2-Color Display

Digital Flow Switch

Applicable fluid: Dry air, N2

Wide range of flow measurement with one product

Flow ratio: **100 : 1**

*1 Rated flow ratio is 10 : 1 for the current PF2A.

Smallest settable increment: **1 L/min**

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

Wide range of flow measurement with one product

<table>
<thead>
<tr>
<th>Rated flow range [L/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2</td>
</tr>
<tr>
<td>----</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>5</td>
</tr>
</tbody>
</table>

Rated flow range is 10 : 1 for the current PF2A.

Smallest settable increment: **1 L/min**

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

Compact, Space saving

Compared with the current PF2A

Weight: Approx. **76% reduction**

Mounting space: Approx. **81% reduction**

Compared with the current PF2A

Weight: Approx. **66% reduction**

Mounting space: Approx. **67% reduction**

Digital Flow Monitor

Allows for the monitoring of remote lines

PFG300 Series

**New**

3-Screen Display

RoHS (Only 200 L type)

Digital Flow Switch

PFMB Series

PFMB

PF2A series

(PFMB7201 and PF2A721-03)

29 mm shorter

44

61

46 mm shorter

116

70

73

45.2

30

4

46 mm shorter

116

70

73

27.8 mm shorter

CAT.ES100-95C
PFMB Series
2-Color Display Digital Flow Switch

Flow adjustment valve is integrated.

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

Flow adjustment valve

500 L/1000 L/2000 L type

Response time
Can be selected from
50 ms (0.05 s)/0.1 s/0.5 s/1.0 s/2.0 s
Response time can be set depending on application.

Grease-free

Piping variations

200 L type

Straight
One-touch fitting ø8
Female thread Rc, NPT, G 1/4

Bottom
One-touch fitting ø8
Female thread Rc, NPT, G 1/4

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

When display is upside down:

With a reversible display function
(Can be set with the reversible display mode.)

With a reversible display function

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

Functions
(Refer to pages 30 and 31 for details.)

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

* For the straight section of piping, refer to “IN Side Straight Piping Length and Accuracy” on page 12.

PFMB700-00-4-0-1-M

IN
OUT
IN
OUT
IN
OUT
IN
OUT
IN
OUT
IN
OUT
IN
OUT
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
- Remote control is possible with accumulated pulse.

### Applications
- Control of purge air flow of ionizer
- Flow control of the air for spray painting
- Flow control of N₂ gas to prevent lead frame oxidation
- N₂ blow prevents distortion of camera image due to air turbulence.

The product is not designed to be explosion proof.

### Mounting

#### 200 L type
Through-hole  
DIN rail  
Bracket  
Panel mount

#### 500 L/1000 L/2000 L type
Bracket

### Example of recommended pneumatic circuit
Air quality in the product specification can be satisfied by using this pneumatic circuit.

Compressed air line
- Air dryer  
  IDF  
  IDU  
- Air filter  
  AF  
- Regulator  
  AR  
- Micro mist separator  
  AMD  
  AFD  
- Flow switch  
  PFMB
The sub screen (label) shows the item to be set. It is possible to change the settings while checking the measured value.

When the S button is pressed and the set value (P_1) is being displayed, the set value (threshold value) can be set. When the S button is pressed and the hysteresis (H_1) is being displayed, the hysteresis value can be set.

Visualization of Settings

The sub screen (label) shows the item to be set.

Current model

Switches between displays

Normal output/Lo side

Set value (Threshold value)

Normal output/Hi side

Set value (Threshold value)

Push

Push

Push

Use the or button to adjust to the set value.

Setting complete

Setting complete

Release the buttons after “—” is displayed on the right side sub screen.

Simple 3-Step Setting

When the S button is pressed and the set value (P_1) is being displayed, the set value (threshold value) can be set. When the S button is pressed and the hysteresis (H_1) is being displayed, the hysteresis value can be set.

Visualization of Settings

The sub screen (label) shows the item to be set.

Current model

Switches between displays

Normal output/Lo side

Set value (Threshold value)

Normal output/Hi side

Set value (Threshold value)

Push

Push

Push

Use the or button to adjust to the set value.

Setting complete

Setting complete

Release the buttons after “—” is displayed on the right side sub screen.

With a snap shot function for set value reading

Pressing the and buttons simultaneously for a minimum of 1 second will make the set value (threshold value) the same as the current flow value.

Snap shot function

The sub screen can be switched by pressing the up/down buttons.

Accumulated flow

Set value (Threshold value)

Hysteresis value

Bottom value

Peak value

* Either “Input of line name” or “Display OFF” can be added via the function settings.
NPN/PNP Switch Function

The number of stock items can be reduced.

![NPN/PNP Switch Function](image)

Analog output of 0 to 10 V is also available.

<table>
<thead>
<tr>
<th>Voltage output</th>
<th>1 to 5 V</th>
<th>Switchable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current output</td>
<td>4 to 20 mA</td>
<td>Fixed</td>
</tr>
</tbody>
</table>

Convenient Functions

- **Copy function**
  The settings of the master monitor can be copied to the slave monitors.

- **Security code**
  The key locking function keeps unauthorized persons from tampering with the settings.

- **Power saving mode**
  Power consumption is reduced by turning off the monitor.

<table>
<thead>
<tr>
<th>Current consumption&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Reduction rate&lt;sup&gt;2&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 mA or less</td>
<td>Approx. 50% reduction</td>
</tr>
</tbody>
</table>

<sup>1</sup> During normal operation
<sup>2</sup> In power saving mode

- **External input function**
  The accumulated value, peak value, and bottom value can be reset remotely.

Compact & Lightweight

- **Compact**: Max. 6 mm shorter
- **Lightweight**: Max. 5 g lighter (30 g → 25 g)

Functions

- **Output operation**
- **Simple setting mode**
- **Display color**
- **Delay time setting**
- **Digital filter setting**
- **FUNC output switching function**
- **Selectable analog output function**
- **External input function**
- **Forced output function**
- **Accumulated value hold**
- **Peak/Bottom value display**
- **Setting of security code**
- **Keylock function**
- **Reset to the default settings**
- **Error display function**
- **Copy function**
- **Selection of power saving mode**
- **Selection of display on sub screen**
- **Analog output free range function**
- **Digital filter setting**
- **Accumulated value hold**
- **Peak/Bottom value display**
- **Setting of security code**
- **Error display function**
- **Copy function**
- **Selection of power saving mode**

Mounting

The bracket configuration allows for mounting in four orientations.

<table>
<thead>
<tr>
<th>Bracket A</th>
<th>Panel mount</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Bracket A" /></td>
<td><img src="image" alt="Panel mount" /></td>
</tr>
</tbody>
</table>

**One opening!**

- Reduced panel fitting labor
- Space saving

Digital Flow Monitor PFG300 Series
## 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>0.2 0.5 1 2 5 10 20 25 50 100 1000 2000 3000 6000 12000</td>
</tr>
</tbody>
</table>

<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>PFM</strong></td>
<td>Dry air, N₂, Ar, CO₂</td>
<td>Thermal type (MEMS)</td>
<td>0.01 L/min 0.1 L/min 0.5 L/min 1 L/min 2 L/min 5 L/min 10 L/min 20 L/min 50 L/min 100 L/min 200 L/min 500 L/min 1000 L/min 2000 L/min 3000 L/min 6000 L/min 12000 L/min</td>
</tr>
</tbody>
</table>

<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>PFMB</strong></td>
<td>Dry air, N₂</td>
<td>Thermal type (MEMS)</td>
<td>1 L/min</td>
</tr>
</tbody>
</table>

<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>PFMC</strong></td>
<td>Dry air, N₂</td>
<td>Thermal type (MEMS)</td>
<td></td>
</tr>
</tbody>
</table>

<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>PF2A</strong></td>
<td>Air, N₂</td>
<td>Thermal type (Thermistor)</td>
<td>0.1 L/min 0.5 L/min 1 L/min 2 L/min 5 L/min</td>
</tr>
</tbody>
</table>

<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>PF3A7H</strong></td>
<td>Air, N₂</td>
<td>Thermal type (Platinum sensor)</td>
<td>2 L/min 5 L/min 10 L/min 30 L/min 60 L/min 120 L/min 300 L/min 600 L/min 1200 L/min</td>
</tr>
</tbody>
</table>
# Flow Switch Variations / Basic Performance Table

<table>
<thead>
<tr>
<th>Series</th>
<th>PFMV</th>
<th>PFM</th>
<th>PFMB</th>
<th>PFMC</th>
<th>PF2A</th>
<th>PF3A7 H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enclosure</td>
<td>IP40</td>
<td>IP40</td>
<td>IP40</td>
<td>IP65</td>
<td>IP65</td>
<td>IP65</td>
</tr>
<tr>
<td>Fluid</td>
<td>Dry air, N₂</td>
<td>Dry air, N₂, Ar, CO₂</td>
<td>Dry air, N₂</td>
<td>Dry air, N₂</td>
<td>Air, N₂</td>
<td>Air, N₂</td>
</tr>
<tr>
<td>Setting</td>
<td>Digital</td>
<td>Digital</td>
<td>Digital</td>
<td>Digital</td>
<td>Digital</td>
<td>Digital</td>
</tr>
<tr>
<td>Rated flow range</td>
<td>0.2 to 10 L/min, 0.5 to 25 L/min, 1 to 50 L/min, 2 to 100 L/min</td>
<td>2 to 200 L/min, 5 to 500 L/min, 10 to 1000 L/min, 20 to 2000 L/min</td>
<td>5 to 500 L/min, 10 to 1000 L/min, 20 to 2000 L/min</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>30 to 3000 L/min, 60 to 6000 L/min, 120 to 12000 L/min</td>
<td></td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>12 to 24 VDC ±10%</td>
<td>24 VDC ±10%</td>
<td>12 to 24 VDC ±10%</td>
<td>12 to 24 VDC ±10%</td>
<td>24 VDC ±10%</td>
<td></td>
</tr>
<tr>
<td>Temperature characteristics (0 to 50°C)</td>
<td>±2% F.S. (15 to 35°C), ±5% F.S. (0 to 50°C)</td>
<td>±2% F.S. (15 to 35°C), ±5% F.S. (0 to 50°C)</td>
<td>±2% F.S. (15 to 35°C), ±5% F.S. (0 to 50°C)</td>
<td>±2% F.S. (15 to 35°C), ±5% F.S. (0 to 50°C)</td>
<td>±2% F.S. (15 to 35°C), ±5% F.S. (0 to 50°C)</td>
<td></td>
</tr>
<tr>
<td>Display</td>
<td>2-color LCD display</td>
<td>2-color LCD display</td>
<td>3-color LCD display</td>
<td>LCD display</td>
<td>3-color LCD display</td>
<td></td>
</tr>
</tbody>
</table>

*The monitor unit shows the PFG300 and PFMV3.*
CONTENTS

2-Color Display  Digital Flow Switch  PFMB Series
3-Screen Display  Digital Flow Monitor  PFG300 Series

2-Color Display  Digital Flow Switch PFMB Series
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- Specifications .............................................................. p. 11
- Flow Range ............................................................... p. 12
- Analog Output .......................................................... p. 12
- Pressure Loss ............................................................ p. 12
- IN Side Straight Piping Length and Accuracy .................. p. 12
- Internal Circuits and Wiring Examples ......................... p. 13
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3-Screen Display  Digital Flow Monitor PFG300 Series
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Safety Instructions ....................................................... Back Cover
2-Color Display
Digital Flow Switch
PFMB7 Series

How to Order

PFMB 7 201 □ □ □ □ □ □

Rated flow range
(Flow rate range) ●
201 2 to 200 L/min

Flow adjustment valve ●
Nil None
S Yes

Port size ●
C8 ø8 (5/16") One-touch fitting
02 Rc1/4
NO2 NPT1/4
F02 G1/4 •
•1 Made to order
•2 ISO1179-1 compliant

Piping entry direction ●
Nil L
Straight Bottom
•1 Made to order

Output specification ●

<table>
<thead>
<tr>
<th>OUT1</th>
<th>OUT2</th>
<th>Applicable monitor unit model</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>NPN</td>
<td>—</td>
</tr>
<tr>
<td>B</td>
<td>PNP</td>
<td>—</td>
</tr>
<tr>
<td>C</td>
<td>NPN</td>
<td>Analog to 1 to 5 V PFG300 series</td>
</tr>
<tr>
<td>D</td>
<td>NPN</td>
<td>Analog 4 to 20 mA PFG310 series</td>
</tr>
<tr>
<td>E</td>
<td>PNP</td>
<td>Analog 1 to 5 V PFG300 series</td>
</tr>
<tr>
<td>F</td>
<td>PNP</td>
<td>Analog 4 to 20 mA PFG310 series</td>
</tr>
<tr>
<td>G</td>
<td>NPN</td>
<td>External input •</td>
</tr>
<tr>
<td>H</td>
<td>PNP</td>
<td>External input •</td>
</tr>
</tbody>
</table>
•1 Made to order
•2 Accumulated flow value, peak/bottom flow value can be reset by external signal input.

Option 1 ●

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

Lead wire with connector (2 m)
Rubber cover for connector (Silicone rubber)

Without lead wire with connector

Option 2 ●

Bracket (For without flow adjustment valve)
ZS-33-M
With 2 tapping screws
No bracket
Bracket (For with straight type flow adjustment valve)
ZS-33-MS
With 3 tapping screws

Panel mount adapter (For without flow adjustment valve)
ZS-33-J
Panel mount adapter B
Mounting bracket
Panel mount adapter A

Panel mount adapter (For with flow adjustment valve)
ZS-33-JS
Panel mount adapter B
Mounting bracket
Panel mount adapter A

DIN Rail Mounting Bracket (Ordered Separately)
ZS – 33 – R

Stations ●
1 1 station
2 2 stations
3 3 stations
4 4 stations
5 5 stations
• The DIN rail should be provided by the customer.
• The DIN rail is not suitable for port size F02 (G1/4).

Unit specification ●

<table>
<thead>
<tr>
<th>Nil</th>
<th>R</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>SI unit only •</td>
<td></td>
</tr>
<tr>
<td>Nil</td>
<td>Units selection function •</td>
<td></td>
</tr>
</tbody>
</table>
•1 Fixed unit: Instantaneous flow: L/min
Accumulated flow: L
•2 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 ⇔ ft³

Output specification ●

<table>
<thead>
<tr>
<th>OUT1</th>
<th>OUT2</th>
<th>Applicable monitor unit model</th>
</tr>
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<tbody>
<tr>
<td>A</td>
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<td>—</td>
</tr>
<tr>
<td>B</td>
<td>PNP</td>
<td>—</td>
</tr>
<tr>
<td>C</td>
<td>NPN</td>
<td>Analog to 1 to 5 V PFG300 series</td>
</tr>
<tr>
<td>D</td>
<td>NPN</td>
<td>Analog 4 to 20 mA PFG310 series</td>
</tr>
<tr>
<td>E</td>
<td>PNP</td>
<td>Analog 1 to 5 V PFG300 series</td>
</tr>
<tr>
<td>F</td>
<td>PNP</td>
<td>Analog 4 to 20 mA PFG310 series</td>
</tr>
<tr>
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•1 Made to order
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Option 1 ●

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

Lead wire with connector (2 m)
Rubber cover for connector (Silicone rubber)

Without lead wire with connector

Option 2 ●

Bracket (For without flow adjustment valve)
ZS-33-M
With 2 tapping screws
No bracket
Bracket (For with straight type flow adjustment valve)
ZS-33-MS
With 3 tapping screws

Panel mount adapter (For without flow adjustment valve)
ZS-33-J
Panel mount adapter B
Mounting bracket
Panel mount adapter A

Panel mount adapter (For with flow adjustment valve)
ZS-33-JS
Panel mount adapter B
Mounting bracket
Panel mount adapter A

DIN Rail Mounting Bracket (Ordered Separately)
ZS – 33 – R

Stations ●
1 1 station
2 2 stations
3 3 stations
4 4 stations
5 5 stations
• The DIN rail should be provided by the customer.
• The DIN rail is not suitable for port size F02 (G1/4).

Unit specification ●

<table>
<thead>
<tr>
<th>Nil</th>
<th>R</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>SI unit only •</td>
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<td></td>
</tr>
</tbody>
</table>
•1 Fixed unit: Instantaneous flow: L/min
Accumulated flow: L
•2 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 ⇔ ft³

Output specification ●

<table>
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<th>OUT2</th>
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<tr>
<td>B</td>
<td>PNP</td>
<td>—</td>
</tr>
<tr>
<td>C</td>
<td>NPN</td>
<td>Analog to 1 to 5 V PFG300 series</td>
</tr>
<tr>
<td>D</td>
<td>NPN</td>
<td>Analog 4 to 20 mA PFG310 series</td>
</tr>
<tr>
<td>E</td>
<td>PNP</td>
<td>Analog 1 to 5 V PFG300 series</td>
</tr>
<tr>
<td>F</td>
<td>PNP</td>
<td>Analog 4 to 20 mA PFG310 series</td>
</tr>
<tr>
<td>G</td>
<td>NPN</td>
<td>External input •</td>
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<td>PNP</td>
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</table>
•1 Made to order
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Option 1 ●

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

Lead wire with connector (2 m)
Rubber cover for connector (Silicone rubber)

Without lead wire with connector

Option 2 ●

Bracket (For without flow adjustment valve)
ZS-33-M
With 2 tapping screws
No bracket
Bracket (For with straight type flow adjustment valve)
ZS-33-MS
With 3 tapping screws

Panel mount adapter (For without flow adjustment valve)
ZS-33-J
Panel mount adapter B
Mounting bracket
Panel mount adapter A

Panel mount adapter (For with flow adjustment valve)
ZS-33-JS
Panel mount adapter B
Mounting bracket
Panel mount adapter A

DIN Rail Mounting Bracket (Ordered Separately)
ZS – 33 – R

Stations ●
1 1 station
2 2 stations
3 3 stations
4 4 stations
5 5 stations
• The DIN rail should be provided by the customer.
• The DIN rail is not suitable for port size F02 (G1/4).
### How to Order

**PFMB 7**

**501-04-A-M**

#### Rated flow range (Flow rate range)

<table>
<thead>
<tr>
<th>Option</th>
<th>Part no.</th>
<th>Qty.</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>501</td>
<td>ZS-33-M</td>
<td>1</td>
<td>Lead wire: 2 m</td>
</tr>
<tr>
<td>102</td>
<td>ZS-33-MS</td>
<td>1</td>
<td>For connector</td>
</tr>
</tbody>
</table>

#### Thread type

- Nil (None)
- Rc
- N (NPT)
- F
- G

#### Port size

<table>
<thead>
<tr>
<th>Port size</th>
<th>Rated flow range</th>
</tr>
</thead>
<tbody>
<tr>
<td>04</td>
<td>1/2</td>
</tr>
<tr>
<td>06</td>
<td>3/4</td>
</tr>
</tbody>
</table>

#### Output specification

<table>
<thead>
<tr>
<th>OUT1</th>
<th>OUT2</th>
<th>Applicable monitor unit model</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>NPN</td>
<td>NPN</td>
</tr>
<tr>
<td>B</td>
<td>PNP</td>
<td>PNP</td>
</tr>
<tr>
<td>C</td>
<td>NPN</td>
<td>Analog 1 to 5 V PFG300 series</td>
</tr>
<tr>
<td>D</td>
<td>NPN</td>
<td>Analog 4 to 20 mA PFG310 series</td>
</tr>
<tr>
<td>E</td>
<td>PNP</td>
<td>Analog 1 to 5 V PFG300 series</td>
</tr>
<tr>
<td>F</td>
<td>PNP</td>
<td>Analog 4 to 20 mA PFG310 series</td>
</tr>
<tr>
<td>G</td>
<td>NPN</td>
<td>External input <strong>2</strong></td>
</tr>
<tr>
<td>H</td>
<td>PNP</td>
<td>External input <strong>2</strong></td>
</tr>
</tbody>
</table>

*1 Made to order
*2 Accumulated flow value, peak/bottom flow value can be reset by external signal input.

#### Option 1

<table>
<thead>
<tr>
<th>Option</th>
<th>Part no.</th>
<th>Qty.</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead wire with connector</td>
<td>ZS-33-D</td>
<td>1</td>
<td>Lead wire: 2 m</td>
</tr>
<tr>
<td>Rubber cover (Silicone rubber)</td>
<td>ZS-33-F</td>
<td>1</td>
<td>For connector</td>
</tr>
</tbody>
</table>

#### Option 2

<table>
<thead>
<tr>
<th>Option</th>
<th>Part no.</th>
<th>Qty.</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bracket (for PFMB7201)</td>
<td>ZS-33-M</td>
<td>1</td>
<td>With 2 tapping screws (3 x 6)</td>
</tr>
<tr>
<td>Bracket (for PFMB7201S)</td>
<td>ZS-33-MS</td>
<td>1</td>
<td>With 3 tapping screws (3 x 6)</td>
</tr>
<tr>
<td>Panel mount adapter (for PFMB7201)</td>
<td>ZS-33-J</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Panel mount adapter (for PFMB7201S)</td>
<td>ZS-33-JS</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Bracket (for PFMB7501/7102)</td>
<td>ZS-42-C</td>
<td>1</td>
<td>With 4 tapping screws (3 x 6)</td>
</tr>
<tr>
<td>Bracket (for PFMB7202)</td>
<td>ZS-42-D</td>
<td>1</td>
<td>With 4 tapping screws (3 x 6)</td>
</tr>
</tbody>
</table>

#### Calibration certificate

- Nil (None)
- A **1** With calibration certificate

*1 Certificate in both English and Japanese
*2 Made to order

#### Unit specification

- M (SI unit only **1**)
- Nil (Units selection function **2**)

*1 Fixed unit: Instantaneous flow: L/min
Accumulated flow: L

*2 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 ⇔ ft³
### Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>PFMB7201</th>
<th>PFMB7501</th>
<th>PFMB7102</th>
<th>PFMB7202</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fluid</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applicable fluid</td>
<td>Dry air, N2 (Air quality grade is JIS B 8392-1:1.1.2 to 1.6.2, ISO 8573-1:1.1.2 to 1.6.2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Flow</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluid temperature range</td>
<td>0 to 50°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detection method</td>
<td>Thermal type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated flow range</td>
<td>2 to 200 L/min</td>
<td>5 to 500 L/min</td>
<td>10 to 1000 L/min</td>
<td>20 to 2000 L/min</td>
</tr>
<tr>
<td>Smallest settable increment</td>
<td>1 L/min</td>
<td>1 L/min</td>
<td>1 L/min</td>
<td>1 L/min</td>
</tr>
<tr>
<td></td>
<td>0 to 999,999,999 L</td>
<td>0 to 999,999,999 L</td>
<td>0 to 999,999,999 L</td>
<td>0 to 999,999,999 L</td>
</tr>
<tr>
<td></td>
<td>Accumulated flow</td>
<td>1 L/min</td>
<td>10 L/min</td>
<td>10 L/min</td>
</tr>
<tr>
<td></td>
<td>Maximum flow</td>
<td>1 L/min</td>
<td>10 L/min</td>
<td>10 L/min</td>
</tr>
<tr>
<td><strong>Pressure</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated pressure range</td>
<td>0 to 0.75 MPa</td>
<td>0 to 0.8 MPa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated pressure loss</td>
<td>1.0 MPa</td>
<td>1.2 MPa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure characteristics</td>
<td>±0.5 F.S.</td>
<td>±0.5 F.S.</td>
<td>±0.5 F.S.</td>
<td>±0.5 F.S.</td>
</tr>
<tr>
<td><strong>Electrical</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>12 to 24 VDC</td>
<td>±10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current consumption</td>
<td>55 mA or less</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection</td>
<td>Polarity protection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Switch output</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output type</td>
<td>NPN open collector</td>
<td>PNP open collector</td>
<td>Select from Hysteresis, Window comparator, Accumulated output, or Accumulated pulse output modes.</td>
<td>Select from Hysteresis, Window comparator, Accumulated output, or Accumulated pulse output modes.</td>
</tr>
<tr>
<td>Output mode</td>
<td>Current output</td>
<td>Maximum load current</td>
<td>80 mA</td>
<td>80 mA</td>
</tr>
<tr>
<td>Switch operation</td>
<td>Maximum load current</td>
<td>80 mA</td>
<td>80 mA</td>
<td></td>
</tr>
<tr>
<td>Maximum applied voltage (V@only)</td>
<td>NPN output type: 1 V or less (at load current of 80 mA)</td>
<td>PNP output type: 1.5 V or less (at load current of 80 mA)</td>
<td>28 VDC</td>
<td>28 VDC</td>
</tr>
<tr>
<td>Response time</td>
<td>Select from 0.05 s, 0.1 s, 0.5 s, 1 s, or 2 s.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hysteresis</td>
<td>Variable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection</td>
<td>Short circuit protection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Analog output</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output type</td>
<td>Voltage output: 1 to 5 V, Current output: 4 to 20 mA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impedance</td>
<td>Voltage output: Approx. 1 kΩ</td>
<td>Current output: Maximum load impedance at power supply voltage of 24 V: 600 Ω, at power supply voltage of 12 V: 300 Ω</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response time</td>
<td>Linked to the response time of the switch output</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External input</td>
<td>Input voltage: 0.4 V or less (Reed or Solid state) for 30 ms or longer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference condition</td>
<td>Select from Standard conditions or Normal conditions.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Display mode</td>
<td>Select from Instantaneous flow or Accumulated flow.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit</td>
<td>L/min or cm³ can be selected.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Display range</td>
<td>L or R² can be selected</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instantaneous flow</td>
<td>–10 to 210 L/min</td>
<td>–25 to 525 L/min</td>
<td>–50 to 1050 L/min</td>
<td>–100 to 2100 L/min</td>
</tr>
<tr>
<td>Accumulated flow</td>
<td>0 to 999,999,999 L</td>
<td>0 to 999,999,999 L</td>
<td>0 to 999,999,999 L</td>
<td>0 to 999,999,999 L</td>
</tr>
<tr>
<td>Minimum display unit</td>
<td>1 L/min</td>
<td>1 L/min</td>
<td>1 L/min</td>
<td>1 L/min</td>
</tr>
<tr>
<td>Minimum display unit</td>
<td>10 L</td>
<td>10 L</td>
<td>10 L</td>
<td>10 L</td>
</tr>
<tr>
<td>Display</td>
<td>LED: Color: Red/Green, 4 digits, 7 segments</td>
<td>LED: Color: Red/Green, 4 digits, 7 segments</td>
<td>LED: Color: Red/Green, 4 digits, 7 segments</td>
<td>LED: Color: Red/Green, 4 digits, 7 segments</td>
</tr>
<tr>
<td><strong>Enclosure</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Withstand voltage</td>
<td>1000 VAC for 1 minute between terminals and housing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistance</td>
<td>50 MΩ or more (500 VDC measured via megohmmeter)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>Operating: 0 to 50°C, Stored: –10 to 60°C (No condensation or freezing)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating humidity range</td>
<td>Operating/Stored: 35 to 85% RH (No condensation or freezing)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Standards</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE, UL (CSA), RoHS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Piping</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piping specification</td>
<td>Rc1/4, NPT1/4, G1/4, all One-touch fitting</td>
<td>Rc1/2, NPT1/2, G1/2</td>
<td>Rc3/4, NPT3/4, G3/4</td>
<td>RC1/4, NPT1/4, G1/4, all One-touch fitting</td>
</tr>
<tr>
<td>Piping entry direction</td>
<td>Straight, Bottom</td>
<td>Straight, Bottom</td>
<td>Straight, Bottom</td>
<td>Straight, Bottom</td>
</tr>
<tr>
<td>Main materials of parts in contact with fluid</td>
<td>PTFE, Stainless steel 304, PPR, PVDF, Brass (Electroless nickel plating), HNBR, Si, Au, GE4F</td>
<td>ADC, PPS, Stainless steel 304, Au, HNBR, Si, GE4F</td>
<td>ADC, PPS, Stainless steel 304, Au, HNBR, Si, GE4F</td>
<td>ADC, PPS, Stainless steel 304, Au, HNBR, Si, GE4F</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body</td>
<td>100 g</td>
<td>155 g</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lead wire</td>
<td>+35 g</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bracket</td>
<td>+20 g</td>
<td>+25 g</td>
<td>+30 g</td>
<td>+30 g</td>
</tr>
<tr>
<td>Panel mount adapter</td>
<td>+15 g</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIN rail mounting bracket</td>
<td>+65 g</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Refer to the “Example of recommended pneumatic circuit” 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 1 million times. If the product is operated 24 hours per day, the product life will be as follows:
3. 5 min interval: life is calculated as 5 min x 1 million = 5 million min = 9.5 years
4. 2 min interval: life is calculated as 2 min x 1 million = 2 million min = 3.8 years
5. The product life calculated by using the accumulated value external reset may be shorter than the calculated life.
6. Do not release the OUT side piping port of the product directly to the atmosphere without connecting piping. If the product is used with the piping port released to atmosphere, accuracy may vary.
7. The time from when the flow is changed by a step input (when the flow rate changes from 0 to the maximum value of the rated flow range instantaneously) until the switch output turns ON (or OFF) when set to be 90% of the rated flow rate when the flow fluctuates around the set value, the width for setting more than
8. If the flow fluctuates more than the fluctuating width needs to be set. Otherwise, chattering will occur.
9. When using a product with an analog output
10. The time from when the flow is changed by a step input (when the flow rate changes from 0 to the maximum value of the rated flow range instantaneously) until the analog output reaches 90% of the rated flow rate when the flow fluctuates around the set value, the width for setting more than
11. For details, refer to “Installation: Parts in Contact with Fluid” on page 14.
12. The accumulated flow display is the upper 3-digit, middle 3-digit, and lower 3-digit (total of 9 digits) display. The position of the dots on the upper part of the screen indicates which digits are displayed.
13. For products with tiny scratches, marks, or display color or brightness variations which do not affect the performance of the product are verified as conforming products.
Flow Range

<table>
<thead>
<tr>
<th>Model</th>
<th>Minimum value of the rated flow range</th>
<th>Maximum value of the rated flow range</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFMB7201</td>
<td>2 L/min</td>
<td>200 L/min</td>
</tr>
<tr>
<td>PFMB7501</td>
<td>5 L/min</td>
<td>500 L/min</td>
</tr>
<tr>
<td>PFMB7102</td>
<td>10 L/min</td>
<td>1000 L/min</td>
</tr>
<tr>
<td>PFMB7202</td>
<td>20 L/min</td>
<td>2000 L/min</td>
</tr>
</tbody>
</table>

Pressure Loss (Reference Data)

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

- Supply pressure 200 kPa
- Supply pressure 400 kPa

**PFMB7501 (for 500 L/min)**

- Supply pressure 200 kPa
- Supply pressure 400 kPa

IN Side Straight Piping Length and Accuracy (Reference Data)

- The piping on the IN side must have a straight section of piping with a length of 8 cm or more.
- "Straight section" means a part of the piping without any bends or rapid changes in the cross sectional area.
- When the PFMB7201 is connected to tubing, use a tube I.D. 5 mm just before the product.
- When the PFMB7501 or 7102 is connected to tubing, use a tube I.D. 9 mm or more just before the product.

The accuracy can vary by approximately ±2% F.S. when such tubing is not used.

Flow Adjustment Valve Flow Rate Characteristics

- PFMB7201 (for 200 L/min)
- PFMB7501 (for 500 L/min)
- PFMB7102 (for 1000 L/min)
- PFMB7202 (for 2000 L/min)

IN: Straight piping length
OUT:

- The tubing on the OUT side is connected to tubing, use a tube I.D. 9 mm or more just before the product.

IN: Straight piping length

Accuracy [% F.S.]

PFMB7201/7501/7102/7202
Internal Circuits and Wiring Examples

**NPN (2 outputs) type**

PFMB7-series-A

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

**NPN (1 output) + Analog (1 to 5 V) output type**

PFMB7-series-C

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

**PNP (2 outputs) type**

PFMB7-series-B

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

**NPN (1 output) + Analog (4 to 20 mA) output type**

PFMB7-series-D

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

**PNP (1 output) + Analog (1 to 5 V) output type**

PFMB7-series-E

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

**NPN (1 output) + External input type**

PFMB7-series-G

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

**PNP (1 output) + External input type**

PFMB7-series-H

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

Accumulated pulse output wiring examples

**NPN (2 outputs) type**

PFMB7-series-A

Max. 28 V, 80 mA

**NPN (1 output) + Analog output type**

PFMB7-series-C

**PNP (2 outputs) type**

PFMB7-series-B

Max. 28 V, 80 mA

**NPN (1 output) + External input type**

PFMB7-series-G

Max. 28 V, 80 mA

**PNP (1 output) + External input type**

PFMB7-series-H

Max. 80 mA

0 V --- | or --- | 50 ms

--- | --- | 50 ms
Component Parts

**PFMB7201**

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

**PFMB7501/7102/7202**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sensor body</td>
<td>PPS</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Gasket</td>
<td>HNBR</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Flow rectifier</td>
<td>Stainless steel 304</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Sensor chip</td>
<td>Silicon</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Printed circuit board</td>
<td>GE4F</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Gasket</td>
<td>HNBR</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Body</td>
<td>PPS</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Mesh</td>
<td>Stainless steel 304</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Spacer</td>
<td>PPS</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>O-ring</td>
<td>HNBR</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>O-ring</td>
<td>HNBR</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Attachment</td>
<td>ADC</td>
<td>Coating</td>
</tr>
</tbody>
</table>
PFMB7 Series

Dimensions

PFMB7201-C8

OUT1
DC (−)

OUT2
DC (+)

2 x ø8 One-touch fitting

OUT1
DC (−)

OUT2
DC (+)

2 x ø8 One-touch fitting

PFMB7201-C8L

OUT1
DC (−)

OUT2
DC (+)

2 x ø8 One-touch fitting

With rubber cover for connector

15
Dimensions

PFMB7201-(N)02

PFMB7201-(N)02L
PFMB7 Series

Dimensions

PFMB7201-F02

PFMB7201-F02L
Dimensions
PFMB7201S-C8

PFMB7201S-C8L
PFMB7 Series

Dimensions

PFMB7201S-(N)02

PFMB7201S-(N)02L
Dimensions

PFMB7201S-F02

PFMB7201S-F02L
**PFMB7 Series**

**Dimensions**

**PFMB7201**  
Panel mount/  
Without flow adjustment valve/Straight

Panel thickness 1 to 3.2 mm  
58 mm (Max. 58.5)

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

Panel thickness 1 to 3.2 mm  
51.5 mm (Max. 58.5)

**Panel mount/  
Without flow adjustment valve/Bottom**

Panel thickness 1 to 3.2 mm  
58 mm (Max. 58.5)

**Panel mount/  
With flow adjustment valve/Bottom**

Panel thickness 1 to 3.2 mm  
51.5 mm (Max. 58.5)

---

**Panel Fitting Dimensions**

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

**PFMB7201**  
With bracket/Without flow adjustment valve  
With bracket/With flow adjustment valve

```
<table>
<thead>
<tr>
<th>With bracket/Without flow adjustment valve</th>
<th>With bracket/With flow adjustment valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>Dimensions</td>
</tr>
<tr>
<td>• The DIN rail should be provided by the customer.</td>
<td>• The DIN rail is not suitable for port size F02 (G1/4).</td>
</tr>
</tbody>
</table>
```

**DIN rail mounting**

```
<table>
<thead>
<tr>
<th>DIN rail mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 x n pcs. + 34.4</td>
</tr>
</tbody>
</table>
```

---

**PFMB7 Series**

**Function Details**

---

**SMC**
PFMB7 Series

Dimensions

PFMB7501/7102/7202

<table>
<thead>
<tr>
<th>Model</th>
<th>Symbol</th>
<th>A</th>
<th>B</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>H</th>
<th>K</th>
<th>L</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFMB7501/7102</td>
<td></td>
<td>70</td>
<td>30</td>
<td>43.7</td>
<td>37.2</td>
<td>15</td>
<td>14</td>
<td>26</td>
<td>18</td>
<td>13.6</td>
</tr>
<tr>
<td>PFMB7202</td>
<td></td>
<td>90</td>
<td>35</td>
<td>49.2</td>
<td>42.7</td>
<td>17.5</td>
<td>24</td>
<td>31</td>
<td>28</td>
<td>16.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Symbol</th>
<th>S</th>
<th>T</th>
<th>U</th>
<th>V</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFMB7501/7102</td>
<td></td>
<td>24</td>
<td>22</td>
<td>32</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td>PFMB7202</td>
<td></td>
<td>30</td>
<td>30</td>
<td>42</td>
<td>48</td>
<td>58</td>
</tr>
</tbody>
</table>

Lead wire with connector
(Part no.: ZS-33-D)

Cable Specifications

<table>
<thead>
<tr>
<th>Conductor</th>
<th>Nominal cross section</th>
<th>AWG26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outside diameter</td>
<td>Approx. 0.50 mm</td>
<td></td>
</tr>
<tr>
<td>Outside diameter</td>
<td>Approx. 1.00 mm</td>
<td></td>
</tr>
<tr>
<td>Color</td>
<td>Brown, White, Black, Blue</td>
<td></td>
</tr>
<tr>
<td>Sheath Material</td>
<td>Oil-resistant PVC</td>
<td></td>
</tr>
<tr>
<td>Finished outside diameter</td>
<td>ø3.5</td>
<td></td>
</tr>
</tbody>
</table>

* For wiring, refer to the “Operation Manual” on the SMC website.

Documents/Download --> Instruction Manuals
How to Order

**PFG 3 0 0 - RT - M - L**

**Type**
- 3 Remote type monitor unit

**Input specification**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Applicable flow switch model</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Voltage input</td>
<td>PFMB7-C/C/E series</td>
</tr>
<tr>
<td>1</td>
<td>Current input</td>
<td>PFMB7-D/D/F series</td>
</tr>
</tbody>
</table>

**Output specification**

- **RT** 2 outputs (NPN/PNP switching type) + Analog voltage output**1,**2
- **SV** 2 outputs (NPN/PNP switching type) + Analog current output**2
- **XY** 2 outputs (NPN/PNP switching type) + Copy function

1. Can switch between 1 to 5 V and 0 to 10 V
2. Can be switched to external input or copy function

**Option 1**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Applicable flow switch model</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>L</strong></td>
<td>Power supply/output connection lead wire (Lead wire length: 2 m)</td>
<td>ZS-46-5L</td>
</tr>
</tbody>
</table>

**Option 2**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Applicable flow switch model</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A1</strong></td>
<td>Bracket A (Vertical mounting)</td>
<td>ZS-46-A1</td>
</tr>
<tr>
<td><strong>A2</strong></td>
<td>Bracket B (Horizontal mounting)</td>
<td>ZS-46-A2</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>Panel mount adapter</td>
<td>ZS-46-B</td>
</tr>
<tr>
<td><strong>D</strong></td>
<td>Panel mount adapter + Front protection cover</td>
<td>ZS-46-D</td>
</tr>
</tbody>
</table>

**Option 3**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Applicable flow switch model</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>F</strong></td>
<td>Sensor connector</td>
<td>ZS-28-C-1</td>
</tr>
</tbody>
</table>

**Option 4**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Applicable flow switch model</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Y</strong></td>
<td>Operation manual</td>
<td>Nil</td>
</tr>
<tr>
<td><strong>K</strong></td>
<td>Calibration certificate</td>
<td>Nil</td>
</tr>
<tr>
<td><strong>T</strong></td>
<td>Nil</td>
<td>Nil</td>
</tr>
</tbody>
</table>

**Unit specification**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Applicable flow switch model</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M</strong></td>
<td>Units selection function**1,**3</td>
<td>Nil</td>
</tr>
<tr>
<td><strong>F</strong></td>
<td>Fixed unit: Instantaneous flow: L/min Accumulated flow: L</td>
<td>ZS-28-C-1</td>
</tr>
</tbody>
</table>

**Type**
- 3 Remote type monitor unit

**Connection Example**

- Sensor connector
- Lead wire with connector (Option for PFMB)
- Power supply/output connection lead wire

---

**Part nos.**

When only optional parts are required, order with the part numbers listed below.

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Option</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZS-28-C-1</td>
<td>Sensor connector</td>
<td>For PFMB</td>
</tr>
<tr>
<td>ZS-46-A1</td>
<td>Bracket A</td>
<td>Tapping screw: Nominal size 3 x 8 L (2 pcs.)</td>
</tr>
<tr>
<td>ZS-46-A2</td>
<td>Bracket B</td>
<td>Tapping screw: Nominal size 3 x 8 L (2 pcs.)</td>
</tr>
<tr>
<td>ZS-46-B</td>
<td>Panel mount adapter</td>
<td></td>
</tr>
<tr>
<td>ZS-46-D</td>
<td>Panel mount adapter + Front protection cover</td>
<td></td>
</tr>
<tr>
<td>ZS-46-5L</td>
<td>Power supply/output connection lead wire 5-core, 2 m</td>
<td></td>
</tr>
<tr>
<td>ZS-27-01</td>
<td>Front protection cover</td>
<td></td>
</tr>
</tbody>
</table>
PFG300 Series

Specifications

**Model**

<table>
<thead>
<tr>
<th>Applicable SMC flow switch</th>
<th>PFG300 series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>PFMB7201</td>
</tr>
<tr>
<td>Rated flow range</td>
<td>2 to 200 L/min</td>
</tr>
<tr>
<td>Flow</td>
<td></td>
</tr>
<tr>
<td>Set point range</td>
<td></td>
</tr>
<tr>
<td>Instantaneous flow range</td>
<td>−10 to 210 L/min</td>
</tr>
<tr>
<td>Accumulated flow range</td>
<td>0 to 999,999,999,999 L</td>
</tr>
<tr>
<td>Smallest settable</td>
<td>1 L/min</td>
</tr>
<tr>
<td>Increment</td>
<td></td>
</tr>
<tr>
<td>Accumulated value range</td>
<td>1 L/pulse</td>
</tr>
<tr>
<td>Volume per pulse (pulse width = 50 ms)</td>
<td>10 L/pulse</td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>12 to 24 VDC ±10%</td>
</tr>
<tr>
<td>Current consumption</td>
<td>25 mA or less</td>
</tr>
<tr>
<td>Protection</td>
<td>Polarity protection</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±0.5% F.S. ± Minimum display unit (Ambient temperature of 25°C)</td>
</tr>
<tr>
<td>Analog output accuracy</td>
<td>±0.5% F.S. (Ambient temperature of 25°C)</td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.1% F.S. ± Minimum display unit</td>
</tr>
<tr>
<td>Temperature characteristics</td>
<td>±0.5% F.S. (Ambient temperature: 0 to 50°C, 25°C standard)</td>
</tr>
<tr>
<td>Switch operation</td>
<td>Select from Normal or Reversed output.</td>
</tr>
<tr>
<td>Output type</td>
<td>Select from NPN or PNP open collector unit.</td>
</tr>
<tr>
<td>Output mode</td>
<td>Select from Hysteresis, Window comparator, Accumulated output, Accumulated pulse output, Error output, or Switch output OFF modes.</td>
</tr>
<tr>
<td>Output type</td>
<td>Voltage output: 1 to 5 V, 0 to 10 V (only when the power supply voltage is 24 VDC)</td>
</tr>
<tr>
<td>Impedance</td>
<td>Current output: 4 to 20 mA (0 L/min to maximum value of the rated flow)</td>
</tr>
<tr>
<td>External input</td>
<td>50 ms or less</td>
</tr>
<tr>
<td>External input type</td>
<td>Input voltage: 0.4 V or less (Reed or Solid state) for 30 ms or longer</td>
</tr>
<tr>
<td>Switch operation</td>
<td>Voltage input: 1 to 5 V DC (Input impedance: 1 MΩ), Current input: 4 to 20 mA DC (Input impedance: 51 Ω) (0 L/min to maximum value of the rated flow)</td>
</tr>
<tr>
<td>Connection method</td>
<td>Connector (e-CON)</td>
</tr>
<tr>
<td>Protection</td>
<td>Over voltage protection (Up to 26.4 VDC)</td>
</tr>
<tr>
<td>Display mode</td>
<td>Select from instantaneous flow or Accumulated flow.</td>
</tr>
<tr>
<td>Display type</td>
<td>LCD</td>
</tr>
<tr>
<td>Number of displays</td>
<td>3-screen display (Main screen, Sub screen)</td>
</tr>
<tr>
<td>Display color</td>
<td>1) Main screen: Red/Green, 2) Sub screen: Orange</td>
</tr>
<tr>
<td>Number of display digits</td>
<td>1) Main screen: 5 digits (7 segments), 2) Sub screen: 9 digits (7 segments)</td>
</tr>
<tr>
<td>Indicator LED</td>
<td>LED ON when switch output is ON OUT1/2: Orange</td>
</tr>
<tr>
<td>Digital filter</td>
<td>Select from 0.00, 0.05 to 0.1 s (increment of 0.01 s), 0.1 to 1.0 s (increment of 0.1 s), 1 to 10 s (increment of 1 s), 20 s, 30 s, 40 s, 50 s, or 60 s</td>
</tr>
<tr>
<td>Environment</td>
<td>IP40</td>
</tr>
<tr>
<td>Enclosure</td>
<td>Select from 0.00, 0.05 to 0.1 s (increment of 0.01 s), 0.1 to 1.0 s (increment of 0.1 s), 1 to 10 s (increment of 1 s), 20 s, or 30 s</td>
</tr>
<tr>
<td>Weight</td>
<td>25 g (Excluding the power supply/output connection lead wire)</td>
</tr>
<tr>
<td>Weight lead with connector</td>
<td>+39 g</td>
</tr>
</tbody>
</table>

---

1. Rated flow range of the applicable flow switch
2. Value without digital filter (at 0.00 s)
3. When using the accumulated value hold function, the operating conditions to calculate the product life, and do not exceed it. The maximum access limit of the memory device is 1.5 million times. If the product is operated 24 hours per day, the product life will be as follows: 5 min interval: life is calculated as 5 min x 1.5 million = 7.5 million min = 14.3 years
4. If the flow fluctuates around the set value, the width for setting more than the fluctuating width needs to be set. Otherwise, chattering will occur.
5. Setting is only possible for models with analog output.
6. Setting is only possible for models with external input.
7. Setting is only possible for models with the units selection function.
8. The response time indicates when the set value is 90% in relation to the step input.
9. If the accumulated value external reset is repeatedly used, the product life will be shorter than the calculated life.

For flow switch precautions and specific product precautions, refer to the “Operation Manual” on the SMC website. Click here for details.
**Internal Circuits and Wiring Examples**

**-XY**
**-RT**
**-SV**

NPN (2 outputs) + Copy function

```
1 DC (+) 4 Analog input
Sensor      Main circuit
3 DC (-)   
```

```
Brown DC (+) Gray Copy terminal
Black OUT1   White OUT2
Blue DC (-)  
```

```
+ 12 to 24 VDC
```

RT: NPN (2 outputs) + Analog voltage output

SV: NPN (2 outputs) + Analog current output

```
1 DC (+) 4 Analog input
Sensor      Main circuit
3 DC (-)   
```

```
Brown DC (+) Gray Analog output
Black OUT1   White OUT2
Blue DC (-)  
```

```
+ 12 to 24 VDC
```

RT: NPN (2 outputs) + External input

SV: NPN (2 outputs) + External input

```
1 DC (+) 4 Analog input
Sensor      Main circuit
3 DC (-)   
```

```
Brown DC (+) Gray External input
Black OUT1   White OUT2
Blue DC (-)  
```

```
+ 12 to 24 VDC
```

Accumulated pulse output wiring examples

NPN (2 outputs) type

```
Max. 28 V, 80 mA

Black OUT1 Load
White OUT2 Load
Blue DC (-)
```

```
0 V ... or ...
50 ms 50 ms
```

PNP (2 outputs) type

```
Max. 80 mA

Brown DC (+) Black OUT1
White OUT2 Load
```

```
0 V ... or ...
50 ms 50 ms
```
Bracket A
(Part no.: ZS-46-A1)

Bracket B
(Part no.: ZS-46-A2)

Bracket configuration allows for mounting in four orientations.
Dimensions

Panel mount adapter
(Part no.: ZS-46-B)

Panel mount adapter + Front protection cover
(Part no.: ZS-46-D)

Power supply/output connection lead wire
(Part no.: ZS-46-5L)

Sensor connector
(Part no.: ZS-28-C-1)

Cable Specifications

<table>
<thead>
<tr>
<th>Conductor cross section</th>
<th>0.15 mm² (AWG26)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulator Outside diameter</td>
<td>1.0 mm</td>
</tr>
<tr>
<td>Color</td>
<td>Brown, Blue, Black, White, Gray (5-core)</td>
</tr>
<tr>
<td>Sheath Finished outside diameter</td>
<td>ø3.5</td>
</tr>
</tbody>
</table>
**Dimensions**

**Panel fitting dimensions**

**Individual mounting**

**Multiple (2 pcs. or more) secure mounting**

<Horizontal>

**Panel mount example**

<Horizontal>

<Vertical>

**Panel mount example**

<Vertical>
PFMB Series
Function Details

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

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

- **Reference condition**
  The display unit can be selected from standard condition or normal condition.
  - Standard condition: Flow rate converted to a volume at 20°C and 1 atm (atmosphere)
  - Normal condition: Flow rate converted to a volume at 0°C and 1 atm (atmosphere)

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

- **Response time**
  The response time can be selected to suit the application.
  (Default setting: 1 s) Abnormalities can be detected more quickly by setting the response time to 0.05 seconds. The effect of fluctuation and flickering of the display can be reduced by setting the response time to 2 seconds.

- **Display OFF mode**
  This function will turn the display OFF. In this mode, decimal points 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 release the key lock. At a time of shipment from the factory, it is set such that a security code is not required.

- **External input function**
  This function can be used only when the optional external input is present. The accumulated flow, peak value, and bottom value can be reset remotely.
  - Accumulated value external reset: A function to reset the accumulated flow value when an external input signal is applied.
  - Accumulated increment mode, the accumulated value will reset to and increase from zero.
  - Accumulated decrement mode, the accumulated value will reset to and decrease from the set value.

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

- **Keylock function**
  Prevents operation errors such as accidentally changing setting values.

- **Analog output free range function**
  This function allows a flow that generates an output of 5 V 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.

- **Accumulated value hold**
  The accumulated value is not cleared even when the power supply is turned off. The accumulated value is memorized every 2 or 5 minutes during measurement and continues from the last memorized value when the power supply is turned on again.
  The life time of the memory device is 1 million access times. Take this into consideration before using this function.

- **Reversibility 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.

- **Reset to the default settings**
  The product can be returned to its factory default settings.
Piping for the metal attachment

• Tighten to the specified torque. Refer to the table below for the required torque values.
• Use a wrench suited for the required torque. Do not use an extremely large wrench (Total length of 40 cm or more).
• If the tightening torque is exceeded, the product can be broken. If the tightening torque is insufficient, the fitting may become loose.
• Avoid any sealant tape getting inside the flow path.
• Ensure there is no leakage after piping.
• When mounting the fitting, a wrench should be used on the metal part (attachment) of the fitting only. Holding other parts of the product with a wrench may damage the product. Specifically, make sure that the wrench does not damage the connector.

### Precautions on piping

#### Piping for the metal attachment

- Tighten to the specified torque. Refer to the table below for the required torque values.
- Use a wrench suited for the required torque. Do not use an extremely large wrench (Total length of 40 cm or more).
- If the tightening torque is exceeded, the product can be broken.
- If the tightening torque is insufficient, the fitting may become loose.
- Avoid any sealant tape getting inside the flow path.
- Ensure there is no leakage after piping.
- When mounting the fitting, a wrench should be used on the metal part (attachment) of the fitting only.

### Model Required torque

<table>
<thead>
<tr>
<th>Model</th>
<th>Required torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFMB7201</td>
<td>12 to 14 N·m</td>
</tr>
<tr>
<td>PFMB7501</td>
<td>28 to 30 N·m</td>
</tr>
<tr>
<td>PFMB7102</td>
<td>3/4</td>
</tr>
<tr>
<td>PFMB7202</td>
<td>30 mm</td>
</tr>
</tbody>
</table>

### 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>E r 1</td>
<td>OUT1 over current error</td>
<td>A load current of 80 mA or more is applied to the switch output (OUT1).</td>
<td>Eliminate the cause of the over current by turning off the power supply and then turning it on again.</td>
</tr>
<tr>
<td>E r 2</td>
<td>OUT2 over current error</td>
<td>A load current of 80 mA or more is applied to the switch output (OUT2).</td>
<td>Decrease the flow rate.</td>
</tr>
<tr>
<td>HHH</td>
<td>Instantaneous flow error</td>
<td>The flow rate exceeds the maximum value of the display range.</td>
<td>Decrease the flow rate.</td>
</tr>
<tr>
<td>LLL</td>
<td>Reverse flow error</td>
<td>There is a reverse flow equivalent to ~5% or more.</td>
<td>Change the flow to the correct direction.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Error name</th>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>E 0</td>
<td>System error</td>
<td>Turn the power off and then on again.</td>
</tr>
<tr>
<td>E 4</td>
<td>System error</td>
<td></td>
</tr>
<tr>
<td>E 6</td>
<td>System error</td>
<td></td>
</tr>
<tr>
<td>E 8</td>
<td>System error</td>
<td></td>
</tr>
</tbody>
</table>

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

Attachment

Caution

Attachment

Precautions on piping
**PFG300 Series**

**Function Details**

- **Output operation**
  The output operation can be selected from the following:
  - Output (hysteresis mode and window comparator mode) corresponding to instantaneous flow or output (accumulated output and pulse output) corresponding to accumulated flow.
  - Green for ON, Red for OFF
  - Red for ON, Green for OFF
  - Red all the time
  - Green all the time
  (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.

  - Display color: Green for ON, Red for OFF
  - Red for ON, Green for OFF
  - Red all the time
  - Green all the time

- **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.
  (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: 0 s)

- **FUNC output switching function**
  Analog output, external input, or copy function can be selected.
  (Default setting: Analog output)

- **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)

- **External input function**
  The accumulated flow, peak value, and bottom value can be reset remotely.
  **Accumulated value external reset**: A function to reset the accumulated flow value when an external input signal is applied.
  In accumulated increment mode, the accumulated value will reset to and increase from zero.
  In accumulated decrement mode, the accumulated value will reset to and decrease from the set value.
  - When the accumulated value is stored to memory, every time the accumulated value external reset is activated, the memory will be accessed. Take into consideration that the maximum number of times the memory can be accessed is 1.5 million times.
  - The total number of external inputs and the accumulated value memorizing time interval should not exceed 1.5 million times.

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

- **Forced output function**
  The output is turned on/off in a fixed state when starting the system or during maintenance. This enables 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 is not cleared even when the power supply is turned off. The accumulated value is memorized every 2 or 5 minutes during measurement and continues from the last memorized value when the power supply is turned on again.
  The maximum writable limit of the memory device is 1.5 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.

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

- **Keylock 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.

- **Display with zero cut-off setting**
  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 function will force the display to zero. The range to display zero can be changed.
Selection of display on sub screen

The display on the sub screen in measuring mode can be set.

<table>
<thead>
<tr>
<th>Set value display</th>
<th>Accumulated value display</th>
<th>Peak value display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displays the set value</td>
<td>Displays the accumulated value</td>
<td>Displays the peak value</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bottom value display</th>
<th>Line name display</th>
<th>OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displays the bottom value</td>
<td>Displays the line name (Up to 5 alphanumeric characters can be input.)</td>
<td>Displays nothing</td>
</tr>
</tbody>
</table>

Analog output free range 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>OUT over current error</td>
<td>A load current of 80 mA or more is applied to the switch output (OUT).</td>
<td>Eliminate the cause of the over current by turning off the power supply and then turning it on again.</td>
</tr>
<tr>
<td>Er 2</td>
<td>Instantaneous flow error</td>
<td>The flow rate exceeds the maximum value of the display range.</td>
<td>Decrease the flow rate.</td>
</tr>
<tr>
<td>Er 999</td>
<td>Reverse flow error</td>
<td>There is a reverse flow equivalent to –5% or more.</td>
<td>Change the flow to the correct direction.</td>
</tr>
<tr>
<td>Er 9999</td>
<td>Accumulated flow error</td>
<td>The flow rate exceeds the accumulated flow rate range.</td>
<td>Clear the accumulated flow rate.</td>
</tr>
<tr>
<td>Er 10</td>
<td>System error</td>
<td>Internal data error</td>
<td>Turn the power off and then on again.</td>
</tr>
<tr>
<td>Er 11</td>
<td>Copy error</td>
<td>The copy function does not operate properly.</td>
<td>After clearing the error by pressing the and buttons simultaneously for a minimum of 1 second, check the wiring and the model, and then attempt to copy again.</td>
</tr>
</tbody>
</table>

If the error cannot be solved after the instructions above are performed, please contact SMC for investigation.
■ Copy function
The settings of the master monitor can be copied to the slave monitors, reducing setting labor and minimizing the risk of setting mistakes.

The set value can be copied to up to 10 flow monitors simultaneously.
(Maximum transmission distance: 4 m)

1) Wire as shown in the figure on the left.
2) Select the slave monitor which is to be the master, and change it into a master using the buttons. (In the default setting, all flow monitors are set as slaves.)
3) Press the button on the master monitor to start copying.

■ Selection of power saving mode
Power saving mode can be selected.
It shifts to the power saving mode without button operation for 30 seconds.
It is set to the normal mode (Power saving mode is OFF.) at a time of shipment from the factory.
(During power saving mode, [ECo] will flash in the sub screen and the operation light is ON (only when the switch is ON.).)

* There may be a difference in the displayed value on the connected flow switch and the flow monitor. When the flow monitor display is being used, it is recommended to set the flow switch display to OFF mode.
### 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). Moreover, other safety regulations.

#### Caution:
- Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

#### Warning:
- Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

#### Danger:
- Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

### 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.

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.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

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.

### 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.

2) Vacuum pads are excluded from this 1 year warranty. A vacuum pad is a consumable part, so it is warranted for a year after it is delivered. Also, even within the warranty period, the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

### 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.

### Safety Instructions

Be sure to read the “Handling Precautions for SMC Products” (M-E03-3) and “Operation Manual” before use.