Wide range of flow measurement with one product

Flow ratio: $100:1$

<table>
<thead>
<tr>
<th>Port size</th>
<th>0.1</th>
<th>0.3</th>
<th>0.5</th>
<th>1</th>
<th>10</th>
<th>25</th>
<th>50</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>PF2M710 C6</td>
<td>0.1</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PF2M725 C6</td>
<td>0.3</td>
<td>0.3</td>
<td></td>
<td></td>
<td>25</td>
<td></td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>PF2M750 C6</td>
<td>0.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>PF2M711 C8</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Smallest settable increment: 0.01 L/min (0.1 L/min for the flow ranges of 25, 50, 100 L/min)

Improved drainage and resistance to foreign matter

Bypass construction reduces the moist air or foreign matter in contact with the sensor, reducing the accuracy deterioration and damage of the sensor.

Low current consumption: 35 mA or less

* PF2M7: 55 mA or less

Compact, Lightweight

Weight: 27.3% reduction (55 g → 40 g)

PF2M7 Series

Applicable fluid: Dry air, N₂, Ar, CO₂

New RoHS
Reversible display mode
When the product is used upside down, the orientation of the display can be rotated to make it easier to read.

Flow adjustment valve is integrated.
- Space-saving design
- Reduced piping labor

Piping variations
(Straight)

Mounting variations

Analog free span function
The analog span point (5 V (10 V), 20 mA) can be changed within the rated pressure range of 10 to 105% with respect to the displayed value.

Application example
When it is required to output 5 V from the flow switch at 75 L/min, using a sensor that outputs 1 to 5 V at 1 to 100 L/min.

Selectable analog output function
1 to 5 V or 0 to 10 V can be selected.

Display OFF mode
Unnecessary LEDs can be turned off and checked only when necessary. Can be used as a remote sensor.

Delay time setting
Can be set between 0 and 60 s
The delay time can be set according to the application.

Grease-free

Functions
- Output operation
- Forced output
- Analog free span
- Display color
- Selection of display OFF mode
- Selectable analog output
- Reference condition
- Peak/Bottom value display
- Reversible display
- Digital filter setting

Key lock
Reset to the default settings
Delay time setting
Error display
Setting of security code
Display mode
Display with zero cut-off setting
Accumulated value hold
Simple setting
Zero clear
Digital flow switch to save energy!

Flow control is necessary for promoting energy saving in any application. Saving energy starts from numerical control of the flow consumption of equipment and lines and clarification of the purpose and effect.

Digital display allows visualization of flow rate.
2-color display, Improved visibility

Can be selected according to the fluid used

Recommended pneumatic circuit examples

Applications

Control of metal wire tension

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

Welding machine
Models compatible with argon (Ar) and carbon dioxide (CO2) mixed gas are available.
* Please contact SMC for details.

Suction verification

Nitrogen (N2)
Carbon dioxide (CO2)
Argon (Ar)

*IN*
*OUT*
Detection camera

Accumulated indication shows the operating flow rate or residual amount (of N2, etc.) in a gas cylinder.
### Flow Switch Flow Rate Variations

<table>
<thead>
<tr>
<th>Series</th>
<th>Applicable fluid</th>
<th>Detection method</th>
<th>Rated flow range [L/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PFMV</strong></td>
<td>Dry air N₂</td>
<td>Thermal type (MEMS)</td>
<td></td>
</tr>
<tr>
<td><strong>PF2M7</strong></td>
<td>Dry air N₂ Ar CO₂</td>
<td>Thermal type (MEMS)</td>
<td>0.01 L/min</td>
</tr>
<tr>
<td><strong>PFMB</strong></td>
<td>Dry air N₂</td>
<td>Thermal type (MEMS)</td>
<td>Bypass flow type</td>
</tr>
<tr>
<td><strong>PFMC</strong></td>
<td>Dry air N₂</td>
<td>Thermal type (MEMS)</td>
<td>Bypass flow type</td>
</tr>
<tr>
<td><strong>PF2A</strong></td>
<td>Air N₂</td>
<td>Thermal type (Thermistor)</td>
<td>0.1 L/min</td>
</tr>
<tr>
<td><strong>PF3A7□H</strong></td>
<td>Air N₂</td>
<td>Thermal type (Platinum sensor)</td>
<td>Bypass flow type</td>
</tr>
</tbody>
</table>

**Availability of the digital flow monitor PFG300**

- **PFMV**
- **PF2M7**
- **PFMB**
- **PFMC**
- **PF2A**
- **PF3A7□H**

**Flow Switch Flow Rate Variations**

- **PFMV**
- **PF2M7**
- **PFMB**
- **PFMC**
- **PF2A**
- **PF3A7□H**
## Flow Switch Variations / Basic Performance Table

<table>
<thead>
<tr>
<th>Series</th>
<th>Fluid</th>
<th>Setting</th>
<th>Rated flow range</th>
<th>Power supply voltage</th>
<th>Temperature characteristics (°C)</th>
<th>Hysteresis</th>
<th>Repeatability</th>
<th>Output</th>
<th>Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFMV</td>
<td>Dry air, N₂, Ar, CO₂</td>
<td>Digital</td>
<td>0.1 to 10 L/min, 0.3 to 25 L/min, 0.5 to 50 L/min, 1 to 100 L/min</td>
<td>12 to 24 VDC ±10%</td>
<td>±2% F.S. (15 to 35°C) ±5% F.S. (0 to 50°C)</td>
<td>Hysteresis mode: Variable Window comparator mode: Variable</td>
<td>±1% F.S. ±1 digit (Fluid: Dry air)</td>
<td>NPN/PNP open collector Analog output</td>
<td>2-color LCD display</td>
</tr>
<tr>
<td>PF2M7</td>
<td>Dry air, N₂</td>
<td>Digital</td>
<td>2 to 200 L/min</td>
<td>12 to 24 VDC ±10%</td>
<td>±3% F.S. ±1 digit (15 to 35°C) ±5% F.S. ±1 digit (0 to 50°C)</td>
<td>Hysteresis mode: Variable Window comparator mode: Variable</td>
<td>±1% F.S. (Fluid: Dry air)</td>
<td>NPN/PNP open collector Analog output</td>
<td>2-color LCD display</td>
</tr>
<tr>
<td>PFMB</td>
<td>Dry air, N₂</td>
<td>Digital</td>
<td>5 to 500 L/min, 10 to 1000 L/min, 20 to 2000 L/min</td>
<td>12 to 24 VDC ±10%</td>
<td>±2% F.S. (15 to 35°C) ±5% F.S. (0 to 50°C)</td>
<td>Hysteresis mode: Variable Window comparator mode: Variable</td>
<td>±1% F.S. (Fluid: Dry air)</td>
<td>NPN/PNP open collector Analog output</td>
<td>2-color LCD display</td>
</tr>
<tr>
<td>PFMC</td>
<td>Air, N₂</td>
<td>Digital</td>
<td>1 to 10 L/min, 5 to 50 L/min, 10 to 100 L/min, 20 to 200 L/min, 50 to 500 L/min</td>
<td>12 to 24 VDC ±10%</td>
<td>±3% F.S. (15 to 35°C) ±5% F.S. (0 to 50°C)</td>
<td>Hysteresis mode: Variable Window comparator mode: Variable</td>
<td>±1% F.S. (Fluid: Dry air)</td>
<td>NPN/PNP open collector Analog output</td>
<td>2-color LCD display</td>
</tr>
<tr>
<td>PF2A</td>
<td>Air, N₂</td>
<td>Digital</td>
<td>30 to 3000 L/min, 60 to 6000 L/min, 120 to 12000 L/min</td>
<td>24 VDC ±10%</td>
<td>±5% F.S. (0 to 50°C)</td>
<td>Hysteresis mode: Variable Window comparator mode: Variable</td>
<td>±1% F.S. (Fluid: Dry air)</td>
<td>NPN/PNP open collector Analog output</td>
<td>2-color LCD display</td>
</tr>
<tr>
<td>PF3A7H</td>
<td>N₂, Ar, CO₂</td>
<td>Digital</td>
<td>1 to 10 L/min, 5 to 50 L/min, 10 to 100 L/min, 20 to 200 L/min, 50 to 500 L/min</td>
<td>12 to 24 VDC ±10%</td>
<td>±1% F.S. (Fluid: Dry air)</td>
<td>Hysteresis mode: Variable Window comparator mode: Variable</td>
<td>±1% F.S. (Fluid: Dry air)</td>
<td>NPN/PNP open collector Analog output</td>
<td>2-color LCD display</td>
</tr>
</tbody>
</table>

* The monitor unit shows the PFG300 and PFMV3.
CONTENTS

2-Color Display Digital Flow Switch PF2M7 Series

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Pressure Loss (Reference Data): Without Flow Adjustment Valve .......... p. 8
Flow Rate Characteristics (Reference Data) ................................ p. 9
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2-Color Display
Digital Flow Switch
PF2M7 Series

How to Order

**PF2M7**
- **Type**
  - 7: Integrated display

**Rated flow range**
- 10: 0.1 to 10 L/min
- 25: 0.3 to 25 L/min
- 50: 0.5 to 50 L/min
- 11: 1 to 100 L/min

**Flow adjustment valve**
- Nil: None
- S: Yes

**Port size**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>C6</th>
<th>C8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated flow range</td>
<td>Ø6</td>
<td>Ø8</td>
</tr>
</tbody>
</table>

**Output specification**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>OUT1</th>
<th>OUT2</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>NPN</td>
<td>NPN</td>
</tr>
<tr>
<td>B</td>
<td>NPN</td>
<td>PNP</td>
</tr>
<tr>
<td>C</td>
<td>Analog 1 to 5 V ⇔ Analog 0 to 10 V</td>
<td>Analog 0 to 10 V</td>
</tr>
<tr>
<td>D</td>
<td>Analog 1 to 5 V</td>
<td>Analog 0 to 10 V</td>
</tr>
<tr>
<td>E</td>
<td>Analog 1 to 5 V</td>
<td>Analog 0 to 10 V</td>
</tr>
<tr>
<td>F</td>
<td>Analog 4 to 20 mA</td>
<td>Analog 4 to 20 mA</td>
</tr>
</tbody>
</table>

* +1 1 to 5 V or 0 to 10 V can be selected by pressing the button. The default setting is 1 to 5 V.
* +2 Fixed unit: Instantaneous flow: L/min
  Accumulated flow: L
* +3 This product is for overseas use only according to the New Measurement Act. (The SI unit type is provided for use in Japan.)
  Unit can be changed. Instantaneous flow: L/min ⇔ cfm
  Accumulated flow: L ⇔ R³

**Option 1**

- **Lead wire with connector (2 m)**
  - ZS-33-D
  - ZS-33-F
  - ZS-33-D

* + Interchangeable with the existing PFM series

- **Without lead wire with connector**
  - Nil

**Option 2**

- **Bracket (For without flow adjustment valve)**
  - ZS-33-M
  - With 2 tapping screws
  - Interchangeable with the existing PFM series

- **Bracket (For with flow adjustment valve)**
  - ZS-33-MS
  - With 3 tapping screws
  - Interchangeable with the existing PFM series

**DIN Rail Mounting Bracket (Ordered Separately)**

<table>
<thead>
<tr>
<th>Stations</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZS – 33 – R</td>
<td>1 station</td>
<td>2 stations</td>
<td>3 stations</td>
<td>4 stations</td>
<td>5 stations</td>
</tr>
</tbody>
</table>

* + Interchangeable with the existing PFM series

- DIN rail is prepared by customer.
## PF2M7 Series Specifications

**Analog Weight**
- PPS, PBT, FKM, Stainless steel 304, Brass (Electroless nickel plating), Si, Au, GE4F

**Flow**
- **Rated flow range**
  - Dry air, N2, Ar: 0.1 to 10 L/min, 0.3 to 25 L/min, 0.5 to 50 L/min, 1 to 100 L/min
  - CO2: 0.1 to 5 L/min, 0.3 to 12.5 L/min, 0.5 to 25 L/min, 1 to 50 L/min

- **Set point range**
  - Instantaneous flow: Accuracy ±5% of the maximum rated flow rate
  - Accumulated flow: 0.0 to 99999999.9 L, ±1% F.S. ±1 digit

- **Accumulated value hold function**
  - Intervals of 2 or 5 minutes can be selected.

**Pressure**
- **Rated pressure range**
  - PPS, PBT, FKM, Stainless steel 304, Brass (Electroless nickel plating), Si, Au, GE4F

**Electrical**
- **Power supply voltage**
  - 12 to 24 VDC ±10%

- **Protection**
  - Polarity protection

- **Display**
  - Analog output accuracy: ±3% F.S.
  - Digital filter: ±3% F.S.

- **Accuracy**
  - Repeatability: ±1% F.S. ±1 digit (±2% F.S. ±1 digit when the digital filter is set to 0.05 s)

- **Temperature characteristics**
  - ±3% F.S. ±1 digit (15 to 35°C; 25°C standard)
  - ±5% F.S. ±1 digit (0 to 50°C; 25°C standard)

**Switch output**
- **Reference condition**
  - Select from Standard condition (STD) or Normal condition (NOR).

- **Display mode**
  - Select from Instantaneous flow or Accumulated flow.

- **Display range**
  - Instantaneous flow: ±2% F.S.
  - Accumulated flow: ±3% F.S.

- **Display**
  - Indicator LED: LED ON when switch output is ON (OUT1/2: Orange)

- **Digital filter**
  - Select from 0.05 s, 0.1 s, 0.5 s, 1 s, 2 s, or 5 s.

**Environmental resistance**
- **Enclosure**
  - IP40

- **Withstand voltage**
  - 1000 VAC for 1 minute

- **Operating temperature range**
  - Operating: 0 to 50°C
  - Stored: −10 to 60°C

**Standards**
- **CE marking** (EMC Directive, RoHS Directive)

**Piping**
- **Piping specification**
  - C6 (6φ) Straight

**Main materials of parts in contact with fluid**
- PPS, PBT, FKM, Stainless steel 304, Brass (Electroless nickel plating), Si, Au, GE4F

**Weight**
- **Body**
  - 40 g
- **Flow adjustment valve**
  - +34 g
- **Lead wire**
  - +35 g
- **Bracket**
  - +20 g
- **Panel mount adapter**
  - +15 g
- **DIN rail mounting bracket**
  - +65 g

---

1. Refer to the “Recommended pneumatic circuit examples” on page 2.
2. When using the accumulated value hold function, use the operating conditions to calculate the product life, and do not exceed it. The maximum access limit of the memory device is 3.7 million times. If the product is operated 24 hours per day, the product life will be as follows:
   - 2 min interval: life is calculated as 2 min x 3.7 million = 7.4 million min = 16 years
   - 5 min interval: life is calculated as 5 min x 3.7 million = 18.5 million min = 40 years
3. Temperature characteristics
4. Negative pressure indicates the pressure value on the IN side (inlet side).
5. Voltage output: 1 to 5 V (0 to 10 V can be selected)
6. Maximum load impedance: 600 Ω
7. Maximum load current: 80 mA
8. Operating/Stored: 35 to 85% RH (No condensation or freezing)
9. DIN rail mounting bracket
10. Operating temperature range
11. Normal condition (NOR): 0 [°C], 101.3 [kPa] (Absolute pressure), 65 [% RH]
12. CE marking (EMC Directive, RoHS Directive)
13. IP40
14. Operating/Stored: 35 to 85% RH (No condensation or freezing)
15. C6 (6φ) Straight
16. Stainless steel 304, Brass (Electroless nickel plating), Si, Au, GE4F
## Flow Range

<table>
<thead>
<tr>
<th>Model</th>
<th>Flow range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>−5 L/min</td>
</tr>
<tr>
<td>PF2M710</td>
<td>0.1 L/min</td>
</tr>
<tr>
<td></td>
<td>−0.5 L/min</td>
</tr>
<tr>
<td></td>
<td>−0.5 L/min</td>
</tr>
<tr>
<td>PF2M725</td>
<td>0.3 L/min</td>
</tr>
<tr>
<td></td>
<td>−1.3 L/min</td>
</tr>
<tr>
<td></td>
<td>−1.3 L/min</td>
</tr>
<tr>
<td>PF2M750</td>
<td>0.5 L/min</td>
</tr>
<tr>
<td></td>
<td>−2.5 L/min</td>
</tr>
<tr>
<td></td>
<td>−2.5 L/min</td>
</tr>
<tr>
<td>PF2M711</td>
<td>1.0 L/min</td>
</tr>
<tr>
<td></td>
<td>−5.5 L/min</td>
</tr>
<tr>
<td></td>
<td>−5.5 L/min</td>
</tr>
</tbody>
</table>

Rated flow range 
Set point range 
Display range

## Flow/Analog Output

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PF2M710/11</td>
<td>PF2M725</td>
<td></td>
</tr>
<tr>
<td>Voltage output (1 to 5 V)</td>
<td>1 V</td>
<td>1.04 V</td>
<td>1.05 V</td>
</tr>
<tr>
<td>Current output (4 to 20 mA)</td>
<td>4 mA</td>
<td>4.16 mA</td>
<td>4.19 mA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage output (0 to 10 V)*1</td>
<td>0 V</td>
<td>0.10 V</td>
<td>0.12 V</td>
</tr>
</tbody>
</table>

*1 The analog output current from the connected equipment should be 20 μA or less when selecting 0 to 10 V. When more than 20 μA current flows, it is possible that the accuracy is not satisfied at less than or equal to 0.5 V. * D or H fluctuates depending on the setting of the zero cut-off function. When the zero cut-off function is set to “0,” the flow rate display value starts from 0 L/min, but in conditions other than horizontal installation and supply pressure of 0.35 MPa, the output may not be 0 L/min.

## Pressure Loss (Reference Data): Without Flow Adjustment Valve

### PF2M710 (10 L/min)

![Pressure Loss Graph](image)

### PF2M725 (25 L/min)

![Pressure Loss Graph](image)

### PF2M750 (50 L/min)

![Pressure Loss Graph](image)

### PF2M711 (100 L/min)

![Pressure Loss Graph](image)
Flow Rate Characteristics (Reference Data)

**PF2M7 Series**

**Flow Rate Characteristics at Negative Pressure (Reference Data)**

When the PF2M series is used with negative pressure (−70 to 0 kPa), the measurable range varies depending on the flow range. Select the flow range referring to the graph below.

**PF2M710 (10 L/min)**

**PF2M725 (25 L/min)**

**PF2M750 (50 L/min)**

**PF2M711 (100 L/min)**
Internal Circuits and Wiring Examples

**NPN + NPN output type**

**PF2M7series-AC**

- Brown DC (+)
- Black OUT1
- White OUT2
- Blue DC (−)

12 to 24 VDC

Max. applied voltage: 28 V, Max. load current: 80 mA, Internal voltage drop: 1 V or less

**NPN + Analog output type**

**PF2M7series-CD**

- Brown DC (+)
- Black OUT1
- White Analog output
- Blue DC (−)

12 to 24 VDC

Max. applied voltage: 28 V, Max. load current: 80 mA, Internal voltage drop: 1 V or less

- **C**: Analog output: 1 to 5 V or 0 to 10 V can be selected.
- **D**: Analog output: 4 to 20 mA
  Load impedance: 50 to 600 Ω

**PNP + PNP output type**

**PF2M7series-B**

- Brown DC (+)
- Black OUT1
- White OUT2
- Blue DC (−)

12 to 24 VDC

Max. load current: 80 mA, Internal voltage drop: 1.5 V or less

**PNP + Analog output type**

**PF2M7series-EF**

- Brown DC (+)
- Black OUT1
- White Analog output
- Blue DC (−)

12 to 24 VDC

Max. load current: 80 mA, Internal voltage drop: 1.5 V or less

- **E**: Analog output: 1 to 5 V or 0 to 10 V can be selected.
- **F**: Analog output: 4 to 20 mA
  Load impedance: 50 to 600 Ω

Accumulated pulse output wiring examples

**NPN + NPN output type**

**PF2M7series-AC**

- Black OUT1
- White OUT2 (PF2M7series-AC only)
- Blue DC (−)

Max. 28 V, 80 mA

- 0 V
- 50 ms
- or
- 50 ms

**NPN + Analog output type**

**PF2M7series-CD**

- Black OUT1
- White OUT2 (PF2M7series-CD only)
- Blue DC (−)

Max. 80 mA

- 0 V
- 50 ms
- or
- 50 ms

**PNP + PNP output type**

**PF2M7series-B**

- Brown DC (+)
- Black OUT1
- White OUT2 (PF2M7series-B only)

Max. 28 V, 80 mA

- 0 V
- 50 ms
- or
- 50 ms

**PNP + Analog output type**

**PF2M7series-EF**

- Brown DC (+)
- Black OUT1
- White OUT2 (PF2M7series-EF only)

Max. 80 mA

- 0 V
- 50 ms
- or
- 50 ms
Construction: Parts in Contact with Fluid

PF2M710/725/750/711

Component Parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body</td>
<td>PPS</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Fitting for piping</td>
<td>Brass Electroless nickel plating</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>O-ring</td>
<td>FKM</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Flow rectifier</td>
<td>Stainless steel 304</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Seal</td>
<td>FKM</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Flow rectifier</td>
<td>Stainless steel 304</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Sensor chip</td>
<td>Silicon</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Body B</td>
<td>PPS</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Printed circuit board</td>
<td>GR4F</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>O-ring</td>
<td>FKM Fluoro coating</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Flow adjustment valve body</td>
<td>PBT</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Body</td>
<td>Brass Electroless nickel plating</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Needle</td>
<td>Brass Electroless nickel plating</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>O-ring</td>
<td>FKM Fluoro coating</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>O-ring</td>
<td>FKM Fluoro coating</td>
<td></td>
</tr>
</tbody>
</table>
2-Color Display Digital Flow Switch PF2M7 Series

Dimensions

PF2M710/25/50-C6

OUT1
DC (–)

2 x ø6 One-touch fitting

OUT2
DC (+)

PF2M711-C8

OUT1
DC (–)

2 x ø8 One-touch fitting

OUT2
DC (+)
PF2M7 Series

Dimensions

PF2M710/25/50S-C6

PF2M711S-C8
Dimensions

**PF2M710/25/50/11**

Panel mount/Without flow adjustment valve/Straight

**Panel Fitting Dimensions**

<table>
<thead>
<tr>
<th>Panel thickness 1 to 3.2 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 x R3 or less</td>
</tr>
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</tr>
</tbody>
</table>

* Port direction: As the piping inlet is straight type, please design the layout with consideration to the tubing and piping materials. If a bend (R) is used, limit it to R3 or less.

**With bracket/Without flow adjustment valve**

**Applicable tubing O.D. for One-touch fittings**

<table>
<thead>
<tr>
<th>Ø6</th>
<th>Ø8</th>
</tr>
</thead>
<tbody>
<tr>
<td>59.9</td>
<td>68</td>
</tr>
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</table>

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</tr>
</thead>
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<tr>
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<td>96</td>
</tr>
</tbody>
</table>

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**PF2M7 Series**

**Dimensions**

PF2M710/25/50/11  
DIN rail mounting

- DIN rail is prepared by customer.

**Lead wire with connector**  
ZS-33-D

**Cable Specifications**

<table>
<thead>
<tr>
<th></th>
<th>Nominal cross section</th>
<th>AWG 26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conductor</td>
<td>Outside diameter</td>
<td>Approx. 0.50 mm</td>
</tr>
<tr>
<td>Insulator</td>
<td>Outside diameter</td>
<td>Approx. 1.00 mm</td>
</tr>
<tr>
<td>Color</td>
<td></td>
<td>Brown, White, Black, Blue</td>
</tr>
<tr>
<td>Sheath Material</td>
<td></td>
<td>Oil-resistant PVC</td>
</tr>
<tr>
<td>Finished outside diameter</td>
<td></td>
<td>ø3.5</td>
</tr>
</tbody>
</table>

* For wiring, refer to the Operation Manual from the SMC website  
  Documents/Download --> Instruction Manuals.
PF2M7 Series
Function Details

■ Output operation
The output operation can be selected from the following:
Output corresponding to instantaneous flow (Hysteresis mode, Window comparator mode)
- Hysteresis mode is the mode where the switch output will turn ON when the flow is greater than the set value, and will turn OFF when the flow falls below the set value by the amount of hysteresis or more.
- Window comparator mode is the mode where an operating mode in which the switch output is turned on and off depending on whether the flow is inside or outside the range of two set values.
Output corresponding to accumulated flow (Accumulated output mode, Accumulated pulse output mode)
- In accumulated output mode, the switch output will start at the set accumulated flow rate value.
- Accumulated pulse output is a pulse signal which is output every time a predefined accumulated flow has passed.
Others (Error output, Switch output OFF)
- The error output function outputs the switch output when an error is displayed.
- The switch output off function turns off the switch output.
* Default setting: Hysteresis mode, Normal output

■ Simple setting mode
Only the set values for instantaneous flow and accumulated flow can be changed. Output mode, output type, display color, and accumulate pulse output cannot be changed.

■ Display color
The display color can be selected for each output condition. The selection of the display color provides visual identification of abnormal values.

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

■ Reference condition
The display unit can be selected from standard condition or normal condition.
Standard condition: Flow rate converted to a volume at 20°C, 101.3 kPa (absolute pressure), and 65% RH
Normal condition: Flow rate converted to a volume at 0°C, 101.3 kPa (absolute pressure), and 0% RH

■ Delay time setting
The time from when the instantaneous flow reaches the set value to when the switch output operates can be set. Setting the delay time can prevent the switch output from chattering.
The total switching time is the switch operation time and the set delay time.
(Default setting: 0 s)

■ Digital filter setting
The time for the digital filter can be set to the sensor input. Setting the digital filter can reduce chattering of the switch output and flickering of the analog output and the display.
The response time indicates when the set value is 90% in relation to the step input.
(Default setting: 1 s)

■ Selectable analog output function
1 to 5 V or 0 to 10 V can be selected for the analog voltage output type.
(Default setting: 1 to 5 V)

■ Forced output function
The output is turned on/off in a fixed state when starting the system or during maintenance. This enables the confirmation of wiring and prevents system errors due to unexpected output.
For the analog output type: When ON, the output will be 5 V (or 10 V when 0 to 10 V is selected) or 20 mA, and when OFF, 1 V (or 0 V when 0 to 10 V is selected) or 4 mA.
* Also, an increase or decrease of the flow will not change the on/off status of the output while the forced output function is activated.

■ Accumulated value hold
The accumulated value will be stored even if the power supply is turned off. The accumulated value is memorized every 2 or 5 minutes during measurement and continues from the last memorized value when the power supply is turned on again.
The maximum writable limit of the memory device is 3.7 million times, which should be taken into consideration.

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

■ Display OFF mode
This function will turn the display OFF. In this mode, “_ _ _” will flash on the main screen. If any button is pressed during this mode, the display reverts to normal for 30 seconds to allow checking of the flow, etc.

■ Setting of security code
The user can select whether a security code must be entered to re-leas the key lock. At the time of factory shipment, it is set so that a security code is not required.

■ Key-lock function
Prevents operation errors such as accidentally changing setting values

■ Reset to the default settings
The product can be returned to its factory default settings.

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

■ Zero cut-off function
When the flow is close to 0 L/min, the product will round the value down and zero will be displayed. A flow value may be displayed even when the flow rate is 0 L/min due to high pressure or depending on the installation. The zero cut-off function will force the display to zero.

■ Zero-clear function
The measured flow rate indication can be adjusted to zero.
The adjustment range is ±5% F.S. of the initial factory setting.

For setting of functions and operation method, refer to the Operation Manual from the SMC website Documents/Download --> Instruction Manuals.
**Analog free span function**

This function allows a flow that generates an output of 5 V (or 10 V when 0 to 10 V is selected) or 20 mA to be changed. The value can be changed between 10% of the maximum value of the rated flow and the maximum value of the display range.

---

**Error display function**

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

<table>
<thead>
<tr>
<th>Display</th>
<th>Error name</th>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Er 1</td>
<td>OUT1 over current</td>
<td>The switch output (OUT1) load current of 80 mA or more flows.</td>
<td>Turn the power OFF and remove the cause of the over current. Then turn the power ON again.</td>
</tr>
<tr>
<td>Er 2</td>
<td>OUT2 over current</td>
<td>The switch output (OUT2) load current of 80 mA or more flows.</td>
<td>Decrease the flow rate.</td>
</tr>
<tr>
<td>RH</td>
<td>Instantaneous flow</td>
<td>The flow has exceeded the upper limit of the flow display range.</td>
<td>Change the flow to the correct direction.</td>
</tr>
<tr>
<td>.9999</td>
<td>Accumulated flow</td>
<td>The accumulated flow has exceeded the accumulated flow range. (For accumulated increment) (The decimal point position varies depending on the flow range or measurement unit setting.)</td>
<td>Reset the accumulated flow. (Press the SET and DOWN buttons simultaneously for 1 second or longer.)</td>
</tr>
<tr>
<td>.0 :</td>
<td>Accumulated flow</td>
<td>The accumulated flow has reached the set accumulated flow value. (For accumulated decrement) (The decimal point position varies depending on the flow range or measurement unit setting.)</td>
<td></td>
</tr>
<tr>
<td>Er 3</td>
<td>Outside of zero-clear range</td>
<td>During zero-clear operation, the flow rate of ±5% F.S. or more is applied. (The mode is returned to measurement mode after 1 second.)</td>
<td>Retry the zero-clear operation without applying fluid.</td>
</tr>
<tr>
<td>Er 0</td>
<td>System error</td>
<td>An internal data error has occurred.</td>
<td>Turn the power OFF and turn it ON again.</td>
</tr>
</tbody>
</table>

*1 A decimal point will be displayed depending on the flow range or measurement unit setting.

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

**Unit display function**

The unit displayed on the screen differs depending on the unit setting in measurement mode.

<table>
<thead>
<tr>
<th>Display</th>
<th>Standard condition (STD)</th>
<th>Instantaneous flow unit L/min</th>
<th>Accumulated flow unit L</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>At the upper right of the display, the index [x10]{sup 2} or [x10]{sup 3} will turn on based on the accumulated flow.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Normal condition (nor)</th>
<th>Instantaneous flow unit CFM</th>
<th>Accumulated flow unit ft³</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>At the upper right of the display, the index [x10]{sup 2} or [x10]{sup 3} will turn on based on the accumulated flow.</td>
</tr>
</tbody>
</table>
### Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “Caution,” “Warning” or “Danger.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)\(^1\), and other safety regulations.

- **Caution:** Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
- **Warning:** Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
- **Danger:** Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

### Caution

1. **The product is provided for use in manufacturing industries.**
   - The product herein described is basically provided for peaceful use in manufacturing industries. If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.
   - If anything is unclear, contact your nearest sales branch.

### Caution

2. **Installation on equipment in conjunction with atomic energy, railways, air transportation, dangerous sources of radiation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press machines, etc., may not be used.**
   - Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.
   - This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

### Caution

3. **Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.**
   - Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

### Warning

1. **The compatibility of the product is the responsibility of the person who designs the equipment or decides its specifications.**
   - Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

### Warning

2. **Only personnel with appropriate training should operate machinery and equipment.**
   - The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

### Warning

3. **Do not service or attempt to remove product and machinery/equipment until safety is confirmed.**
   - 1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runaway of the driven objects have been confirmed.
   - 2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
   - 3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

### Caution

4. **Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.**
   - 1. Conditions and environments outside of the given specifications, or use outdoors or in a place exposed to direct sunlight.
   - 2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
   - 3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
   - 4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

### Limited warranty and Disclaimer

**Limited warranty and Disclaimer/Compliance Requirements**

1. **The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”,** read and accept them before using the product.

### Limited warranty and Disclaimer

1. **The warranty period of the product is 1 year in service or 1.5 years after the product is delivered, whichever is first.**
   - Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

### Compliance Requirements

1. **The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.**
2. **The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.**

### Caution

**SMC products are not intended for use as instruments for legal metrology.**

Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country. Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

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\(^1\) ISO 4414: Pneumatic fluid power – General rules relating to systems.  
ISO 4413: Hydraulic fluid power – General rules relating to systems.  
IEC 60204-1: Safety of machinery – Electrical equipment of machines.  
(Part 1: General requirements)  
ISO 10218-1: Manipulating industrial robots – Safety. etc.