

# 2-Colour Display Digital Flow Switch

- Flow rate range: 10, 25, 50, 100  $\ell$ /min.
- Minimum unit setting: 0.01  $\ell$ /min.  
(0.1  $\ell$ /min when the flow rate range is 25, 50, 100  $\ell$ /min.)
- Repeatability:  $\pm 1\%$ F.S. or less
- Grease-free
- Flow adjustment valve is integrated.  
(Reduced piping and space saving)
- Response time:  
Either 50 msec., 0.5 sec., 1 sec.  
or 2 sec. can be chosen.

Fluid  
**Air, N<sub>2</sub>, Ar, CO<sub>2</sub>**

**2-colour display**  
Irregular value at a glance



Series **PFM**

  
CAT.EUS100-63B-UK

# 2-Colour Display Digital Flow Switch

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

**Piping variations**  
 One-touch fittings, female threads, straight piping, and bottom piping can be selected.

**Series PFM7**

**Flow characteristics**

**Indicator function**  
 Flashing speed varies according to flow rate. Colour changes from green to red when rated flow rate is exceeded. Can be used as a simple monitor.

**Series PFM5**

| Flashing speed | Flow rate |
|----------------|-----------|
| Fast           | High      |
| Slow           | Low       |

Flashing

**Connectors**  
 Connection and removal of wiring is easy.

**Series PFM3**

Power supply / Output connector

e-con connector  
 Sensor connector

**Support for vertical and horizontal secure mounting (panel mount)**

A single panel opening is sufficient.  
 Reduces panel fitting work and enables space-savings.

34.5

Panel opening

| Measurement flow range (l/min) | Model  | Integrated type |              | Remote type |              |
|--------------------------------|--------|-----------------|--------------|-------------|--------------|
|                                |        | Sensor unit     | Display unit | Sensor unit | Display unit |
| 0.2 to 10 (0.2 to 5)           | PFM710 | PFM510          | PFM3□□       |             |              |
| 0.5 to 25 (0.5 to 12.5)        | PFM725 | PFM525          |              |             |              |
| 1 to 50 (1 to 25)              | PFM750 | PFM550          |              |             |              |
| 2 to 100 (2 to 50)             | PFM711 | PFM511          |              |             |              |

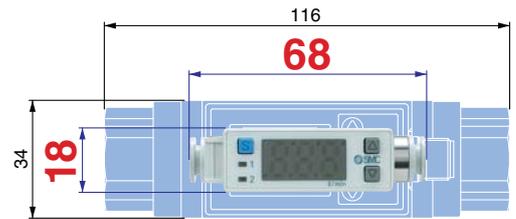
( ) : Fluid: CO<sub>2</sub>

Features 1



## Compact

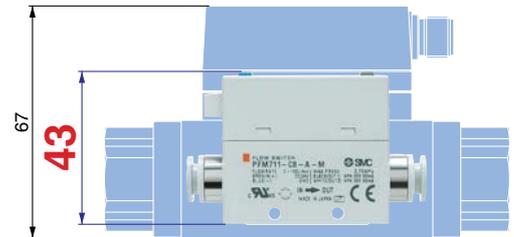
Same size even when the model with different flow rate range (10, 25, 50, 100 ℓ/min) is chosen.



## Light weight: 55 g (PFM711)

(With one-touch fitting, without flow adjustment valve)

Conventional model PF2A711: 290 g

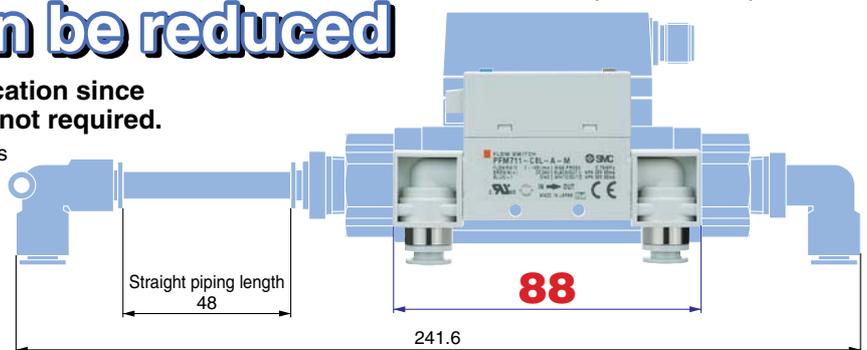


Comparison with the conventional model PF2A711 (10 to 100 ℓ/min)

## Piping space can be reduced

Mountable in a narrow location since straight piping length\* is not required.

\* A straight piping length of 8 times the piping diameter is required for the conventional model.

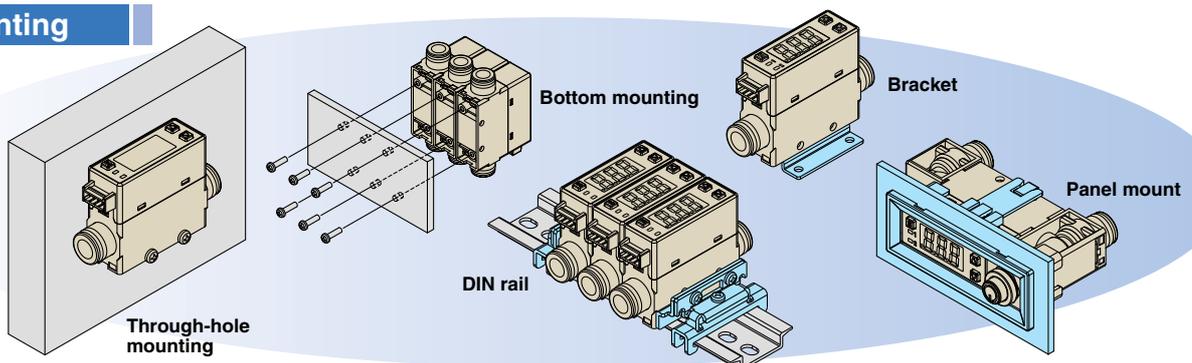


Comparison with the conventional model PF2A711 (10 to 100 ℓ/min) when  $\phi 6$  one-touch fittings are attached.

## Piping Variations

|                         | One-touch fitting: $\phi 4, \phi 6, \phi 8, \phi 1/4$ |        | Female thread: Rc 1/8, 1/4 • NPT 1/8, 1/4 • G 1/8, 1/4 |        |
|-------------------------|---|--------|--|--------|
|                         | Straight  | Bottom | Straight   | Bottom |
| Without flow adjustment |   |        |  |        |
| With flow adjustment    |   |        |  |        |

## Mounting



## Main Functions

### ● Selection of fluid

Air, Nitrogen (N<sub>2</sub>), Argon (Ar) or Carbon dioxide (CO<sub>2</sub>) can be selected using the buttons.

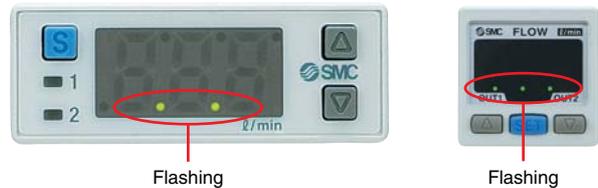
### ● Secret code setting function

The user must input a secret code to cancel the keylock mode. This ensures that only authorised persons can operate the switch.

For details and other functions, refer to page 33.

### ● Power-saving mode

Turning off the display can save power consumption.



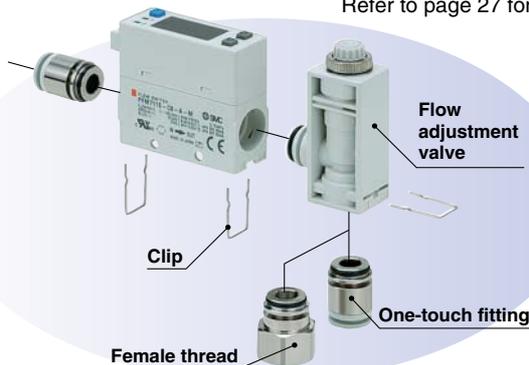
The decimal point indicators flash in power-saving mode.

|                                       |  |
|---------------------------------------|--|
| <b>■ Selection of indication unit</b> | User can select between ANR and N <sub>l</sub> /min for each fluid.<br>[ANR] Indicates the flow rate converted to a volume under standard conditions: 20°C, 1 atm (atmosphere), 65%RH<br>[N <sub>l</sub> /min] Indicates the flow rate converted to a volume under normal conditions: 0°C, 1 atm (atmosphere). |
| <b>■ External input</b>               | Can be selected from accumulated value external reset, auto-shift and auto-shift zero.   |
| <b>■ Indication resolution</b>        | Minimum unit setting can be selected from 1 $\mu$ /min, 0.1 $\mu$ /min and 0.01 $\mu$ /min. Depends on the model. Refer to the specifications (P. 33) for details.   |

## Several Combinations

Depending on the installation conditions, it is possible to add or remove the **flow adjustment valve**, change the **fitting type** and the **piping direction** as desired.

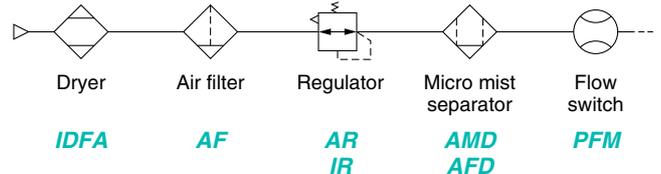
Refer to page 27 for details.



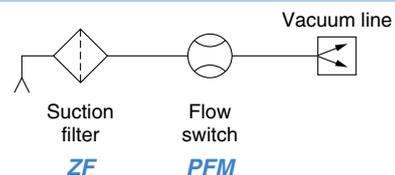
The accuracy may fluctuate by 2 to 3% just after replacement. (Repeatability does not change.)

## Recommended Air Circuits

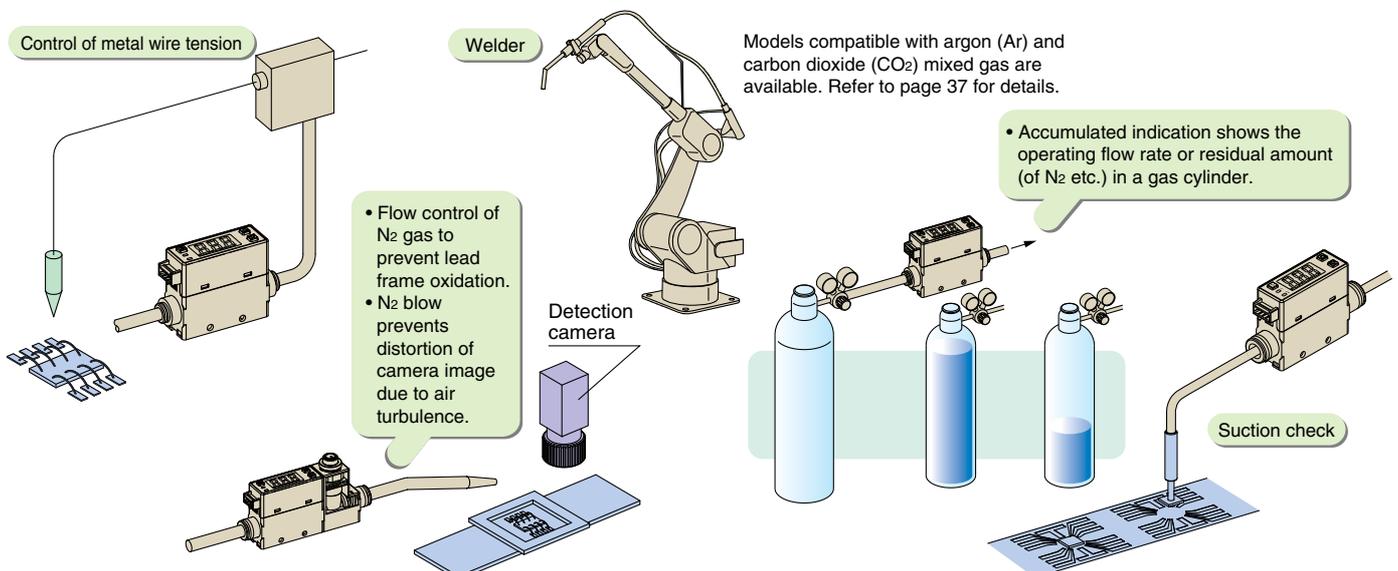
### Compressed air line



### Vacuum line

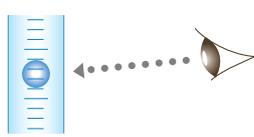


## Applications



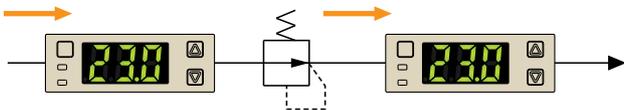
# Comparison with Float Type Flow Meter

## Digital display

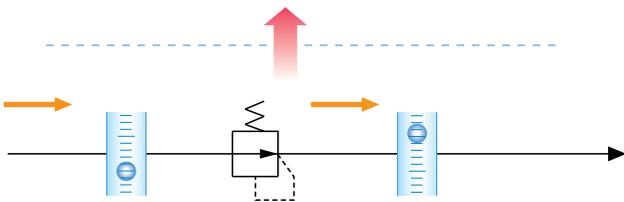


Indicated value depends on the viewing angle.

## Not subject to pressure variations

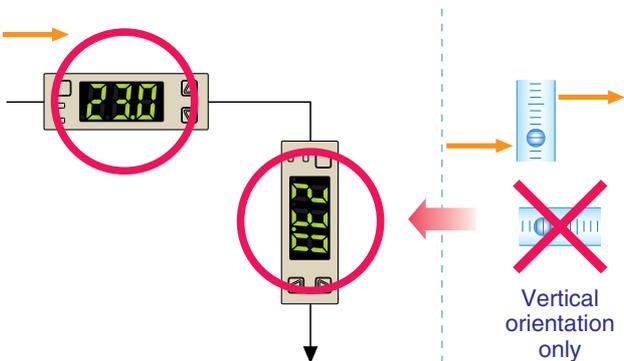


Indicated value is the same at any installation position. (No conversion is needed.)



Indicated value depends on installation position. (Conversion is required.)

## Free mounting orientation



Mounting orientation is not limited.

## With switch output and analogue output

Control by sensor output

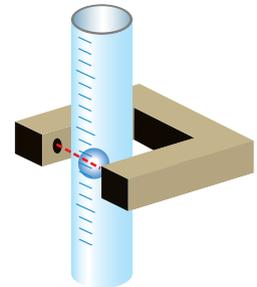
Visual control



With switch output and analogue output

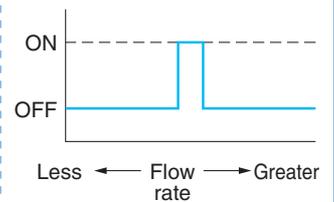
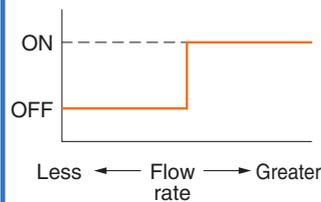
Without output function

A photoelectric switch, or similar, must be prepared separately.



Can detect whether greater or less than set flow rate. The flow condition can be controlled all the time.

Can only detect when float passes. Cannot detect whether greater or less than set flow rate.



## Accumulated flow display



Able to confirm the total air consumption per day (Max. 999999 ℓ)  
Accumulated pulse output is also equipped.

Not displayable

## ■ SMC Digital Flow Switch Variations ■

### For Air

| Measurement flow range<br>ℓ/min | Integrated type | Remote type |         |                        |
|---------------------------------|-----------------|-------------|---------|------------------------|
|                                 | Model           | Sensor unit | Monitor | 4-channel flow monitor |
| 1 to 10                         | PF2A710         | PF2A510     | PF2A30□ | PF2A20□                |
| 5 to 50                         | PF2A750         | PF2A550     | PF2A31□ |                        |
| 10 to 100                       | PF2A711         | PF2A511     |         | —                      |
| 20 to 200                       | PF2A721         | PF2A521     |         |                        |
| 50 to 500                       | PF2A751         | PF2A551     |         |                        |
| 150 to 3000                     | PF2A703H        | —           | —       | —                      |
| 300 to 6000                     | PF2A706H        | —           | —       | —                      |
| 600 to 12000                    | PF2A712H        | —           | —       | —                      |

### For Water

| Measurement flow range<br>ℓ/min | Integrated type | Remote type |         |                        |
|---------------------------------|-----------------|-------------|---------|------------------------|
|                                 | Model           | Sensor unit | Monitor | 4-channel flow monitor |
| 0.5 to 4                        | PF2W704(T)      | PF2W504(T)  | PF2W30□ | PF2W20□                |
| 2 to 16                         | PF2W720(T)      | PF2W520(T)  |         |                        |
| 5 to 40                         | PF2W740(T)      | PF2W540(T)  | PF2W33□ | —                      |
| 10 to 100                       | PF2W711         | PF2W511     |         |                        |

### For Deionised Water and Chemicals



For details, refer to the individual catalogue (CAT.ES100-54).

| Measurement flow range<br>ℓ/min | Remote type |         |                        |
|---------------------------------|-------------|---------|------------------------|
|                                 | Sensor unit | Monitor | 4-channel flow monitor |
| 0.4 to 4                        | PF2D504     | PF2D30□ | PF2D20□                |
| 1.8 to 20                       | PF2D520     |         |                        |
| 4.0 to 40                       | PF2D540     | —       | —                      |

# ● 2-Color Display Digital Flow Switch

## Series PFM7 Integrated Display



## Series PFM5 Remote Sensor Unit



## Series PFM7, PFM5 Common Specifications

## Series PFM3 Flow Sensor Monitor



## Made to Order

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combination for IN and OUT side

Compatible with argon (Ar) and carbon ..... P. 37  
dioxide (CO<sub>2</sub>) mixed gas

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# 2-Colour Display Digital Flow Switch

Integrated  
display



# Series PFM7



## 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) $\ell$ /min    |
| 25 | 0.5 to 25 (12.5) $\ell$ /min |
| 50 | 1 to 50 (25) $\ell$ /min     |
| 11 | 2 to 100 (50) $\ell$ /min    |

\* ( ): Fluid: CO<sub>2</sub>

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     | ø4 (5/32") one-touch fitting | ●               |    |    |    |
| C6     | ø6 one-touch fitting         | ●               | ●  | ●  |    |
| C8     | ø8 (5/16") one-touch fitting | ●               | ●  | ●  | ●  |
| N7     | ø1/4 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 <sup>Note 1)</sup>                |
| Nil | With unit switching function <sup>Note 2)</sup> |

Note 1) Fixed unit: Real-time flow rate:  $\ell$ /min  
Accumulated flow:  $\ell$

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

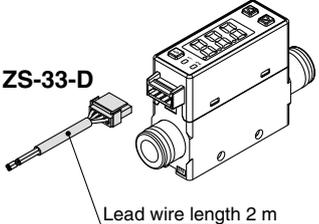
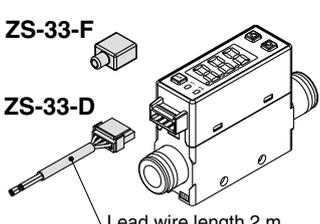
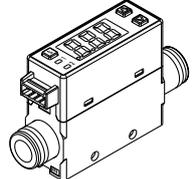
|   |  |
|---|--|
| A | 2 NPN outputs                                    |
| B | 2 PNP outputs                                    |
| C | 1 NPN output + Analogue (1 to 5 V)               |
| D | 1 NPN output + Analogue (4 to 20 mA)             |
| E | 1 PNP output + Analogue (1 to 5 V)               |
| F | 1 PNP output + Analogue (4 to 20 mA)             |
| G | 1 NPN output + External input <sup>Note 3)</sup> |
| H | 1 PNP output + External input <sup>Note 3)</sup> |

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

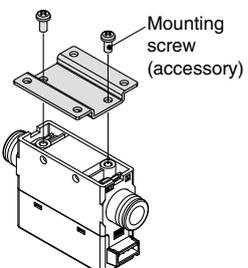
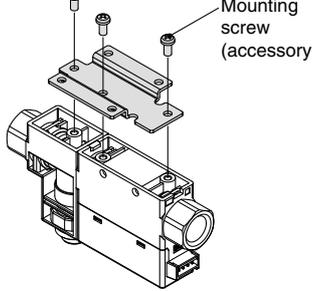
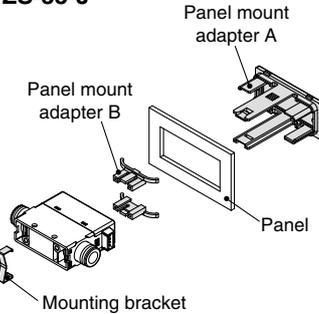
## Piping Variations

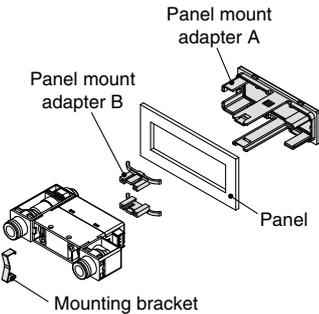
|                                     | With one-touch fittings (C4, C6, C8, N7) |            | Female thread (01, 02, N01, N02, F01, F02) |            |
|-------------------------------------|--|------------|--|------------|
|                                     | Straight (Nil)                           | 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><b>ZS-33-D</b></p> <p>Lead wire length 2 m</p> | <p>With lead wire with connector (2 m) + Rubber cover for connector (silicon rubber)</p>  <p><b>ZS-33-F</b></p> <p><b>ZS-33-D</b></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<br/>(For without flow adjustment valve)</p> <p><b>ZS-33-M</b></p>  <p>Mounting screw (accessory)</p> | <p>Bracket<br/>(For with flow adjustment valve)</p> <p><b>ZS-33-MS</b></p>  <p>Mounting screw (accessory)</p> <p>Piping direction: Cannot be mounted with bottom piping type.</p> | <p>Panel mount adapter<br/>(For without flow adjustment valve)</p> <p><b>ZS-33-J</b></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<br/>(For with flow adjustment valve)</p> <p><b>ZS-33-JS</b></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  |
|-------------|--|
| <b>X693</b> | Change of piping entry direction combination                               |
| <b>X694</b> | Compatible with argon (Ar) and carbon dioxide (CO <sub>2</sub> ) mixed gas |

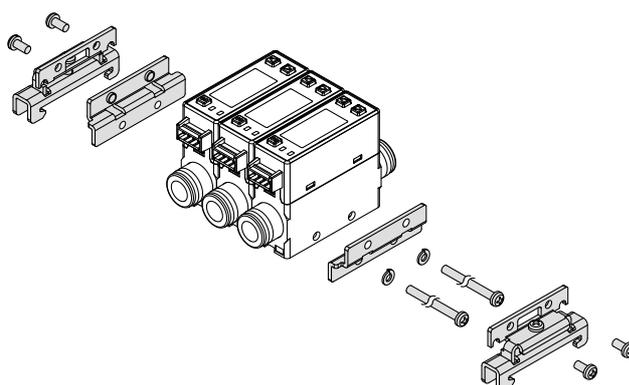
For details, refer to page 35 through to 37.

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

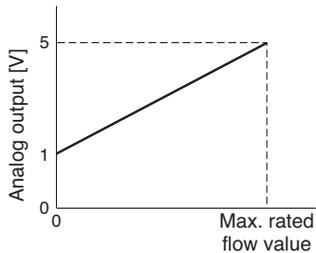
Note 6) Set to hysteresis mode at the time of shipment from the factory. Can be changed to window comparator mode using push-buttons.

## Piping Specifications / Weight

| Part no.                     | 01   | 02        | N01   | N02        | F01                                      | F02  | C4   | C6                         | C8                                       | N7                          |   |
|------------------------------|--|-----------|---|------------|--|------|--|----------------------------|--|-----------------------------|---|
| <b>Port size</b>             | Rc<br>1/8  | Rc<br>1/4 | NPT<br>1/8  | NPT<br>1/4 | G1/8                                     | G1/4 | ø4<br>(5/32")<br>one-touch<br>fitting  | ø6<br>one-touch<br>fitting | ø8<br>(5/16")<br>one-touch<br>fitting    | 1/4<br>one-touch<br>fitting |   |
| <b>Weight</b>                | Straight<br>Bottom<br>Straight<br>Bottom   |           | Without orifice: 95 g<br>Without orifice: 105 g<br>With orifice: 135 g<br>With orifice: 145 g |            | Straight<br>Bottom<br>Straight<br>Bottom |      | Without orifice: 125 g<br>Without orifice: 135 g<br>With orifice: 165 g<br>With orifice: 175 g |                            | Straight<br>Bottom<br>Straight<br>Bottom |                             | Without orifice: 55 g<br>Without orifice: 65 g<br>With orifice: 95 g<br>With orifice: 105 g |
| <b>Wetted parts material</b> | LCP, PBT, Brass (Electroless nickel plated), HNBR (+ Fluoro coated), FKM (+ Fluoro coated), Silicon, Au, Stainless steel 304 |           |   |            |  |      |  |                            |  |                             |   |

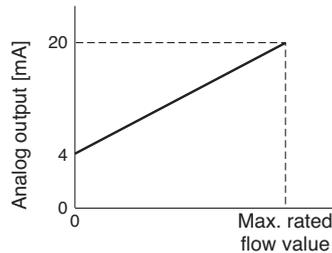
## Analogue Output

Note: Analogue output at maximum rated flow rate when CO<sub>2</sub> is selected is 3 [V] for the voltage output type and 12 [mA] for the current output type.



**Analogue 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                           |



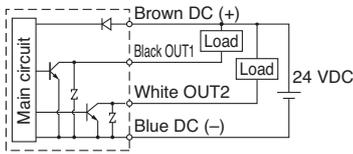
**Analogue Current Output (4 to 20 mA)**

| 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: CO<sub>2</sub>

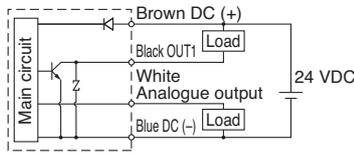
## Internal Circuits and Wiring Examples

### 2 NPN outputs type PFM7□□□-□□-A-□□



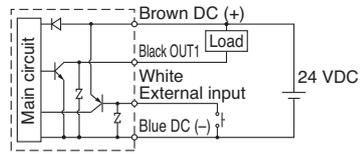
Max. 28 V, 80 mA  
Internal voltage drop 1 V or less

### NPN + Analogue output type PFM7□□□-□□-C-□□ NPN + Analogue output type PFM7□□□-□□-D-□□



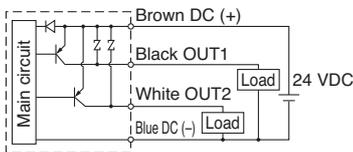
Max. 28V, 80 mA  
Internal voltage drop 1 V or less  
C: Analogue output 1 to 5 V  
Output impedance 1 kΩ  
D: Analogue output 4 to 20 mA  
Load impedance 50 to 600Ω

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



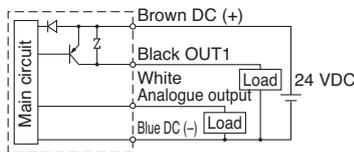
Max. 28 V, 80 mA  
Internal voltage drop 1 V or less  
External input: No-voltage input  
Reed switch or solid state switch input  
30 msec or more

### 2 PNP outputs type PFM7□□□-□□-B-□□



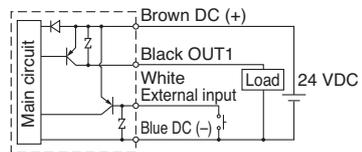
Max. 80 mA  
Internal voltage drop 1.5 V or less

### PNP + Analogue output type PFM7□□□-□□-E-□□ PNP + Analogue output type PFM7□□□-□□-F-□□



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

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



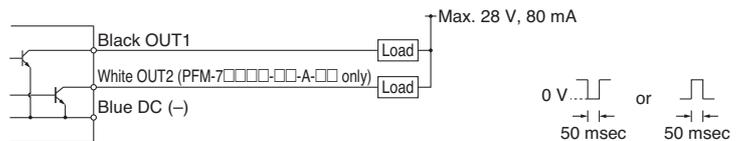
Max. 80 mA  
Internal voltage drop 1.5 V or less  
External input: No-voltage input  
Reed switch or solid state switch input  
30 msec or more

## Accumulated pulse output wiring examples

### 2 NPN outputs type PFM7□□□-□□-A-□□

### NPN + Analogue output type PFM7□□□-□□-C-□□/PFM7□□□-□□-D-□□

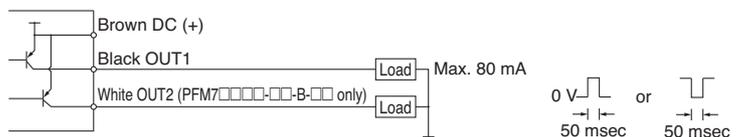
### NPN + External input type PFM7□□□-□□-G-□□



### 2 PNP outputs type PFM7□□□-□□-B-□□

### PNP + Analogue output type PFM7□□□-□□-E-□□/PFM7□□□-□□-F-□□

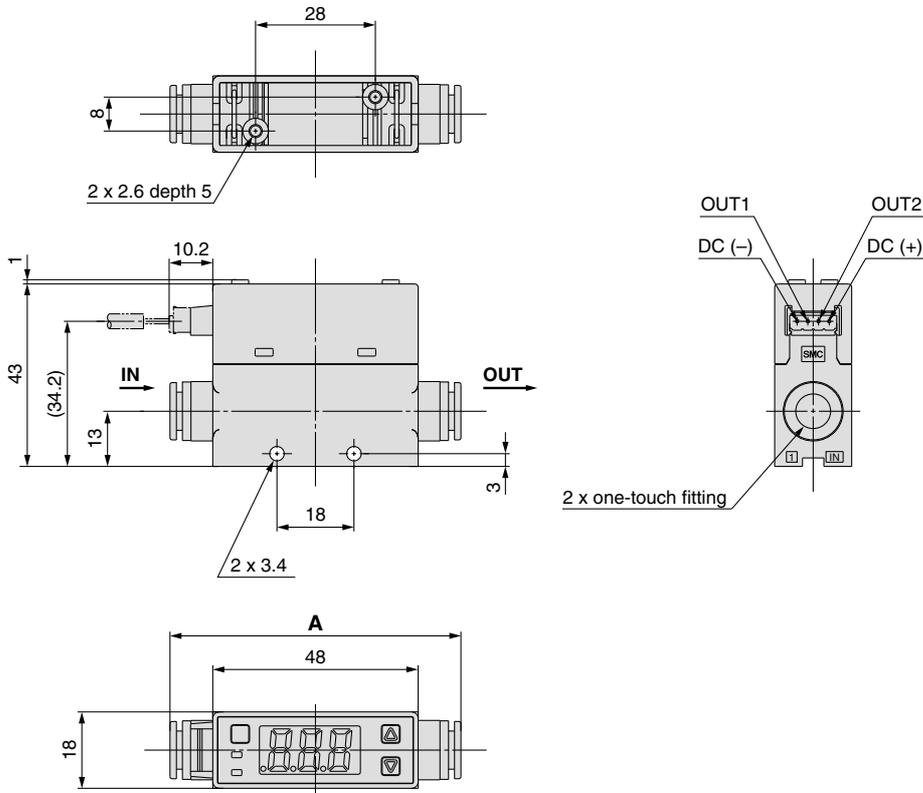
### PNP + External input type PFM7□□□-□□-H-□□



# Series PFM7

## Dimensions

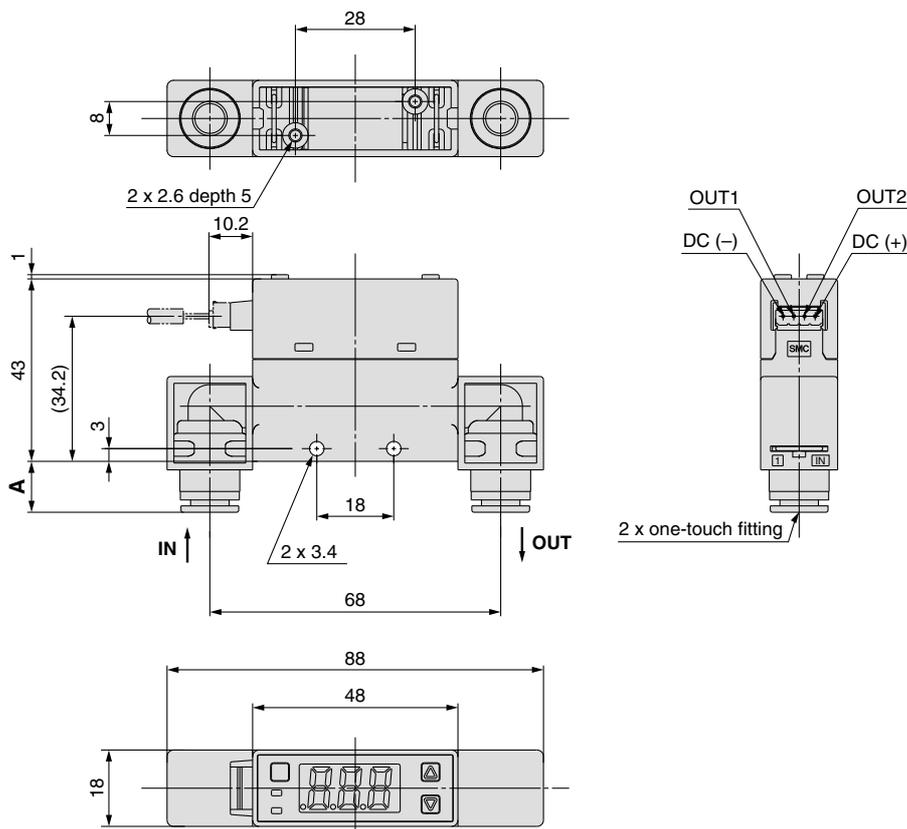
### PFM7□□-C4/C6/C8/N7



(mm)

| One-touch fitting<br>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

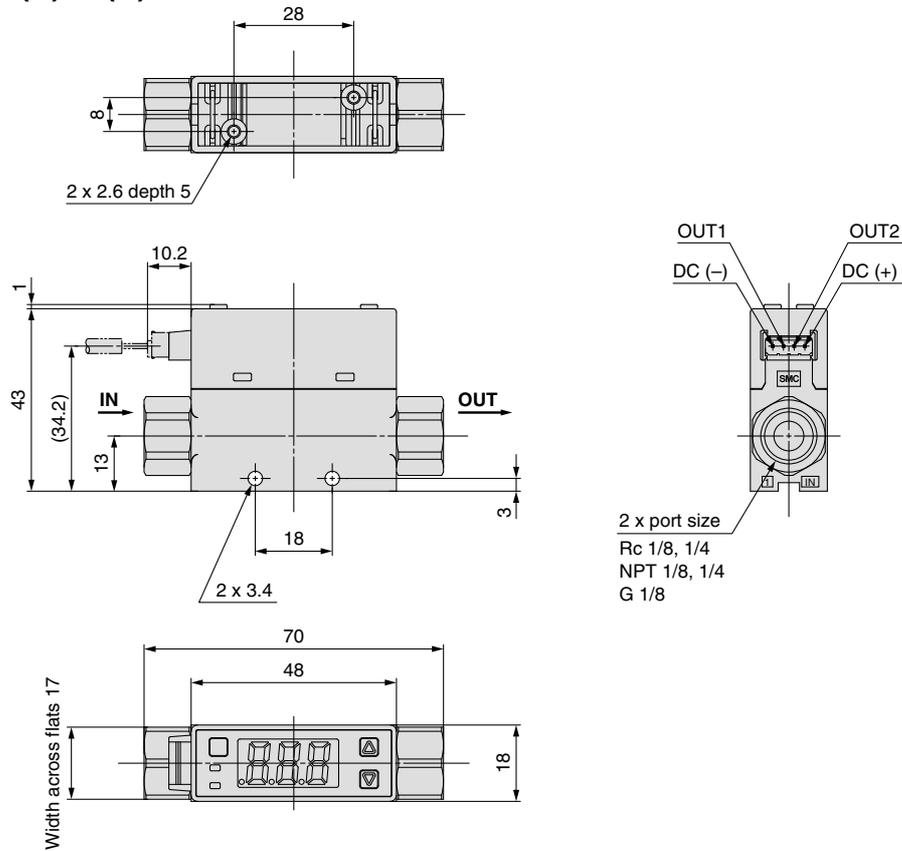


(mm)

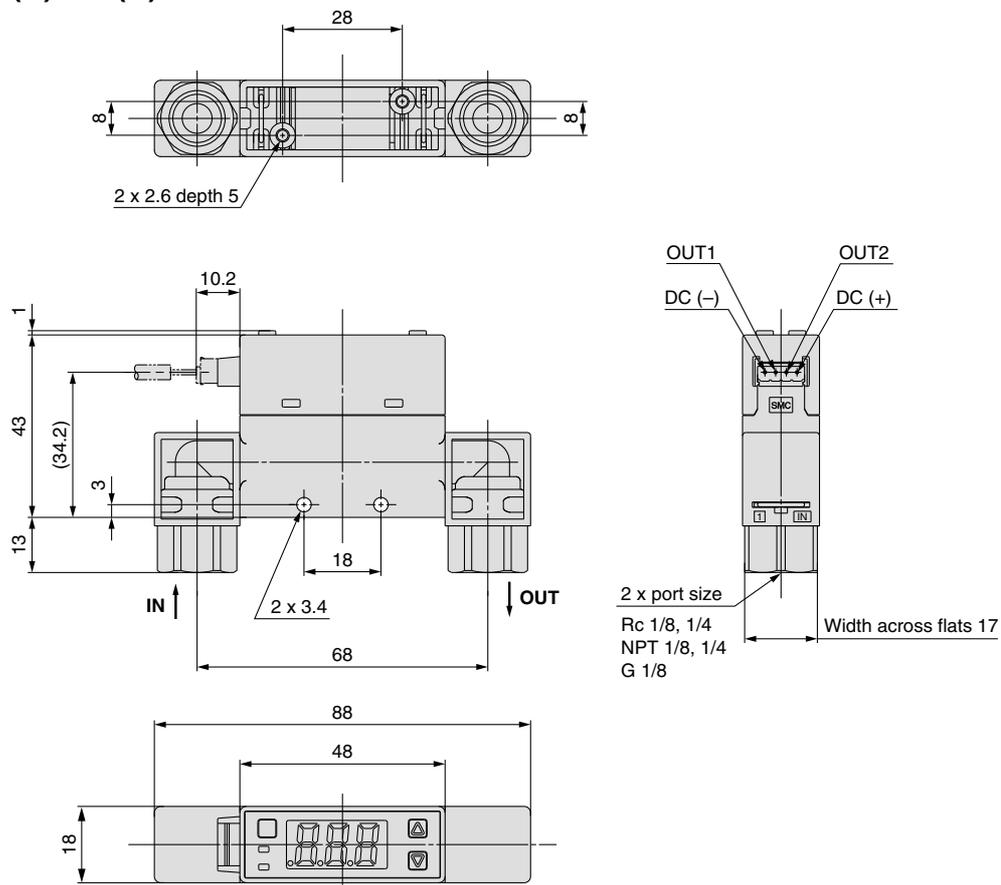
| One-touch fitting<br>Applicable tube O.D. | A    |
|---|------|
| ø4 (5/32")                                | 10.1 |
| ø6  | 10.3 |
| ø8 (5/16")                                | 12   |
| ø1/4                                      | 10.3 |

## Dimensions

### PFM7□□-(N)01/(N)02/F01



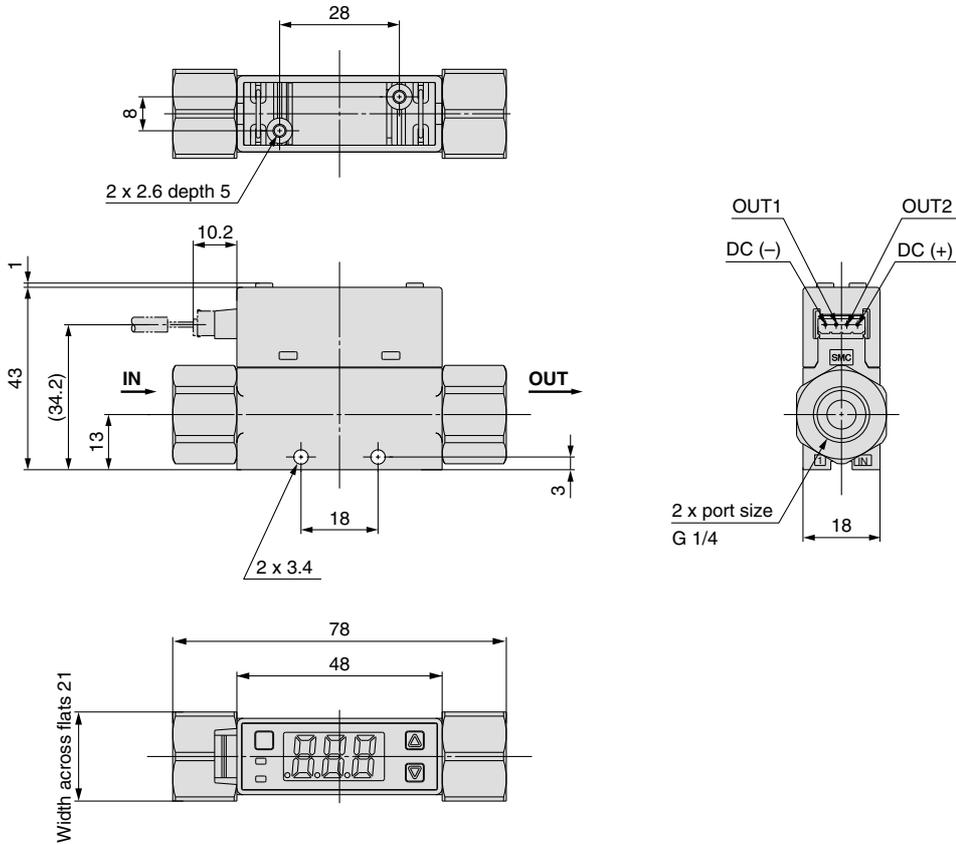
### PFM7□□-(N)01L/(N)02L/F01L



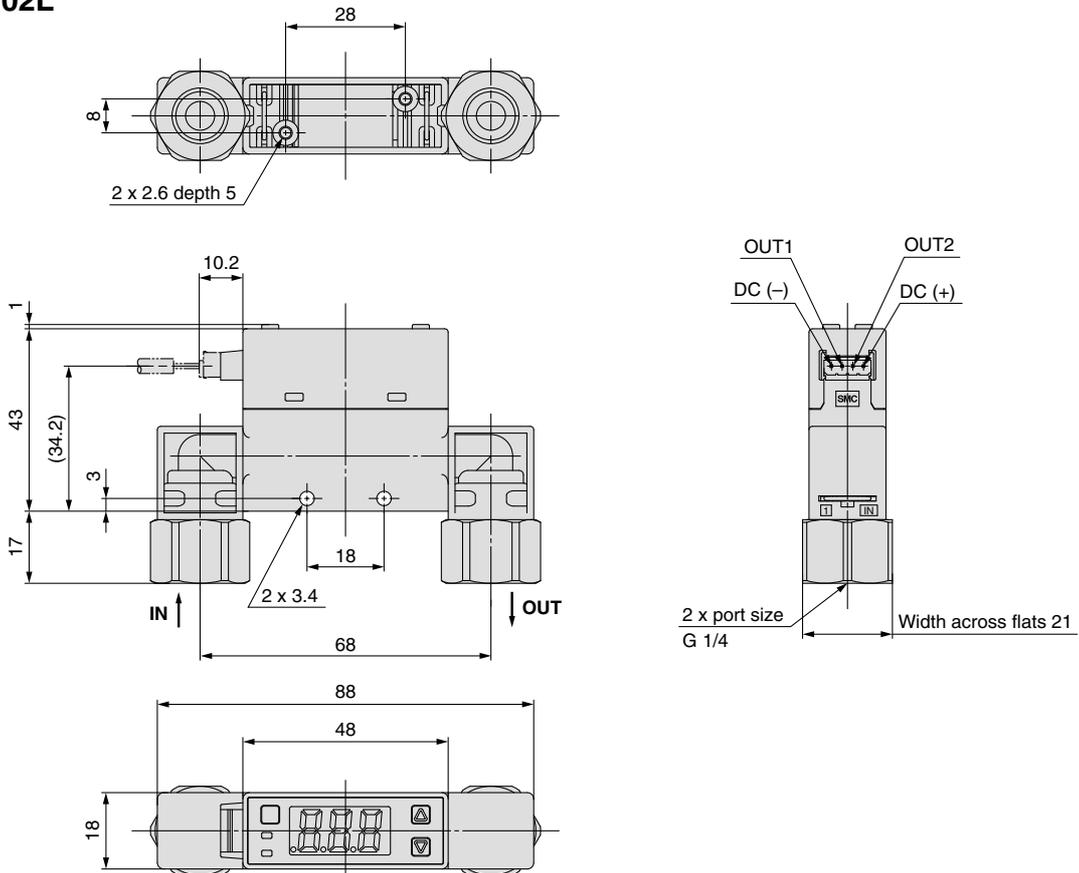
# Series PFM7

## Dimensions

### PFM7□□-F02

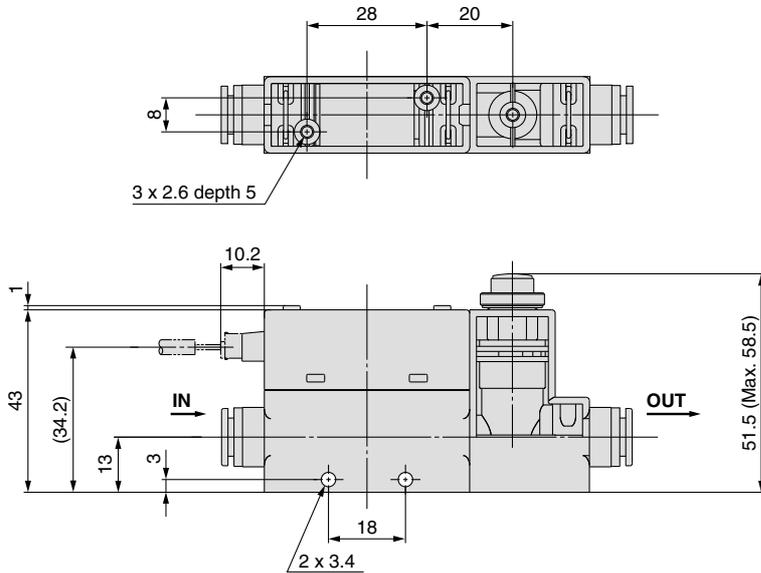


### PFM7□□-F02L

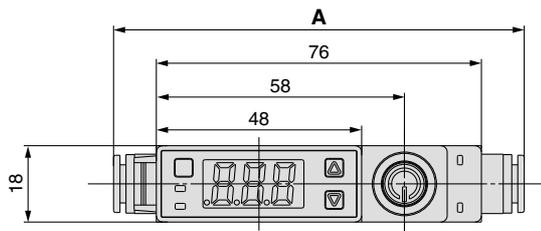
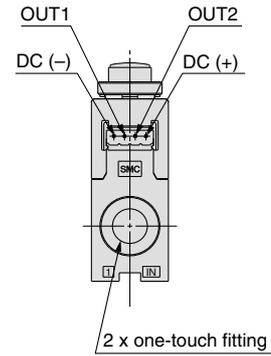


## Dimensions

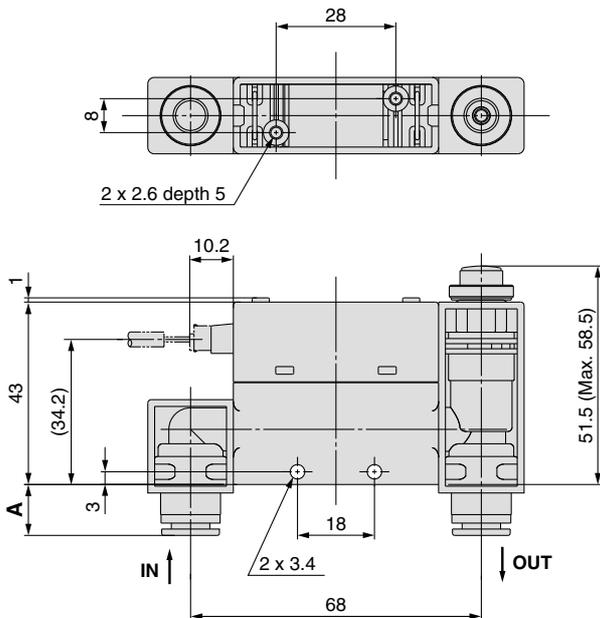
### PFM7□S-C4/C6/C8/N7



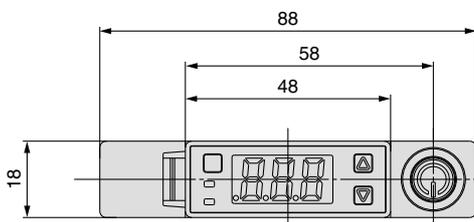
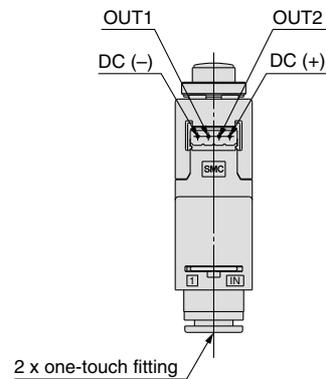
| (mm)                                      |      |
|---|------|
| One-touch fitting<br>Applicable tube O.D. | A    |
| ø4 (5/32")                                | 92.2 |
| ø6  | 92.6 |
| ø8 (5/16")                                | 96   |
| ø1/4                                      | 92.6 |



### PFM7□S-C4L/C6L/C8L/N8L



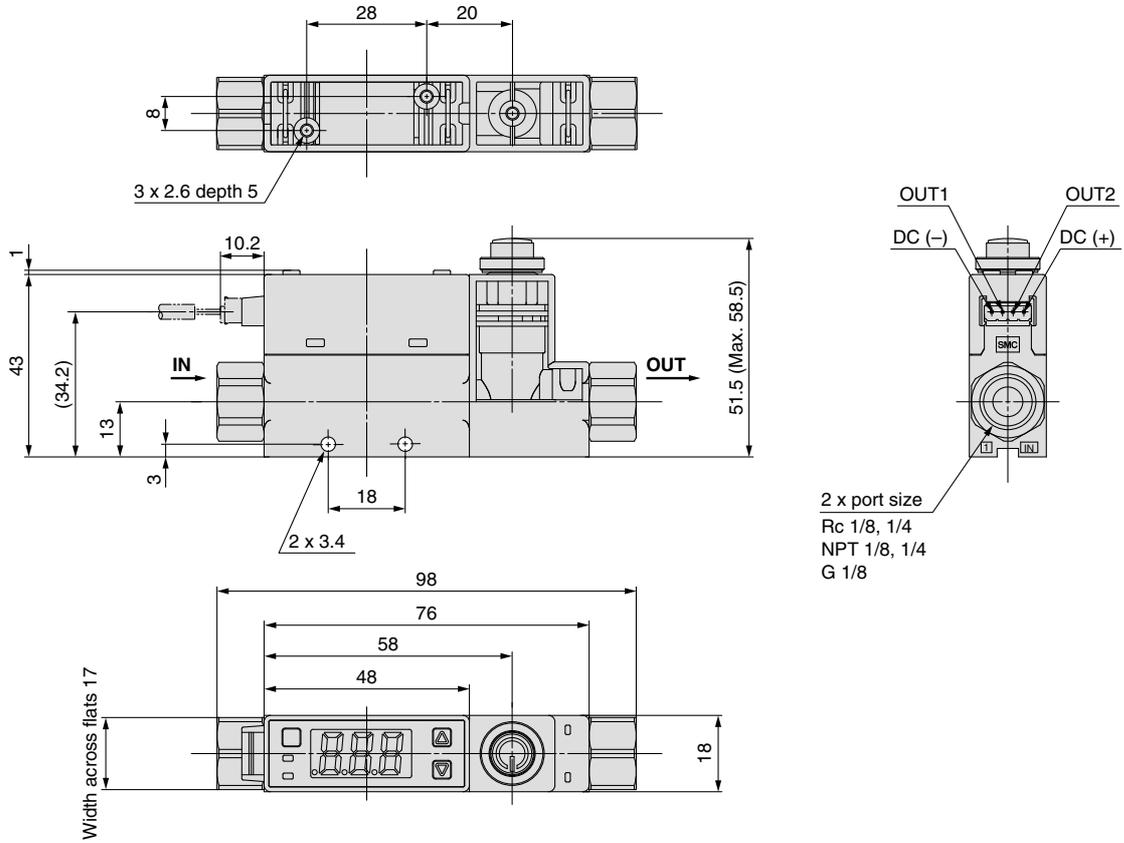
| (mm)                                      |      |
|---|------|
| One-touch fitting<br>Applicable tube O.D. | A    |
| ø4 (5/32")                                | 10.1 |
| ø6  | 10.3 |
| ø8 (5/16")                                | 12   |
| ø1/4                                      | 10.3 |



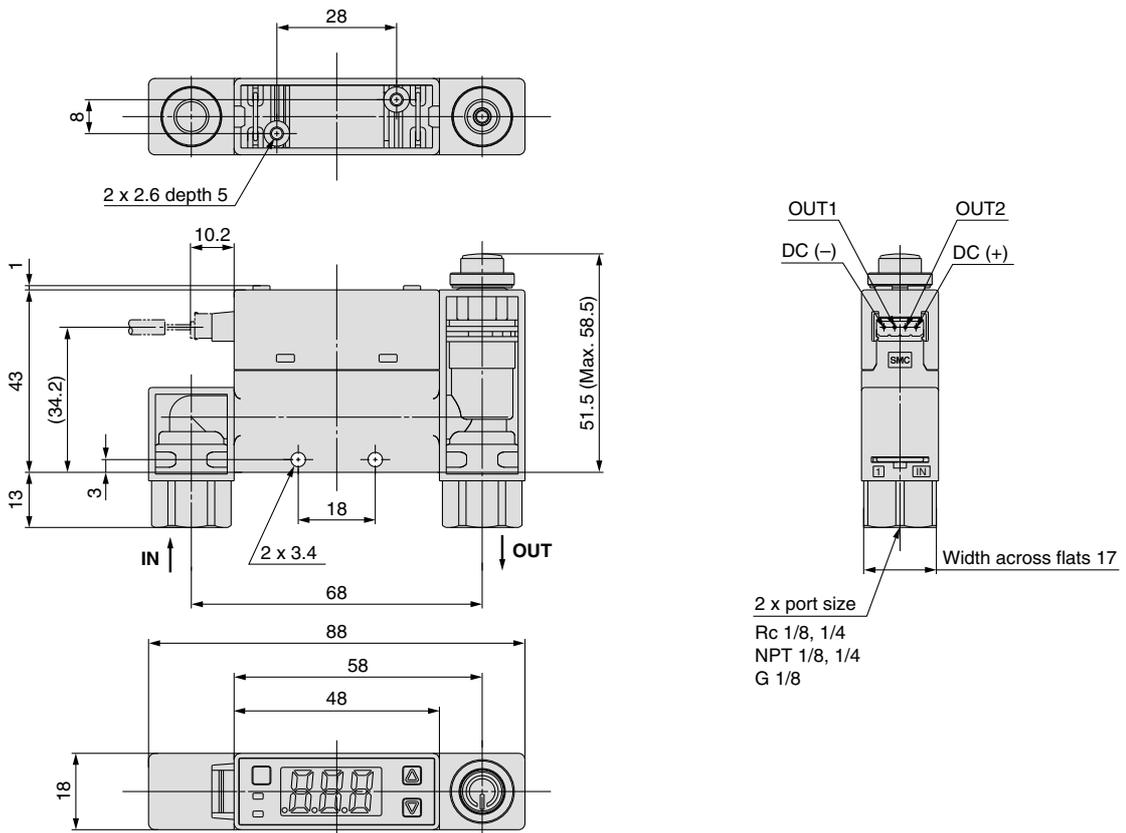
# Series PFM7

## Dimensions

### PFM7□S-(N)01/(N)02/F01

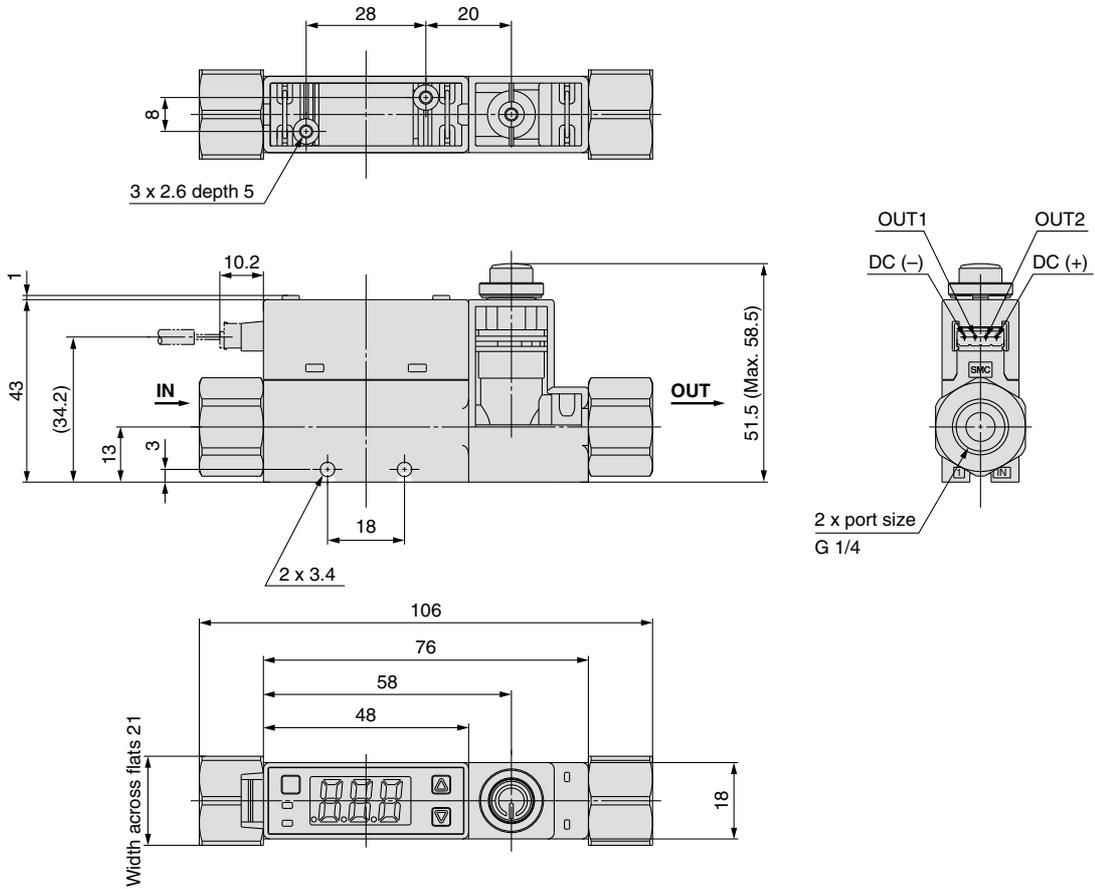


### PFM7□S-(N)01L/(N)02L/F01L

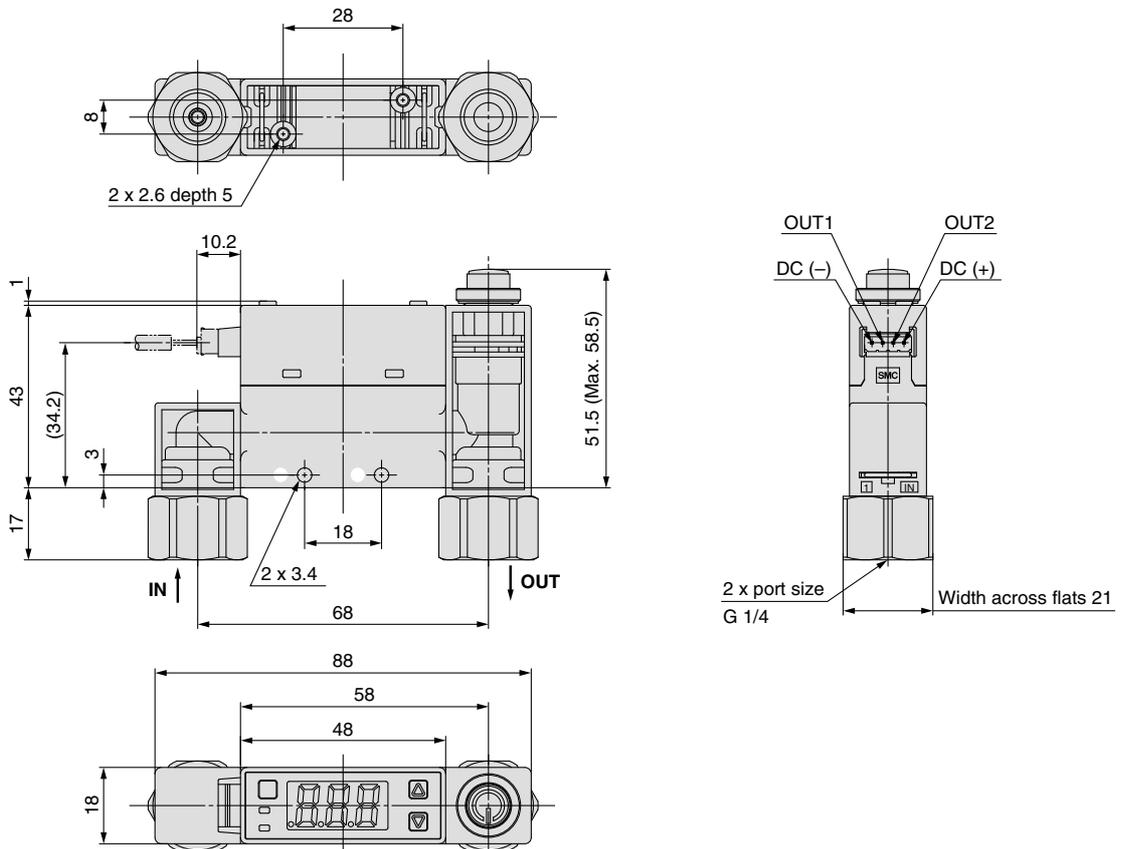


## Dimensions

### PFM7□S-F02



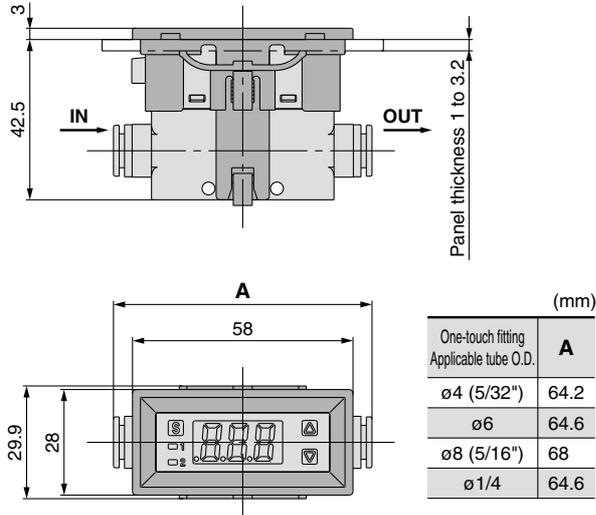
### PFM7□S-F02L



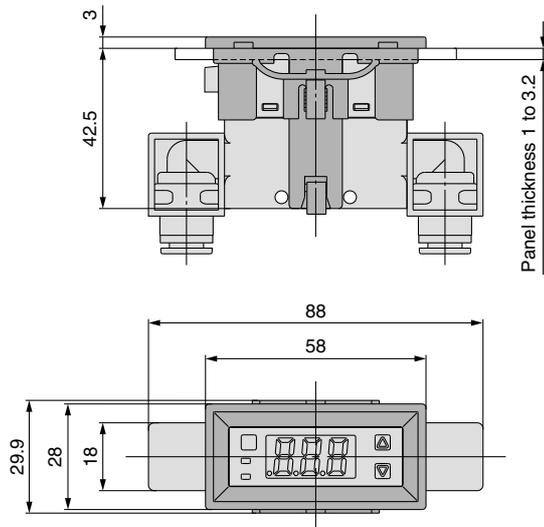
# Series PFM7

## Dimensions

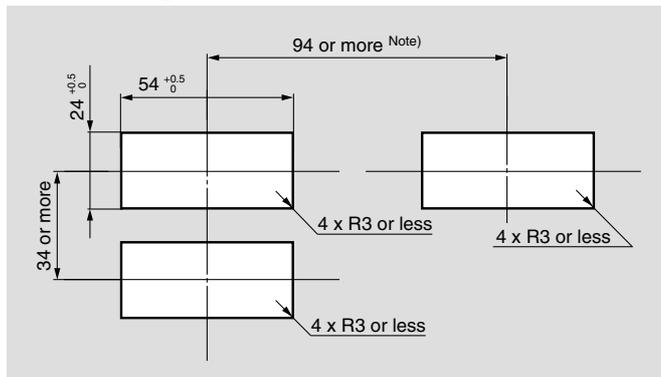
### Panel mount / Without flow adjustment valve / Straight



### Panel mount / Without flow adjustment valve



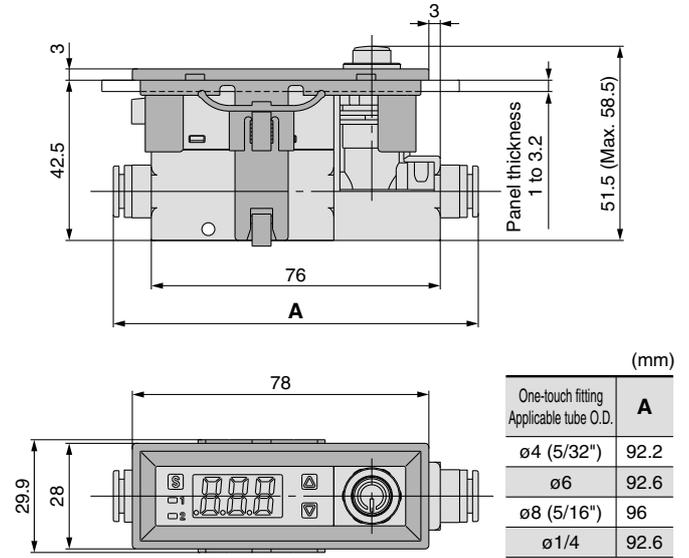
### Panel Fitting Dimensions



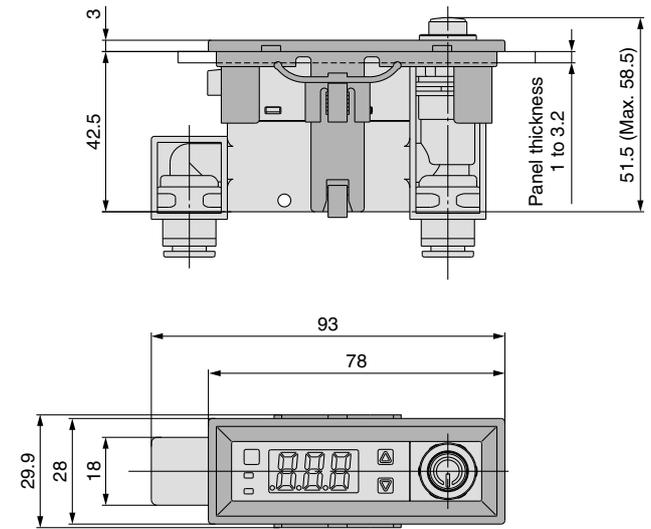
Panel thickness 1 to 3.2 mm

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.

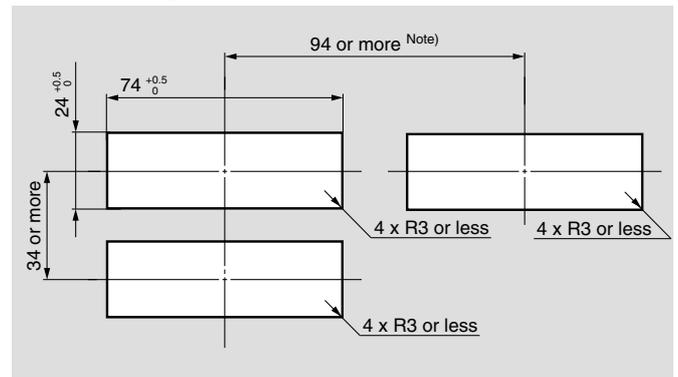
### Panel mount / With flow adjustment valve / Straight



### Panel mount / With flow adjustment valve



### Panel Fitting Dimensions

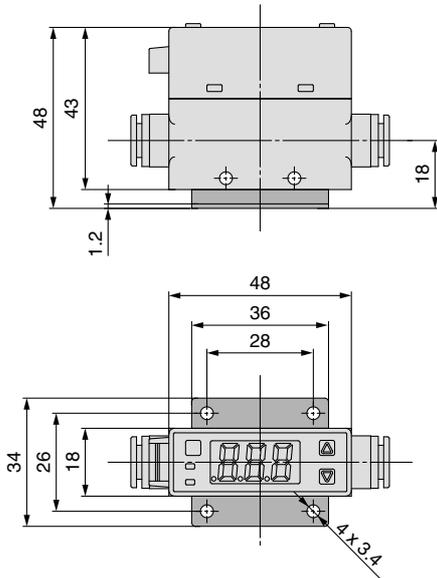


Panel thickness 1 to 3.2 mm

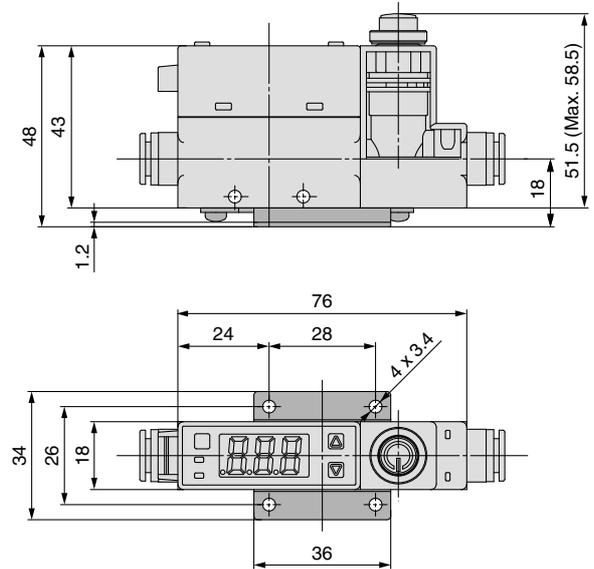
Note) Piping entry direction: Minimum dimensions for bottom side piping. If using straight piping, the piping material and tubing need to be taken into consideration when designing the system. If a bend (R) is used, limit it to R3 or less.

## Dimensions

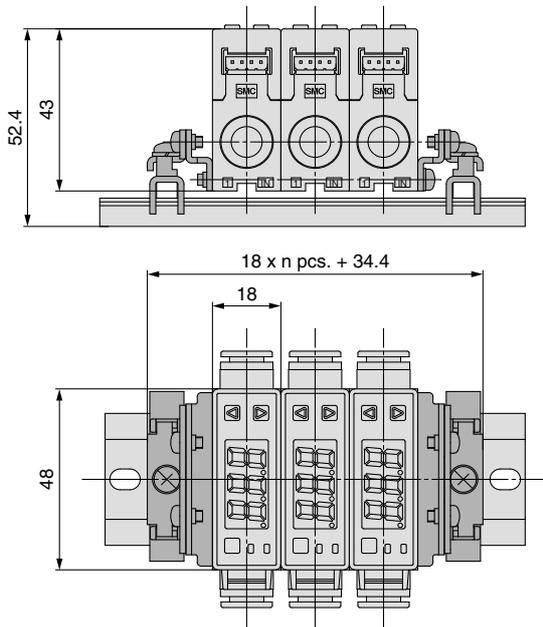
### With bracket / Without flow adjustment valve



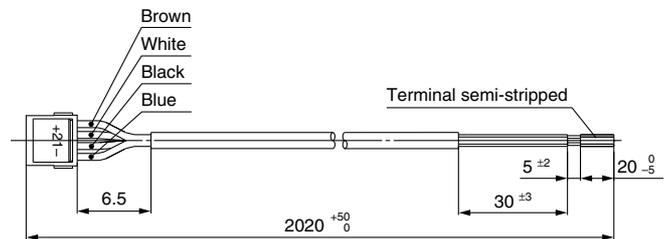
### With bracket / With flow adjustment valve



### DIN rail mounting



### 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                             |
|                            | Colours                    | Brown, White, Black, Blue                   |
| Sheath                     | Material                   | Oil-resistant vinyl chloride resin compound |
|                            | Colour                     | Light grey                                  |
| Finished external diameter |                            | ø3.5 <sup>+0.10</sup> / <sub>-0.25</sub>    |

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

# 2-Colour Display Digital Flow Switch

Remote  
sensor unit



# Series PFM5



## How to Order

Remote  
sensor unit

PFM5 10 - C4 - 1 - - - -

Type

5 Remote sensor unit

Rated flow range (Flow rate range)

|    |                              |
|----|------------------------------|
| 10 | 0.2 to 10 (5) $\ell$ /min    |
| 25 | 0.5 to 25 (12.5) $\ell$ /min |
| 50 | 1 to 50 (25) $\ell$ /min     |
| 11 | 2 to 100 (50) $\ell$ /min    |

\* ( ): Fluid: CO<sub>2</sub>

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     | $\phi$ 4 (5/32") one-touch fitting | ●               |    |    |    |
| C6     | $\phi$ 6 one-touch fitting         | ●               | ●  | ●  | ●  |
| C8     | $\phi$ 8 (5/16") one-touch fitting |                 | ●  | ●  | ●  |
| N7     | $\phi$ 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 14 and 35.)

Option 2  
(Refer to page 14.)

Option 1  
(Refer to page 14.)

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  |

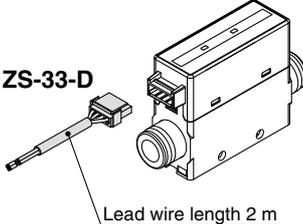
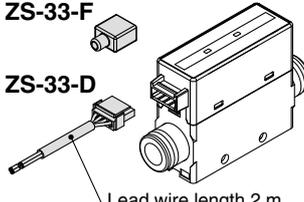
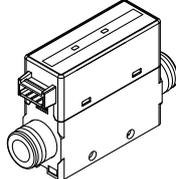
Output specification

| No. | Description                  | Applicable display unit |
|-----|------------------------------|-------------------------|
| 1   | Analogue output (1 to 5 V)   | PFM30□                  |
| 2   | Analogue output (4 to 20 mA) | PFM31□                  |

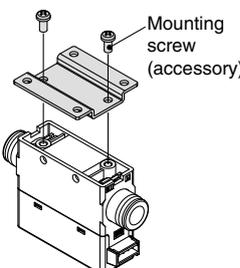
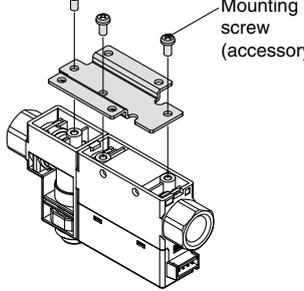
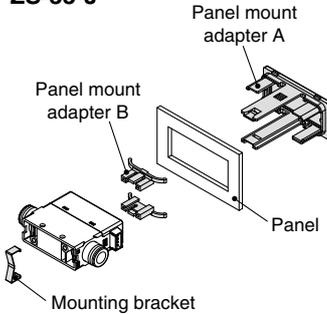
## Piping Variations

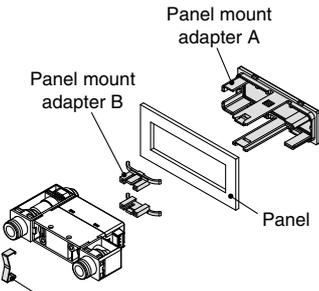
|                                     | With one-touch fittings (C4, C6, C8, N7) |            | Female thread (01, 02, N01, N02, F01, F02) |            |
|-------------------------------------|--|------------|--|------------|
|                                     | Straight (Nil)                           | 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><b>ZS-33-D</b></p> <p>Lead wire length 2 m</p> | <p>With lead wire with connector (2 m) + Rubber cover for connector (silicon rubber)</p>  <p><b>ZS-33-F</b></p> <p><b>ZS-33-D</b></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<br/>(For without flow adjustment valve)</p> <p><b>ZS-33-M</b></p>  <p>Mounting screw (accessory)</p> | <p>Bracket<br/>(For with flow adjustment valve)</p> <p><b>ZS-33-MS</b></p>  <p>Mounting screw (accessory)</p> <p>Piping direction: Cannot be mounted with bottom piping type.</p> | <p>Panel mount adapter<br/>(For without flow adjustment valve)</p> <p><b>ZS-33-J</b></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<br/>(For with flow adjustment valve)</p> <p><b>ZS-33-JS</b></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        |
|-------------|----------------------------------|
| <b>X693</b> | Change of piping entry direction |
| <b>X694</b> | combination                      |

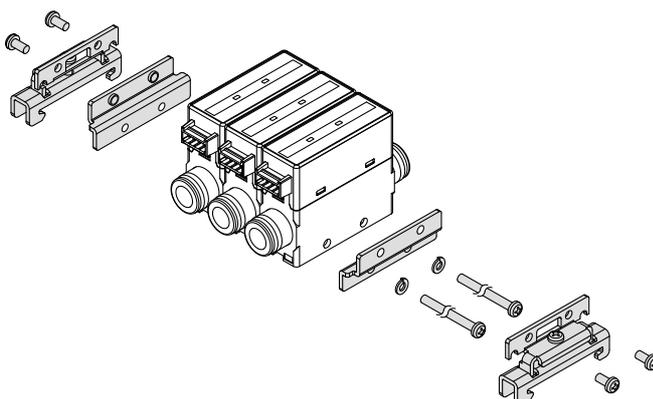
For details, refer to page 35 and 36.

## 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 PFM5

## Specifications

| Model  |                                    | PFM510  | PFM525            | PFM550        | PFM511         |
|--|------------------------------------|---|-------------------|---------------|----------------|
| <b>Applicable fluid</b>                                    |                                    | Dry air, N <sub>2</sub> , Ar, CO <sub>2</sub><br>(Air quality grade is ISO8573.1-1, 1.1.2 to 1.6.2.)  |                   |               |                |
| <b>Rated flow range (Flow rate range)</b> <sup>Note)</sup> | <b>Dry air, N<sub>2</sub>, Ar</b>  | 0.2 to 10 l/min   | 0.5 to 25 l/min   | 1 to 50 l/min | 2 to 100 l/min |
|  | <b>CO<sub>2</sub></b>              | 0.2 to 5 l/min  | 0.5 to 12.5 l/min | 1 to 25 l/min | 2 to 50 l/min  |
| <b>Accuracy</b>  |                                    | ±3%F.S. or less   |                   |               |                |
| <b>Repeatability</b>                                       |                                    | ±1%F.S. or less (Fluid: Dry air)  |                   |               |                |
| <b>Pressure characteristics</b>                            |                                    | ±5%F.S. or less (based on 0.35 MPa)   |                   |               |                |
| <b>Temperature characteristics</b>                         |                                    | ±2%F.S. (15 to 35°C)<br>±5%F.S. (0 to 50°C)   |                   |               |                |
| <b>Operating pressure range</b>                            |                                    | -100 kPa to 750 kPa   |                   |               |                |
| <b>Rated pressure range</b>                                |                                    | -70 kPa to 750 kPa  |                   |               |                |
| <b>Proof pressure</b>                                      |                                    | 1 MPa   |                   |               |                |
| <b>Analogue output</b>                                     | <b>Response time</b>               | 50 msec or 1 s (with response time selection function: 1 s at no-voltage input)<br>→ Refer to the internal circuits and wiring examples on page 16.   |                   |               |                |
|  | <b>Voltage output</b>              | Voltage output: 1 to 5 V<br>Output impedance: 1 kΩ  |                   |               |                |
|  | <b>Current output</b>              | Current output: 4 to 20 mA<br>Max. load impedance: 600 Ω, Min. load impedance: 50 Ω   |                   |               |                |
| <b>Status LED's</b>  |                                    | Power ON indicator: Lights when power is turned on (Green).<br>Flow rate indicator: Flashes when flow is applied (Green).   |                   |               |                |
| <b>Power supply voltage</b>                                |                                    | 24 VDC ±10%   |                   |               |                |
| <b>Current consumption</b>                                 |                                    | 35 mA or less   |                   |               |                |
| <b>Environmental resistance</b>                            | <b>Enclosure</b>                   | IP40  |                   |               |                |
|  | <b>Operating fluid temperature</b> | 0 to 50°C (with no freezing and condensation)   |                   |               |                |
|  | <b>Operating temperature range</b> | Operating: 0 to 50°C    Stored: -10 to 60°C (with no freezing and condensation)   |                   |               |                |
|  | <b>Operating humidity range</b>    | Operating, Stored: 35 to 85%R.H. (with no condensation)   |                   |               |                |
|  | <b>Withstand voltage</b>           | 1000 VAC for 1 min. between external terminal and case  |                   |               |                |
|  | <b>Insulation resistance</b>       | 50 MΩ or more (at 500 VDC measured via Megohmmeter) between external terminal and case  |                   |               |                |
|  | <b>Vibration resistance</b>        | Without orifice: 10 to 500 Hz with a 1.5 mm amplitude or 98 m/s <sup>2</sup> acceleration, in each X, Y, Z direction for 2 hrs, whichever is smaller.<br>With orifice: 10 to 150 Hz with a 1.5 mm amplitude or 19.6 m/s <sup>2</sup> acceleration, in each X, Y, Z direction for 2 hrs, whichever is smaller. |                   |               |                |
|  | <b>Impact resistance</b>           | 490 m/s <sup>2</sup> in X, Y, Z directions 3 times each   |                   |               |                |

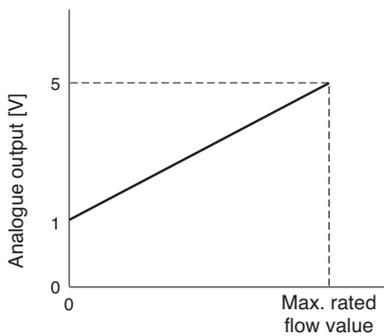
Note: Flow rate unit is based on standard conditions (20C, 1 atm, 65% RH).

## Piping Specifications / Weight

| Part no.                     | 01   | 02        | N01   | N02        | F01                                      | F02  | C4   | C6                         | C8                                       | N7                          |   |  |
|------------------------------|--|-----------|---|------------|--|------|--|----------------------------|--|-----------------------------|---|--|
| <b>Port size</b>             | Rc<br>1/8  | Rc<br>1/4 | NPT<br>1/8  | NPT<br>1/4 | G1/8                                     | G1/4 | ø4<br>(5/32")<br>one-touch<br>fitting  | ø6<br>one-touch<br>fitting | ø8<br>(5/16")<br>one-touch<br>fitting    | 1/4<br>one-touch<br>fitting |   |  |
| <b>Weight</b>                | Straight<br>Bottom   |           | Without orifice: 95 g<br>Without orifice: 105 g<br>With orifice: 135 g<br>With orifice: 145 g |            | Straight<br>Bottom<br>Straight<br>Bottom |      | Without orifice: 125 g<br>Without orifice: 135 g<br>With orifice: 165 g<br>With orifice: 175 g |                            | Straight<br>Bottom<br>Straight<br>Bottom |                             | Without orifice: 55 g<br>Without orifice: 65 g<br>With orifice: 95 g<br>With orifice: 105 g |  |
| <b>Wetted parts material</b> | LCP, PBT, Brass (Electroless nickel plated), HNBR (+ Fluoro coated), FKM (+ Fluoro coated), Silicon, Au, Stainless steel 304 |           |   |            |  |      |  |                            |  |                             |   |  |

## Analogue Output

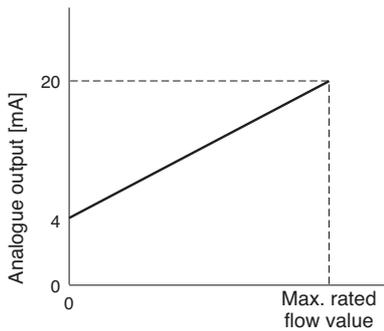
Note: Analogue output at maximum rated flow rate when CO<sub>2</sub> is selected is 4.57 [V] for the voltage output type and 18.28 [mA] for the current output type.



### Analogue Voltage Output (1 to 5 V)

| Model             | Max. rated flow value [l/min] |
|-------------------|-------------------------------|
| <b>PFM510-□-1</b> | 10 (5)                        |
| <b>PFM525-□-1</b> | 25 (12.5)                     |
| <b>PFM550-□-1</b> | 50 (25)                       |
| <b>PFM511-□-1</b> | 100 (50)                      |

\* ( ) : Fluid: CO<sub>2</sub>



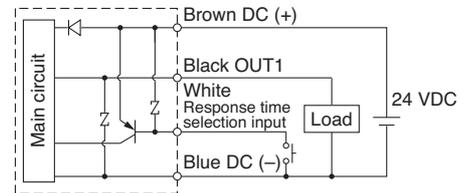
### Analogue Current Output (4 to 20 mA)

| Model             | Max. rated flow value [l/min] |
|-------------------|-------------------------------|
| <b>PFM510-□-2</b> | 10 (5)                        |
| <b>PFM525-□-2</b> | 25 (12.5)                     |
| <b>PFM550-□-2</b> | 50 (25)                       |
| <b>PFM511-□-2</b> | 100 (50)                      |

\* ( ) : Fluid: CO<sub>2</sub>

## Internal Circuits and Wiring Examples

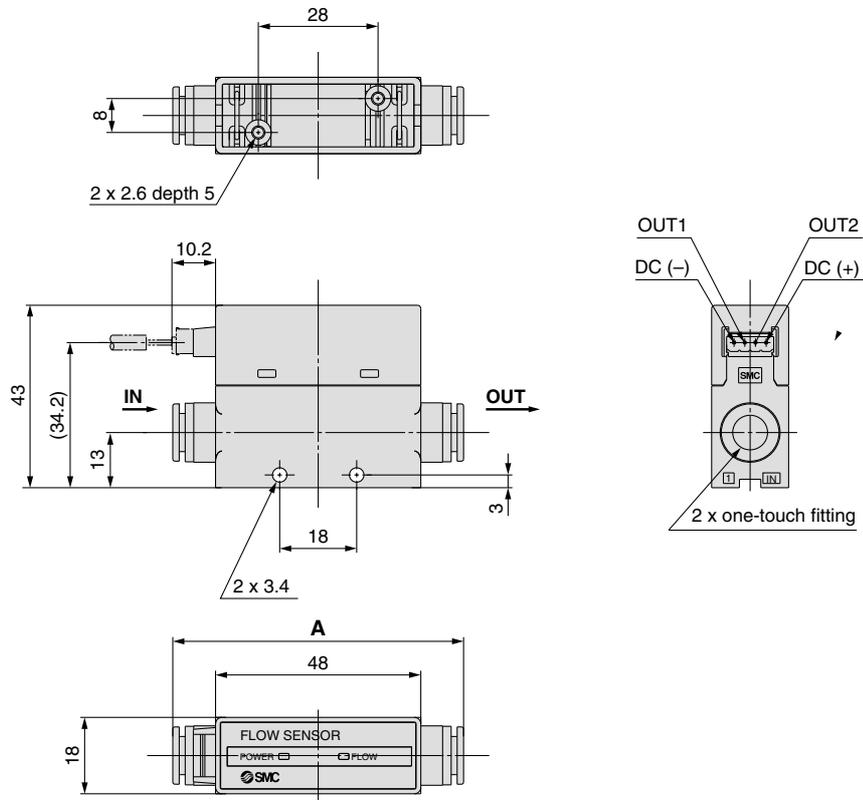
### PFM5□□



# Series PFM5

## Dimensions

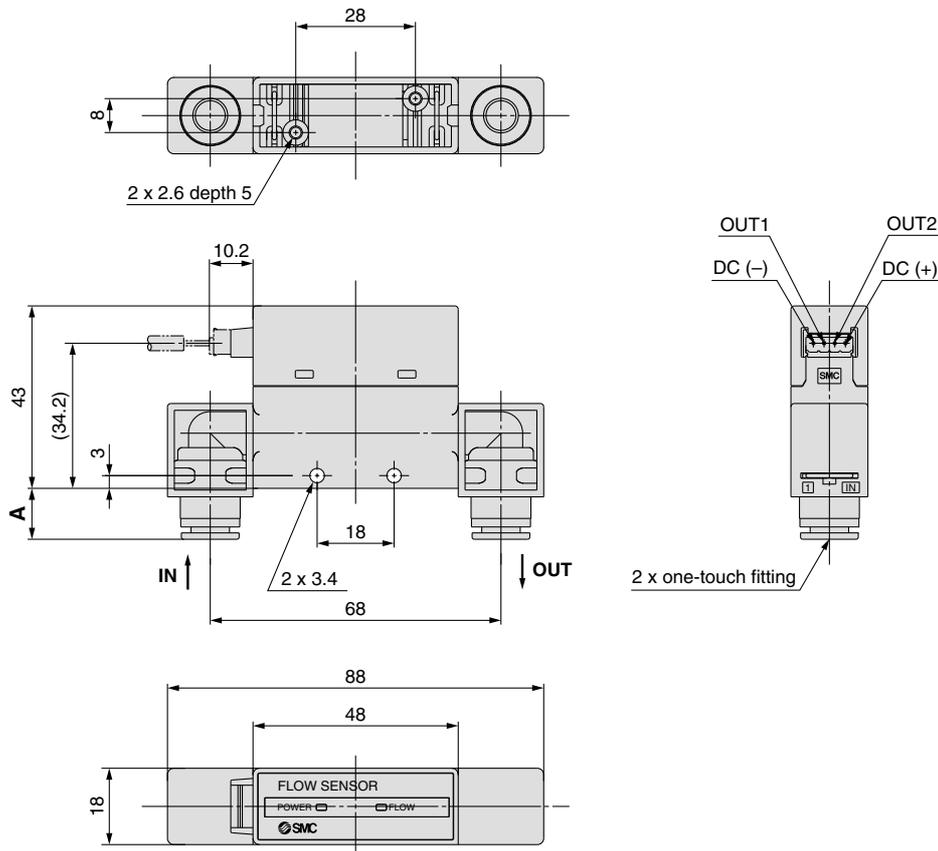
### PFM5□□-C4/C6/C8/N7



(mm)

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

### PFM5□□-C4L/C6L/C8L/N7L

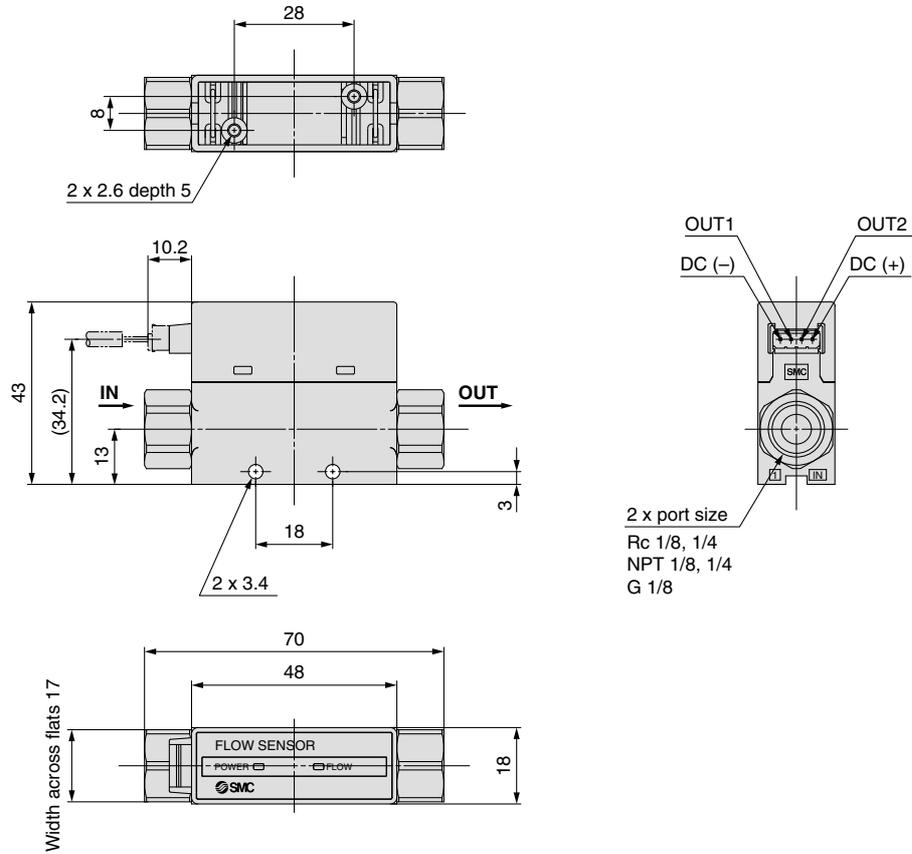


(mm)

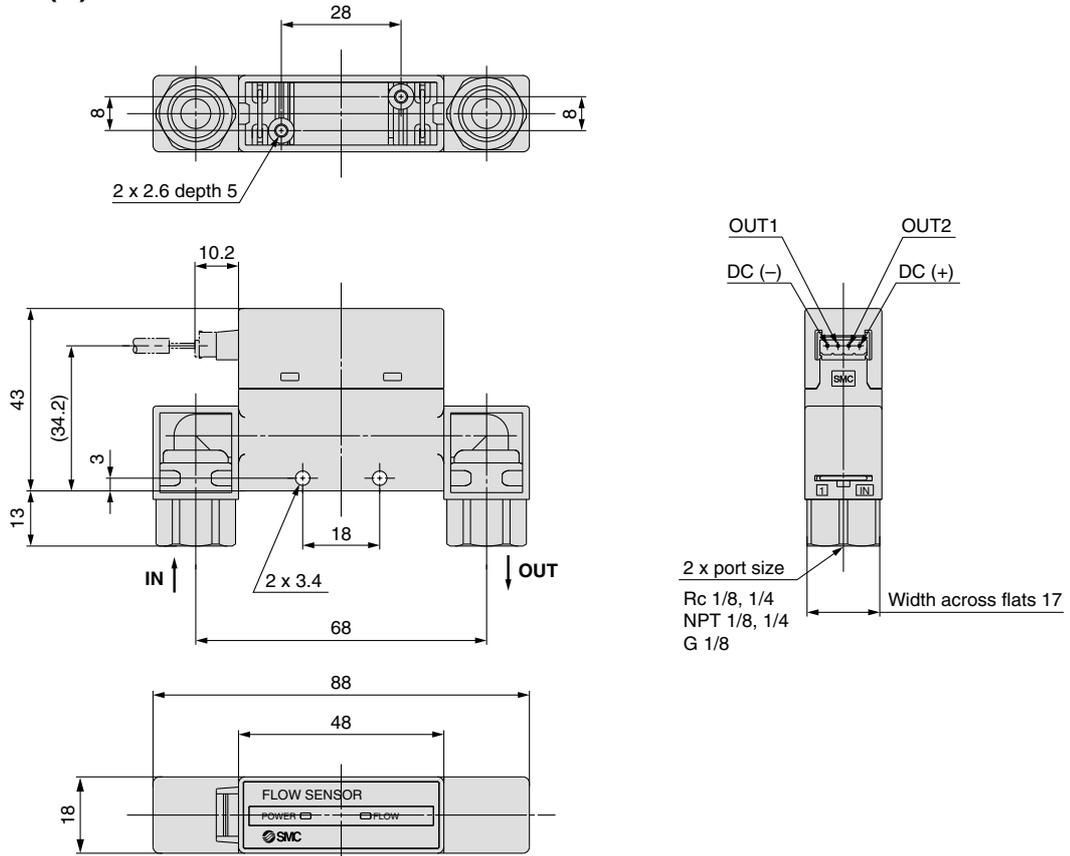
| One-touch fitting<br>Applicable tube O.D. | A    |
|---|------|
| ø4 (5/32")                                | 10.1 |
| ø6  | 10.3 |
| ø8 (5/16")                                | 12   |
| ø1/4                                      | 10.3 |

**Dimensions**

**PFM5□□-(N)01/(N)02/F01**



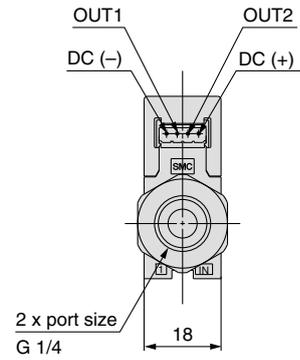
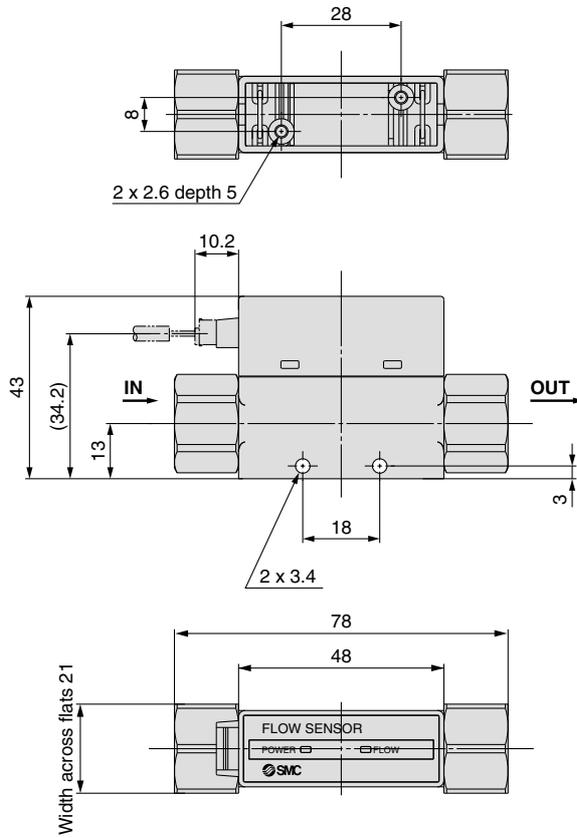
**PFM5□□-(N)01L/(N)02L/F01L**



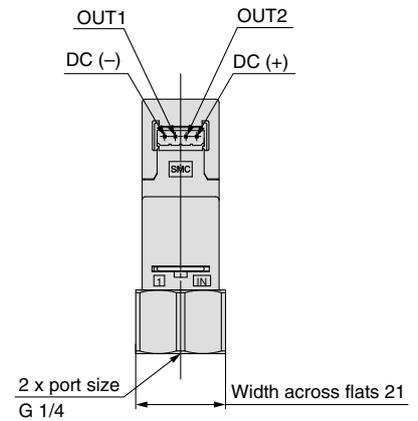
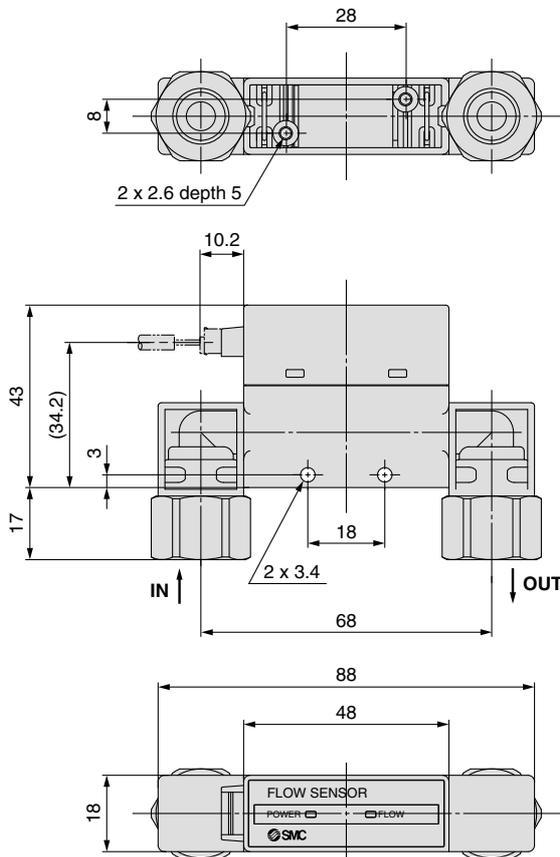
# Series PFM5

## Dimensions

### PFM5□□-F02

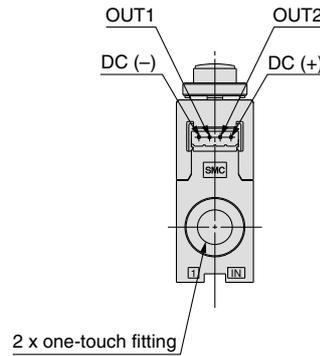
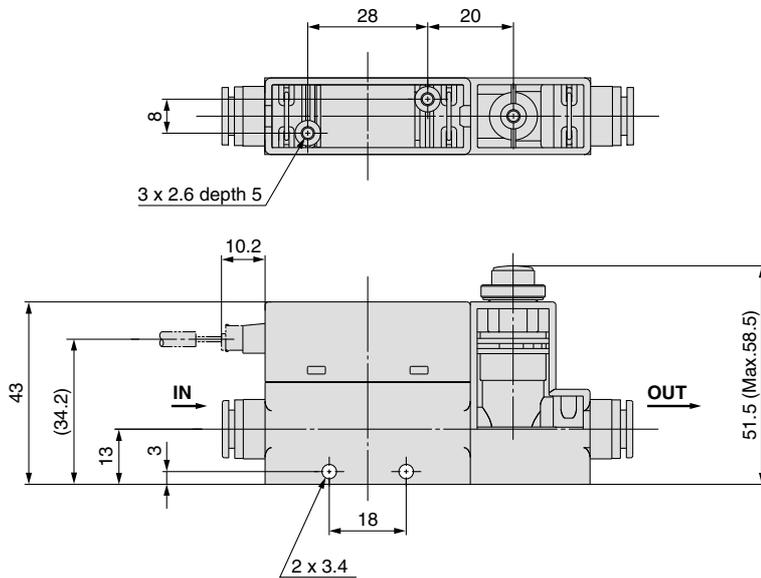


### PFM5□□-F02L

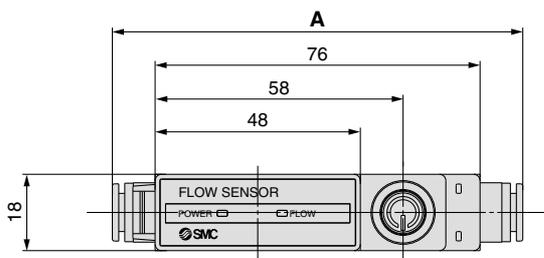


## Dimensions

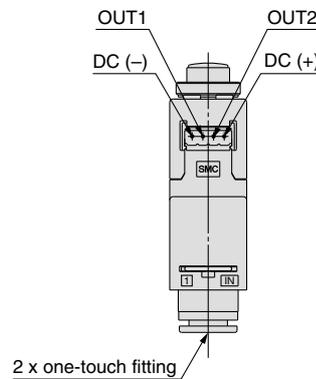
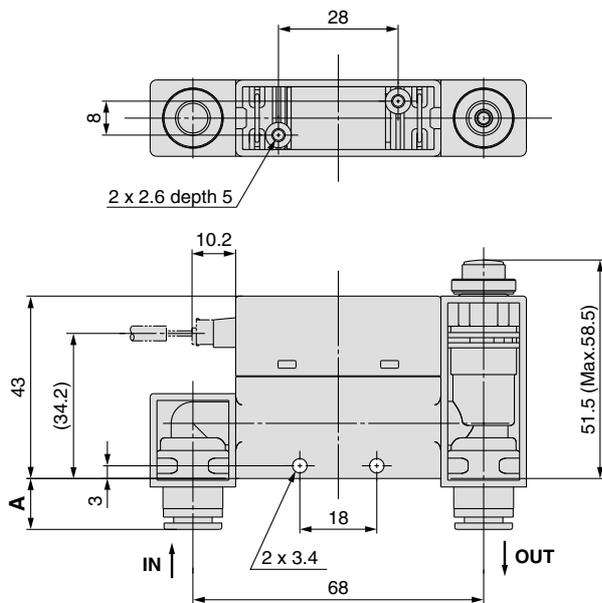
### PFM5□S-C4/C6/C8/N7



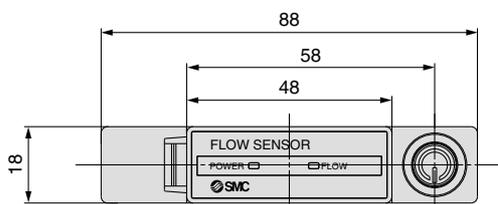
| (mm)                                      |      |
|---|------|
| One-touch fitting<br>Applicable tube O.D. | A    |
| ø4 (5/32")                                | 92.2 |
| ø6  | 92.6 |
| ø8 (5/16")                                | 96   |
| ø1/4                                      | 92.6 |



### PFM5□S-C4L/C6L/C8L/N8L



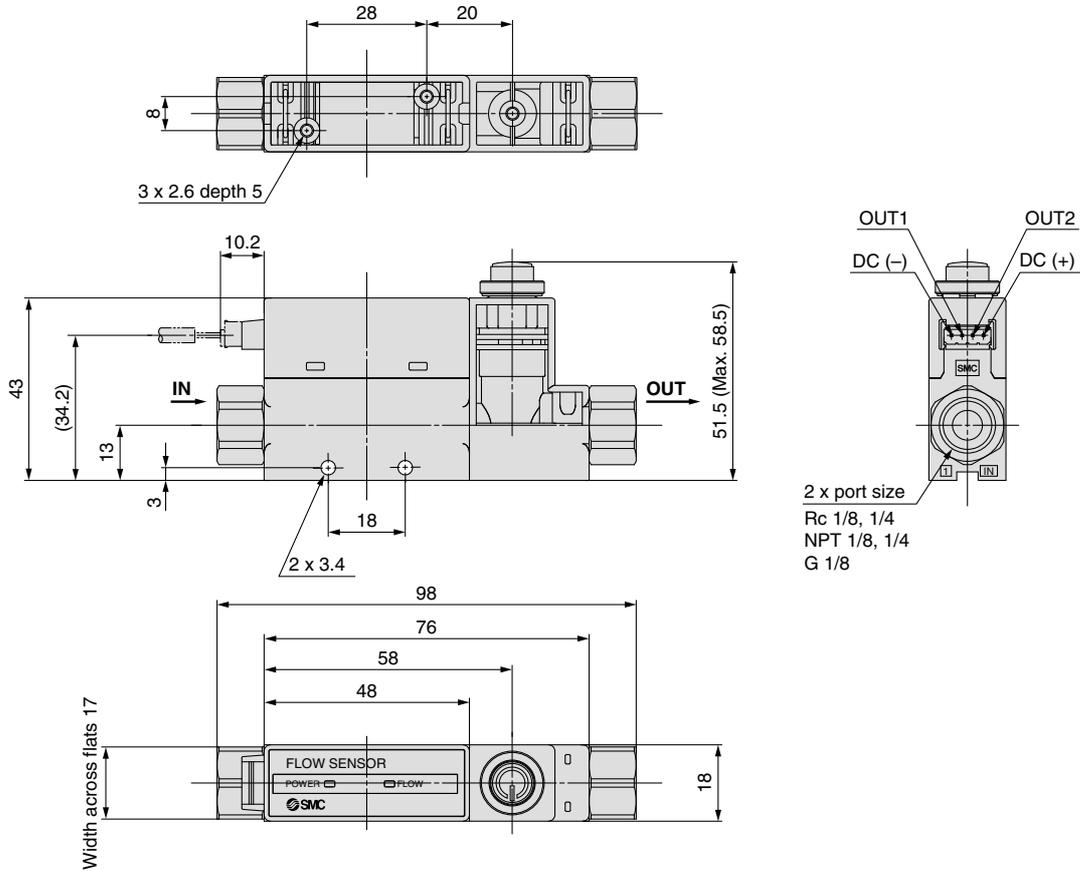
| (mm)                                      |      |
|---|------|
| One-touch fitting<br>Applicable tube O.D. | A    |
| ø4 (5/32")                                | 10.1 |
| ø6  | 10.3 |
| ø8 (5/16")                                | 12   |
| ø1/4                                      | 10.3 |



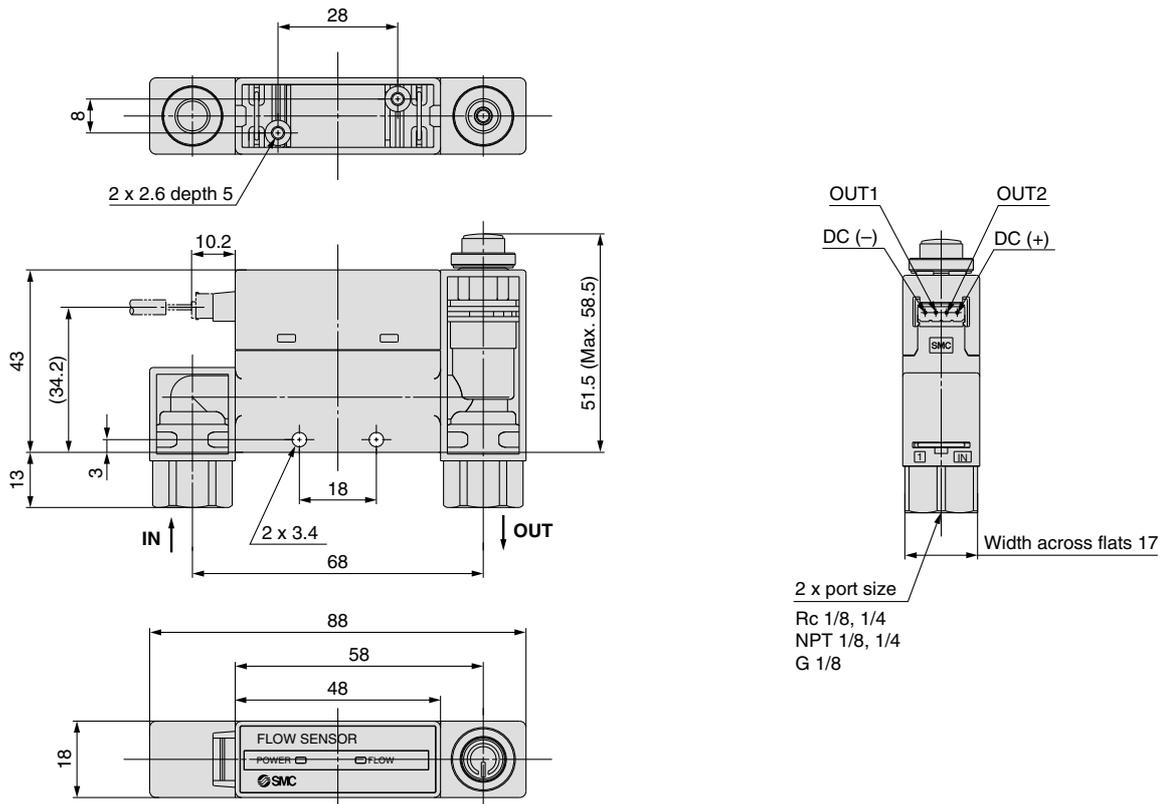
# Series PFM5

## Dimensions

### PFM5□S-(N)01/(N)02/F01

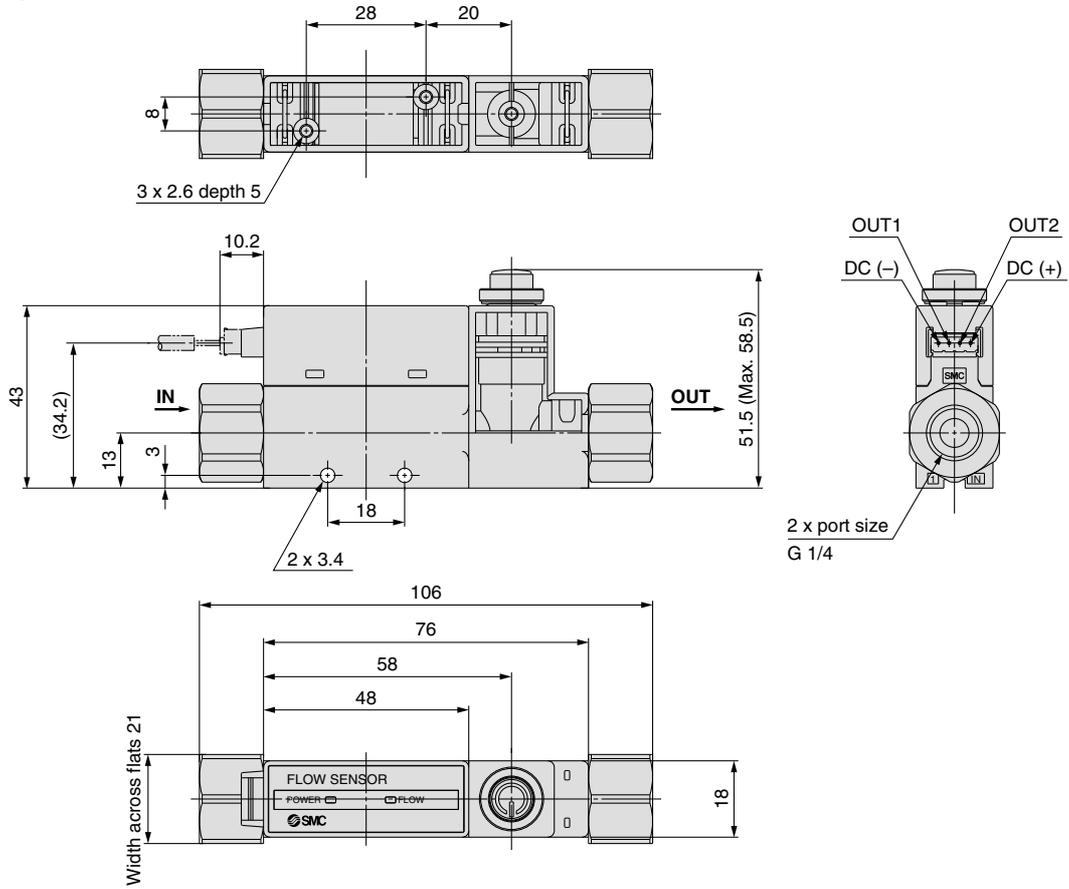


### PFM5□S-(N)01L/(N)02L/F01L

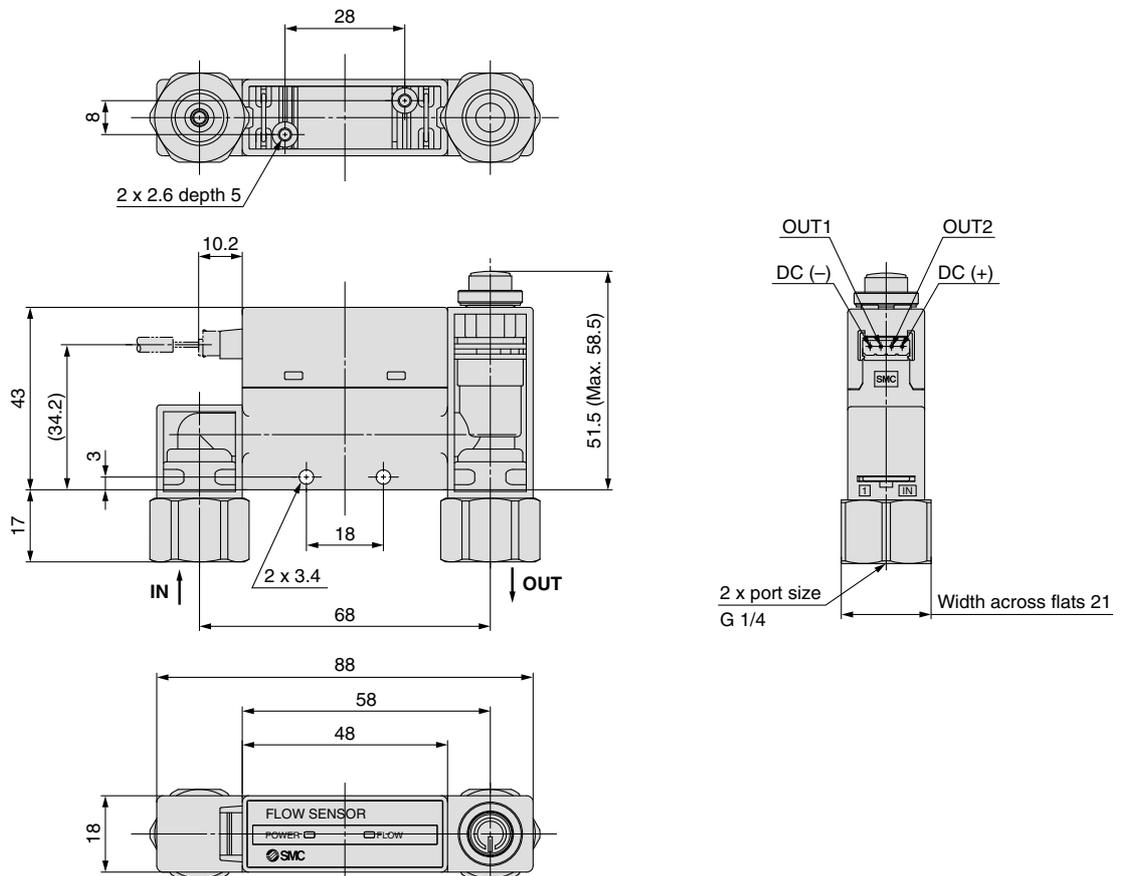


## Dimensions

### PFM5□S-F02



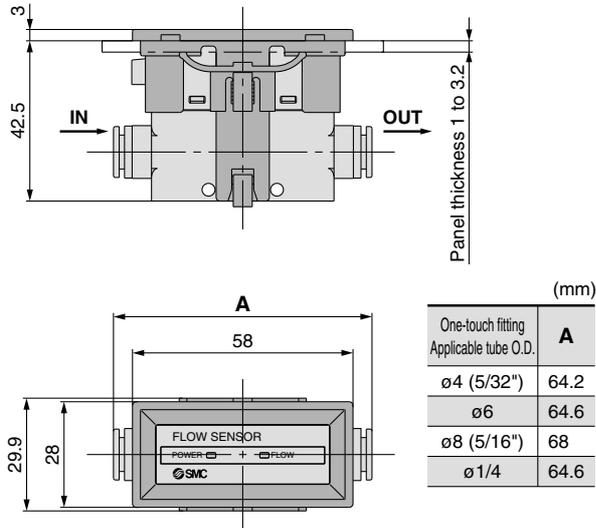
### PFM5□S-F02L



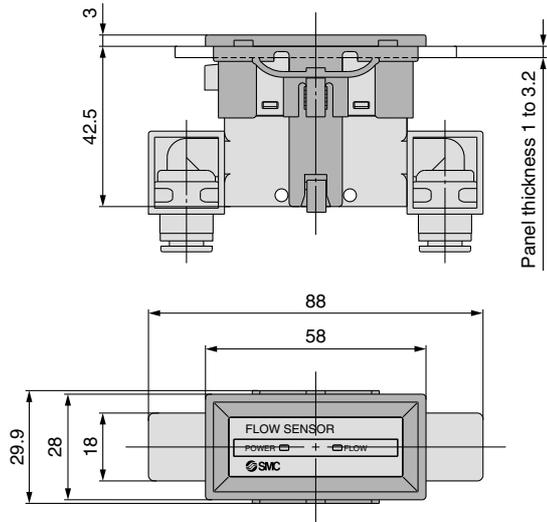
# Series PFM5

## Dimensions

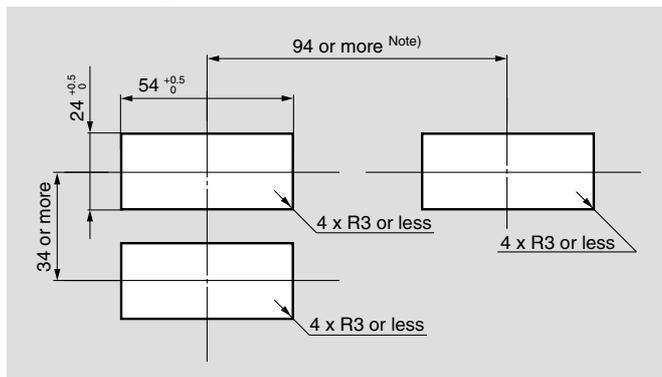
### Panel mount / Without flow adjustment valve / Straight



### Panel mount / Without flow adjustment valve



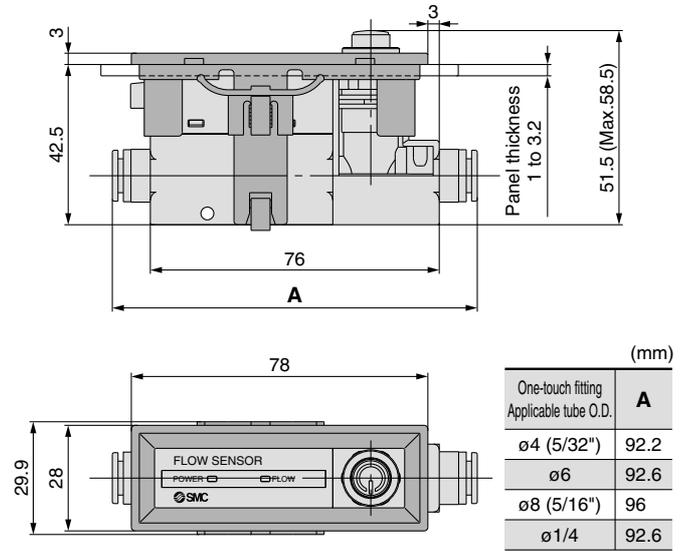
### Panel Fitting Dimensions



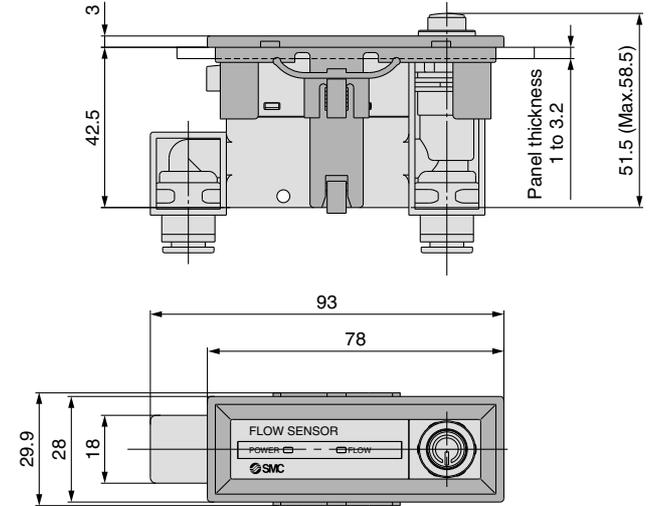
Panel thickness 1 to 3.2 mm

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.

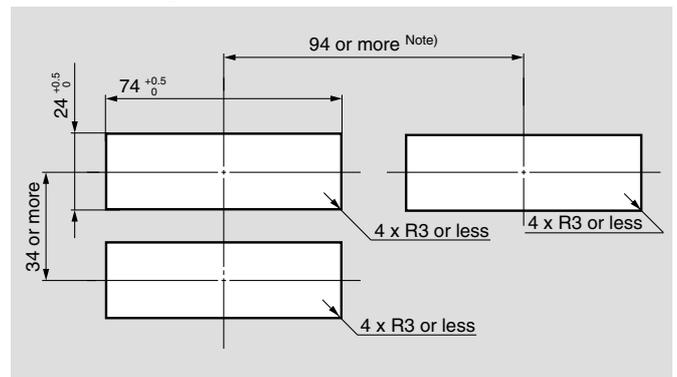
### Panel mount / With flow adjustment valve / Straight



### Panel mount / With flow adjustment valve



### Panel Fitting Dimensions

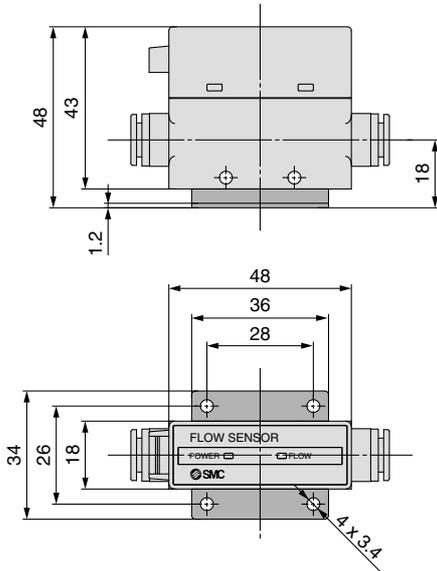


Panel thickness 1 to 3.2 mm

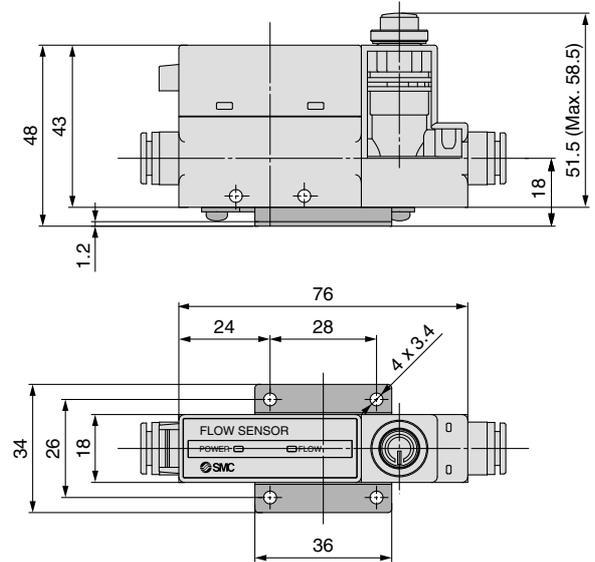
Note) Piping entry direction: Minimum dimensions for bottom side piping. If using straight piping, the piping material and tubing need to be taken into consideration when designing the system. If a bend (R) is used, limit it to R3 or less.

## Dimensions

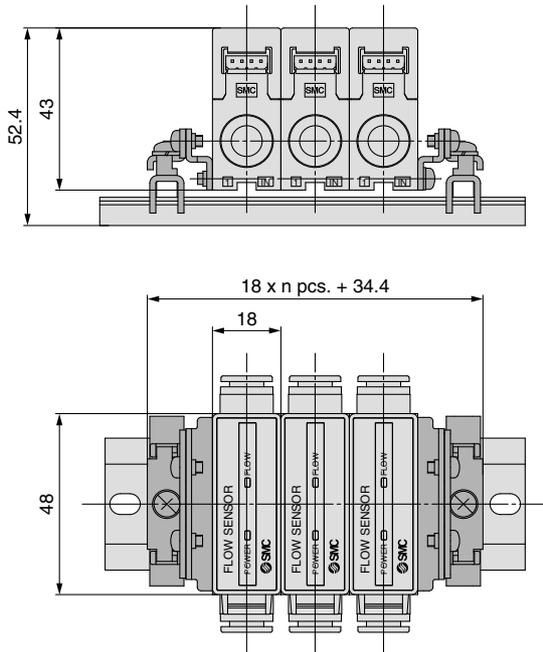
### With bracket / Without flow adjustment valve



### With bracket / With flow adjustment valve

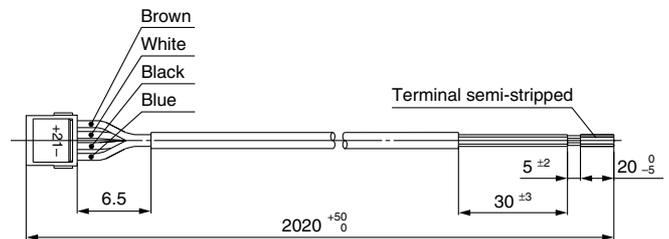


### DIN rail mounting



- 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

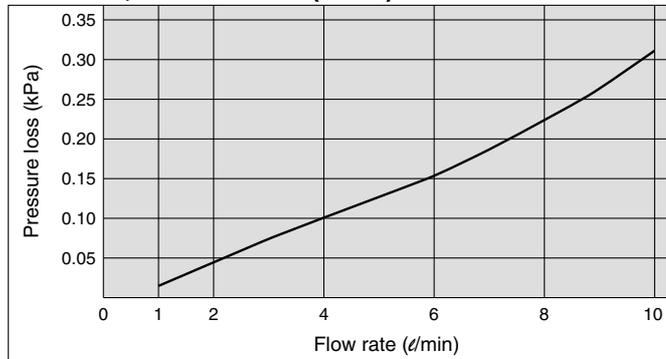
|                            |                            |   |
|----------------------------|----------------------------|---|
| Rated temperature          |                            | 80°C  |
| Rated voltage              |                            | 30 V  |
| Number of wires            |                            | 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 grey                                  |
| Finished external diameter |                            | ø3.5 <sup>+0.10</sup> / <sub>-0.25</sub>    |

\* Connects to the PFM3□□ series.

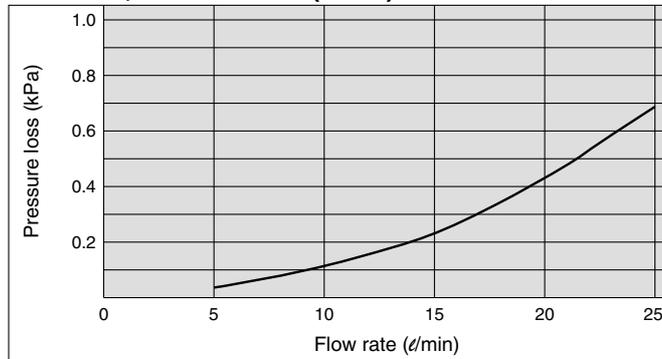
# Series PFM7/PFM5 Common Specifications

## Pressure Loss (Pressure: 350 [kPa])

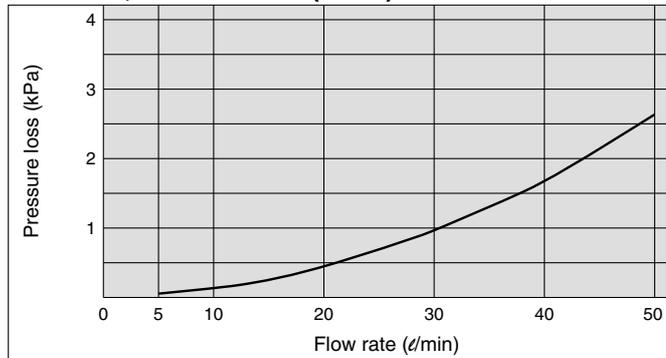
PFM710, 510 / For 10 (ℓ/min)



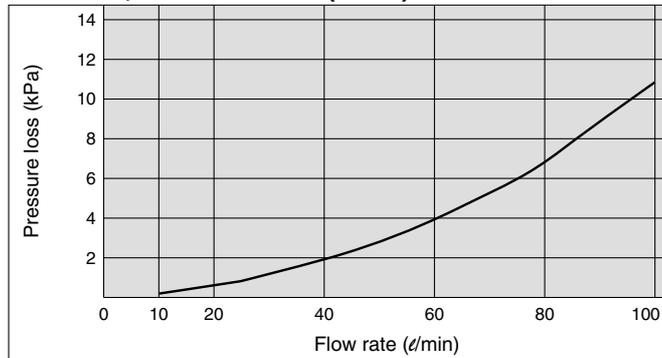
PFM725, 525 / For 25 (ℓ/min)



PFM750, 550 / For 50 (ℓ/min)

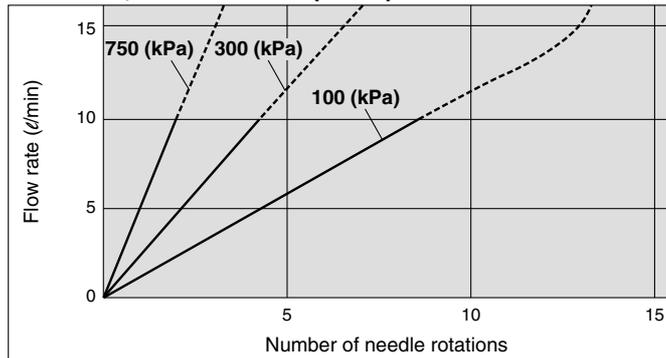


PFM711, 511 / For 100 (ℓ/min)

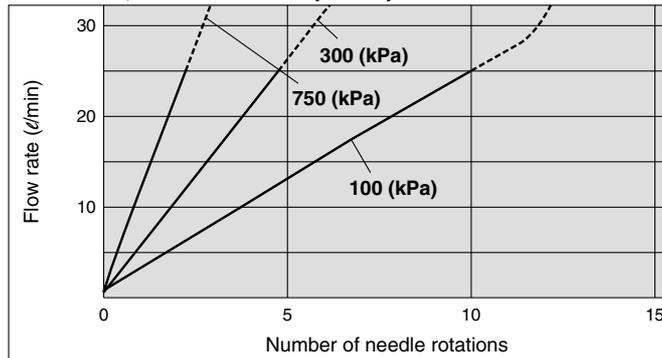


## Flow Characteristics

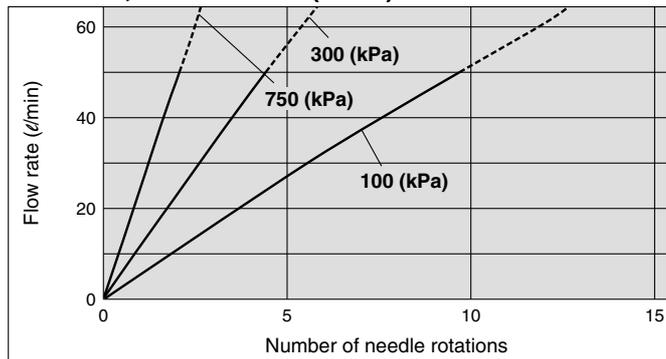
PFM710, 510 / For 10 (ℓ/min)



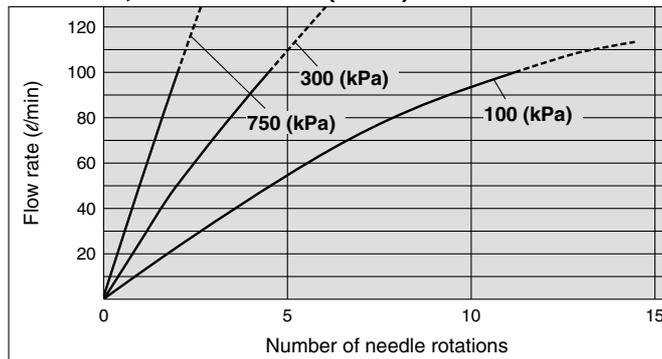
PFM725, 525 / For 25 (ℓ/min)



PFM750, 550 / For 50 (ℓ/min)

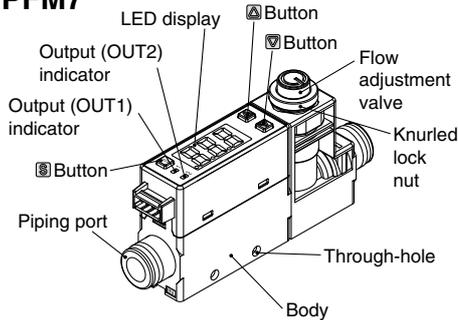


PFM711, 511 / For 100 (ℓ/min)

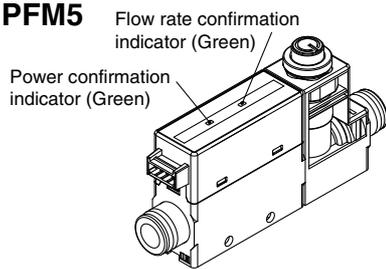


## Parts Description

### PFM7

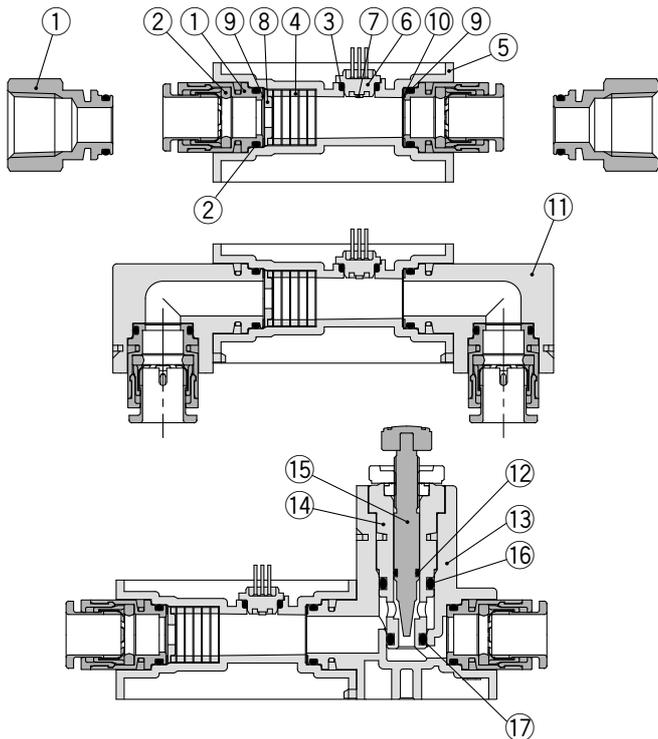


### PFM5



| 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 colour 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. Colour 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             |

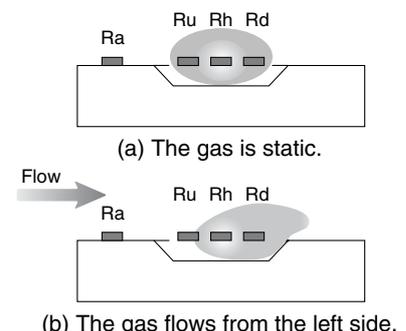
## Detection Principle

This MEMS sensor chip consists of upstream temperature measuring sensor (Ru) and downstream temperature measuring sensor (Rd), which are placed symmetrically from the centre 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.

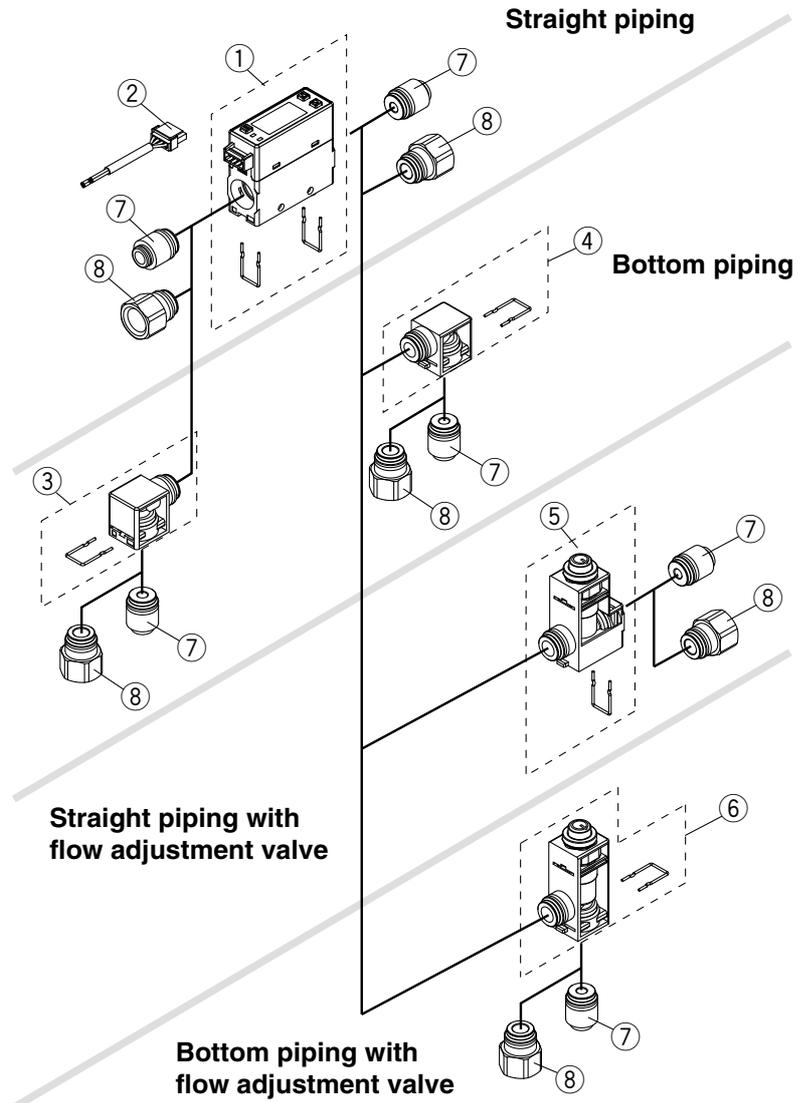
Ra is used to compensate the gas and/or ambient temperature.



# 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<br>Flow adjustment valve<br>assembly<br>(with pin) | For 10 $\text{d}/\text{min}$  | ZS-33-10N  |
|     |  | For 25 $\text{d}/\text{min}$  | ZS-33-25N  |
|     |  | For 50 $\text{d}/\text{min}$  | ZS-33-50N  |
|     |  | For 100 $\text{d}/\text{min}$ | ZS-33-11N  |
| 6   | For bottom piping<br>Flow adjustment valve<br>assembly<br>(with pin)   | For 10 $\text{d}/\text{min}$  | ZS-33-10NL |
|     |  | For 25 $\text{d}/\text{min}$  | ZS-33-25NL |
|     |  | For 50 $\text{d}/\text{min}$  | ZS-33-50NL |
|     |  | For 100 $\text{d}/\text{min}$ | 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  |



# Flow Sensor Monitor

## Series PFM3



### How to Order

#### Output specification

|   |   |
|---|---|
| 0 | 2 NPN outputs + 1 to 5 V output                 |
| 1 | 2 NPN outputs + 4 to 20 mA output               |
| 2 | 2 NPN outputs + External input <sup>Note)</sup> |
| 3 | 2 PNP outputs + 1 to 5 V output                 |
| 4 | 2 PNP outputs + 4 to 20 mA output               |
| 5 | 2 PNP outputs + External input <sup>Note)</sup> |

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

#### Instruction manual

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

#### Calibration certificate

|     |                              |
|-----|------------------------------|
| Nil | None                         |
| A   | With calibration certificate |

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

**PFM3 0 0 - M L**

#### Type

|   |                     |
|---|---------------------|
| 3 | Remote display unit |
|---|---------------------|

#### Input specification

| Symbol | Content       | Applicable remote type sensor unit |
|--------|---------------|------------------------------------|
| 0      | Voltage input | PFM5□□(S)-□-1-□                    |
| 1      | Current input | PFM5□□(S)-□-2-□                    |

#### Unit specification

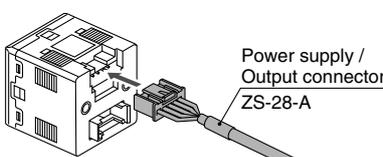
|     |   |
|-----|---|
| Nil | With unit switching function <sup>Note 1)</sup> |
| M   | Fixed SI unit <sup>Note 2)</sup>                |

Note 1) This product is for overseas use only according to the new Measurement Law. (The SI unit is provided for use in Japan.)

Note 2) Fixed unit: Real-time flow rate: ℓ/min  
Accumulated flow: ℓ

#### Option 1

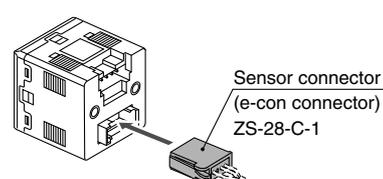
|     |                                 |
|-----|---------------------------------|
| Nil | None                            |
| L   | Power supply / Output connector |



Note) Cable is not connected, but shipped together.

#### Option 3

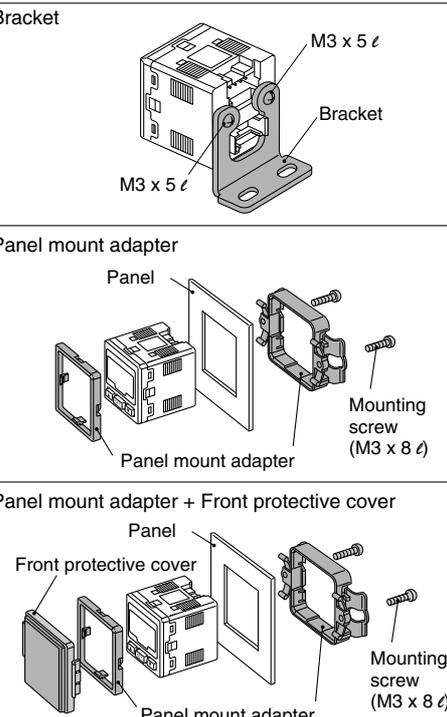
|     |                       |
|-----|-----------------------|
| Nil | None                  |
| F   | With sensor connector |



Note) Connector is not connected, but shipped together.

#### Option 2

|     |  |
|-----|--|
| Nil | None   |
| E   | Bracket                                      |
| B   | Panel mount adapter                          |
| D   | Panel mount adapter + Front protective cover |



Note) Options are not assembled, but shipped together.

### Option / Part No.

| Description                                  | Part no.  | Note                   |
|--|-----------|------------------------|
| Power supply / Output connector (2 m)        | ZS-28-A   |                        |
| Bracket                                      | ZS-28-B   | With M3 x 5 ℓ (2 pcs.) |
| Sensor connector                             | ZS-28-C-1 | 1 pc.                  |
| Panel mount adapter                          | ZS-27-C   | With M3 x 8 ℓ (2 pcs.) |
| Panel mount adapter + Front protective cover | ZS-27-D   | With M3 x 8 ℓ (2 pcs.) |

# Series PFM3

## Specifications

| Model  |                              | PFM3□□  |                   |                 |                |
|--|------------------------------|---|-------------------|-----------------|----------------|
| Rated flow range<br>(Flow rate range)            | Dry air, N <sub>2</sub> , Ar | 0.2 to 10 ℓ/min   | 0.5 to 25 ℓ/min   | 1 to 50 ℓ/min   | 2 to 100 ℓ/min |
|  | CO <sub>2</sub>              | 0.2 to 5 ℓ/min  | 0.5 to 12.5 ℓ/min | 1 to 25 ℓ/min   | 2 to 50 ℓ/min  |
| Displayed flow range<br><small>Note 1)</small>   | Dry air, N <sub>2</sub> , 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 <sub>2</sub>              | 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  |
| Set flow range<br><small>Note 1)</small>         | Dry air, N <sub>2</sub> , 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 <sub>2</sub>              | 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<br><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<br><small>Note 3)</small>        |                              | Real-time flow rate ℓ/min, CFM x 10 <sup>-2</sup><br>Accumulated flow ℓ, ft <sup>3</sup> x 10 <sup>-1</sup>   |                   |                 |                |
| Accumulated flow range<br><small>Note 4)</small> |                              | 1999999 ℓ   |                   |                 |                |
| Power supply voltage                             |                              | 24 VDC (ripple ±10% or less) (With polarity protection)   |                   |                 |                |
| Current consumption                              |                              | 50 mA or less   |                   |                 |                |
| Sensor input<br>Number of inputs: 1              |                              | PFM30□: Voltage input 1 to 5 VDC (input impedance: 1 MΩ)<br>PFM31□: Current input 4 to 20 mADC (input impedance: 250 Ω)   |                   |                 |                |
| Hysteresis<br><small>Note 5)</small>             |                              | Hysteresis mode: Variable, Window comparator mode: Variable   |                   |                 |                |
| Switch output                                    |                              | NPN or PNP open collector output: 2 outputs<br>Maximum load current: 80 mA, max. load voltage 30 VDC (at NPN output),<br>Residual voltage 1 V or less (at load current 80 mA), With short-circuit protection  |                   |                 |                |
| Accumulated pulse output                         |                              | NPN or PNP open collector output (Same as switch output)  |                   |                 |                |
| Response time                                    |                              | 1 s (50 ms, 0.5 s, 2 s can be selected.)  |                   |                 |                |
| Repeatability                                    |                              | ±0.1%F.S. or less, Analogue output accuracy: ±0.3%F.S. or less  |                   |                 |                |
| Analogue output                                  |                              | Voltage output: 1 to 5 VDC (0 ℓ/min to max. rated flow rate value)<br>Output impedance: Approx. 1 kΩ, Accuracy: ±1%F.S. or less (relative to display value)<br>Current output: 4 to 20 mADC (0 ℓ/min to max. rated flow rate value)<br>Max. load impedance: 600 Ω (at 24 VDC), Min. load impedance: 50 Ω<br>Accuracy: ±1%F.S. or less (relative to display value) |                   |                 |                |
| Display accuracy                                 |                              | ±0.5%F.S. ±1 digit or less  |                   |                 |                |
| Display method                                   |                              | 3+1/2-digit, 7-segment LED 2-color display (Red/Green) Sampling cycle: 10 times/sec   |                   |                 |                |
| Status LED's                                     |                              | OUT1: Illuminates when output is turned ON (Green). OUT2: Illuminates when output is turned ON (Red).   |                   |                 |                |
| External input<br><small>Note 6)</small>         |                              | No-voltage input (Reed or Solid state), LOW level input 30 msec or more, LOW level 0.4 V or less  |                   |                 |                |
| Enclosure  |                              | IP40  |                   |                 |                |
| 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 whole charging part and live part   |                   |                 |                |
| Insulation resistance                            |                              | 50 MΩ or more (at 500 VDC measured via Megohmmeter) between whole charging part and live part   |                   |                 |                |
| Vibration resistance                             |                              | 10 to 500 Hz with a 1.5 mm amplitude or 98 m/s <sup>2</sup> acceleration, in each X, Y, Z direction for 2 hrs, whichever is smaller. (de-energised)   |                   |                 |                |
| Impact resistance                                |                              | 100 m/s <sup>2</sup> in X, Y, Z directions 3 times each (de-energised)  |                   |                 |                |
| Temperature characteristics                      |                              | ±0.5%F.S. or less (based on 25°C)   |                   |                 |                |
| Connection                                       |                              | Power supply / Output connection: 5P connector, Sensor connection: 4P connector   |                   |                 |                |
| Material   |                              | Front case, Rear case: PBT  |                   |                 |                |
| Weight   |                              | 30 g (Without cable) 85 g (With cable)  |                   |                 |                |

Note 1) Select the sensor to connect in the initial setting. If CO<sub>2</sub> is selected as the operating fluid, the value is 1/2 on the maximum side.

Note 2) When 10 ℓ/min with a minimum unit setting of 0.01 ℓ/min is selected for the connected sensor, the upper limit of the display range is 105.0 ℓ/min.

When 100 ℓ/min with a minimum unit setting of 0.1 ℓ/min is selected for the connected sensor, the upper limit of the display range is 105.0 ℓ/min.

The setting at the time of shipment is 10 ℓ/min with a minimum unit setting of 0.01 ℓ/min for the connected sensor.

Note 3) 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) The accumulated flow value is cleared to 0 when power is turned off. It is possible to select function that holds the accumulated flow value so it is not cleared. (The accumulated flow value can be held at 2- or 5-minute intervals.) The service life of the memory element (electronic component) is limited to 1 million overwrite cycles (assuming 24-hour operation, 5 minutes x 1 million cycles = 5 million minutes = 9.5 years) when 5-minute intervals are selected. Therefore, when using the holding function, calculate the service life based on the usage conditions, and use the switch within the service life. Applies to models equipped with a unit switching function. (The SI unit (ℓ/min or ℓ) is fixed for types with no unit switching function.)

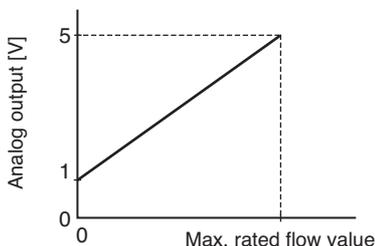
Note 5) Set to hysteresis mode at the time of shipment from the factory. Can be changed to window comparator mode using push-buttons.

Note 6) Accumulated external reset function at the time of shipment from the factory. Auto-shift or auto-shift zero function can be selected using push-buttons.

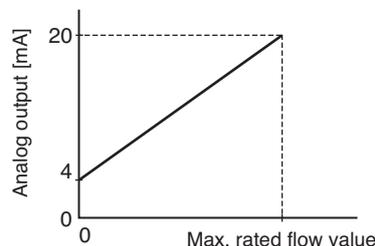
## Analogue Output

Note: Analogue output at maximum rated flow rate when CO<sub>2</sub> is selected is 3 [V] for the voltage output type and 12 [mA] for the current output type.

### 1 to 5 VDC



### 4 to 20 mADC



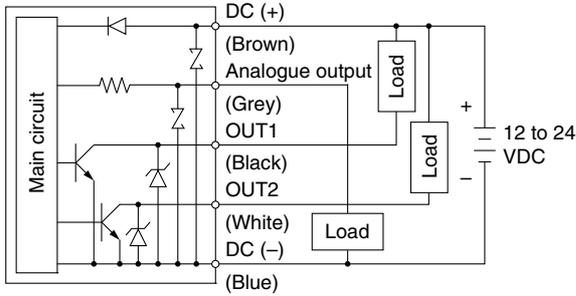
| Rated flow range | Max. rated flow value<br>[ℓ/min] |
|------------------|----------------------------------|
| 0.2 to 10 ℓ/min  | 10 (5)                           |
| 0.5 to 25 ℓ/min  | 25 (12.5)                        |
| 1 to 50 ℓ/min    | 50 (25)                          |
| 2 to 100 ℓ/min   | 100 (50)                         |

\* ( ): Fluid: CO<sub>2</sub>

## Internal Circuits

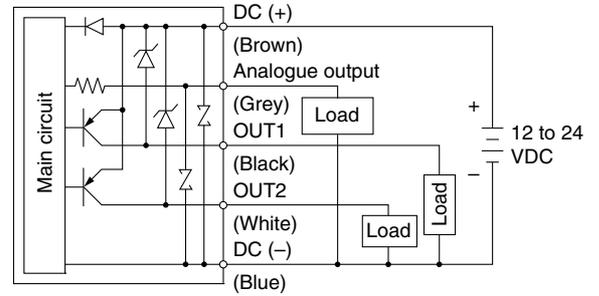
### PFM3□0

NPN open collector output: 2 outputs  
 Max. 30 V, 80 mA, residual voltage 1 V or less  
 Analogue output: 1 to 5 V  
 Output impedance: approx. 1 kΩ



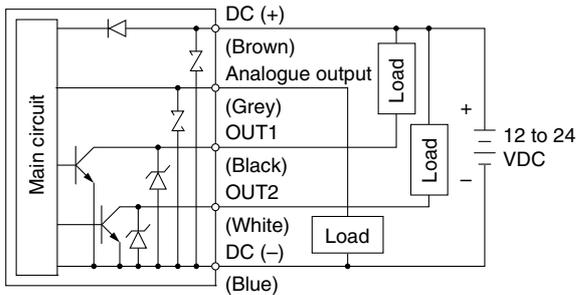
### PFM3□3

PNP open collector output: 2 outputs  
 Max. 80 mA, residual voltage 1 V or less  
 Analogue output: 1 to 5 V  
 Output impedance: approx. 1 kΩ



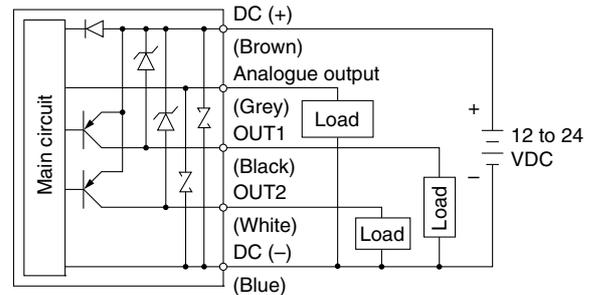
### PFM3□1

NPN open collector output: 2 outputs  
 Max. 30 V, 80 mA, residual voltage 1 V or less  
 Analogue output: 4 to 20 mA  
 Max. load impedance: 300 Ω (12 VDC) 600 Ω (24 VDC)  
 Min. load impedance: 50 Ω



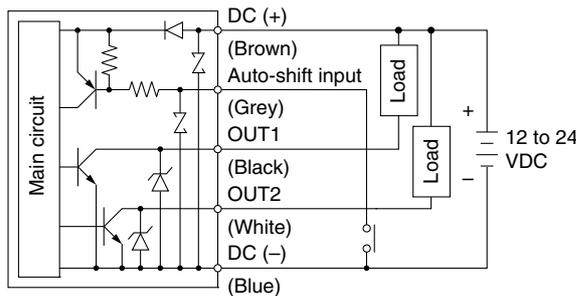
### PFM3□4

PNP open collector output: 2 outputs  
 Max. 80 mA, residual voltage 1 V or less  
 Analogue output: 4 to 20 mA  
 Max. load impedance: 300 Ω (12 VDC) 600 Ω (24 VDC)  
 Min. load impedance: 50 Ω



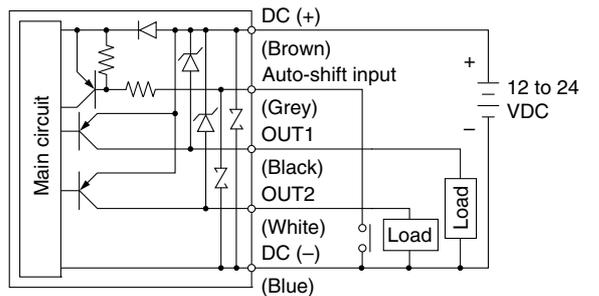
### PFM3□2

NPN open collector output with external input: 2 outputs  
 Max. 30 V, 80 mA, residual voltage 1 V or less

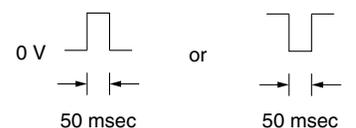
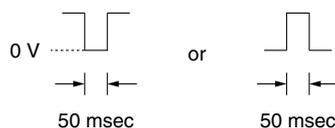
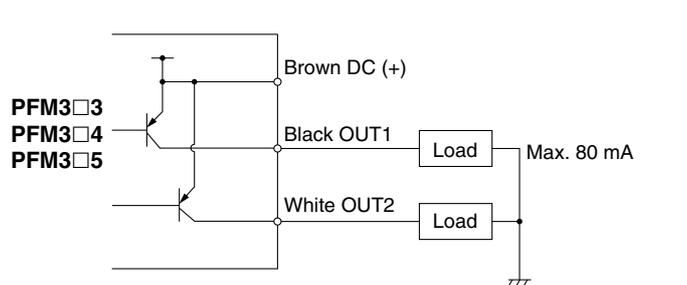
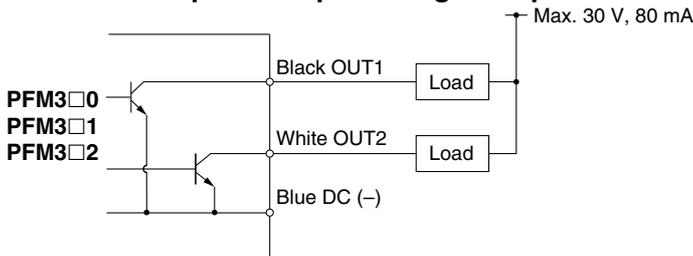


### PFM3□5

PNP open collector output with external input: 2 outputs  
 Max. 80 mA, residual voltage 1 V or less



## Accumulated pulse output wiring example



## Descriptions

---

### LCD Display

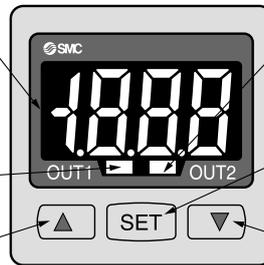
Shows the current flow rate, mode setting, selected display unit, and error code. Four display modes are available, some of which use indications that are fixed either red or green, and others use indications that change from green to red.

### Output (OUT1) Indicator (Green)

Lights when the output (OUT1) is turned on.

### △ Button

Used for mode selection and increasing the ON/OFF setting value. Also used to switch to peak display mode.



### Output (OUT2) Indicator (Red)

Lights when the output (OUT2) is turned on.

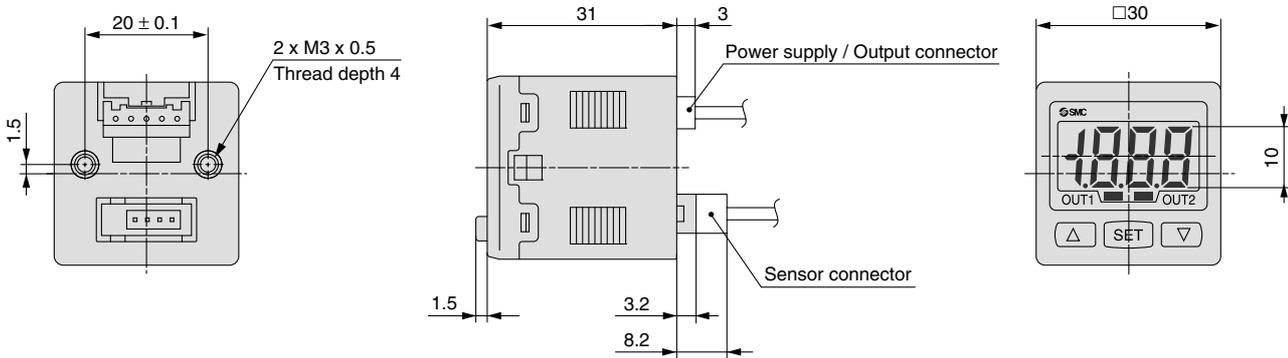
### SET Button

Used to activate mode changes and new setting values.

### ▽ Button

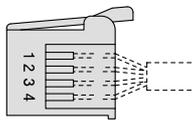
Used for mode selection and decreasing the on/off setting value. Also used to switch to bottom display mode.

## Dimensions



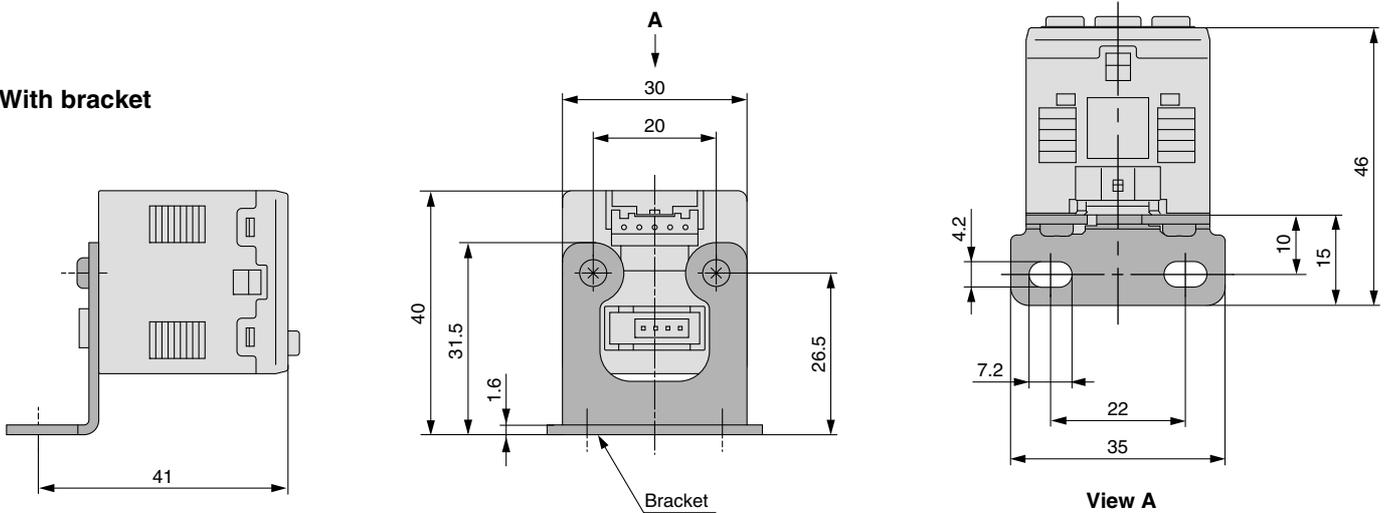
### Sensor connector (ZS-28-C-1)

| Pin no. | Terminal name |
|---------|---------------|
| 1       | DC (+)        |
| 2       | N.C.          |
| 3       | DC (-)        |
| 4       | IN*           |

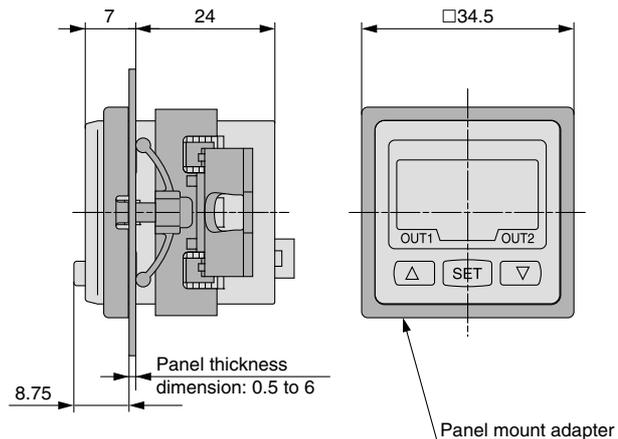


\* 1 to 5 V or 4 to 20 mA

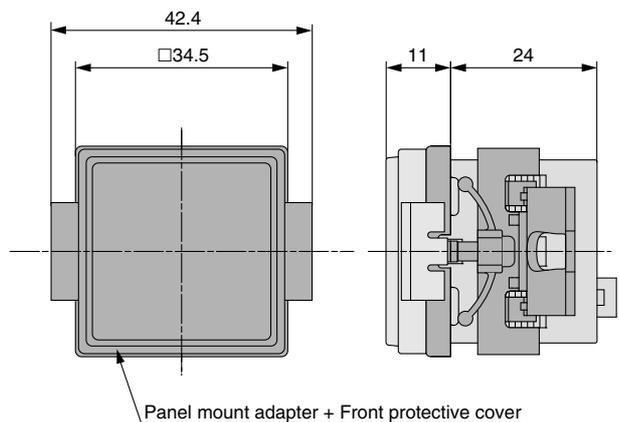
### With bracket



### With panel mount adapter



### With panel mount adapter + Front protective cover

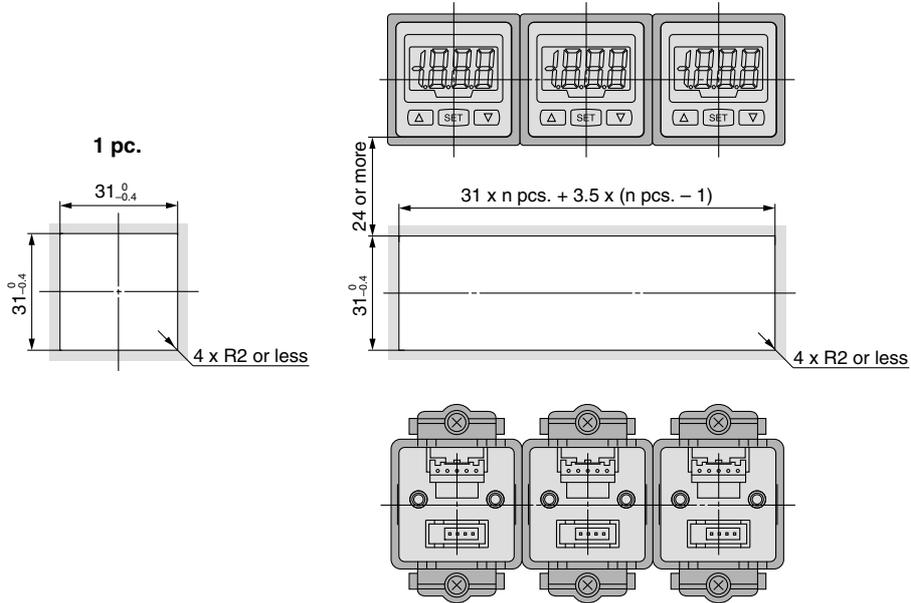


# Series PFM3

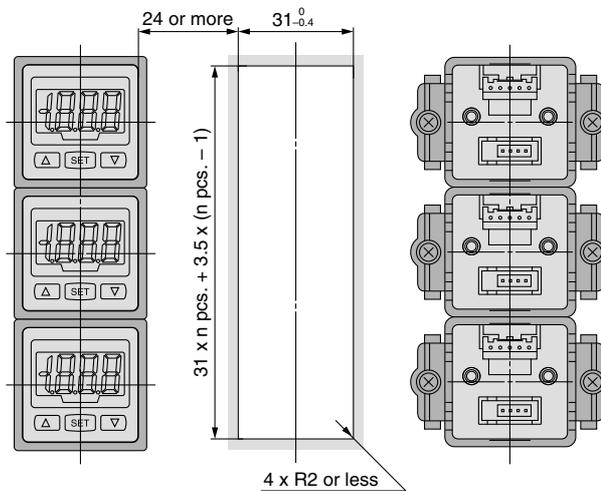
## Dimensions

### Panel fitting dimensions

#### Secure mounting of n (2 or more) switches (horizontal)

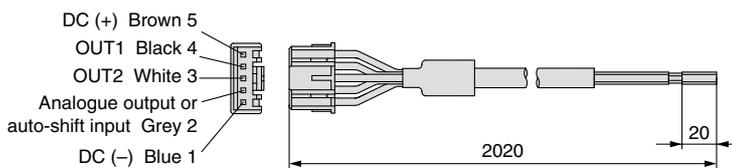


#### Secure mounting of n (2 or more) switches (vertical)



Note) If a bend (R) is used, limit it to R2 or less.

### Power supply / Output connector (ZS-28-A)



### Cable Specifications

|                            |                            |   |
|----------------------------|----------------------------|---|
| Rated temperature          |                            | 105°C                                       |
| Rated voltage              |                            | 300 V                                       |
| Number of wires            |                            | 5   |
| Conductor                  | Nominal cross section area | 0.2 mm <sup>2</sup>                         |
|                            | Material                   | Soft copper wire                            |
|                            | Construction               | 40 / 0.08 mm                                |
|                            | External diameter          | 0.58 mm                                     |
| Insulation                 | Material                   | Cross-linked vinyl chloride resin compound  |
|                            | External diameter          | Approx. 1.12 mm                             |
|                            | Standard thickness         | 0.27 mm                                     |
|                            | Colours                    | Brown, Black, White, Grey, Blue             |
| Sheath                     | Material                   | Oil-resistant vinyl chloride resin compound |
|                            | Standard thickness         | 0.5 mm                                      |
|                            | Colour                     | Light grey (Munsell N7)                     |
| Finished external diameter |                            | ø4.1  |

# 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 colour

The indication colour can be selected for each output condition. The selection of the indication colour provides visual identification of abnormal values. (The indication colour 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 (CO<sub>2</sub>) is used, the setting needs to be changed.

|                         |
|-------------------------|
| Dry air, N <sub>2</sub> |
| Argon                   |
| CO <sub>2</sub>         |

Note) When CO<sub>2</sub> 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 $\mu$ /min<br>PFM711 by 1 $\mu$ /min    |
| 1000 resolution | PFM710 by 0.01 $\mu$ /min<br>PFM711 by 0.1 $\mu$ /min |

## ■ Accumulated value hold

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

The accumulated value is memorised every 2 or 5 min. during measurement, and continues from the last memorised 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 analogue 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 memorising 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.

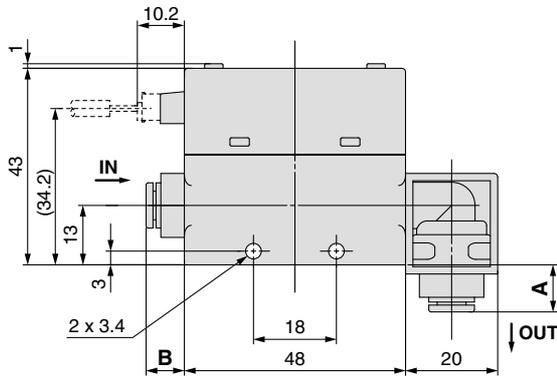
● **Changing the piping entry direction combination**

|             |                                      |
|-------------|--------------------------------------|
| <b>X693</b> | IN side: Straight / OUT side: Bottom |
| <b>X694</b> | IN side: Bottom / OUT side: Straight |

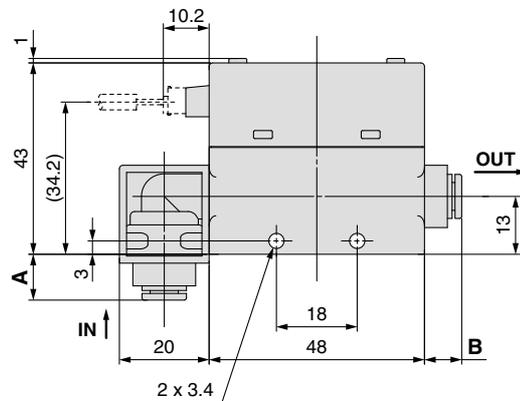
For details of How to Order, refer to page 1 and 13.

## Dimensions

PFM<sub>5</sub> □ □ □ -C4/C6/C8/N7-□ -X693

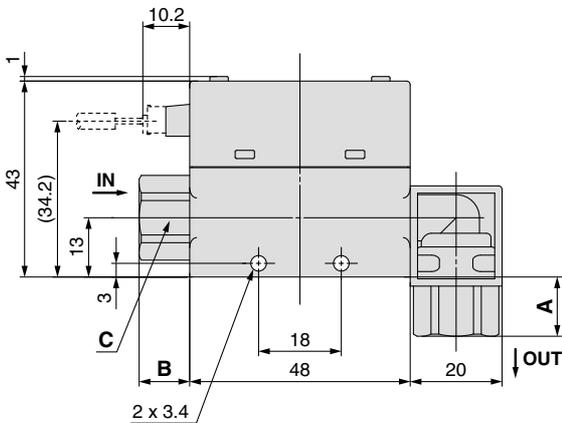


PFM<sub>5</sub> □ □ □ -C4/C6/C8/N7-□ -X694

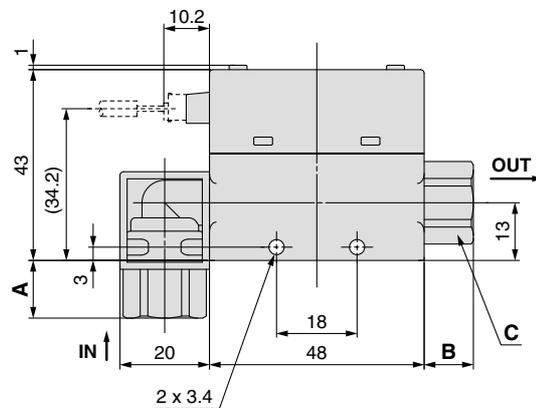


| One-touch fitting<br>Applicable tube O.D. |            | A    | B   |
|---|------------|------|-----|
| C4  | ø4 (5/32") | 10.1 | 8.1 |
| C6  | ø6         | 10.3 | 8.3 |
| C8  | ø8 (5/16") | 12   | 10  |
| N7  | ø1/4       | 10.3 | 8.3 |

PFM<sub>5</sub> □ □ □ -□01/02-□ -X693



PFM<sub>5</sub> □ □ □ -□01/02-□ -X694



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

# Series PFM7/PFM5

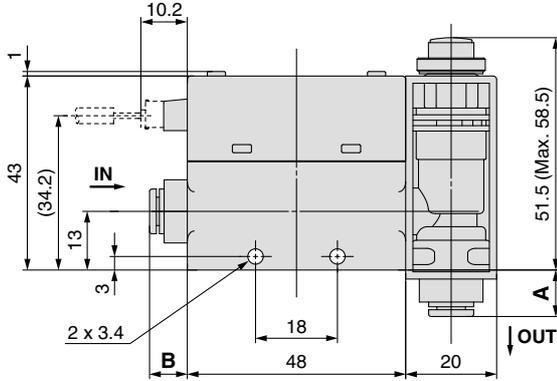
## Made to Order 2

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



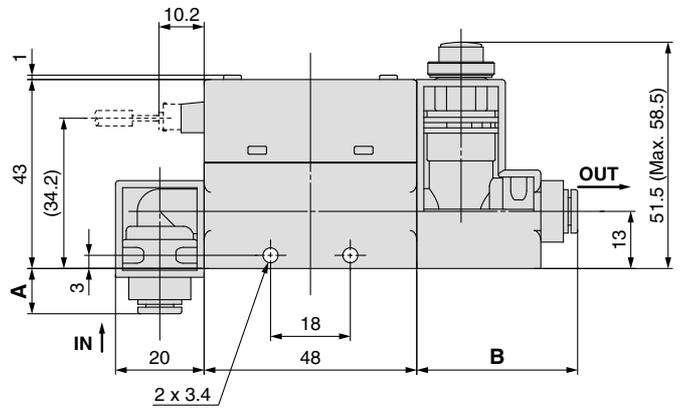
### Dimensions

PFM<sub>5</sub><sup>7</sup>□□S-C4/C6/C8/N7-□-X693



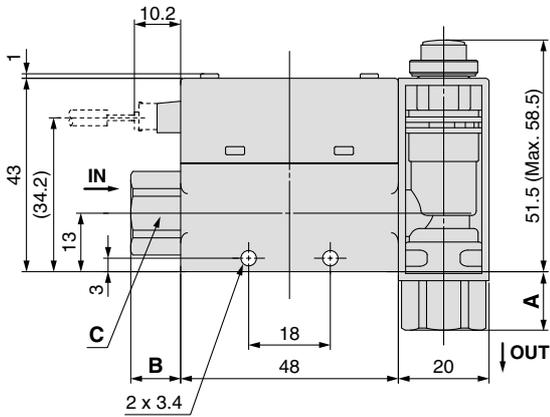
| One-touch fitting<br>Applicable tube O.D. | A    | B   |
|---|------|-----|
| ø4 (5/32")                                | 10.1 | 8.1 |
| ø6  | 10.3 | 8.3 |
| ø8 (5/16")                                | 12   | 10  |
| ø1/4                                      | 10.3 | 8.3 |

PFM<sub>5</sub><sup>7</sup>□□S-C4/C6/C8/N7-□-X694



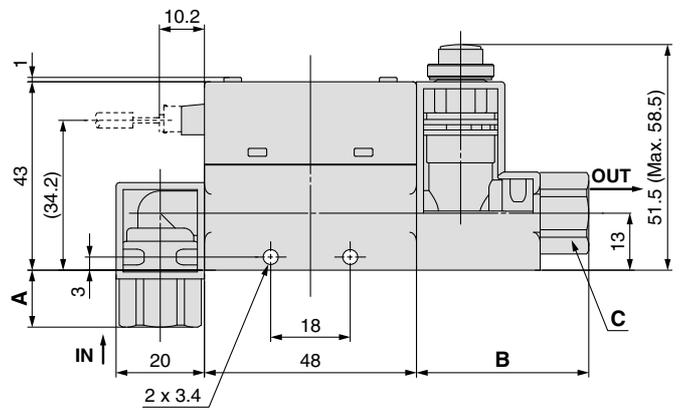
| One-touch fitting<br>Applicable tube O.D. | A    | B    |
|---|------|------|
| ø4 (5/32")                                | 10.1 | 36.1 |
| ø6  | 10.3 | 36.3 |
| ø8 (5/16")                                | 12   | 37   |
| ø1/4                                      | 10.3 | 36.3 |

PFM<sub>5</sub><sup>7</sup>□□S-□01/02-□-X693



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

PFM<sub>5</sub><sup>7</sup>□□S-□01/02-□-X694



| Port size                            | A  | B  | C<br>(Width across flats) |
|--------------------------------------|----|----|---------------------------|
| Rc 1/8, 1/4<br>NPT 1/8, 1/4<br>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 (CO<sub>2</sub>) mixed gas

The argon-carbon dioxide gas ratio (Ar: CO<sub>2</sub>) 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

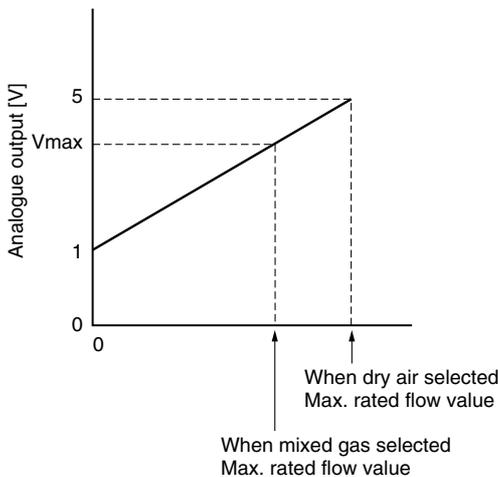
7 Integrated display

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

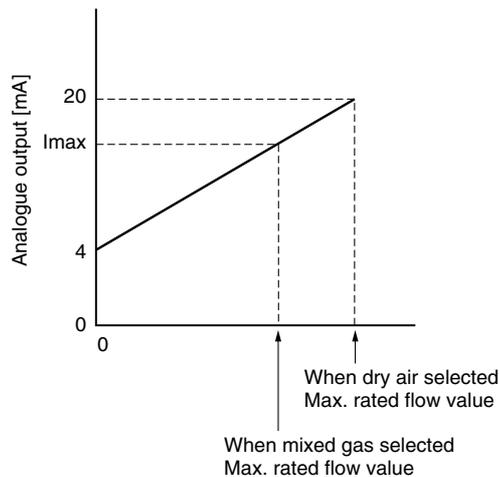
| Model  | Gas ratio |                 | Rated flow range          | Displayable range         | Settable range          | Max. analog output |                |
|--------|-----------|-----------------|---------------------------|---------------------------|-------------------------|--------------------|----------------|
|        | Ar        | CO <sub>2</sub> |                           |                           |                         | 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

Analogue voltage output (1 to 5 V)



Analogue current output (4 to 20 mA)





Series PFM

# Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by labels of "Caution", "Warning" or "Danger". To ensure safety, be sure to observe ISO 4414 <sup>Note 1)</sup>, JIS B 8370 <sup>Note 2)</sup> and other safety practices.

## ■ Explanation of the Labels

| Labels   | Explanation of the labels  |
|--|--|
|  <b>Danger</b>  | In extreme conditions, there is a possible result of serious injury or loss of life.             |
|  <b>Warning</b> | Operator error could result in serious injury or loss of life.                                   |
|  <b>Caution</b> | Operator error could result in injury <sup>Note 3)</sup> or equipment damage. <sup>Note 4)</sup> |

Note 1) ISO 4414: Pneumatic fluid power – General rules relating to systems

Note 2) JIS B 8370: General Rules for Pneumatic Equipment

Note 3) Injury indicates light wounds, burns and electrical shocks that do not require hospitalisation or hospital visits for long-term medical treatment.

Note 4) Equipment damage refers to extensive damage to the equipment and surrounding devices.

## ■ Selection/Handling/Applications

### 1. The compatibility of the pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.

Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or post analysis and/or tests to meet the specific requirements. The expected performance and safety assurance are the responsibility of the person who has determined the compatibility of the system. This person should continuously review the suitability of all items specified, referring to the latest catalog information with a view to giving due consideration to any possibility of equipment failure when configuring a system.

### 2. Only trained personnel should operate pneumatically operated machinery and equipment.

Compressed air can be dangerous if handled incorrectly. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced operators. (Understanding JIS B 8370 General Rules for Pneumatic Equipment, and other safety rules are included.)

### 3. Do not service machinery/equipment or attempt to remove components until safety is confirmed.

1. Inspection and maintenance of machinery/equipment should only be performed once measures to prevent falling or runaway of the driven objects have been confirmed.
2. When equipment is removed, confirm that safety process as mentioned above. Turn off the supply pressure for this equipment and exhaust all residual compressed air in the system, and release all the energy (liquid pressure, spring, condenser, gravity).
3. Before machinery/equipment is restarted, take measures to prevent quick extension of a cylinder piston rod, etc.

### 4. If the equipment will be used in the following conditions or environment, please contact SMC first and be sure to take all necessary safety precautions.

1. Conditions and environments beyond the given specifications, or if product is used outdoors.
2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, clutch and brake circuits in press applications, or safety equipment.
3. An application which has the possibility of having negative effects on people, property, requiring special safety analysis.
4. If the products are used in an interlock circuit, prepare a double interlock style circuit with a mechanical protection function for the prevention of a breakdown. And, examine the devices periodically if they function normally or not.

## ■ Exemption from Liability

1. SMC, its officers and employees shall be exempted from liability for any loss or damage arising out of earthquakes or fire, action by a third person, accidents, customer error with or without intention, product misuse, and any other damages caused by abnormal operating conditions.

2. SMC, its officers and employees shall be exempted from liability for any direct or indirect loss or damage, including consequential loss or damage, loss of profits, or loss of chance, claims, demands, proceedings, costs, expenses, awards, judgments and any other liability whatsoever including legal costs and expenses, which may be suffered or incurred, whether in tort (including negligence), contract, breach of statutory duty, equity or otherwise.

3. SMC is exempted from liability for any damages caused by operations not contained in the catalogs and/or instruction manuals, and operations outside of the specification range.

4. SMC is exempted from liability for any loss or damage whatsoever caused by malfunctions of its products when combined with other devices or software.



## Series PFM

# Specific Product Precautions 1

Be sure to read this before handling.

Refer to the back of page 1 for Safety Instructions and “Precautions for Handling Pneumatic Devices” (M-03-E3A) for Common Precautions.

### Design and Selection

#### Warning

##### 1. Operate the switch only within the specified voltage.

Use of the switch outside of the specified voltage range can cause not only a malfunction and damage to the switch, but it can also cause electrocution and fire.

##### 2. Do not exceed the maximum allowable load specification.

A load exceeding the maximum load specification can cause damage to the switch.

##### 3. Do not use a load that generates surge voltage.

Although surge protection is installed in the circuit at the output side of the switch, damage may still occur if a surge is applied repeatedly. When working directly such an unit as relay, solenoid valve, etc., which generates surge, use a built-in surge absorbing element type.

##### 4. Be sure to verify the applicable fluid.

The switches do not have an explosion proof rating. To prevent possible fire hazard, do not use with flammable gases or fluids.

##### 5. Monitor the internal voltage drop of a switch.

When operating below the specified voltage, it is possible that a load may be ineffective, even though the pressure switch function is normal. Therefore, the formula below should be satisfied after confirming the voltage of the load.

|                |   |                                 |   |                                   |
|----------------|---|---------------------------------|---|-----------------------------------|
| Supply voltage | – | Internal voltage drop of switch | > | Minimum operating voltage of load |
|----------------|---|---------------------------------|---|-----------------------------------|

##### 6. Use the switch within the specified flow rate measurement and operating pressure.

Operating beyond the specified flow rate and operating pressure can damage the switch.

##### 7. Never use flammable fluids and/or permeable fluids.

They may cause a fire, an explosion or corrosion.

\* Refer to the MSDS (Material Safety Data Sheet) when using chemicals.

##### 8. To prevent damage due to failure and/or malfunction of the product, establish a backup system such as a fail-safe system which enables multiple-stage type operation of the equipment and machinery.

##### 9. When the product is for an interlock circuit, the following points should be noted.

- Provide double interlocking through another system (mechanical protection function, etc.).
- Perform checks to ensure the product is operating properly, as there is a risk of injury.

#### Caution

##### 1. Ensure sufficient space for maintenance activities.

Provide space required for maintenance.

##### 2. The direct-current power supply to combine should be UL authorized power supply.

(1) Limited voltage current circuit in accordance with UL 508.

A circuit in which power is supplied by the secondary coil of a transformer that meets the following conditions.

- Maximum voltage (with no load): 30 Vrms (42.4 V peak) or less
- Maximum current:

(1) 8 A or less (including when short circuited)

(2) limited by circuit protector (such as fuse) with the following ratings.

| No load voltage (V peak) | Max. current rating |
|--------------------------|---------------------|
| 0 to 20 [V]              | 5.0                 |
| Above 20 to 30 [V]       | 100                 |
|                          | Peak voltage        |

(2) A circuit using max. 30 Vrms or less (42.4 V peak), which is powered by UL 1310 or UL 1585 compatible Class-2 power supply.

##### 3. Data of the switch are stored even after the power supply is turned off.

Input data is stored in an EEPROM so that the data will not be lost after the flow switch is turned off. (The data can be rewritten for up to one million times, and stored for up to 20 years.)

### Mounting

#### Warning

##### 1. Monitor the flow direction of the fluid.

Install and connect piping so that the fluid flows in the direction of the arrow indicated on the body.

##### 2. Remove dirt and dust from the inside of the piping by means of air blow, before attaching to the switch.

##### 3. Do not drop or bump.

Do not drop, bump, or apply excessive impacts (490 m/s<sup>2</sup>) while handling. Although the external body of the switch (switch case) may not be damaged, the inside of the switch could be damaged and cause a malfunction.

##### 4. Hold the body of the switch when handling.

The tensile strength of the cord is 49 N and applying a greater pulling force than this can cause a malfunction. When handling, hold the body of the switch.

##### 5. Do not use until you can verify that equipment can operate properly.

Following mounting, repair, or retrofit, verify correct mounting by conducting suitable function and leakage tests after piping and power connections have been made.

##### 6. Never mount the switch in a place that will be used as a scaffold during piping.

##### 7. Apply a wrench only to the metal part of the piping when installing the flow switch in the piping system.

There is a risk of breakage of the switch.



## Series PFM

# Specific Product Precautions 2

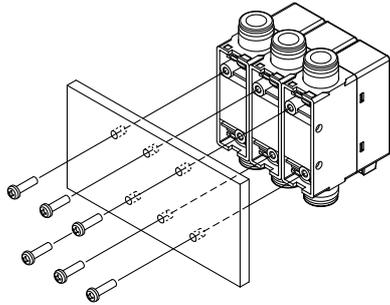
Be sure to read this before handling.

Refer to the back of page 1 for Safety Instructions and “Precautions for Handling Pneumatic Devices” (M-03-E3A) for Common Precautions.

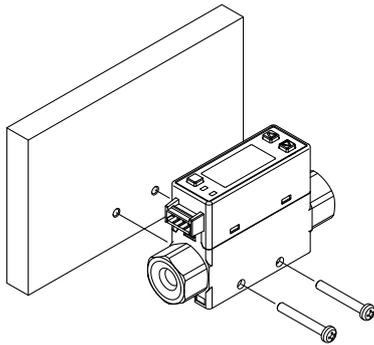
### Mounting

#### ⚠ Caution

- 1. Observe the proper tightening torque.**  
When the switch is tightened beyond the specified tightening torque, the switch may be damaged.
- 2. Do not mount the switch in a place that will be used as a scaffold.**  
The switch could break if subjected to excessive load such as being accidentally stepped on.
- 3. Use a tapping screw (P-tite) with nominal diameter of 3 to mount the product by using the bracket mounting hole(s) at the bottom.**  
The length of the screw depends on the thickness of the plate to be fixed. Please select a screw whose length is the thickness of the plate + 4.8 mm. (The hole depth is 5 mm.)



- 4. When fixing the switch with screws using mounting holes, use a tightening torque of 0.3 N·m or less. If necessary, tighten the product to prevent it from loosening.**



### Wiring

#### ⚠ Warning

- 1. Verify the color and the terminal number when wiring.**  
Incorrect wiring can cause the switch to be damaged and malfunction. Verify the colour and the terminal number in the instruction manual when wiring.
- 2. Use caution not to repeatedly apply bending or stretching forces to the lead wire.**  
Repeated pulling or bending of the lead wire may cause some of the wires to break.

### Wiring

#### ⚠ Warning

- 3. Confirm proper insulation of wiring.**  
Make sure that there is no faulty wiring insulation (contact with other circuits, ground fault, improper insulation between terminals, etc.). Damage may occur due to excess current flow into a switch.
- 4. Do not wire in conjunction with power lines or high voltage lines.**  
Wire separately from power lines and high voltage lines, and avoid wiring in the same conduit with these lines. Control circuits, including switches, may malfunction due to noise from these lines.
- 5. Do not short-circuit a load.**  
Although the switch displays an overcurrent error if a load is short-circuited, there is not protection against incorrect wiring (power source polarity, etc.). Use caution to avoid wiring incorrectly.
- 6. Do not connect wiring while energising the product.**  
The switch and any equipment connected to it could break and malfunction.

### Operating Environment

#### ⚠ Warning

- 1. Never use in the presence of explosive gases.**  
The switch does not have an explosion proof construction. If it is used in an environment where explosive gases are used, it may cause an explosive disaster. Therefore, never use it in such an environment.
- 2. Mount the switch in a location where there is no vibration greater than 98 m/s<sup>2</sup>, or no impact greater than 490 m/s<sup>2</sup>.**  
With a switch with orifice, the adjusted flow rate value could be affected by vibration.
- 3. Do not use in an area where surges are generated.**  
When there are units that generate a large amount of surge in the area around a pressure switch, (e.g., solenoid type lifters, high frequency induction furnaces, motors, etc.) this may cause deterioration or damage to the switch's internal circuitry. Avoid sources of surge generation and crossed lines.
- 4. Switches are not equipped with surge protection against lightning.**  
The flow switches are CE compliant; however, they are not equipped with surge protection against lightning. Lightning surge protection measures should be applied directly to system components as necessary.
- 5. Avoid using the switch in an environment where the likelihood of splashing or spraying of liquids exists.**  
The switch is an open type and should not be used in an environment exposed to splashing of water and oil.
- 6. Do not use the product in an environment subject to a temperature cycle.**  
If the product is subject to a temperature cycle other than natural changes in air temperature, the internal components of the switch could be adversely affected.
- 7. Do not mount the product in locations where it is exposed to radiant heat.**  
This could result in damage and/or malfunction.



## Series PFM

# Specific Product Precautions 3

Be sure to read this before handling.

Refer to the back of page 1 for Safety Instructions and “Precautions for Handling Pneumatic Devices” (M-03-E3A) for Common Precautions.

### Maintenance

#### Warning

##### 1. Perform periodical inspections to ensure proper operation of the switch.

Unexpected malfunctions may cause possible danger.

##### 2. Take precautions when using the switch for an interlock circuit.

When a pressure switch is used for the interlock circuit, devise a multiple interlock system to prevent trouble or malfunction, and verify the operation of the switch and interlock function on a regular basis.

##### 3. Do not make any modifications (including exchanging the printed circuit boards) to the product.

It may cause human injuries and damage.

##### 4. When maintenance work is performed, the following points should be noted.

- Turn off the power supply.
- Cut off the fluid supply, drain the fluid from the piping and ensure the fluid is released to atmosphere before carrying out maintenance. Otherwise, it could cause injury.

#### Caution

##### 1. Do not wipe the product with chemicals such as benzene or thinner.

Such chemicals could damage the product.

##### 2. The accuracy could change by 2 to 3% when the piping is removed or replaced.

The repeatability accuracy is  $\pm 1\%$  F.S. when piping is replaced with piping of the same size. However, the accuracy could change by 2 to 3% if the size is different or when changing from straight to elbow or from elbow to straight piping.

##### 3. Do not poke the inside of the piping port with a stick.

The rectifier could break, making the product unable to sustain the desired performance.

##### 4. Do not touch terminals or connectors when energising the product.

It could cause electric shock, malfunction, or damage to the switch.

### Fluid

#### Warning

##### 1. Check regulators and flow adjustment valves before introducing the fluid.

If pressure or flow rate beyond the specified range are applied to the switch, the sensor unit may be damaged.

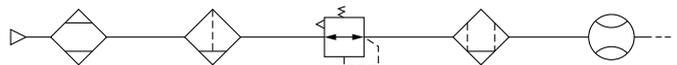
##### 2. Install a filter on the inlet side when there is a possibility of foreign matter being mixed with the fluid.

##### 3. Use dry air of quality compliant with ISO85731-1 for this product.

If any mist or drainage present in the air attaches to the product, accurate measurement could be prevented. Also, the accuracy of the product could be degraded.

#### Recommended air circuits

##### <Compressed air line>



Dryer

Air filter

Regulator

Micro mist separator

Flow switch

*IDFA*

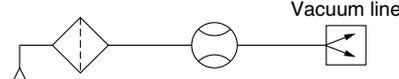
*AF*

*AR*  
*IR*

*AMD*  
*AFD*

*PFM*

##### <Vacuum line>



Suction filter

Flow switch

*ZF*

*PFM*

### Others

#### Warning

##### 1. After the power is turned on, the switch's output remains off while a message is displayed. Therefore, start the measurement after a value is displayed.

##### 2. Perform settings after stopping control systems.

Operation reflects the new values when settings are made. However, if the power is turned OFF in that state, the settings return to the values before the change when the power is turned ON again. Make sure to press the S button to save any setting changes before turning OFF the power.



## Series PFM

# Specific Product Precautions 4

Be sure to read this before handling.

Refer to the back of page 1 for Safety Instructions and “Precautions for Handling Pneumatic Devices” (M-03-E3A) for Common Precautions.

### Settable Range and Rated Flow Range

## Caution

**Set the flow rate within the rated flow range.**

The regulating flow rate range is the range of flow rate that can be set in the switch.

The rated flow range is the range that satisfies the switch specifications (accuracy, linearity etc.) of the sensor.

It is possible to set a value outside of the rated flow range if it is within the regulating flow rate range, however, the specification is not be guaranteed.

| Sensor           | Flow range |          |         |        |                         |         |                         |          |                         |
|------------------|------------|----------|---------|--------|-------------------------|---------|-------------------------|----------|-------------------------|
|                  | 0.2ℓ/min   | 0.5ℓ/min | 1ℓ/min  | 2ℓ/min | 10ℓ/min                 | 25ℓ/min | 50ℓ/min                 | 100ℓ/min |                         |
| PFM710<br>PFM510 | 0.2 ℓ/min  |          |         |        | 10 ℓ/min (5 ℓ/min)      |         |                         |          |                         |
|                  | 0.2 ℓ/min  |          |         |        | 10.5 ℓ/min (5.2 ℓ/min)  |         |                         |          |                         |
|                  |            |          |         |        | 10.5 ℓ/min (5.2 ℓ/min)  |         |                         |          |                         |
|                  | 0          |          |         |        |                         |         |                         |          |                         |
| PFM725<br>PFM525 | 0.5 ℓ/min  |          |         |        | 25 ℓ/min (12.5 ℓ/min)   |         |                         |          |                         |
|                  | 0.5 ℓ/min  |          |         |        | 26.3 ℓ/min (13.1 ℓ/min) |         |                         |          |                         |
|                  |            |          |         |        | 26.3 ℓ/min (13.1 ℓ/min) |         |                         |          |                         |
|                  | 0          |          |         |        |                         |         |                         |          |                         |
| PFM750<br>PFM550 |            | 1 ℓ/min  |         |        |                         |         | 50 ℓ/min (25 ℓ/min)     |          |                         |
|                  |            | 1 ℓ/min  |         |        |                         |         | 52.5 ℓ/min (26.2 ℓ/min) |          |                         |
|                  |            |          |         |        |                         |         | 52.5 ℓ/min (26.2 ℓ/min) |          |                         |
|                  | 0          |          |         |        |                         |         |                         |          |                         |
| PFM711<br>PFM511 |            |          | 2 ℓ/min |        |                         |         |                         |          | 100 ℓ/min<br>(50 ℓ/min) |
|                  |            |          | 2 ℓ/min |        |                         |         |                         |          | 105 ℓ/min<br>(52 ℓ/min) |
|                  |            |          |         |        |                         |         |                         |          | 105 ℓ/min<br>(52 ℓ/min) |
|                  | 0          |          |         |        |                         |         |                         |          |                         |

- Rated flow range
- Displayable range
- Settable range

In the case of the PFM5 series, the displayable and settable ranges are the same as the PFM3 series flow monitor.






**EUROPEAN SUBSIDIARIES:**

**Austria**

SMC Pneumatik GmbH (Austria).  
Girakstrasse 8, A-2100 Korneuburg  
Phone: +43 2262-62280, Fax: +43 2262-62285  
E-mail: office@smc.at  
http://www.smc.at


**France**

SMC Pneumatique, S.A.  
1, Boulevard de Strasbourg, Parc Gustave Eiffel  
Bussy Saint Georges F-77607 Mame La Vallée Cedex 3  
Phone: +33 (0)1-6476 1000, Fax: +33 (0)1-6476 1010  
E-mail: contact@smc-france.fr  
http://www.smc-france.fr


**Netherlands**

SMC Pneumatics BV  
De Ruyterkade 120, NL-1011 AB Amsterdam  
Phone: +31 (0)20-5318888, Fax: +31 (0)20-5318880  
E-mail: info@smcpneumatics.nl  
http://www.smcpneumatics.nl


**Spain**

SMC España, S.A.  
Zuazobidea 14, 01015 Vitoria  
Phone: +34 945-184 100, Fax: +34 945-184 124  
E-mail: post@smc.smces.es  
http://www.smces.es


**Belgium**

SMC Pneumatics N.V./S.A.  
Nijverheidsstraat 20, B-2160 Wommelgem  
Phone: +32 (0)3-355-1464, Fax: +32 (0)3-355-1466  
E-mail: post@smcpneumatics.be  
http://www.smcpneumatics.be


**Germany**

SMC Pneumatik GmbH  
Boschring 13-15, D-63329 Egelsbach  
Phone: +49 (0)6103-4020, Fax: +49 (0)6103-402139  
E-mail: info@smc-pneumatik.de  
http://www.smc-pneumatik.de


**Norway**

SMC Pneumatics Norway A/S  
Vollsveien 13 C, Granfos Næringspark N-1366 Lysaker  
Tel: +47 67 12 90 20, Fax: +47 67 12 90 21  
E-mail: post@smc-norge.no  
http://www.smc-norge.no


**Sweden**

SMC Pneumatics Sweden AB  
Ekhagsvägen 29-31, S-141 71 Huddinge  
Phone: +46 (0)8-603 12 00, Fax: +46 (0)8-603 12 90  
E-mail: post@smcpneumatics.se  
http://www.smc.nu


**Bulgaria**

SMC Industrial Automation Bulgaria EOOD  
16 Kliment Ohridski Blvd., fl.13 BG-1756 Sofia  
Phone: +359 2 9744492, Fax: +359 2 9744519  
E-mail: office@smc.bg  
http://www.smc.bg


**Greece**

SMC Hellas EPE  
Anagniniseos 7-9 - P.C. 14342, N. Philadelphia, Athens  
Phone: +30-210-2717265, Fax: +30-210-2717766  
E-mail: sales@smchellas.gr  
http://www.smchellas.gr


**Poland**

SMC Industrial Automation Polska Sp.z.o.o.  
ul. Poloneza 89, PL-02-826 Warszawa,  
Phone: +48 22 211 9600, Fax: +48 22 211 9617  
E-mail: office@smc.pl  
http://www.smc.pl


**Switzerland**

SMC Pneumatik AG  
Dorfstrasse 7, CH-8484 Weisslingen  
Phone: +41 (0)52-396-3131, Fax: +41 (0)52-396-3191  
E-mail: info@smc.ch  
http://www.smc.ch


**Croatia**

SMC Industrijska automatika d.o.o.  
Crmomerc 12, 10000 ZAGREB  
Phone: +385 1 377 66 74, Fax: +385 1 377 66 74  
E-mail: office@smc.hr  
http://www.smc.hr


**Hungary**

SMC Hungary Ipari Automatizálási Kft.  
Budafoki út 107-113, H-1117 Budapest  
Phone: +36 1 371 1343, Fax: +36 1 371 1344  
E-mail: office@smc.hu  
http://www.smc.hu


**Portugal**

SMC Sucursal Portugal, S.A.  
Rua de Engº Ferreira Dias 452, 4100-246 Porto  
Phone: +351 22-610-89-22, Fax: +351 22-610-89-36  
E-mail: postpt@smc.smces.es  
http://www.smces.es


**Turkey**

Entek Pnömatik San. ve Tic. A\*.  
Perpa Ticaret Merkezi B Blok Kat:11 No: 1625, TR-34386, Okmeydanı, İstanbul  
Phone: +90 (0)212-444-0762, Fax: +90 (0)212-221-1519  
E-mail: smc@entek.com.tr  
http://www.entek.com.tr


**Czech Republic**

SMC Industrial Automation CZ s.r.o.  
Hudcova 78a, CZ-61200 Brno  
Phone: +420 5 414 24611, Fax: +420 5 412 18034  
E-mail: office@smc.cz  
http://www.smc.cz


**Ireland**

SMC Pneumatics (Ireland) Ltd.  
2002 Citywest Business Campus, Naas Road, Saggart, Co. Dublin  
Phone: +353 (0)1-403 9000, Fax: +353 (0)1-464-0500  
E-mail: sales@smcpneumatics.ie  
http://www.smcpneumatics.ie


**Romania**

SMC Romania srl  
Str Frunzei 29, Sector 2, Bucharest  
Phone: +40 213205111, Fax: +40 213261489  
E-mail: smcromania@smcromania.ro  
http://www.smcromania.ro


**UK**

SMC Pneumatics (UK) Ltd  
Vincent Avenue, Crownhill, Milton Keynes, MK8 0AN  
Phone: +44 (0)800 1382930 Fax: +44 (0)1908-555064  
E-mail: sales@smcpneumatics.co.uk  
http://www.smcpneumatics.co.uk


**Denmark**

SMC Pneumatik A/S  
Knudsminde 4B, DK-8300 Odder  
Phone: +45 70252900, Fax: +45 70252901  
E-mail: smc@smc-pneumatik.dk  
http://www.smc.dk.com


**Italy**

SMC Italia S.p.A  
Via Garibaldi 62, I-20061 Carugate, (Milano)  
Phone: +39 (0)2-92711, Fax: +39 (0)2-9271365  
E-mail: mailbox@smcitalia.it  
http://www.smcitalia.it


**Russia**

SMC Pneumatik LLC.  
4B Sverdlovskaja nab. St. Petersburg 195009  
Phone: +7 812 718 5445, Fax: +7 812 718 5449  
E-mail: info@smc-pneumatik.ru  
http://www.smc-pneumatik.ru


**Estonia**

SMC Pneumatics Estonia OÜ  
Laki 12, 106 21 Tallinn  
Phone: +372 6510370, Fax: +372 65110371  
E-mail: smc@smcpneumatics.ee  
http://www.smcpneumatics.ee


**Latvia**

SMC Pneumatics Latvia SIA  
Smerla 1-705, Riga LV-1006  
Phone: +371 781-77-00, Fax: +371 781-77-01  
E-mail: info@smclv.lv  
http://www.smclv.lv


**Slovakia**

SMC Priemyselná Automatizácia, s.r.o.  
Námestie Matina Benku 10, SK-81107 Bratislava  
Phone: +421 2 444 56725, Fax: +421 2 444 56028  
E-mail: office@smc.sk  
http://www.smc.sk


**Finland**

SMC Pneumatics Finland Oy  
PL72, Tiistinniityntie 4, SF-02231 ESPOO  
Phone: +358 207 513513, Fax: +358 207 513595  
E-mail: smcfin@smc.fi  
http://www.smc.fi


**Lithuania**

SMC Pneumatics Lietuva, UAB  
Oslo g.1, LT-04123 Vilnius  
Phone: +370 5 264 81 26, Fax: +370 5 264 81 26


**Slovenia**

SMC industrijska Avtomatika d.o.o.  
Mirnska cesta 7, SLO-8210 Trebnje  
Phone: +386 7 3885412 Fax: +386 7 3885435  
E-mail: office@smc.si  
http://www.smc.si


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