Compact flow rate sensor RAPIFLOW

FSM3 Series

LCD display

● Resin body (flow rate range: 500 mL/min to 1000 L/min)

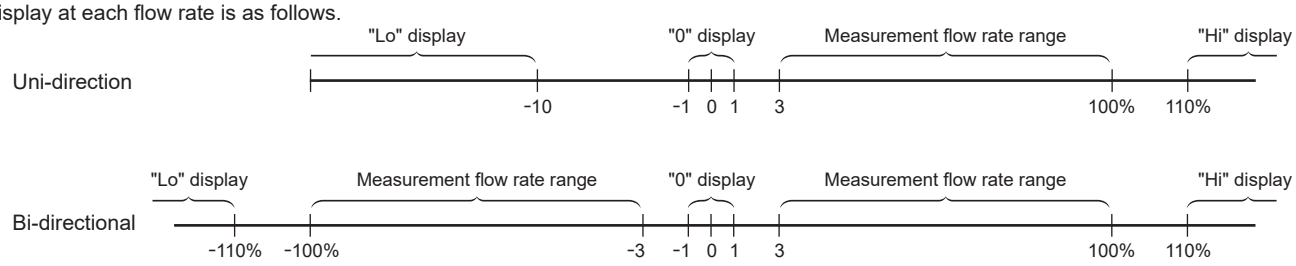
LCD display specifications

Item			FSM3-[A][B][C][D][E][F][G][H][I]-[ ]										
			[B]										
			005	010	020	050	100	200	500	101	201	501	102
Flow direction	[C]	U	Uni-direction										
		B	Bi-direction										
Measurement flow rate range (□/min) *1	[C]	U	15 to 500 mL	30 to 1000 mL	0.06 to 2.00 L	0.15 to 5.00 L	0.30 to 10.00 L	0.6 to 20.0 L	1.5 to 50.0 L	3.0 to 100.0 L	6 to 200 L	15 to 500 L	30 to 1000 L
		B	−500 to −15, 15 to 500 mL	−1000 to −30, 30 to 1000 mL	−2.00 to −0.06, 0.06 to 2.00 L	−5.00 to −0.15, 0.15 to 5.00 L	−10.00 to −0.30, 0.30 to 10.00 L	−20.0 to −0.6, 0.6 to 20.0 L	−50.0 to −1.5, 1.5 to 50.0 L	−100.0 to −3.0, 3.0 to 100.0 L	−200 to −6, 6 to 200 L	−500 to −15, 15 to 500 L	−1000 to −30, 30 to 1000 L
Display			4 digit + 4 digit 2 color LCD										
Flow rate display range (□/min) *2	[C]	U	−49 to 549 mL	−99 to 1099 mL	−0.19 to 2.19 L	−0.49 to 5.49 L	−0.99 to 10.99 L	−1.9 to 21.9 L	−4.9 to 54.9 L	−9.9 to 109.9 L	−19 to 219 L	−49 to 549 L	−99 to 1099 L
		B	−549 to 549 mL	−1099 to 1099 mL	−2.19 to 2.19 L	−5.49 to 5.49 L	−10.99 to 10.99 L	−21.9 to 21.9 L	−54.9 to 54.9 L	−109.9 to 109.9 L	−219 to 219 L	−549 to 549 L	−1099 to 1099 L
Integration display *3		Display range	0 to ±9999999 mL		0.00 to ±99999.99 L			0.0 to ±999999.9 L			0 to ±9999999 L		
		Pulse output rate	5 mL	10 mL	0.02 L	0.05 L	0.1 L	0.2 L	0.5 L	1 L	2 L	5 L	10 L
Working conditions		Applicable fluid *4	Clean air (JIS B 8392-1:2012 1.1.1 to 5.6.2), compressed air (JIS B 8392-1:2012 1.1.1 to 1.6.2) , Nitrogen Gas										
			Argon, carbon dioxide (*5), gas mixture (argon + carbon dioxide)									-	
		Temperature range	0 to 50°C (no condensation)										
		Pressure range	−0.09 to 0.75 MPa										
		Proof pressure	1 MPa										
Operating ambient temperature/humidity			0 to 50 °C, 90% RH or less										
Storage temperature			−10 to 60°C										
Accuracy *6 (Fluid: in dry air)		Accuracy *7	Within ±3% F.S. (Secondary side released to atmosphere) (The scope of warranty is in accordance with the "measurement flow rate range.")										
		Repeatability *8	Within ±1% F.S. (Secondary side released to atmosphere)										
		Temperature characteristics	Within ±0.2% F.S./°C (15 to 35°C, base temperature 25°C)										
		Pressure characteristics	Within ±5% F.S. (-0.09 to 0.7 MPa, where secondary side is released to atmosphere)								Within ±5% F.S. (-0.09 to 0.7 MPa, 0.35 MPa standard)		
Response time		*9	50 msec or less (setting response time OFF)										
Switch output	[G]	A, B, E, F	NPN open collector output (50 mA or less, voltage drop 2.4 V or less)										
		C, D, G, H	PNP open collector output (50 mA or less, voltage drop 2.4 V or less)										
Analog output *10		A, B, C, D	1 to 5 V voltage output (connecting load impedance 50 kΩ or more)										
		E, F, G, H	4 to 20 mA current output (connecting load impedance 0 to 300 Ω)										
Power supply voltage *11		A, B, C, D	12 to 24 VDC (10.8 to 26.4 V) ripple rate 1% or less										
		E, F, G, H	24 VDC (21.6 to 26.4 V) ripple rate 1% or less										
Current consumption		*12	45 mA or less										
Lead wire			ø3.7, AWG26 or equivalent × 5-conductor (connector), insulator O.D. ø1.0										
Functions		*13	① Gas type selection, ② setting copy function, ③ flow rate integration, ④ peak hold, etc.										
Degree of protection			IP40 or equivalent (IEC standard)										
Protection circuit		*14	Power reverse connection protection, switch output reverse connection protection, switch output load short-circuit protection										
Vibration resistance			10 to 150 Hz, 100 m/s^2, 2 hours each in X, Y, Z directions										
EMC Directive			EN55011, EN61000-6-2, EN61000-4-2/3/4/6/8										
Mounting		Mounting orientation *15	Unrestricted in vertical/horizontal direction										
		Straight piping section *16	Not required										

CKD

*1: The value converted to volumetric flow rate at standard condition (20°C, 1 barometric pressure (101 kPa), 65%RH). (20°C, 1 atmospheric pressure (101 kPa), 0%RH with a type of gas other than air.)

*2: Display at each flow rate is as follows.



*3: The integrated flow is a calculated (reference) value. When using the integrated save function, take care to prevent the number of saves from exceeding the access count limit of the storage device (1 million times). (Changes to the settings are counted in number of accesses.)

$$\text{Number of saves} = \frac{\text{Usage time}}{5\ \text{mins}} < 1\ \text{million times}$$

When the instantaneous flow rate is 1% or less, the flow rate is counted as integrated flow rate.

*4: Use dry gas which does not contain corrosive elements such as chlorine, sulfur or acids, and which is clean and does not contain dust or oil mist. When using compressed air, use clean air that complies with JIS B 8392-1:2012 Class 1.1.1 to 1.6.2. Compressed air from the compressor contains drainage (water, oil oxides, foreign matter, etc.). To maintain the function of this product, install a filter, air dryer (min. pressure dew point 10˚C or less), and oil mist filter (max. oil content 0.1 mg/m^3) on the primary side (upstream side) of this product. (Refer to page 72 for details on recommended circuit.)

*5: With the gas type switching function, the full scale flow rate after switching to carbon dioxide is half the flow rate range. Output type can also be selected for analog output.

Gas	Flow direction	Measurement flow rate range (□/min)							
		005	010	020	100	200	500	101	201
Carbon dioxide	Uni-direction	15 to 250mL	30 to 500mL	0.06 to 1.00L	0.30 to 5.00L	0.6 to 10.0L	1.5 to 25.0L	3.0 to 50.0L	6 to 100L
	Bi-direction	-250 to -15mL	-500 to -30mL	-1.00 to 0.06L	-5.00 to 0.30L	-10.0 to -0.6L	-25.0 to -1.5L	-50.0 to -3.0L	-100 to -6L
		15 to 250mL	30 to 500mL	0.06 to 1.00L	0.30 to 5.00L	0.6 to 10.0L	1.5 to 25.0L	3.0 to 50.0L	6 to 100L

Gas	Flow direction	Analog output			
		Output A		Output B	
		Voltage	Current	Voltage	Current
Carbon dioxide	Uni-direction	1 to 3V	4 to 12mA	1 to 5V	4 to 20mA
	Bi-direction	2 to 4V	8 to 16mA	1 to 5V	4 to 20mA

*6: Compressed air is used for adjusting and inspecting this product. Accuracy for gas types other than air is a guideline.

*7: Accuracy is based on a CKD standard flow rate meter. It does not indicate absolute accuracy.
Repeatability, temperature characteristics, and pressure characteristics are not included for an accuracy of ±3% F.S.
Consider separately according to the working environment and working conditions.

*8: Repeatability calculated during a short time. Change over time is not included. (Refer to the product specifications for details.)

*9: The actual response time changes depending on the piping conditions. As a guideline, the response time setting can be selected within the range 50 msec to 1.5 sec.

*10: The output impedance of the output impedance of the analog output voltage output is approximately 1 kΩ. If the impedance of the connecting load is small, output and error increase. Check error with the impedance of the connecting load before using.

*11: The power supply voltage specifications differ for the voltage output and current output types.

*12: Current for when 24 VDC is connected, and no load is applied. The current consumption will vary depending on how the load is connected.

*13: The gas type switching function enables switching to argon, carbon dioxide and a gas mixture of argon 80% + carbon dioxide 20%. The full scale flow rate and analog output after changing are as follows. (Note that the 500 L/min and 1,000 L/min models do not have a gas change function.)

Gas	Flow direction	Measurement flow rate range (□/min)							
		005	010	020	100	200	500	101	201
・Air ・Nitrogen ・Argon ・Argon 80% + Carbon dioxide 20%	Uni-direction	15 to 500mL	30 to 1000mL	0.06 to 2.00L	0.30 to 10.00L	0.6 to 20.0L	1.5 to 50.0L	3.0 to 100.0L	6 to 200L
	Bi-direction	-500 to -15mL	-1000 to -30mL	-2.00 to -0.06L	-10.00 to -0.30L	-20.0 to -0.6L	-50.0 to -1.5L	-100.0 to -3.0L	-200 to -6L
		15 to 500mL	30 to 1000mL	0.06 to 2.00L	0.30 to 10.00L	0.6 to 20.0L	1.5 to 50.0L	3.0 to 100.0L	6 to 200L

The "Setting copy function" setting is selected at "Ⓖ Output specifications".
Note that the "External input" function is not available on models on which the "Setting copy function" is enabled.

*14: This product's protection circuit is effective only for specific misconnections and load short-circuits. It does not provide protection for all misconnections.

*15: This product measures changes in heat distribution that are caused by flow.
When this product is mounted in a vertical orientation, convective flow may affect heat distribution or cause the zero point to deviate.

*16: Accuracy may be affected by the piping conditions. To perform measurement with greater accuracy, install a straight pipe with a piping I.D. ten times larger. With the 500 L/min and 1,000 L/min models, use piping with an internal diameter of 9 mm or more. If it is less than 9 mm, accuracy may be negatively affected.

*17: Refer to page 58 for weight.

How to order

FSM3 - L 005 U 1 BH 1 A 1 N - B M R - P80

Model No. FSM3
Ⓐ Display: L
Ⓑ Flow rate ranges (full scale): 005
Ⓒ Flow direction: U
Ⓓ Body material / applicable fluid: 1
Ⓔ Port size: BH
Ⓕ Piping direction: 1
Ⓖ Output specifications: A
Ⓗ Unit specifications: 1
Ⓘ Valve option: N
Ⓙ Lead wire: B
Ⓚ Mounting attachments: M
Ⓛ Attached documents: R
Ⓜ Clean-room specifications: P80

[Example of model No.]

FSM3-L005U1BH1A1N-BMR-P80

Model: RAPIFLOW FSM3 Series

Ⓐ Display	L	: LCD
Ⓑ Flow rate	005	: 500 mL/min
Ⓒ Flow direction	U	: Uni-direction
Ⓓ Body material / applicable fluid	1	: Resin/air
Ⓔ Port size	BH	: Push-in (ø4 mm for tube)
Ⓕ Piping direction	1	: Straight
Ⓖ Output specifications	A	: Analog voltage output ×1, NPN switch output ×1, setting copy function
Ⓗ Unit specifications	1	: SI units only
Ⓘ Valve option	N	: None
Ⓙ Lead wire	B	: 5-conductor 3 m
Ⓚ Mounting attachment	M	: DIN rail mount
Ⓛ Attached documents	R	: Company certification
Ⓜ Clean-room specifications	P80	: Oil free

Precautions for model No. selection

*1: Refer to the correspondence table on the following page when selecting the model.
*2: For "B: bi-directional" models, Ⓘ the only valve option is "N: none". Note that "T: with needle valve" and "E: EXA connecting fitting" cannot be selected.
*3: The G thread connection shape is compliant with ISO16030 standards.
*4: Please refer to the external dimension diagram (Pages 5 to 7) for the G thread connection shape when making a selection. (The G thread connection shape is compliant with JIS B 2351-1, O types.)
*5: Note that if you mount the elbow fitting in an upward position, it will interfere with the connector, and if you mount the elbow fitting in a downward position, it will interfere with the DIN rail mounting.
*6: Models with the unit switching function are not sold in Japan.
*7: Connection to solenoid valves (EXA Series) is possible with the dedicated fitting. Refer to page 67.
*8: Be sure to set EXA to the OUT side of the product. Use a lead wire for the EXA coil option. The DIN terminal box cannot be mounted because it will cause interference. After making sure it is connected firmly, confirm that there is no external leakage.
*9: Ⓜ Clean-room specifications "P70" and "P80" cannot be selected.
*10: Note that the bracket mounting position may interfere with the elbow fitting.
*11: Optional parts are provided with the product. They are not assembled with the product.
*12: The product surface is degreased and cleaned before packaging, and heat-sealed into an antistatic bag on a clean bench (Class 1000 or more).
*13: In addition to P70 specifications, wetted section materials are degreased and cleaned.

Ⓑ Flow rate ranges (full scale)

Code		Code	
005	500 mL/min	500	50 L/min
010	1000 mL/min	101	100 L/min
020	2 L/min	201	200 L/min
050	5 L/min	501	500 L/min
100	10 L/min	102	1000 L/min
200	20 L/min		

Ⓒ Flow direction *2

Code	Description
U	Uni-direction
B	Bi-direction

Ⓓ Body material / applicable fluid

Code	Body material	Applicable fluid
1	Resin	Air (gas switchable)

Ⓔ Port size

BH	Push-in (for ø4 mm tube)	AF	G1/8	*3
CH	Push-in (for ø6 mm tube)	BF	G1/4	*3
DH	Push-in (for ø8 mm tube)	CF	G1/2	*3
EH	Push-in (for ø10 mm tube)	AB	G1/8	*4
HH	Push-in (for ø1/4" tube)	BB	G1/4	*4
JH	Push-in (for ø3/8" tube)	CB	G1/2	*4
AA	Rc1/8	AC	NPT1/8	
BA	Rc1/4	BC	NPT1/4	
CA	Rc1/2	CC	NPT1/2	

Ⓕ Piping direction

Code	Description
1	Straight
2	Elbow *5

Ⓖ Output specifications

Code	Analog output	Switch output	Setting copy function
A	1 point (Voltage output) 1-5 V	1 point (NPN)	With
B		2 points (NPN)	–
C		1-point output (PNP)	With
D		2-points output (PNP)	–
E	1 point Current output 4-20 mA	1 point (NPN)	With
F		2 points (NPN)	–
G		1-point output (PNP)	With
H		2-points output (PNP)	–

Ⓗ Unit specifications

Code	Description
1	SI units only
2	With unit switching function (overseas models only) *6

Ⓘ Valve option *2

Code	Description
N	None
T	With needle valve (only for models 200 L or less)
E	EXA connecting fitting (EXA sold separately) *7, *8, *9

Ⓙ Lead wire

Code	Description
Blank	None
A	5-conductor 1 m
B	5-conductor 3 m

Ⓚ Mounting attachments *10, *11

Code	Description
Blank	None
H	Bracket 1 (for models 200 L or less)
J	Bracket 2 (for 500 or 1000 L models)
K	Panel mounting (for sensor products of models 200 L or less)
L	Panel mounting (for needle valves of models 200 L or less)
M	DIN rail mounting (for models 200 L or less)

Ⓛ Attached documents

Code	Description
Blank	None
R	Company certification
S	Inspection certificate + Calibration certificate + Traceability system diagram

Ⓜ Clean-room specifications

Code	Description
Blank	None
P70	Anti-dust generation *12
P80	Oil free *13

Compatibility of flow rate ranges and port sizes, needle valve options, and EXA connection fittings

Ⓑ Flow range	Ⓔ Port sizes Ⓕ Piping direction															
	BH1	CH1	DH1	EH1	HH1	JH1	BH2	CH2	DH2	EH2	HH2	JH2	AA1	BA1	CA1	AA2
005	●○	●○			●○		●○	●○			●○		●○			●○
010	●○	●○			●○		●○	●○			●○		●○			●○
020	●○	●○			●○		●○	●○			●○		●○			●○
050	●○	●○			●○		●○	●○			●○		●○			●○
100	●○	●○			●○		●○	●○			●○		●○			●○
200	●○	●○			●○		●○	●○			●○		●○			●○
500		●○	●○		●○			●○	●○		●○		●○	●○★		●○
101			●○	●○		●○			●○	●○		●○		●○★		
201			●○	●○		●○			●○	●○		●○		●○★		
501															●	
102															●	
	BA2	AF1	BF1	CF1	AF2	BF2	AB1	BB1	CB1	AB2	BB2	AC1	BC1	CC1	AC2	BC2
005		●○			●○		●○			●○		●○			●○	
010		●○			●○		●○			●○		●○			●○	
020		●○			●○		●○			●○		●○			●○	
050		●○			●○		●○			●○		●○			●○	
100		●○			●○		●○			●○		●○			●○	
200		●○			●○		●○			●○		●○			●○	
500	●○	●○	●○		●○	●○	●○	●○		●○	●○	●○	●○		●○	●○
101	●○		●○			●○		●○			●○		●○			●○
201	●○		●○			●○		●○			●○		●○			●○
501				●					●					●		
102				●					●					●		

●: Port compatibility ○: Needle valve option compatibility ★: EXA connection fitting compatibility

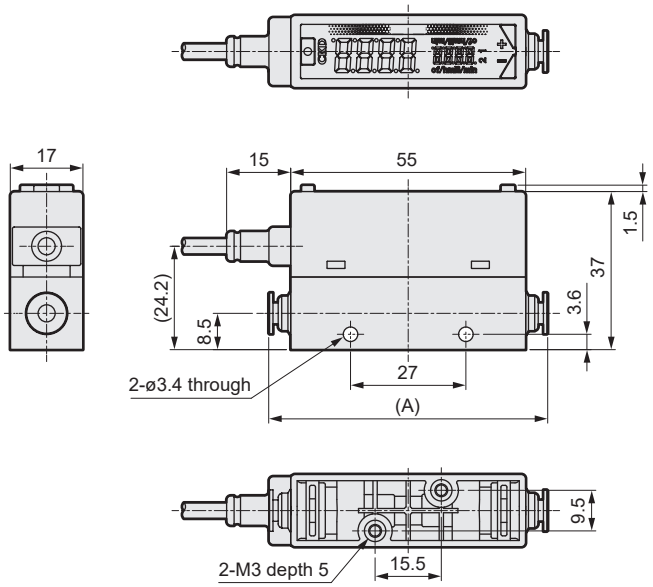
Compatibility table of port sizes and clean-room specifications

Ⓜ Clean-room specifications	Ⓔ Port size Ⓕ Piping direction															
	BH1	CH1	DH1	EH1	HH1	JH1	BH2	CH2	DH2	EH2	HH2	JH2	AA1	BA1	CA1	AA2
Blank	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
P70	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
P80	●	●					●	●					●	●	●	●
	BA2	AF1	BF1	CF1	AF2	BF2	AB1	BB1	CB1	AB2	BB2	AC1	BC1	CC1	AC2	BC2
Blank	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
P70	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
P80	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

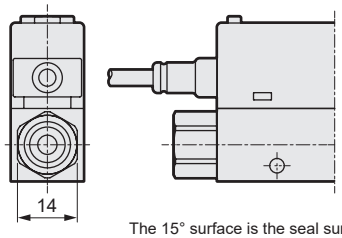
Dimensions (LCD display)

Port sizes: Straight ø4 mm, ø6 mm, ø1/4", Rc1/8, G1/8, NPT1/8

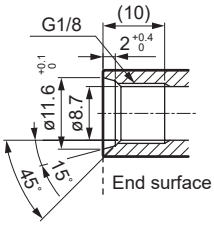
● FSM3−L□□1/BH1/CH1/HH1/AA1/AF1/AB1/AC1 (Full scale flow rates: 500 mL/min,1, 2, 5,10, 20, 50 L/min)



Rc1/8, NPT1/8, G1/8 (AB1)

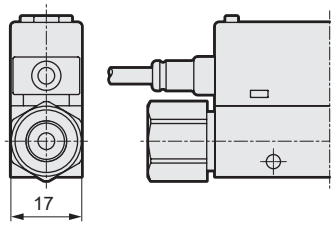


G thread shape (AB)



The 15° surface is the seal surface.
Please note that this is not an end face seal. Please also use upon confirming the thread insertion depth of the fitting.

G1/8 (AF1)

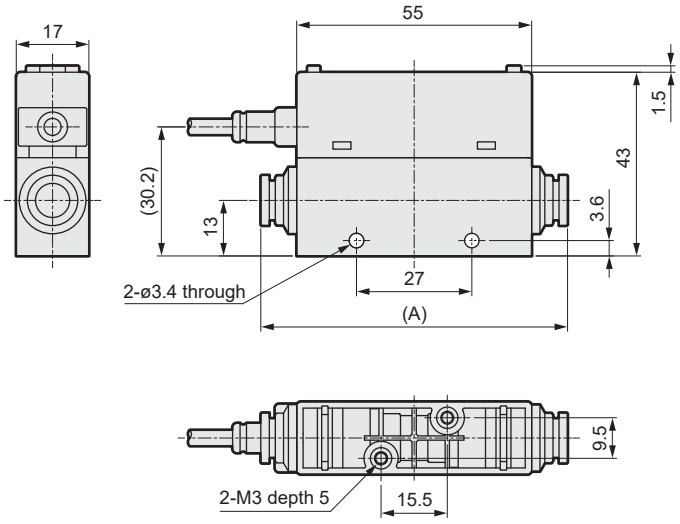


Model No.	Fitting	Dimension (A)
FSM3-L□□1BH1	Push-in ø4 mm	(65)
FSM3-L□□1CH1	Push-in ø6 mm	(67.2)
FSM3-L□□1HH1	Push-in 1/4"	(70.4)
FSM3-L□□1AA1	Rc1/8	(75)
FSM3-L□□1AF1	G1/8	(87)
FSM3-L□□1AB1	G1/8	(87)
FSM3-L□□1AC1	NPT1/8	(75)

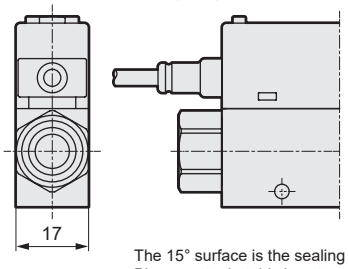
Port sizes: Straight ø8 mm, ø10 mm, ø3/8", Rc1/4, G1/4, NPT1/4

● FSM3−L□□1/DH1/EH1/JH1/BA1/BF1/BB1/BC1 (Full scale flow rates: 50, 100, 200 L/min)

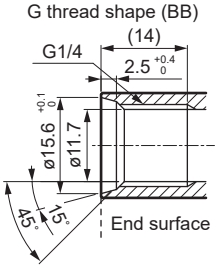
* The dedicated adaptor for the EXA connection type is the secondary side (to the right in the figure below).
For connection dimensions, refer to page 67.



Rc1/4,NPT1/4,G1/4 (BB1)

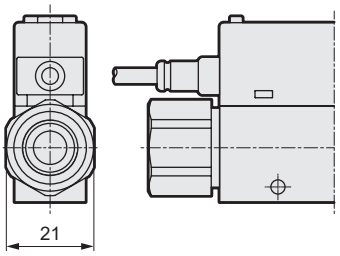


G thread shape (BB)



The 15° surface is the sealing surface.
Please note that this is not an end face seal. Also, be sure to confirm that the screw depth of the fitting matches before use.

G1/4 (BF1)

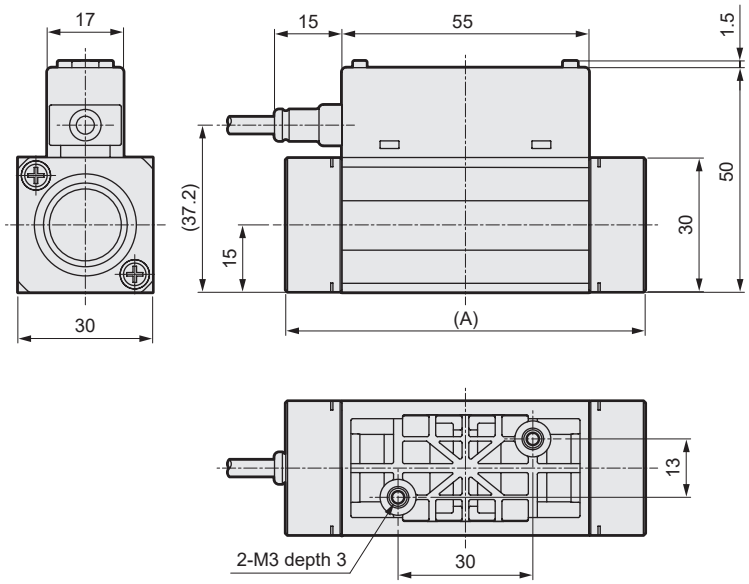


Model No.	Fitting	Dimension (A)
FSM3-L□□1DH1	Push-in ø8 mm	(70.6)
FSM3-L□□1EH1	Push-in ø10 mm	(82.1)
FSM3-L□□1JH1	Push-in 3/8"	(83.4)
FSM3-L□□1BA1	Rc1/4	(75)
FSM3-L□□1BF1	G1/4	(89)
FSM3-L□□1BB1	G1/4	(89)
FSM3-L□□1BC1	NPT1/4	(75)

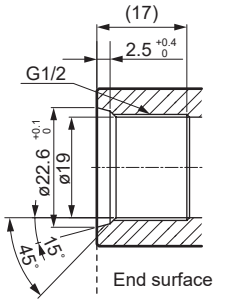
Dimensions (LCD display)

Port sizes: Straight Rc1/2, G1/2, NPT1/2

● FSM3−L□□1/CA1/CF1/CB1/CC1 (Full scale flow rates: 500, 1000 L/min)

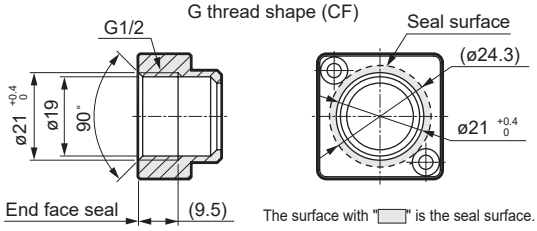


G thread shape (CB)



The 15° surface is the sealing surface.
Please note that this is not an end face seal. Also, be sure to confirm that the screw depth of the fitting matches before use.

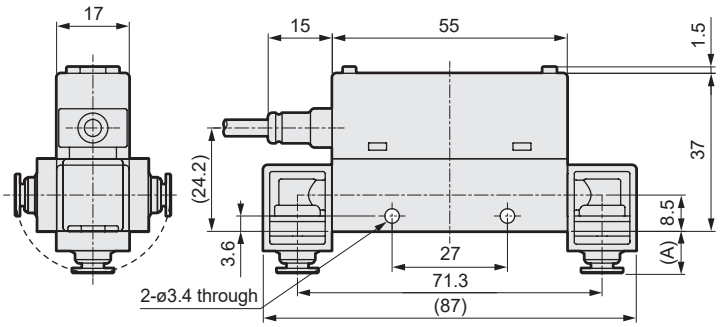
G thread shape (CF)



Model No.	Fitting	Dimension (A)
FSM3-L□□1CA1	Rc1/2	(80)
FSM3-L□□1CF1	G1/2	(80)
FSM3-L□□1CB1	G1/2	(95.4)
FSM3-L□□1CC1	NPTG1/2	(80)

Port sizes: Elbow ø4 mm, ø6 mm, ø1/4", Rc1/8, G1/8, NPT1/8

● FSM3−L□□1/BH2/CH2/HH2/AA2/AF2/AB2/AC2 (Full scale flow rates: 500 mL/min, 1, 2, 5, 10, 20, 50 L/min)



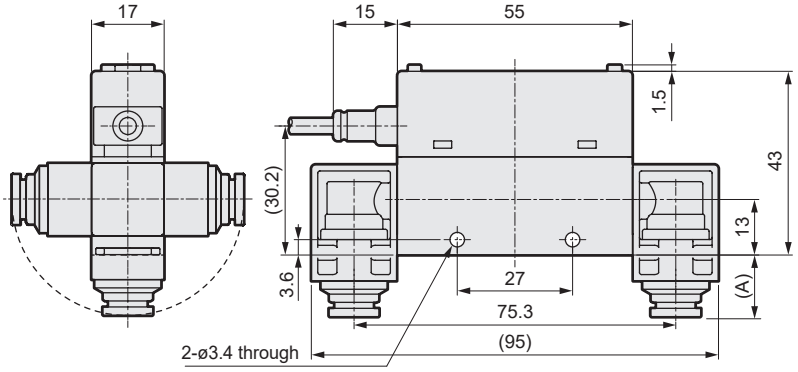
* The shapes of the upper surface and lower surface of the main body are the same as that of the straight type.

Model No.	Fitting	Dimension (A)
FSM3-L□□1BH2	Push-in ø4 mm	(9.5)
FSM3-L□□1CH2	Push-in ø6 mm	(10.6)
FSM3-L□□1HH2	Push-in 1/4"	(12.2)
FSM3-L□□1AA2	Rc1/8	(14.5)
FSM3-L□□1AF2	G1/8 *	(20.5)
FSM3-L□□1AB2	G1/8 *	(20.5)
FSM3-L□□1AC2	NPT1/8	(14.5)

*Please refer to the straight type for the G thread shape.

Port sizes: Elbow ø8 mm, ø10 mm, ø3/8", Rc1/4, G1/4, NPT1/4

● FSM3−L□□1/DH2/EH2/JH2/BA2/BF2/BB2/BC2 (Full scale flow rates: 50, 100, 200 L/min)



* The shapes of the upper surface and lower surface of the main body are the same as that of the straight type.

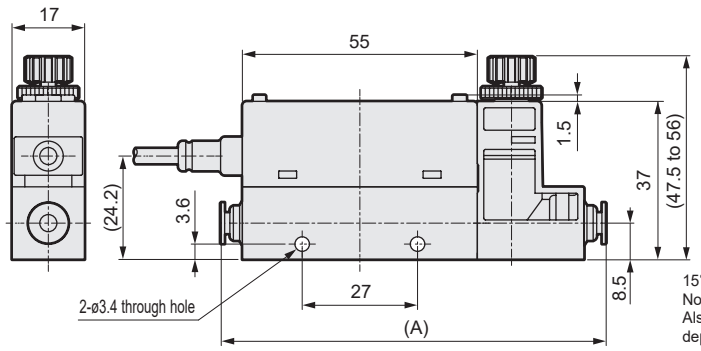
Model No.	Fitting	Dimension (A)
FSM3-L□□1DH2	Push-in ø8 mm	(13.6)
FSM3-L□□1EH2	Push-in ø10 mm	(19.3)
FSM3-L□□1JH2	Push-in 3/8"	(20.0)
FSM3-L□□1BA2	Rc1/4	(15.8)
FSM3-L□□1BF2	G1/4 *	(22.8)
FSM3-L□□1BB2	G1/4 *	(22.8)
FSM3-L□□1BC2	NPT1/4	(15.8)

*Please refer to the straight type for the G thread shape.

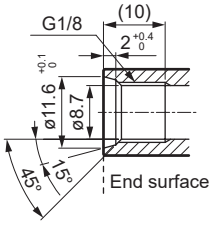
Dimensions with needle valve

Port size: straight ø4 mm, ø6 mm, ø1/4", Rc1/8, G1/8, NPT1/8

●FSM3-LLoc1/BH1/CH1/HH1/AA1/AF1/AB1/AC1/TochiT (full scale flow rate: 500mL/min, 1, 2, 5, 10, 20, 50L/min)



G thread shape (AB)



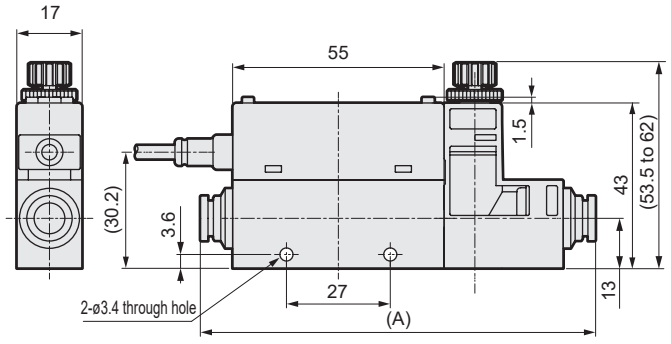
15° of the surface is the sealing surface. Note that it is not the end surface seal. Also, be sure to confirm that the screw depth of the fitting matches before use.

*The top and bottom surfaces of the body are the same as the straight type.

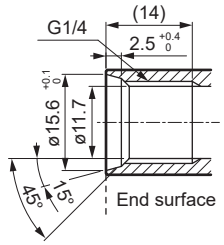
Model No.	Fitting	Dimension (A)
FSM3-L□□1BH1	Push-in ø4 mm	(90)
FSM3-L□□1CH1	Push-in ø6 mm	(92.2)
FSM3-L□□1HH1	Push-in 1/4"	(95.4)
FSM3-L□□1AA1	Rc1/8	(100)
FSM3-L□□1AF1	G1/8	(112)
FSM3-L□□1AB1	G1/8	(112)
FSM3-L□□1AC1	NPT1/8	(100)

Port size: straight ø8 mm, ø10 mm, ø3/8", Rc1/4, G1/4, NPT1/4

●FSM3-LLoc1/DH1/EH1/JH1/BA1/BF1/BB1/BC1/TochiT (full scale flow rate: 50, 100, 200L/min)



G thread shape (BB)



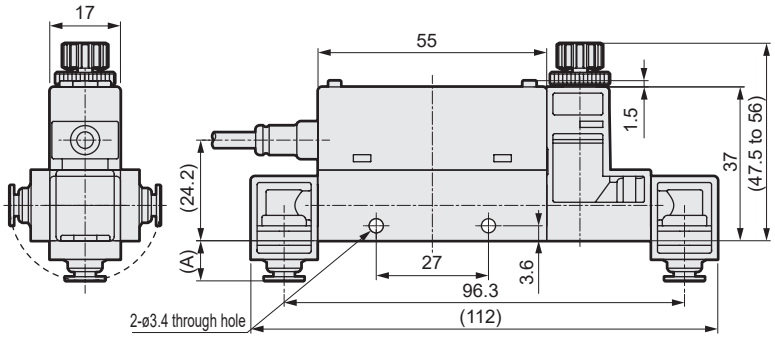
15° of the surface is the sealing surface. Note that it is not the end surface seal. Also, be sure to confirm that the screw depth of the fitting matches before use.

*The top and bottom surfaces of the body are the same as the straight type.

Model No.	Fitting	Dimension (A)
FSM3-L□□1DH1	Push-in ø8 mm	(101.6)
FSM3-L□□1EH1	Push-in ø10 mm	(113.1)
FSM3-L□□1JH1	Push-in 3/8"	(114.4)
FSM3-L□□1BA1	Rc1/4	(106)
FSM3-L□□1BF1	G1/4	(120)
FSM3-L□□1BB1	G1/4	(120)
FSM3-L□□1BC1	NPT1/4	(106)

Port size: Elbow ø4 mm, ø6 mm, ø1/4", Rc1/8, G1/8, NPT1/8

●FSM3-LLoc1/BH2/CH2/HH2/AA2/AF2/AB2/AC2 (full scale flow rate: 500mL/min, 1, 2, 5, 10, 20, 50L/min)



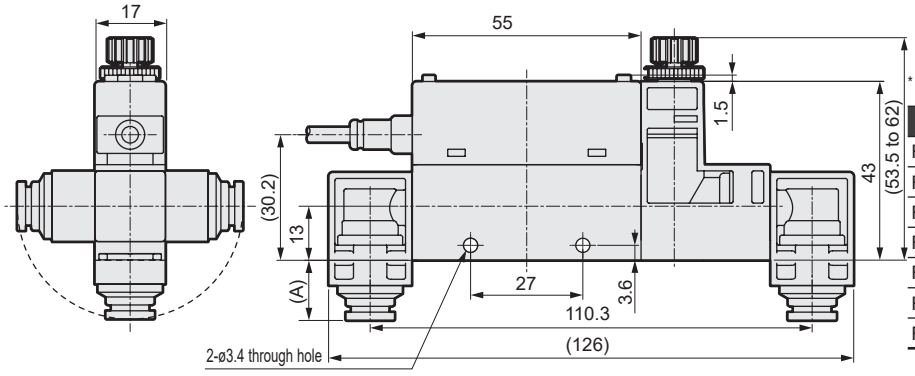
* The top and bottom surfaces of the body are the same as the straight type.

Model No.	Fitting	Dimension (A)
FSM3-L□□1BH2	Push-in ø4 mm	(9.5)
FSM3-L□□1CH2	Push-in ø6 mm	(10.6)
FSM3-L□□1HH2	Push-in 1/4"	(12.2)
FSM3-L□□1AA2	Rc1/8	(14.5)
FSM3-L□□1AF2	G1/8 *	(20.5)
FSM3-L□□1AB2	G1/8 *	(20.5)
FSM3-L□□1AC2	NPT1/8	(14.5)

* For G thread shape, refer to the straight type.

Port size: Elbow ø8 mm, ø10 mm, ø3/8", Rc1/4, G1/4, NPT1/4

●FSM3-LLoc1/DH2/EH2/JH2/BA2/BF2/BB2/BC2 (full scale flow rate: 50, 100, 200L/min)

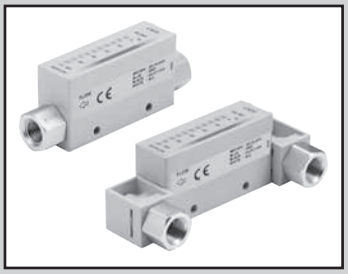


* The top and bottom surfaces of the body are the same as the straight type.

Model No.	Fitting	Dimension (A)
FSM3-L□□1DH2	Push-in ø8 mm	(13.6)
FSM3-L□□1EH2	Push-in ø10 mm	(19.3)
FSM3-L□□1JH2	Push-in 3/8"	(20.0)
FSM3-L□□1BA2	Rc1/4	(15.8)
FSM3-L□□1BF2	G1/4 *	(22.8)
FSM3-L□□1BB2	G1/4 *	(22.8)
FSM3-L□□1BC2	NPT1/4	(15.8)

* For G thread shape, refer to the straight type.

MEMO



Compact flow rate sensor RAPIFLOW

FSM3 Series

Bar display

● Resin body (flow rate range: 500 mL/min to 1000 L/min)

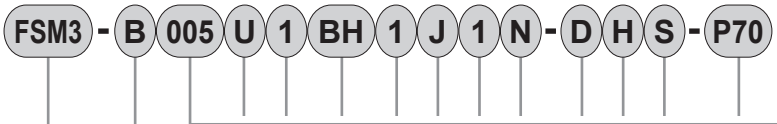
CE RoHS

Bar display specifications

Item			FSM3-[A][B][C][D][E][F][G][H][I]-[ ]										
			[B]										
			005	010	020	050	100	200	500	101	201	501	102
Flow direction	[C]	U	Uni-direction										
		B	Bi-direction										
Measurement flow rate range (□/min) *1	[C]	U	15 to 500 mL	30 to 1000 mL	0.06 to 2.00 L	0.15 to 5.00 L	0.30 to 10.00 L	0.6 to 20.0 L	1.5 to 50.0 L	3.0 to 100.0 L	6 to 200 L	15 to 500 L	30 to 1000 L
		B	−500 to −15, 15 to 500 mL	−1000 to −30, 30 to 1000 mL	−2.00 to −0.06, 0.06 to 2.00 L	−5.00 to −0.15, 0.15 to 5.00 L	−10.00 to −0.30, 0.30 to 10.00 L	−20.0 to −0.6, 0.6 to 20.0 L	−50.0 to −1.5, 1.5 to 50.0 L	−100.0 to −3.0, 3.0 to 100.0 L	−200 to −6, 6 to 200 L	−500 to −15, 15 to 500 L	−1000 to −30, 30 to 1000 L
Display			LED bar display										
Working fluid		Applicable fluid *2	Clean air (JIS B 8392-1:2012 1.1.1 to 5.6.2), compressed air (JIS B 8392-1:2012 1.1.1 to 1.6.2), nitrogen gas										
		Temperature range	0 to 50°C (no condensation)										
		Pressure range	−0.09 to 0.75 MPa										
		Proof pressure	1 MPa										
Operating ambient temperature/humidity			0 to 50°C, 90% RH or less										
Storage temperature			−10 to 60°C										
Accuracy		Accuracy *3	Within ±3% F.S. (Secondary side released to atmosphere) (The scope of warranty is in accordance with the "measurement flow rate range.")										
		Repeatability *4	Within ±1% F.S. (Secondary side released to atmosphere)										
		Temperature characteristics	Within ±0.2% F.S./°C (15 to 35°C, base temperature 25°C)										
		Pressure characteristics	Within ±5% F.S. (-0.09 to 0.7 MPa, where secondary side is released to atmosphere)								Within ±5% F.S. (-0.09 to 0.7 MPa, 0.35 MPa standard)		
Response time *5			50 msec or less										
Analog output *6	[G]	J	1 to 5 V voltage output (connecting load impedance 50 kΩ or more)										
		K	4 to 20 mA current output (connecting load impedance 0 to 300 Ω)										
Power supply voltage *7		J	12 to 24 VDC (10.8 to 26.4 V) ripple rate 1% or less										
		K	24 VDC (21.6 to 26.4 V) ripple rate 1% or less										
Current consumption *8			45 mA or less										
Lead wire			ø3.7, AWG26 or equivalent × 4-conductor (connector), insulator O.D. ø1.0										
Degree of protection			IP40 or equivalent (IEC standard)										
Protection circuit *9			Power supply reverse connection protection										
Vibration resistance			10 to 150 Hz, 100 m/s^2, 2 hours each in X, Y, Z directions										
EMC Directive			EN55011, EN61000-6-2, EN61000-4-2/3/4/6/8										
Mounting		Mounting orientation *10	Unrestricted in vertical/horizontal direction										
		Straight piping section *11	Not required										

*1: The value converted to volumetric flow rate at standard condition (20°C, 1 barometric pressure (101 kPa), 65%RH)
*2: Use dry gas which does not contain corrosive elements such as chlorine, sulfur or acids, and which is clean and does not contain dust or oil mist. When using compressed air, use clean air that complies with JIS B 8392-1:2012 Class 1.1.1 to 1.6.2. Compressed air from the compressor contains drainage (water, oil oxides, foreign matter, etc.). To maintain the function of this product, install a filter, air dryer (min. pressure dew point 10˚C or less), and oil mist filter (max. oil content 0.1 mg/m^3) on the primary side (upstream side) of this product. (Refer to page 74 for details on recommended circuit.)
*3: Accuracy is based on a CKD standard flow rate meter. It does not indicate absolute accuracy.
Repeatability, temperature characteristics, and pressure characteristics are not included for an accuracy of ±3% F.S.
Consider separately according to the working environment and working conditions.
*4: Repeatability calculated during a short time. Change over time is not included. (Refer to the product specifications for details.)
*5: The actual response time changes depending on the piping conditions.
*6: The output impedance of the output impedance of the analog output voltage output is approximately 1 kΩ. If the impedance of the connecting load is small, output and error increase. Check error with the impedance of the connecting load before using.
*7: The power supply voltage specifications differ for the voltage output and current output types.
*8: Current for when 24 VDC is connected, and no load is applied. The current consumption will vary depending on how the load is connected.
*9: This product's protection circuit is effective only for specific misconnections and load short-circuits. It does not provide protection for all misconnections.
*10: This product measures changes in heat distribution that are caused by flow.
When this product is mounted in a vertical orientation, convective flow may affect heat distribution or cause the zero point to deviate.
*11: Accuracy may be affected by the piping conditions. To perform measurement with greater accuracy, install a straight pipe with a piping I.D. ten times larger. With the 500 L/min and 1,000 L/min models, use piping with an internal diameter of 9 mm or more. If it is less than 9 mm, accuracy may be negatively affected.
*12: Refer to page 58 for weight.

How to order



Model No.

A Display

B Flow rate ranges (full scale)

C Flow direction

D Body material / applicable fluid

E Port size

F Piping direction

G Output specifications

H Unit specifications

I Valve option

J Lead wire

K Mounting (not assembled)

L Attached documents

M Clean-room specifications

Code	Description
A Display	
B	Bar display

B Flow rate ranges (full scale)			
005	500 mL/min	500	50 L/min
010	1000 mL/min	101	100 L/min
020	2 L/min	201	200 L/min
050	5 L/min	501	500 L/min
100	10 L/min	102	1000 L/min
200	20 L/min		

C Flow direction	*3
U	Uni-direction
B	Bi-direction

D Body material / applicable fluid		
	Body material	Applicable fluids
1	Resin	Air

E Port size				
BH	Push-in (for ø4 mm tube)	AF	G1/8	*4
CH	Push-in (for ø6 mm tube)	BF	G1/4	*4
DH	Push-in (for ø8 mm tube)	CF	G1/2	*4
EH	Push-in (for ø10 mm tube)	AB	G1/8	*5
HH	Push-in (for ø1/4" tube)	BB	G1/4	*5
JH	Push-in (for ø3/8" tube)	CB	G1/2	*5
AA	Rc1/8	AC	NPT1/8	
BA	Rc1/4	BC	NPT1/4	
CA	Rc1/2	CC	NPT1/2	

F Piping direction	
1	Straight
2	Elbow *6

G Output specifications	*2
J	Analog voltage output x 1 point
K	Analog current output x 1 point

H Unit specifications	
1	SI units only

I Valve option	*3
N	None
E	EXA connecting fitting (EXA sold separately) *7, *8, *9

J Lead wire	
Blank	None
C	4-conductor 1 m
D	4-conductor 3 m

K Mounting (not assembled)	*10, *11
Blank	None
H	Bracket 1 (for models 200 L or less)
J	Bracket 2 (for 500 or 1000 L models)
M	DIN rail mounting (for models 200 L or less)

L Attached documents	
Blank	None
R	Company certification
S	Inspection certificate + Calibration certificate + Traceability system diagram

M Clean-room specifications		
Blank	None	
P70	Anti-dust generation	*12
P80	Oil free	*13

[Example of model No.]

FSM3-B005U1BH1J1N-DHS-P70

Model: RAPIFLOW FSM3 Series

A Display	B	: Bar display
B Flow rate	005	: 500 mL/min
C Flow direction	U	: Uni-direction
D Body material / applicable fluid	1	: Resin/air
E Port size	BH	: Push-in (ø4 mm for tube)
F Piping direction	1	: Straight
G Output specifications	J	: Analog voltage output ×1
H Unit specifications	1	: SI units only
I Valve option	N	: None
J Lead wire	D	: 4-conductor 3 m
K Mounting attachment	H	: Bracket
L Attached documents	S	: Company certification + Traceability certification
M Clean-room specifications	P70	: Anti-dust generation

Precautions for model No. selection

*1: Refer to the correspondence table on the following page when selecting the model.
*2: When using in combination with a separated display (FSM2-D), select ""J": analog voltage output × 1 point".
*3: For "B: bi-directional" models, I the only valve option is "N: none". Note that "E: EXA connecting fitting" cannot be selected.
*4: The G thread connection shape is compliant with ISO16030 standards.
*5: Please refer to the external dimension diagram (Pages 13 to 14) for the G thread connection shape when making a selection. (The G thread connection shape is compliant with JIS B 2351-1, O types.)
*6: Note that if you mount the elbow fitting in an upward position, it will interfere with the connector, and if you mount the elbow fitting in a downward position, it will interfere with the DIN rail mounting.
*7: Connection to solenoid valves (EXA Series) is possible with the dedicated fitting. Refer to page 67.
*8: Be sure to set EXA to the OUT side of the product. Use a lead wire for the EXA coil option. The DIN terminal box cannot be mounted because it will cause interference. After making sure it is connected firmly, confirm that there is no external leakage.
*9: M Clean-room specifications "P70" and "P80" cannot be selected.
*10: "Panel mount" option cannot be selected. Note that the bracket mounting position may interfere with the elbow fitting.
*11: Optional parts are provided with the product. They are not assembled with the product.
*12: The product surface is degreased and cleaned before packaging, and heat-sealed into an antistatic bag on a clean bench (Class 1000 or more).
*13 In addition to P70 specifications, wetted section materials are degreased and cleaned.

Compatibility table of flow rate ranges and port sizes, and EXA connection fittings

Ⓑ Flow rate range	Ⓔ Port sizes Ⓕ Piping direction															
	BH1	CH1	DH1	EH1	HH1	JH1	BH2	CH2	DH2	EH2	HH2	JH2	AA1	BA1	CA1	AA2
005	●	●			●		●	●			●		●			●
010	●	●			●		●	●			●		●			●
020	●	●			●		●	●			●		●			●
050	●	●			●		●	●			●		●			●
100	●	●			●		●	●			●		●			●
200	●	●			●		●	●			●		●			●
500		●	●		●			●	●		●		●	●★		●
101			●	●		●			●	●		●		●★		
201			●	●		●			●	●		●		●★		
501															●	
102															●	
	BA2	AF1	BF1	CF1	AF2	BF2	AB1	BB1	CB1	AB2	BB2	AC1	BC1	CC1	AC2	BC2
005		●			●		●			●		●			●	
010		●			●		●			●		●			●	
020		●			●		●			●		●			●	
050		●			●		●			●		●			●	
100		●			●		●			●		●			●	
200		●			●		●			●		●			●	
500	●	●	●		●	●	●	●		●	●	●	●		●	●
101	●		●			●		●			●		●			●
201	●		●			●		●			●		●			●
501				●					●					●		
102				●					●					●		

● : Port compatibility ★ : EXA connection fitting compatibility

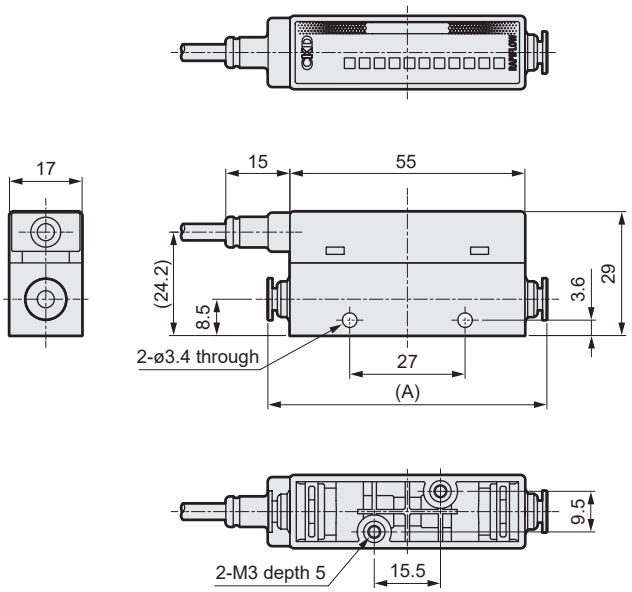
Compatibility table of port sizes and clean-room specifications

Ⓜ Clean-room specifications	Ⓔ Port size Ⓕ Piping direction															
	BH1	CH1	DH1	EH1	HH1	JH1	BH2	CH2	DH2	EH2	HH2	JH2	AA1	BA1	CA1	AA2
Blank	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
P70	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
P80	●	●					●	●					●	●	●	●
	BA2	AF1	BF1	CF1	AF2	BF2	AB1	BB1	CB1	AB2	BB2	AC1	BC1	CC1	AC2	BC2
Blank	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
P70	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
P80	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

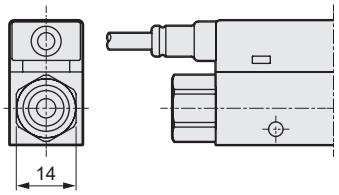
Dimensions (bar display)

Port sizes: Straight ø4 mm, ø6 mm, ø1/4", Rc1/8, G1/8, NPT1/8

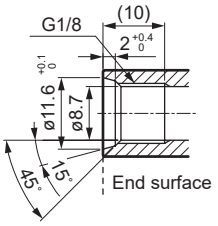
● FSM3−B□□1/BH1/CH1/HH1/AA1/AF1/AB1/AC1 (Full scale flow rates: 500 mL/min, 1, 2, 5, 10, 20, 50 L/min)



Rc1/8, NPT1/8, G1/8 (AB1)

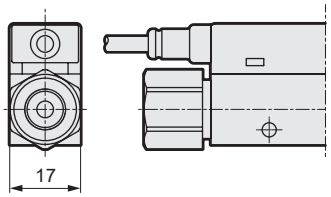


G thread shape (AB)



The 15° surface is the sealing surface.
Please note that this is not an end face seal. Also, be sure to confirm that the screw depth of the fitting matches before use.

G1/8 (AF1)

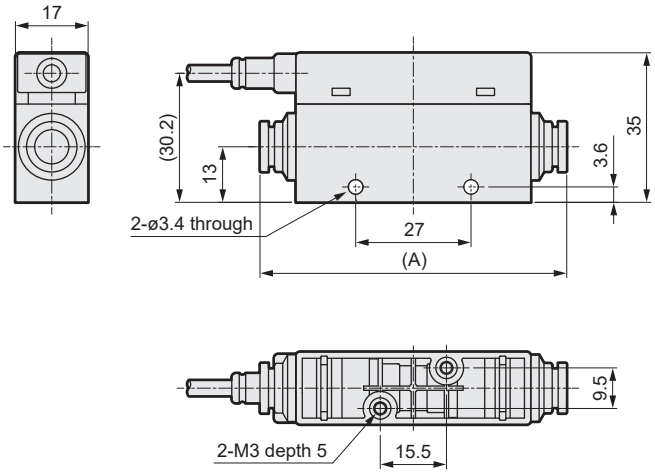


Model No.	Fitting	Dimension (A)
FSM3-B□□1BH1	Push-in ø4 mm	(65)
FSM3-B□□1CH1	Push-in ø6 mm	(67.2)
FSM3-B□□1HH1	Push-in 1/4"	(70.4)
FSM3-B□□1AA1	Rc1/8	(75)
FSM3-B□□1AF1	G1/8	(87)
FSM3-B□□1AB1	G1/8	(87)
FSM3-B□□1AC1	NPT1/8	(75)

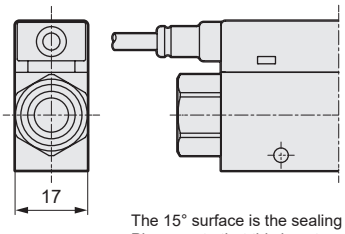
Port sizes: Straight ø8 mm, ø10 mm, ø3/8", Rc1/4, G1/4, NPT1/4

● FSM3−B□□1/DH1/EH1/JH1/BA1/BF1/BB1/BC1 (Full scale flow rates: 50, 100, 200 L/min)

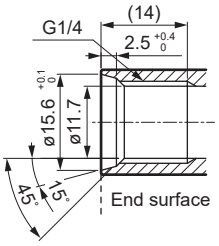
* The dedicated adaptor for the EXA connection type is the secondary side (to the right in the figure below).
For connection dimensions, refer to page 67.



Rc1/4, NPT1/4, G1/4 (BB1)

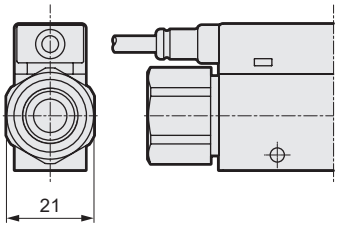


G thread shape (BB)



The 15° surface is the sealing surface.
Please note that this is not an end face seal. Also, be sure to confirm that the screw depth of the fitting matches before use.

G1/4 (BF1)

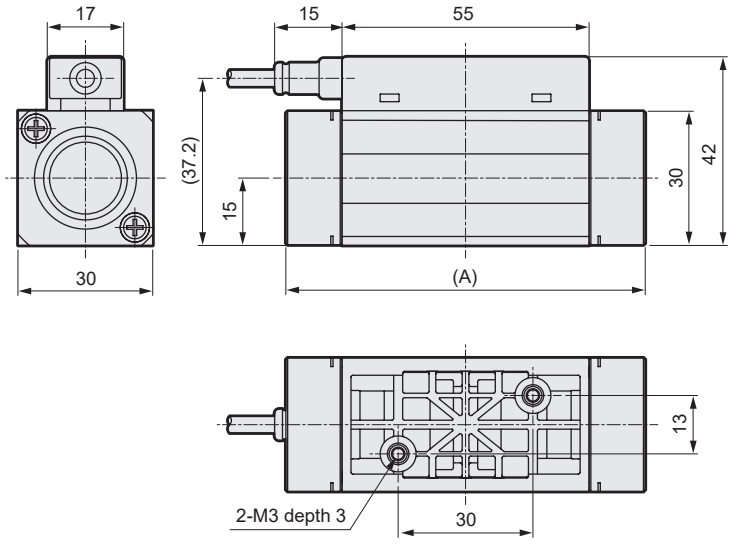


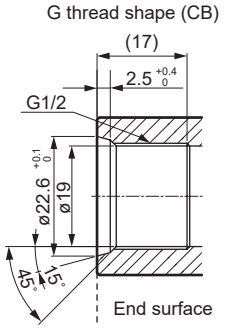
Model No.	Fitting	Dimension (A)
FSM3-B□□1DH1	Push-in ø8 mm	(70.6)
FSM3-B□□1EH1	Push-in ø10 mm	(82.1)
FSM3-B□□1JH1	Push-in 3/8"	(83.4)
FSM3-B□□1BA1	Rc1/4	(75)
FSM3-B□□1BF1	G1/4	(89)
FSM3-B□□1BB1	G1/4	(89)
FSM3-B□□1BC1	NPT1/4	(75)

Dimensions (bar display)

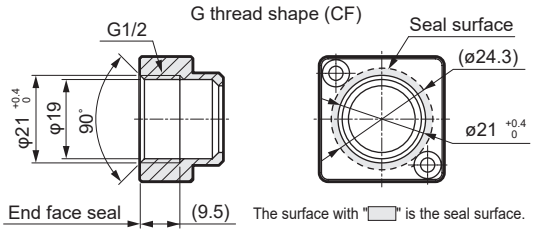
Port sizes: Straight Rc1/2, G1/2, NPT1/2

● FSM3−B□□1/CA1/CF1/CB1/CC1 (Full scale flow rates: 500, 1000 L/min)





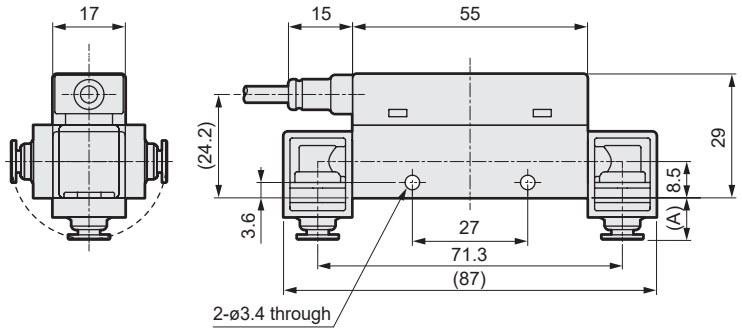
The 15° surface is the sealing surface. Please note that this is not an end face seal. Also, be sure to confirm that the screw depth of the fitting matches before use.



Model No.	Fitting	Dimension (A)
FSM3-B□□1CA1	Rc1/2	(80)
FSM3-B□□1CF1	G1/2	(80)
FSM3-B□□1CB1	G1/2	(95.4)
FSM3-B□□1CC1	NPT1/2	(80)

Port sizes: Elbow ø4 mm, ø6 mm, ø1/4", Rc1/8, G1/8, NPT1/8

● FSM3−B□□1/BH2/CH2/HH2/AA2/AF2/AB2/AC2 (Full scale flow rates: 500 mL/min, 1, 2, 5, 10, 20, 50 L/min)



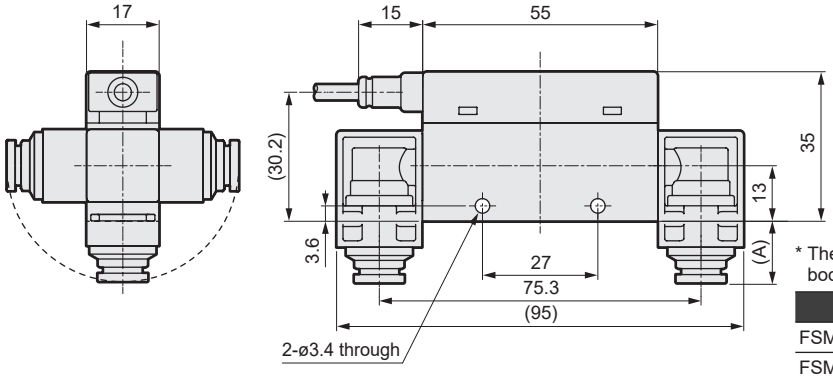
* The shapes of the upper surface and lower surface of the main body are the same as that of the straight type.

Model No.	Fitting	Dimension (A)
FSM3-B□□1BH2	Push-in ø4 mm	(9.5)
FSM3-B□□1CH2	Push-in ø6 mm	(10.6)
FSM3-B□□1HH2	Push-in 1/4"	(12.2)
FSM3-B□□1AA2	Rc1/8	(14.5)
FSM3-B□□1AF2	G1/8 *	(20.5)
FSM3-B□□1AB2	G1/8 *	(20.5)
FSM3-B□□1AC2	NPT1/8	(14.5)

*Please refer to the straight type for the G thread shape.

Port sizes: Elbow ø8 mm, ø10 mm, ø3/8", Rc1/4, G1/4, NPT1/4

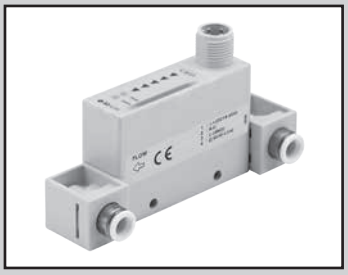
● FSM3−B□□1/DH2/EH2/JH2/BA2/BF2/BB2/BC2 (Full scale flow rates: 50, 100, 200 L/min)



* The shapes of the upper surface and lower surface of the main body are the same as that of the straight type.

Model No.	Fitting	Dimension (A)
FSM3-B□□1DH2	Push-in ø8 mm	(13.6)
FSM3-B□□1EH2	Push-in ø10 mm	(19.3)
FSM3-B□□1JH2	Push-in 3/8"	(20.0)
FSM3-B□□1BA2	Rc1/4	(15.8)
FSM3-B□□1BF2	G1/4 *	(22.8)
FSM3-B□□1BB2	G1/4 *	(22.8)
FSM3-B□□1BC2	NPT1/4	(15.8)

*Please refer to the straight type for the G thread shape.



Compact flow rate sensor RAPIFLOW

FSM3 Series

IO-Link

● Resin body (flow rate range: 500 mL/min to 1000 L/min)

IO-Link specifications

Item			FSM3-[A][B][C][D][E][F][G][H][I]-[ ]										
			[B]										
			005	010	020	050	100	200	500	101	201	501	102
Flow direction	[C]	U	Uni-direction										
		B	Bi-direction										
Measurement flow rate range (□/min) *1	[C]	U	15 to 500 mL	30 to 1000 mL	0.06 to 2.00 L	0.15 to 5.00 L	0.30 to 10.00 L	0.6 to 20.0 L	1.5 to 50.0 L	3.0 to 100.0 L	6 to 200 L	15 to 500 L	30 to 1000 L
		B	−500 to −15, 15 to 500 mL	−1000 to −30, 30 to 1000 mL	−2.00 to −0.06, 0.06 to 2.00 L	−5.00 to −0.15, 0.15 to 5.00 L	−10.00 to −0.30, 0.30 to 10.00 L	−20.0 to −0.6, 0.6 to 20.0 L	−50.0 to −1.5, 1.5 to 50.0 L	−100.0 to −3.0, 3.0 to 100.0 L	−200 to −6, 6 to 200 L	−500 to −15, 15 to 500 L	−1000 to −30, 30 to 1000 L
Display			LED display (power and status indicators)										
Working fluid		Applicable fluid *2	Clean air (JIS B 8392-1:2012 1.1.1 to 5.6.2), compressed air (JIS B 8392-1:2012 1.1.1 to 1.6.2), Nitrogen Gas										
			Argon, carbon dioxide(*3), gas mixture (argon + carbon dioxide)									-	
		Temperature range	0 to 50°C (no condensation)										
		Pressure range	−0.09 to 0.75 MPa										
		Proof pressure	1 MPa										
Operating ambient temperature/humidity			0 to 50°C, 90% RH or less										
Storage temperature			−10 to 60°C										
Accuracy *4 (Fluid: in dry air)		Accuracy *5	Within ±3% F.S. (Secondary side released to atmosphere) (The scope of warranty is in accordance with the "measurement flow rate range.")										
		Repeatability *6	Within ±1% F.S. (Secondary side released to atmosphere)										
		Temperature characteristics	Within ±0.2% F.S./°C (15 to 35°C, base temperature 25°C)										
		Pressure characteristics	Within ±5% F.S. (-0.09 to 0.7 MPa, where secondary side is released to atmosphere)								Within ±5% F.S. (-0.09 to 0.7 MPa, 0.35 MPa standard)		
Response time *7			50 msec or less (Setting response time OFF)										
Power supply voltage			18 to 30 VDC (ripple rate 1% or less)										
Current consumption *8			45 mA or less										
Lead wire *9			M12 both-end connector lead wire (3 m), AWG#23 or equivalent, 4-conductor										
Functions *10			① Gas type selection, ② flow rate integration, ③ peak hold, etc.										
Degree of protection			IP40 or equivalent (IEC standard)										
Protection circuit *11			Power supply reverse connection protection										
Vibration resistance *12			10 to 150 Hz, 100 m/s², 2 hours each in X, Y, Z directions										
EMC Directive			EN55011, EN61000-6-2, EN61000-4-2/3/4/6/8										
Mounting		Mounting orientation *13	Unrestricted in vertical/horizontal direction										
		Straight piping section *14	Not required										

* Refer to page 63 for communication specifications.

*1: The value converted to volumetric flow rate at standard condition (20°C, 1 barometric pressure (101 kPa), 65%RH) (20°C, 1 atmospheric pressure (101 kPa), 0%RH with a type of gas other than air.)

*2: Use dry gas which does not contain corrosive elements such as chlorine, sulfur or acids, and which is clean and does not contain dust or oil mist. When using compressed air, use clean air that complies with JIS B 8392-1:2012 Class 1.1.1 to 1.6.2. Compressed air from the compressor contains drainage (water, oil oxides, foreign matter, etc.). To maintain the function of this product, install a filter, air dryer (min. pressure dew point 10˚C or less), and oil mist filter (max. oil content 0.1 mg/m^3) on the primary side (upstream side) of this product. (Refer to page 72 for details on recommended circuit.)

*3: With the gas type switching function, the full scale flow rate after switching to carbon dioxide is half the flow rate range.

Gas	Flow direction	Measurement flow rate range (□/min)							
		005	010	020	100	200	500	101	201
Carbon dioxide	Uni-direction	15 to 250mL	30 to 500mL	0.06 to 1.00L	0.30 to 5.00L	0.6 to 10.0L	1.5 to 25.0L	3.0 to 50.0L	6 to 100L
	Bi-direction	-250 to -15mL	-500 to -30mL	-1.00 to -0.06L	-5.00 to -0.30L	-10.0 to -0.6L	-25.0 to -1.5L	-50.0 to -3.0L	-100 to -6L
		15 to 250mL	30 to 500mL	0.06 to 1.00L	0.30 to 5.00L	0.6 to 10.0L	1.5 to 25.0L	3.0 to 50.0L	6 to 100L

*4: Compressed air is used for adjusting and inspecting this product. Accuracy for gas types other than air is a guideline.

*5: Accuracy is based on a CKD standard flow rate meter. It does not indicate absolute accuracy.
Repeatability, temperature characteristics, and pressure characteristics are not included for an accuracy of ±3% F.S.
Consider separately according to the working environment and working conditions.

*6: Repeatability calculated during a short time. Change over time is not included. (Refer to the product specifications for details.)

*7: The actual response time changes depending on the piping conditions. As a guideline, the response time can be set within the range of 50 msec. to 1.5 sec.

*8: Current for when 24 VDC is connected, and no load is applied. The current consumption will vary depending on how the load is connected.

*9: The male end is straight, and the female end is angled. (Refer to page 65.)
Tighten the M12 connector at a torque of 0.5 N·m or less.
Note, however, that using excessive force to tighten the connector can cause it to break.

*10: The gas type switching function enables switching to argon, carbon dioxide and a gas mixture of argon 80% + carbon dioxide 20%.
The measurement flow rate ranges after switching are as follows. (Note that the 500 L/min and 1,000 L/min models do not have a gas change function.)

Gas type	Flow direction	Measurement flow rate range (□/min)							
		005	010	020	100	200	500	101	201
• Air • Nitrogen • Argon • Argon 80% + carbon dioxide 20%	Uni-direction	15 to 500 mL	30 to 1000 mL	0.06 to 2.00 L	0.30 to 10.00 L	0.6 to 20.0 L	1.5 to 50.0 L	3.0 to 100.0 L	6 to 200 L
	Bi-direction	−500 to −15 mL	−1000 to −30 mL	−2.00 to −0.06 L	−10.00 to −0.30 L	−20.0 to −0.6 L	−50.0 to −1.5 L	−100.0 to −3.0 L	−200 to −6 L
		15 to 500 mL	30 to 1000 mL	0.06 to 2.00 L	0.30 to 10.00 L	0.6 to 20.0 L	1.5 to 50.0 L	3.0 to 100.0 L	6 to 200 L

The integrating flow is a reference value.
When using the integrated save function, take care to prevent the number of saves from exceeding the access count limit of the storage device (1 million times).
(Changes to the settings are counted in number of accesses.)

$$\text{Number of saves} = \frac{\text{Usage time}}{5 \text{ mins}} < 1 \text{ million times}$$

*11: This product's protection circuit is effective only for specific misconnections and load short-circuits. It does not provide protection for all misconnections.

*12: A communication error might occur depending on the vibration conditions. Install this product as far as possible in a place not subject to vibration.

*13: This product measures changes in heat distribution that are caused by flow.
When this product is mounted in a vertical orientation, convective flow may affect heat distribution or cause the zero point to deviate.

*14: Accuracy may be affected by the piping conditions. To perform measurement with greater accuracy, install a straight pipe with a piping I.D. ten times larger. With the 500 L/min and 1,000 L/min models, use piping with an internal diameter of 9 mm or more. If it is less than 9 mm, accuracy may be negatively affected.

*15: Refer to page 58 for weight.

How to order

FSM3 - C 005 U 1 BH 1 L 1 N - G H R - P70

Model No. / Ⓐ Display / Ⓑ Flow rate ranges (full scale) / Ⓒ Flow direction / Ⓓ Body material / applicable fluid / Ⓔ Port size / Ⓕ Piping direction / Ⓖ Output specifications / Ⓗ Unit specifications / Ⓘ Valve option / Ⓙ Lead wire / Ⓚ Mounting (not assembled) / Ⓛ Attached documents / Ⓜ Clean-room specifications

[Example of model No.]

FSM3-C005U1BH1L1N-GHR-P70

Model: RAPIFLOW FSM3 Series

Ⓐ Display	C	: IO-Link
Ⓑ Flow rate	005	: 500 mL/min
Ⓒ Flow direction	U	: Uni-direction
Ⓓ Body material / applicable fluid	1	: Resin/air
Ⓔ Port size	BH	: Push-in (ø4 mm for tube)
Ⓕ Piping direction	1	: Straight
Ⓖ Output specifications	L	: IO-Link
Ⓗ Unit specifications	1	: SI units only
Ⓘ Valve option	N	: None
Ⓙ Lead wire	G	: M12 both-end lead wire with connector (3 m)
Ⓚ Mounting attachment	H	: Bracket
Ⓛ Attached documents	R	: Company certification
Ⓜ Clean-room specifications	P70	: Anti-dust generation

Precautions for model No. selection

*1: Refer to the correspondence table on the following page when selecting the model.
*2: The G thread connection shape is compliant with ISO16030 standards.
*3: Please refer to the external dimension diagram (Pages 19 to 20) for the G thread connection shape when making a selection. (The G thread connection shape is compliant with JIS B 2351-1, O types.)
*4: Note that if you mount the elbow fitting in an upward position, it will interfere with the connector, and if you mount the elbow fitting in a downward position, it will interfere with the DIN rail mounting.
*5: Note that the bracket mounting position may interfere with the elbow fitting.
*6: Optional parts are provided with the product. They are not assembled with the product.
*7: The product surface is degreased and cleaned before packaging, and heat-sealed into an antistatic bag on a clean bench (Class 1000 or more).
*8: In addition to P70 specifications, wetted section materials are degreased and cleaned.

Code	Description
Ⓐ Display	
C	IO-Link

Ⓑ Flow rate ranges (full scale)

005	500 mL/min	**500**	50 L/min
010	1000 mL/min	**101**	100 L/min
020	2 L/min	**201**	200 L/min
050	5 L/min	**501**	500 L/min
100	10 L/min	**102**	1000 L/min
200	20 L/min		

Ⓒ Flow direction

U	Uni-direction
B	Bi-direction

Ⓓ Body material / applicable fluid

	Body material	Applicable fluid
1	Resin	Air (gas switchable)

Ⓔ Port size

BH	Push-in (for ø4 mm tube)	**AF**	G1/8	*2
CH	Push-in (for ø6 mm tube)	**BF**	G1/4	*2
DH	Push-in (for ø8 mm tube)	**CF**	G1/2	*2
EH	Push-in (for ø10 mm tube)	**AB**	G1/8	*3
HH	Push-in (for ø1/4" tube)	**BB**	G1/4	*3
JH	Push-in (for ø3/8" tube)	**CB**	G1/2	*3
AA	Rc1/8	**AC**	NPT1/8	
BA	Rc1/4	**BC**	NPT1/4	
CA	Rc1/2	**CC**	NPT1/2	

Ⓕ Piping direction

1	Straight
2	Elbow *4

Ⓖ Output specifications

L	IO-Link communication

Ⓗ Unit specifications

1	SI units only

Ⓘ Valve option

N	None

Ⓙ Lead wire

Blank	None
G	M12 both-end lead wire with connector (3 m)

Ⓚ Mounting (not assembled) *5, *6

Blank	None
H	Bracket 1 (for models 200 L or less)
J	Bracket 2 (for 500 or 1000 L models)
M	DIN rail mounting (for models 200 L or less)

Ⓛ Attached documents

Blank	None
R	Company certification
S	Inspection certificate + Calibration certificate + Traceability system diagram

Ⓜ Clean-room specifications

Blank	None	
P70	Anti-dust generation	*7
P80	Oil free	*8

Flow rate ranges and port sizes

Ⓑ Flow rate range	Ⓔ Port sizes Ⓕ Piping direction															
	BH1	CH1	DH1	EH1	HH1	JH1	BH2	CH2	DH2	EH2	HH2	JH2	AA1	BA1	CA1	AA2
005	●	●			●		●	●			●		●			●
010	●	●			●		●	●			●		●			●
020	●	●			●		●	●			●		●			●
050	●	●			●		●	●			●		●			●
100	●	●			●		●	●			●		●			●
200	●	●			●		●	●			●		●			●
500		●	●		●			●	●		●		●	●		●
101			●	●		●			●	●		●		●		
201			●	●		●			●	●		●		●		
501															●	
102															●	
	BA2	AF1	BF1	CF1	AF2	BF2	AB1	BB1	CB1	AB2	BB2	AC1	BC1	CC1	AC2	BC2
005		●			●		●			●		●			●	
010		●			●		●			●		●			●	
020		●			●		●			●		●			●	
050		●			●		●			●		●			●	
100		●			●		●			●		●			●	
200		●			●		●			●		●			●	
500	●	●	●		●	●	●	●		●	●	●	●		●	●
101	●		●			●		●			●		●			●
201	●		●			●		●			●		●			●
501				●					●					●		
102				●					●					●		

● : Port size compatibility

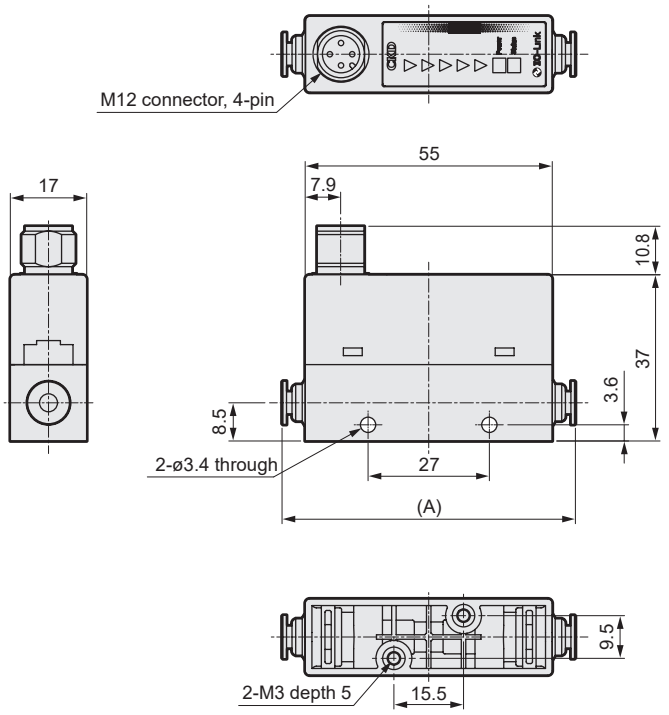
Compatibility table of port sizes and clean-room specifications

Ⓜ Clean-room specifications	Ⓔ Port sizes Ⓕ Piping direction															
	BH1	CH1	DH1	EH1	HH1	JH1	BH2	CH2	DH2	EH2	HH2	JH2	AA1	BA1	CA1	AA2
Blank	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
P70	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
P80	●	●					●	●					●	●	●	●
	BA2	AF1	BF1	CF1	AF2	BF2	AB1	BB1	CB1	AB2	BB2	AC1	BC1	CC1	AC2	BC2
Blank	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
P70	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
P80	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

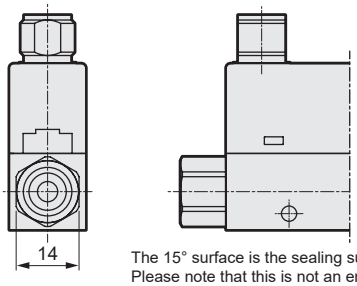
Dimensions (IO-Link)

Port sizes: Straight ø4 mm, ø6 mm, ø1/4", Rc1/8, G1/8, NPT1/8

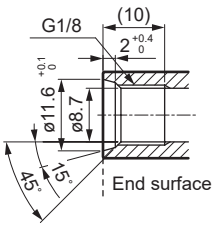
● FSM3−C□□1/BH1/CH1/HH1/AA1/AF1/AB1/AC1 (Full scale flow rates: 500 mL/min, 1, 2, 5, 10, 20, 50 L/min)



Rc1/8, NPT1/8, G1/8 (AB1)

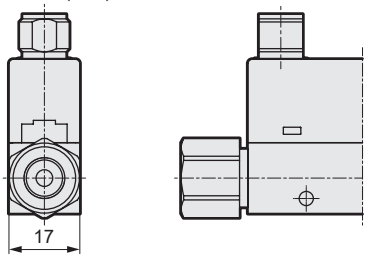


G thread shape (AB)



The 15° surface is the sealing surface.
Please note that this is not an end face seal. Also, be sure to confirm that the screw depth of the fitting matches before use.

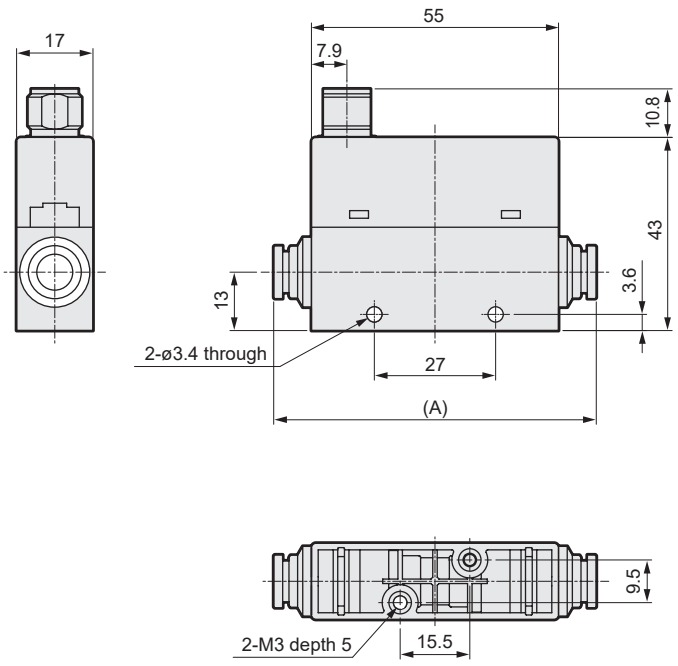
G1/8 (AF1)



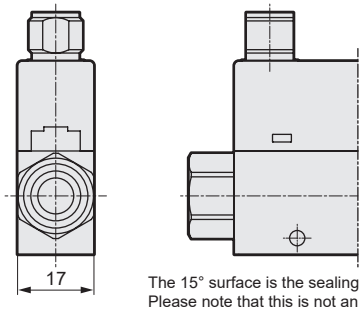
Model No.	Fitting	Dimension (A)
FSM3-C□□1BH1	Push-in ø4 mm	(65)
FSM3-C□□1CH1	Push-in ø6 mm	(67.2)
FSM3-C□□1HH1	Push-in 1/4"	(70.4)
FSM3-C□□1AA1	Rc1/8	(75)
FSM3-C□□1AF1	G1/8	(87)
FSM3-C□□1AB1	G1/8	(87)
FSM3-C□□1AC1	NPT1/8	(75)

Port sizes: Straight ø8 mm, ø10 mm, ø3/8", Rc1/4, G1/4, NPT1/4

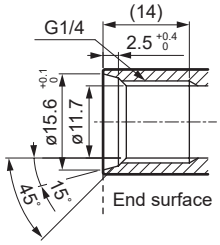
● FSM3−C□□1/DH1/EH1/JH1/BA1/BF1/BB1/BC1 (Full scale flow rates: 50, 100, 200 L/min)



Rc1/4, NPT1/4, G1/4 (BB1)

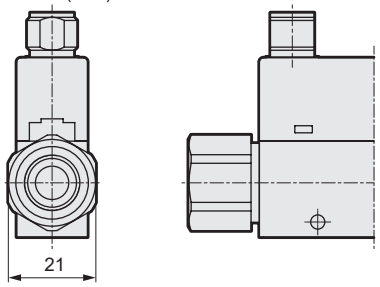


G thread shape (BB)



The 15° surface is the sealing surface.
Please note that this is not an end face seal. Also, be sure to confirm that the screw depth of the fitting matches before use.

G1/4 (BF1)

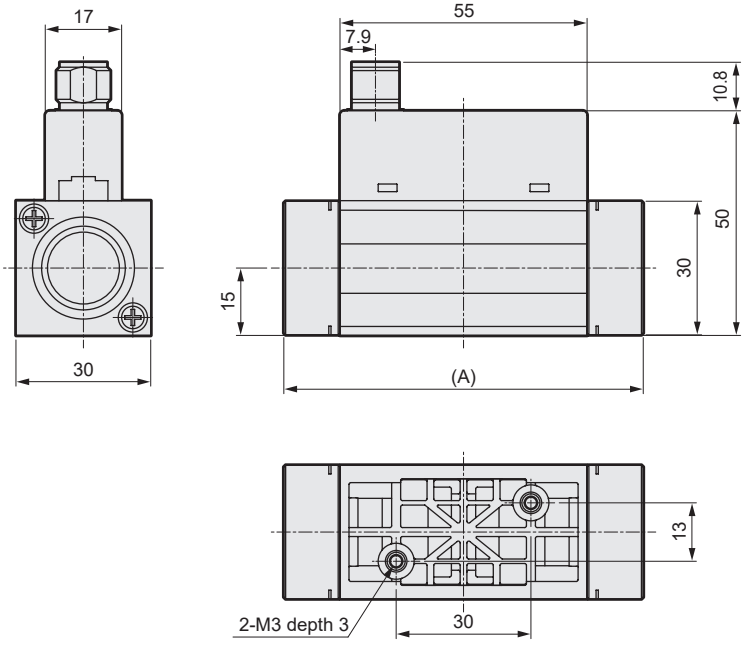


Model No.	Fitting	Dimension (A)
FSM3-C□□1DH1	Push-in ø8 mm	(70.6)
FSM3-C□□1EH1	Push-in ø10 mm	(82.1)
FSM3-C□□1JH1	Push-in 3/8"	(83.4)
FSM3-C□□1BA1	Rc1/4	(75)
FSM3-C□□1BF1	G1/4	(89)
FSM3-C□□1BB1	G1/4	(89)
FSM3-C□□1BC1	NPT1/4	(75)

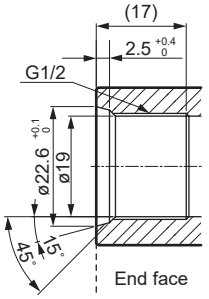
Dimensions (IO-Link)

Port sizes: Straight Rc1/2, G1/2, NPT1/2

● FSM3−C[B][C]1/CA1/CF1/CB1/CC1 (Full scale flow rates: 500, 1000 L/min)

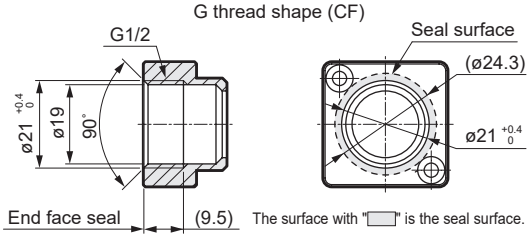


G thread shape (CB)



The 15° surface is the sealing surface. Please note that this is not an end face seal. Also, be sure to confirm that the screw depth of the fitting matches before use.

G thread shape (CF)

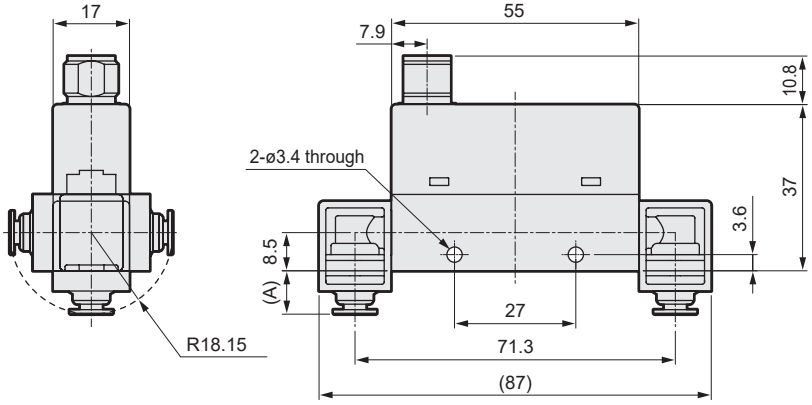


The surface with "▭" is the seal surface.

Model No.	Fitting	Dimension (A)
FSM3-C □□1CA1	Rc1/2	(80)
FSM3-C □□1CF1	G1/2	(80)
FSM3-C □□1CB1	G1/2	(95.4)
FSM3-C □□1CC1	NPT1/2	(80)

Port sizes: Elbow ø4 mm, ø6 mm, ø1/4", Rc1/8, G1/8, NPT1/8

● FSM3−C[B][C]1/BH2/CH2/HH2/AA2/AF2/AB2/AC2 (Full scale flow rates: 500 mL/min, 1, 2, 5, 10, 20, 50 L/min)



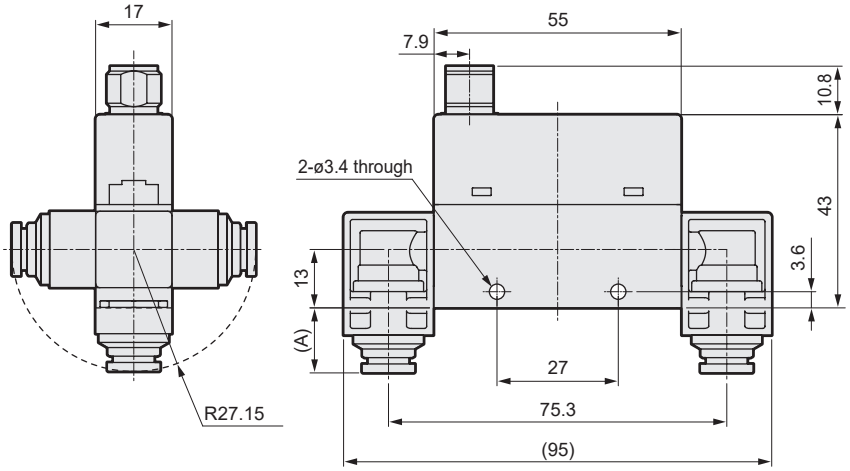
* The shapes of the upper surface and lower surface of the main body are the same as that of the straight type.

Model No.	Fitting	Dimension (A)
FSM3-C □□1BH2	Push-in ø4 mm	(9.5)
FSM3-C □□1CH2	Push-in ø6 mm	(10.6)
FSM3-C □□1HH2	Push-in 1/4"	(12.2)
FSM3-C □□1AA2	Rc1/8	(14.5)
FSM3-C □□1AF2	G1/8 *	(20.5)
FSM3-C □□1AB2	G1/8 *	(20.5)
FSM3-C □□1AC2	NPT1/8	(14.5)

*Please refer to the straight type for the G thread shape.

Port sizes: Elbow ø8 mm, ø10 mm, ø3/8", Rc1/4, G1/4, NPT1/4

● FSM3−C[B][C]1/DH2/EH2/JH2/BA2/BF2/BB2/BC2 (Full scale flow rates: 50, 100, 200 L/min)



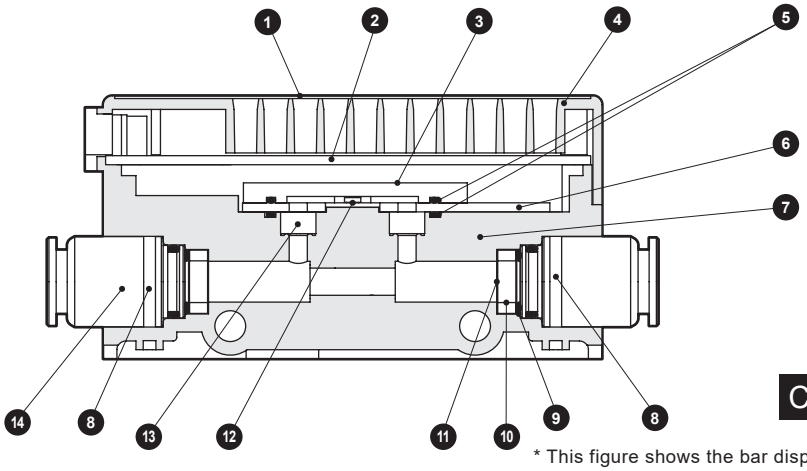
* The shapes of the upper surface and lower surface of the main body are the same as that of the straight type.

Model No.	Fitting	Dimension (A)
FSM3-C □□1DH2	Push-in ø8 mm	(13.6)
FSM3-C □□1EH2	Push-in ø10 mm	(19.3)
FSM3-C □□1JH2	Push-in 3/8"	(20.0)
FSM3-C □□1BA2	Rc1/4	(15.8)
FSM3-C □□1BF2	G1/4 *	(22.8)
FSM3-C □□1BB2	G1/4 *	(22.8)
FSM3-C □□1BC2	NPT1/4	(15.8)

*Please refer to the straight type for the G thread shape.

Internal structure

● FSM3−B005 to 500



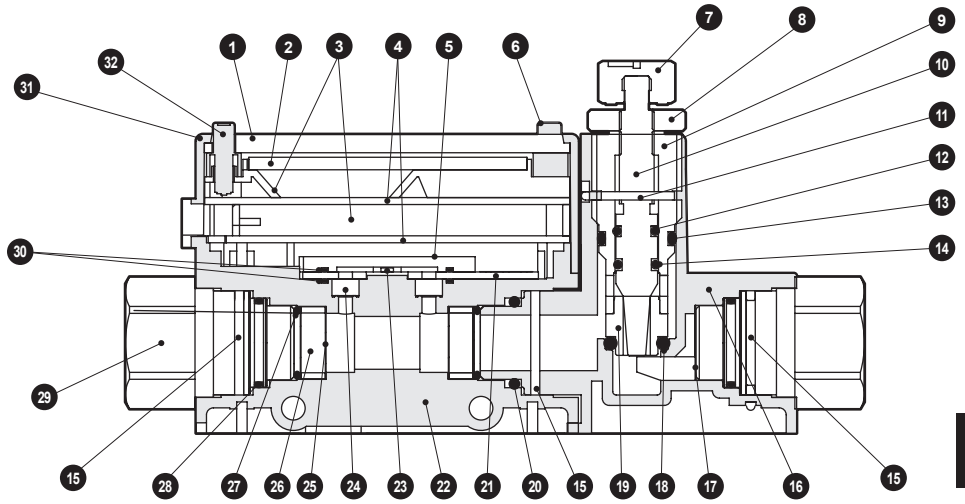
Cannot be disassembled

* This figure shows the bar display with straight fitting.
* The part materials are subject to change without notice.

No.	Part name		Material	No.	Part name		Material
1	Front sheet		PET film	8	Fitting fixing pin		Stainless steel
2	Electronic circuit board		Glass epoxy resin	9	O-ring	*	Fluoro rubber
3	Sensor cover	*	Stainless steel	10	Spacer	*	Aluminum
4	Case		Polyamide resin	11	Port filter	*	Stainless steel
5	Gasket	*	Fluoro rubber	12	Sensor chip	*	Semiconductor silicon
6	Sensor board	*	Glass epoxy resin	13	Bypass filter	*	Stainless steel
7	Sensor body	*	Polyamide resin	14	Fitting		–

* For P80 specifications, the component has been cleaned.

● FSM3−L500 to 201



Cannot be disassembled

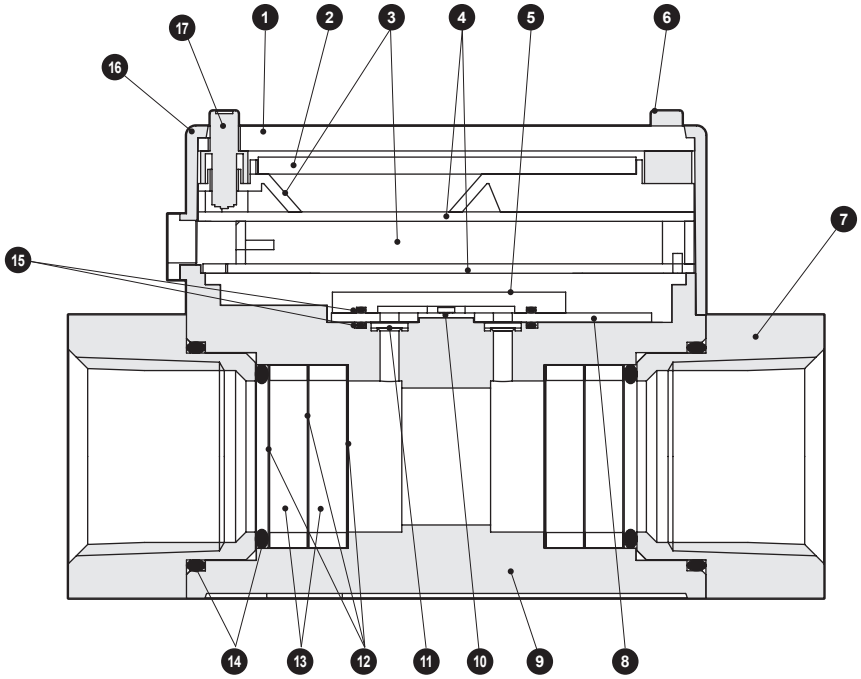
* This figure shows the LCD display with needle valve.
* The part materials are subject to change without notice.

No.	Part name		Material	No.	Part name		Material
1	Liquid crystal cover		Acrylic resin	17	Port filter	*	Stainless steel
2	Liquid crystal		–	18	O-ring	*	Fluoro rubber
3	Base spacer		Polycarbonate resin	19	Orifice	*	Copper alloy/nickeling
4	Electronic circuit board		Glass epoxy resin	20	O-ring	*	Fluoro rubber
5	Sensor cover	*	Stainless steel	21	Sensor board	*	Glass epoxy resin
6	Switch		Ethylene/propylene rubber	22	Sensor body	*	Polyamide resin
7	Knob		Polybutylene terephthalate	23	Sensor chip	*	Semiconductor silicon
8	Lock nut		Copper alloy/nickeling	24	Bypass filter	*	Stainless steel
9	Needle guide	*	Copper alloy/nickeling	25	Port filter	*	Stainless steel
10	Needle	*	Copper alloy/nickeling	26	Spacer	*	Aluminum
11	Fixing pin		Stainless steel	27	O-ring	*	Fluoro rubber
12	O-ring	*	Fluoro rubber	28	O-ring	*	Fluoro rubber
13	O-ring	*	Fluoro rubber	29	Fitting (Rc1/4)	*	Aluminum
14	O-ring	*	Fluoro rubber	30	Gasket	*	Fluoro rubber
15	Fitting fixing pin		Stainless steel	31	Case		Polyamide resin
16	Needle valve body	*	Polyamide resin	32	Switch		Ethylene/Propylene rubber

* For P80 specifications, the component has been cleaned.

Internal structure

● FSM3−L501/102



Cannot be disassembled

* This figure shows the LCD display.
* The part materials are subject to change without notice.

No.	Part name	Material	No.	Part name	Material
1	Liquid crystal cover	Acrylic resin	10	Sensor chip *	Semiconductor silicon
2	Liquid crystal	−	11	Bypass filter *	Stainless steel
3	Base spacer	Polycarbonate resin	12	Port filter *	Stainless steel
4	Electronic circuit board	Glass epoxy resin	13	Spacer *	Aluminum
5	Sensor cover *	Stainless steel	14	O-ring *	Fluoro rubber
6	Switch	Ethylene/propylene rubber	15	Gasket *	Fluoro rubber
7	Fitting (Rc1/2) *	Aluminum	16	Case	Polyamide resin
8	Sensor board *	Glass epoxy resin	17	Switch	Ethylene/Propylene rubber
9	Sensor body *	Polyamide resin			

* For P80 specifications, the component has been cleaned.