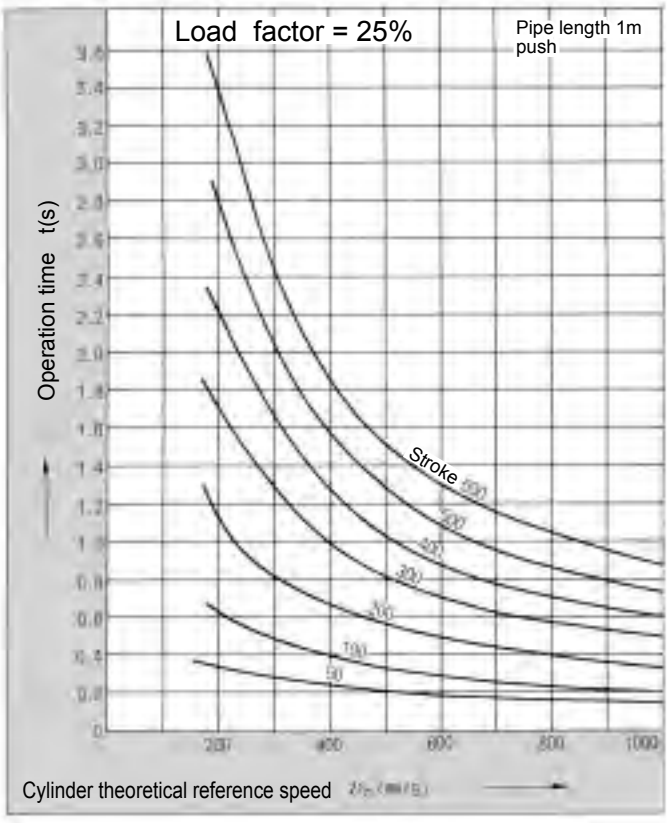
According to t-v_o graph, read Value v_o to obtain the required operation time t (sec).

V_o = □

(E.g.) When load factor 50% and 200 mm stroke cylinder with operating 1.0 sec, theoretical reference speed is 450 mm/s.

Graph-2 t-v_o graph





System selection 2

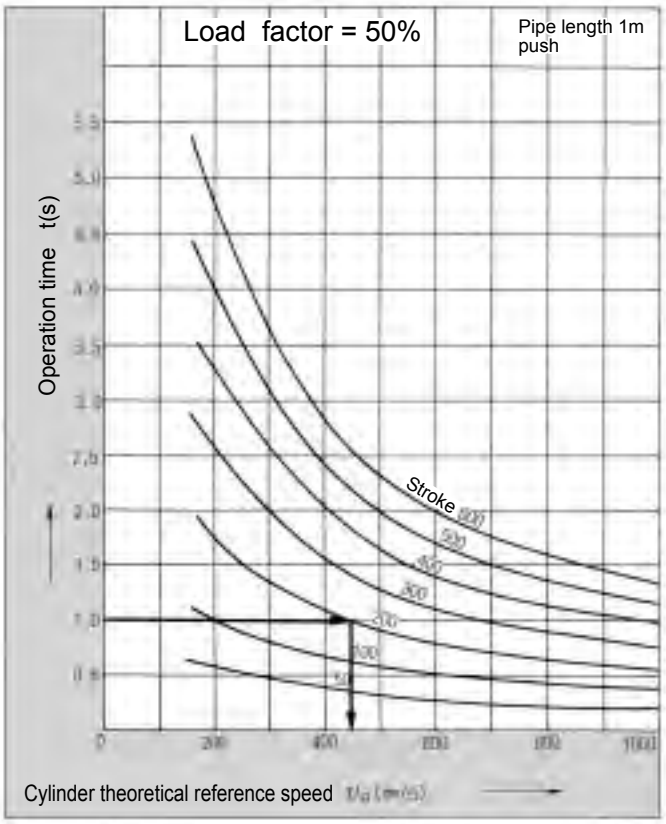
STEP 1 <Checking conditions>
Load (N),
Required operation time (S)

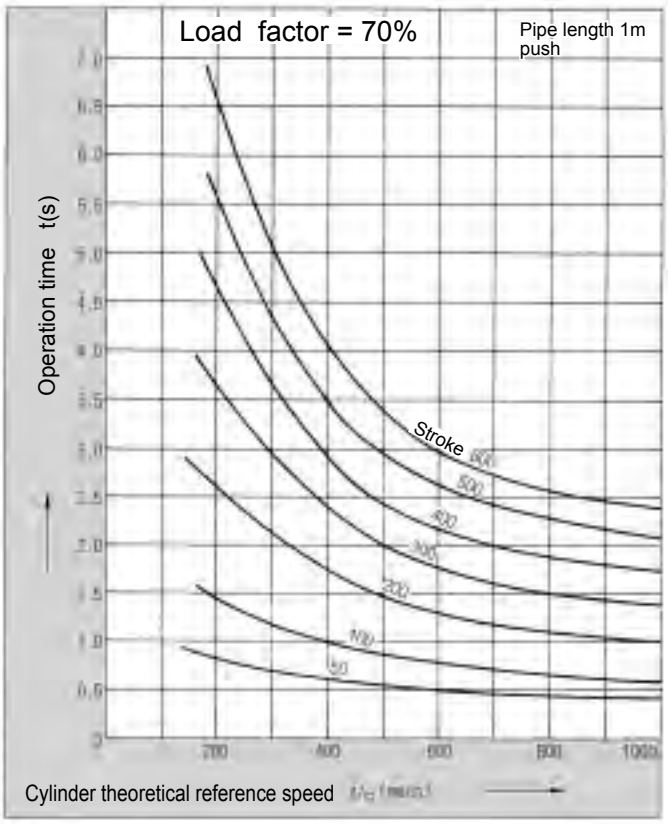
→

STEP 2 Refer to Graph-1
Selecting cylinder bore size

→

STEP 3 Refer to Graph-2
Selecting theoretical reference speed





STEP 4
Refer to Graph-3
Selecting proper system

STEP 5
Refer to Table-1
Selecting proper component

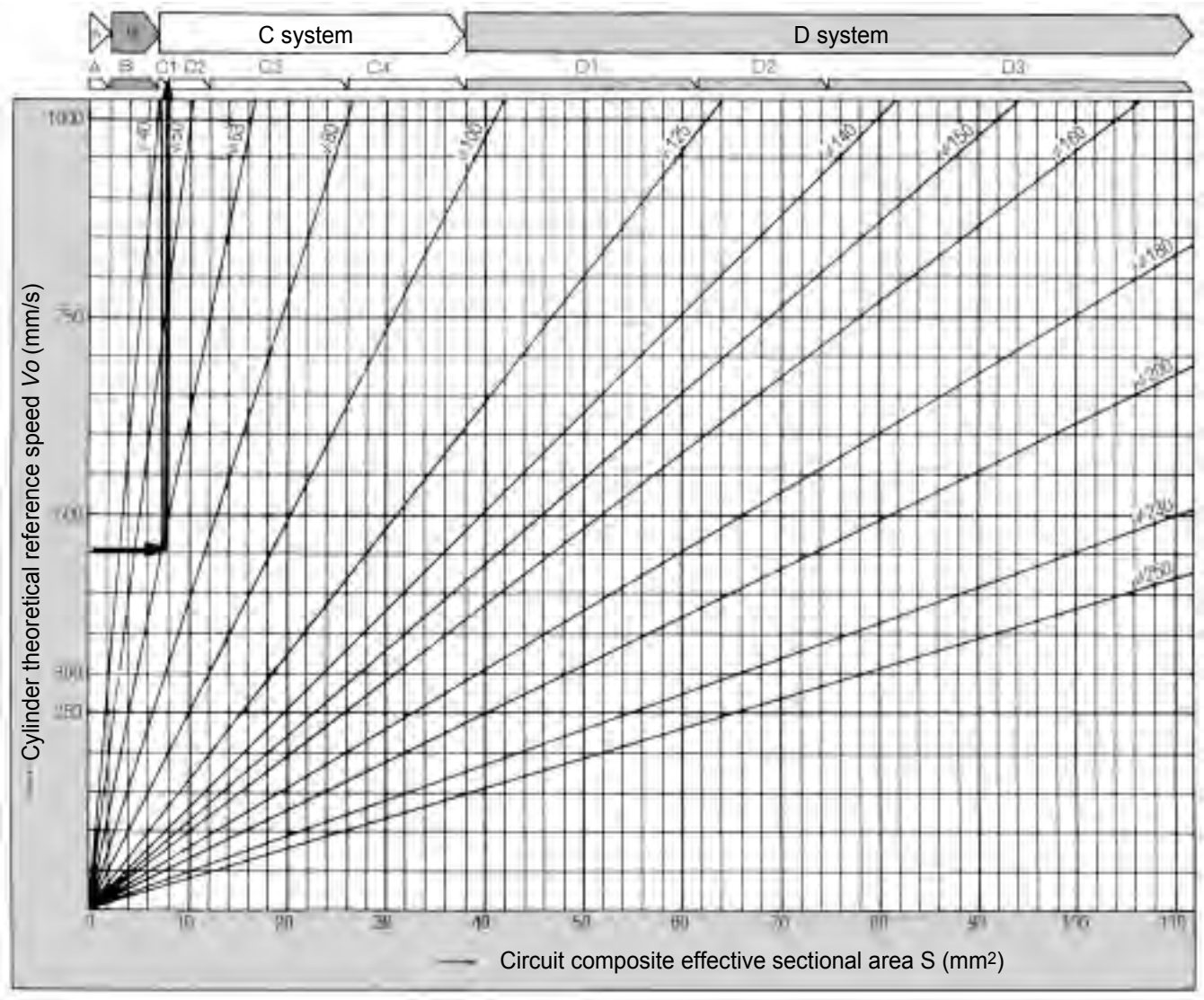
STEP 4 Selecting proper system

According to the system selection table, read system symbol with tracing the cross point between v_o found by [STEP 3 Selecting theoretical reference speed] and øD found by [STEP 2 Selecting cylinder bore size] upward.

System symbol □

(E.g.) In order to operate 63 mm bore cylinder with theoretical reference speed 450 mm/s, C1 system is the optimum.

Graph-3 System selection table



System selection 2

STEP 1
<Checking conditions>
Load (N),
Required operation time (S)

→

STEP 2
Refer to Graph-1
Selecting cylinder bore size

→

STEP 3
Refer to Graph-2
Selecting theoretical reference speed

STEP 5 Selecting proper component

According to the standard system table, confirm the model No, of proper system components found by [STEP 4 Selecting proper system].

	(Example) CI system
Valve ☐	Valve: Single 4KB210-08 or 4GB310-08 Double 4KB220-08 or 4GB320-08
Speed control valve ☐	Speed control valve: SCI-8
Silencer ☐	Silencer: SLW-8A
Piping ☐	Piping: ø10×ø7.2 nylon tube 1 m

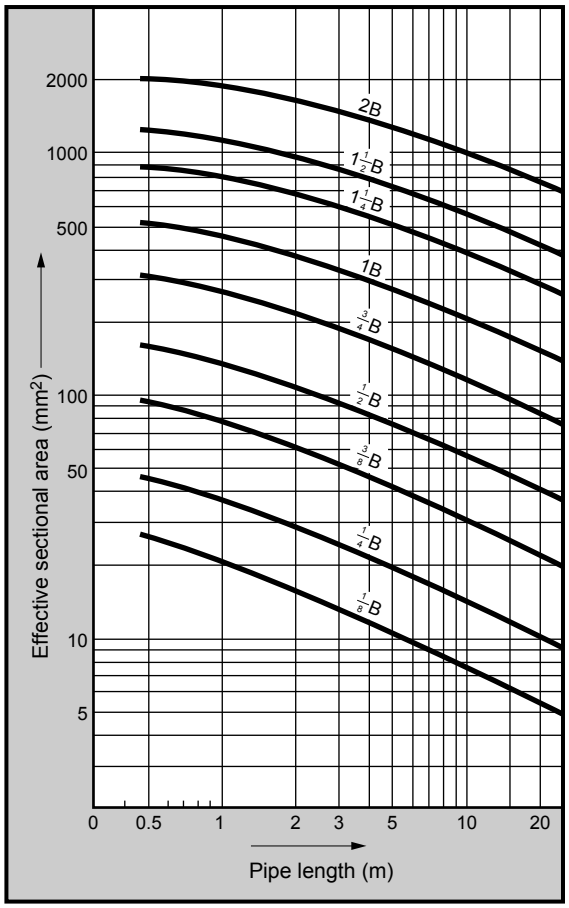
Table-1 Standard system table

Standard system No.	Valve		Speed control valve	Silencer	Piping	Composite effective sectional area (mm^2) Pipe length 1 m
	Single solenoid	Double solenoid				
A	4SB010-M5 4KA110-GS4	4SB020-M5 4KA120-GS4	SC3W-M5-4 (SC-M5)	SLM-M5	ø4×ø2.5 nylon tube	0.9
B1	4KA110-GS6 4KB110-06	4KA120-GS6 4KB120-06	SC3W-6-6 SCL2-06-H66	SLM-M5 SLW-6A	ø6×ø4 nylon tube	2.0
B2	4KB110-06 4GB110-06	4KB120-06 4GB220-06	SC1-6 SCL2-08-H88	SL-M5 SLW-6A	ø8×ø5.7 nylon tube	3.0
B3	4GB210-06 4KB210-06	4GB220-06 4KB220-06	SC1-6 SCL2-08-H88	SLW-6A SLW-6S	ø8×ø5.7 nylon tube	5.2
B4	4GB210-08 4KB210-08	4GB220-08 4KB220-08	SC1-8 SCL2-10-H1010	SLW-6A SLW-8A	ø10×ø7.2 nylon tube	6.4
C1	4GB210-08 4KB210-08 4F210-08	4GB220-08 4KB220-08 4F220-08	SC1-8 SCL2-10-H1010	SLW-8A SLW-8S	ø10×ø7.2 nylon tube	7.8
C2	4GB310-10 4F310-10 4KB310-10	4GB320-10 4F320-10 4KB320-10	SC1-10	SLW-10A	ø10×ø7.2 nylon tube or Rc3/8 steel pipe	12
C3	4F510-15 4KB410-15	4F520-15 4KB420-15	SC1-15	SLW-15A	Rc1/2 steel pipe	27
C4	4F510-15 4KB410-15	4F520-15 4KB420-15	SC-20A	SLW-15A	Rc1/2 steel pipe	38
D1	4F610-20	4F620-20	SC-20A	SL-20A	Rc3/4 steel pipe	64
D2	4F710-20	4F720-20	SC-20A	SL-20A	Rc3/4 steel pipe	80
D3	4F710-25	4F720-25	SC-25A	SL-25A	Rc1 steel pipe	112

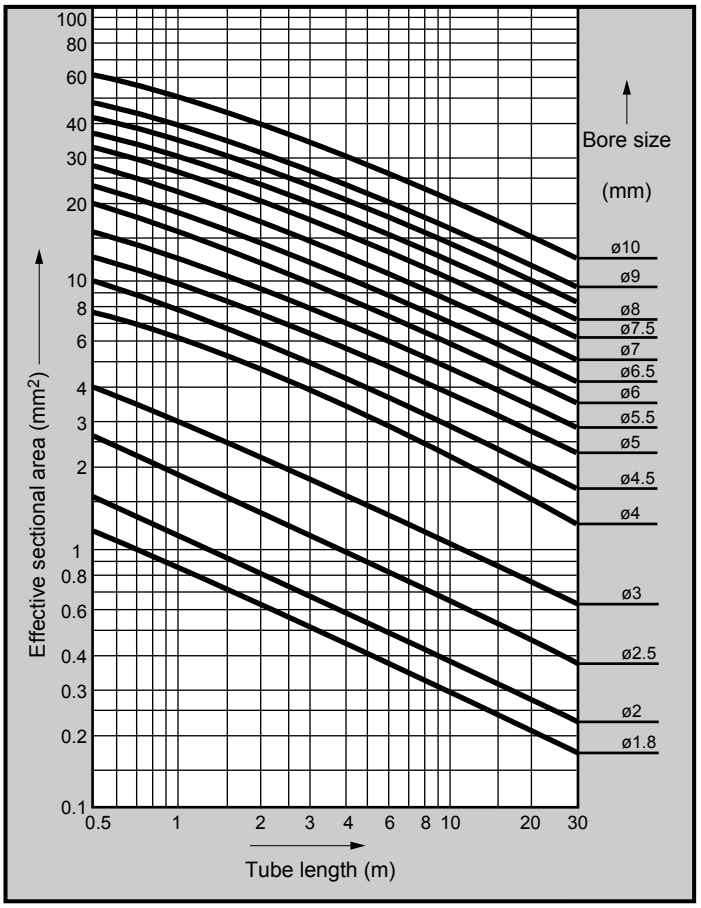
STEP 4 Refer to Graph-3 Selecting proper system → STEP 5 Refer to Table-1 Selecting proper component

Effective sectional area of steel pipe/nylon tube and recommended maximum flow rate for gas pipes

Effective sectional area of steel pipe



Effective sectional area of nylon tube



Recommended maximum flow rate for gas pipes

Nominal size	1/8 B	1/4 B	3/8 B	1/2 B	3/4 B	1 B	1 1/4 B	1 1/2 B
Pressure drop MPa (Note 1)	0.124	0.0707	0.0576	0.0425	0.0276	0.0209	0.0133	0.0105
Inlet pressure MPa	Recommended maximum flow (ℓ/min.)							
0.05	127	244	518	838	1,465	2,460	3,870	5,150
0.1	146	282	598	965	1,690	2,828	4,460	5,950
0.15	163	314	668	1,076	1,885	3,150	4,960	6,630
0.2	179	344	730	1,180	2,060	3,450	5,430	7,280
0.3	206	395	840	1,360	2,375	3,900	6,300	8,400
0.4	230	442	940	1,520	2,660	4,450	7,000	9,360
0.5	252	485	1,030	1,660	2,920	4,875	7,700	10,250
0.6	272	523	1,110	1,800	3,140	5,250	8,300	11,050
0.7	292	558	1,185	1,920	3,350	5,620	8,870	11,800
0.8	308	592	1,260	2,035	3,560	5,970	9,430	12,570
0.9	324	623	1,325	2,140	3,745	6,290	9,900	13,220
1.0	340	654	1,395	2,250	3,930	6,600	10,400	13,880
1.2	370	717	1,510	2,450	4,280	7,150	11,250	15,040
1.4	398	763	1,625	2,624	4,590	7,700	12,100	16,200
1.5	410	790	1,680	2,710	4,740	7,930	12,550	16,780

(Note 1: Inlet pressure = 0.5 MPa
Gas tube length: 10 m)

(Remarks)

In the main line where the piping distance tends to increase, it is necessary to consider pressure drop occurring at the end of the main line when air passes.

The recommended maximum flow rate refers to the maximum flow rate that can be recommended in the range that the pressure drop is allowable for the piping length, and is determined based on actual use.

This does not mean that a higher flow is not possible, but rather that the pressure drop will increase if the flow exceeds this value.

Flow characteristics

1. Indicating flow properties

The flow rate in catalog specifications is indicated as follows:

Components	Indication	Unit	Standards
Pneumatic components	New JIS compliant indication	C/b	ISO 6358: 1989 Pneumatic fluid power - Components using compressible fluids - Determination of flow rate properties JIS B8390: 2000 (ISO 6358 translation)
	Conventional indication	S	JIS B8373: 1993 "pneumatic 2 port solenoid valve" JIS B8374: 1993 "pneumatic 3 port solenoid valve" JIS B8375: 1993 "pneumatic 4, 5 port solenoid valve" JIS B8379: 1995 "pneumatics noise reduction device"
		Cv	ANSI (NFPA) T3.21.3: 1990

2. Explanation

The flow characteristics of the pneumatic components were conventionally indicated with the effective sectional area S. However, JIS was revised (JIS B 8390: 2000), and these are now indicated with the sonic conductance C and critical pressure ratio b.

- The sonic conductance C: Value obtained by dividing the passage mass flow of the component in the choke flow by the sum of upstream absolute pressure and standard state density. (sonic conductance)
  $S \fallingdotseq 5.0C$ (C is sized conventionally.)
- Critical pressure ratio b: Pressure at which choke flow results if smaller than this value (downstream pressure/upstream pressure) (critical pressure ratio).
- Effective sectional area S (mm^2): Value calculated from changes in pneumatic tank pressure indicating the ideal restriction effective section at which friction or restricted flow does not occur when flowing in the choke flow from the component on the pneumatic tank.

* Choke flow: Flow at which upstream pressure is higher than downstream pressure, and speed at certain sections of components reach sonic levels. The gas mass flow is proportional to upstream pressure, and does not rely on downstream pressure. (Choked flow)

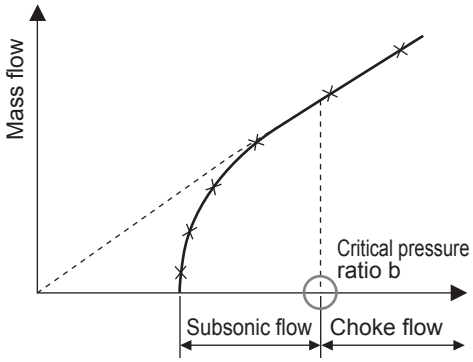


Fig. 1 Mass flow characteristics in respect to upstream pressure

Flow rate calculation formula

The flow rate is expressed as follows with practical units.

$$\frac{P_2 + 0.1}{P_1 + 0.1} \leqq b : \text{Choke flow}$$

$$Q = 600 \times C (P_1 + 0.1) \sqrt{\frac{293}{273 + t}} \quad : (1)$$

$$\frac{P_2 + 0.1}{P_1 + 0.1} > b : \text{Subsonic flow}$$

$$Q = 600 \times C (P_1 + 0.1) \sqrt{1 - \left[\frac{\frac{P_2 + 0.1}{P_1 + 0.1} - b}{1 - b}\right]^2} \sqrt{\frac{293}{273 + t}} \quad : (2)$$

Q : Flow rate [dm^3/min. (ANR)], SI unit dm^3 (digital cubic meter) expressed as ℓ (liters). $1dm^3 = 1\ell$
C : Sonic conductance [$dm^3/(s \cdot bar)$]
b : Critical pressure ratio (-)
P_1 : Upstream pressure (MPa)
P_2 : Downstream pressure (MPa)
t : Temperature (°C)

To calculate effective sectional area S, substitute the value C obtained with C=S/5 above in the above formula.
For the subsonic flow, substitute b = 0.5 in formula (2).

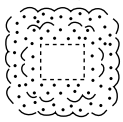
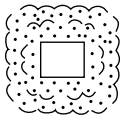
Protective structure

● Protective structure
■ IEC (International Electrotechnical Commission) Standards (IEC60529)
■ JIS C 0920 : 2003

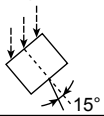
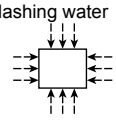
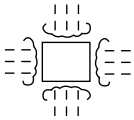
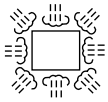
IP - * *

Protection property symbols (International Protection)

1st characteristic number (protection grade for foreign solid)

1st characteristic number	Degree of protection	
0	No protection	Without protection
1	 ø50mm	Protection against inflow of solids 50 mm or more in diameter
2	 ø12.5mm	Protection against inflow of solids 12.5 mm or more in diameter
3	 2.5mm	Protection against inflow of solids 2.5 mm or more in diameter
4	 1mm	Protection against inflow of solids 1.0 mm or more in diameter
5	Dust-proof type 	No inflow of dust at levels adversely affecting normal device operation or safety
6	Dust proof type 	No inflow of dust

2nd characteristic number (protection grade for trespass of water)

2nd characteristic number	Degree of protection	
0	No protection	
1	Protection against water dripping 	Dripping water falling vertically shall not harm.
2	Protection against dripping water titled at an angle of up to 15°  15°	Vertically dripping water shall have no adverse effect when the product is tilted at an angle of up to 15° from its normal position.
3	Protection for watering 	Water falling as a spray at any angle up to 60° from the vertical shall have no adverse effect.
4	Protection against splashing water 	Water splashing against the product from any direction shall have no adverse effect.
5	Protection against water jets 	Water projected by a nozzle against the product from any direction shall have no adverse effects.
6	Protection against powerful jets 	Water projected in powerful jets shall not enter products in adverse amounts.
7	Protection against immersion in water 	Inflow of water shall not be possible when the product is immersed in water under defined conditions.
8	Protection against submersion 	The product is suitable for continuous submersion in water.

Safety precautions

Always read this section before starting use.

When designing and manufacturing a device using CKD products, the manufacturer is obligated to check that device safety mechanism, pneumatic control circuit, or water control circuit and the system operated by electrical control that controls the devices is secured.
It is important to select, use, handle, and maintain the product appropriately to ensure that the CKD product is used safely.
Observe warnings and precautions to ensure device safety.
Check that device safety is ensured, and manufacture a safe device.

⚠ WARNING

1 This product is designed and manufactured as a general industrial machine part.
It must be handled by an operator having sufficient knowledge and experience in handling.

2 Use this product in accordance of specifications.

This product must be used within its stated specifications. It must not be modified or machined.
This product is intended for use as a general-purpose industrial device or part. It is not intended for use outdoors or for use under the following conditions or environment.
(Note that this product can be used when CKD is consulted prior to use and the customer consents to CKD product specifications. The customer must provide safety measures to avoid risks in the event of problems.)

❶ Use for special applications including nuclear energy, railway, aircraft, marine vessel, vehicle, medicinal devices, devices or applications coming into contact with beverages or foodstuffs, amusement devices, emergency cutoff circuits, press machines, brake circuits, or safety devices or applications.
❷ Use for applications where life or assets could be adversely affected, and special safety measures are required.

3 Observe corporate standards and regulations, etc., related to the safety of device design and control, etc.

ISO4414, JIS B 8370 (pneumatic system rules)
JFPS2008 (principles for pneumatic cylinder selection and use)
Including High Pressure Gas Maintenance Law, Occupational Safety and Sanitation Laws, other safety rules, body standards and regulations, etc .

4 Do not handle, pipe, or remove devices before confirming safety.

❶ Inspect and service the machine and devices after confirming safety of the entire system related to this product.
❷ Note that there may be hot or charged sections even after operation is stopped.
❸ When inspecting or servicing the device, turn off the energy source (air supply or water supply), and turn off power to the facility. Discharge any compressed air from the system, and pay enough attention to possible water leakage and leakage of electricity.
❹ When starting or restarting a machine or device that incorporates pneumatic components, make sure that the system safety, such as pop-out prevention measures, is secured.

5 Observe warnings and cautions on the pages below to prevent accidents.

■ The precautions are ranked as "DANGER", "WARNING" and "CAUTION" in this section.

⚠ DANGER: When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries, or when there is a high degree of emergency to a warning.

⚠ WARNING: When a dangerous situation may occur if handling is mistaken leading to fatal or serious injuries.

⚠ CAUTION: When a dangerous situation may occur if handling is mistaken leading to minor injuries or physical damage.

Note that some items described as "CAUTION" may lead to serious results depending on the situation.
In any case, important information that must be observed is explained.

Limited Warranty and Disclaimer

1 Term of Warranty

"Warranty Period" is one (1) year from the first delivery to the customer.

2 Scope of Warranty

In case any defect attributable to CKD is found during Warranty Period, CKD shall, at its own discretion, repair the defect or replace the relevant product in whole or in part, according to its own judgment.

This Limited Warranty will not apply to:
(1) Product abuse/misuse contrary to conditions/environment recommended in its catalogs/specifications.
(2) Failure due to other causes.
(3) Use other than original design purposes.
(4) Third-party repair/modification.
(5) Failure due to causes not foreseeable with technology at the time of delivery.
(6) Failure attributable to force majeure.

In no event CKD shall never be liable for the costs in relation to and the damages resulting from the (de) installation of the product.

3 Confirmation of compatibility

IN NO EVENT SHALL CKD BE LIABLE FOR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, not withstanding any disclosure to CKD of the use to which the product is to be put.

Export

1 Security Trade Control

Products in this catalog and their related technology may require approval before export or provision.
To contribute to world peace and safety, there may be cases in which approval under the Foreign Exchange and Foreign Trade Control Law is required depending on the country to where the product or related technology is being exported or provided.
The scope of products and related technologies requiring approval are listed in Export Trade Control Ordinance Appendix Table 1 or Foreign Exchange and Foreign Trade Control Law Appendix Table.
Export Trade Control Ordinance Appendix Table 1 and Foreign Exchange and Foreign Trade Control Low Appendix Table contain the following two types of information:

· List Provisions indicating items 1 to 15 for each section
· Catchall Provisions that do not specify specifications by item, but restrict by application (Item 16)

Application for Approval is received by the Ministry of Economy, Trade, and Industry, Security Trade Control Review Section or local bureaus of the Ministry of Economy, Trade, and Industry.

2 Products and related technologies in this catalog

Products and related technologies in this catalog are exposed to Catchall Provisions of the Foreign Exchange and Foreign Trade Control Law.
When exporting or providing products or related technologies in this catalog, ensure that they are not used for arms or weapons.

3 Contact

Contact your local CKD Sales Office for information on the Security Trade Control of products and related technologies in this technology.

Design & Selection

1. Specifications confirmation

⚠ WARNING

■ Use within the product's specific specification range.
The product in this catalog is designed for use only in a compressed air system. Use with pressures or temperatures exceeding the specification range may result in damage or operation faults.
(Refer to specifications)
Consult with CKD when using fluids other than compressed air.

2. Design for safety

⚠ WARNING

■ Always take necessary measures to prevent harm to operators or objects if this product fails.

⚠ CAUTION

■ Understand compressed air features before designing a pneumatic circuit.

- The same functions as mechanical, hydraulic, and electrical methods cannot be anticipated if instantaneous service interruption and holding are required during an emergency stop.
- Pop-out, air discharge, or leakage due to air compression and expansion could occur.
- Design the circuit so that compressed air in the system can be discharged.

■ Decide the method of lubricating pneumatic components, and provide correct maintenance.

- Decide whether to use lubrication or oilless, and provide proper lubricant control.

■ Check leakage current to prevent malfunction caused by leakage current.

- Note that when using a PLC, etc., leakage current could result in malfunctions.

3. Design per application

⚠ CAUTION

■ Small leaks that do not affect performance are tolerated because this product is used with compressed air.
Contact CKD when no leaks are tolerable.

4. Working condition

⚠ WARNING

■ Avoid installing this product in rain, water or direct sunlight.

■ Do not use this product in a corrosive environment. Use in such an environment could lead to damage or operation faults.

■ Consult with CKD if ozone is generated in supply air.
(Ozone proof series are available.)

■ If the ambient temperature is less than 5°C, moisture in the circuit could freeze and lead to operation faults, etc. Remove moisture to prevent freezing.

■ Avoid using this product in environments where ozone is generated.

⚠ CAUTION

■ Confirm that the product will withstand the working environment.

- This product cannot be used in environments where functional obstacles could occur. Example: Special environment where there are high temperatures, a chemical atmosphere, chemicals, vibration, humidity, moisture, coolant, or gas, etc., or in an ozone generating environment.

5. Securing of space

⚠ CAUTION

■ Ensure space around the pneumatic component for installation, removal, wiring, and piping work.

6. Stipulation in instruction manual

⚠ CAUTION

■ Indicate the maintenance conditions in the device's instruction manual.

- The product's function can drop markedly with working status, working environment, and maintenance, and can prevent safety from being attained. With correct maintenance, the product functions can be used to the fullest.

Installation & Adjustment

⚠ CAUTION

1. Installation

■ Do not remove the pneumatic component package or the piping port seat cap until just before piping the product.

- If the piping port cap is removed from the piping port before piping work is started, foreign matter could enter and result in faults or faulty operation.

■ Do not install pneumatic components with a method that supports with pipes.

■ Do not remove the dust-proof seal on the piping port until just before piping the product.

- If the seal is removed from the piping port before piping work is started, foreign matter could enter and result in faults or faulty operation.

2. Check before operation

■ After connecting piping, check pipe connections for air leaks before supplying compressed air.

- Apply a leakage detection agent on pipe connections with a brush, and check for air leaks. Check that the leak detection agent does not get on the plastic bowl because the plastic bowl could break and cause a hazard.

3. Piping

■ When connecting pipes, wrap sealing tape in the opposite direction from threads starting 2 mm margin from the end of piping threads.

- If sealing tape protrudes from pipe threads, it could be cut when screwed in. This could cause the tape to enter the solenoid valve and lead to faults.

When using a liquid sealant, check that it does not adhere to the plastic bowl, because it could damage the plastic bowl and cause a hazard.

■ Check that the pipe connected to the pneumatic component is not dislocated due to vibration, loosening, or pulling.

- Piping dislocation generates a hazardous state.

■ Observe the following precautions when using nylon tubes or urethane tubes for piping material.

- Use a flame resistance tube or steel pipe when using in an environment where spatter could scatter.
- Use a hydraulic hose when piping is to be used for both hydraulics and pneumatics.
- When using the standard push in joint on the spiral tube, fix the base of the tube with a hose band. The tube could rotate and reduce holding performance.
- Use a spigot joint for high-temperature fluid. Push-in joint is not required.

■ Pipe so that piping connection does not deviate by the device's movement, vibration, tension, etc.

■ Always flush just before piping pneumatic component.

- Foreign matter entered inside during piping must not enter pneumatic components.

■ Tighten pipes with the appropriate torque.

- Pipes must be connected with the appropriate torque to prevent air leakages and screw damage.
- First tighten the screw by hand to prevent damage to screw threads, then use a tool.

(Recommended value)

Port thread	Tightening torque N·m
M3	0.3 to 0.6
M5	1 to 1.5
Rc1/8	3 to 5
Rc1/4	6 to 8
Rc3/8	13 to 15
Rc1/2	16 to 18
Rc3/4	19 to 40
Rc1	41 to 70

Note: If tightening torque is designated for the model, use that value.

4. Pneumatics pressure source

■ Install an air filter just before the pneumatic component in the circuit.

■ When supplying compressed air for the first time after connecting pipes, do not apply high pressure suddenly.

- Piping connection could be dislocated or the piping tube fly off, leading to accidents.
- Caution: If compressed air is supplied too slowly, sealing pressure may not be generated by the sealing mechanism in the solenoid valve. This can lead to air leaks.

■ Air quality

- Use a CKD clean air system as designated for the application.
- Use compressed air that does not contain oxidized oil, tar, carbon, etc., from the air compressor.
- Use compressed air that does not contain solid foreign matter.

During Use & Maintenance

⚠ CAUTION

1. Assembling & Disassembling

■ The pneumatic component must be disassembled and assembled by a qualified worker.

- Personnel involved in this step must have passed the Pneumatic Pressure Skill Test Class 2 or higher.

■ Read the relevant product instruction manual thoroughly and fully familiarize yourself with work before disassembling or assembling the pneumatic component.

- Personnel must be fully familiar with pneumatic component structure and operational principles and safety requirements.

2. Maintenance and inspection

■ Before servicing the product, turn power OFF, stop the compressed air supply, and check that there is no residual pressure.

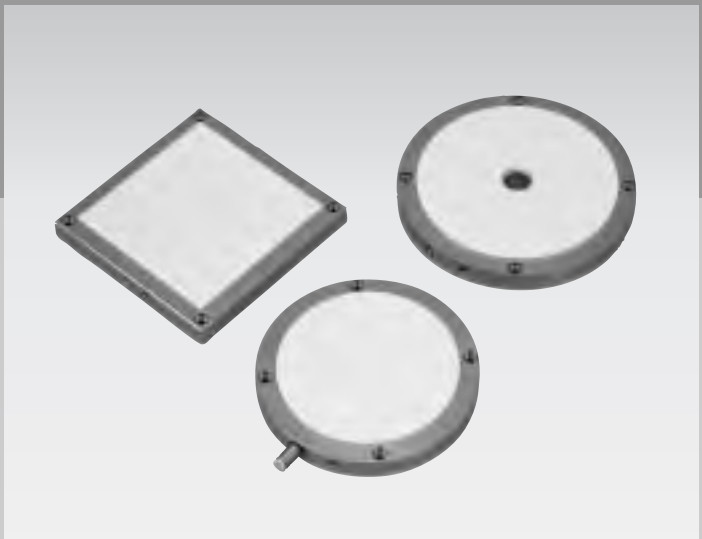
- This is a requirement for ensuring safety.

Precise suction plate
PVP

■ **Vacuum component**

Overview

This precision suction plate uses CKD's original sintered multiporous fluorine resin with 40% porosity for the suction surface.
Even extremely thin or soft workpieces are handled without suction damage, distortion, or deformation. A wide variety of workpiece types is processed highly accurately.



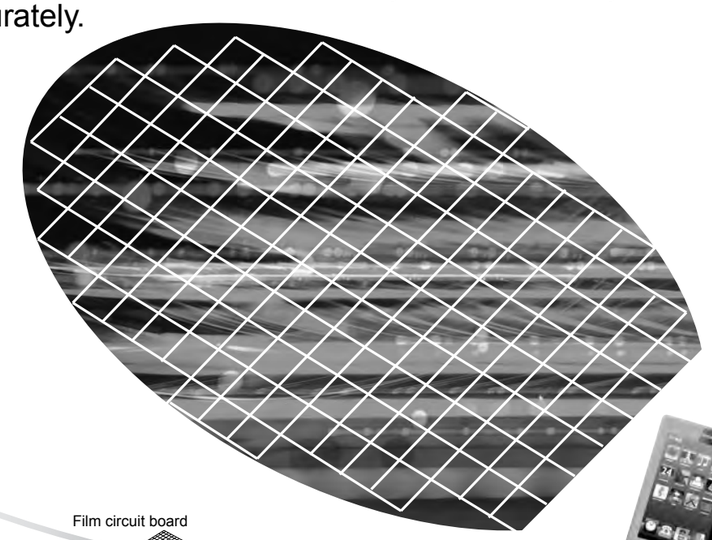
Feature

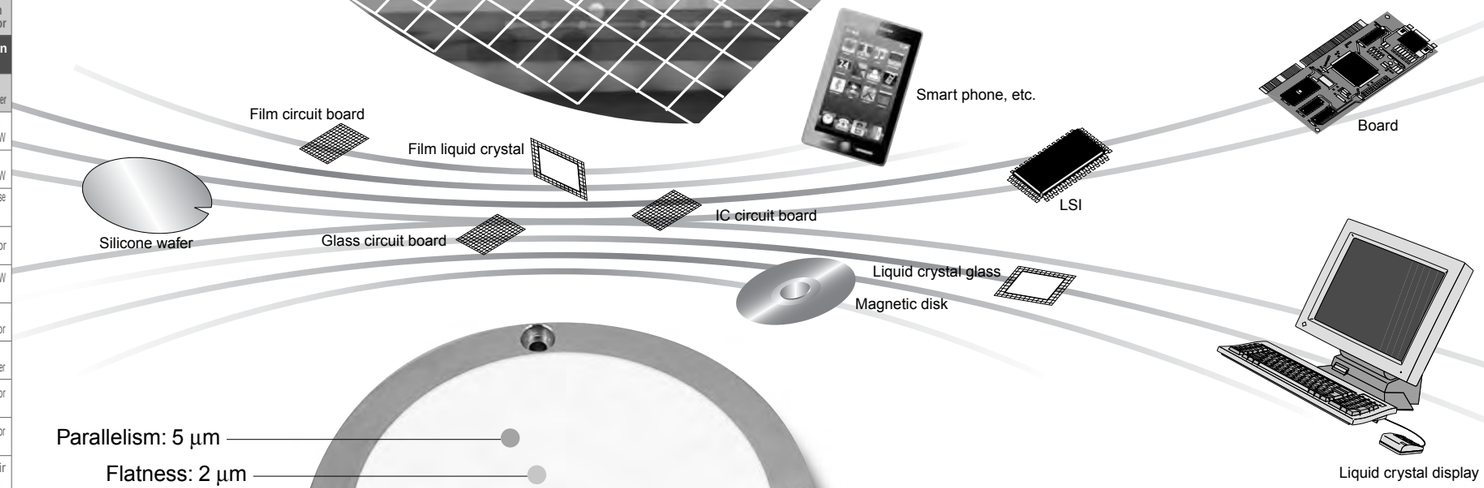
- Highly accurate workpiece processing
- Large suction
- Workpieces are not damaged.
- Three types of plate shapes available.

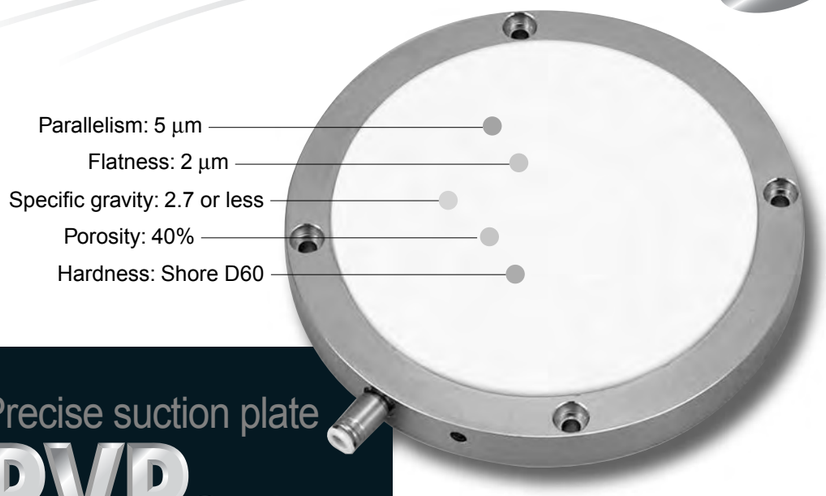
CONTENTS

High cleanness and highly accurate suction easy on workpieces

Performance is highly accurate for difficult processes within fine processes. Even extremely thin or soft workpieces are handled without suction damage, distortion, or deformation. A wide variety of workpiece types is processed highly accurately.







Applications

- This series can be used to transfer and laminate optical and magnetic disks, to laminate and transfer LCD glass and film substrates, and to spin, polish, and transfer wafers. In addition to suction applications, suspension systems are available as custom orders.

Precise suction plate
PVP Series

CKD's original sintered multipurpose fluorine resin with 40% porosity. Performance is highly accurate for difficult processes within fine processes.

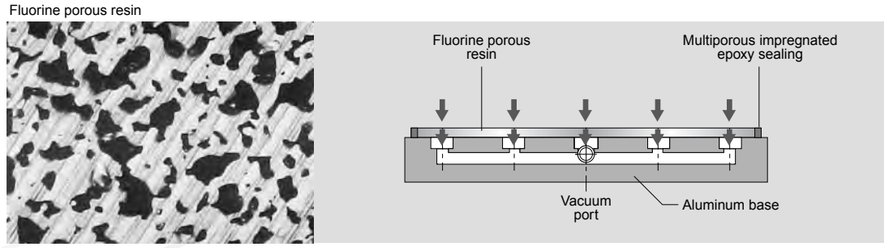
Highly accurate workpiece processing

Suction surface flatness: 2 μm, parallelism: 5 μm.
(Specified value for R-36-18, C-50, S50-50)
Workpiece fixing is highly accurate, enabling highly accurate processing.

Large suction

40% porosity lets the entire surface be picked up with strong suction.
Extra thin workpieces are not deformed even under large suction.

Fluorine porous resin



Easy on workpieces

Suction surface hardness is Shore D60. Soft handling leaves workpieces damage-free.

Light

The plate is made of multiporous fluorine resin (visible weight 1.3) and an aluminum base (weight 2.7). This light weight requires only a small drive.

Antistatic (Optional)

Multiporous fluorine resin is coated with antistatic agent.
Electrostatic discharge is suppressed, protecting workpieces.

Free plate design

The plate comes in three standard shapes.
Original shapes are available as custom orders.

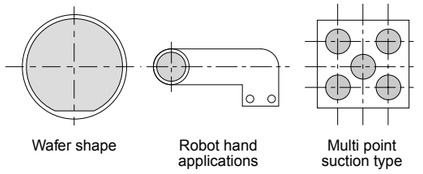
● Standard type

PVP-R (1) Donut shaped — Disk, etc.

PVP-C (2) Round — Semiconductor, silicone wafer, etc.

PVP-S (3) Square — Plastic circuit board, etc.

● Example of specially shaped order



• Consult with CKD for custom order of special shape.

Safety precautions

Always read this section before starting use.

Design & Selection

⚠ WARNING

■ If problems could arise when using a system with a precise suction plate and the selected workpiece is dropped, provide mechanical position locking for safety.

■ Do not use in areas containing corrosive or flammable gases.
Do not let the precision suction plate get stuck in corrosive of flammable gases.

■ Consider the behavior during emergency stop.
Design the system so that operators, workpieces, devices or system will not be damaged if the safety device activates during emergency stop or a system error and causes the power source or machine, etc., to stop.

■ Be sure to use the product within the specified range — 5 to 40°C, 0.2 MPa or less.
The multi-porous layer could peel off and generate corrosive gases when used at pressure or temperature exceeding the specified range.

■ Consider the behavior when restarting after emergency stop or abnormal stop.
Design the system so that the operators, workpieces, devices or system will not be damaged when restarting.

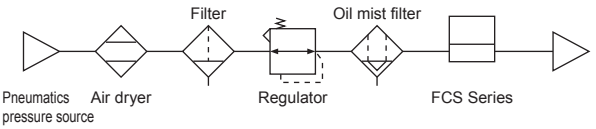
⚠ CAUTION

■ Check that the product withstands the working environment before use.
Avoid use in environments involving functional damage — high levels of dust, processes where dust is generated, chemicals, environments containing chemicals, vibration, humidity, moisture, gas, or ozone-generating environments.

■ Use within the specified humidity range (65% RH or less). Use exceeding the specified range could adversely affect suction surface accuracy.

■ Suction conditions vary with the product, piping, work, and working environment.
When selecting a vacuum generator, consider the maximum vacuum, suction flow rate, and response time.

■ Use dry, clean compressed air “Class 1.6.2” (solid particles 0.1μm, pressure dew point 10°C, oil concentration 0.1mg/m^3) when purging with air.
(Class follows JIS B 8392-1:2000 compressed air quality class.)
<Use of the CKD Super Dryer D Series or CKD Inline Clean Filter FCS Series is recommended.>
<Recommended circuit>



■ Do not use a spiral hose.
Using a spiral hose could increase piping resistance and lead to faults such as delays in gaining vacuum levels and required suction.

■ Note the following when connecting more than one precision suction plate to one vacuum generator.
- If one precise suction plate leaks, vacuum will drop and cause suction faults.
- Piping between the vacuum generator and branch must be bigger than piping between the branch and vacuum pad.

■ Take appropriate anti-freezing measures when using in cold climates.
Foreign debris or oil in the compressed air could clog the porous plate and cause faults or malfunction.

■ Insulate if there is a heat source in the area.
Radiant heat could cause the product’s temperature to rise and exceed the working temperature range. Insulate the product with a cover, etc.

■ Do not use where product could be subject to vibration or impact.
There is a risk of fault or malfunction.

Installation & Adjustment

⚠ CAUTION

■ If the workpiece is not picked up using the entire multi-porous surface, suction drops. Consult with CKD in this case.

■ Use an M4 hexagon socket bolt when installing the product’s device. Fix in place with a tightening torque of 0.62 to 0.75 N·m.

■ Store the product so that foreign debris will not enter from the screws on the end, the holes on the side, or the gaps under the body. To prevent contamination, do not remove the product from the package until just before mounting or piping it to the device.
Contamination could result in faults or malfunctions.

■ Do not remove the protective port seal until just before piping.

■ Wipe the device’s mounting surface with ethanol and remove foreign matter by flushing with air.

Installation & Adjustment

⚠ CAUTION

■ When not using for a long time, place the product in a polyethylene bag, etc., and store in a dry clean environment. When reusing, do not remove the product from the package until just before mounting or piping it to the device.
Contamination could result in faults or malfunctions.

■ Before starting operation, check for loosening or problems at load or joint connections.

■ Read the instruction manual before use.
Familiarize yourself with details before using the product.

■ Start operation after confirming that devices operate correctly.
After installing, repairing, or modifying the product, conduct a function inspection and confirm that the product is correctly installed.

During Use & Maintenance

⚠ CAUTION

■ Avoid using outdoors in areas with high levels of dust. Materials deteriorate if exposed to direct sunlight. Dust may clog the multi-porous layer and reduce suction.

■ Do not use in applications applying a pressure of 1.0 MPa or more to the multi-porous surface.

■ Do not use in applications applying partial loads or impact to the multi-porous surface.

■ Check that the surface the product is installed on is not warped and that the required flatness is attained.
The product could warp or be deflected if not fixed on a surface with the required flatness.

■ Do not machine the product additionally.
Accuracy could drop due to machining strain.

■ Note the following when installing the product to prevent reducing product accuracy and causing permanent deformation.

- Do not support the product with a point or lean the product against a wall. (Install the product on a flat surface, such as a table, to avoid strain and deflection caused by product weight.)
- Do not pull on the product excessively or expose it to sudden or strong impact.
(The product scratches easily, so be sure to lift it when moving it.)
- Do not apply sudden or excessive impact.
(Damage from impact damages flatness accuracy. Protect the multi-porous surface and sides when mounting and transporting the product.)
- Do not install immediately upon arrival.
(Installing the product before temperature is adjusted to the surroundings damages shape accuracy due to thermal expansion or contraction. Leave the product to the working environment for 24 hours before installing.)
- Check that the multi-porous surface is not exposed to coolant or dust.
(The multi-porous surface is extremely hard to clean. Dirt cannot be removed.)

■ Always release the residual pressure before mounting or removing the product.

■ When starting the system after it has been idle for a long time, check that it operates normally before starting full-scale operations.

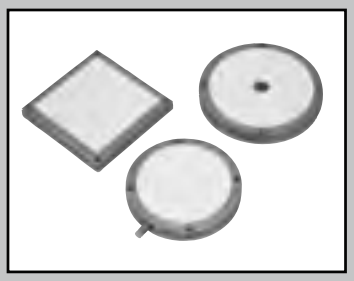
■ Perform the following periodic inspection once or twice a year to ensure that the product is used with the optimum functions.
(1) Check for leaks to the outside
(2) Check for a drop in pickup performance
(3) Check for exterior faults (scratches, chips on the porous plate, surface contamination)

■ Start the vacuum generator after the workpiece contacts the multi-porous surface.
(This reduces environmental dust that the multi-porous surface absorbs and helps prevent contamination.)

■ The antistatic effect is reduced if the product is washed and depends on the working environment such as workpiece suction frequency. The product should be recoated if its effectiveness drops.

■ Conduct daily inspections and regular inspections to ensure that maintenance control is done correctly.
Insufficient maintenance could lower product functions, shorten product life, or result in damage or incorrect operations.

■ Stop use if leakage increases or if the device does not function correctly.
After installing, repairing, or modifying the product, conduct a function inspection and confirm that the product is correctly installed.



Precise suction plate

PVP Series

RoHS CAD

Specifications

Descriptions			PVP-R-36-18 PVP-C-50 PVP-S-50-50	PVP-R-85-27 PVP-R-118-18 PVP-C-75 PVP-C-100 PVP-C-113 PVP-C-138 PVP-S-100-100	PVP-C-187 PVP-S-150-150 PVP-S-200-250
Product	Suction surface μm (Note 1)	Flatness	2	3	4
		Parallelism	5	10	15
	Datum level flatness	μm	10	10	10
	Air leakage volume	ℓ/min. (ANR)	0.4	0.6	1
	Vacuum differential pressure	kPa (Note 2)	40 and over		
	Use pressure	MPa	0.2 or less (clean air)		
	Ambient temperature range	°C	5 to 40		
	Working humidity range	%RH (Note 3)	65 or less		
Porous material	Material		Trifluoroethylene resin		
	Porosity	%	40±5		
	Shore D hardness	Degree	60±15		
Base	Material		Corrosion proof aluminum alloy		
	Surface treatment	(Note 4)	None		

Note 1: This accuracy is that measured after leaving the product for 24 hours at constant 23°C room temperature.
Accuracy may deviate from that specified at a temperature other than 23°C.
The value is measured by placing the product without load on a table and measuring straightness in two or more and using the maximum value.
This is not usual flatness measurement, but has been used because multiporous material has indentations.
Note 2: Indicates the vacuum source pressure drop when a workpiece is vacuumed onto the entire multiporous surface.
Note 3: In humidity exceeding 65% RH, suction surface accuracy may deviate from the specified value.
Note 4: This product is made of corrosion-resistant aluminum alloy.
Surface treatment — alumite, electrolesss nickel plating, etc. — is a custom order.

Suction area / weight table

Model no.	Suction area (cm^2)	Weight (g)
PVP-R-36-18	8	80
PVP-R-85-27	51	290
PVP-R-118-18	107	520
PVP-C-50	20	140
PVP-C-75	44	250
PVP-C-100	79	390
PVP-C-113	100	490
PVP-C-138	149	680
PVP-C-187	275	1,170
PVP-S-50-50	25	160
PVP-S-100-100	100	490
PVP-S-150-150	225	980
PVP-S-200-250	500	2,030

How to order

● How to order round suction plate

PVP - C - 50 - CP - A

C: Round

A Porous plate O.D. dimension
50
75
100
113
138
187

B Vacuum port position	
Blank	Side port
CP	Rear port

C Option	
Blank	None
A	Antistatic treatment

● How to order square suction plate

PVP - S - 50-50 - CP - A

S: Square

A Porous material short side dimension-Porous material long side dimension
50-50
100-100
150-150
200-250

B Vacuum port position	
Blank	Side port
CP	Rear port

C Option	
Blank	None
A	Antistatic treatment

● How to order donut shaped suction plate

PVP - R - 36-18 - CP - A

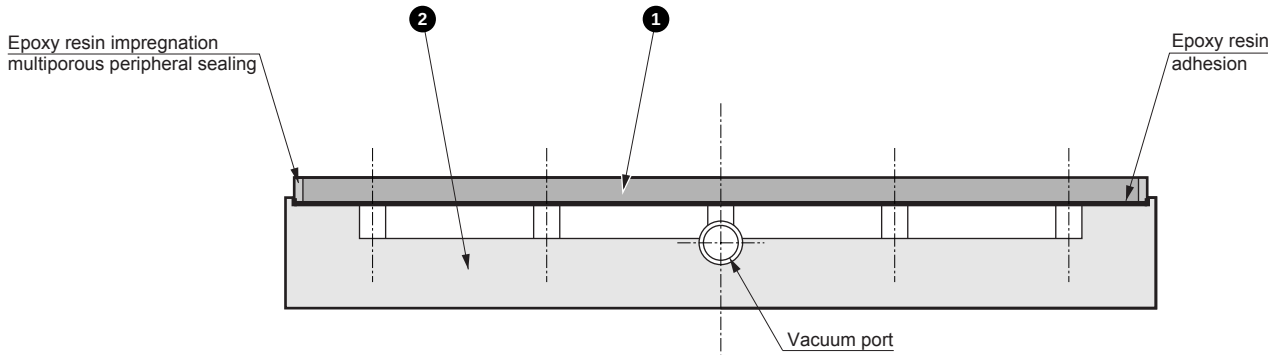
R: Donut shaped

A Porous plate O.D. dimension-Porous plate I.D. dimension
36-18
85-27
118-18

B Vacuum port position	
Blank	Side port
CP	Rear port

C Option	
Blank	None
A	Antistatic treatment

Internal structure and parts list

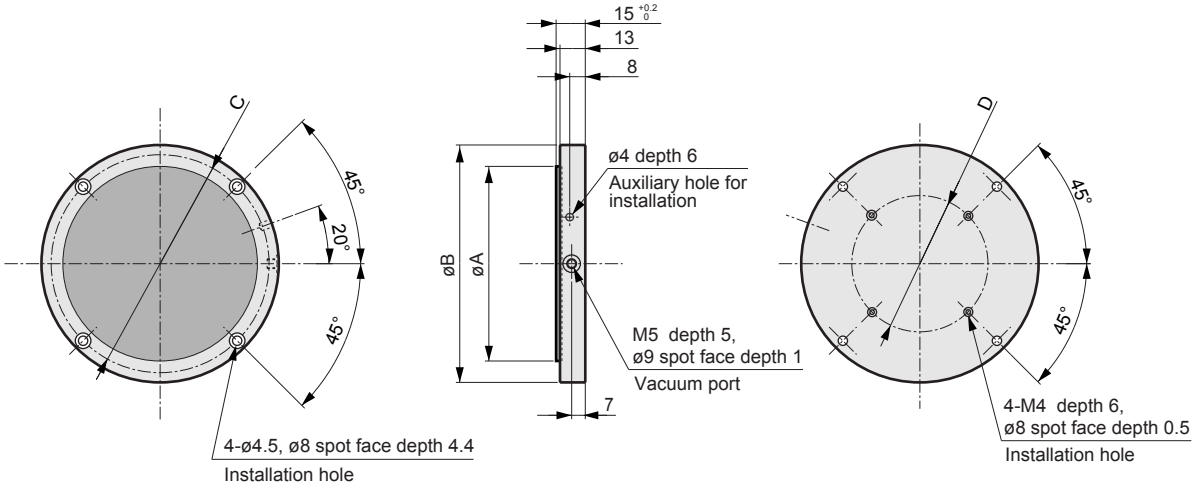


● Parts list

No.	Parts name	Material
1	Porous material	Trifluoroethylene resin
2	Base	Corrosion proof aluminum alloy

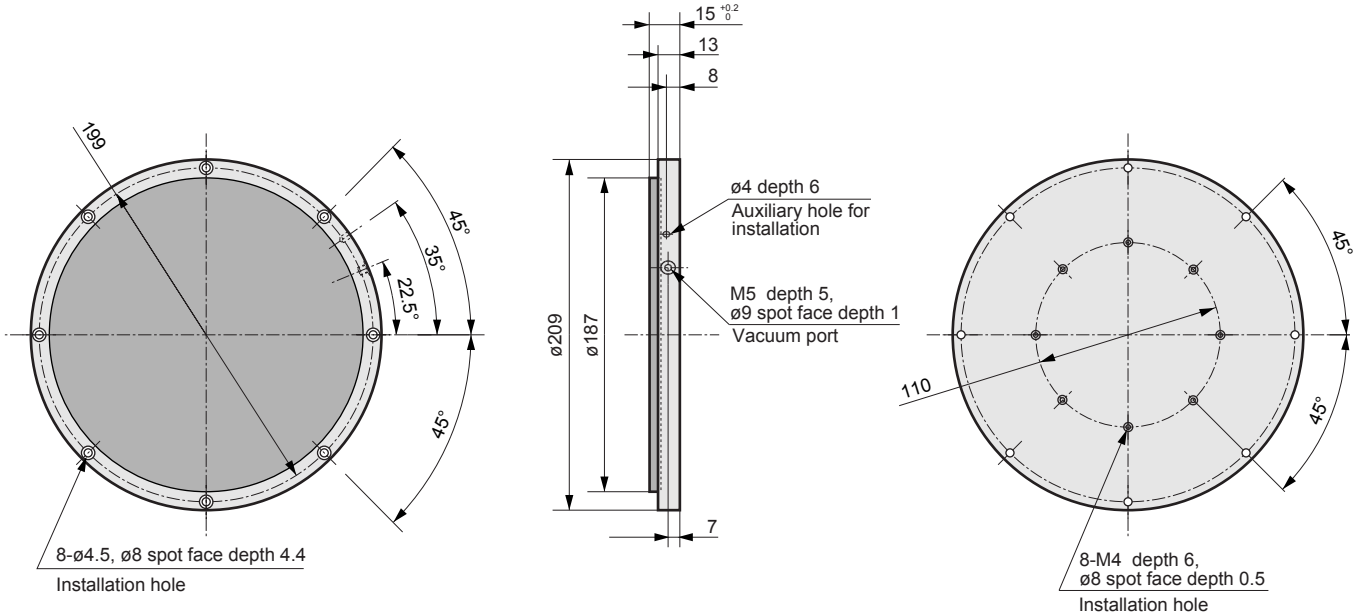
Dimensions

● PVP-C-*



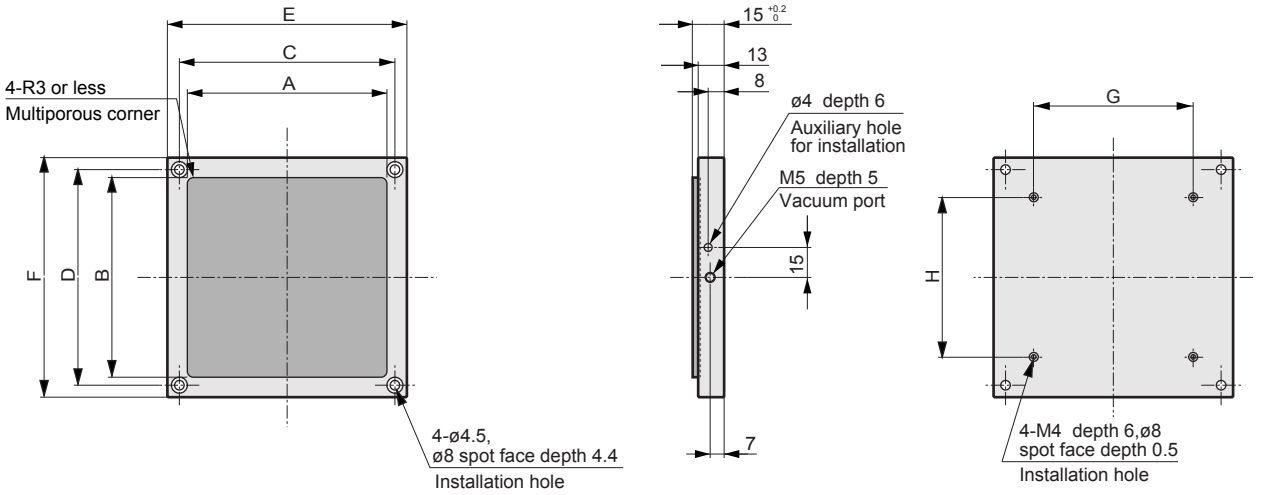
Model no.	A	B	C	D
PVP-C-50	50	72	62	30
PVP-C-75	75	97	87	50
PVP-C-100	100	122	112	70
PVP-C-113	113	135	125	70
PVP-C-138	138	160	150	90

● PVP-C-187



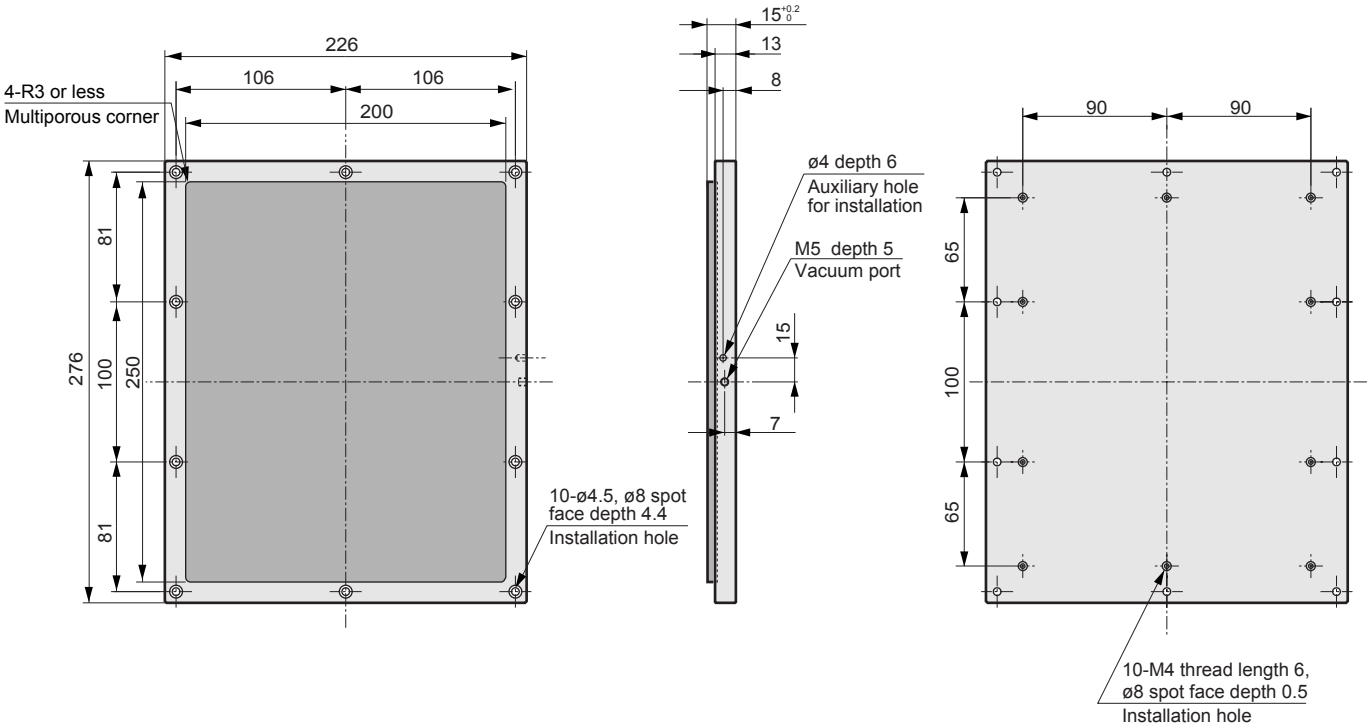
Dimensions

● PVP-S-*



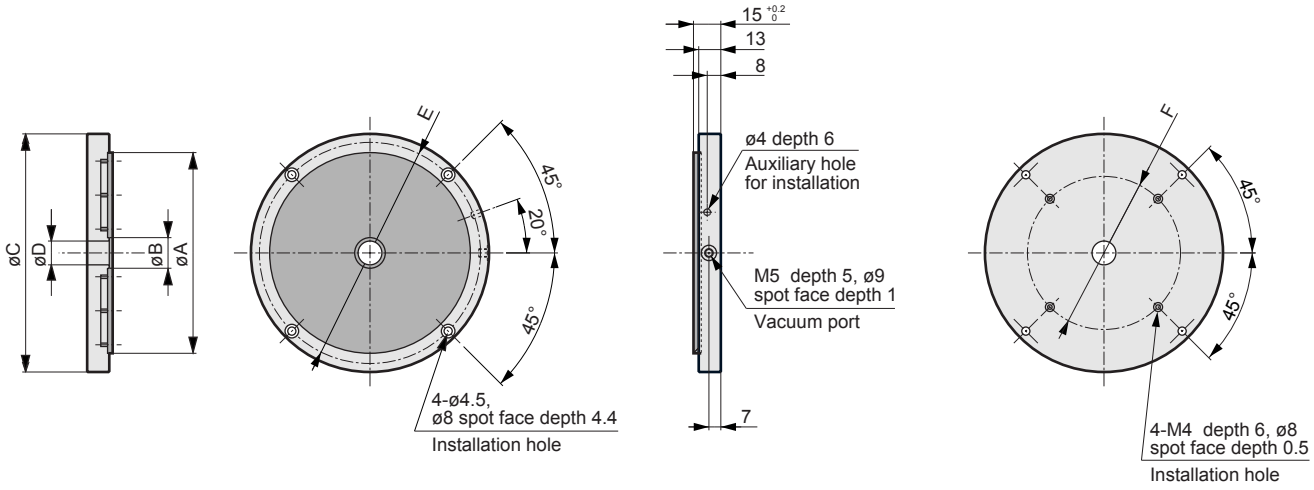
Model no.	A	B	C	D	E	F	G	H
PVP-S-50-50	50	50	58	58	70	70	40	40
PVP-S-100-100	100	100	108	108	120	120	80	80
PVP-S-150-150	150	150	158	158	170	170	120	120

● PVP-S-200-250



Dimensions

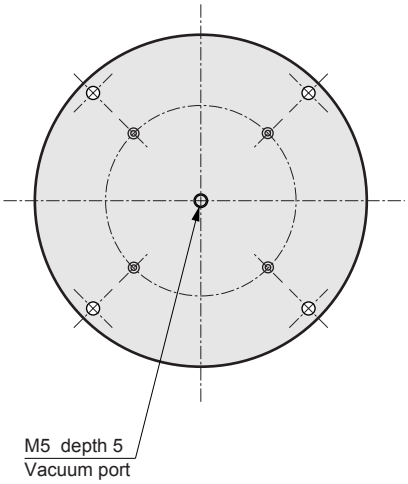
● PVP-R-*



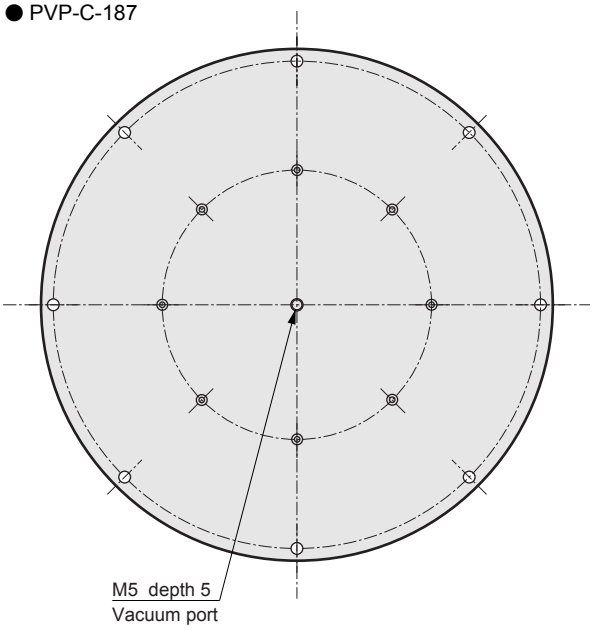
Model no.	A	B	C	D	E	F
PVP-R-36-18	36	18	58	16	48	30
PVP-R-85-27	85	27	107	25	97	60
PVP-R-118-18	118	18	140	16	130	90

Vacuum port position rear port (CP)

● PVP-C-*



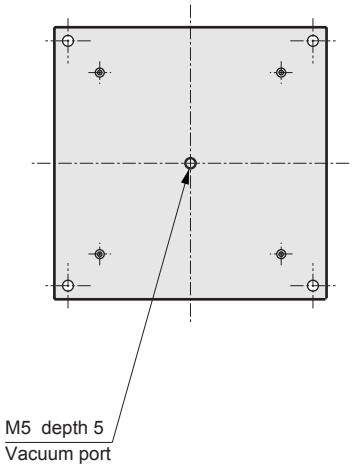
● PVP-C-187



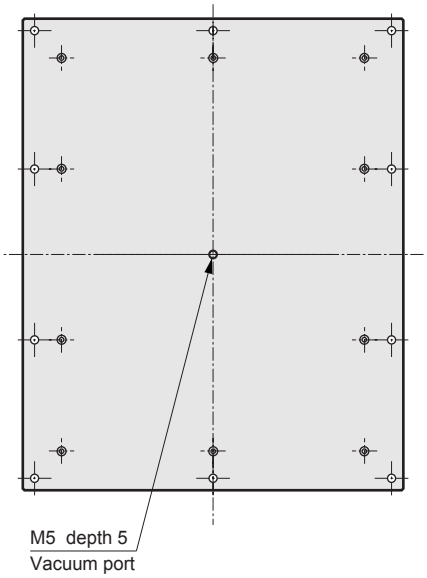
Dimensions

Vacuum port position rear port (CP)

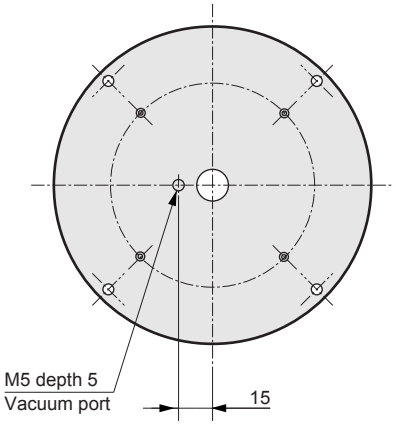
● PVP-S-*



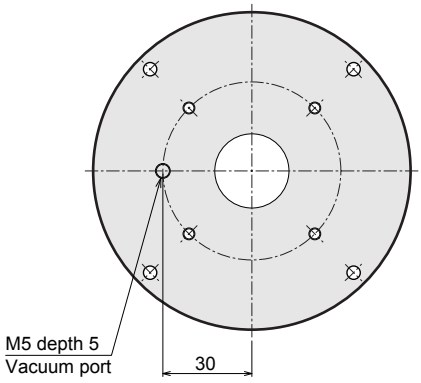
● PVP-S-200-250



● PVP-R-*-18

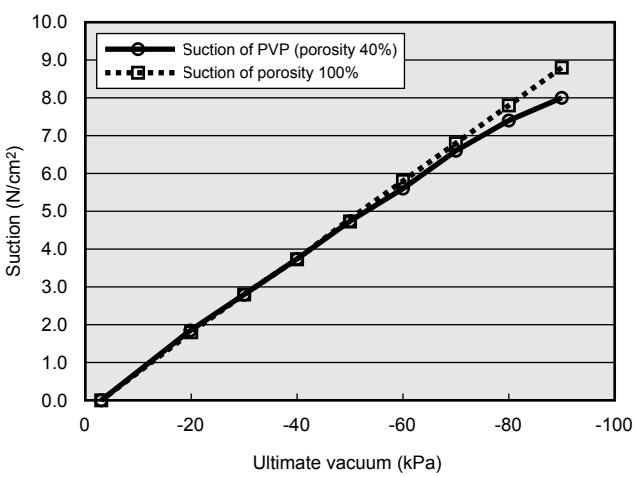


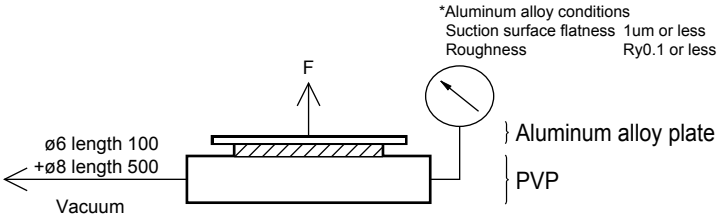
● PVP-R-85-27



Technical data

● Vertical suction (references data)





This reference data is measured at PVP-S-50-50 or above.
The ultimate vacuum's minimum is not zero because of piping resistance due to multiporous material and piping.
Under conditions other than the above, suction could vary due to piping resistance, the shape of the part to be vacuumed, or surface roughness.

Silencer

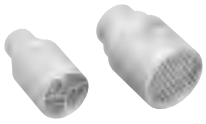
■ Pneumatics Auxiliary Components

CONTENTS

Silencer

● High damping effect and 2 types of materials

Model / appearance	Model no.	Port size(R)															Effective sectional area (mm^2)	Flow (ℓ/min.) ANR 0.5MPa	Applicable cylinder bore size (mm)	Page
		M3	M5	1/8	1/4	3/8	1/2	3/4	1	11/4	11/2	2	ø6	ø8	ø10	ø12				
● Metering valve with silencer 	SMW2-6A			●													5.6	370	ø20 to ø50	874
	SMW2-8A				●												9.9	660	ø32 to ø75	
	FMS-M5		●														4	250	ø6 to ø15	876
	SMW-10A					●											25	1700	ø50 to ø100	
	SMW-15A						●										39	2600	ø50 to ø100	
● Small bore size type 	SL-M5		●														5	300	ø6 to ø15	878
● Resin body type 	SLW-6A/6N			●													10	650	ø20 to ø80	
	SLW-8A/8N				●												20	1300	ø32 to ø80	
	SLW-10A/10N					●											30	2000	ø50 to ø100	
	SLW-15A/15N						●										75	4850	ø50 to ø100	
● High noise reduction, small bore size, resin body type 	SLW-8A-H				●												15	1000	ø32 to ø80	880
	SLW-10A-H					●											30	2000	ø50 to ø100	
	SLW-15A-H						●										50	3250	ø50 to ø100	
● Large flow rate, small bore size, resinbody type 	SLW-8L				●												30	2000 and over	ø32 to ø80	881
	SLW-10L					●											60	4000 and over	ø50 to ø100	
● High noise reduction, compact type 	SLW-6S			●													12	800	ø20 to ø80	882
	SLW-8S				●												30	1900	ø32 to ø80	
	SLW-20S							●									90	6000	ø100 to ø200	883

Model / appearance	Model no.	Port size (Rc or R)															Effective sectional area (mm^2)	Flow (ℓ/min.) ANR 0.5MPa	Applicable cylinder bore size (mm)	Page
		M3	M5	1/8	1/4	3/8	1/2	3/4	1	11/4	11/2	2	ø6	ø8	ø10	ø12				
● Push-in type 	SLW-H6												●				7	455	ø20 to ø40	884
	SLW-H8													●			8.5	550		
	SLW-H10														●		17.5	1135		
	SLW-H12															●	25.5	1655		
● Miniature type 	SLM-M3	●															1	60 and over	ø6 or less	885
	SLM-M5		●														5	350 and over	ø6 to ø15	
● Aluminum body type 	SL-8A				●												36	2400	ø50 to ø100	886
	SL-10A					●											48	3200	ø63 to ø140	
	SL-15A						●										61	4100	ø75 to ø180	
	SL-20A							●									160	12000	ø100 to ø250	
	SL-25A								●								210	14000	ø140 to ø250	
	SL-32A									●							280	18000	ø140 to ø450	
	SL-40A										●						320	21000	ø140 to ø450	
	SL-50A											●					500	33000	ø300 to ø450	

Safety precautions

Always read this section before starting use.
Refer to Intro 67 for general precautions, and to "⚠ Safety precautions" in this section for details on each series.

Design & Selection

⚠CAUTION

■ Use this product in accordance with the specifications range.
Consult with CKD when using the product for special applications.

- The exhaust port could plug if the silencer is clogged.
  Design safely to prevent the system from malfunctioning.
- Use with exceeding the specifications range may result in insufficient performance, and safety can not be secured.
- This product could not use in special applications and environment.
  For example, use for special applications including nuclear energy, railway, aircraft, marine vessel, vehicle, medical equipment, equipment, or applications coming into contact with beverage or food, amusement equipment, emergency shutoff circuits, press machine, brake circuits, or for safeguard.

■ Confirm that the product will withstand the working environment.

- This product cannot be used in environments where functional obstacles could occur.
  Such environments include high temperatures, a chemical atmosphere, or where chemicals, vibration, moisture, water drip, or gas are present.

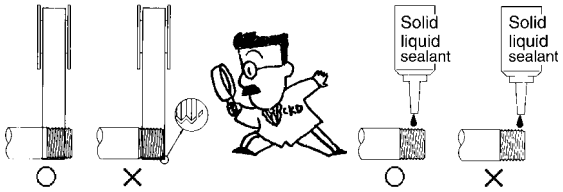
Installation & Adjustment

Piping

⚠CAUTION

■ When connecting pipes, wrap sealing tape in the opposite direction from threads starting 2 mm inside from the end of piping threads.

- If sealing tape protrudes from pipe threads, it could be cut when screwed in. This could cause the tape to enter the pneumatic components and lead to faults.



■ Apply adequate torque when connecting pipes.

- To prevent air leakage and screw damage.
- Refer to the text for adequate torque of each series.

■ Install the silencer so that exhaust air does not blow directly into eyes.

■ Do not apply lateral load to the main unit during or after installation.

■ Secure space around the silencer for installation and removal.

■ Handling push-in joints and tubes

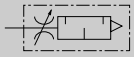
- Refer to Cautions of joint and tube, and "Safety Precautions" (pages 918 to 921) for handling push-in joints and tubes.

Metering valve with silencer

SMW2 Series

● Port size: R1/8 to R1/4

JIS symbol



Features

- Compact, light weight, high flow
  Volume reduced by 50%, and weight reduced by 80% compared with conventional series, while maximum effective sectional area in the class is achieved.
- Damping effect 23dB (A) and over
  P.P. sintering element with high damping effect integrated into the body to maintain low noise level.
- Provided push lock type needle
  Knob with push lock mechanism enables easy and secure locking.
- Environmental friendly design
  Using plastic material only, sorting at disposing is eliminated.

Specifications

Descriptions	SMW2-6A	SMW2-8A
Working fluid	Compressed air	
Max. working pressure MPa	0.7	
Min. working pressure MPa	0	
Withstanding pressure MPa	1.05	
Fluid temperature °C	5 to 60	
Ambient temperature °C	-10 to 60 (no freezing)	
Ambient humidity %RH	85 or less	
Port size R	1/8	1/4
Product weight g	4.5	5
Applicable cylinder bore size mm	ø20 to ø50	ø32 to ø75
Number of needle turn	9	
Damping effect (Note 2) dB [A]	23 and over	28 and over
Flow (Note 1) ℓ/min. (ANR)	370	660
Effective sectional area mm^2	5.6	9.9

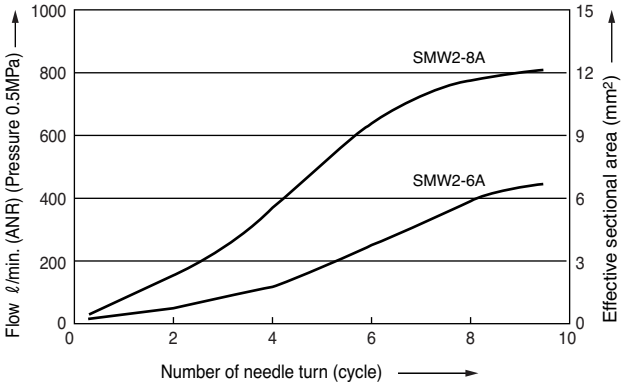
Note 1: Flow rate is the atmospheric pressure conversion value at pressure 0.5MPa.
Note 2: Damping effect at maximum flow rate is shown.

How to order

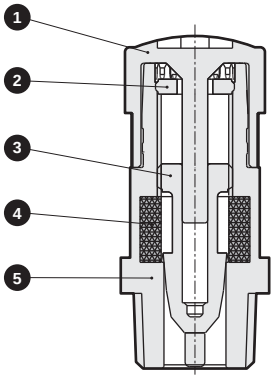
SMW2 - 6A

Symbol	Descriptions
Ⓐ Port size	
6A	R1/8
8A	R1/4

Flow characteristics

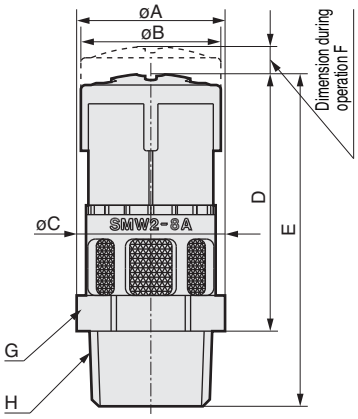


Internal structure and parts list



No.	Parts name	Material
1	Knob	PBT
2	Guide ring	Polyamide
3	Needle	Polyamide
4	Element	PP sintering resin
5	Body	Polyamide

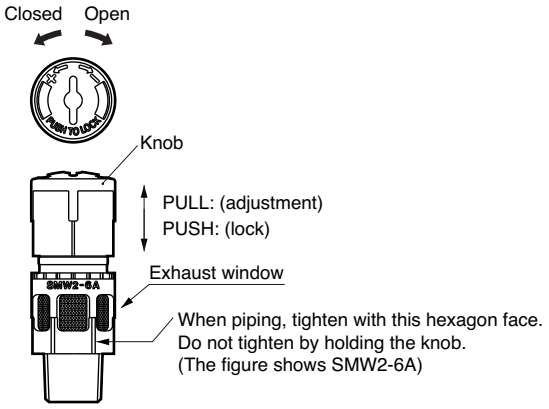
Dimensions



Symbol / Model no.	A	B	C	D	E	F	G Opposite side of hexagon	H Port size
SMW2-6A	13.5	14.9	13.8	27.4	35.4	2.9	12	R1/8
SMW2-8A	15.8						14	R1/4

How to use

- The needle lock is released when the knob is pulled, and is locked when pressed.
- Pull the knob and the release the lock before adjusting the flow rate.
  The knob opens when turned to the right and closes when turned to the left.
- Return the knob to the closed state, and gradually open it to adjust speed.
- After adjusting speed, press the knob and confirm that the needle is locked.



Safety Precautions

■ Design & Selection

- This product cannot be used as a stop valve with zero leakage.
  Due to structure, a few leakage could occur.

- Depending on air quality (dew point), the exhaust port could freeze due to adiabatic expansion.

■ Installation & Adjustment

- The needle is designed to open and close by turning lightly with the fingers.
  Turning the needle too far when fully opened or closed could damage internal parts.

- Return the knob to the closed state, and gradually open it to adjust speed. If the needle is opened, the actuator could pop out suddenly and pose a hazard, open the needle after confirming that it is fully closed.

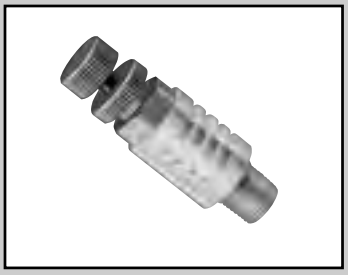
- The tightening torque for the pipe thread is shown in Table 1.
  Screws loosen easily under high temperatures, so when the ambient temperature is 40°C and over, mount with the upper torque limit (1.0N·m).

Model no.	Tightening torque (N·m)
SMW2-6A	0.5 to 1.0
SMW2-8A	0.5 to 1.0

Table 1. Recommended tightening torque

- When piping, use a tool and tighten with the hexagon face below the exhaust window.
  Do not tighten or remove pipes with the knob. Internal damage could result.

- Sealant is not applied on threads. If use in this state, screws do not loose but some leakage could result. When using in middle speed range, wrap sealing tape around the joint.

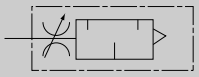


Metering valve with silencer

FMS/SMW Series

● Port size: M5, R3/8, R1/2

JIS symbol



CAD

Specifications

Descriptions	FMS-M5	SMW-10A	SMW-15A
Working fluid	Compressed air		
Max. working pressure MPa	0.7		
Min. working pressure MPa	0		
Withstanding pressure MPa	1.05		
Fluid temperature °C	5 to 60 (no freezing Note3)		
Ambient temperature °C	-10 to 60 (no freezing)		
Port size R	M5	3/8	1/2
Product weight g	6	125	170
Applicable cylinder bore size mm	ø6 to ø15	ø50 to ø100	ø50 to ø100
Number of needle turn	10	19	19
Damping effect Note2 dB	20 and over		
Flow Note ℓ/min.(ANR)	250	1700	2600
Effective sectional area mm^2	4	25	39

Note 1: Flow rate is the atmospheric pressure conversion value at pressure 0.5MPa.
Note 2: Damping effect at maximum flow rate is shown.
Note 3: Freezing could occur by adiabatic expansion depending on air quality (dew point).

How to order

FMS – M5

Ⓐ Port size

Symbol	Descriptions
Ⓐ Port size	
M5	M5 × 0.8

Note: Sales unit is 2 pieces/1 bag.

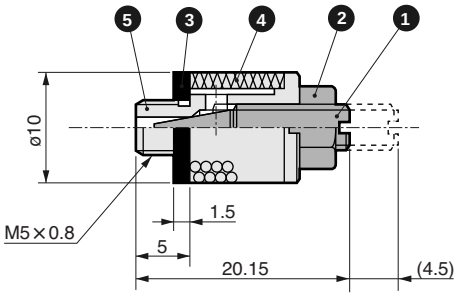
SMW – 10A

Ⓐ Port size

Symbol	Descriptions
Ⓐ Port size	
10A	R3/8
15A	R1/2

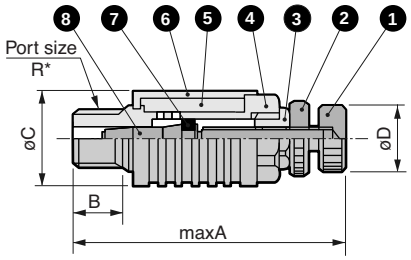
Internal structure and parts list/Dimensions

● FMS-M5



No.	Parts name	Material
1	Needle	Brass
2	Lock nut	Brass
3	Gasket	Nitrile rubber
4	filter	Bronze casting
5	Valve body	Brass

● SMW-10A/15A

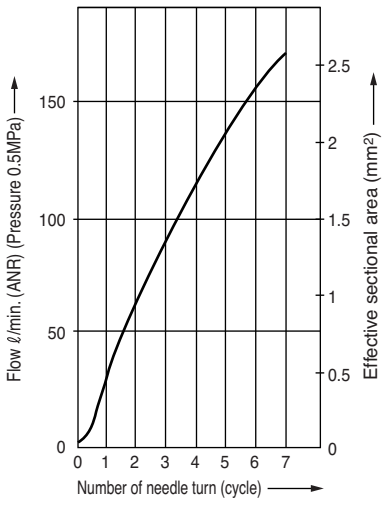


Model no.	A	B	C	D	Port size
SMW-10A	85	12	25	16	R3/8
SMW-15A	98	15	28	16	R1/2

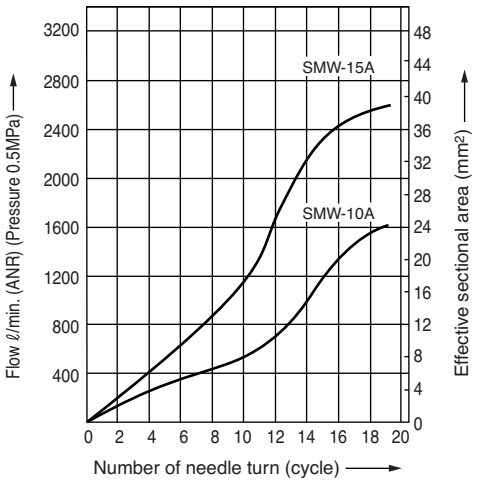
No.	Parts name	Material	No.	Parts name	Material
1	Knob	Brass	5	Sound absorbing	Felt
2	Lock nut	Brass	6	Guard	Polyamide resin
3	Gland nut	Brass	7	O ring	Nitrile rubber
4	Shaft	Brass	8	Spindle	Brass

Flow characteristics

● FMS



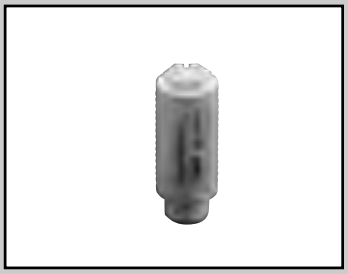
● SMW-10A/15A



Safety Precautions

● Tightening torque

Thread size	Tightening torque (N·m)
M5	1.0
R3/8	3.0
R1/2	3.0



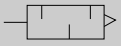
Silencer Small bore size type resin body type

SL/SLW Series

Damping effect 30dB (A) and over

● Port size: M5, R1/8 to R1/2

JIS symbol



RoHS CAD

Specifications

Descriptions	SL-M5	SLW-6A SLW-6N	SLW-8A SLW-8N	SLW-10A SLW-10N	SLW-15A SLW-15N
Working fluid	Compressed air				
Max. working pressure MPa	1.0				
Min. working pressure MPa	0				
Withstanding pressure MPa	1.5				
Fluid temperature °C	5 to 60 (no freezing Note2)				
Ambient temperature °C	-10 to 60 (no freezing)				
Port size R/NPT/G	M5	1/8	1/4	3/8	1/2
Product weight g	5	3.5	7.5	15	21
Applicable cylinder bore size mm	ø6 to ø15	ø20 to ø80	ø32 to ø80	ø50 to ø100	ø50 to ø100
Damping effect dB	20 and over	30 and over			
Flow Note1 ℓ/min. (ANR)	300	650	1300	2000	4850
Effective sectional area mm^2	5	10	20	30	75

Note 1: Flow rate is the atmospheric pressure conversion value at pressure 0.5MPa.
Note 2: Freezing could occur by adiabatic expansion depending on air quality (dew point).

How to order

SL – M5

Ⓐ Port size	
M5	M5×0.8

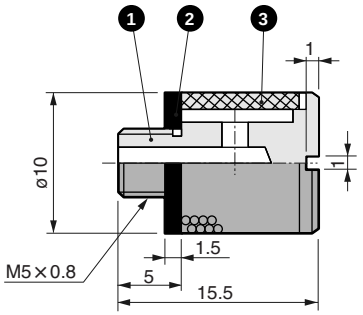
Note: Sales unit is 2 pcs/bag.

SLW – 6A

Ⓐ Port size	
6A	R1/8
6N	NPT1/8
6G	G1/8
8A	R1/4
8N	NPT1/4
8G	G1/4
10A	R3/8
10N	NPT3/8
10G	G3/8
15A	R1/2
15N	NPT1/2
15G	G1/2

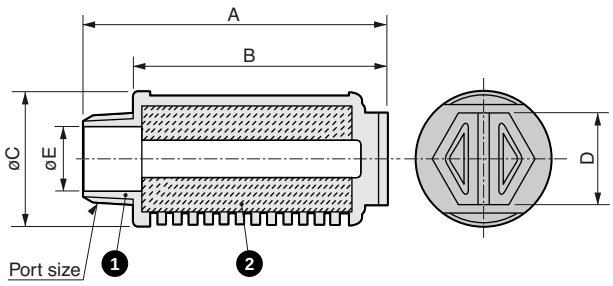
Internal structure and parts list / dimensions CAD

● SL-M5



No.	Parts name	Material
1	Body	Brass
2	Gasket	Nitrile rubber
3	Element	Brass sintering

● SLW-6A/8A/10A/15A



No.	Parts name	Material	Color
1	Body	Polyamide resin (flame resistant resin *)	White
2	Element	PP sintering resin	White

* Equivalent to UL94 standards V-O

Model no.	A	B	C	D	E	Port size	
						A	N
SLW-6*	34	28	16.5	10	7	R1/8	NPT1/8
SLW-8*	44.5	36	20	13	8.5	R1/4	NPT1/4
SLW-10*	58.5	48.5	25.5	17	12	R3/8	NPT3/8
SLW-15*	71.4	58.4	28	19	15	R1/2	NPT1/2

Safety Precautions

● Use tightening torque as strong as human hand.
(Refer to the table below for tightening torque.)

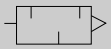
Thread size	Tightening torque (N·m)
M5	1.0
R1/8	1.0
R1/4	2.5
R3/8	3.0
R1/2	3.0

Silencer High noise reduction small bore size resin body type

SLW-*A-H Series

● Port size: R1/4 to R1/2

JIS symbol



RoHS

Specifications

Descriptions	SLW-8A-H	SLW-10A-H	SLW-15A-H
Working fluid	Compressed air		
Max. working pressure MPa	1.0		
Min. working pressure MPa	0		
Withstanding pressure MPa	1.5		
Fluid temperature °C	5 to 60 (no freezing Note2)		
Ambient temperature °C	-10 to 60 (no freezing)		
Port size R	1/4	3/8	1/2
Product weight g	7.5	15	21
Applicable cylinder bore size mm	ø32 to ø80	ø50 to ø100	ø50 to ø100
Damping effect dB [A]	40 and over		
Flow Note 1 ℓ/min. (ANR)	1000	2000	3250
Effective sectional area mm^2	15	30	50

Note 1: Flow rate is the atmospheric pressure conversion value at pressure 0.5MPa.
Note 2: Freezing could occur by adiabatic expansion depending on air quality (dew point).

How to order

SLW – 8A – H

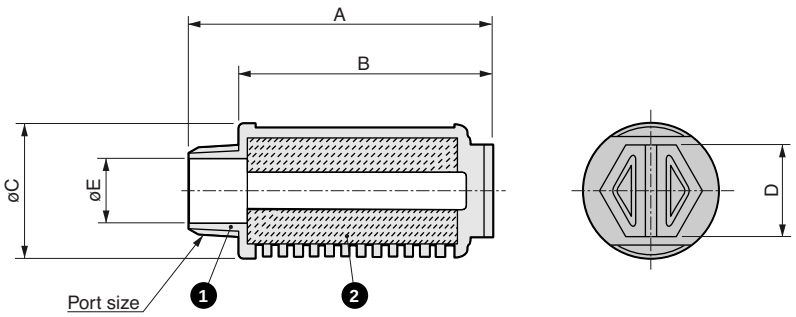
Ⓐ Port size	
8A	R1/4
10A	R3/8
15A	R1/2

Safety Precautions

● Use tightening torque as strong as human hand and do not apply a lateral load.
(Refer to the table below for tightening torque.)

Thread size	Tightening torque (N·m)
R1/4	2.5
R3/8	3.0
R1/2	3.0

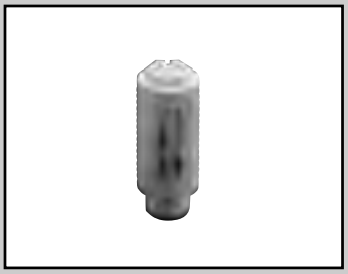
Internal structure and parts list / dimensions



No.	Parts name	Material	Color
1	Body	Polyamide resin (flame resistant resin *)	White
2	Element	PP sintering resin	Light yellow

* Equivalent to UL94 standards V-O

Model no.	A	B	C	D	E	Port size
SLW-8A-H	44.5	36	20	13	8.5	R1/4
SLW-10A-H	58.5	48.5	25.5	17	12	R3/8
SLW-15A-H	71.4	58.4	28	19	15	R1/2

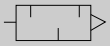


Silencer Large flow rate small bore size resin body type

SLW-*L Series

● Port size: R1/4, R3/8

JIS symbol



RoHS

Specifications

Descriptions		SLW-8L	SLW-10L
Working fluid		Compressed air	
Max. working pressure	MPa	1.0	
Min. working pressure	MPa	0	
Withstanding pressure	MPa	1.5	
Fluid temperature	°C	5 to 60 (no freezing Note2)	
Ambient temperature	°C	-10 to 60 (no freezing)	
Port size	R	1/4	3/8
Product weight	g	15	19.5
Applicable cylinder bore size	mm	ø32 to ø80	ø50 to ø100
Damping effect	dB [A]	30 and over	
Flow Note 1	ℓ/min. (ANR)	2000	4000
Effective sectional area	mm^2	30	60

Note 1: Flow rate is the atmospheric pressure conversion value at pressure 0.5MPa.
Note 2: Freezing could occur by adiabatic expansion depending on air quality (dew point).

How to order

SLW – 8L

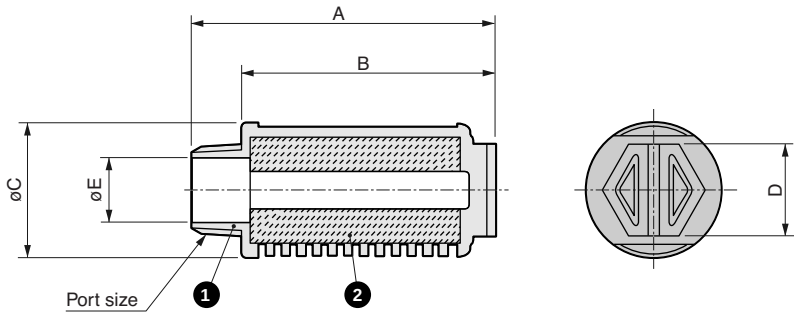
Ⓐ Port size	
8L	R1/4
10L	R3/8

Safety Precautions

● Use tightening torque as strong as human hand. (Refer to the table below for tightening torque.)

Thread size	Tightening torque (N·m)
R1/4	2.5
R3/8	3.0

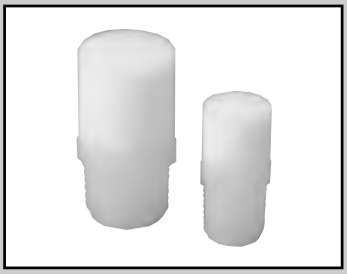
Internal structure and parts list / dimensions



No.	Parts name	Material	Color
1	Body	Polyamide resin (flame resistant resin*)	White
2	Element	PP sintering resin	White

* Equivalent to UL94 standards V-O

Model no.	A	B	C	D	E	Port size
SLW-8L	57.4	48.5	25.5	17	8.5	R1/4
SLW-10L	68.2	58.4	28	19	12	R3/8

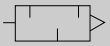


Silencer High noise reduction compact type

SLW-6S/8S Series

Compact type, light weight, damping effect 25dB(A) and over

JIS symbol



RoHS CAD

Specifications

Descriptions	SLW-6S	SLW-8S
Working fluid	Compressed air	
Max. working pressure MPa	1.0	
Min. working pressure MPa	0	
Withstanding pressure MPa	1.5	
Fluid temperature °C	5 to 60 (no freezing Note2)	
Ambient temperature °C	-10 to 60 (no freezing)	
Port size R	1/8	1/4
Product weight g	1.0	2.0
Applicable cylinder bore size mm	ø20 to ø80	ø32 to ø80
Damping effect dB [A]	25 and over	28 and over
Flow Note 1) ℓ/min. (ANR)	800	1900
Effective sectional area mm^2	12	30

Note 1: Flow rate is the atmospheric pressure conversion value at pressure 0.5MPa.
Note 2: Freezing could occur by adiabatic expansion depending on air quality (dew point).

How to order

SLW – 8 S

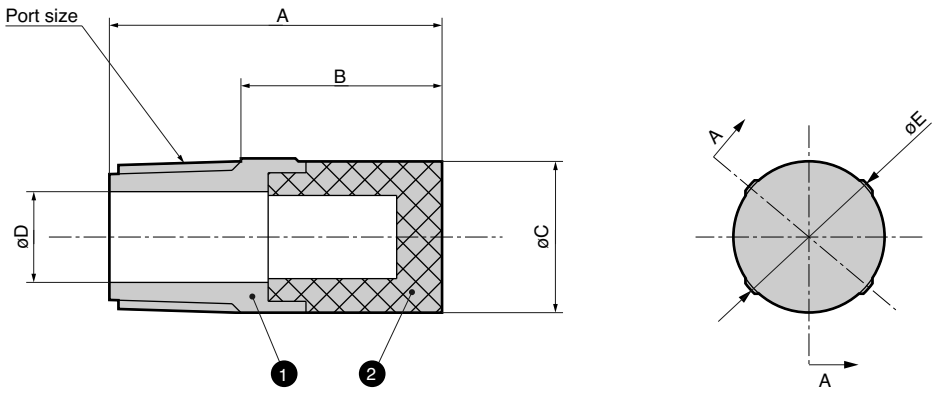
Ⓐ Port size	
6	R1/8
8	R1/4

Safety precautions

Using tightening torque as strong as human hand.
(Refer to the table below for tightening torque.)

Thread size	Tightening torque (N·m)
R1/8	0.1 to 0.15
R1/4	0.15 to 0.25

Dimensions and internal structure CAD



Cross section A-A

No.	Parts name	Material	Color
1	Body	PP	White
2	Element	PP sintering resin	White

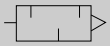
Model no.	Port size	A	B	C	D	E
SLW-6S	R1/8	22	13.3	10.5	6	10.5
SLW-8S	R1/4	28	19	14.8	9	15.4

Silencer High noise reduction compact type

SLW-20S Series

Compact type, damping effect 30dB (A) and over

JIS symbol



RoHS

Specifications

Descriptions	SLW-20S
Working fluid	Compressed air
Max. working pressure MPa	1.0
Min. working pressure MPa	0
Withstanding pressure MPa	1.5
Fluid temperature °C	5 to 60 (no freezing Note2)
Ambient temperature °C	-10 to 60 (no freezing)
Port size R	3/4
Product weight g	20
Applicable cylinder bore size mm	ø100 to ø200
Damping effect dB [A]	30 and over
Flow Note 1) ℓ/min. (ANR)	6000
Effective sectional area mm^2	90

Note 1: Flow rate is the atmospheric pressure conversion value at pressure 0.5MPa.
Note 2: Freezing could occur by adiabatic expansion depending on air quality (dew point).

How to order

SLW – 20 S

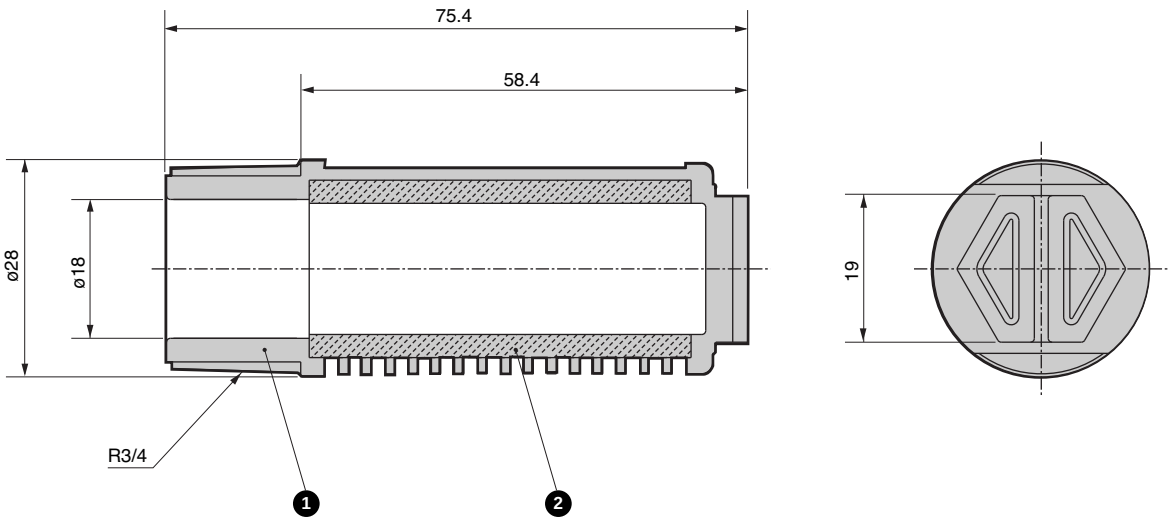
Ⓐ Port size	
20	R3/4

Safety precautions

Using tightening torque as strong as human hand.
(Refer to the table below for tightening torque.)

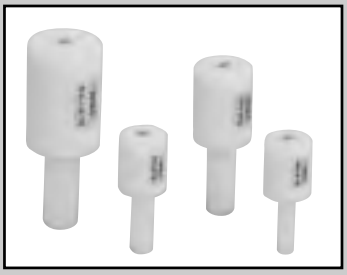
Thread size	Tightening torque (N·m)
R3/4	3.0

Dimensions and internal structure



No.	Parts name	Material	Color
1	Body	Polyamide resin (flame resistant resin*)	White
2	Element	PP sintering resin	White

* Equivalent to UL94 standards V-O

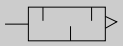


Silencer Push-in type

SLW-H* Series

● Joint port size: ø6, ø8, ø10, ø12

JIS symbol



RoHS

Specifications

Descriptions	SLW-H6	SLW-H8	SLW-H10	SLW-H12
Working fluid	Compressed air			
Max. working pressure MPa	0.7			
Min. working pressure MPa	0			
Withstanding pressure MPa	1.05			
Fluid temperature °C	5 to 60 (no freezing Note 2)			
Ambient temperature °C	-10 to 60 (no freezing)			
Joint port size	ø6	ø8	ø10	ø12
Product weight g	3.5	3.5	6.2	12.5
Damping effect dB (A)	20 and over			
Flow Note1 ℓ/min.	455	550	1135	1655
Effective sectional area mm^2	7	8.5	17.5	25.5

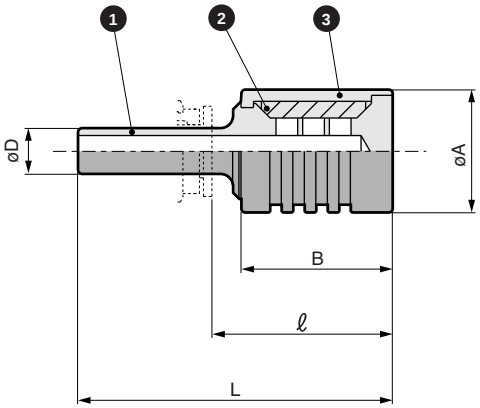
Note 1: Flow rate is the atmospheric pressure conversion value at pressure 0.5MPa.
Note 2: Freezing could occur by adiabatic expansion depending on air quality (dew point).

How to order

SLW - H6

Ⓐ Port size	
H6	ø6
H8	ø8
H10	ø10
H12	ø12

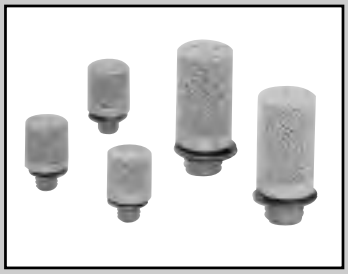
Dimensions and internal structure



No.	Parts name	Material
1	Shaft	Polyamide resin
2	Element	Felt
3	Guard	Polyamide resin

Model no.	A	B	D	L	ℓ*
SLW-H6	16	20	ø6	41	23.5
SLW-H8	16	20	ø8	42	23
SLW-H10	20	27	ø10	53	31.5
SLW-H12	25	37	ø12	66	43

* For connecting joint, dimension of CKD (GW Series) are shown.

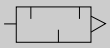


Silencer Miniature type

SLM Series

Compact type, damping effect 20dB (A) and over

JIS symbol



RoHS CAD

Specifications

Descriptions	SLM-M3	SLM-M5
Working fluid	Compressed air	
Max. working pressure MPa	1.0	
Min. working pressure MPa	0	
Withstanding pressure MPa	1.5	
Fluid temperature °C	5 to 60 (no freezing Note2)	
Ambient temperature °C	-10 to 60 (no freezing)	
Port size	M3	M5
Product weight g	1.0	3.0
Applicable cylinder bore size mm	ø6 or less	ø6 to ø15
Damping effect dB [A]	20 and over	
Flow Note 1) ℓ/min. (ANR)	60	350
Effective sectional area mm^2	1	5

Note 1: Flow rate is the atmospheric pressure conversion value at pressure 0.5MPa.
Note 2: Freezing could occur by adiabatic expansion depending on air quality (dew point).

How to order

SLM - M3

Ⓐ Port size

Ⓐ Port size	
M3	M3
M5	M5

Note: Sales unit is 10 pieces/1 bag.

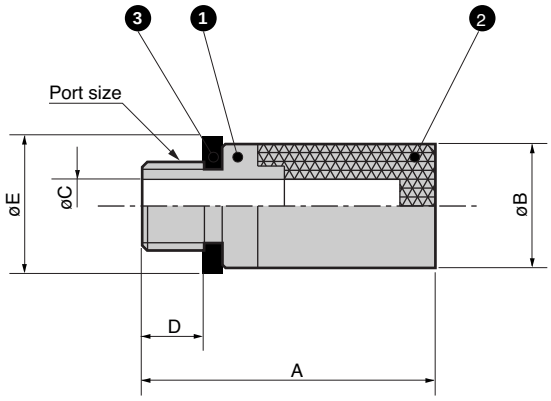
Safety precautions

- Use tightening torque as strong as human hand. (Refer to the table below for tightening torque.)

Thread size	Tightening torque (N·m)
M3	0.1 to 0.15
M5	0.2 to 0.25

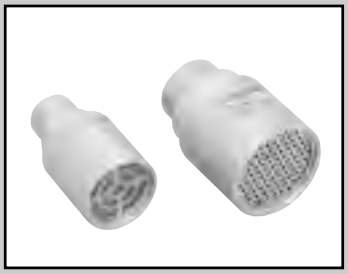
- Avoid use in areas with high vibration or impact. Provide measures against loosening in such areas.

Dimensions and internal structure CAD



No.	Parts name	Material	Color
1	Body	Copper alloy	Silver
2	Element	Bronze sintering body	Silver
3	Gasket	Nitrile rubber + steel	–

Model no.	A	B	C	D	E	Port size
SLM-M3	9	5.5	1.4	2.6	4.9	M3×0.5
SLM-M5	16.5	7	3	3.4	7.8	M5×0.8



Silencer Metal body type

SL Series

● Port size: R1/4 to R2

JIS symbol

RoHS CAD

Features

● SL-8A to 25A has been upgraded, integrating the entire series in a lightweight, compact design.
- Weight ratio (SL-8A to 25A) reduced by 50% or more compared to conventional CKD model

● The replaceable element extends product life.

● The product is eco-friendly.
- Chromate treatment (hexavalent chrome) has been eliminated.
- Paint has been eliminated.
- Segregated disposal is possible.

● Damping effect 20dB (A) and over

Specifications

Descriptions	SL-8A	SL-10A	SL-15A	SL-20A	SL-25A	SL-32A	SL-40A	SL-50A
Working fluid	Air							
Max. working pressure MPa	0.9							
Min. working pressure MPa	0							
Withstanding pressure MPa	1.35							
Fluid temperature °C	5 to 60 (no freezing Note 2)							
Ambient temperature °C	-10 to 60 (no freezing)							
Port size R	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
Product weight g	75	100	105	245	250	500	500	800
Applicable cylinder bore size mm	ø50 to ø100	ø63 to ø140	ø75 to ø180	ø100 to ø250	ø140 to ø250	ø140 to ø450	ø140 to ø450	ø300 to ø450
Damping effect dB [A]	20 and over							
Flow m^3/min. (ANR)	2.4	3.2	4.1	12	14	17	17.5	33
Effective sectional area mm^2	36	48	61	160	210	250	260	500

Note 1: Flow rate is the atmospheric pressure conversion value at pressure 0.5MPa.
Note 2: Freezing could occur by adiabatic expansion depending on air quality (dew point).

How to order

SL - 8A

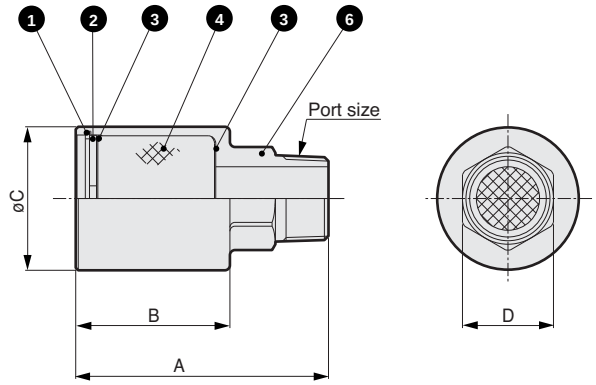
● Element for replacement

SL - 8A - EL

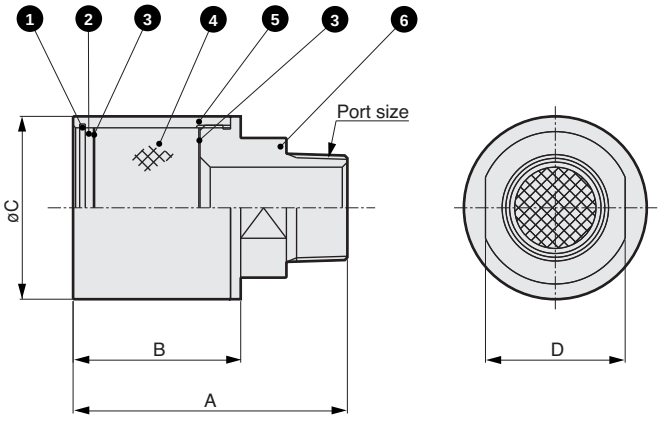
Ⓐ Port size	
8A	R 1/4
10A	R 3/8
15A	R 1/2
20A	R 3/4
25A	R1
32A	R1 1/4
40A	R1 1/2
50A	R2

Dimensions / internal structure and main parts list CAD

● SL-8A to 25A



● SL-32A to 50A



Model no.	Port size	A	B	øC	D
SL-8A	R1/4	64	41	30	17
SL-10A	R3/8	74.5	49.5	36	24
SL-15A	R1/2	77.5	49.5	36	24
SL-20A	R3/4	98	61	56	36
SL-25A	R1	100	61	56	36
SL-32A	R1/4	108	66	72	55
SL-40A	R1/2	108	66	72	55
SL-50A	R2	120	70	89	70

No.	Parts name	Material
1	C type snap ring	Steel (8A to 25A)
		Stainless steel (32A to 50A)
2	Punching metal	Steel
3	Wire net	Stainless steel
4	Element	Vinylidene chloride (8A to 25A)
		Urethane (32A to 50A)
5	Case	Aluminum alloy
6	Body	Aluminum alloy

⚠ Safety Precautions

- Tighten with the appropriate torque when connecting pipes.
- Check that the snap ring does not pop off when removed or attached.
- Assemble the snap ring accurately when replacing the element.
  Parts used inside could pop out and cause problems if assembly is not complete.
- Depending on work, the silencer could clog and reduce exhaust.
  Service the product by replacing the element regularly.
- Silencing values are based on JIS Standards.
  Silencing could vary with the type of circuit and pressure used.

(Recommended tightening torque)

Port thread	Tightening torque N·m
R 1/4	6 to 8
R 3/8	13 to 15
R 1/2	16 to 18
R 3/4	19 to 40
R1	41 to 70
R1 1/4	43 to 75
R1 1/2	45 to 80
R2	47 to 85