

2-Color Display Digital Flow Switch

Applicable fluid **Air, N₂**



Switches/
Sensors

ISA3

PFMB

LFE

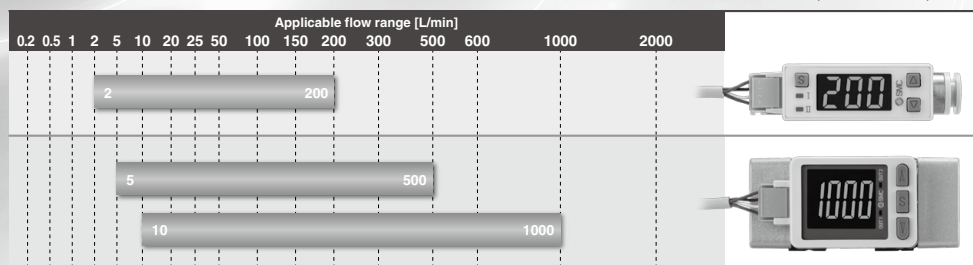
Expanded flow range! Wide range of flow measurement with one product

Flow ratio* **(100: 1)**

* Flow ratio is 10: 1 for current PF2A.

Setting resolution: **1 L/min**

Current PF2A: 5 L/min (200 L: 2 L/min)

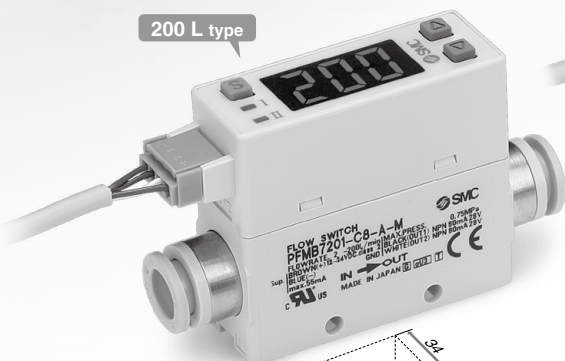


Compact, Space saving

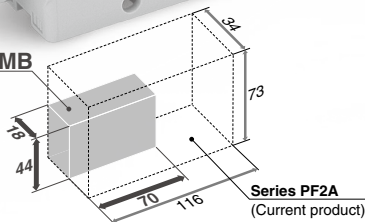
500 L/1000 L type

Approx. **1/3** the volume of the current product (200 L type)

200 L type

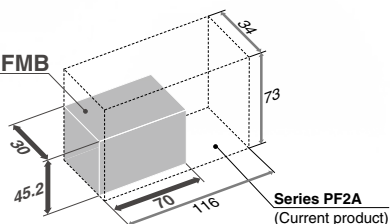


New PFMB



Comparison with PFMB7201 and PF2A721-03

New PFMB



Comparison with PFMB7501-04 and PF2A751-04

Series PFMB



2-Color Display Digital Flow Switch

Flow adjustment valve is integrated.

200 L type

Reduces piping installation work and space requirements. Special design provides smooth adjustment to match needle rotations.

Flow adjustment valve

500 L/1000 L type

200 L type

Response time

Can be selected from

50 msec.(0.05 sec./ **0.1** sec./
0.5 sec./ **1.0** sec./ **2.0** sec.

Response time can be set depending on application.

Grease-free

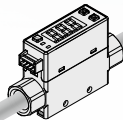
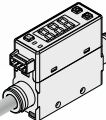
Piping variations

200 L type

Straight

One-touch fitting $\varnothing 8$

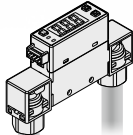
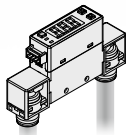
Female thread Rc, NPT, G 1/4



Bottom

One-touch fitting $\varnothing 8$

Female thread Rc, NPT, G 1/4



Reversed display mode

When the switch is used upside down, the orientation of the display can be rotated to make it easier to read.

No display rotating function Display is upside down.



With display rotating function

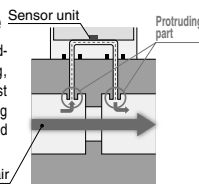


Functions (Refer to page 567 and 568 for details.)

- Output operation
- Display color
- Reference condition
- Response time
- Display mode
- External input function
- Accumulated value hold
- Analog output hold
- Forced output function
- Analog output free range function
- Power-saving mode
- Peak/Bottom value display
- Keylock function
- Error display function
- Orientation correction function
- Reversed display mode
- Reset to the default settings.
- Setting of security code

Bypass structure

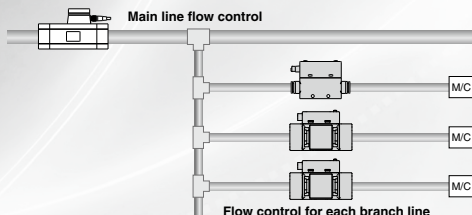
Bypass structure with protruding part at the main piping, reduces the contact of moist air with the sensor, reducing degradation of the sensor and maintaining accuracy.



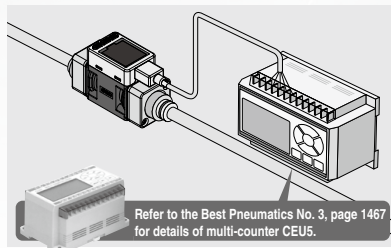
Digital flow switch to save energy!

Flow control is necessary for promoting energy saving in any application.

Saving energy starts from numerical control of the flow consumption of equipment and lines and clarification of the purpose and effect.

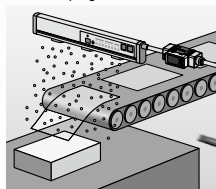


- Digital display allows visualization of flow rate.
- Remote control is possible with accumulated pulse.
- 2-color display Improved visibility



Applications

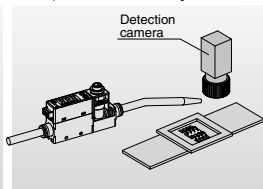
Control of purge air flow of ionizer



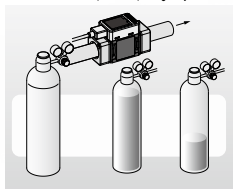
Flow control of the air for spray painting



- Flow control of N₂ gas to prevent lead frame oxidation
- N₂ blow prevents distortion of camera image due to air turbulence.



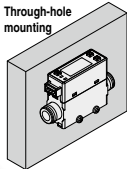
- Accumulated indication shows the operating flow rate or residual amount (of N₂ etc.) in a gas cylinder.



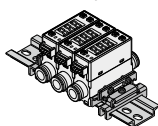
Mounting

200 L type

Through-hole mounting



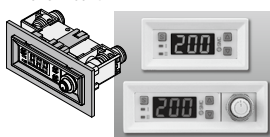
DIN rail



Bracket

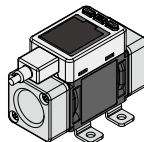


Panel mount



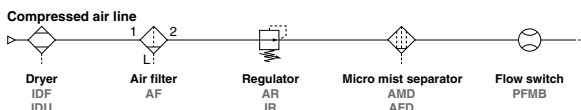
500 L/1000 L type

Bracket

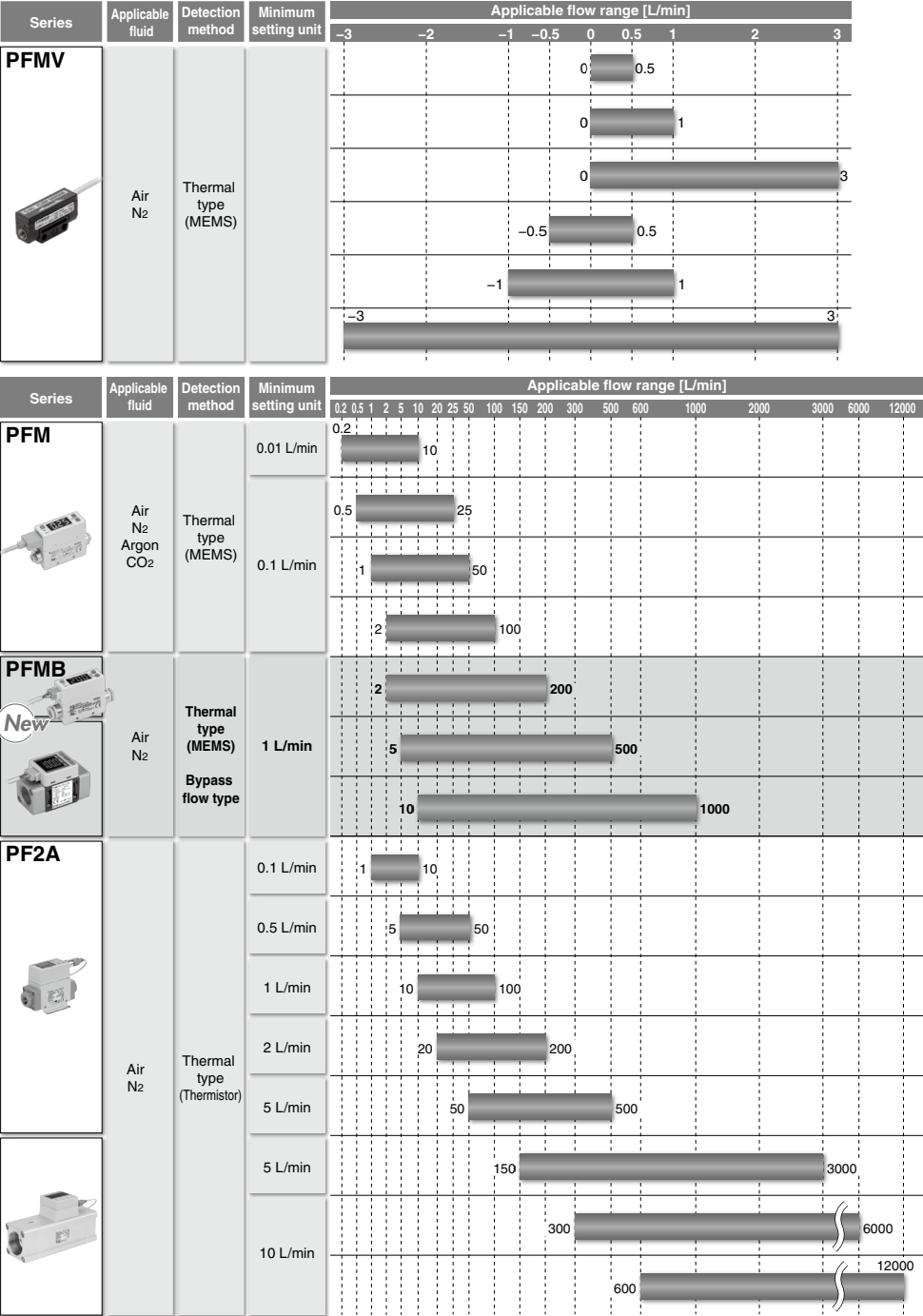


Example of Recommended Pneumatic Circuit

Air quality in the product specification can be satisfied by using this pneumatic circuit.



Flow Switch Flow Rate Variations



Flow Switch Variations/Basic Performance Table

Series	PFMV 	PFM 	New PFM B 	PF2A 
Enclosure	IP40	IP40	IP40	IP65
Fluid	Dry air, N ₂	Dry air, N ₂ , Ar, CO ₂	Dry air, N ₂	Dry air, N ₂
Setting	Digital	Digital	Digital	Digital
Rated flow range	0 to 0.5 L/min -0.5 to 0.5 L/min 0 to 1 L/min -1 to 1 L/min 0 to 3 L/min -3 to 3 L/min	0.2 to 10 L/min 0.5 to 25 L/min 1 to 50 L/min 2 to 100 L/min	2 to 200 L/min 5 to 500 L/min 10 to 1000 L/min	1 to 10 L/min 50 to 500 L/min 5 to 50 L/min 150 to 3000 L/min 10 to 100 L/min 300 to 6000 L/min 20 to 200 L/min 600 to 12000 L/min
Power supply voltage	24 VDC±10%	24 VDC±10%	12 to 24 VDC±10%	12 to 24 VDC±10%
Temperature characteristics (25°C reference)	±2%F.S. (15 to 35°C) ±5%F.S. (0 to 50°C) [Monitor unit: ±0.5%F.S. (0 to 50°C)]	±2%F.S. (15 to 35°C) ±5%F.S. (0 to 50°C)	±2%F.S. (15 to 35°C) ±5%F.S. (0 to 50°C)	±3%F.S. (15 to 35°C) ±5%F.S. (0 to 50°C) ±2%F.S. (PF2A7□□H: 0 to 50°C)
Repeatability	±1%F.S. (Fluid: Dry air) Analog output: ±5%F.S. [Monitor unit: ±0.1%F.S. Analog output: ±0.5%F.S.]	±1%F.S. (Fluid: Dry air) Analog output: ±3%F.S.	±1%F.S. (Fluid: Dry air)	±1%F.S. (PF2A7□0, PF2A7□□H) ±2%F.S. (PF2A7□1)
Hysteresis	Hysteresis mode: Variable Window comparator mode: Variable	Hysteresis mode: Variable Window comparator mode: Variable	Hysteresis mode: Variable Window comparator mode: Variable	Hysteresis mode: Variable Window comparator mode: Fixed (3 digits)
Output	NPN/PNP Open collector Analog voltage output Analog current output	NPN/PNP Open collector Accumulated pulse output Analog voltage output Analog current output	NPN/PNP Open collector Accumulated pulse output Analog voltage output Analog current output	NPN/PNP Open collector Accumulated pulse output
Display	2-color LCD display	2-color LED display	2-color LED display 2-color LCD display	LED display

Switches/
Sensors

ISA3

PFMB

LFE

2-Color Display

Digital Flow Switch

Series PFMB7



RoHS



How to Order

PFMB7 201 - **C8** - **A** - **M**

Type

7 Integrated display

Rated flow range (Flow rate range)

201 2 to 200 L/min

Flow adjustment valve

NII	None
S	Yes

Port size

C8	ø8 (5/16") One-touch fitting
O2	Rc1/4
N02	NPT1/4
F02	G1/4 (Note 4)

Note 4) ISO1179-1 compliant

*Made to Order

Piping entry direction

NII	L
Straight	Bottom

*Made to Order

Output specifications

	OUT1	OUT2
A	NPN	NPN
B	PNP	PNP
C	NPN	Analog 1 to 5 V
D	NPN	Analog 4 to 20 mA
E	PNP	Analog 1 to 5 V
F	PNP	Analog 4 to 20 mA
G	NPN	External input (Note)
H	PNP	External input (Note)

Note) Accumulated flow, peak flow and minimum flow can be reset by external signal input.

*Made to Order

Calibration certificate (Note 1)

NII	None
A	With calibration certificate

Note 1) Certificate in both English and Japanese

*Made to Order

Unit specifications

M	SI unit only (Note 2)
NII	Unit selection function (Note 3)

Note 2) Fixed unit: Instantaneous flow: L/min

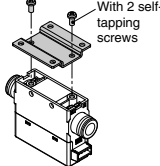
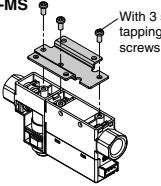
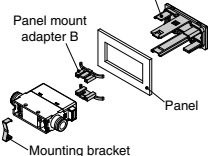
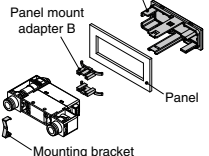
Accumulated flow: L

Note 3) Since the unit for Japan is fixed to SI due to new measurement law, this option is for overseas.

Unit can be changed. Instantaneous flow: L/min ↔ cfm

Accumulated flow: L ↔ ft³

Option 2

Option 2		
NII	R	S
No bracket	With bracket (For without flow adjustment valve) ZS-33-M  With 2 self-tapping screws	With bracket (For with straight type flow adjustment valve) ZS-33-MS  With 3 self-tapping screws
T		V
With panel mount adapter (For without flow adjustment valve) ZS-33-J  Panel mount adapter A Panel mount adapter B Panel Mounting bracket		With panel mount adapter (For with flow adjustment valve) ZS-33-JS  Panel mount adapter A Panel mount adapter B Panel Mounting bracket

Note) Each option is not assembled with the product, but shipped together. If an accessory is required, order separately using "ZS" part numbers.

Option 1

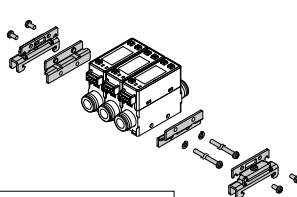
NII	W
With lead wire with connector (2 m) ZS-33-D	With lead wire with connector (2 m) + Connector cover (Silicone rubber) ZS-33-F ZS-33-D
N	Note) If an accessory is required, order separately using "ZS" part numbers.
No lead wire	

DIN Rail Mounting Bracket (Order Separately)

ZS-33-R

Stations

1	1 station
2	2 stations
3	3 stations
4	4 stations
5	5 stations



- DIN rail is prepared by customer.
- DIN rail is not suitable for port size F02 (G1/4).



How to Order

PFMB 7 **501** - **04** - **A** - **M**

Type

7	Integrated display
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Rated flow range (Flow rate range)

501	5 to 500 L/min
102	10 to 1000 L/min

Thread type

Nil	Rc
N	NPT
F	G (Note)

(Note) ISO228 compliant

Port size

Port size	Rated flow range
04	1/2
	501 102
	● ●

Output specifications

	OUT1	OUT2
A	NPN	NPN
B	PNP	PNP
C	NPN	Analog 1 to 5 V
D	NPN	Analog 4 to 20 mA
E	PNP	Analog 1 to 5 V
F	PNP	Analog 4 to 20 mA
G	NPN	External input (Note 4)
H	PNP	External input (Note 4)

Note 4) Accumulated flow, peak flow and minimum flow can be reset by external signal input.

*Made to Order

Calibration certificate (Note 1)

Nil	None
A	With calibration certificate

Note 1) Certificate in both English and Japanese
*Made to Order

Option 2

Nil	R
No bracket	With bracket With 4 self-tapping screws

Note) Each option is not assembled with the product, but shipped together. If an accessory is required, order separately using "ZS" part numbers.

Unit specifications

M	SI unit only (Note 2)
Nil	Unit selection function (Note 3)

Note 2) Fixed unit: Instantaneous flow: L/min
Accumulated flow: L

Note 3) Since the unit for Japan is fixed to SI due to new measurement law, this option is for overseas. Unit can be changed. Instantaneous flow: L/min ↔ cfm
Accumulated flow: L ↔ ft³

Option 1

Nil	W
With lead wire with connector (2 m)	With lead wire with connector (2 m) + Connector cover (Silicone rubber)
 ZS-33-D	 ZS-33-F ZS-33-D
N	
No lead wire	Note) If an accessory is required, order separately using "ZS" part numbers.

Option 2/Part No.

Option	Part no.	Qty.	Note
Bracket	ZS-42-C	1	PFMB 7501/7102 with self-tapping screw (3 x 6), 4 pcs.

Refer to "Handling Precautions for SMC Products" for Flow Switch Precautions and the Operation Manual in our website for Specific Product Precautions.

Specifications

	Model	PFMB7201	PFMB7501	PFMB7102
Fluid	Applicable fluid ^{Note 1)}	Air, N ₂ (Air quality grade is JIS B 8392-1 1.1.2 to 1.6.2, ISO8573-1 1.1.2 to 1.6.2.)		
	Fluid temperature range	0 to 50°C		
	Detection method	Thermal type		
Flow	Rated flow range	2 to 200 L/min	5 to 500 L/min	10 to 1000 L/min
	Set flow rate range	2 to 210 L/min	5 to 525 L/min	10 to 1050 L/min
	Instantaneous flow	0 to 999,999,999 L	0 to 999,999,990 L	
	Accumulated flow	1 L/min		
	Minimum setting unit	1 L	10 L	10 L/pulse
	Accumulated volume per pulse (Pulse width = 50 msec.)	1 L/pulse		
	Accumulated value hold function ^{Note 2)}			
Pressure	Rated pressure range	0 to 0.75 MPa	Interval of 2 or 5 minutes can be selected.	
	Proof pressure	1.0 MPa	0 to 0.8 MPa	
	Pressure loss	1.2 MPa		
	Pressure characteristics ^{Note 3)}	Refer to "Pressure Loss" graph.		
Electrical	Power supply voltage	±5%F.S. (0 to 0.75 MPa, 0.35 MPa reference)		
	Current consumption	12 to 24 VDC ±10% 55 mA or less		
^{Note 11)} Accuracy	Protection	Polarity protection		
	Display accuracy	±3%F.S.		
	Analog output accuracy	±3%F.S.		
	Repeatability	±1%F.S. (±2%F.S. when response time is set to 0.05 seconds.)		
	Temperature characteristics	±5%F.S. (0 to 50°C, 25°C reference)		
Switch output	Output type	NPN open collector PNP open collector		
	Output mode	Select from Hysteresis, Window comparator, Accumulated output or Accumulated pulse output modes.		
	Switch operation	Select from Normal or Reversed output.		
	Maximum load current	80 mA		
	Maximum applied voltage (NPN only)	28 VDC		
	Internal voltage drop (Residual voltage)	NPN output type: 1 V or less (at load current 80 mA) PNP output type: 2 V or less (at load current 80 mA)		
	Response time ^{Note 4)}	Select from 0.05 sec., 0.1 sec., 0.5 sec., 1 sec., or 2 sec.		
Analog output ^{Note 8)}	Hysteresis ^{Note 5)}	Variable from 0		
	Protection	Short circuit protection		
	Output type	Voltage output: 1 to 5 V, Current output: 4 to 20 mA		
	Impedance	Output impedance: Approx. 1 kΩ		
	Current output ^{Note 7)}	Max. load impedance at power supply voltage 24 V: 600 Ω, at power supply voltage 12 V: 300 Ω		
External input ^{Note 8)}	Response time	Linked with the response time of the switch output.		
	External input	Input voltage: 0.4 V or less (reed or solid state) for 30 msec. or longer		
	Input mode	Select from Accumulated flow external reset or Peak/Bottom reset.		
	Reference condition ^{Note 9)}	Select from Standard condition or Normal condition.		
	Display mode	Select from Instantaneous flow or Accumulated flow.		
Display	Unit ^{Note 10)}	L/min or cfm can be selected.		
	Instantaneous flow	L or ft ³ can be selected.		
	Accumulated flow	L or ft ³ can be selected.	L or ft ³ can be selected.	
	Displayable range	-10 to 210 L/min (Displays [0] when the value is within the -1 to 1 L/min range.)	-25 to 525 L/min (Displays [0] when the value is within the -4 to 4 L/min range.)	-50 to 1050 L/min (Displays [0] when the value is within the -9 to 9 L/min range.)
	Minimum display unit	1 L	1 L/min	10 L
	Display	Display method: LED Display color: Red/Green Display: 3 digit 7 segment		
	Indicator LED	LED ON when switch output is ON. (OUT1: Green, OUT2: Red)		
Environmental	Enclosure	IP40		
	Withstand voltage	1000 VAC for 1 minute between terminals and housing		
	Insulation resistance	50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing		
	Operating temperature range	Operation: 0 to 50°C, Storage: -10 to 60°C (No condensation or freezing)		
	Operating humidity range	Operation, Storage: 35 to 85%RH (No condensation or freezing)		
Standard		CE, UL (CSA), RoHS		
Piping	Piping specifications	Rc1/4, NPT1/4, G1/4, ø8 One-touch fitting	CE, RoHS	
	Piping entry direction	Straight, Bottom	Rc1/2, NPT1/2, G1/2	
Main materials of parts in contact with fluid ^{Note 12)}		FKM, Stainless steel 304, PPS, PBT, Brass (Electroless nickel plating), HNBR, Si, Au, GE4F	ADC, PPS, Stainless steel 304, Au	
		Rc1/4, NPT1/4/Straight: 70 g Bottom: 85 g G1/4/Straight: 115 g Bottom: 130 g ø8 One-touch fitting/Straight: 50 g Bottom: 65 g	HNBR, Si, GE4F	
Weight	Body	100 g		
	Flow adjustment valve	—		
	Lead wire	+45 g	+35 g	—
	Bracket	+20 g	—	+25 g
	Panel mount adapter	+15 g	—	—
	DIN rail mounting bracket	+65 g	—	—

Note 1) Refer to "Example of Recommended Pneumatic Circuit" on page 550.

Note 2) When using the accumulated value hold function, use the operating conditions to calculate the product life, and do not exceed it. The maximum access limit of the memory device is 1 million cycles. If the product is operated 24 hours per day, the product life will be as follows:
 • 5 min interval: life is calculated as 5 min x 1 million = 5 million min = 9.5 years
 • 2 min interval: life is calculated as 2 min x 1 million = 2 million min = 3.8 years
 If the accumulated flow external reset is repeatedly used, the product life will be shorter than calculated life.

Note 3) Do not release the OUT side piping port of the product directly to the atmosphere without connecting piping. If the product is used with the piping port released to atmosphere, accuracy may vary.

Note 4) The time from when the flow is changed by a step input (when the flow rate changes from 0 to the maximum flow instantaneously) until the switch output turns ON (or OFF) when set at 90% of the rated flow rate.

Note 5) If the flow fluctuates around the set value, the width for setting more than the fluctuating width needs to be set. Otherwise, chattering will occur.

Note 6) When using a product with an analog output
 Note 7) The time from when the flow is changed as a step input (when the flow rate changes from 0 to the maximum flow instantaneously) until the analog output reaches 90% of the rated flow rate.

Note 8) When using a product with an external input
 Note 9) The flow rate given in the specification is the value at standard condition.
 Note 10) Setting is only possible for models with the unit selection function.

Note 11) Refer to "Straight Piping Length and Accuracy" on page 556 for details.

Note 12) Refer to "Construction/Fluid Contact Parts" on page 557 for details.

Flow Range

Model	Flow range					
	-100 L/min	0 L/min	200 L/min	500 L/min	1000 L/min	2000 L/min
PFMB7201		2 L/min	200 L/min			
		2 L/min	210 L/min			
		-10 L/min	210 L/min			
PFMB7501		5 L/min	500 L/min			
		5 L/min	525 L/min			
		-25 L/min	525 L/min			
PFMB7102		10 L/min	1000 L/min			
		10 L/min	1050 L/min			
		-50 L/min	1050 L/min			

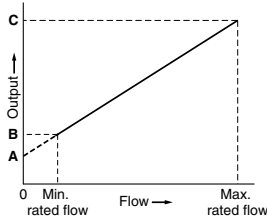
Rated flow range Set flow rate range Displayable range

Analog Output

Flow/Analog Output

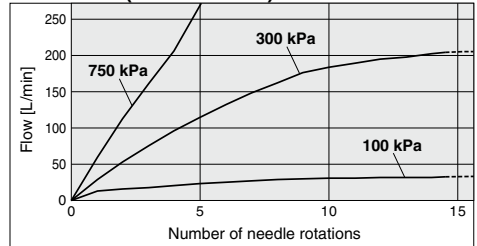
	A	B	C
Voltage output	1 V	1.04 V	5 V
Current output	4 mA	4.16 mA	20 mA

Model	Rated flow [L/min]	
	Min.	Max.
PFMB7201	2	200
PFMB7501	5	500
PFMB7102	10	1000



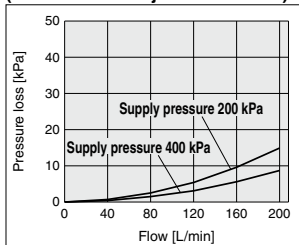
Flow Adjustment Valve Flow-rate Characteristics

PFMB7201 (for 200 L/min)

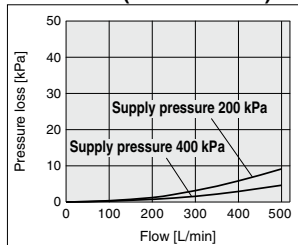


Pressure Loss

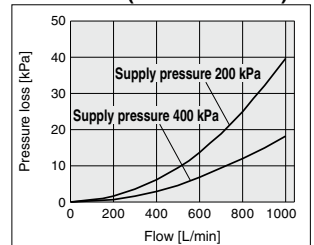
PFMB7201 (for 200 L/min) (Without flow adjustment valve)



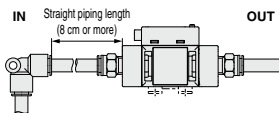
PFMB7501 (for 500 L/min)



PFMB7102 (for 1000 L/min)

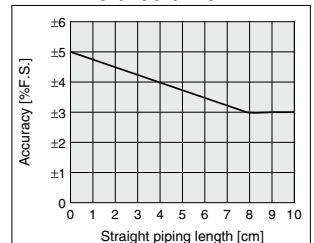


Straight Piping Length and Accuracy



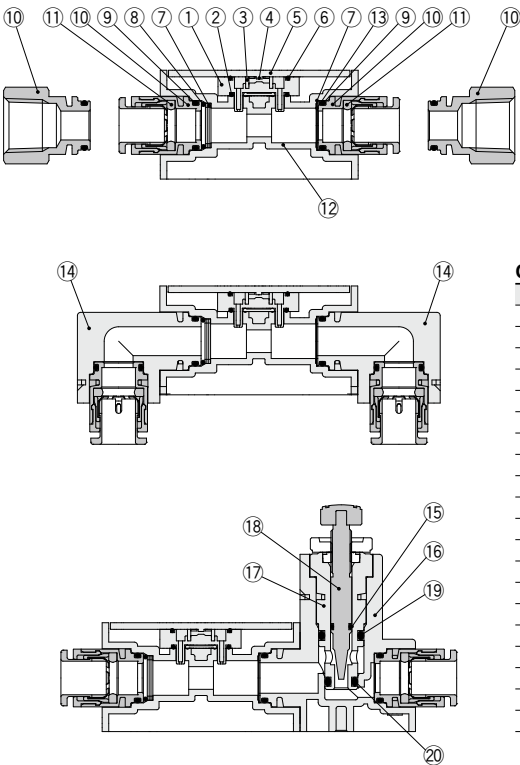
- The piping on the IN side must have a straight section of piping with a length of 8 cm or more. If a straight section of piping is not installed, the accuracy can vary by approximately $\pm 2\%$ F.S.
 - * "Straight section" means a part of the piping without any bends or rapid changes in the cross sectional area.
 - When the PFMB7201 is connected to tubing, use a tube I.D. 5 mm just before the product.
 - When the PFMB7501 or 7102 is connected to tubing, use a tube I.D. 9 mm or more just before the product.
- The accuracy can vary by approximately $\pm 2\%$ F.S. when such tubing is not used.

PFMB7201/7501/7102



Construction/Fluid Contact Parts

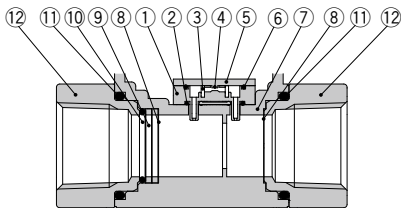
PFMB7201



Component Parts

No.	Description	Material	Note
1	Sensor body	PPS	
2	Gasket	HNBR	
3	Flow rectifier	Stainless steel 304	
4	Sensor chip	Silicon	
5	Printed circuit board	GE4F	
6	Gasket	HNBR	
7	Flow rectifier	Stainless steel 304	
8	O-ring	FKM	Fluoro coating
9	O-ring	FKM	Fluoro coating
10	Fitting for piping	Brass	Electroless nickel plating
11	O-ring	FKM	Fluoro coating
12	Body	PBT	
13	Gasket	HNBR	
14	Bottom piping adapter	PBT	
15	O-ring	HNBR	Fluoro coating
16	Flow adjustment valve body	PBT	
17	Body	Brass	Electroless nickel plating
18	Needle	Brass	Electroless nickel plating
19	O-ring	HNBR	Fluoro coating
20	O-ring	HNBR	Fluoro coating

PFMB7501/7102



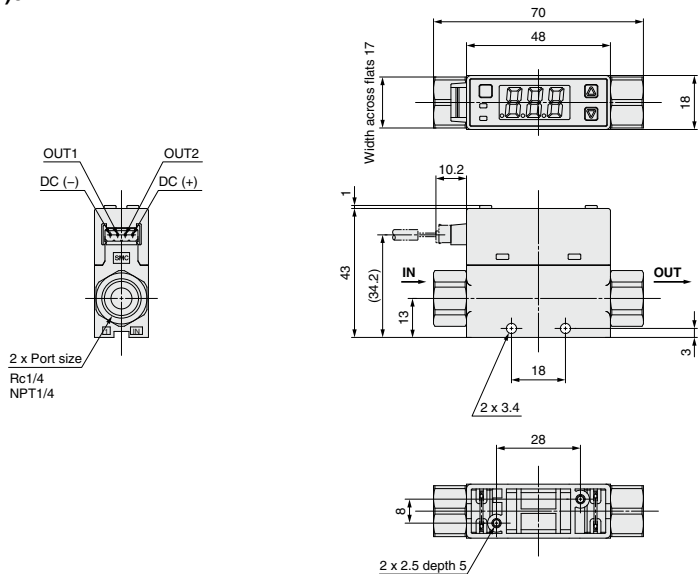
Component Parts

No.	Description	Material	Note
1	Sensor body	PPS	
2	Gasket	HNBR	
3	Flow rectifier	Stainless steel 304	
4	Sensor chip	Silicon	
5	Printed circuit board	GE4F	
6	Gasket	HNBR	
7	Body	PPS	
8	Mesh	Stainless steel 304	
9	Spacer	PPS	
10	O-ring	HNBR	
11	O-ring	HNBR	
12	Attachment	ADC	Coating

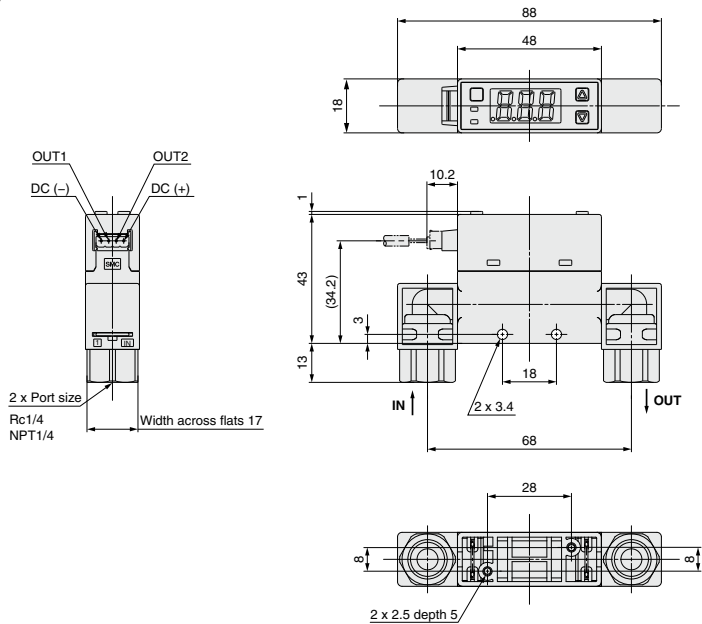
Series PFMB7

Dimensions

PFMB7201-(N)02

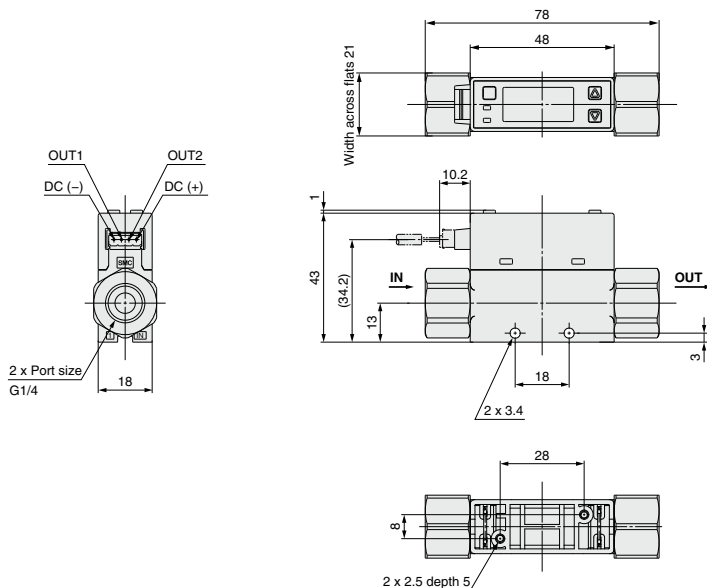


PFMB7201-(N)02L

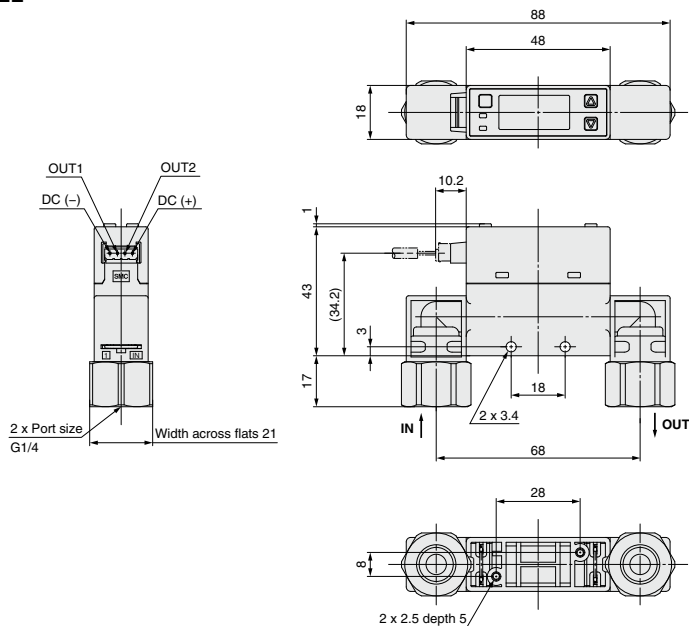


Dimensions

PFMB7201-F02



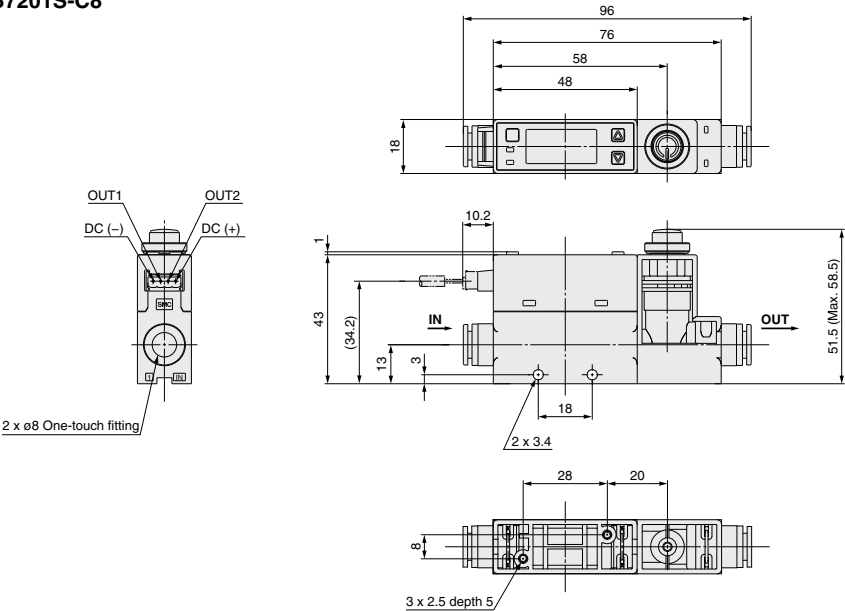
PFMB7201-F02L



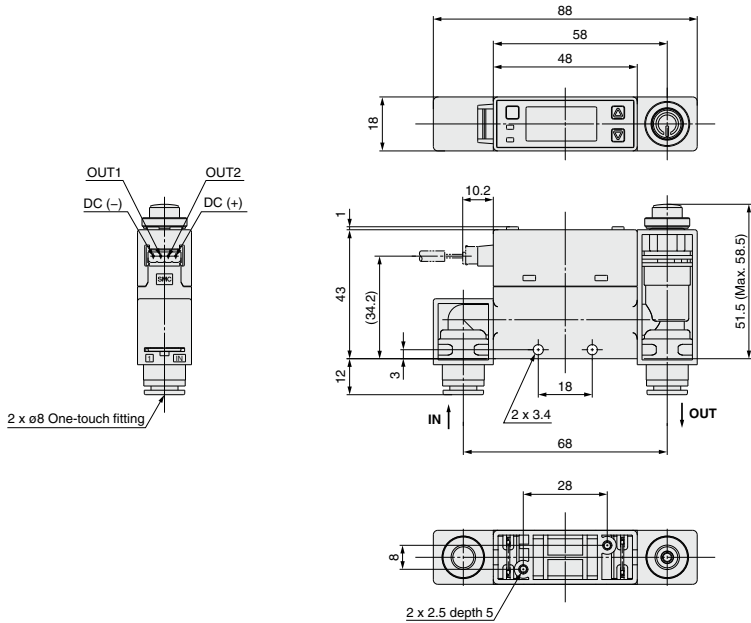
Series **PFMB7**

Dimensions

PFMB7201S-C8

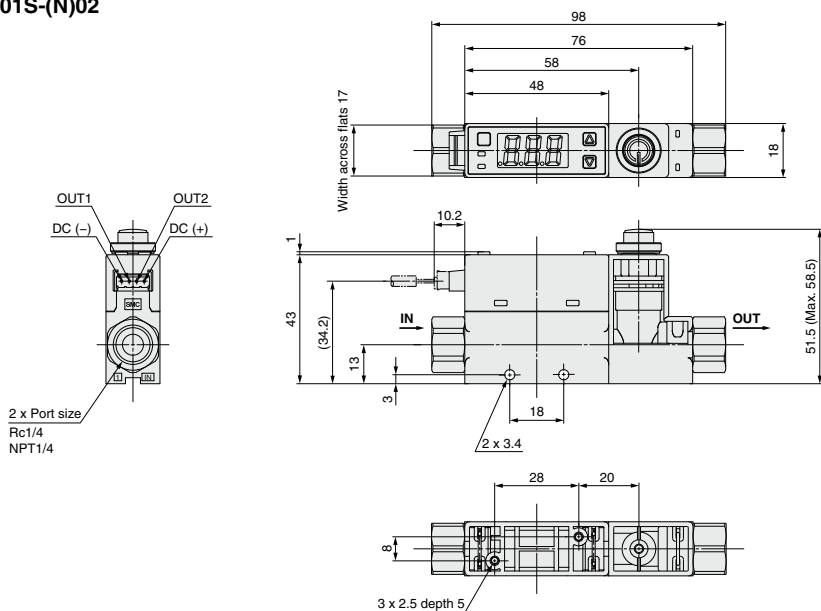


PFMB7201S-C8L

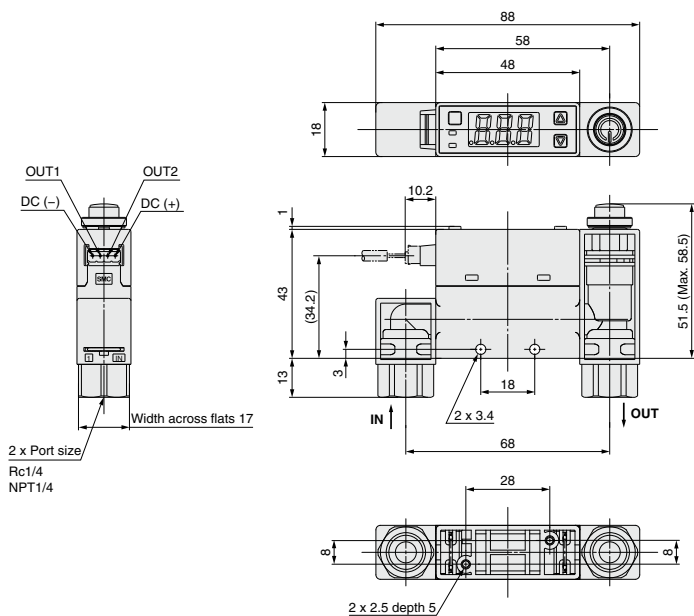


Dimensions

PFMB7201S-(N)02



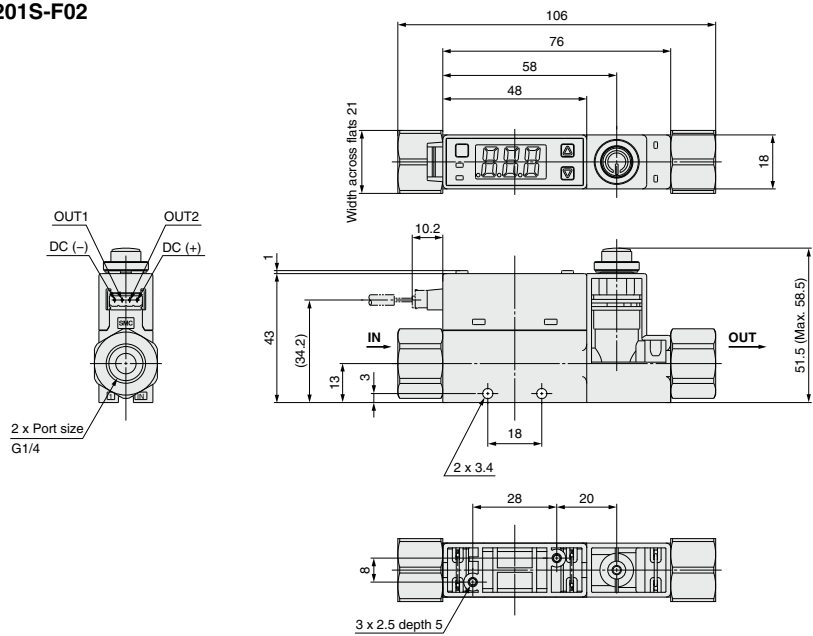
PFMB7201S-(N)02L



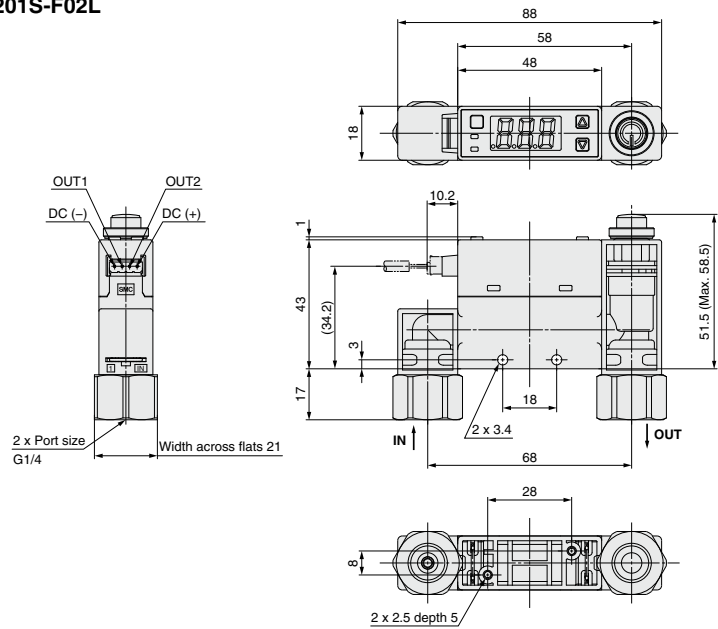
Series **PFMB7**

Dimensions

PFMB7201S-F02



PFMB7201S-F02L

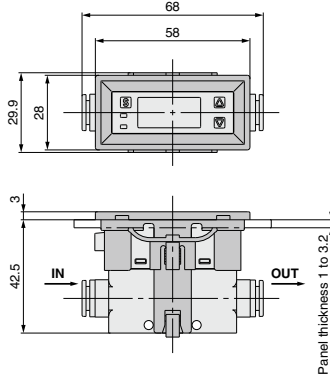


Dimensions

PFMB7201

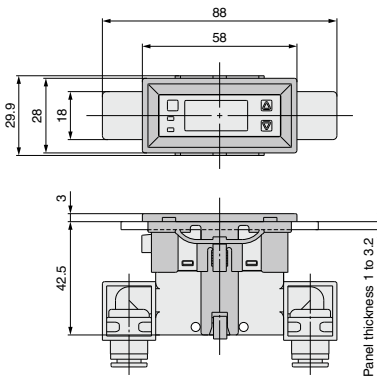
Panel mount/

Without flow adjustment valve/Straight

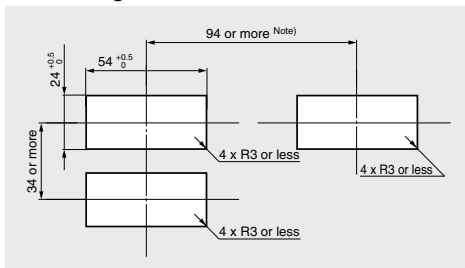


Panel mount/

Without flow adjustment valve/Bottom



Panel Fitting Dimensions

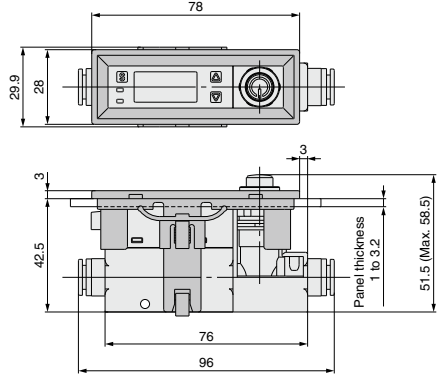


Panel thickness 1 to 3.2 mm

Note) Piping entry direction: Minimum dimensions for bottom piping. If using straight piping, the piping material and tubing need to be taken into consideration when designing the system. If a bend (R) is used, limit it to R3 or less.

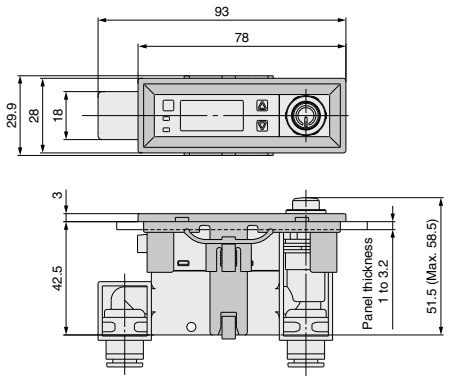
Panel mount/

With flow adjustment valve/Straight

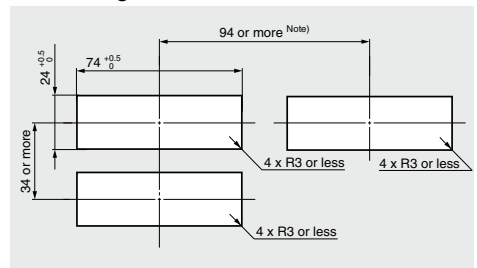


Panel mount/

With flow adjustment valve/Bottom



Panel Fitting Dimensions



Panel thickness 1 to 3.2 mm

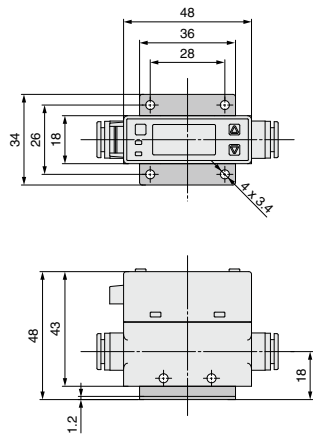
Note) Piping entry direction: Minimum dimensions for bottom piping. If using straight piping, the piping material and tubing need to be taken into consideration when designing the system. If a bend (R) is used, limit it to R3 or less.

Series PFMB7

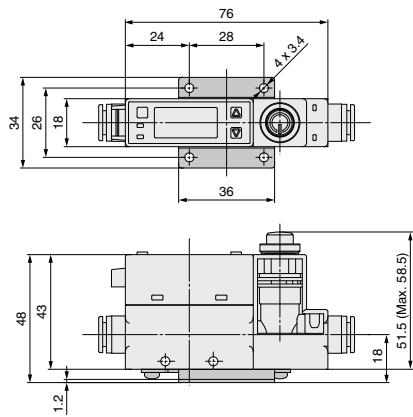
Dimensions

PFMB7201

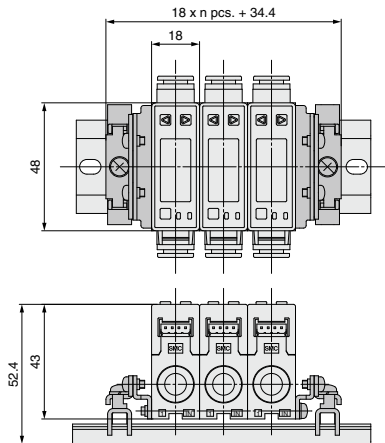
With bracket/Without flow adjustment valve



With bracket/With flow adjustment valve



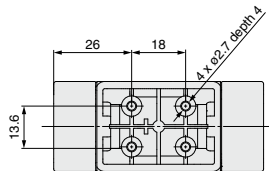
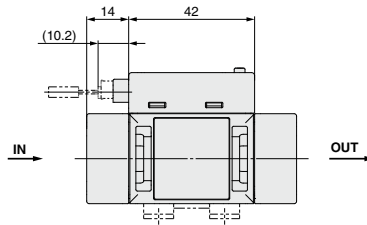
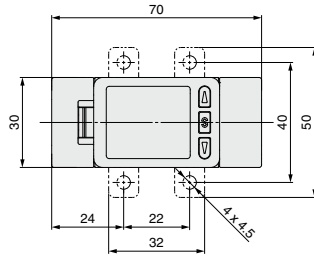
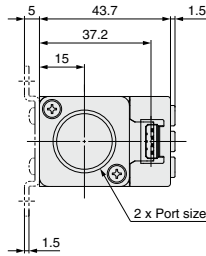
DIN rail mounting



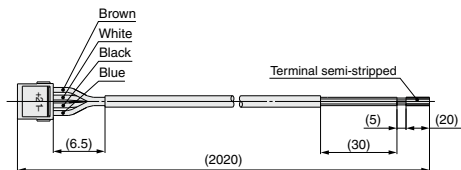
- DIN rail is prepared by customer.
- DIN rail is not suitable for port size F02 (G1/4).

Dimensions

PFMB7501/7102



Lead wire with connector ZS-33-D



Cable Specifications

Conductor	Nominal cross section area	AWG26
	External diameter	Approx. 0.50 mm
Insulation	External diameter	Approx. 1.00 mm
	Colors	Brown, White, Black, Blue
Sheath	Material	Oil-resistant PVC
Finished external diameter		ø3.5

Note) For wiring, refer to the Operation Manual from the SMC website Documents/Download-->Instruction Manuals.

Series PFMB

Function Details

■ Output operation

The output operation can be selected from the following: Output (hysteresis mode and window comparator mode) corresponding to instantaneous flow, or output (accumulated output and pulse output) corresponding to accumulated flow.

Note) At the time of shipment from the factory, it is set to hysteresis mode and normal output.

■ Display color

The display color can be selected for each output condition. The selection of the display color provides visual identification of abnormal values. (The display color depends on OUT1 setting.)

Green for ON, Red for OFF
Red for ON, Green for OFF
Red all the time
Green all the time

■ Reference condition

The display unit can be selected from standard condition or normal condition.

Standard condition: Flow rate converted to a volume at 20°C and 1 atm (atmosphere)
Normal condition: Flow rate converted to a volume at 0°C and 1 atm (atmosphere)

■ Display mode

The display mode can be selected from instantaneous flow or accumulated flow.

Instantaneous flow display
Accumulated flow display

■ Response time

The response time can be selected to suit the application. (default setting is 1 second.) Abnormalities can be detected more quickly by setting the response time to 0.05 seconds. The effect of fluctuation and flickering of the display can be reduced by setting the response time to 2 seconds.

0.05 sec.
0.1 sec.
0.5 sec.
1 sec.
2 sec.

■ Power-saving mode

The display can be turned off to reduce the power consumption. In this power-saving mode, decimal points flash on the main screen. If any button is pressed during power-saving mode, the display is reverts to normal for 30 seconds to allow checking of the flow etc.

■ Setting of security code

The user can select whether a security code must be entered to release key lock. At the time of shipment from the factory, it is set such that the security code is not required.

■ External input function

This function can be used only when the optional external input is present. The accumulated flow, peak value and bottom value can be reset remotely.

Accumulated flow external reset: A function to reset the accumulated flow value when an external input signal is applied. In accumulated increment mode, the accumulated value will reset to, and increase from zero. In accumulated decrement mode, the accumulated value will reset to, and decrease from the set value.

* When the accumulated value is memorized, every time the accumulated flow external reset is activated, the memory device (EEPROM) will be accessed. Take into consideration the maximum number of times the memory device can be accessed, 1 million times. The total of external input times and accumulated value memorizing time interval should not exceed 1 million times.

Peak/Bottom reset: Peak and bottom value are reset.

■ Forced output function

The output is turned on/off in a fixed state when starting the system or during maintenance. This enables confirmation of the wiring and prevents system errors due to unexpected output. For the analog output type, when ON the output will be 5 V or 20 mA, and when OFF, it will be 1 V or 4 mA.

* Also, the increase or decrease of the flow and temperature will not change the on/off status of the output while the forced output function is activated.

■ Accumulated value hold

Accumulated value is not cleared even when the power supply is turned off.

The accumulated value is memorized every 2 or 5 minutes during measurement, and continues from the last memorized value when the power supply is turned on again.

The life time of the memory element is 1 million access cycles. Take this into consideration before using this function.

■ Peak/Bottom value display

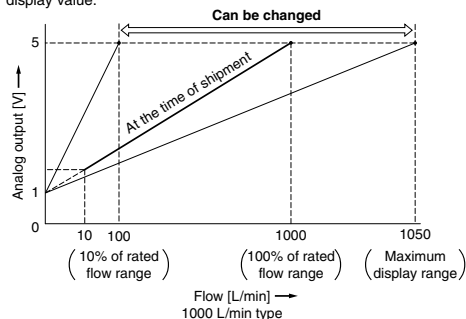
The maximum (minimum) flow rate is detected and updated from when the power supply is turned on. In peak (bottom) value display mode, this maximum (minimum) flow rate is displayed.

■ Keylock function

Prevents operation errors such as accidentally changing setting values.

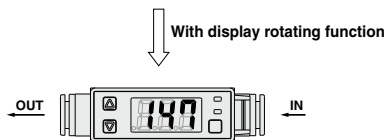
■ Analog output free range function

Allows the flow that generates an output of 5 V or 20 mA to be changed. The value can be changed 10% of maximum rated flow to maximum display value.



■ Reversed display mode

When the switch is used upside down, the orientation of the display can be rotated to make it easier to read by using the display rotating function.



■ Reset to the default settings.

The product can be returned to its factory default settings.

■ Error display function

When an error or abnormality arises, the location and contents are displayed.

Display		Description	Contents	Action
Er 1		OUT1 over current error	Load current of 80 mA or more is applied to the switch output (OUT1).	Eliminate the cause of the overcurrent by turning off the power supply and then turn on it again.
Er 2		OUT2 over current error	Load current of 80 mA or more is applied to the switch output (OUT2).	
HHH		Instantaneous flow error	The flow rate exceeds the upper limit of indicated flow rate range.	Decrease the flow rate.
LLL		Reverse flow error	There is a reverse flow equivalent to -5% or more.	Turn the flow to correct direction.
9999999999 (“999” will flash in any of upper, middle, lower 3-digit displays.)	PFMB7201 PFMB7501 PFMB7102	Accumulated flow error	The flow rate exceeds the accumulated flow rate range.	Clear the accumulated flow rate.
Er 0	System error		Displayed if an internal error has occurred.	Turn the power off and on again.
Er 4				
Er 6				
Er 8				

If the failure cannot be solved after the above instructions are performed, please contact SMC for investigation.