

Air Muffler

SL-1
SL-2L
SL-3
SL-4
SL-6
SL-8



A muffler is suitable to remove and mitigate the irritating noise caused by compressed air discharge. A muffler is unrelated to the performance of pneumatic machines.

Specifications

Model No.	Unit	SL-1	SL-2L	SL-3	SL-4	SL-6	SL-8	
Screw thread size	PT	R $\frac{1}{8}$	R $\frac{1}{4}$	R $\frac{3}{8}$	R $\frac{1}{2}$	R $\frac{3}{4}$	R1	
Fluid		Air						
Operating pressure range	MPa	0~1						
Ambient temperature	°C	-5~60						
Silencing effects	dB	20 or more			25 or more			
Weight	g	1	3	15	18	22	30	

Note) When the temperature falls below 5 °C, please provide air dryer to prevent water frozen.

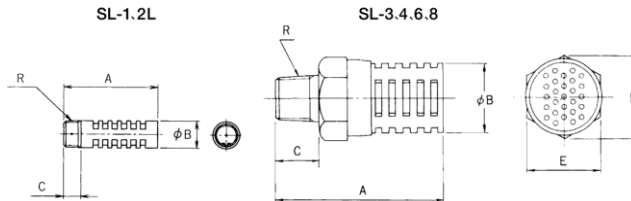
Representation



① Screw thread size

- 1 : R $\frac{1}{8}$
- 2L: R $\frac{1}{4}$ (Long type)
- 3 : R $\frac{3}{8}$
- 4 : R $\frac{1}{2}$
- 6 : R $\frac{3}{4}$
- 8 : R1

Dimensions



Model no.	R	A	Ø B	C	D	E
SL-1	1/8	35	10	6.8	—	—
SL2	1/4	43.5	15	8	—	—
SL-3	3/8	52.5	25	13.5	28	26
SL-4	1/2	57.5	28	16.5	33.5	29
SL6	3/4	62.5	31	18.5	37	32
SL-8	1	68	36	19	43.9	38

(Unit: mm)

Caution

Excessive lateral load force may damage silencer made by synthetic resin.

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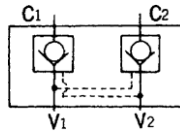
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Permanent Stop

Pilot operated check valve

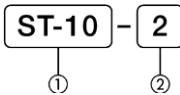
ST-10
Port Rc $\frac{1}{4}$, Rc $\frac{3}{8}$
ST-15
Port Rc $\frac{1}{2}$
ST-25
Port Rc $\frac{3}{4}$, Rc1

JIS Symbol



- Normally, to maintain the piston at the middle of the stroke of the pneumatic cylinder, a closed type solenoid to control would be used. However, minor leakage and the pressure imbalance between solenoid, tubes, and cylinder make such position fixture difficult. Pilot operated check valve can solve this problem.
- Pilot operated check valve is used to connect the cylinder with solenoid to prevent leakage from occurring when pneumatic cylinder is stopped in the middle.

Representation



① Model No.

ST-10
ST-15
ST-25

② Port size

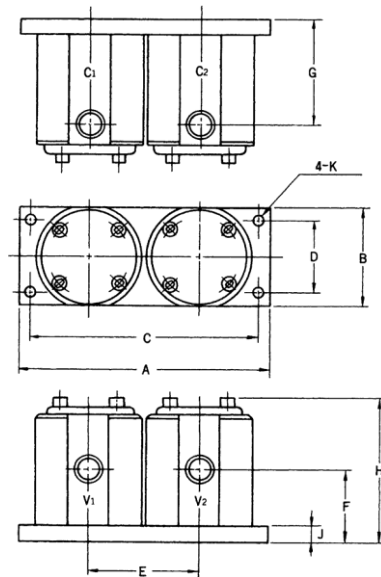
2 : R $\frac{1}{4}$
3 : R $\frac{3}{8}$
4 : R $\frac{1}{2}$
6 : R $\frac{3}{4}$
8 : R1

Specifications

Model No.	Unit	ST-10	ST-15	ST-25
Port size		Rc $\frac{1}{4}$, $\frac{3}{8}$	Rc $\frac{1}{2}$	Rc $\frac{3}{4}$, 1
Effective area	mm ²	45	70	190
Fluid		Air		
Operating pressure range	MPa	0.15~1		
Ambient temperature	°C	-5~60		
Internal leakage amount	External	0		
	Internal			
Weight	kg	1.3	1.8	3.9

Note) When the temperature falls below 5 °C, please provide air dryer to prevent water frozen.

Dimensions



(Unit: mm)

Model No	A	B	C	D	E	F	G	H	J	K
ST-10	150	60	136	44	66	41	61	84	10	∅ 6.5
ST-15	170	64	150	46	72	45	70	98	12	∅ 8.5
ST-25	210	80	190	60	92	60	98	131	16	∅ 11

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Pilot operated check valve

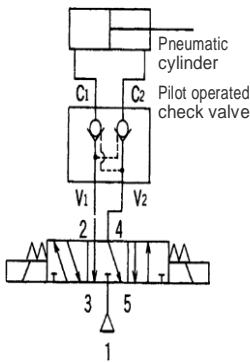


Connection method as well as warning

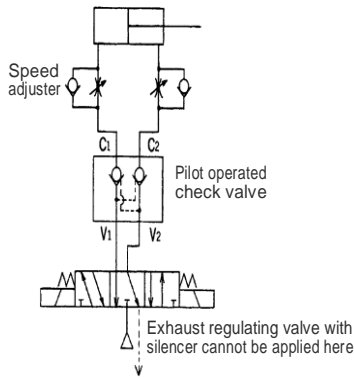
- Connect the port 2, 4 of the solenoid to the port V1, V2 of the pilot operated check valve. Then Connect the port C1, C2 of the tube to the port(s) of the pneumatic cylinder to complete the connection process.
- Use 3-position, PAB connect type solenoid instead of closed type solenoid (please refer to circuit diagram 1)
- Tubes for the pneumatic cylinder and the pilot operated check valve are recommended to be as short as possible; also, be sure that there is no air leakage from the tube.

- If speed adjuster is used, please have it installed in between the pilot operated check valve and the pneumatic cylinder. Avoid using metering valve on the gas exhaust port, otherwise pilot operated check valve may not function properly.
- Do not use metering valve on the port V1, V2 of the pilot operated check valve. Have one of the gas exhaust ports utilises silencer; if both ports are applied with silencer, if there is an obstruction, pneumatic cylinder will fail to keep still at the same position.

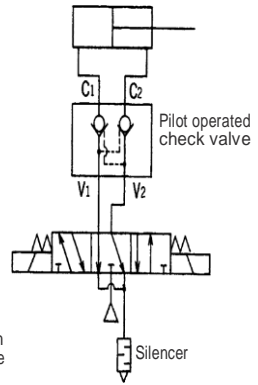
Pic1 Standard application



Pic 2 Speed adjuster application



Pic 3 Silencer application



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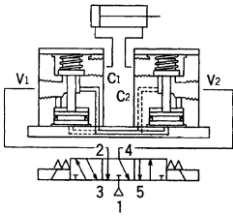
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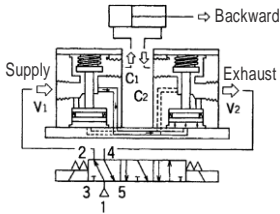
Actuation principle

1. Actuation status after tubing is in place



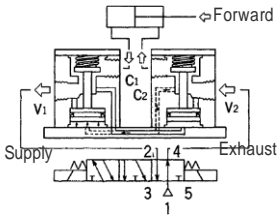
Use PABconnect type solenoid, connect the port 2, 4 of the solenoid to the port V1, V2 of the pilot operated check valve. Then Connect the port C1, C2 of the tube to the port(s) of the pneumatic cylinder to complete the connection process.

2. Pneumatic cylinder axis extend forward



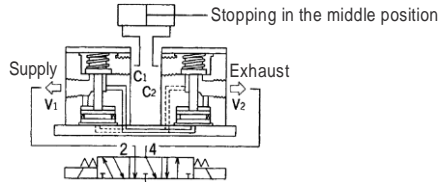
Position of the valve is altered, pneumatic pressure goes from port 1 to port 2, and then to port V1 of the pilot operated check valve. Pneumatic pressure goes through port C1 of the pilot operated check valve and the chamber of the pressurized pneumatic cylinder. Meanwhile, air exhausted from the pneumatic cylinder passes through port C2, V2 of pilot operated check valve and are exhausted from port 5, making the piston in the cylinder move toward the direction of cylinder's frontcap.

3. Pneumatic cylinder axis moves backward



Position of the valve is altered, pneumatic pressure goes from port 1 to port 2, and then to port V1 of the pilot operated check valve. Pneumatic pressure goes through port C1 of the pilot operated check valve and the chamber of the pressurized pneumatic cylinder. Meanwhile, air exhausted from the pneumatic cylinder passes through port C2, V2 of pilot operated check valve and are exhausted from port 5, making the piston in the cylinder move toward the direction of cylinder's front cap.

4. Stopping in the middle position



Acting among 2 and 4, if the position of the valve is set in the middle position, axis will stop in the middle of the stroke. Air passes through port V1, V2 and reaches port 2, 4, and will be exhausted from port 3, 5. Air in C1, C2 is controlled via popper oil seal. Stopping pneumatic cylinder is done by sealing air inside of the pilot operated check valve.

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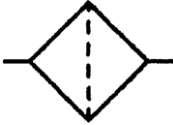
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LF Series

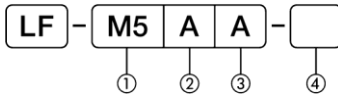
Miniature vacuum filtration

LF-M5A
LF-M5AA
LF-M5AA-A

JIS Symbol



Representation



① Port size

M5: M5x0.8

② Material

A : Acrylic

③ Type

No label : Internal thread

A : External thread

④ Filter cartridge

No label : 60µm

40 : 40µm

Specifications

Model No.	Unit	ST-10	ST-15	ST-25
Fluid		Oil-free air ^(note)		
Port size		M5x0.8		
Operating pressure range	KPa	-100-0		
Ambient temperature	°C	-5-60 ^(note)		
Filter rating	µm	60		
Weight	g	9	9	4

Note) When the temperature falls below 5 °C, please provide air dryer to prevent water frozen.

Caution

Pipe is made of acrylic; keep organic solvent away when using this product to avoid dangers and damages

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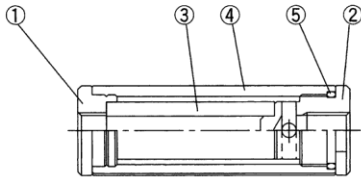
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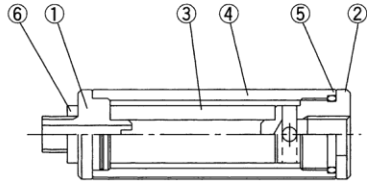
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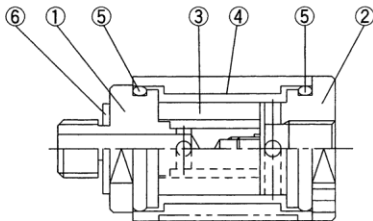
LF-M5A



LF-M5AA



LF-M5AA-A



Main Components

No.	Component Name	Material
1	Body A	Aluminum alloy
2	Body B	Aluminum alloy
3	Filter element	PVF
4	Case	Synthetic resin
5	O-ring	NBR
6	Gasket	NBR
7	Joint for $\varnothing 4$	—
8	Wavy ring	Spring steel

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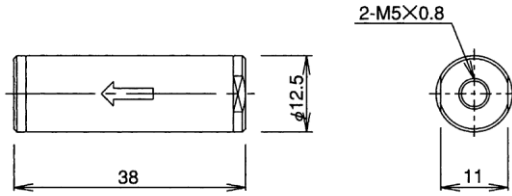
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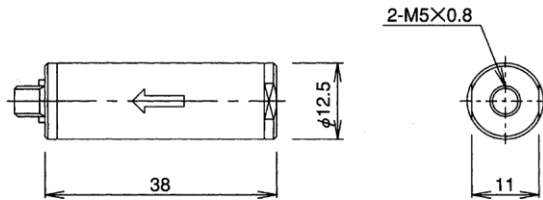
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(Unit: mm)

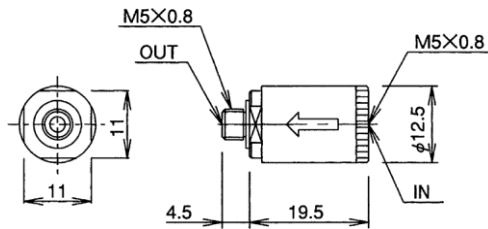
LF-M5A



LF-M5AA



LF-M5AA-A



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Fitting

Tube fitting for speed piping

Order code

FPC **6** - **01G**

① ② ③

① Model

② Piping bore(ϕ D)

	Metric (MM)					
Number	4	6	8	10	12	16
Size	$\phi 4$	$\phi 6$	$\phi 8$	$\phi 10$	$\phi 12$	$\phi 16$

③ Stroke B(mm)

	Metric thread		
Number	M3	M5	M6
Size	M3x0.5	M5x0.8	M6x1.0

	Leaning thread (PT)			
Number	01	02	03	04
Size	PT 1/8	PT 1/4	PT 3/8	PT 1/2

	Perpendicular thread (PF)			
Number	01G	02G	03G	04G
Size	G 1/8	G 1/4	G 3/8	G 1/2

Packaging: 10 unit/bag

- Joint can be used on pneumatic piping (can be used under water with certain restriction)
- Joints may be applied versatilely with corresponding pneumatic piping in different kind of circumstances
- Angles of the joints may be freely adjusted even upon installation

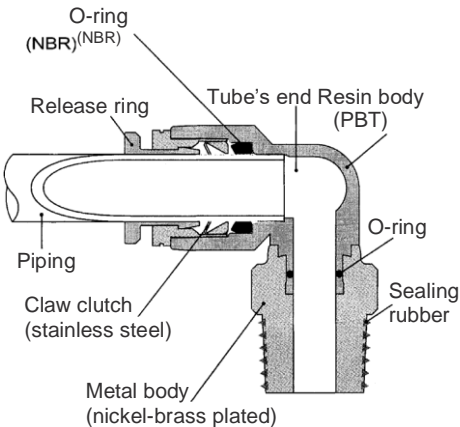
Specifications

Fluid	Air, vacuum, water *(restriction)
Operating pressure range	0~9 kgf/cm ² (0~900 kpa)
Operating vacuum pressure	-750 mmHg(10 Torr)
Operating temperature range	0~60°C

Restriction for under-water usage

- Operating temperature within 0~60°C
- Operating pressure within 0~3.2 kgf/cm²
- Be sure that the piping and the joint are well-connected.

Structure



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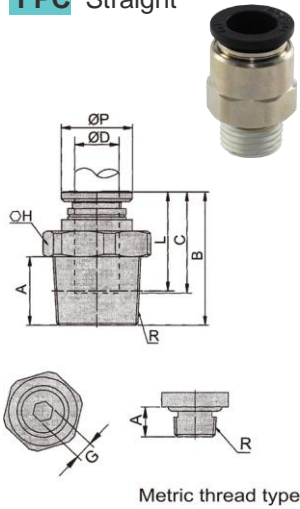
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Tube Fitting(Black)

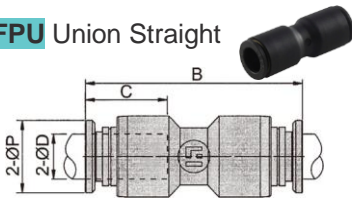
(Unit: m/m)

FPC Straight



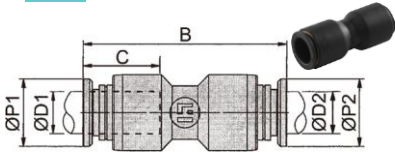
Model	Tube dia. Ø D	Ø P	A	R	H	L	C	B	G	Weight	Orifice	
FPC4-M5	4	8	3.5	M5x0.8	8	12.4	15.9	17.6	3	3.2	3	
FPC4-M6			3.9	M6x1.0	10		12.5	18.1	3	4.6	3	
FPC4-01			7	PT 1/8	10		12.8	16.3	3	5.6	3	
FPC4-02			9.6	PT 1/4	14		12.9	17.7	3	12.8	3	
FPC6-M5	6	10	3.5	M5x0.8	8	14.2	17.6	19.4	2	4.6	2	
FPC6-M6			3.7	M6x1.0	10		14.3	18.5	3	4.8	3	
FPC6-01			7	PT 1/8	10		15.8	19.3	4	5.6	4	
FPC6-02			9.6	PT 1/4	14		13.9	18.7	4	11.6	4	
FPC6-03	6	10	9.6	PT 3/8	17	18.5	14.9	19.7	4	22.8	4	
FPC8-01			7	PT 1/8	14		24	27.5	5	12	5	
FPC8-02			9.6	PT 1/4	14		20.3	24.2	6	13.2	6	
FPC8-03			9.6	PT 3/8	17		19.4	24.2	6	22.2	6	
FPC8-04	8	13.6	12	PT 1/2	21	20.6	19.2	25.2	6	40.4	6	
FPC10-01			7	PT 1/8	17		26.1	29.6	5	19.4	5	
FPC10-02			9.6	PT 1/4	17		20.3	24.3	7	20	7	
FPC10-03			9.6	PT 3/8	17		15.7	21	25.8	8	21.2	8
FPC10-04	10	16.7	12	PT 1/2	21	20.6	19.9	25.9	8	37	8	
FPC12-02			9.6	PT 1/4	21		30	34.8	—	35	7	
FPC12-03			9.6	PT 3/8	21		23.2	27.4	32.2	—	32.4	9
FPC12-04			12	PT 1/2	21		26.2	32.2	—	40.2	9	

FPU Union Straight



Model	Tube dia. Ø D	C	B	Ø P	Weight	Orifice
FPU4	4	13.2	27.8	8	2.6	3.3
FPU6	6	13.8	30.4	10	4.2	4.7
FPU8	8	19	39	13.6	8.2	6.7
FPU10	10	20.4	42.8	16.7	13.6	8.5
FPU12	12	22.6	47	19.6	18.8	10.5

FPG Different Diam. Union Straight



Model	Tube dia. Ø D1	Tube dia. Ø D2	C	B	Ø P1	Ø P2	Weight	Orifice
FPU6-4	6	4	13.2	27.8	10	8	2.6	3
FPU8-6	8	6	13.8	30.4	13.6	10	4.2	4.5
FPU10-8	10	8	19	39	16.7	13.6	8.2	6
FPU12-10	12	10	20.4	42.8	19.6	16.7	13.6	8.5

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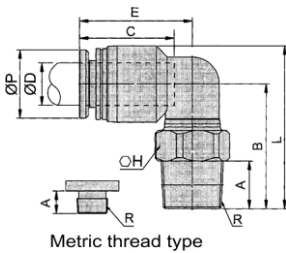
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Tube Fitting(Black)

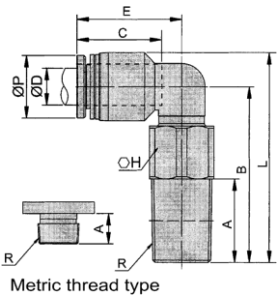
(Unit: m/m)

FPL Elbow



Model	Tube dia. Ø D	A	B	L	Ø P	C	E	H	R	Weight	Orifice
FPL4-M3	4	3	13.6	17	8	13.7	15.5	8	M3x0.5	3	1.1
FPL4-M5		4	13.3	17		13.7	15.5	8	M5x0.8	3.2	2
FPL4-M6		4	16.2	20.5		13.7	15.5	10	M6x1.0	4.6	2.5
FPL4-01		9.6	20	24		13.7	15.5	10	PT 1/8	6.4	4
FPL4-02		7	17.2	21		13.7	15.5	14	PT 1/4	15.2	4
FPL6-M5	6	4	14.1	19	10	13.8	16.2	8	M5x0.8	4	2
FPL6-M6		4	15.7	20.6		13.8	16.5	10	M6x1.0	5.4	2.5
FPL6-01		7	18.3	23		13.9	16.5	10	PT 1/8	7.4	4
FPL6-02		9.4	21.1	26		14	15.7	14	PT 1/4	16.2	4
FPL6-03	9.8	21.2	26	14	16.1	17	PT 3/8	19.6	4		
FPL8-01	8	7	21.5	28	13.6	20.2	22.6	10	PT 1/8	9.8	5.4
FPL8-02		9.5	22	28.5		20	22.5	14	PT 1/4	16	5.4
FPL8-03		9.3	22.3	29		20.1	22.5	17	PT 3/8	20.6	5.4
FPL10-04	10	11.8	25.2	31.5	16.7	20.1	22.3	21	PT 1/2	33.8	5.4
FPL10-01		6.9	23	31		24.3	27.7	10	PT 1/8	17	5
FPL10-02		9.6	25.2	33		24.1	27.6	14	PT 1/4	18.4	5
FPL10-03		9.4	24.9	33		24.2	27.6	17	PT 3/8	23.6	5
FPL10-04		12	27	35		24.3	27.5	21	PT 1/2	34.8	5
FPL12-02	12	12	23.2	32.5	19.6	24.7	28.2	14	PT 1/4	21.4	5
FPL12-03		9.6	26.6	35		24.9	28.9	17	PT 3/8	26.6	8
FPL12-04		9.6	26	35		25	28.8	21	PT 1/2	37.8	8

FPLL Long Elbow



Model	Tube dia. Ø D	A	B	L	Ø P	C	E	H	R	Orifice
FPLL4-M5	4	3.3	23.2	27.5	8	13.7	15.5	8	M5x0.8	2
FPLL4-01		13.5	28.4	32.7		13.7	15.5	10	PT 1/8	4
FPLL4-02		16.1	31.6	35.9		13.7	15.5	14	PT 1/4	4
FPLL6-M5	6	3.3	24.5	30.1	10	13.8	16.2	8	M5x0.8	2
FPLL6-01		13.5	29.7	35.3		13.9	16.5	10	PT 1/8	4
FPLL6-02		16.1	32.9	38.5		14	15.7	14	PT 1/4	4
FPLL8-01	8	14.5	37	44.4	13.6	20.2	22.6	10	PT 1/8	5
FPLL8-02		18.1	38.1	45.5		20	22.5	14	PT 1/4	5
FPLL8-03		16.6	37.6	45		20.1	22.5	17	PT 3/8	5
FPLL10-02	10	19.6	45.2	54.2	16.7	24.1	27.6	15	PT 1/4	8
FPLL10-03		19.6	45.3	54.3		24.2	27.6	17	PT 3/8	9.8
FPLL10-04		22	47.6	56.6		24.3	27.5	21	PT 1/2	9.8
FPLL12-02	12	19.6	47	57.3	19.7	24.8	28.9	15	PT 1/4	8
FPLL12-03		19.6	47.1	57.4		24.9	28.9	17	PT 3/8	9.2
FPLL12-04		22	49.4	59.6		25	28.8	21	PT 1/2	9.2

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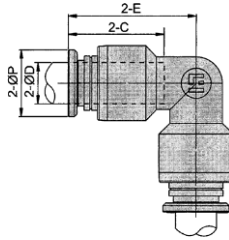
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Tube Fitting(Black)

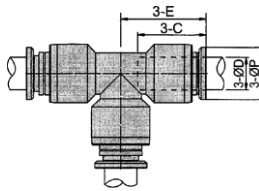
(Unit: m/m)

FPV Union Elbow



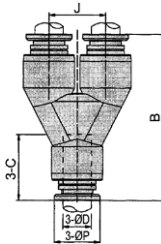
Model	Tube dia. Ø D	E	C	Ø P	Weight	Orifice
FPV4	4	15.5	8	8	2.6	4.1
FPV6	6	19.3	14	10	4.4	4.7
FPV8	8	23	18.8	13.6	8.4	6.6
FPV10	10	25.6	20.6	16.7	14.2	8.5
FPV12	12	30.3	22.8	19.6	20.2	10.5

FPE Union Tee



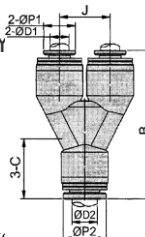
Model	Tube dia. Ø D	E	C	Ø P	Weight	Orifice
FPE4	4	15.5	12.5	8	3.8	4.1
FPE6	6	16.3	13.1	10	6.4	6.1
FPE8	8	23	18.8	13.6	12.4	8.2
FPE10	10	26.2	19.6	16.7	20.8	10.3
FPE12	12	30.1	22.5	19.6	29	12.2

FPY Union Y



Model	Tube dia. Ø D	C	J	B	Ø P	Weight	Orifice
FPY4	4	18.2	9	31.5	8	8	4
FPY6	6	21.9	12	36.2	10	10	7
FPY8	8	27	15.5	46.8	13.6	13.6	13.8
FPY10	10	32.6	19	52.9	16.7	16.7	22.4
FPY12	12	38.4	21	61	19.6	19.6	31.6

FPW Different Dia. Union Y



Model	Tube dia. Ø D1	Tube dia. Ø D2	C	J	B	Ø P1	Ø P2	Orifice
FPW6-4	4	6	13.9	12.3	35.1	8	10	3
FPW8-6	6	8	18	16	46.6	10	13.6	4.5
FPW10-8	8	10	20.7	19.3	53.1	13.6	16.7	6
FPW12-10	10	12	23.5	22.1	62.2	16.7	19.6	8.5

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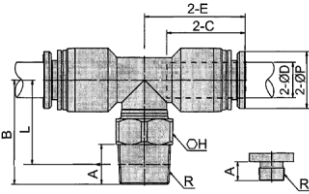
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Tube Fitting(Black)

(Unit: m/m)

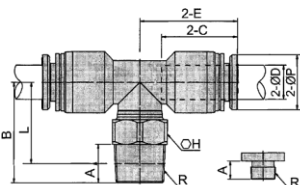
FPB Tee



Metric thread type

Model	Tube dia. Ø D	E	C	Ø P	A	R	H	B	L	Weight	Orifice
FPB4-M3	4	15.8	14.2	8	3	M3x0.5	8	15.2	13.7	3.2	1.1
FPB4-M5					4.8	M5x0.8	8	15.7	13.6	4.8	2
FPB4-M6					4	M6x1.0	10	16.2	14.2	4.4	2.5
FPB4-01					7	PT 1/8	10	17.4	13.1	7.6	4.2
FPB4-02					9.6	PT 1/4	14	20	15	16.4	4.2
FPB4-03					9.6	PT 3/8	17	20	15	19.5	4.2
FPB6-M5	6	17.7	13.8	10	4.8	M5x0.8	8	17	15.5	6.6	2
FPB6-M6					4	M6x1.0	10	17.5	15.5	5.3	2.5
FPB6-01					7	PT 1/8	10	18.3	14.6	9.6	4
FPB6-02					9.6	PT 1/4	14	21.6	17	18.4	4
FPB6-03	9.6	PT 3/8	17	21.7	17	21.6	4				
FPB8-01	8	23.2	14.7	13.6	7	PT 1/8	10	21.5	18	13.6	5.4
FPB8-02					7	PT 1/4	10	21.8	18.6	19.8	5.4
FPB8-03					9.6	PT 3/8	14	22.3	17.2	24.6	5.4
FPB8-04					9.6	PT 1/2	17	22.7	18.1	38	5.4
FPB10-01	10	26.8	16	16.7	9.6	PT 1/8	15	22.9	20.7	23.8	5
FPB10-02					9.6	PT 1/4	15	24.7	19.2	25.4	5
FPB10-03					9.6	PT 3/8	17	24.7	19.3	30.4	5
FPB10-04					9.6	PT 1/2	21	27	19.6	42	5
FPB12-02	12	29.9	19.5	19.6	9.6	PT 1/4	15	27.4	21.3	34	8
FPB12-03					9.6	PT 3/8	17	27.4	21.4	36	8
FPB12-04					12	PT 1/2	21	29.4	23.1	47.2	8

FPD Branch Tee



Metric thread type

Model	Tube dia. Ø D	E	C	Ø P	A	R	H	B	L	Weight	Orifice
FPD4-M3	4	15.9	13.2	8	4	M3x0.5	8	16.2	14.2	3.2	1.1
FPD4-M5					3.3	M5x0.8	8	15.5	13.8	4.8	2
FPD4-M6					4	M6x1.0	10	16.2	14.2	4.5	2.5
FPD4-01					7	PT 1/8	10	17.2	13.7	7.6	4
FPD4-02					9.6	PT 1/4	14	20.2	15.2	16.6	4
FPD4-03					9.6	PT 3/8	17	20.2	15.2	19.6	4
FPD6-M5	6	18.1	14.3	10	4.8	M5x0.8	8	16.5	15.7	6.6	2
FPD6-M6					4	M6x1.0	10	17.5	15.5	5.5	2.5
FPD6-01					7	PT 1/8	10	18.4	14.4	9.6	4
FPD6-02					9.6	PT 1/4	14	21.7	16.9	18.2	4
FPD6-03	9.6	PT 3/8	17	21.2	16.8	22	4				
FPD8-01	8	23.3	15.6	13.6	7	PT 1/8	10	21.4	17.5	14	5
FPD8-02					9.6	PT 1/4	14	22.2	16.5	20	5.4
FPD8-03					9.6	PT 3/8	17	22.1	17.9	24.8	5.4
FPD8-04					7	PT 1/2	21	22.2	17.8	38.6	5.4
FPD10-01	10	26.6	17.5	16.7	7	PT 1/8	15	24.7	19.5	24.4	5
FPD10-02					9.6	PT 1/4	15	24.5	19.6	25.8	8
FPD10-03					12	PT 3/8	17	27.5	21.3	30.8	9.76
FPD10-04					12.5	PT 1/2	21	27.5	21.1	42	9.76
FPD12-02	12	31.4	23.5	19.6	9.6	PT 1/4	15	26.5	21.3	31.6	5
FPD12-03					9.6	PT 3/8	17	26.5	21.5	36.6	6.5
FPD12-04					12	PT 1/2	21	26.5	21.7	47.8	6.5

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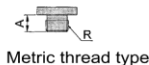
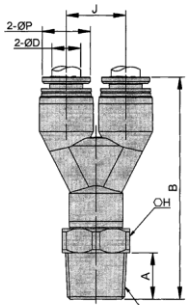
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ADD

Tube Fitting(Black)

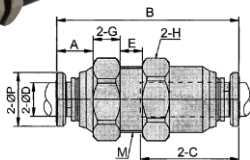
(Unit: m/m)

FPX Branch Y



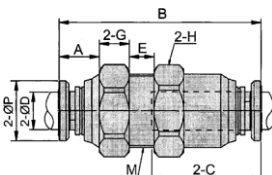
Model	Tube dia. ϕ D	ϕ P	A	R	H	B	J	Orifice
FPX4-M5	4	8	3.5	M5x0.8	10	38.2	9.6	2
FPX4-01			7	PT1/8	10	39.9		2
FPX4-02			9.6	PT1/4	14	43		2
FPX6-M5	6	10	3.5	M5x0.8	12	41.2	12.3	2
FPX6-01			7	PT1/8	12	43.4		4.5
FPX6-02			9.6	PT1/4	14	46		4.5
FPX6-03			9.6	PT3/8	17	46		4.5
FPX8-01	8	13.6	7	PT1/8	15	54.8	16	5
FPX8-02			9.6	PT1/4	15	57.4		6.2
FPX8-03			9.6	PT3/8	17	56.4		6.2
FPX10-02	10	16.7	9.6	PT1/4	19	62.9	19.3	8
FPX10-03			9.6	PT3/8	19	62.9		8
FPX10-04			12	PT1/2	21	65.3		8
FPX12-02			9.6	PT1/4	21	73		8
FPX12-03	12	19.6	9.6	PT3/8	21	73	22.1	10
FPX12-04			12	PT1/2	21	74.5		10

FPM Bulkhead Union



Model	Tube dia. ϕ D	M	A	B	ϕ P	C	E	H	G	Weight	Orifice
FPM4	4	M10x1.0	8.2	26.9	8	12.4	2.4	10	4	8.8	3
FPM6	6	M12x1.0	9.3	30.3	10	14.6	5.4	14	4	9.4	4.8
FPM8	8	M16x1.0	10.4	39.9	13.6	18.7	9	19	4	18.6	6.8
FPM10	10	M20x1.0	11.8	43.8	16.7	20.6	12	24	5	36.6	8.5
FPM12	12	M22x1.0	12.1	48.9	19.6	23.5	15.9	27	5	48.8	10.5

FPMF Bulkhead Female Straight



Model	Tube dia. ϕ D	A	E	G	B	C	M	H	R	Weight	Orifice
FPMF4-01G	4	8	5.9	4	25.2	12.4	M12x1.0	14	G1/8	18.8	3
FPMF6-01G		9	7.8	4	28.8	14.3	M14x1.0	17	G1/8	29.5	4.8
FPMF6-02G	6	10	7.8	4	29.8	14.3	M14x1.0	17	G1/4	29	
FPMF8-01G		8	9	9.8	4	31.6	18.3	M16x1.0	17	G1/8	30.8
FPMF8-02G	10		9.8	4	32.6	18.3	M16x1.0	19	G1/4	38.2	
FPMF8-03G	11		9.8	4	33.6	18.3	M16x1.0	21	G3/8	51.2	
FPMF10-02G	10	10	11.8	5	36	20.9	M20x1.0	21	G1/4	59	8.5
FPMF10-03G		10	11.8	5	36	20.9	M20x1.0	24	G3/8	68	
FPMF12-03G	12	10	13.8	5	38.7	24.3	M22x1.0	24	G3/8	73.1	10.5
FPMF12-04G		14	13.8	5	42.7	24.3	M22x1.0	24	G1/2	71.8	

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FC

Series

Float Coupler



FC Series

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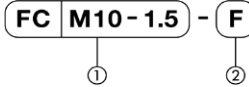
FC Series

Float Coupler

Absorbs lateral load and eccentricity between cylinder and piston rod, making the piston movement smooth.



Ordering Instructions



① Screw size

M3-0.5	: M3x0.5	M12A-1.5	: M12x1.5
M4-0.7	: M4x0.7	M14A-1.5	: M14x1.5
M5-0.8	: M5x0.8	M18A-1.5	: M18x1.5
M6-1	: M6x1	M22A-1.5	: M22x1.5
M8-1.25	: M8x1.25	M26A-1.5	: M26x1.5
M10-1.25	: M10x1.25	M30-1.5	: M30x1.5
M10-1.5	: M10x1.5	M40-1.5	: M40x1.5
M12A-1.25	: M12x1.25	M45A-1.5	: M45x1.5

② Mounting

- No symbol : Basic type
- F : Flange type
- L : Foot type

Note: FCM3-5 is for basic type only.

Specifications

Model No.	Unit	FCM3-0.5	FCM4-0.7	FCM5-0.8	FCM6-1	FCM8-1.25	FCM10-1.25	FCM10-1.5	FCM12A-1.25
Screw size		M3x0.5	M4x0.7	M5x0.8	M6x1	M8x1.25	M10x1.25	M10x1.5	M12x1.25
Temperature range	°C	-10-60							
Allowable oscillating angle	degree	±5							
Allowable eccentricity	mm	0.5	0.5	0.5	0.75	0.75	0.75	0.75	0.75
Max. working tensile /compressive force	kN	0.019	0.053	0.121	1.08	1.08	2.45	2.45	2.45
Mounting		Basic type				Basic type, Flange type, Foot type			

Model No.	Unit	FCM12A-1.5	FCM14A-1.5	FCM18A-1.5	FCM22A-1.5	FCM26A-1.5	FCM30-1.5	FCM40-1.5	FCM45-1.5
Screw size		M12x1.5	M14x1.5	M18x1.5	M22x1.5	M26x1.5	M30x1.5	M40x1.5	M45x1.5
Temperature range	°C	-10-60							
Allowable oscillating angle	degree	±5							
Allowable eccentricity	mm	0.75	1.0	1.5	2.0	3.0	3.0	4.0	4.0
Max. working tensile /compressive force	kN	2.45	5.88	10.8	17.6	27.5	60.8	87.3	108
Mounting		Basic type, Flange type, Foot type							

Note: FCM40 and 45: made to order

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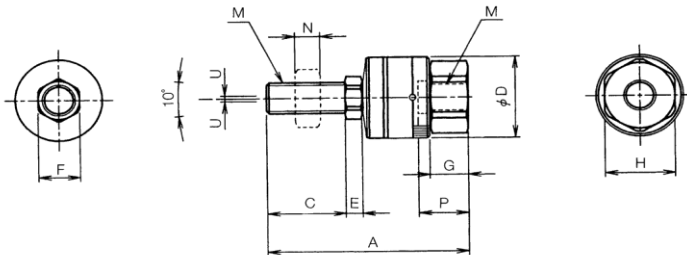
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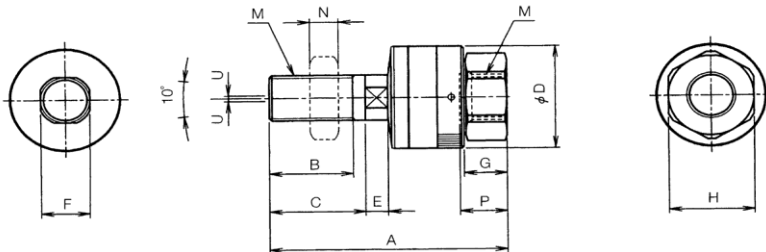
Basic Type

(Unit: mm)

FCM3~10, FCM40~45



FCM12A~30



Model No.	M(Screw)	A	B	C	D	E	F	G	H	N	P	Mass(kg)
FCM3-0.5	M3x0.5	23	—	8.5	12	2.5	5.5	2.5	11	1.8	4.5	0.01
FCM4-0.7	M4x0.7	26	—	10.3	12	3.5	5.5	2.5	11	2.4	5	0.01
FCM5-0.8	M5x0.8	32	—	12.2	15.5	4	7	3.5	14	3.2	5.5	0.02
FCM6-1	M6x1	45	—	16	21	4	10	9	17	4	12	0.06
FCM8-1.25	M8x1.25	48	—	19	21	4	10	9	17	6	12	0.06
FCM10-1.25	M10x1.25	56	—	22	24	7	12	10	19	7	12	0.09
FCM10-1.5	M10x1.5	56	—	22	24	7	12	10	19	7	12	0.09
FCM12A-1.25	M12x1.25	58	20.5	23.5	27	6	12	10	21	7	11.5	0.12
FCM12A-1.5	M12x1.5	58	20.5	23.5	27	6	12	10	21	8	11.5	0.12
FCM14A-1.5	M14x1.5	67	20	22	32	7	14	13	27	8	16.5	0.22
FCM18A-1.5	M18x1.5	85	26	29.5	43	11	18	14	27	11	16.5	0.41
FCM22A-1.5	M22x1.5	103	31	34	53	14	22	17	32	13	17	0.75
FCM26A-1.5	M26x1.5	122	39	42	69	15	26	20	41	16	20.5	1.5
FCM30-1.5	M30x1.5	146	47	50	90	16	30	21	46	18	24	3.1
FCM40-1.5	M40x1.5	171	—	64	108	16	60	22	55	24	26	4.7
FCM45-1.5	M45x1.5	200	—	72	118	18	70	24	60	27	36	7.0

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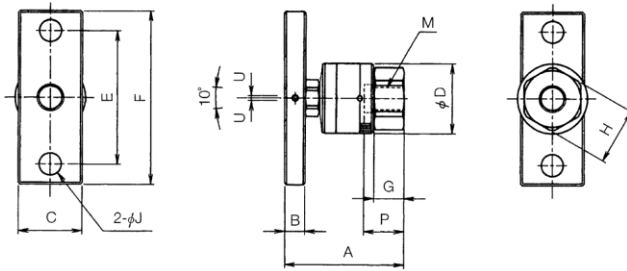
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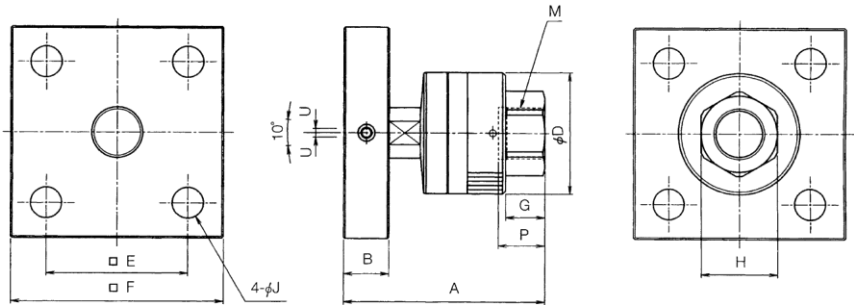
Flange Type

(Unit: mm)

FCM8~14A



FCM18A~45



Model No.	M(Screw)	A	B	C	D	E	F	G	H	J	P	Mass(kg)
FCM8-1.25	M8x1.25	35	6	19	21	40	52	9	17	6.6	12	0.11
FCM10-1.25	M10x1.25	43	9	25	24	44	56	10	19	6.6	12	0.18
FCM10-1.5	M10x1.5	43	9	25	24	44	56	10	19	6.6	12	0.18
FCM12A-1.25	M12x1.25	43	9	25	27	44	56	10	21	6.6	11.5	0.19
FCM12A-1.5	M12x1.5	43	9	25	27	44	56	10	21	6.6	11.5	0.19
FCM14A-1.5	M14x1.5	56	12	32	32	60	80	13	27	11	16.5	0.56
FCM18A-1.5	M18x1.5	71.5	16	—	43	50	75	14	27	11	16.5	1.1
FCM22A-1.5	M22x1.5	88	19	—	53	62	100	17	32	14	17	1.9
FCM26A-1.5	M26x1.5	102	22	—	69	70	100	20	41	14	20.5	2.8
FCM30-1.5	M30x1.5	121	25	—	90	90	123	21	46	18	24	5.6
FCM40-1.5	M40x1.5	135	29	—	108	114	150	22	55	22	26	9.3
FCM45-1.5	M45x1.5	159	32	—	118	132	175	24	60	26	36	13.4

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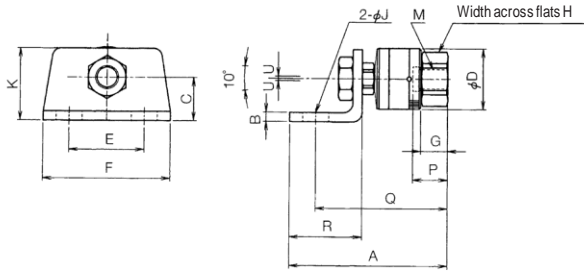
Fax : + 603 - 8023 9743

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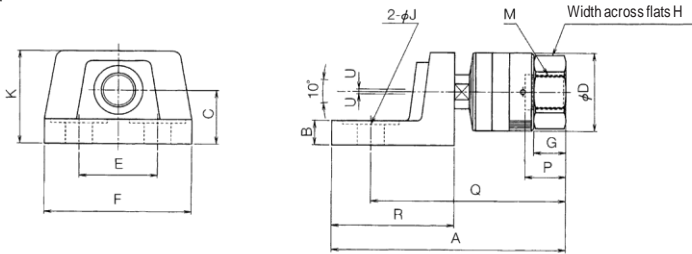
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FC Series

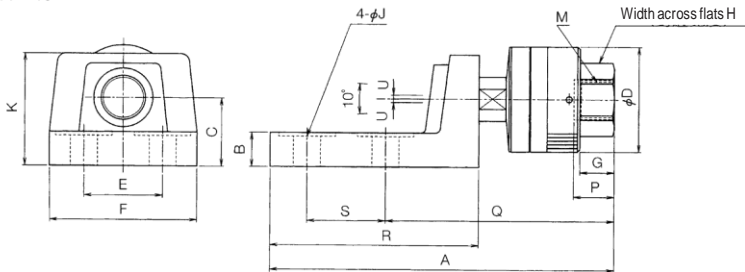
FCM8~12A



FCM14A



FCM18A~45



Model No.	M(Screw)	A	B	C	D	E	F	G	H	J	K	P	Q	R	S	Mass(kg)
FCM8-1.25	M8x1.25	54	3	15	21	26	44	9	17	9	25	12	45	25	—	0.1
FCM10-1.25	M10x1.25	64	5	19	24	26	44	10	19	9	32	12	53	30	—	0.18
FCM10-1.5	M10x1.5	64	5	19	24	26	44	10	19	9	32	12	53	30	—	0.18
FCM12A-1.25	M12x1.25	64	5	19	27	26	44	10	21	9	32	11.5	54	30	—	0.19
FCM12A-1.5	M12x1.5	64	5	19	27	26	44	10	21	9	32	11.5	54	30	—	0.19
FCM14A-1.5	M14x1.5	94	10	22	32	32	60	13	27	11	38	16.5	78	50	—	0.43
FCM18A-1.5	M18x1.5	140.5	14	28	43	32	60	14	27	11	46	16.5	93.5	85	32	1.1
FCM22A-1.5	M22x1.5	164	19	35	53	36	68	17	32	14	56	17	111	95	36	2.1
FCM26A-1.5	M26x1.5	180	24	42	69	36	68	20	41	14	64	20.5	127	100	36	2.9
FCM30-1.5	M30x1.5	218	35	55	90	46	82	21	46	18	80	24	153	122	46	5.6
FCM40-1.5	M40x1.5	255	41	67	108	56	100	22	55	22	97	26	177	148	56	8.8
FCM45-1.5	M45x1.5	294	41	70	118	66	125	24	60	26	103	36	203	166	66	13.2

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Z, H Series

Flow control valve

SP

Straight type

SPE

Elbow type

SPF

Flat type

SPER

Universal elbow type

SPSR

Universal type

SPR

Universal type

(Air inlet specifications)



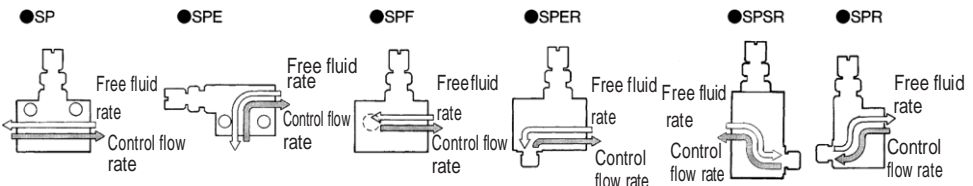
Specifications

Model No.	Unit	SP-Z-M3	SPER-Z-M3	SPSR-Z-M3	SPR-Z-M3N
Port size		M3x0.5			
Effective area	mm ²	0.4			
Cv value (fully open)		0.022			
Fluid		Air			
Operating pressure range	MPa	0~0.8			
Ambient temperature	°C	-5~60			
Weight	g	3	4	5	4

Model No.	Unit	SP-H-M5	SPE-H-M5	SPF-H-M5	SPER-H-M5	SPSR-H-M5	SPR-H-M5N
Port size		M5x0.8					
Effective area	mm ²	1					
Cv value (fully open)		0.056					
Fluid		Air					
Operating pressure range	MPa	0~0.8					
Ambient temperature	°C	-5~60					
Weight	g	10	10	15	15	16	15

Note) Effective area: value measured when flow rate of speed controller is fully open. When the temperature falls below 5 °C, please provide air dryer to prevent water frozen.

Control Method



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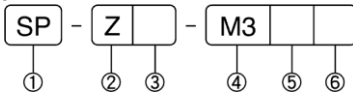
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Representation



① Type

SP : Straight type
 SPE : Elbow type
 SPF : Flat type
 SPER: Universal Elbow type
 SPSR: Universal type
 SPR : Speed type (Air inlet specifications)

② Series

Z: Z series
 H: H series

③ Surface treatment

Without mark : Standard
 S : Electroless nickel plating

④ Port size

M3: M3x0.5
 M5: M5x0.8

⑤ Control method method

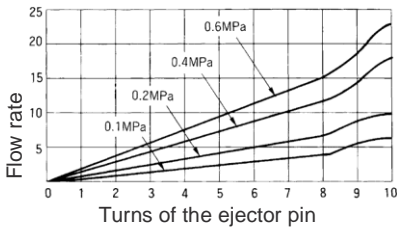
Without mark : Outlet flow control
 N : Inlet flow control
 (Note) Inlet flow control is only available with SPR type

⑥ Special style

Without mark : Standard
 N1 : No oil treatment

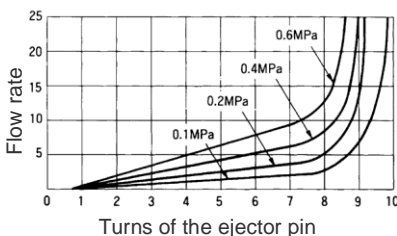
Characteristic of the flow rate

Z $\bar{V}/\text{min}(\text{ANR})$

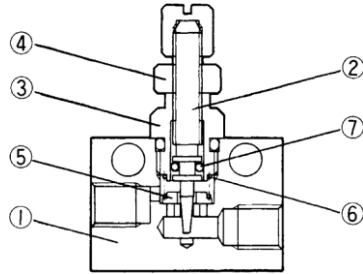


H Series

H $\bar{V}/\text{min}(\text{ANR})$



Structure



Main Components

No.	Component Name
1	Body
2	Ejector pin
3	Top cap
4	Mounting nut
5	Check valve seat
6	Spring
7	O-ring



Caution

Before using speed control valve, please check the flowing direction first.

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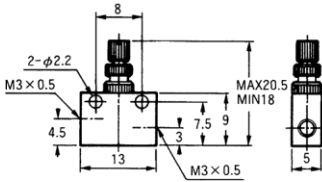
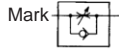
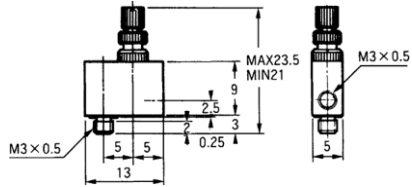
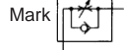
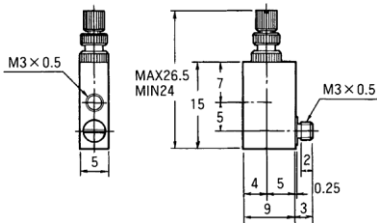
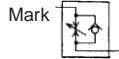
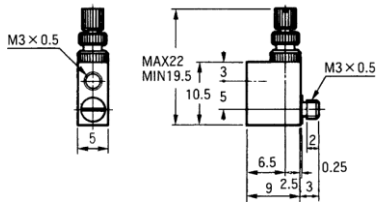
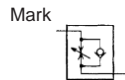
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(Unit: mm)

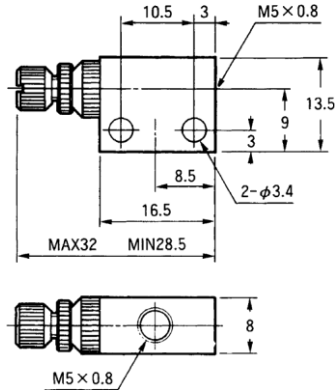
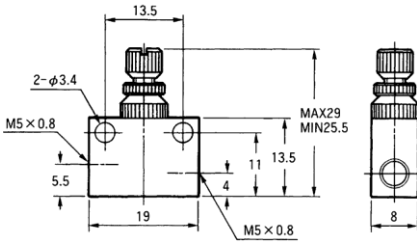
SP-Z-M3**SPSR-Z-M3****SPER-Z-M3****SPR-Z-M3N**

(Unit: mm)

SP-H-M5

Mark  **SPE-H-M5**

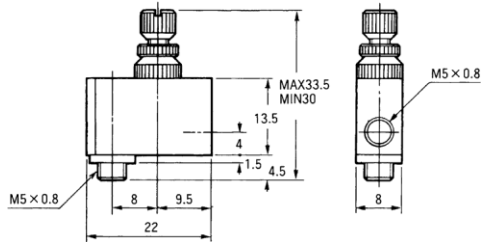
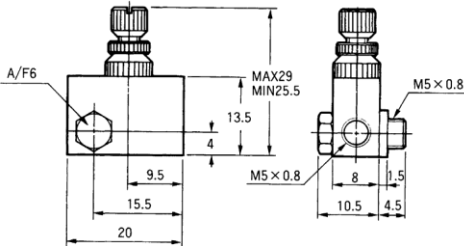
Mark 



SPF-H-M5


Mark  **SPER-H-M5**

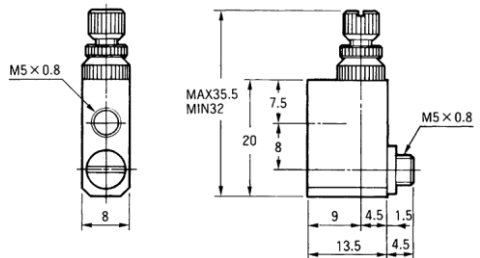
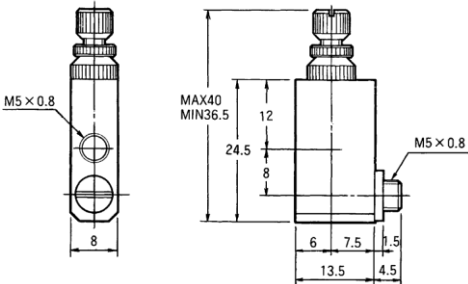
Mark 



SPSR-H-M5

Mark  **SPR-H-M5N**

Mark 



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ADD

06, 10, 15, 20 Series

Speed control valve

SP-06

Straight type

SPE-06

Elbow type

SP-10

Elbow type

SP-15

Straight type

SP-20

Straight type



Specifications

Model No.	Unit	SP-06-1	SP-06-2	SPE-06-1	SPE-06-2	SPE-10-3	SPE-10-34
Port size		Rc $\frac{3}{8}$	Rc $\frac{1}{4}$	R, Rc $\frac{3}{8}$	R, Rc $\frac{1}{4}$	R, Rc $\frac{3}{8}$	Male thread Rc $\frac{1}{2}$ Female thread Rc $\frac{3}{8}$
Effective area	mm ²	14	17	9	12	39	45
Cv value (fully open)		0.78	0.94	0.5	0.67	2.17	2.5
Fluid		Air					
Operating pressure range	MPa	0~1					
Ambient temperature	°C	-5~60					
Weight	g	205	200	84	85	190	195

Model No.	Unit	SP-15-3	SP-15-4	SP-15-46	SP-15-6	SP-20-6	SP-20-8
Port size		Rc $\frac{3}{8}$	Rc $\frac{1}{2}$	Free flow rate Rc $\frac{1}{2}$ Control flow rate Rc $\frac{1}{4}$	Rc $\frac{3}{4}$	Rc $\frac{3}{4}$	Rc1
Effective area	mm ²	64	69	69	70	155	174
Cv value (fully open)		3.56	3.83	3.83	3.89	8.61	9.67
Fluid		Air					
Operating pressure range	MPa	0~1					
Ambient temperature	°C	-5~60					
Weight	g	195	185	173	160	625	600

Note) Effective area: value measured when flow rate of speed controller is fully open.

When the temperature falls below 5 °C, please provide air dryer to prevent water frozen.

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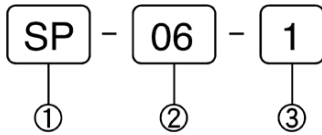
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Representation



① Type

SP : Straight type
SPE : Elbow type

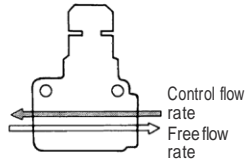
② Series

③ Port size

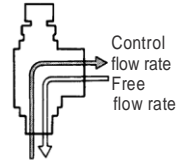
- 1 : R, Rc $\frac{1}{2}$
- 2 : R, Rc $\frac{1}{4}$
- 3 : R, Rc $\frac{3}{8}$
- 34: Male thread Rc $\frac{1}{2}$
Female thread Rc $\frac{3}{8}$
- 4 : Rc $\frac{1}{2}$
- 46: Free flow rate Rc $\frac{1}{2}$
Control flow rate Rc $\frac{3}{8}$
- 6 : Rc $\frac{3}{4}$
- 8 : Rc1

Control Method

●SP-06, 15, 20



●SPE-06, 10



Caution

Before using speed control valve, please check the flowing direction first.

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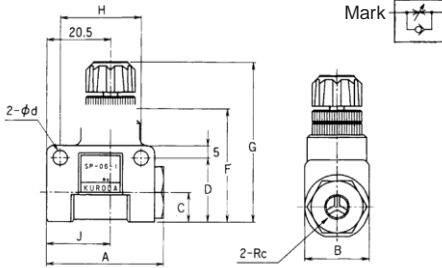
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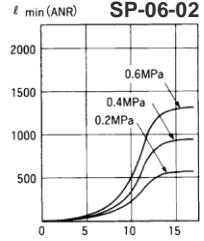
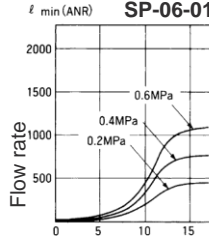
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SP-06

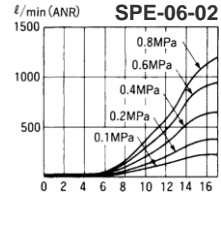
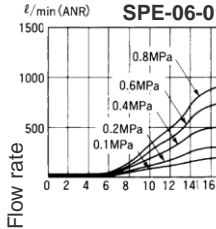


Characteristic of the flow rate

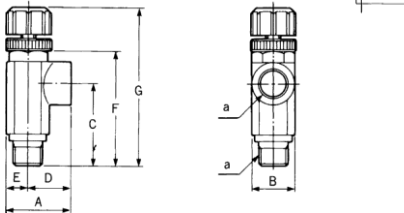


Model No.	A	B	C	D	F	G	H	J	a Rc	d
SP-06-1	47.7	26	13	27	47	MAX74, MIN66	33	26	1/8	6
SP-06-2	47.7	26	13	27	47	MAX74, MIN66	33	26	1/4	6

Turns of the ejector pin

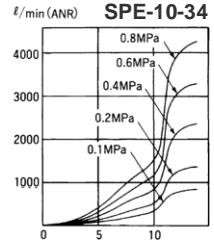
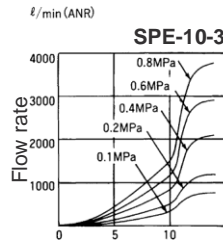


SPE-06

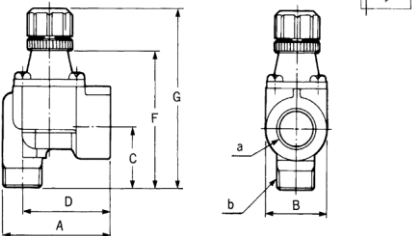


Model No.	A	B	C	D	E	F	G	a R · Rc
SPE-06-1	28.5	19	33.5	19	9.5	47	MAX74.5, MIN66	1/8
SPE-06-2	28.5	19	37.5	19	9.5	51	MAX78.5, MIN70	1/4

Turns of the ejector pin



SPE-10



ModelNo.	A	B	C	D	F	G	a Rc	b Rc
SPE-10-3	47.7	27	26	39	58	MAX83, MIN76	3/8	3/8
SPE-10-34	49.5	27	28	39	60	MAX85, MIN78	3/8	1/2

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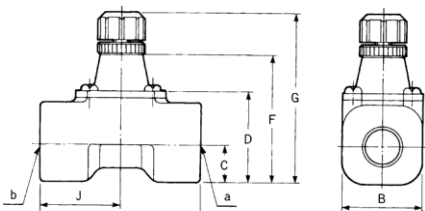
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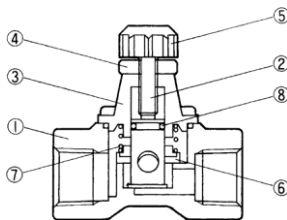
ADD

SP-15

Mark



Structure



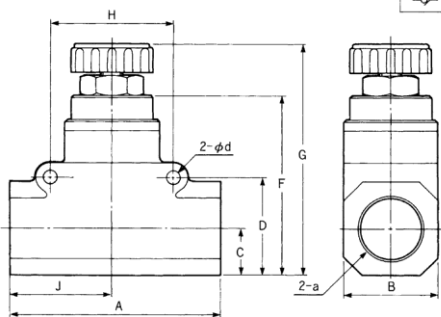
Model No.	A	B	C	D	F	G	J	a Rc	b Rc
SP-15-3	68	34	16	39	55	MAX85, MIN73	34	3/8	3/8
SP-15-4	68	34	16	39	55	MAX85, MIN73	34	1/2	1/2
SP-15-46	68	34	16	39	55	MAX85, MIN73	34	1/2	3/4
SP-15-6	68	34	16	39	55	MAX85, MIN73	34	3/4	3/4

Main Components

No.	Component Name
1	Body
2	Ejector pin
3	Top cap
4	Mounting nut
5	Knob
6	Check valve seat
7	Spring
8	O-ring

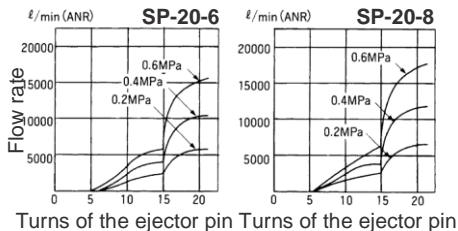
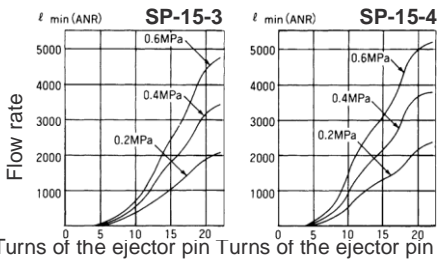
SP-20

Mark



Model No.	A	B	C	D	F	G	H	J	a Rc	d
SP-20-6	103	46	23	48	88	MAX132.5, MIN113.5	60	50	3/4	6.5
SP-20-8	103	46	23	48	88	MAX132.5, MIN113.5	60	50	1	6.5

Characteristic of the flow rate



ADD

Gentle Automatic Solution Sdn Bhd

2H Series

Speed control valve

SP-2H
Straight type
SPE-2H
Elbow type



Specifications

Model No.	Unit	SP-2H-1	SP-2H-2	SPE-2H-1	SPE-2H-2
Port size		Rc $\frac{1}{8}$	Rc $\frac{1}{4}$	R, Rc $\frac{1}{8}$	R, Rc $\frac{1}{4}$
Effective area	mm ²	2.7			
Cv value (fully open)		0.15			
Fluid		Air			
Operating pressure range	MPa	0~1			
Ambient temperature	°C	-5~60			
Weight	g	45	51	52	60

Note) Effective area: value measured when flow rate of speed controller is fully open.
When the temperature falls below 5 °C, please provide air dryer to prevent water frozen.

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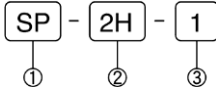
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Representation



① Type

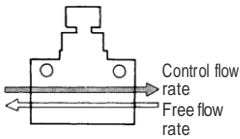
SP : Straight type
SPE : Elbow type

② Portsize

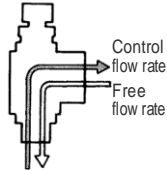
1: R, Rc½
2: R, Rc¾

Control Method

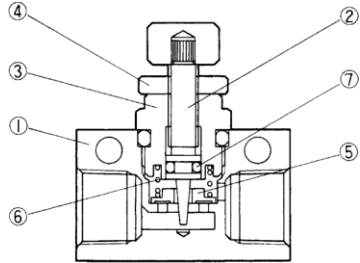
●SP-2H



●SPE-2H



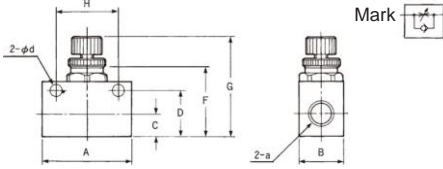
Structure



Main Components

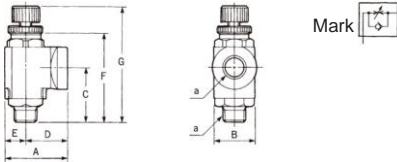
No.	Component Name
1	Body
2	Ejector pin
3	Top cap
4	Mounting nut
5	Check valve seat
6	Spring
7	O-ring

SP-2H



Model No.	A	B	C	D	F	G	H	a Rc	d
SP-2H-1	36	18	9	18.5	28	MAX45, MIN40	25	1/8	4.5
SP-2H-2	36	18	9	18.5	28	MAX45, MIN40	25	1/4	4.5

SPE-2H

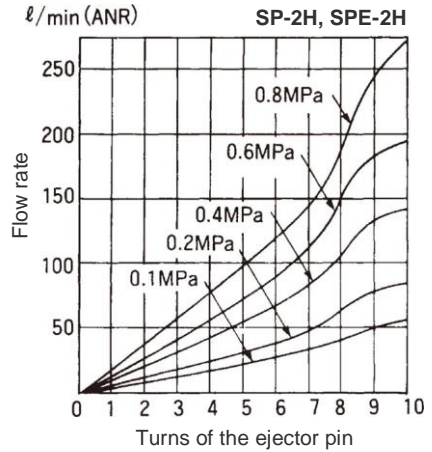


Model No.	A	B	C	D	E	F	G	a Rc
SPE-2H-1	27.5	18	24	18.5	9	39.5	MAX56, MIN51	1/8
SPE-2H-2	27.5	18	28	18.5	9	43.5	MAX60, MIN55	1/4

**Caution**

Before using speed control valve, please check the flowing direction first.

Characteristic of the flow rate



Rotary Joint

RJC-062L
RJH-062M

Specifications

- Assist oil and air supply back to rotating object even under high pressure or high speed.
- Rotary part is made of metal seal, guaranteeing its prolonged usage life as well as durability.
- Rotary torque can be maintained stable under different supply pressures.



Specifications

Model No.		Unit	RJC-062L		RJH-062M	
Port size			RC $\frac{1}{4}$		RC $\frac{1}{4}$	
Fluid			Oil	Air	Oil	
Rated pressure		MPa	3	1	14	
Maximum number of rotations		min ⁻¹	3000		3000	
Flow path		mm	Ø6		Ø2	
Number of flow paths			2		2	
Temperature of fluid applied	Oil	°C	0~60		0~60	
	Air	°C	5~60		5~60	
Allowable pressure discharged		MPa	0.03		0.03	
Rotary torque		N•cm	29.4		29.4	
Internal leakage amount	Oil	With rated pressure	cm ³ /min	4	—	16
	Air	0.1MPa	ℓ/min(ANR)	—	0.4	—
		0.2MPa	ℓ/min(ANR)	—	0.8	—
		0.3MPa	ℓ/min(ANR)	—	1.3	—
		0.4MPa	ℓ/min(ANR)	—	2.0	—
Effective area		mm ²	—	15.7	—	
Weight		kg	1.2		1.6	

Note) Do not alter the product specifications and structure without consultation with FONTAL.

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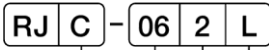
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Representation



①

C : Oil, Air

H : Oil

② Flow path

06 : Ø 6

③ Number of flow paths

1: Both ways

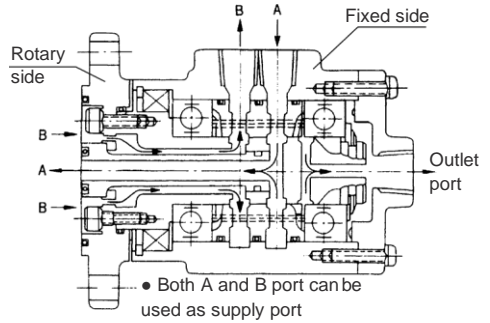
④ Rated pressure

L : Oil 3 MPa

Air 1 MPa

M : Oil 14 MPa

Construction



ADD

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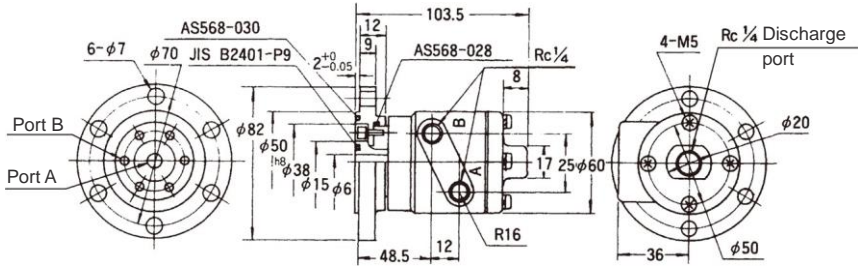
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RJC-062L, RJH-062M

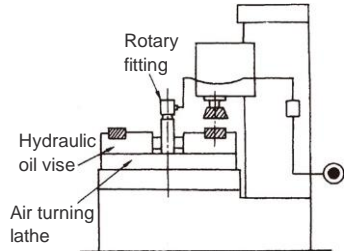
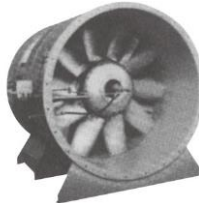
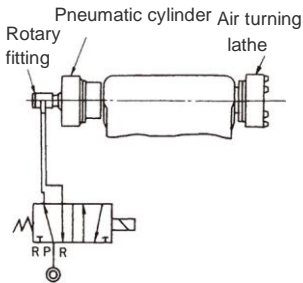
(Unit: mm)



Application

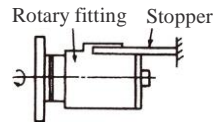
(Unit: mm)

- Air turning lathe of a hydraulic oil lathe
- Fan with variable vanes
- Hydraulic oil supply for the vise of a rotary milling



Warnings

- Flange must be constantly mounted on the rotary side with sufficiently free space.
- Piping applied must be soft tubes rather than steel tubes nor regular tubes.
- Discharge port must be mounted by independent pipes with back pressure below 0.03MPa. If used in an air environment, then such requirement is no longer necessary. In addition, air muffler is strongly recommended to avoid pollutants from entering. Note that air muffler is not compatible with blind plug and must not be used together.
- Because the structure of the rotary part is made of metal seal, a minor degree of internal leakage is inevitable.
- Stopper is used to stop object rotation; its body cannot be mounted.



Rotary fitting mounting (reference)

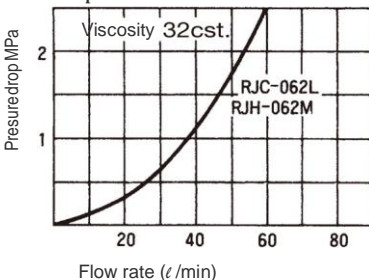
(Unit: mm)

Port B (among range of \varnothing 15 to \varnothing 38, with bore size less than \varnothing 11)

Port A (with bore size less than \varnothing 6)

over

Pressure drop table for actuation in oil



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ADD

Sensor switch

For miniature HI-ROTOR
Adjustable sensor switch

Simultaneously using this sensor switch with PRO series will render a more versatile angle setting.



Ordering Instructions

Sensor switch

FR - 20PRN

①

②

① Sensor switch type

FR : CT-3

FU : CT-3U

② Suitable HI-ROTOR

1PRNA : PRNA1S

3PRNA : PRNA3S

10PRN : PRNA10S

20PRN : PRNA20S

30PRN : PRN30S/D

3PRO : PROA3S

10PRO : PROA10S

20PRO : PROA20S

30PRO : PRO30S/D

Switch

CT-3 R U

①

②

③

① Sensor switch type

CT-3: NPN

② Sensor switch setup

R : Right side

L : Left side

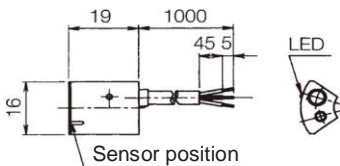
③ Wiring specifications

No mark : Axial

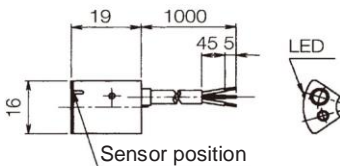
U : Perpendicular

Shapes and sizes of sensor switch (Unit: mm)

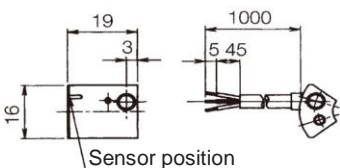
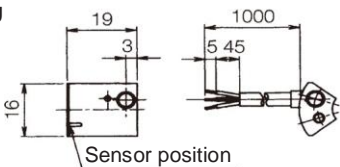
CT-3R



CT-3L



CT-3RU



Specifications

Model No.	Unit	CT-3
Sensor switch type		Proximity switch
Applications		Relay, PLC, IC Circuit
Output mode		NPN
Load voltage	V	DC5 ~ 30
Load current	mA	5 ~ 200
Maximum current consumption	mA	max. 20 (24V) max. 10 (12V) max. 4 (5V)
Maximum leakage current	μm	max. 10
Internal pressure drop	V	1.5
Response time	ms	1
Shock resistance	m/s ²	490
Operating ambient temperature	°C	5~ 60
Protecting class		IP67
Wiring	Color	Oil resistant, black core wire 3-core cord
	Length	m

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Delay and response range of the sensor switch

HI-ROTOR	Response range	Delay
CT-3	23 ° ±7°	Approximately 2 °

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M type proximity switch

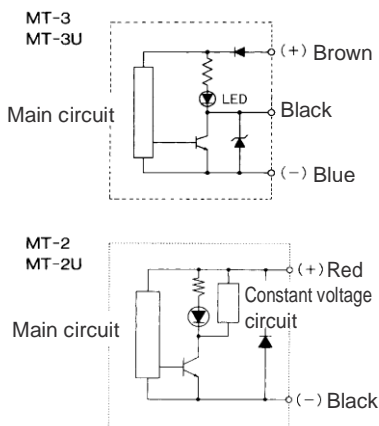
3 - wire type, 2 - wire type



Specifications

Model No.	Unit	MT-3	MT-3U	MT-2	MT-2U
Applications		Relay, PLC, IC Circuit		Relay, PLC	
Rated voltage	V	DC5~30		DC24(DC10~30)	
Rated current range	mA	5~200		5~100	
Maximum current	mA	max. 20(at 24V) max. 10(at 12V) max. 4(at 5V)		—	
Maximum leakage	μA	10		1	
Internal pressure drop	V	max. 1.5		max. 3	
Average response time	ms	1		1	
Shock resistance	G	50		50	
Operating ambient temperature	°C	5~60		5~60	
Protect mechanism		IP67		IP67	
Indicator light		Red LED (Light-up at ON)		Red LED (Light-up at ON)	
Wiring	Color	Black 3-core wire		Black 2-core wire	
	Length	m	1	1	1

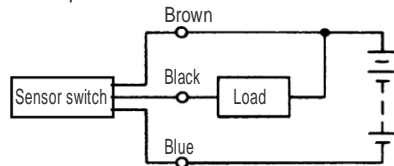
Note: Standard wire length of 1m is provided; other wire length can be supplied upon request.



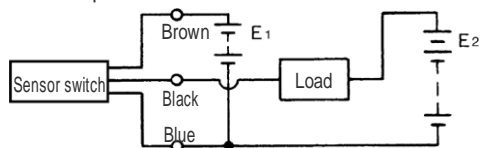
LED: Light-emitting diode

How to use sensor switch

When electricity supply to the load is the common power switch



When electricity supply to the load is not the common power switch



Voltage for E1 and E2 should be the same

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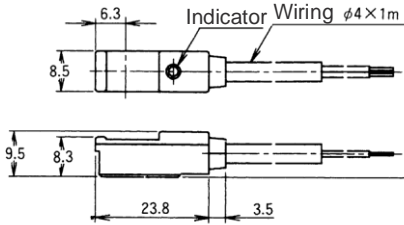
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Dimensions

(Unit: mm)

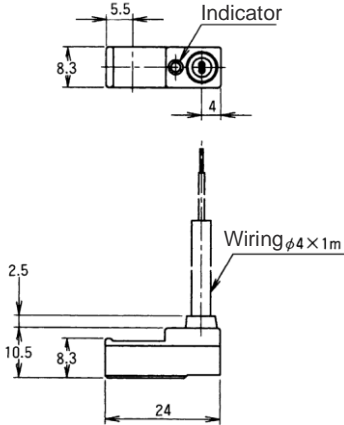
MT-3, MT-2

Center of the sensor switch

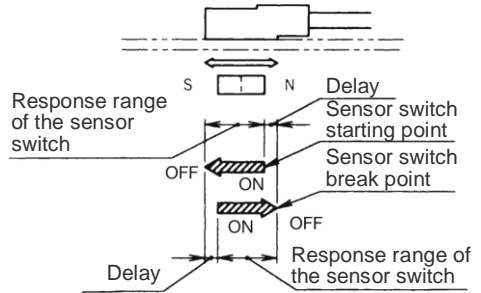


MT-3U, MT-2U

Center of the sensor switch



Delay and response range of the sensor



When the piston moves to the left side, the sensor switch will be activated and an indicator will be on to show it's at its starting point. This status remains at response range. When the piston return to the right side, the sensor switch will be off (breakpoint) and cause slight delay.

(Unit : mm)

Pneumatic cylinder	Bore	Response range of the sensorswitch	Delay
X Series	∅ 10, ∅ 16, ∅ 20, ∅ 25, ∅ 32	9±1	about 1
	∅ 40	7±1	
	∅ 50	6±1	
	∅ 63, ∅ 80, ∅ 100	9±1	
Z Series	∅ 6	4±0.5	about 0.5
	∅ 10	4.5±0.5	
	∅ 16	5.5±0.5	
J Series	∅ 20, ∅ 25, ∅ 32, ∅ 40	7.5±0.5	about 0.5
K Series	∅ 40, ∅ 50, ∅ 63, ∅ 80, ∅ 100	7±2	about 0.5
A Series	∅ 125, ∅ 140, ∅ 160, ∅ 180, ∅ 200	8±2	about 1

! Sensor switch technical information

- Be sure to turn off the power supplies before doing the wiring.
- When the piston moves to the left side, the sensor switch will be activated and an indicator will be ON, showing that sensor switch is at its starting point.
- Check the center position
- When sensor switch is installed far from the end of the stroke, contact will shut off and reset so that the magnet will move off from sensor switch. This will happen regardless of which direction the piston rod is acting toward. The minimum distance between magnet will keep the sensor switch remain active. Please refer to the diagram "Delay and response range of the sensor switch." The time to shut off the sensor switch can be calculated by response range divided the speed of magnet.
- Keep the sensor switch away from other magnetic objects for at least 10mm far will help stabilise the sensing condition.
- Keep the wire away from the electrical circuit to avoid disturbance caused by a large current.
- Pay attention to the magnetic field surrounded which may cause sensor switch become dysfunctional.
- When using 24V DC sensor switch, be sure to check polarity (Red: +, Black: -)
- Avoid connects sensor switch output wired directly to the power supply.
- M type proximity switch has water proof feature of IP67, yet it shouldn't be used in the water for a long period of time; please provide shelter to ensure proper functionality.

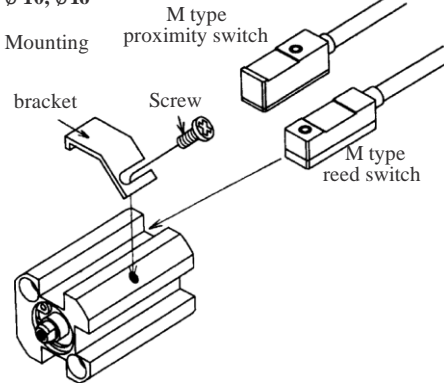
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Switch

Mounting

Suitable cylinder type / X Series

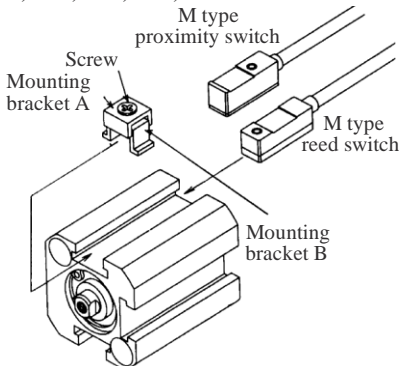
Ø 10, Ø 16



1. Put the M type sensor switch to the groove in the body and adjust the mounting position.
2. Slightly fasten the screw onto the bracket.
3. Check the position of sensor switch, then fasten the screw with 4kgf·cm torque.
4. If sensor switch needs to be repositioned, loosen the screw and simply repeat step 2.

Suitable cylinder type / X Series

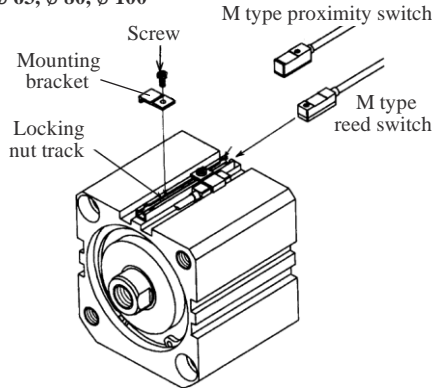
Ø 20, Ø 25, Ø 32, Ø 40, Ø 50



1. Assemble bracket A and bracket B, then put in the screws.
2. Slide the bracket A and B assembled from Step 1 into the groove in the bottom of the body.
3. Put the M type sensor switch to the groove below the assembled bracket A and B, slightly fasten the screw onto the bracket just enough to hold.
4. Check the position of sensor switch, then fasten the screw with 4kgf·cm torque.
5. If sensor switch needs to be repositioned, loosen the screw and simply repeat step 3.

Suitable cylinder type/X Series

Ø 63, Ø 80, Ø 100



1. Slide the locking nut into the track, then determine the mounting position.
2. Put the M type sensor switch to the groove in the body and adjust.
3. Mount the bracket above the sensor switch, use screw to slightly fasten the locking nut.
4. Check the position of sensor switch, then fasten the screw with 4kgf·cm torque.
5. If sensor switch needs to be repositioned, loosen the screw and simply repeat step 3.

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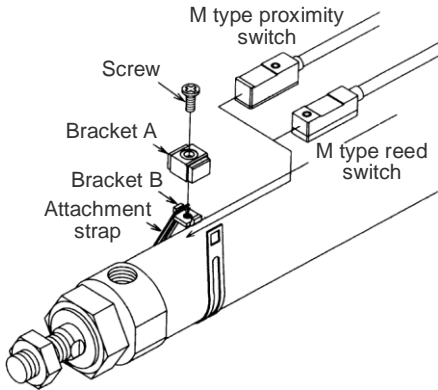
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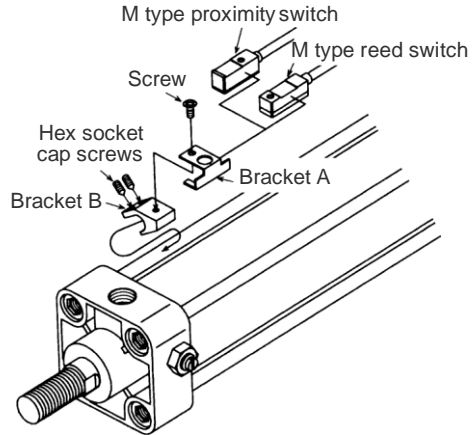
Mounting

Suitable cylinder type/Z, J Series



1. Twine the attachment strap on the outer tube of the cylinder, connect one end of the strap to the hook on the bracket B.
2. Place the sensor switch's groove side below bracket B.
3. Connect the other end of the attachment strap to bracket B.
4. Connect bracket A and bracket B, slightly fasten the screw onto the bracket just enough to hold.
5. Check the position of sensor switch, then fasten the screw with 4kgf·cm torque.
6. If sensor switch needs to be repositioned, loosen the screws and simply repeat step 4.

Suitable cylinder type/K, A Series



1. Place bracket B on the tie rod of the cylinder.
2. Place the sensor switch's groove side below bracket A.
3. Connect bracket A and bracket B, fasten the screw onto the bracket with 4kgf·cm torque.
4. Check the position of sensor switch, then fasten the hex socket cap screws with 4kgf·cm torque.
5. If sensor switch needs to be repositioned, loosen the hex socket cap screws and simply repeat step 4.

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Preventive measures

When adopting pneumatic components, please comply with JIS B8370 (ISO 4414) as the operating standards for pneumatic system. Before operating, one should first read through the following precautions.

Environment

1. Do not operate pneumatic machines in an environment containing gasses, chemical elements, sea water, water, water vapour, etc. If operation in such environment is a must, please first consult with FONTAL.
2. If using in an environment with a temperature lower than 5°C , please provide air dryer to prevent water frozen which will cause malfunction (the component can endure at a temperature as low as -5°C).
3. Air supplied for the pneumatic cylinder can only be from industrial air compressing system. To avoid unnecessary hazards, all other gas temperature or pressure that is higher than the maximum permissible range is prohibited.

Air quality

1. Please use an air filter with filtration rate of $5\ \mu\text{m}$ or finer, oil mist separator, poor-quality oil filter to improve the air quality and prolong usage life.
2. Please discharge water and change filter cartridge periodically.

Lubrication

1. Pneumatic cylinder are available with both lubrication and non-lubrication feature. Choose turbine oil Class 1 (ISO VG32) or equivalent for lubrication.
2. Avoid using spindle oil or machine oil; otherwise, these seal parts may be corroded.

Piping

1. Thoroughly clean the inside of air pipe before installation before doing piping to avoid malfunction caused by impurities entering the inside of the cylinder.
2. When fastening piping with connector, please be careful to avoid iron scrap and other sealing tape from entering the pipe.
3. When mounting piping with a connector, the appropriate torque is listed in the following table. Do not use excessive or insufficient torque to prevent thread stripped or leakage.

Threaded size	Torque N·m (kgf·cm)
M5	1.5 ~ 2.0 (15 ~ 20)
Rc $\frac{1}{8}$	7 ~ 10 (70 ~ 100)
Rc $\frac{1}{4}$	13 ~ 15 (130 ~ 150)
Rc $\frac{3}{8}$	18 ~ 20 (180 ~ 200)
Rc $\frac{1}{2}$	38 ~ 40 (380 ~ 400)
Rc $\frac{3}{4}$	58 ~ 60 (580 ~ 600)
Rc 1	78 ~ 80 (780 ~ 800)

Mounting pneumatic cylinder

1. When operating, axis should avoid using eccentric load or transverse load.
2. Please take extra care not to scratch or damage axis; otherwise such seal scratch would cause leakage.

Piston speed

A speed controller is set inside of the pneumatic cylinder. Speed can be set within desirable range. When connecting the speed controller, it is highly recommended to provide air outlet specification circuit.

Cushion

Although cushion has been thoroughly inspected before dispatched, an user can still make adjustment depending on operational need.

Maintenance

When mounting or before maintenance, please shut off power supply and air supplies and exhaust residual air from the pneumatic machinery to prevent damage and hazardous situations.

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M type reed switch

Wiring type



Specifications

Model No.		Unit	MA-I		MD-I	MD-3	MR	MA-2L	MA-2H
Applications			Relay, PLC		Relay	IC Circuit	Relay	Relay	Relay
Rated voltage		V	AC110	DC24	DC24	DC5-6	AC,DC5-110	AC110	AC220
Maximum contact rating	Inductive load		4.5VA	1W	1.5W	0.3W	1.5VA 1.5W	4.5VA	4.5VA
	Resistance load					1.8W	10VA 10W		
Rated current range	Inductive load	mA	5~45		25~65	max. 50	max. 50	5~150	5~150
	Resistance load						max. 300		
Internal pressure drop		V	Max. 2			0		—	
Surge suppressor			Not provided					Provided	
Average response time		ms	1.0						
Shock resistance		G	30						
Operating ambient temperature		°C	5~60						
Indicator light			Red LED (Light-up at ON)				Not provided	Red LED (Light-up at ON)	
Wiring	Color		Black 2-core wire (Blue wire)		Black 2-core wire		Black 3-core wire	Black 2-core wire	Black 2-core wire (Blue wire)
	Length	m	1						

Switch

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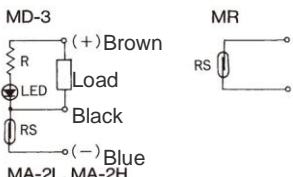
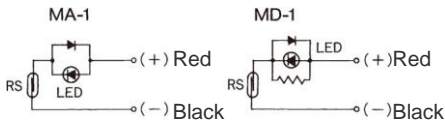
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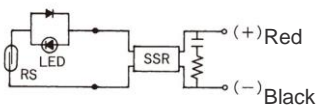
Fax : + 603 - 8023 9743

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Internal circuit

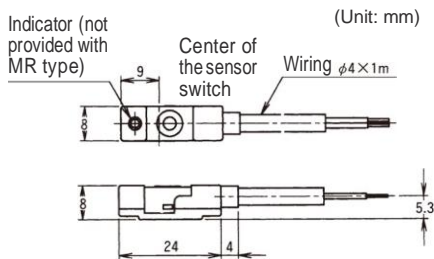


MA-2L, MA-2H



RS : Reed switch
LED: Light-emitting diode

Dimensions of sensor switch

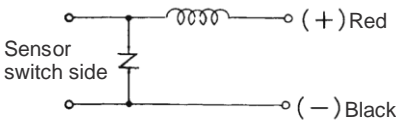


Protective circuit specifications

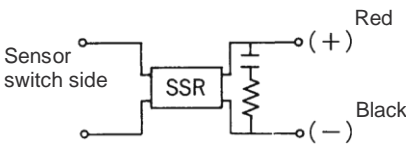
Model No.	Rated voltage (V)	Rated current range (mA)
SS-I	AC110V	max. 300
SS-D	DC24	max. 300
SS- 2L	AC110	5~150
SS- 2H	AC220	5 ~ 150

Internal circuit

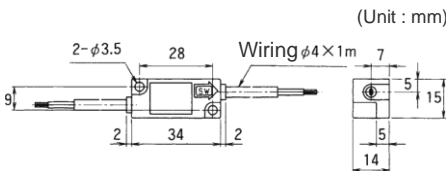
SS-1, SS-D



SS-2L, SS-2H



Dimensions of Protective circuit



Wire length of sensor switch

The standard wire length of M type reed switch is 1 meter. Other lengths are available upon request, including 2m, 3m, 4m, and 5m.

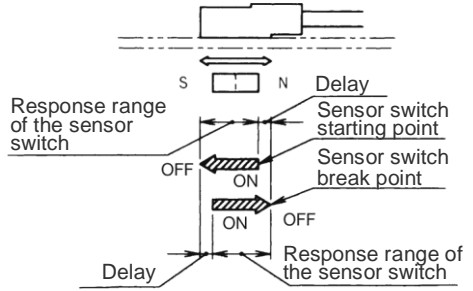


Wire length

- No mark: 1m (Standard)
- L20 : 2m
- L30 : 3m
- L40 : 4m
- L50 : 5m

Sensor switch type

Delay and response range of the sensor switch



When the piston moves to the left side, the sensor switch will be activated and the indicator will be on to show it's at its starting point. This status remains at response range. When the piston return to the right side, the sensor switch will be off (breakpoint) and cause a slight delay.

(Unit : mm)

Pneumatic cylinder	Bore	Response range of the sensor switch	Delay
X Series	∅ 10	4±0.5	about 1
	∅ 16, ∅ 20, ∅ 25, ∅ 32, ∅ 40, ∅ 50	6±1	about 1.5
	∅ 63, ∅ 80, ∅ 100	9±1	
Z Series	∅ 6, ∅ 10	3±1	about 1
	∅ 16	4.5±0.5	
J Series	∅ 20, ∅ 25, ∅ 32, ∅ 40	7.5±1	about 1.5
K Series	∅ 40, ∅ 50, ∅ 63, ∅ 80, ∅ 100	7.5±1.5	about 1
A Series	∅ 125, ∅ 140, ∅ 160, ∅ 180, ∅ 200	9±1	about 1.5

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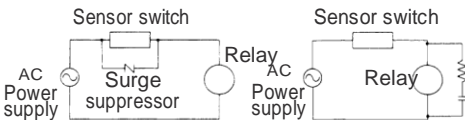
Email : sales@gentle.com.my / myfontal@gmail.com

! Sensor switch technical information

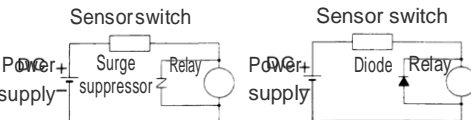
- Be sure to turn off the power supplies before doing the wiring.
- MA-1 may be supplied with 110V AC and 24V DC.
 MA - 2L : MA - 1 & SS - 2L (Surge suppressor 110V AC)
 MA-2H: MA-1 & SS-2H (Surge suppressor 220V AC)
- When selecting sensor switch, be sure the load is within maximum contact rating and rated current range.
- Check the center position
- When sensor switch is installed far from the end of the stroke, contact will shut off and reset so that the magnet will move off from sensor switch. This will happen regardless of which direction the piston rod is acting toward. The minimum distance between magnet will keep the sensor switch remain active. Please refer to the diagram "Delay and response range of the sensor switch." The time to shut off the sensor switch can be calculated by response range divides speed of magnet.
- Keep the sensor switch away from other magnetic objects for at least 10mm far will help stabilise the sensing condition.
- Keep the wire away from electrical circuit to avoid disturbance caused by large current.
- Pay attention to the magnetic field surrounded which may cause sensor switch become dysfunctional.
- When using 24V DC sensor switch, be sure to check polarity (Red : +, Black : -)
- Avoid connect sensor switch output wire directly to the power supply.
- Some parts may cause voltage spikes which will affect the functionality of sensor switch. To protect sensor switch to properly function with the following circuit in such voltage spike, with wire length longer than 10m, SS-1 is recommended to protect circuit AC and SS-D is recommended to protect DC.
- M type reed switch has no water proof feature at all; if operating in an environment exposed to water, please provide shelter to ensure proper functionality.

Recommended specification

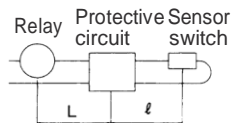
- Inductive load
110V AC load



DC load

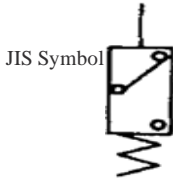


- Capacitive load



When the wire length is greater than 10 meter, l must be approximately 100 ~ 200mm.

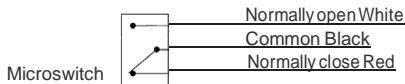
Pressure switch/PS-6-1



Specifications

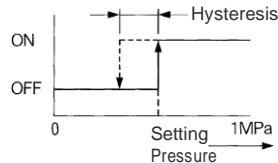
Model No.	Unit	PS-6-1
Port size		Rc $\frac{1}{8}$
Max. operating pressure	MPa (kgf / cm 2)	1.6 (16)
Pressure operating range	MPa (kgf / cm 2)	0.15 ~ 0.9 [1.5 ~ 9]
Hysteresis	MPa (kgf / cm 2)	0.05 [0.5]
Surrounding temperature range	°C	5~65
Rated current	A	3 (AC125V), 2 (DC24V)
ON/ OFF cycle life		100,000 cycles (20 ON / OFF cycles / minute, rated load)
Weight	g	50

Electric connection diagram



Operation diagram

(Common-Normally open connection)

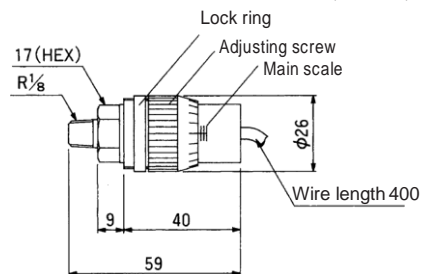


Pressure setting

Please rotate the adjusting caliber to set the pressure. Rotate clockwise to increase the set value. The main pressure setting standard is 0.4MPa. When pressure setting is accurate, lay piping and supply intended pressure, and then check the contact and operating condition is proper and stable by a tester. Be sure to use a lock ring to secure the screw after completing pressure setting.

Dimensions

(Unit : mm)



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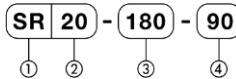
Sensor switch

For miniature HI-ROTORS
Fixed sensor switch

Fixed (angle) miniature sensor switch, with proximity switch design to prolong its usage life.



Ordering Instructions



① Sensor switch type **③ Oscillating angle**

SR : Axial cable 90 : 90°
 SU : Perpendicular cable 180 : 180°
 270 : 270°

② Suitable HI-ROTOR **④ Oscillating reference point**

3 : PRNA3S
 10 : PRNA10S 90 : 90°
 20 : PRNA20S 45 : 45°
 30 : PRN30S/ D

Model No.	Oscillating angle			Oscillating reference point	
	90°	180°	270°	90°	45°
PRNA3S	○	○	○	—	○
PRNA10S	○	○	○	○	○
PRNA10S	○	○	○	○	○
PRNA10S	○	○	○	○	○
PRNA30S	○	○	○	○	○
PRNA30D	○	—	—	—	○

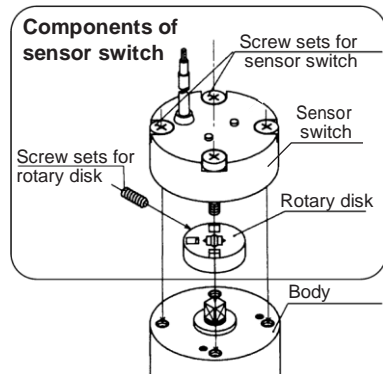
Specifications

Model No.	Unit	SR, SU
Sensor switch type		Proximity switch
Applications		Relay, PLC, IC Circuit
Load voltage	V	DC5 ~ 30
Load current	mA	5 ~ 200
Maximum current consumption	mA	max. 20 (24V) max. 10 (12V) max. 4 (5V)
Maximum leakage current	µm	max. 10
Internal pressure drop	V	1.5 or less than 1.5
Response time	ms	1
Shock resistance	m/s ²	490
Operating ambient temperature	°C	5~ 60
Protecting class		IP67
Wiring	Color	Oil resistant, black core wire
	Length	m 1

Delay and response range of the sensor switch (Unit: mm)

HI - ROTOR	Response range	Delay
PRNA3S, 10S, 20S	15°±7°	Approximately 2°
PRN30S / D		

Components



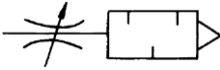
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MV Series

Silencer throttle valve

JIS Symbol



- Exhaust control valve can control the air flow to alter the operating speed of pneumatic cylinder
- Extreme simplistic structure and design, enabling fault-free, uninterrupted operation
- Exhaust flow control: 0~100

Representation

MV 01

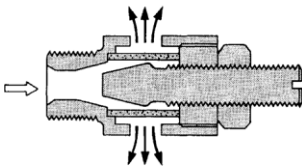
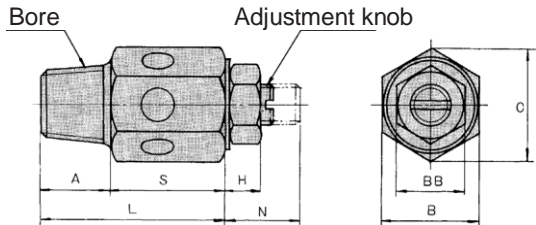
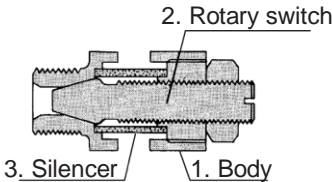
Port size

00 : M5x0.8
 01 : PT½
 02 : PT¼
 03 : PT¾
 04 : PT½
 06 : PT¾
 08 : PT1

Model No.	Unit	MV-00	MV-01	MV-02	MV-03	MV-04	MV-06	MV-08
Port size	PT	M5x0.8	1/8	1/4	3/8	1/2	3/4	1
Fluid		Air						
Operating pressure range		0~7kgf/cm ² (0~0.686MPa)		0~9.9kgf/cm ² (0~0.971MPa)				
Proved pressure		10.5kgf/cm ² (1.03MPa)		15kgf/cm ² (1.471Mpa)				
Ambient temperature		0~+80°C						
Weight	kgf	0.005	0.02	0.03	0.04	0.07	0.12	0.22

Structure

Dimensions



Size table

No.	Component Name	Quantity
1	Body	1
2	Rotary switch	1
3	Silencer	1

Mark Type	Bore	A	B	BB	C(About)	H	L	N		S
								max	min	
MV-00	M5x0.8	4	8	5.5	9	2	18	6	3.5	14
MV-01	PT½	8.5	12	8	13.8	3.2	25	13	6	16.5
MV-02	PT¼	12	14	10	16.2	3.6	30	16.5	6	18
MV-03	PT¾	12	17	10	19.6	3.6	30	16.5	6	18
MV-04	PT½	16	22	10	25.4	3.6	37	18.5	6	21
MV-06	PT¾	18	27	10	31.0	3.6	43	22	8	25
MV-08	PT1	19	36	13	41.0	5	46	22	7.5	27

(Unit: mm)

ADD

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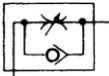
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Speed Control Joint

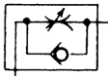
M □ R	Minature Universal Type
B □ R	Standard Universal Type
M □ R	Miniature Elbow Type
□ R	Standard Elbow Type

- Adjustable speed fitting can control acuating speed of an acuator.
- Support direct piping which is both time saving and cost saving.
- Claws on the pipe are designed with prolonged durability and can be used for a long period of time. It is difficult to become elastic fatigue causing potential hazards.
- Simply by turning the body, piping angles of the universal type can be variously changed even after installation completion.
- Polyurethane tube and nylon tube are both available for use.
- Seal tape are already applied onto the threaded area, thus there is no need to spend time twining them on.

JIS Symbol



Air outlet specifications



Air inlet specifications



Specifications

Fluid	Air
Operating pressure range	0.05~0.7MPa
Ambient temperature	-5~60°C
Recommended air tube	Nylon and polyurethane tube
Threaded seal	Seal tape (M5: Gasket)

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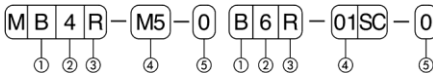
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Representation



① Type

No label : Elbow type

B : Universal type

② Bore

4 : Ø 4

6 : Ø 6

8 : Ø 8

10: Ø 10

12: Ø 12

③ Body material

B: Synthetic resin

④ Threaded size

M3 : M3x0.5

M5 : M5x0.8

01 : R $\frac{1}{8}$

02 : R $\frac{1}{4}$

03 : R $\frac{3}{8}$

04 : R $\frac{1}{2}$

⑤ Control method

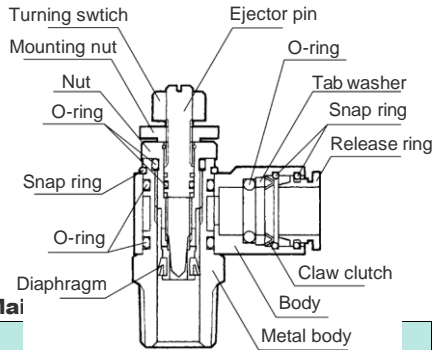
O : Airoutlet

I : Air inlet

(Note)

- On the flat area of the turning switch, air outlet specification of the miniature type is labeled with "O," and air inlet specification is labeled with "I."
- Turning switch of the air inlet and air outlet is each labeled with Yellow and Black, respectively (i.e. Yellow as air inlet, and Black as air outlet)

Structure



Material

Body	Synthetic resin
Metal Body	Stainless steel
Ejector pin	Stainless steel
Nut	Copper alloy
Mounting nut	Copper alloy
Turning switch	Synthetic resin
Diaphragm	NBR
O-ring	NBR

ADD

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Specifications

Universal Type

Elbow Type

Model No.		Threaded size	Effective area (mm ²)	Recommended air tube No.	Model No.		Threaded size	Effective area (mm ²)	Recommended air tube No.
Air outlet specifications	Air inlet specifications				Air outlet specifications	Air inlet specifications			
MB4R-M3-O	MB4R-M3-I	M3	0.6	100U04 (O.D.∅4)	M4R-M3-O	M4R-M3-I	M3	0.6	100U04 (O.D.∅4)
MB4R-M5-O	MB4R-M5-I	M5	0.6		M4R-M5-O	M4R-M5-I	M5	0.6	
MB4R-01-O	MB4R-01-I	R½	0.6		M4R-01-O	M4R-01-I	R½	0.6	
MB6R-M5-O	MB4R-M5-I	M5	0.64	100U06 (O.D.∅6)	M6R-M5-O	M6R-M5-I	M5	0.64	100U06 (O.D.∅6)
MB6R-01-O	MB6R-01-I	R½	0.68		M6R-01-O	M6R-01-I	R½	0.68	
B6R-M5SC-O	B6R-M5SC-I	M5	2.3		6R-M5SC-O	6R-M5SC-I	M5	2.3	
B6R-01SC-O	B6R-01SC-I	R½	2.3	100U08 (O.D.∅8)	6R-01SC-O	6R-01SC-I	R½	2.3	100U08 (O.D.∅8)
B6R-02SC-O	B6R-02SC-I	R¼	2.3		6R-02SC-O	6R-02SC-I	R¼	2.3	
B8R-01SC-O	B8R-01SC-I	R½	4.8		8R-01SC-O	8R-01SC-I	R½	4.8	
B8R-02SC-O	B8R-02SC-I	R¼	5	100U10 (O.D.∅10)	8R-02SC-O	8R-02SC-I	R¼	5	100U10 (O.D.∅10)
B8R-03SC-O	B8R-03SC-I	R¾	5		8R-03SC-O	8R-03SC-I	R¾	5	
B10R-02SC-O	B10R-02SC-I	R¼	8.5	100U12 (O.D.∅12)	10R-02SC-O	10R-02SC-I	R¼	8.5	100U12 (O.D.∅12)
B10R-03SC-O	B10R-03SC-I	R¾	8.5		10R-03SC-O	10R-03SC-I	R¾	8.5	
B10R-04SC-O	B10R-04SC-I	R½	8.5		10R-04SC-O	10R-04SC-I	R½	8.5	
B12R-03SC-O	B12R-03SC-I	R¾	14	100U12 (O.D.∅12)	12R-03SC-O	12R-03SC-I	R¾	14	100U12 (O.D.∅12)
B12R-04SC-O	B12R-04SC-I	R½	14		12R-04SC-O	12R-04SC-I	R½	14	

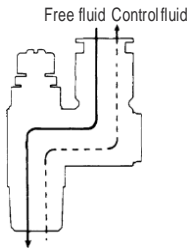
(Note)

Effective area is the value of control fluid when the ejector pin is completely open.

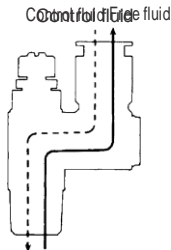
Control Method

Universal Type

Air outlet

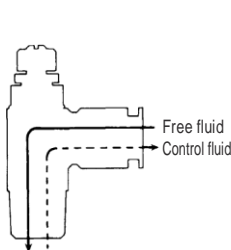


Air inlet

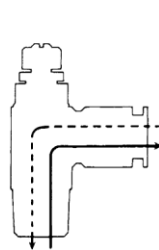


Elbow Type

Air outlet



Air outlet



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 **Caution**

- Check the air flow direction of the fluid before mounting
- Manually tightening adjustable speed fitting first, then apply proper tool and force to tightening the rest. If it is too loose, air leakage may occur, yet if it is too tight (exceeding the torque shown in the following), the fitting may be damaged.

Threaded size	Torque
M3	Approximate 1/6 to 1/4 turn
M5	Approximate 1/12 to 1/6 turn
Rc1/8	4~6
Rc1/4	7~9
Rc3/8	10~13
Rc1/2	20~23

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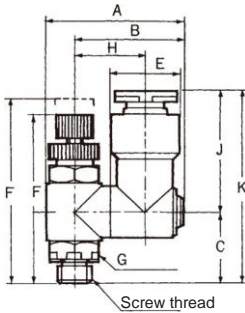
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Universal type

(Unit: mm)

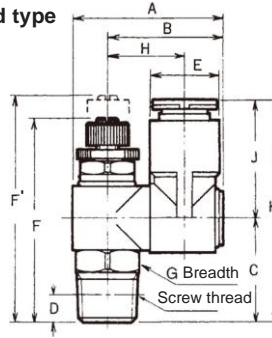
Miniature type

MB4R
MB6R



Standard type

B6R
B8R
B10R
B12R



(Unit: mm)

Model No.		Threaded size	Recommended air tube No.	Dimension											Weight (g)
Air outlet specifications	Air inlet specifications			A	B	C	D	E	F	F'	G	H	J	K	
MB4R-M3-O	MB4R-M3-I	M3x0.5	100U04 (O.D. Ø4)	21.9	17.9	12.5	—	Ø 11	30.1	32.5	8	11.3	19.2	32.2	10.5
MB4R-M5-O	MB4R-M5-I	M5x0.8		22.4	—	13.5	16	4	31.1	33.5	10		34.7	11.5	
MB4R-Ø1-O	MB4R-Ø1-I	R¾		—	—	—	—	—	33.6	36	10		36.7	14.5	
MB6R-M5-O	MB6R-M5-I	M5x0.8	100U06 (O.D. Ø6)	23.3	17.9	13.5	—	Ø 13	31.1	33.5	8	12.3	21.7	36.7	12.5
MB6R-Ø1-O	MB6R-Ø1-I	R¾		23.8	—	16	4	—	33.6	36	10		39.2	15.5	
B6R-M5SC-O	B6R-M5SC-I	M5x0.8		—	—	15.9	—	—	36.2	39.3	—		37.6	22.5	
B6R-Ø1SC-O	B6R-Ø1SC-I	R¾	100U06 (O.D. Ø6)	28.5	22	19	4	Ø 13	39.3	42.4	12	14.5	21.7	40.7	25
B6R-Ø2SC-O	B6R-Ø2SC-I	R¾		—	—	22	6	—	42.3	45.4	14		43.7	30.5	
B8R-Ø1SC-O	B8R-Ø1SC-I	R¾		—	—	20	4	—	41.9	46.9	—		44.2	34.5	
B8R-Ø2SC-O	B8R-Ø2SC-I	R¾	100U08 (O.D. Ø8)	33	25.5	23	6	Ø 15	44.9	49.9	14	17	24.2	47.2	39.5
B8R-Ø3SC-O	B8R-Ø3SC-I	R¾		—	—	24	6.5	—	45.9	50.9	17		48.2	47.5	
B10R-Ø2SC-O	B10R-Ø2SC-I	R¾		—	—	24.5	6	—	48.3	54.3	—		51.1	58.5	
B10R-Ø3SC-O	B10R-Ø3SC-I	R¾	100U10 (O.D. Ø10)	39.9	30.9	25.1	6.5	Ø 17	49.3	55.3	17	20.2	26.6	51.7	65
B10R-Ø4SC-O	B10R-Ø4SC-I	R¾		—	—	29.5	8	—	53.3	59.3	21		56.1	83.5	
B12R-Ø3SC-O	B12R-Ø3SC-I	R¾		—	—	26.5	6.5	—	52	61	19		55.6	85.5	
B12R-Ø4SC-O	B12R-Ø4SC-I	R¾	100U12 (O.D. Ø12)	43.4	32.9	30.5	8	Ø 20	56	65	21	21.7	29.1	59.6	103.5

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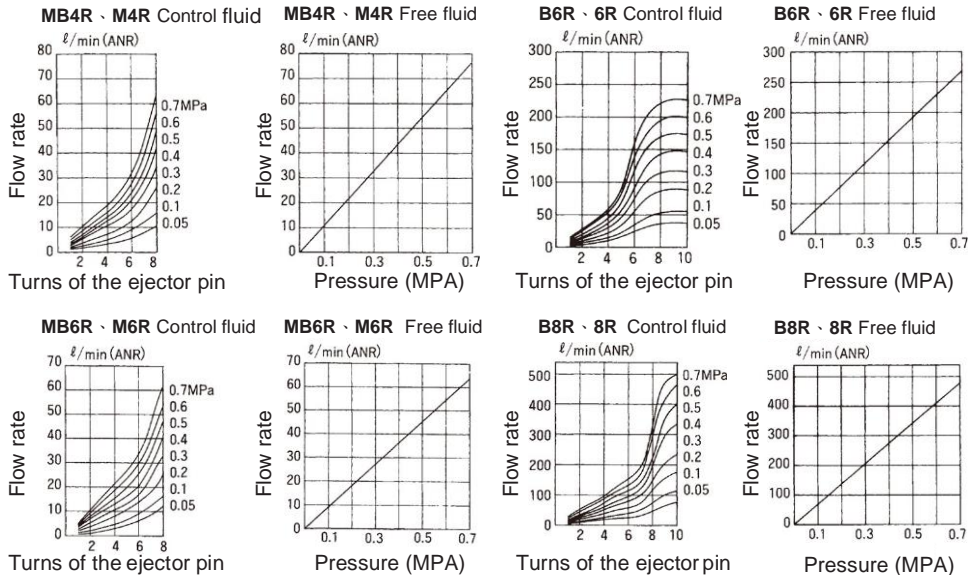
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Characteristic of the flow rate



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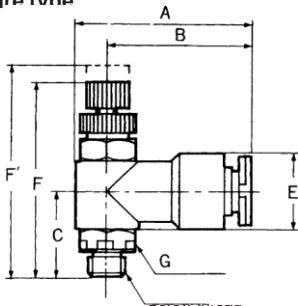
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Elbow type

(Unit: mm)

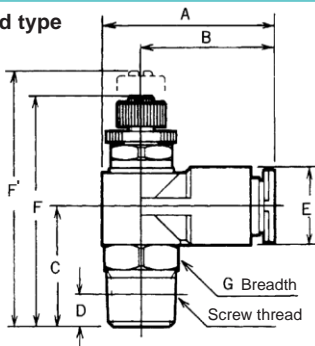
Miniature type

M4R
M6R



Standard type

6R
8R
10R
12R

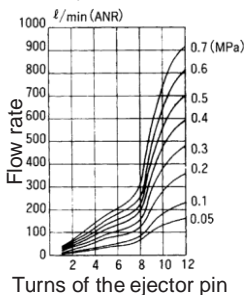


(Unit: mm)

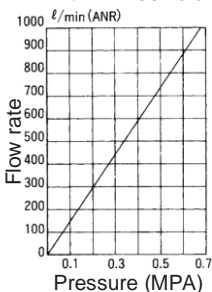
Model No.		Threaded size	Recommended air tube No.	Shapes and dimensions							Weight (g)			
Air outlet specifications	Air inlet specifications			A	B	C	D	E	F	F'		G		
M4R-M3-O	M4R-M3-I	M3x0.5	100U04 (O.D. Ø4)	24.7	19.2	13	—	Ø 11	30.1	32.5	8	9.0		
M4R-M5-O	M4R-M5-I	M5x0.8		25.2		16.5			4	31.1		33.5	10	10.0
M4R-01-O	M4R-01-I	R½	100U06 (O.D. Ø6)	27.2	21.7	15	—	Ø 13	31.1	33.5	8	11.5		
M6R-M5-O	M6R-M5-I	M5x0.8		27.7		17.5			4	33.6		36	10	14.0
6R-M5SC-O	6R-M5SC-I	M5x0.8	100U06 (O.D. Ø6)	28.2	21.7	16.4	—	Ø 13	36.2	39.3	12	20.0		
6R-01SC-O	6R-01SC-I	R½				19.5			4	39.3		42.4	14	22.0
6R-02SC-O	6R-02SC-I	R¼				22.5			6	42.3		45.4	14	27.5
8R-01SC-O	8R-01SC-I	R½	100U08 (O.D. Ø8)	31.7	24.2	20.5	4	Ø 15	41.9	46.9	14	30.5		
8R-02SC-O	8R-02SC-I	R¼				23.5			6	44.9		49.9	14	35.5
8R-03SC-O	8R-03SC-I	R¾				24.5			6.5	45.9		50.9	17	43.0
10R-02SC-O	10R-02SC-I	R¼	100U10 (O.D. Ø10)	35.6	26.6	24.5	6	Ø 17	48.3	54.3	17	51.0		
10R-03SC-O	10R-03SC-I	R¾				25.1			6.5	49.3		55.3	17	58.0
10R-04SC-O	10R-04SC-I	R½				29.5			8	53.3		59.3	21	76.0
12R-03SC-O	12R-03SC-I	R¾	100U12 (O.D. Ø12)	39.1	29.1	27	6.5	Ø 20	52	61	19	75.0		
12R-04SC-O	12R-04SC-I	R½				31			8	56		65	21	93.0

Characteristic of the flow rate

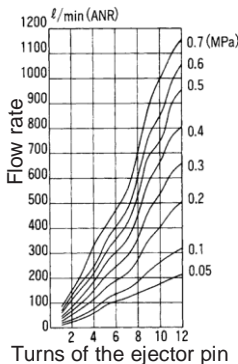
B10R, 10R Control fluid



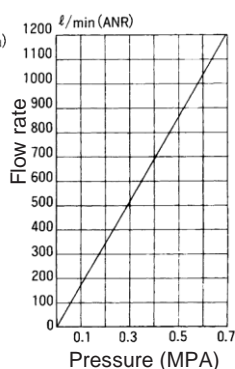
B10R, 10R Free fluid



B12R, 12R Control fluid



B12R, 12R Free fluid



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ADD

Tube

Regular straight-type pneumatic tube

Characteristics

- Polyurethane tube are of great flexibility, curvature radius of the tube can thus be minimized
- There are 5 different sets of colors for the tube, allowing users to identify more easily; users may also choose the same colors for both the tubes and the equipments

Specifications

Model no.		100U04	100U06	100U08	100U10	100U12
Tube size	0.D X I.D. (mm)	4x2.5	6x4	8x5	10x6.5	12x8
	Length (m)	100				
Tube color	Black (B) 01	○				
	Green (G) 02	○				
	Red (R) 03	○				
	Blue (B) 04	○				
	Yellow (Y) 05	○				
Fluid		Air				
Maximum pressure range		116 psi (0.8MPa) (20°C ※1H: 65%RH)				
Working vacuum		-29.5in. Hg (-100kPa)				
Operating temperature range		-5~140°C(-15~60°C)(non-freezing)				
Minimum curvature radius		10	15	20	30	
Maximum curvature radius		15	23	30	45	



Packing specifications 100m length



Model no.
100U 04-□
100U 06-□
100U 08-□
100U 10-□
100U 12-□

- 1. Value as of maximum range being 20°C and 65% condition. When applied in different temperature conditions, operate within the safety temperature as shown in the burst pressure chart. When tube is used in a condition of vibrating and shifting side, heat generated from molecular heat may thus cause the temperature rise up resulting in the tube rupture.

Order Code (Example)

100 U 04 01

(1) (2) (3) (4)

(1) Tube length

100: 100m

(2) Tube Name

U: PU

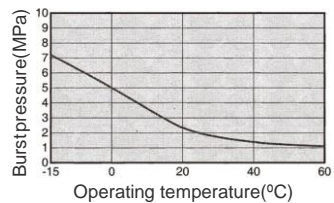
(3) Tube Diameter

Code	04	06	08	10	12
External diameter	∅ 4mm	∅ 6mm	∅ 8mm	∅ 10mm	∅ 12mm
Internal diameter	∅ 2.5mm	∅ 4mm	∅ 5mm	∅ 6.5mm	∅ 8mm

(4) Tube color

Code	01	02	03	04	05
Color	Black	Green	Red	Blue	Yellow

Burst pressure curve (Reference)



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