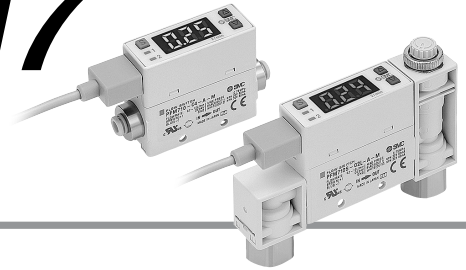


2-Color Display Digital Flow Switch Series PFM7

Integrated display



How to Order

Integrated display

PFM7 **10** **C4** **A** **M**

Type

7 Integrated display

Rated flow range (Flow rate range)

10	0.2 to 10 (5) ℓ /min
25	0.5 to 25 (12.5) ℓ /min
50	1 to 50 (25) ℓ /min
11	2 to 100 (50) ℓ /min

* (): Fluid: CO₂

Flow adjustment valve

Nil	None
S	Yes

Port size

Symbol	Description	Flow rate range			
		10	25	50	11
01	Rc1/8	●	●	●	
02	Rc1/4				●
N01	NPT1/8	●	●	●	
N02	NPT1/4				●
F01	G1/8	●	●	●	
F02	G1/4				●
C4	ϕ 4 (5/32") one-touch fitting	●			
C6	ϕ 6 one-touch fitting	●	●	●	
C8	ϕ 8 (5/16") one-touch fitting		●	●	●
N7	ϕ 1/4 one-touch fitting		●	●	●

Piping entry direction

Nil	Straight
L	Bottom

* Different combinations of piping entry directions for IN and OUT side are available as made-to-order. (Refer to page 35.)

Made to Order
(Refer to page 2 and 35.)

Option 2
(Refer to page 2.)

Option 1
(Refer to page 2.)

Calibration certificate

Nil	None
A	With calibration certificate

* The certificate is written in English and Japanese. Other languages are available as specials.

Instruction manual

Nil	With instruction manual (Leaflet: Japanese and English)
N	None

Unit specification

M	Fixed SI unit ^{Note 1)}
Nil	With unit switching function ^{Note 2)}

Note 1) Fixed unit: Real-time flow rate: ℓ /min
Accumulated flow: ℓ

Note 2) This product is for overseas use only according to the new Measurement Law. (The SI unit is provided for use in Japan.)

Output specification

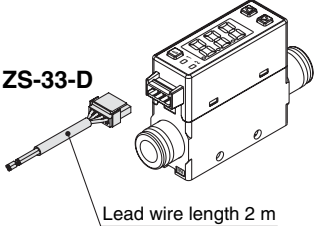
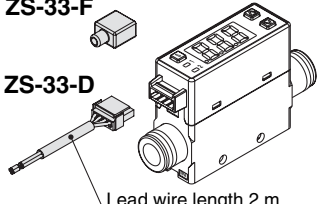
A	2 NPN outputs
B	2 PNP outputs
C	1 NPN output + Analog (1 to 5 V)
D	1 NPN output + Analog (4 to 20 mA)
E	1 PNP output + Analog (1 to 5 V)
F	1 PNP output + Analog (4 to 20 mA)
G	1 NPN output + External input ^{Note 3)}
H	1 PNP output + External input ^{Note 3)}

Note 3) User can select from accumulated value external reset, auto-shift and auto-shift zero.

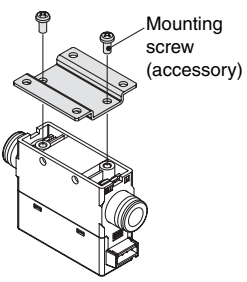
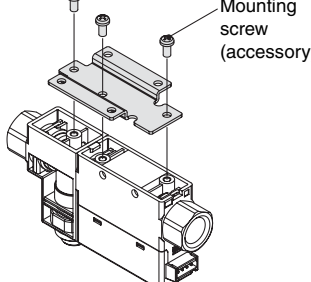
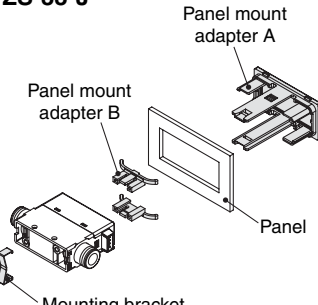
Piping Variations

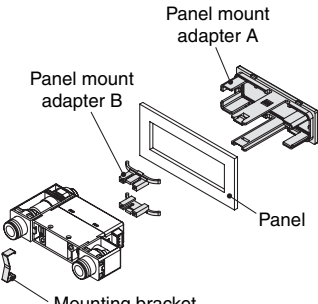
	With one-touch fittings (C4, C6, C8, N7)		Female thread (01, 02, N01, N02, F01, F02)	
	Straight (Nil)	Bottom (L)	Straight (Nil)	Bottom (L)
Without flow adjustment valve (Nil)				
With flow adjustment valve (S)				

Option 1

Nil	W	Z
<p>With lead wire with connector (2 m)</p>  <p>ZS-33-D</p> <p>Lead wire length 2 m</p>	<p>With lead wire with connector (2 m) + Rubber cover for connector (silicon rubber)</p>  <p>ZS-33-F</p> <p>ZS-33-D</p> <p>Lead wire length 2 m</p>	<p>Without lead wire with connector</p>

Option 2

Nil	R	S	T
<p>None</p>	<p>Bracket (For without flow adjustment valve)</p> <p>ZS-33-M</p>  <p>Mounting screw (accessory)</p>	<p>Bracket (For with flow adjustment valve)</p> <p>ZS-33-MS</p>  <p>Mounting screw (accessory)</p> <p>Piping direction: Cannot be mounted with bottom piping type.</p>	<p>Panel mount adapter (For without flow adjustment valve)</p> <p>ZS-33-J</p>  <p>Panel mount adapter A</p> <p>Panel mount adapter B</p> <p>Panel</p> <p>Mounting bracket</p>

V
<p>Panel mount adapter (For with flow adjustment valve)</p> <p>ZS-33-JS</p>  <p>Panel mount adapter A</p> <p>Panel mount adapter B</p> <p>Panel</p> <p>Mounting bracket</p>

Each option is not assembled with the product, but shipped together.

Made to Order

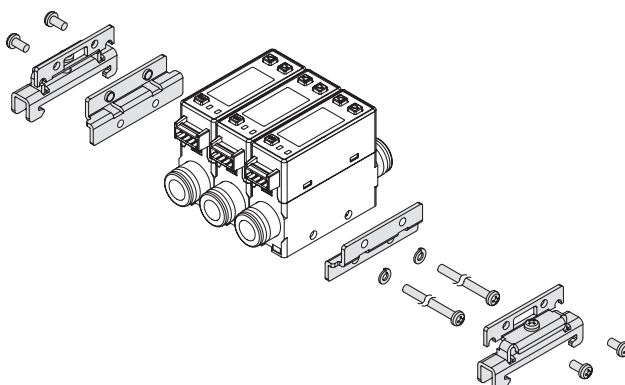
Symbol	Specification/Description
X693	Change of piping entry direction combination
X694	Compatible with argon (Ar) and carbon dioxide (CO ₂) mixed gas

For details, refer to page 35 through to 37.

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 (supplied by customers)
- Port size F02: G1/4 cannot be mounted on the DIN rail.

Series PFM7

Specifications

Model		PFM710	PFM725	PFM750	PFM711
Applicable fluid		Dry air, N ₂ , Ar, CO ₂ (Air quality grade is JIS B8392.1-1, 1.2 to 1.6.2 and ISO8573.1-1, 1.2 to 1.6.2.)			
Rated flow range (Flow rate range)	Dry air, N ₂ , Ar	0.2 to 10 ℓ/min	0.5 to 25 ℓ/min	1 to 50 ℓ/min	2 to 100 ℓ/min
	CO ₂	0.2 to 5 ℓ/min	0.5 to 12.5 ℓ/min	1 to 25 ℓ/min	2 to 50 ℓ/min
Displayable range <small>Note 1)</small>	Dry air, N ₂ , Ar	0.2 to 10.5 ℓ/min	0.5 to 26.3 ℓ/min	1 to 52.5 ℓ/min	2 to 105 ℓ/min
	CO ₂	0.2 to 5.2 ℓ/min	0.5 to 13.1 ℓ/min	1 to 26.2 ℓ/min	2 to 52 ℓ/min
Settable range <small>Note 1)</small>	Dry air, N ₂ , Ar	0 to 10.5 ℓ/min	0 to 26.3 ℓ/min	0 to 52.5 ℓ/min	0 to 105 ℓ/min
	CO ₂	0 to 5.2 ℓ/min	0 to 13.1 ℓ/min	0 to 26.2 ℓ/min	0 to 52 ℓ/min
Minimum unit setting <small>Note 2)</small>		0.01 ℓ/min	0.1 ℓ/min	0.1 ℓ/min	0.1 ℓ/min
Accumulated pulse flow rate exchange value		0.1 ℓ/pulse	0.1 ℓ/pulse	0.1 ℓ/pulse	1 ℓ/pulse
Indication unit <small>Note 3)</small>		Real-time flow rate ℓ/min, CFM x 10 ⁻² Accumulated flow ℓ, ft ³ x 10 ⁻¹			
Linearity		Display accuracy: ±3%F.S. or less (Fluid: Dry air) Analog output accuracy: ±5%F.S. or less			
Repeatability		±1%F.S. or less (Fluid: Dry air) Analog output accuracy: ±3%F.S. or less			
Pressure characteristics		±5%F.S. or less (based on 0.35 MPa)			
Temperature characteristics		±2%F.S. (15 to 35°C) ±5%F.S. (0 to 50°C)			
Operating pressure range		-100 kPa to 750 kPa			
Rated pressure range		-70 kPa to 750 kPa			
Proof pressure		1 MPa			
Accumulated flow range		Max. 999999 ℓ <small>Note 4)</small>			
Switch output		NPN or PNP open collector output			
Maximum load current		80 mA			
Maximum applied voltage		28 VDC (at NPN output)			
Internal voltage drop		NPN output: 1 V or less (at 80 mA) PNP output: 1.5 V or less (at 80 mA)			
Response time		1 s (50 ms, 0.5 s, 2 s can be selected.)			
Output protection		Short-circuit protection, Overcurrent protection			
Accumulated pulse output		NPN or PNP open collector output (Same as switch output)			
Analog output <small>Note 5)</small>	Response time	1.5 s or less (90% response)			
	Voltage output	Voltage output: 1 to 5 V Output impedance: 1 k			
	Current output	Current output: 4 to 20 mA Max. load impedance: 600 Ω, Min. load impedance: 50 Ω			
Hysteresis <small>Note 6)</small>	Hysteresis mode	Variable			
	Window comparator mode	Variable			
External input		No-voltage input (Reed or Solid state) Input 30 ms or more			
Display method		3-digit, 7-segment LED 2-color display (Red/Green) Renewed cycle: 10 times/sec			
Status LED's		OUT1: Illuminates when output is turned ON (Green). OUT2: Illuminates when output is turned ON (Red).			
Power supply voltage		24 VDC ±10%			
Current consumption		55 mA or less			
Environmental resistance	Enclosure	IP40			
	Operating fluid temperature	0 to 50°C (with no freezing and condensation)			
	Operating temperature range	Operating: 0 to 50°C Stored: -10 to 60°C (with no freezing and condensation)			
	Operating humidity range	Operating, Stored: 35 to 85%R.H. (with no condensation)			
	Withstand voltage	1000 VAC for 1 min. between external terminal and case			
	Insulation resistance	50 M or more (500 VDC Mega) between external terminal and case			
	Vibration resistance	Without orifice: 10 to 500 Hz with a 1.5 mm amplitude or 98 m/s ² acceleration, in each X, Y, Z direction for 2 hrs, whichever is smaller. With orifice: 10 to 150 Hz with a 1.5 mm amplitude or 19.6 m/s ² acceleration, in each X, Y, Z direction for 2 hrs, whichever is smaller.			
Impact resistance		490 m/s ² in X, Y, Z directions 3 times each			

Note 1) When the minimum unit setting 0.01 ℓ/min is selected for 10 ℓ/min type, the indication upper limit will be [9.99 ℓ/min].

When the minimum unit setting 0.1 ℓ/min is selected for 100 ℓ/min type, the indication upper limit will be [99.9 ℓ/min].

Note 2) User can select between 0.01 ℓ/min and 0.1 ℓ/min for the PFM710, and between 0.1 ℓ/min and 1 ℓ/min for the PFM711 respectively.

If the indication unit is selected to "CFM", the minimum unit setting cannot be changed.

At the time of shipment from the factory, the minimum unit setting is set to 0.1 ℓ/min for the PFM710 and 1 ℓ/min for the PFM711 respectively.

Note 3) Set to "ANR" at the time of shipment from the factory.

"ANR" is used for standard conditions: 20°C, 1 atm and 65%R.H.

"Nℓ/min" is used for normal conditions: 0°C and 1 atm.

When equipped with a unit switching function. (The SI unit (ℓ/min or ℓ) is fixed for types with no unit switching function.)

Note 4) Cleared when the power supply is turned off. Hold function can be selected. (Interval of 2 min or 5 min can be selected).

If the 5 min interval is selected, the life of the memory element (electronic part) is limited to 1 million cycles.

(If energized for 24 hours, life is calculated as 5 min x 1 million = 5 million min = 9.5 years).

Therefore, if using the hold function, calculate the memory life for your operating conditions, and use within this life.

Note 5) Set to 1.5 s (90%), can be changed to 100 ms.

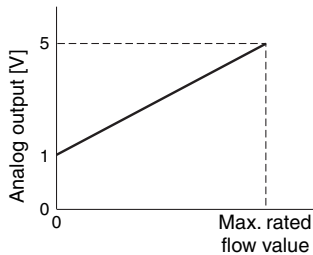
Note 6) Set to hysteresis mode at the time of shipment from the factory. Can be changed to window comparator mode using push-buttons.

Piping Specifications / Weight

Part no.	01	02	N01	N02	F01	F02		C4	C6	C6	N7
Port size	Rc 1/8	Rc 1/4	NPT 1/8	NPT 1/4	G1/8	G1/4		ø4 (5/32") one-touch fitting	ø6 one-touch fitting	ø8 (5/16") one-touch fitting	1/4 one-touch fitting
Weight	Straight Bottom Straight Bottom		Without orifice: 95 g Without orifice: 105 g With orifice: 135 g With orifice: 145 g		Straight Bottom Straight Bottom		Without orifice: 125 g Without orifice: 135 g With orifice: 165 g With orifice: 175 g		Straight Bottom Straight Bottom		Without orifice: 55 g Without orifice: 65 g With orifice: 95 g With orifice: 105 g
Wetted parts material	LCP, PBT, Brass (Electroless nickel plated), HNBR (+ Fluoro coated), FKM (+ Fluoro coated), Silicon, Au, Stainless steel 304										

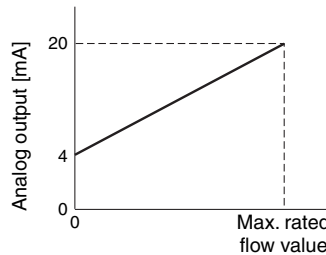
Analog Output

Note: Analog output at maximum rated flow rate when CO₂ is selected is 3 [V] for the voltage output type and 12 [mA] for the current output type.



Analog Voltage Output (1 to 5 V)

Model	Max. rated flow value [l/min]
PFM710-□-C/E	10
PFM725-□-C/E	25
PFM750-□-C/E	50
PFM711-□-C/E	100



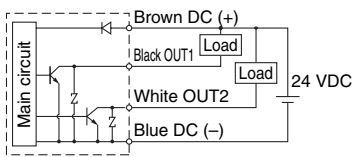
Analog Current Output (4 to 20 mA)

Model	Max. rated flow value [l/min]
PFM710-□-D/F	10 (5)
PFM725-□-D/F	25 (12.5)
PFM750-□-D/F	50 (25)
PFM711-□-D/F	100 (50)

* () : Fluid: CO₂

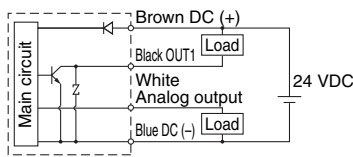
Internal Circuits and Wiring Examples

2 NPN outputs type PFM7□□□-□□-A-□□



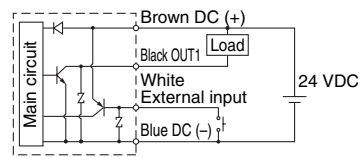
Max. 28 V, 80 mA
Internal voltage drop 1 V or less

NPN + Analog output type PFM7□□□-□□-C-□□ NPN + Analog output type PFM7□□□-□□-D-□□



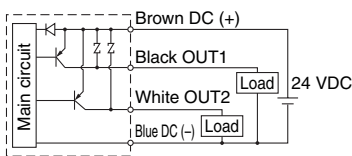
Max. 28V, 80 mA
Internal voltage drop 1 V or less
C: Analog output 1 to 5 V
Output impedance 1 k
D: Analog output 4 to 20 mA
Load impedance 50 to 600

NPN + External input type PFM7□□□-□□-G-□□



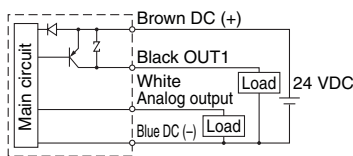
Max. 28 V, 80 mA
Internal voltage drop 1 V or less
External input: No-voltage input
Reed switch or solid state switch input
30 msec or more

2 PNP outputs type PFM7□□□-□□-B-□□



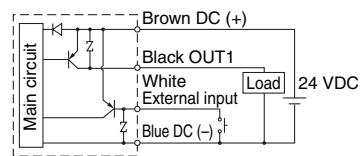
Max. 80 mA
Internal voltage drop 1.5 V or less

PNP + Analog output type PFM7□□□-□□-E-□□ PNP + Analog output type PFM7□□□-□□-F-□□



Max. 80 mA
Internal voltage drop 1.5 V or less
E: Analog output 1 to 5 V
Output impedance 1 k
F: Analog output 4 to 20 mA
Load impedance 50 to 600

PNP + External input type PFM7□□□-□□-H-□□



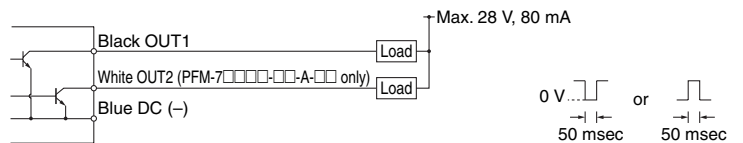
Max. 80 mA
Internal voltage drop 1.5 V or less
External input: No-voltage input
Reed switch or solid state switch input
30 msec or more

Accumulated pulse output wiring examples

2 NPN outputs type PFM7□□□-□□-A-□□

NPN + Analog output type PFM7□□□-□□-C-□□/PFM7□□□-□□-D-□□

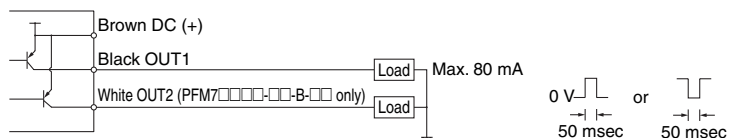
NPN + External input type PFM7□□□-□□-G-□□



2 PNP outputs type PFM7□□□-□□-B-□□

PNP + Analog output type PFM7□□□-□□-E-□□/PFM7□□□-□□-F-□□

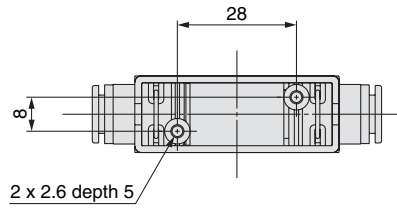
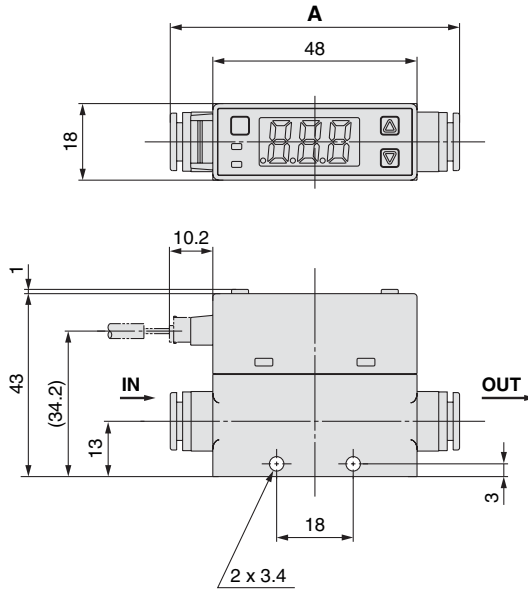
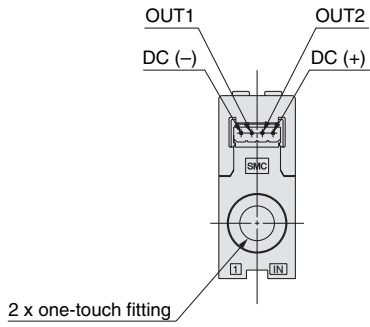
PNP + External input type PFM7□□□-□□-H-□□



Series PFM7

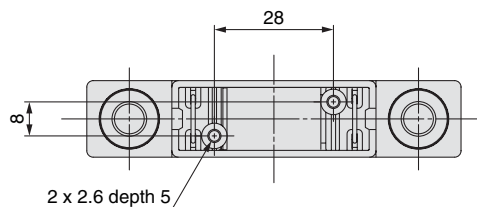
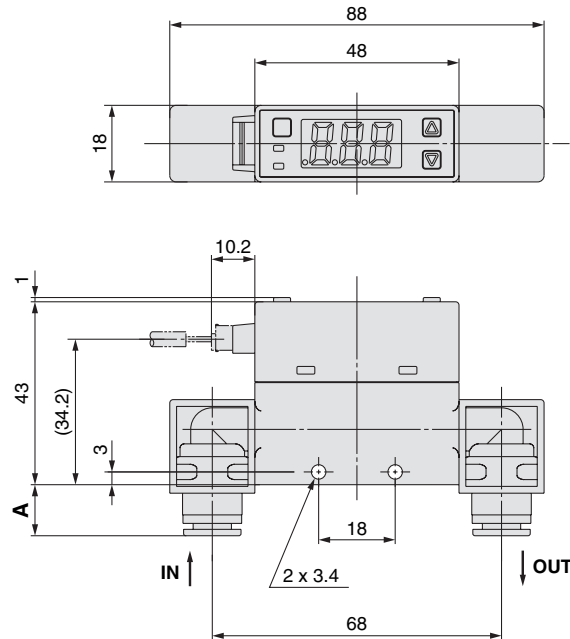
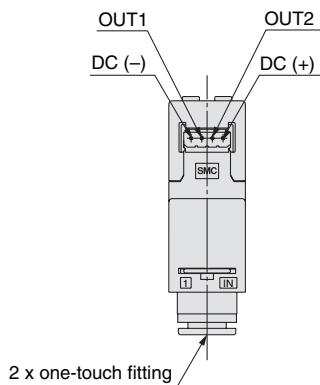
Dimensions

PFM7□□-C4/C6/C8/N7



(mm)	
One-touch fitting Applicable tube O.D.	A
ø4 (5/32")	64.2
ø6	64.6
ø8 (5/16")	68
ø1/4	64.6

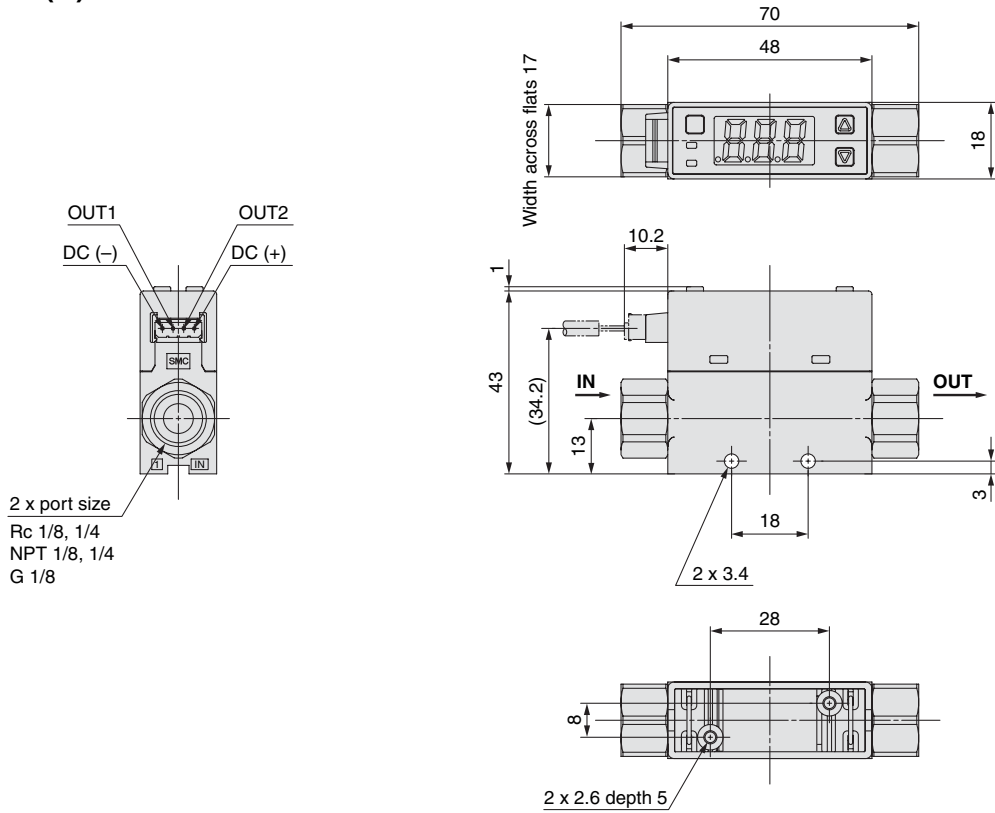
PFM7□□-C4L/C6L/C8L/N7L



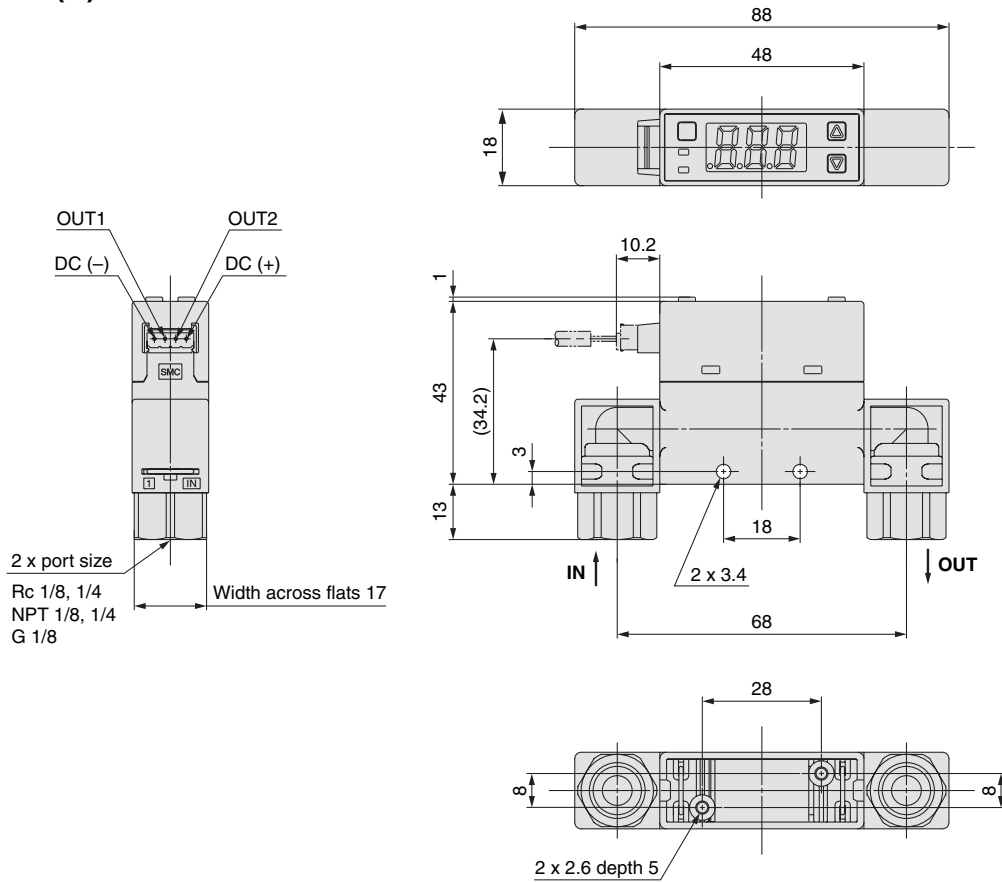
(mm)	
One-touch fitting Applicable tube O.D.	A
ø4 (5/32")	10.1
ø6	10.3
ø8 (5/16")	12
ø1/4	10.3

Dimensions

PFM7□□-(N)01/(N)02/F01



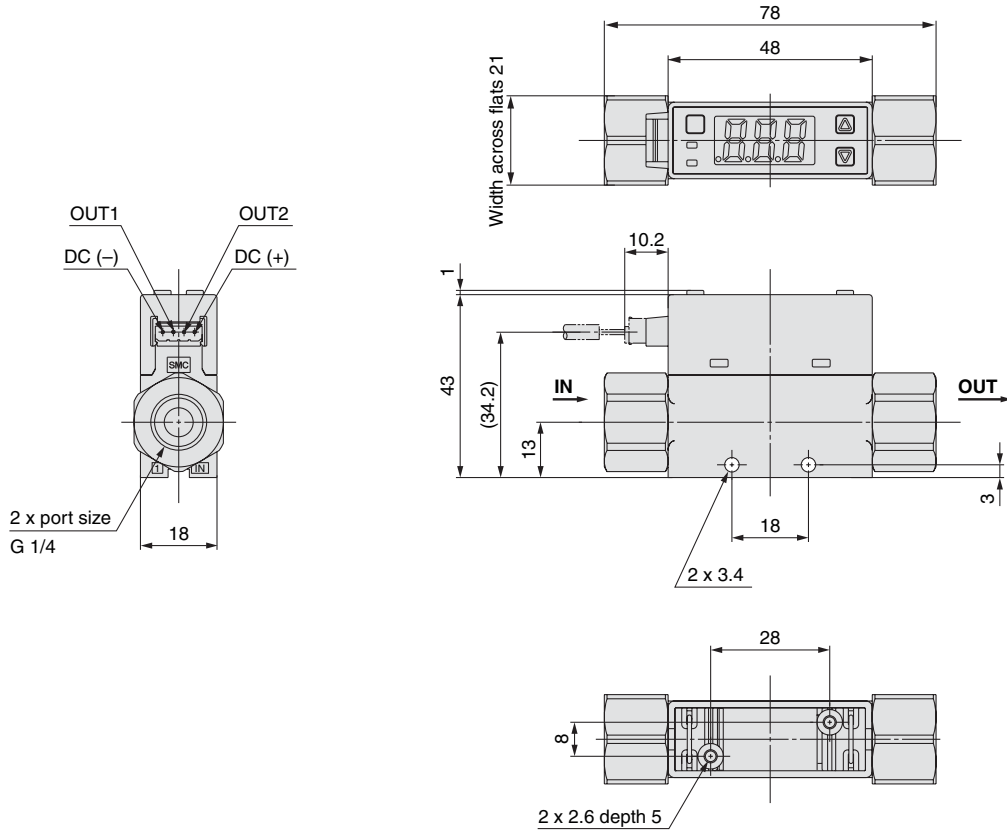
PFM7□□-(N)01L/(N)02L/F01L



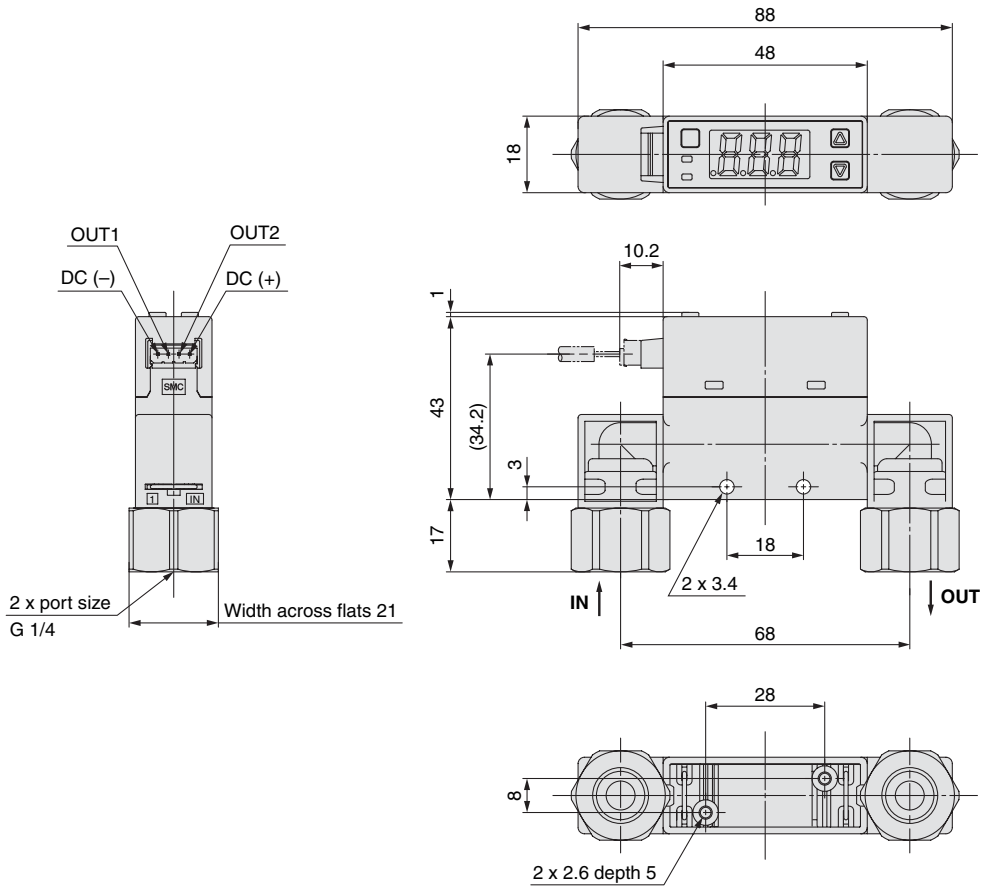
Series PFM7

Dimensions

PFM7□□-F02

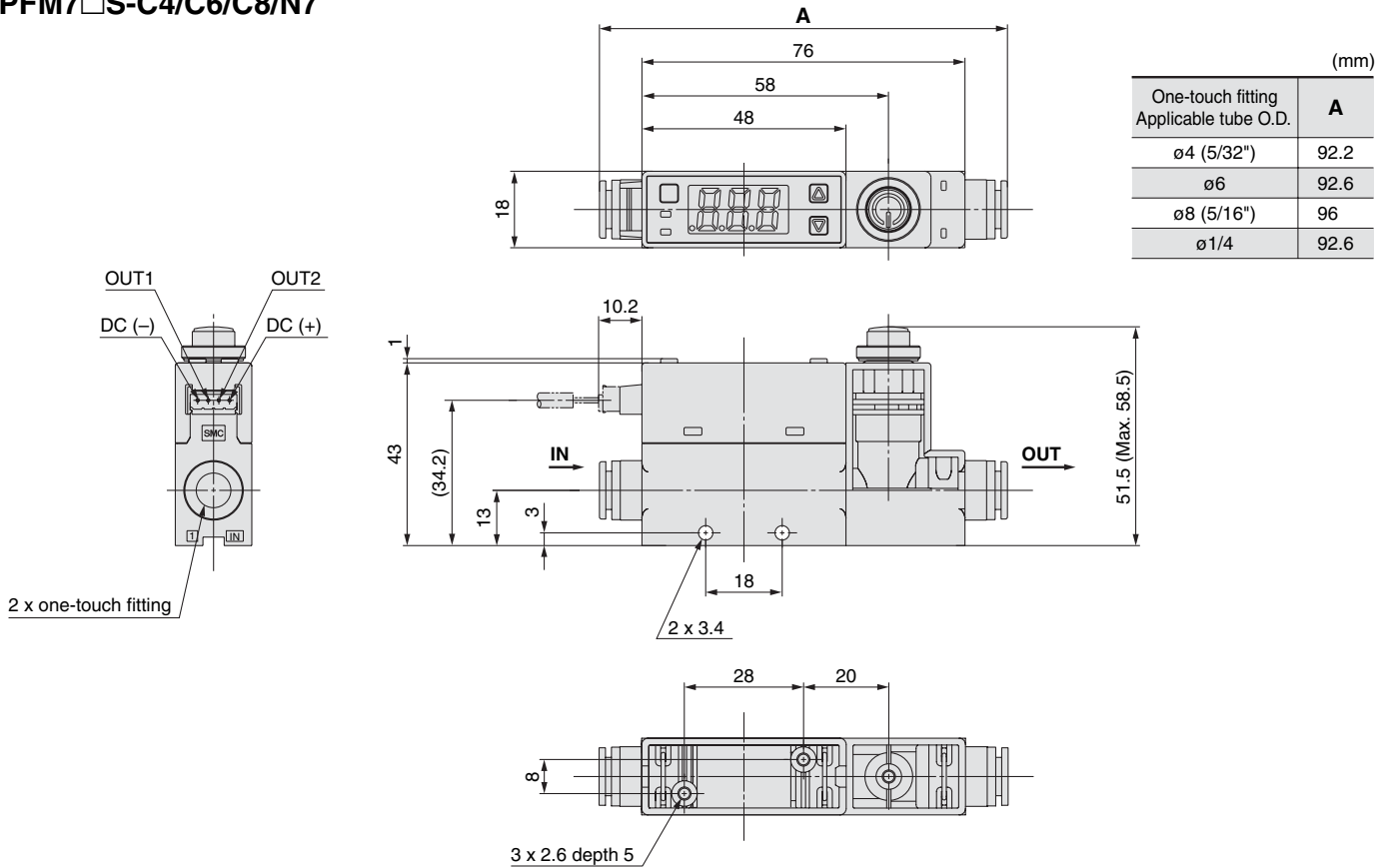


PFM7□□-F02L

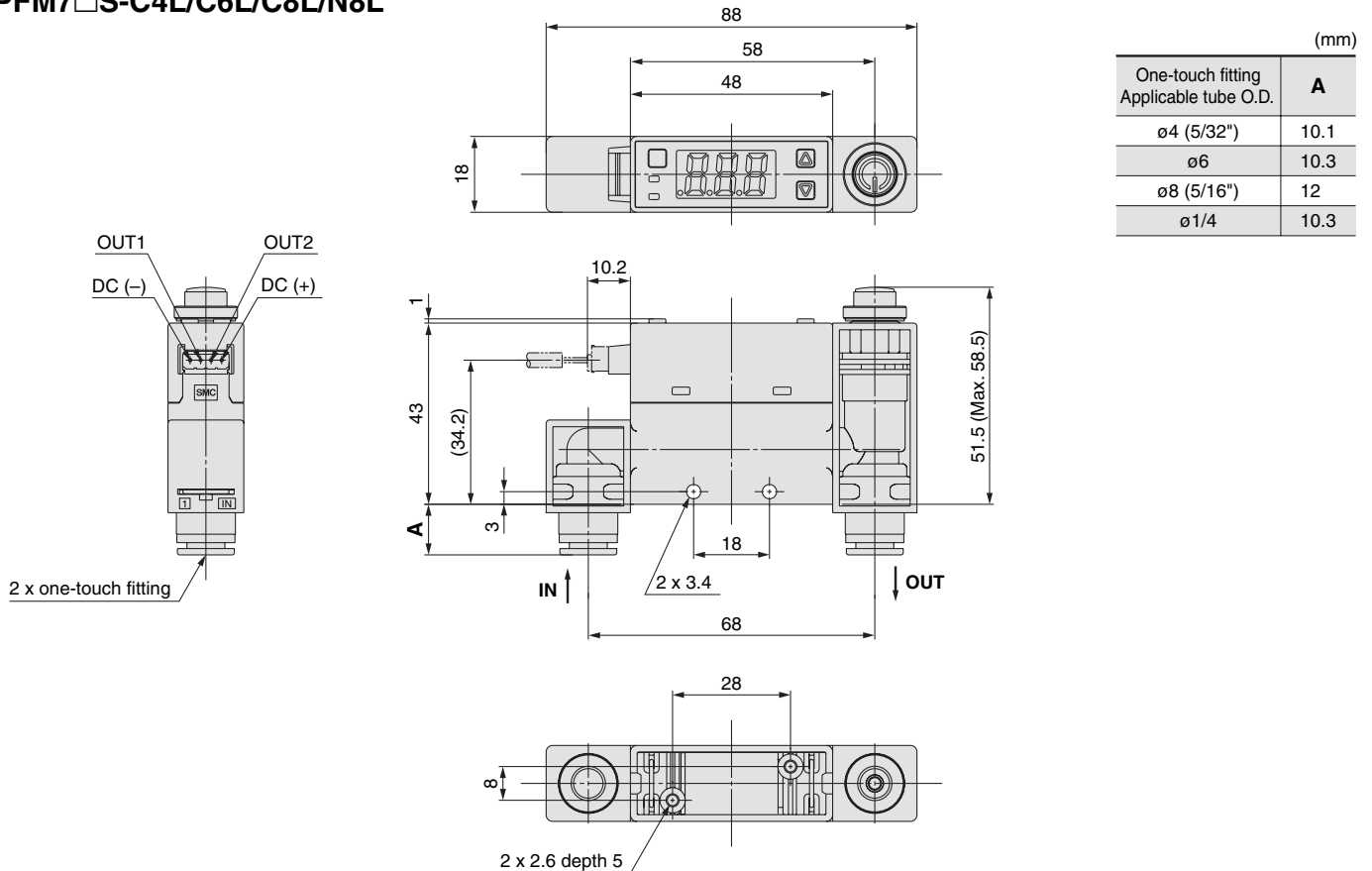


Dimensions

PFM7□S-C4/C6/C8/N7



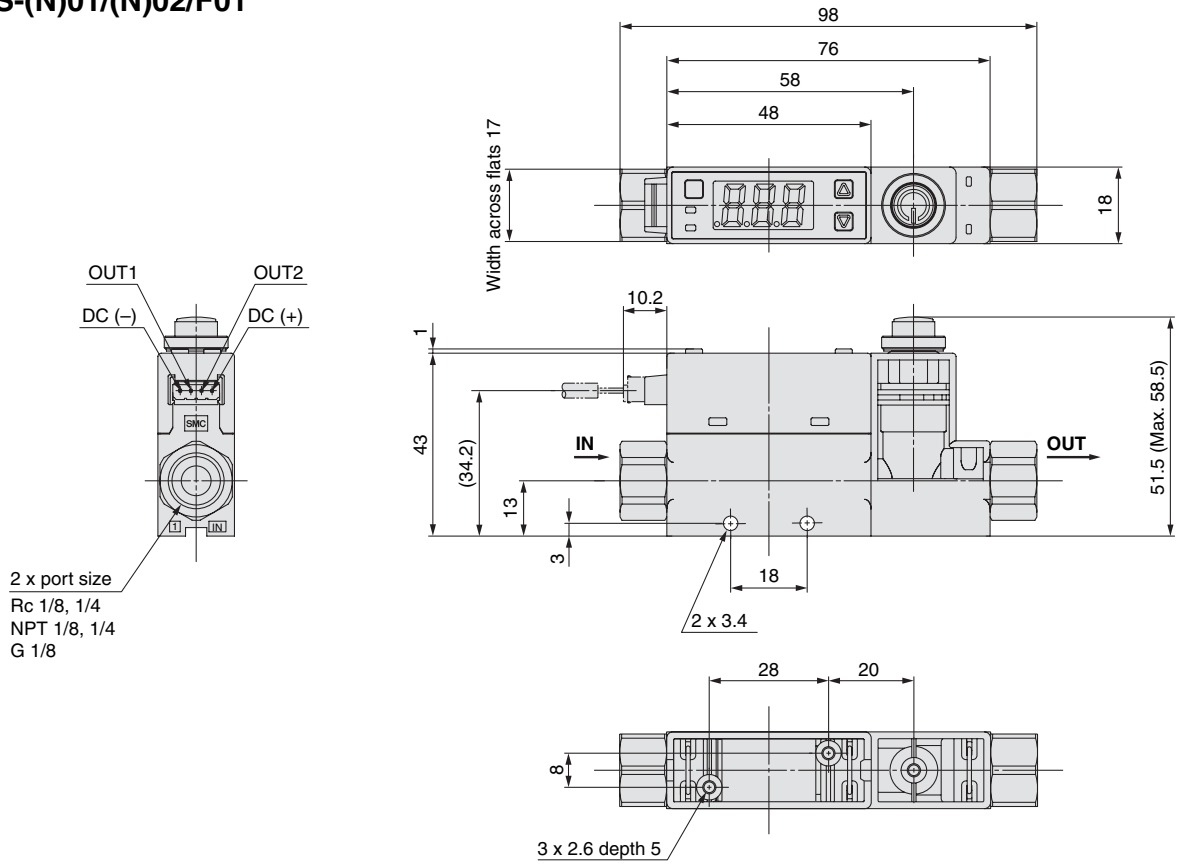
PFM7□S-C4L/C6L/C8L/N8L



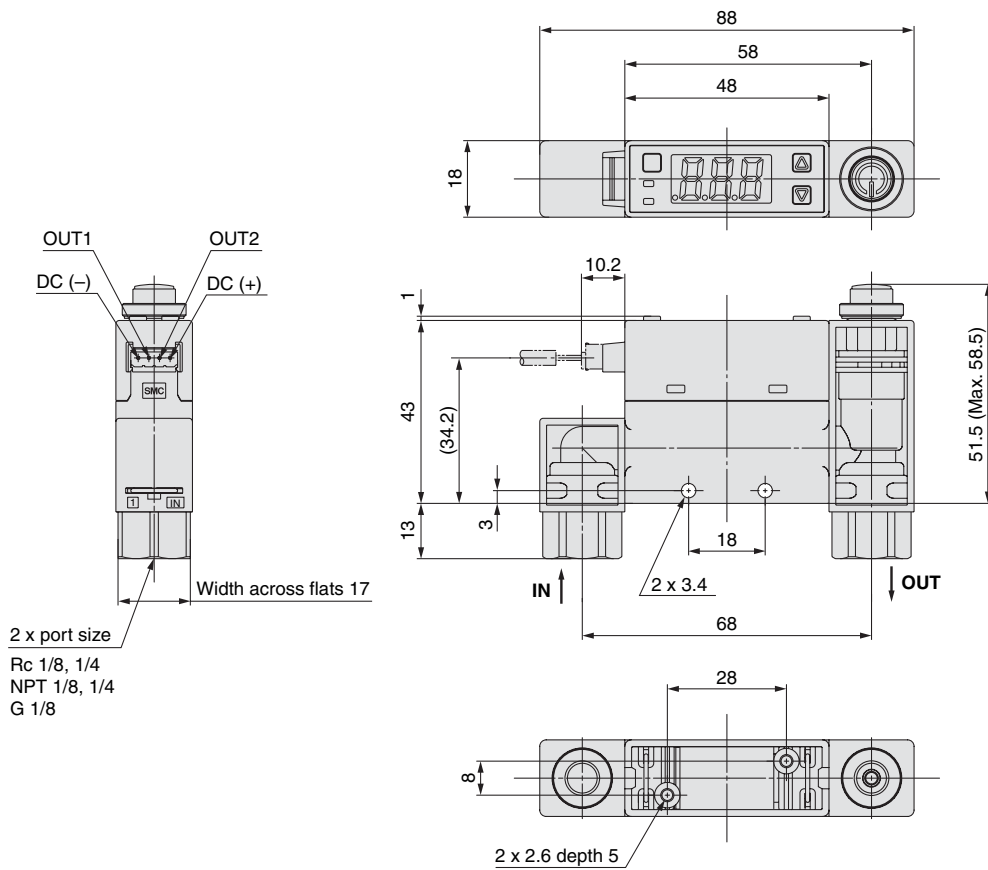
Series PFM7

Dimensions

PFM7□S-(N)01/(N)02/F01

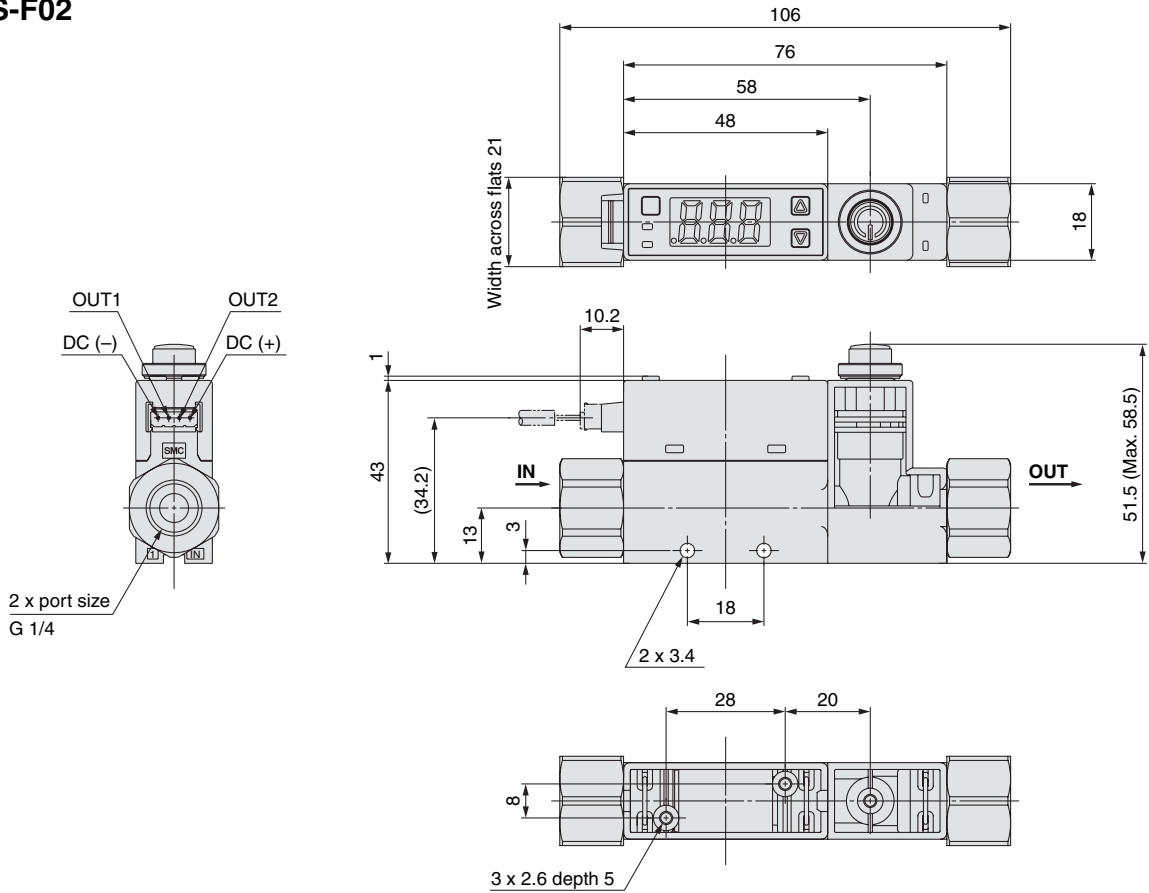


PFM7□S-(N)01L/(N)02L/F01L

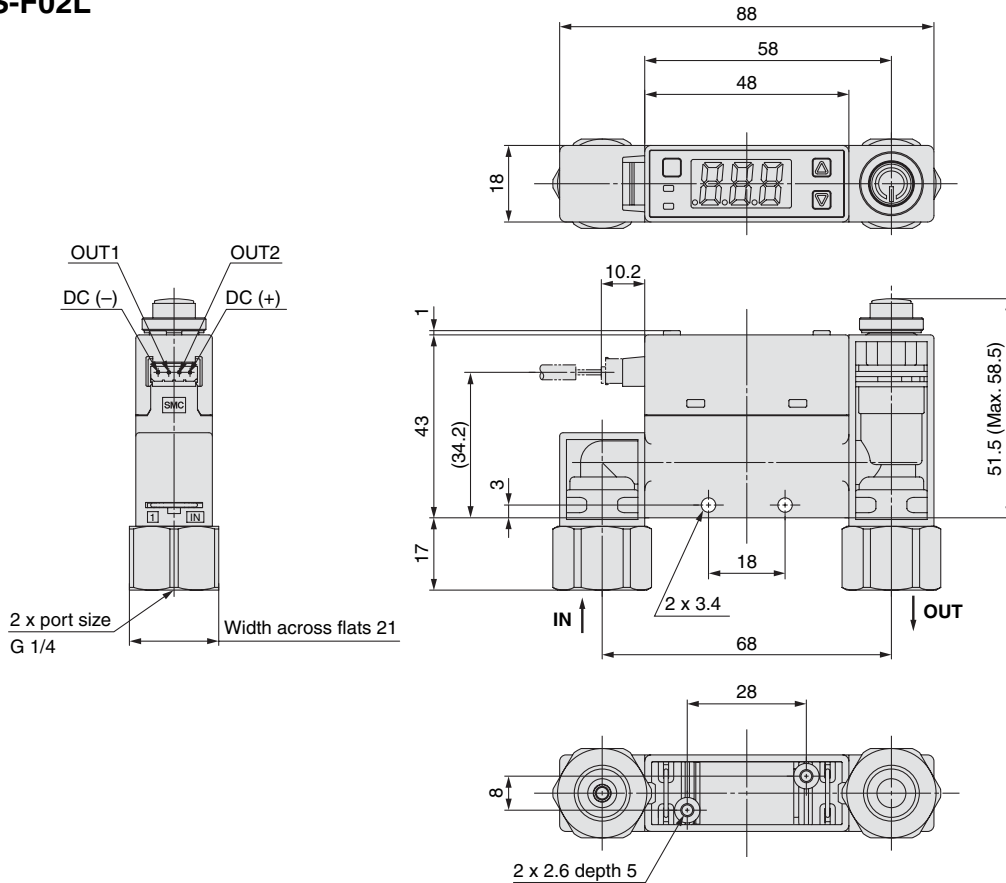


Dimensions

PFM7□S-F02



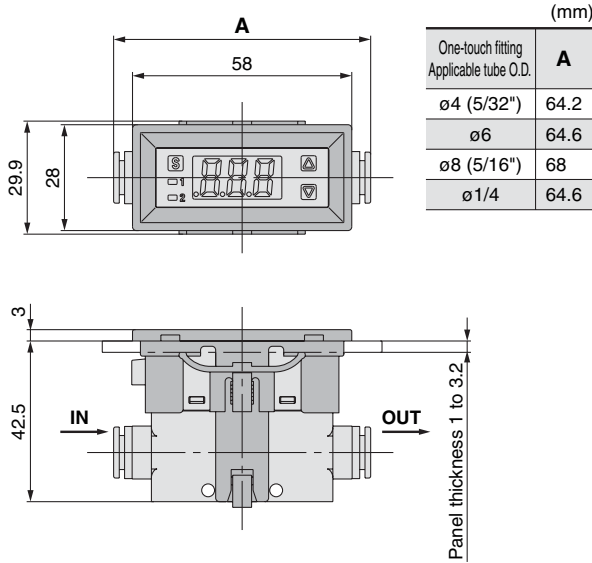
PFM7□S-F02L



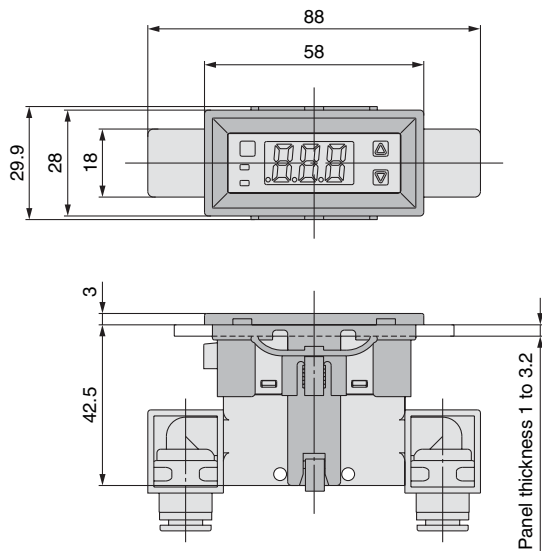
Series PFM7

Dimensions

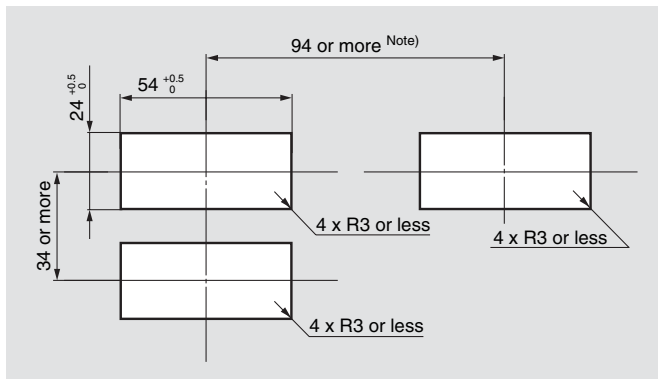
Panel mount / Without flow adjustment valve / Straight



Panel mount / Without flow adjustment valve



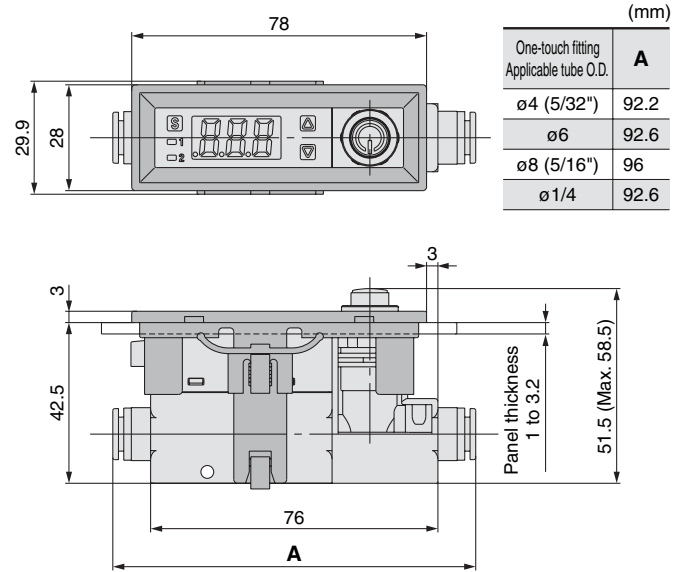
Panel Fitting Dimensions



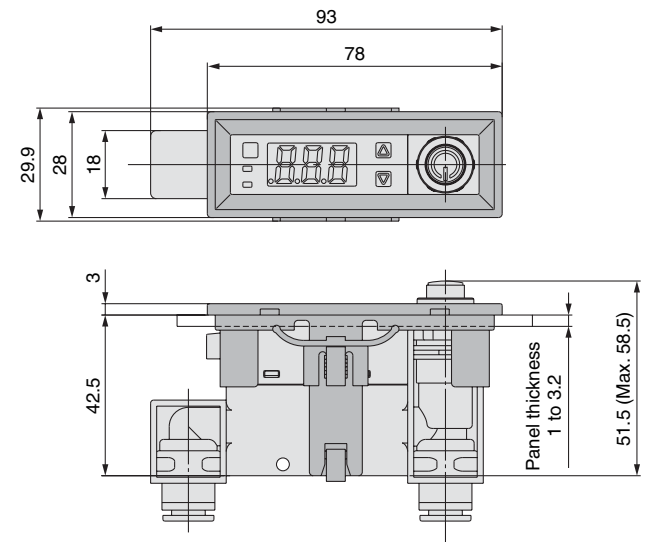
Panel thickness 1 to 3.2 mm

Note) Piping entry direction: Minimum dimensions for bottom side 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.

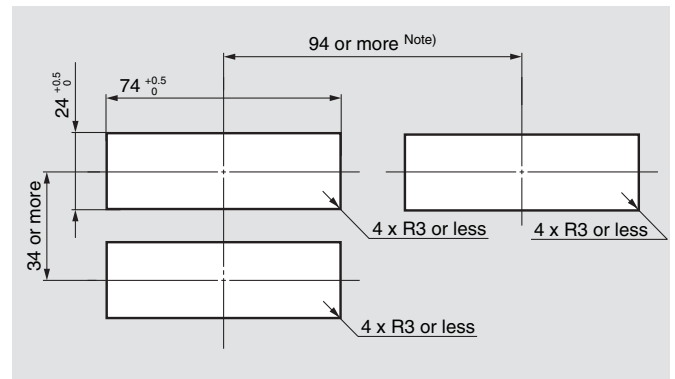
Panel mount / With flow adjustment valve / Straight



Panel mount / With flow adjustment valve



Panel Fitting Dimensions

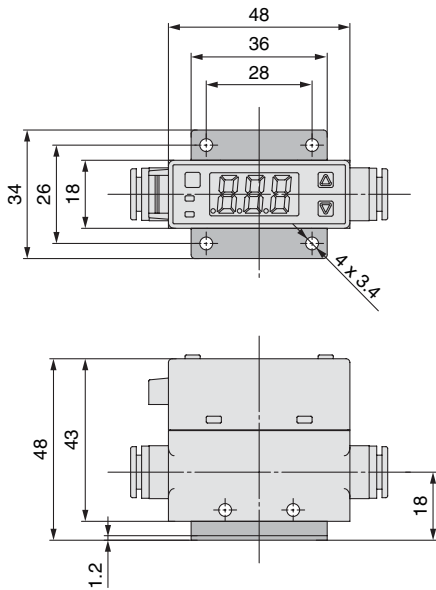


Panel thickness 1 to 3.2 mm

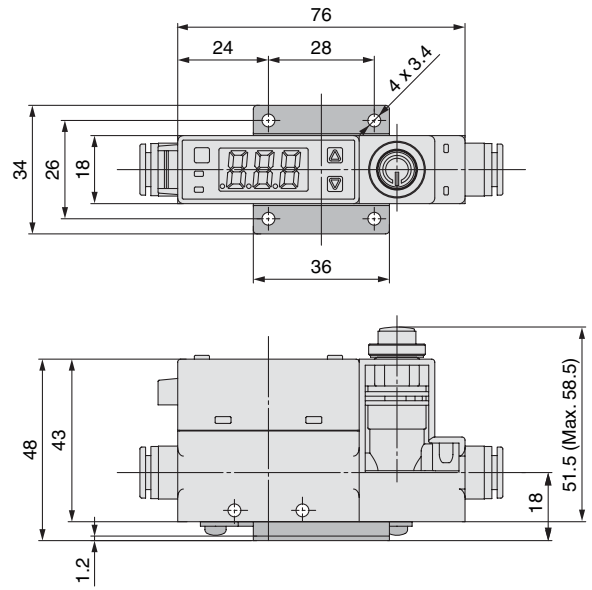
Note) Piping entry direction: Minimum dimensions for bottom side piping. If using straight piping, the piping material and tubing need to be taken into consideration when designing the system. If a bend (R) is used, limit it to R3 or less.

Dimensions

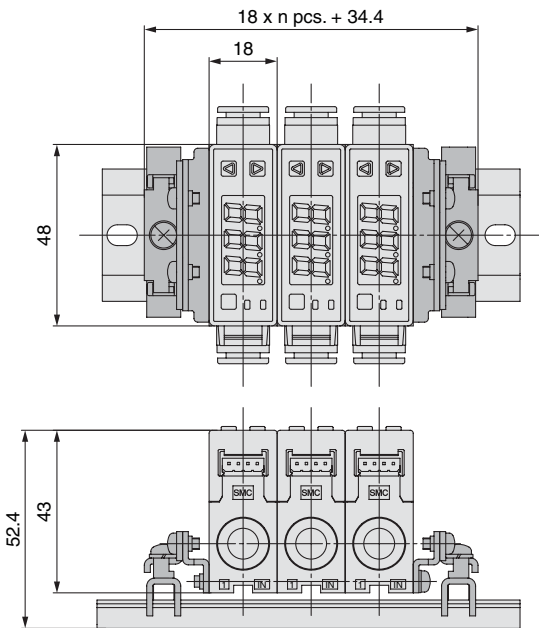
With bracket / Without flow adjustment valve



With bracket / With flow adjustment valve

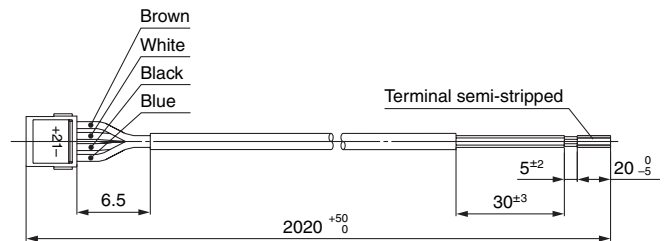


DIN rail mounting



- DIN rail (supplied by customers)
- Port size, F02: G1/4 cannot be mounted on the DIN rail.

Lead wire with connector
ZS-33-D



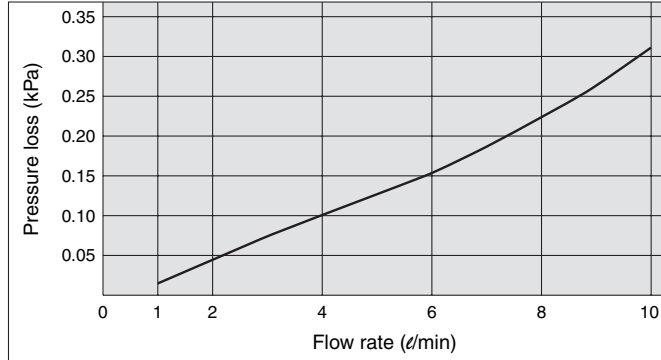
Cable Specifications of Lead Wire
with Connector

Rated temperature		80°C
Rated voltage		30 V
Number of wires		4
Conductor	Nominal cross section area	AWG26
	Material	Soft copper wire
	Construction	28 / 0.08 mm
	External diameter	Approx. 0.50 mm
Insulation	Material	Cross-linked vinyl chloride resin compound
	External diameter	Approx. 1.00 mm
	Colors	Brown, White, Black, Blue
Sheath	Material	Oil-resistant vinyl chloride resin compound
	Color	Light gray
Finished external diameter		ø3.5 ^{+0.10} / _{-0.25}

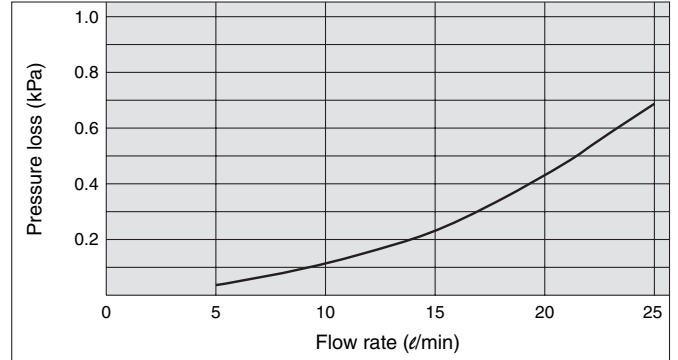
Series PFM7/PFM5 Common Specifications

Pressure Loss (Pressure: 350 [kPa])

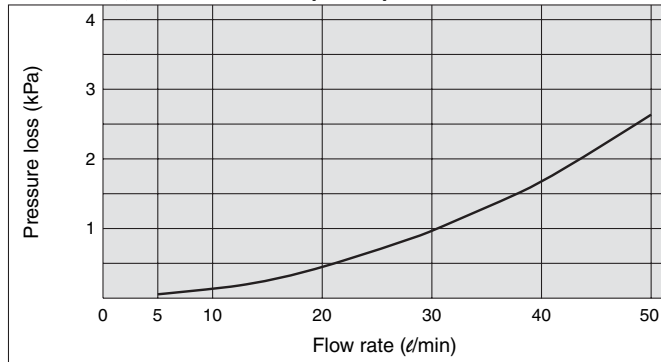
PFM710, 510 / For 10 (ℓ/min)



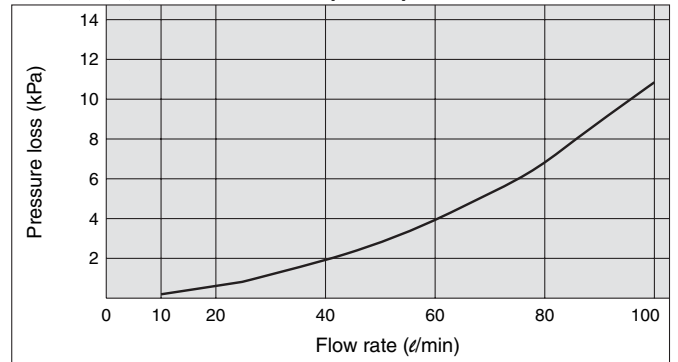
PFM725, 525 / For 25 (ℓ/min)



PFM750, 550 / For 50 (ℓ/min)

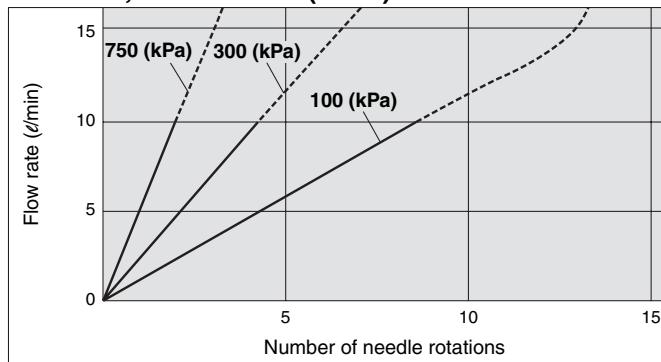


PFM711, 511 / For 100 (ℓ/min)

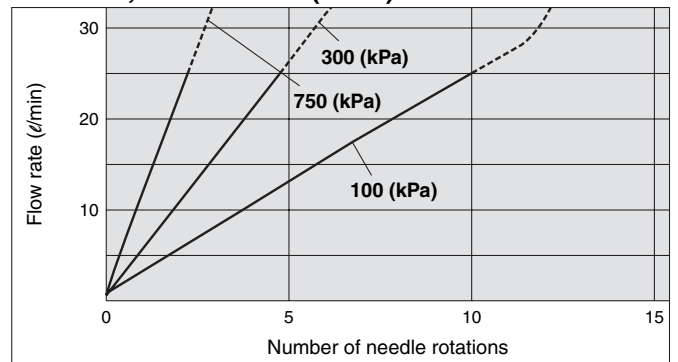


Flow Characteristics

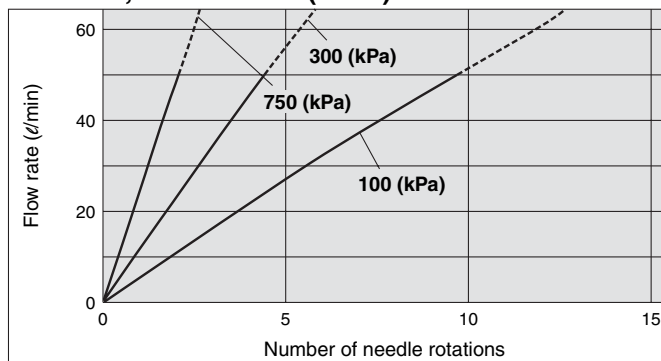
PFM710, 510 / For 10 (ℓ/min)



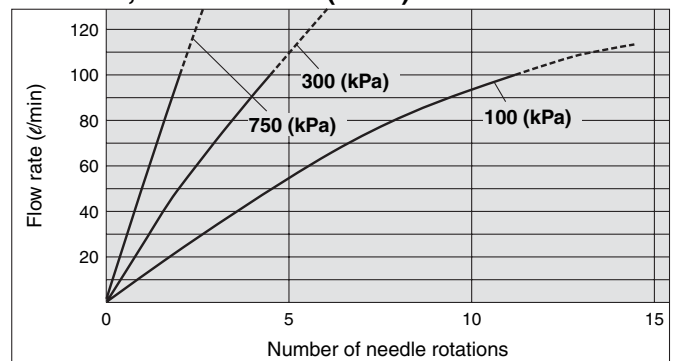
PFM725, 525 / For 25 (ℓ/min)



PFM750, 550 / For 50 (ℓ/min)

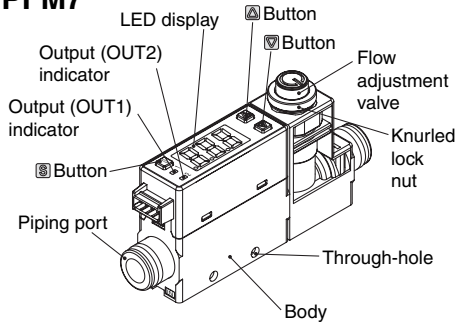


PFM711, 511 / For 100 (ℓ/min)

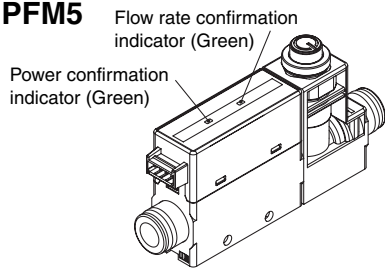


Parts Description

PFM7

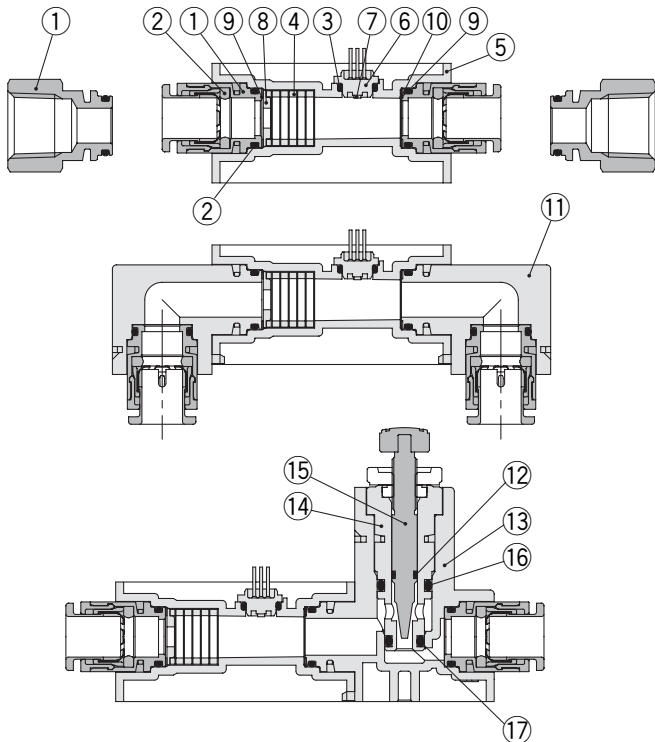


PFM5



Description	Item
Output (OUT1) indicator (Green)	Illuminates when the output (OUT1) is turned on. Flashes when overcurrent error occurs.
Output (OUT2) indicator (Red)	Illuminates when the output (OUT2) is turned on. Flashes when overcurrent error occurs.
LED display	Indicates the flow rate, set mode state and error code. The display color can be selected between red and green according to the output (OUT1) status.
▲ Button	Selects the operation mode and increases the set value for ON and OFF. Used to transfer to peak indication mode.
▼ Button	Selects the operation mode and decreases the set value for ON and OFF. Used to transfer to bottom indication mode.
Ⓢ Button	Used to make changes in each mode and to enter the set value.
Reset	Reset function is activated by pressing ▲ and ▼ buttons simultaneously. Returns the indicated value to zero and clears errors.
Body	Main body of the flow switch
Flow adjustment valve	Orifice mechanism to adjust the flow rate
Piping port	Connection port for piping
Knurled lock nut	Used to fix the needle.
Power confirmation indicator (Green)	Illuminates when power is supplied.
Flow rate confirmation indicator (Green)	Flashing interval changes according to flow rate. Flashes faster when flow rate is increased. Color changes to red when exceeding the rated flow rate.

Construction



Component Parts

No.	Description	Material	Note
1	Fitting for piping	Brass	Electroless nickel plated
2	O-ring	FKM	Fluoro coated
3	O-ring	HNBR	Fluoro coated
4	Rectifying module	Stainless steel 304	
5	Body	PBT	
6	Sensor housing	LCP	
7	Sensor chip	Silicon	
8	Orifice	Brass	Electroless nickel plated
9	Seal	FKM	Fluoro coated
10	Mesh	Stainless steel 304	
11	Bottom piping adapter	PBT	
12	O-ring	HNBR	Fluoro coated
13	Flow adjustment valve assembly	PBT	
14	Body B	Brass	Electroless nickel plated
15	Needle	Brass	Electroless nickel plated
16	O-ring	HNBR	Fluoro coated
17	O-ring	HNBR	Fluoro coated

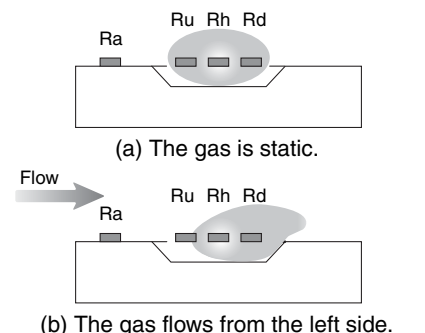
Detection Principle

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

The principle is as shown in the diagram on the right. (a) When the gas is static, the temperature distribution of heated gas centered around Rh is uniform, and Ru and Rd have the same resistance. (b) When the gas flows from the left side, it upsets the balance of the temperature distribution of heated gas, and the resistance of Rd becomes greater than that of Ru.

The difference in resistance between Ru and Rd is proportional to the gas velocity, so measurement and analysis of the resistance can show the flow direction and velocity of the gas.

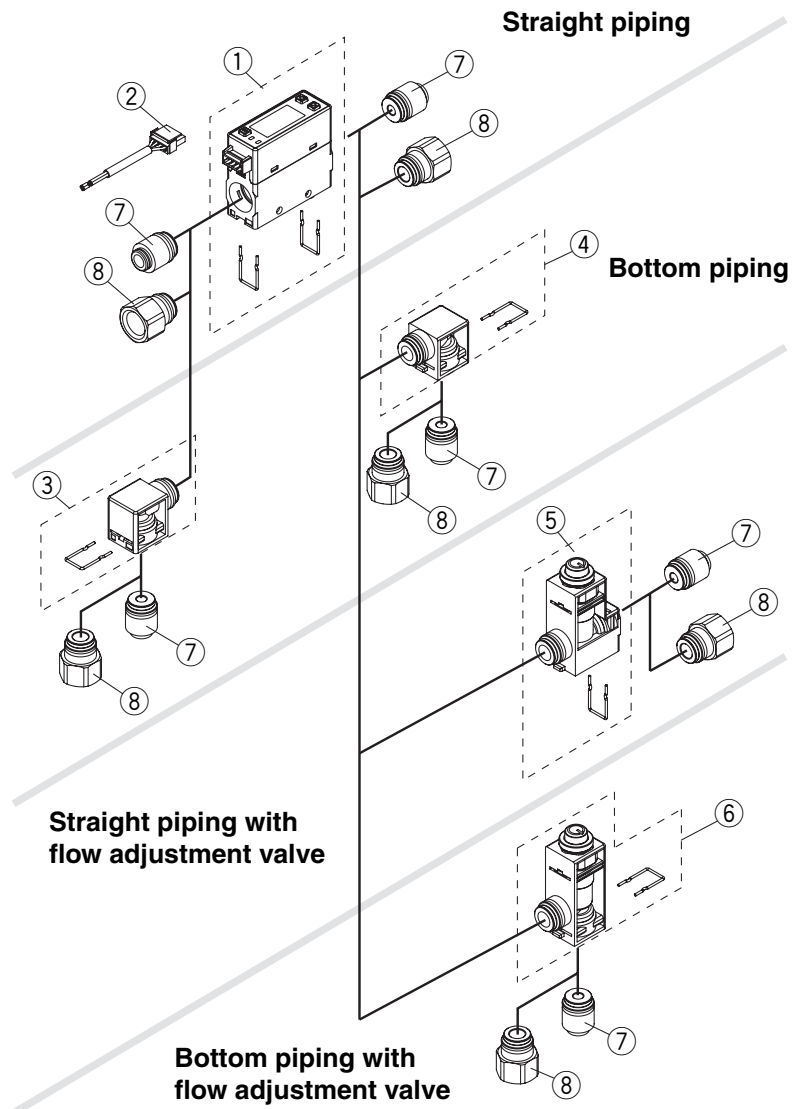
Ra is used to compensate the gas and/or ambient temperature.



Series PFM7/PFM5

Component Parts

No.	Description	Model	
1	Body		
2	Lead wire with connector (2 m)	ZS-33-D	
3	IN side Bottom piping adapter (with pin)	ZS-33-P1L	
4	OUT side Bottom piping adapter (with pin)	ZS-33-P2L	
5	For straight piping Flow adjustment valve assembly (with pin)	For 10 d/min	ZS-33-10N
		For 25 d/min	ZS-33-25N
		For 50 d/min	ZS-33-50N
		For 100 d/min	ZS-33-11N
6	For bottom piping Flow adjustment valve assembly (with pin)	For 10 d/min	ZS-33-10NL
		For 25 d/min	ZS-33-25NL
		For 50 d/min	ZS-33-50NL
		For 100 d/min	ZS-33-11NL
7	One-touch fitting	$\varnothing 4$ (5/32")	ZS-33-C4
		$\varnothing 6$	ZS-33-C6
		$\varnothing 8$ (5/16")	ZS-33-C8
		$\varnothing 1/4$	ZS-33-N7
8	Female thread	Rc 1/8	ZS-33-01
		NPT 1/8	ZS-33-N01
		G 1/8	ZS-33-F01
		Rc 1/4	ZS-33-02
		NPT 1/4	ZS-33-N02
		G 1/4	ZS-33-F02



Series PFM Function Details

■ Output operation

The output operation can be selected from the following:
Output (hysteresis mode and window comparator mode) corresponding to real-time flow rate,
Output corresponding to accumulated flow,
Accumulated output pulse output

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

■ Indication color

The indication color can be selected for each output condition. The selection of the indication color provides visual identification of abnormal values. (The indication 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

■ Selection of operating fluid

The fluid can be selected. If argon (Ar) or carbon dioxide (CO₂) is used, the setting needs to be changed.

Dry air, N ₂
Argon
CO ₂

Note) When CO₂ is selected, the upper limit of the measured flow rate range will be 1/2 of that for other fluids.

■ Selection of indication unit reference

The indication unit reference can be selected between standard conditions and normal conditions.

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

■ Setting of response time

The flow rate may change momentarily during transition between ON (open) and OFF (closed) of the valve. It can be set so that this momentary change is not detected.

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

<Principle>

When the switch has been in ON area for a set period of time, the output will turn on (or off).

■ Indication mode

The indication mode can be selected between real-time flow rate and accumulated flow.

Real-time flow rate display
Accumulated flow display

■ External input function

The external input function can be selected from accumulated value external reset, auto-shift and auto-shift zero.

(Input signal: Connect input line to GND for 30 ms or more.)

External reset: This function resets the accumulated value to "0" when an input signal is applied.

Auto-shift: This function generates an output corresponding to the change in relation to real-time flow rate when an input signal is applied.

Auto-shift zero: This function displays real-time flow rate as "0" when a positive input signal is applied in the auto shift function described above.

Set values and flow rates that are relatively on the negative side are expressed by illumination of the decimal point on the far left.

■ Indication resolution

The indication resolution of the PFM710 and 711 series can be changed to enable values to be indicated in smaller steps.

100 resolution	PFM710 by 0.1 μ /min PFM711 by 1 μ /min
1000 resolution	PFM710 by 0.01 μ /min PFM711 by 0.1 μ /min

■ 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 min. 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.

■ Selection of analog output filter

This selection is available when using a product with an analog output.

A signal with fast response speed can be generated by turning off the analog output filter.

■ Selection of power-saving mode

The power-saving mode can be selected.

With this function, if no buttons are pressed for 30 sec., it shifts to power-saving mode.

At the time of shipment from the factory, the product is set to the normal mode (the power-saving mode is turned off).

(When power-saving mode is activated, the decimal point flashes.)

■ Setting of secret code

The user can select whether a secret code must be entered to release key lock.

At the time of shipment from the factory, it is set such that the secret code is not required.

■ Peak/Bottom value indication

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

■ Keylock function



Prevents operation errors such as accidentally changing setting values.

■ Zero clear function

Allows the user to adjust the measured flow rate indication to zero. The adjustment range is $\pm 7\%$ F.S. of the initial factory setting.

■ Error indication function

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

Description	Contents	Action
Flow rate error	The flow rate exceeds the upper limit of indicated flow rate range.	Decrease the flow rate.
	There is a reverse flow equivalent to -5% or more.	Turn the flow to correct direction.
Overcurrent 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.
	Load current of 80 mA or more is applied to the switch output (OUT2).	
System error	Possibility of internal circuit damage before factory adjustment.	Stop operation immediately and contact SMC.
	System error. Possibility of data memorizing failure or internal circuit damage.	Reset the unit, and carry out all settings again.
Zero clear error	If zero clear is performed (by holding down  and  buttons simultaneously for 1 sec.) while there is some flow, "Er4" will be displayed for 1 sec.	Perform zero clear of accumulated flow rate when there is no flow.
Flow rate error	The flow rate exceeds the accumulated flow rate range.	Clear the accumulated flow rate. (This error does not matter when the accumulated flow rate is not being used.)

If the error or abnormality cannot be solved by the action above, please contact SMC for further investigation.

Series PFM7/PFM5

Made to Order 1

Please contact SMC for detailed specifications, lead times and prices.



Symbol

Changing the piping entry direction combination for IN and OUT side

X693, X694

PFM **7** □ □ □ - □ □ □ □ □ □ □ - **X693**

● **Type**

5	Remote sensor unit
7	Integrated display

● **Piping entry direction**
 (Note) No symbol is entered.

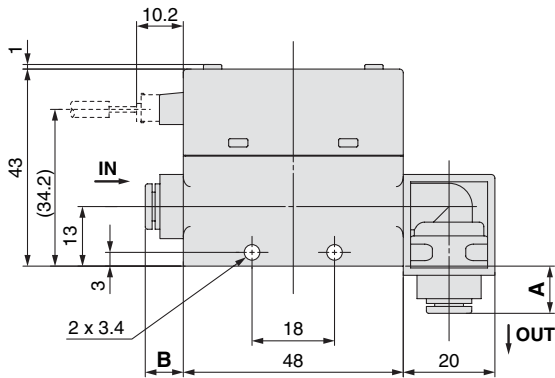
● **Changing the piping entry direction combination**

X693	IN side: Straight / OUT side: Bottom
X694	IN side: Bottom / OUT side: Straight

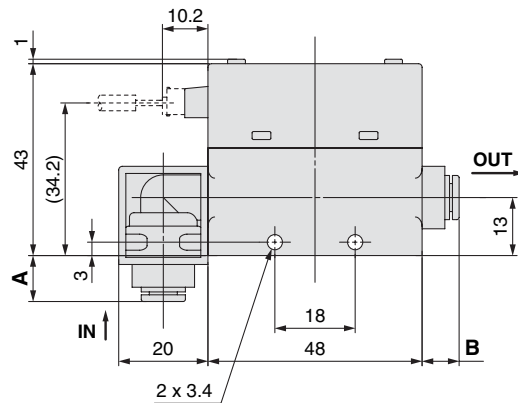
For details of How to Order, refer to page 1 and 13.

Dimensions

PFM₅ □ □ □ -C4/C6/C8/N7-□-X693

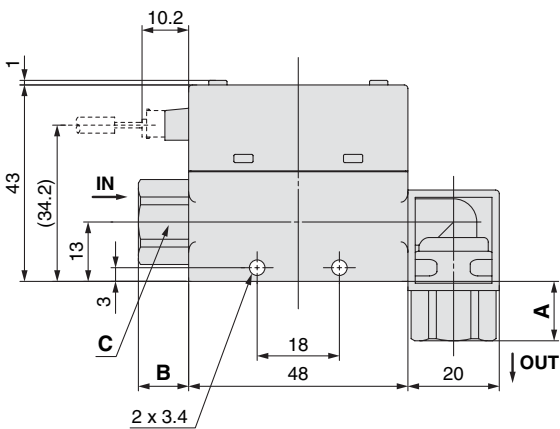


PFM₅ □ □ □ -C4/C6/C8/N7-□-X694

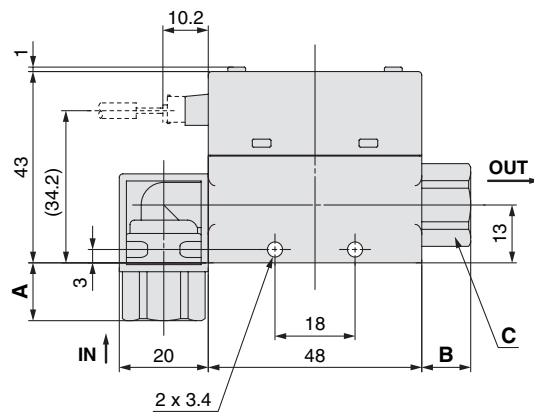


One-touch fitting Applicable tube O.D.		A	B
C4	ø4 (5/32")	10.1	8.1
C6	ø6	10.3	8.3
C8	ø8 (5/16")	12	10
N7	ø1/4	10.3	8.3

PFM₅ □ □ □ -□01/02-□-X693



PFM₅ □ □ □ -□01/02-□-X694



Port size	A	B	C (Width across flats)
Rc 1/8, 1/4 NPT 1/8, 1/4 G 1/8	13	11	17
G 1/4	17	15	21

Series PFM7/PFM5

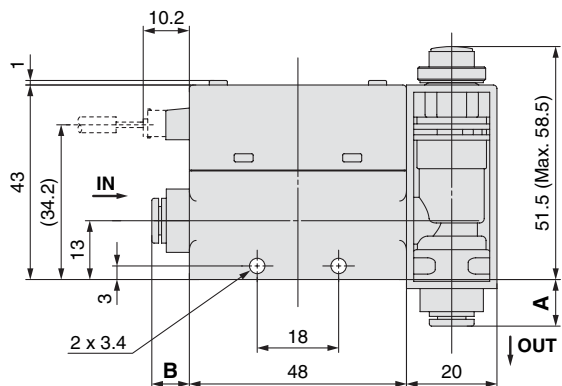
Made to Order 2

Please contact SMC for detailed specifications, lead times and prices.



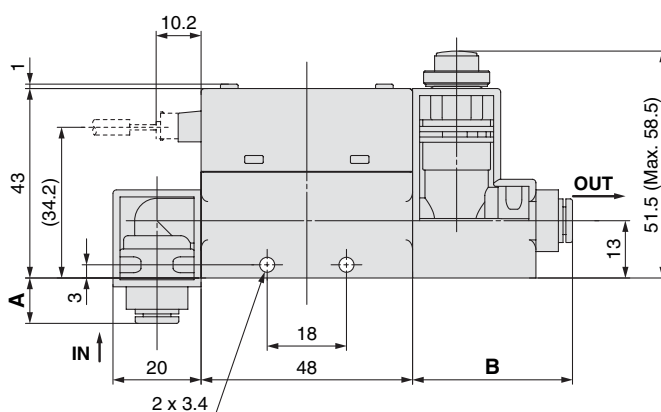
Dimensions

PFM7□□S-C4/C6/C8/N7-□-X693



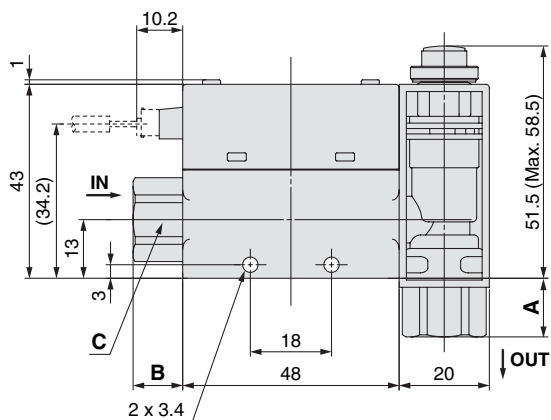
One-touch fitting Applicable tube O.D.	A	B
ø4 (5/32")	10.1	8.1
ø6	10.3	8.3
ø8 (5/16")	12	10
ø1/4	10.3	8.3

PFM7□□S-C4/C6/C8/N7-□-X694



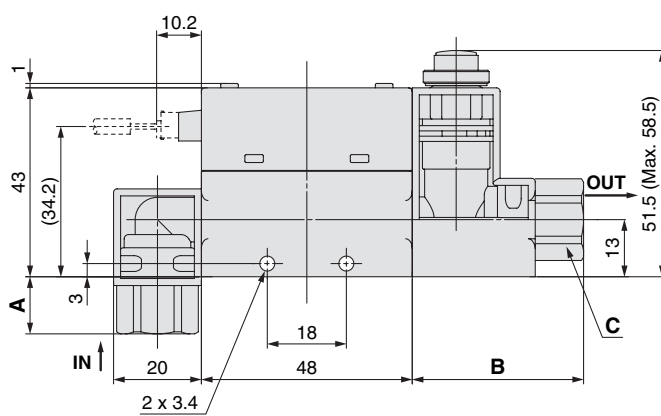
One-touch fitting Applicable tube O.D.	A	B
ø4 (5/32")	10.1	36.1
ø6	10.3	36.3
ø8 (5/16")	12	37
ø1/4	10.3	36.3

PFM7□□S-□01/02-□-X693



Port size	A	B	C (Width across flats)
Rc 1/8, 1/4 NPT 1/8, 1/4 G 1/8	13	11	17
G 1/4	17	15	21

PFM7□□S-□01/02-□-X694



Port size	A	B	C (Width across flats)
Rc 1/8, 1/4 NPT 1/8, 1/4 G 1/8	13	39	17
G 1/4	17	43	21

Series PFM7/PFM5

Made to Order 3

Please contact SMC for detailed specifications, lead times and prices.



Symbol
X731

Compatibility with argon (Ar) and carbon dioxide (CO₂) mixed gas

The argon-carbon dioxide gas ratio (Ar: CO₂) can be selected using the push-buttons from among the following: 92 : 8, 90 : 10, 80 : 20, 70 : 30, and 60 : 40. Dimensions are same as those of standard models.

PFM 7 - - - X731

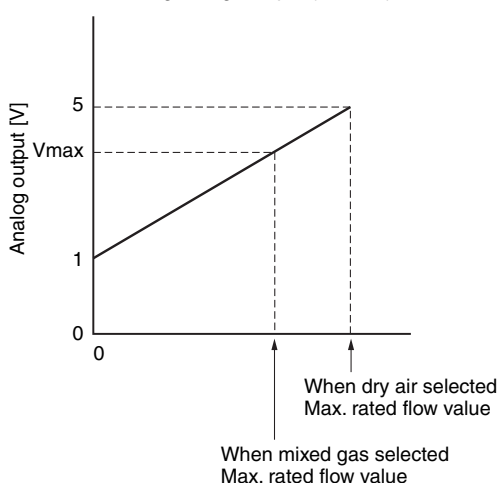
7 Integrated display

For details of How to Order, refer to page 1 and 13.

Model	Gas ratio		Rated flow range	Displayable range	Settable range	Max. analog output	
	Ar	CO ₂				Voltage (Vmax)	Current (Imax)
PFM710	92%	8%	0.2 to 7.0 <i>l</i> /min	0.2 to 7.4 <i>l</i> /min	0 to 7.4 <i>l</i> /min	3.80 V	15.2 mA
	90%	10%					
	80%	20%					
	70%	30%					
	60%	40%					
PFM725	92%	8%	0.5 to 25.0 <i>l</i> /min	0.5 to 26.3 <i>l</i> /min	0 to 26.3 <i>l</i> /min	5.00 V	20.0 mA
	90%	10%	0.5 to 20.0 <i>l</i> /min	0.5 to 21.0 <i>l</i> /min	0 to 21.0 <i>l</i> /min	4.20 V	16.8 mA
	80%	20%					
	70%	30%					
	60%	40%					
PFM750	92%	8%	1.0 to 50.0 <i>l</i> /min	1.0 to 52.5 <i>l</i> /min	0 to 52.5 <i>l</i> /min	5.00 V	20.0 mA
	90%	10%	1.0 to 40.0 <i>l</i> /min	1.0 to 42.0 <i>l</i> /min	0 to 42.0 <i>l</i> /min	4.20 V	16.8 mA
	80%	20%					
	70%	30%					
	60%	40%					
PFM711	92%	8%	2 to 100 <i>l</i> /min	2 to 105 <i>l</i> /min	0 to 105 <i>l</i> /min	5.00 V	20.0 mA
	90%	10%	2 to 90 <i>l</i> /min	2 to 95 <i>l</i> /min	0 to 95 <i>l</i> /min	4.60 V	18.4 mA
	80%	20%					
	70%	30%					
	60%	40%					

Output characteristics using mixed gas

Analog voltage output (1 to 5 V)



Analog current output (4 to 20 mA)

