3-Color Display
Digital Flow Switch

**Applicable fluid**
Dry air, N₂

**3-color/2-screen display**

- Instantaneous flow rate (Main screen)
- Set value (Sub screen)

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

<table>
<thead>
<tr>
<th>Flow ratio**2</th>
<th>100:1</th>
</tr>
</thead>
</table>

**Flow ratio**

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

**Smallest settable increment**
1 L/min

**Current PF2A:** 5 L/min

**Compact, Space saving**

Compared with the current PF2A

- **Weight**: 78% reduction
  - 1100 g → 240 g
- **Mounting space**: 74% reduction
  - Compared with the PFMC7202-06 and PF2A703H-10

**Smaller dimensions**

- **PF2A series**
  - (Current model)
  - 90 mm shorter

**PFMC Series**

**New**

**3-Screen Display**
Digital Flow Monitor
Allows for the monitoring of remote lines

**Applicable fluid**
Dry air, N₂

**RoHS**

**IP65**
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.

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

Applications
- Flow control of equipment, main line and branch line
  Remote control is possible with accumulated pulse.
- Accumulated indication shows the operating flow rate or residual amount (of N2, etc.) in a gas cylinder.
- Flow control of the air for spray painting

Example of recommended pneumatic circuit

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.
- 3-color/2-screen display, improved visibility
- Remote control is possible with accumulated pulse.
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.

Easy Screen Switching

It is possible to change the settings while checking the measured value.

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 can be switched by pressing the up/down buttons.

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.

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.
NPN/PNP Switch Function

The number of stock items can be reduced.

Analog output of 0 to 10 V is also available.

| Voltage output | 1 to 5 V | 0 to 10 V | Switchable |
| Current output | 4 to 20 mA | Fixed |

Convenient Functions

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

Secret code setting function
The key locking function keeps unauthorized persons from tampering with the settings.

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 (Refer to pages 21 to 23 for details.)

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
Display with zero cut-off setting

Selection of display on sub screen
Analog output free range function
Error display function
Copy function
Selection of power-saving mode

Mounting

Bracket configuration allows for mounting in four orientations.

Bracket A

Panel mount

Mountable side by side without clearance

One opening!
- Reduced panel fitting labor
- Space saving
# 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><img src="chart1.png" alt="Bar Chart" /></td>
</tr>
<tr>
<td><strong>PFM</strong></td>
<td>Dry air, N₂, Ar, CO₂</td>
<td>Thermal type (MEMS)</td>
<td><img src="chart2.png" alt="Bar Chart" /></td>
</tr>
<tr>
<td><strong>PFMB</strong></td>
<td>Dry air, N₂</td>
<td>Thermal type (MEMS), Bypass flow type</td>
<td><img src="chart3.png" alt="Bar Chart" /></td>
</tr>
<tr>
<td><strong>PFMC</strong></td>
<td>Dry air, N₂</td>
<td>Thermal type (MEMS), Bypass flow type</td>
<td><img src="chart4.png" alt="Bar Chart" /></td>
</tr>
<tr>
<td><strong>PF2A</strong></td>
<td>Air, N₂</td>
<td>Thermal type (Thermistor)</td>
<td><img src="chart5.png" alt="Bar Chart" /></td>
</tr>
<tr>
<td><strong>PF3A7H</strong></td>
<td>Air, N₂</td>
<td>Thermal type (Platinum sensor), Bypass flow type</td>
<td><img src="chart6.png" alt="Bar Chart" /></td>
</tr>
</tbody>
</table>

### Availability of the Digital Flow Monitor

- **PFG300** on page 7
- **PFG300** on page 13
## 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</th>
<th>PFG300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitor unit</td>
<td>Monitor unit IP40</td>
<td>Monitor unit IP65</td>
<td>Monitor unit IP65</td>
<td>Monitor unit IP65</td>
<td>Monitor unit IP65</td>
<td>Monitor unit IP65</td>
<td>Monitor unit 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>
<td></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>5 to 500 L/min</td>
<td>1 to 10 L/min, 5 to 50 L/min, 10 to 100 L/min, 20 to 2000 L/min</td>
<td>20 to 200 L/min, 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 2000 L/min</td>
<td>1 to 1 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>
</tr>
<tr>
<td>Power supply voltage</td>
<td>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>
<td></td>
</tr>
<tr>
<td>Temperature characteristics</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>±3% F.S. (15 to 35°C), ±5% F.S. (0 to 50°C)</td>
<td>±5% F.S. (0 to 50°C)</td>
<td></td>
</tr>
<tr>
<td>Repeatability</td>
<td>±1% F.S. (Fluid: Dry air), Analog output ±5% F.S.</td>
<td>±1% F.S. (Fluid: Dry air), Analog output ±5% F.S.</td>
<td>±1% F.S. (Fluid: Dry air), Analog output ±5% F.S.</td>
<td>±1% F.S. (Fluid: Dry air), Analog output ±5% F.S.</td>
<td>±1% F.S. (Fluid: Dry air), Analog output ±5% F.S.</td>
<td>±1% F.S. (Fluid: Dry air), Analog output ±5% F.S.</td>
<td></td>
</tr>
<tr>
<td>Hysteresis mode</td>
<td>Variable</td>
<td>Variable</td>
<td>Variable</td>
<td>Variable</td>
<td>Variable</td>
<td>Variable</td>
<td>Variable</td>
</tr>
<tr>
<td>Output</td>
<td>NPN/PNP open collector, Analog voltage output, Analog current output</td>
<td>NPN/PNP open collector, Analog voltage output, Analog current output</td>
<td>NPN/PNP open collector, Analog voltage output, Analog current output</td>
<td>NPN/PNP open collector, Analog voltage output, Analog current output</td>
<td>NPN/PNP open collector, Analog voltage output, Analog current output</td>
<td>NPN/PNP open collector, Analog voltage output, Analog current output</td>
<td>NPN/PNP open collector, Analog voltage output, Analog current output</td>
</tr>
<tr>
<td>Display</td>
<td>2-color LCD display</td>
<td>2-color LCD display</td>
<td>2-color LCD display</td>
<td>3-color LCD display</td>
<td>LED display</td>
<td>3-color LCD display</td>
<td></td>
</tr>
</tbody>
</table>

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

3-Color Display  Digital Flow Switch  PFMC Series
3-Screen Display  Digital Flow Monitor  PFG300 Series

3-Color Display  Digital Flow Switch PFMC Series
How to Order ......................................................... p. 7
Specifications .................................................................. p. 8
Flow Range ..................................................................... p. 9
Analog Output .................................................................. p. 9
Pressure Loss .................................................................. p. 9
IN Side Straight Piping Length and Accuracy .......................... p. 9
Internal Circuits and Wiring Examples ..................................... p. 10
Construction: Parts in Contact with Fluid ................................. p. 11
Dimensions ................................................................... p. 12

3-Screen Display  Digital Flow Monitor PFG300 Series
How to Order ................................................................. p. 13
Specifications ................................................................... p. 14
Internal Circuits and Wiring Examples ....................................... p. 15
Dimensions ................................................................... p. 16

PFMC/Function Details ...................................................... p. 19
PFG300/Function Details .................................................... p. 21
Safety Instructions ................................................................ Back Cover
3-Color Display
Digital Flow Switch
PFMC Series

How to Order

PFMC 7 501-04-A-M

Rated flow range
- 501: 5 to 500 L/min
- 102: 10 to 1000 L/min
- 202: 20 to 2000 L/min

Thread type
- Nil
- Rc
- N
- NPT
- F
- G

*1 ISO228 compliant

Port size

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Port size</th>
<th>Rated flow range</th>
</tr>
</thead>
<tbody>
<tr>
<td>04</td>
<td>1/2</td>
<td>501 102 202</td>
</tr>
<tr>
<td>06</td>
<td>3/4</td>
<td>---</td>
</tr>
</tbody>
</table>

Output specification

<table>
<thead>
<tr>
<th>Symbol</th>
<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>
<td>---</td>
</tr>
<tr>
<td>B</td>
<td>NPN</td>
<td>PNP</td>
<td>---</td>
</tr>
<tr>
<td>C</td>
<td>NPN</td>
<td>Analog (1 to 5 V)</td>
<td>PFG300 series</td>
</tr>
<tr>
<td>D</td>
<td>NPN</td>
<td>Analog (4 to 20 mA)</td>
<td>PFG310 series</td>
</tr>
<tr>
<td>E</td>
<td>NPN</td>
<td>Analog (1 to 5 V)</td>
<td>PFG300 series</td>
</tr>
<tr>
<td>F</td>
<td>NPN</td>
<td>Analog (4 to 20 mA)</td>
<td>PFG310 series</td>
</tr>
<tr>
<td>G</td>
<td>NPN</td>
<td>External input*3</td>
<td>---</td>
</tr>
<tr>
<td>H</td>
<td>PNP</td>
<td>External input*3</td>
<td>---</td>
</tr>
</tbody>
</table>

*2 Made to order
*3 Can be selected from accumulated value external reset and peak/bottom value reset.

Calibration certificate
- Nil: None
- A*: Yes

*8 Made to order: Certificate in both English and Japanese

Option 2

<table>
<thead>
<tr>
<th>Nil</th>
<th>No bracket</th>
</tr>
</thead>
<tbody>
<tr>
<td>With bracket*7</td>
<td></td>
</tr>
</tbody>
</table>

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

Option 1

<table>
<thead>
<tr>
<th>Nil</th>
<th>With lead wire and M8 connector (3 m)*4</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Without lead wire and M8 connector</td>
</tr>
</tbody>
</table>

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

Unit specification

<table>
<thead>
<tr>
<th>Nil</th>
<th>Units selection function*5</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>SI unit only*6</td>
</tr>
</tbody>
</table>

*5 This product is for overseas use only according to the New Measurement Act. (The SI unit type is provided for use in Japan.)
*6 Fixed unit: Instantaneous flow: L/min, Accumulated flow: L

Options/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-40-A</td>
<td>Lead wire and M8 connector</td>
<td>Length: 3 m</td>
</tr>
<tr>
<td>ZS-42-A</td>
<td>Bracket</td>
<td>Mounting screw for PFMC7501/7102 (M3 x 5, 2 pcs.)</td>
</tr>
<tr>
<td>ZS-42-B</td>
<td>Bracket</td>
<td>Mounting screw for PFMC7202 (M3 x 5, 2 pcs.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<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>
<td>---</td>
</tr>
<tr>
<td>B</td>
<td>NPN</td>
<td>PNP</td>
<td>---</td>
</tr>
<tr>
<td>C</td>
<td>NPN</td>
<td>Analog (1 to 5 V)</td>
<td>PFG300 series</td>
</tr>
<tr>
<td>D</td>
<td>NPN</td>
<td>Analog (4 to 20 mA)</td>
<td>PFG310 series</td>
</tr>
<tr>
<td>E</td>
<td>NPN</td>
<td>Analog (1 to 5 V)</td>
<td>PFG300 series</td>
</tr>
<tr>
<td>F</td>
<td>NPN</td>
<td>Analog (4 to 20 mA)</td>
<td>PFG310 series</td>
</tr>
<tr>
<td>G</td>
<td>NPN</td>
<td>External input*3</td>
<td>---</td>
</tr>
<tr>
<td>H</td>
<td>PNP</td>
<td>External input*3</td>
<td>---</td>
</tr>
</tbody>
</table>

*2 Made to order
*3 Can be selected from accumulated value external reset and peak/bottom value reset.
### Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>PFMC7501</th>
<th>PFMC7102</th>
<th>PFMC7202</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fluid</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applicable fluid</td>
<td>Dry air, N2</td>
<td>Dry air, N2</td>
<td>Dry air, N2</td>
</tr>
<tr>
<td>Fluid temperature range</td>
<td>0 to 50°C</td>
<td>0 to 50°C</td>
<td>0 to 50°C</td>
</tr>
<tr>
<td><strong>Pressure</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated pressure range</td>
<td>0 to 0.8 MPa</td>
<td>0 to 0.8 MPa</td>
<td>0 to 0.8 MPa</td>
</tr>
<tr>
<td>Max. applied voltage (V)</td>
<td>28 VDC</td>
<td>28 VDC</td>
<td>28 VDC</td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>10 to 1050 L/min</td>
<td>10 to 1050 L/min</td>
<td>10 to 1050 L/min</td>
</tr>
<tr>
<td>Current consumption</td>
<td>55 mA or less</td>
<td>55 mA or less</td>
<td>55 mA or less</td>
</tr>
<tr>
<td>Protection</td>
<td>Polarity protection</td>
<td>Polarity protection</td>
<td>Polarity protection</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Display accuracy</td>
<td>±5% F.S. (0 to 0.8 MPa, 0.6 MPa standard)</td>
<td>±5% F.S. (0 to 0.8 MPa, 0.6 MPa standard)</td>
<td>±5% F.S. (0 to 0.8 MPa, 0.6 MPa standard)</td>
</tr>
<tr>
<td>Analog output accuracy</td>
<td>±3% F.S.</td>
<td>±3% F.S.</td>
<td>±3% F.S.</td>
</tr>
<tr>
<td>Repeatability</td>
<td>±1% F.S. (±2% F.S. when response time is set to 0.05 s)</td>
<td>±1% F.S. (±2% F.S. when response time is set to 0.05 s)</td>
<td>±1% F.S. (±2% F.S. when response time is set to 0.05 s)</td>
</tr>
<tr>
<td>Temperature characteristics</td>
<td>±5% F.S. (0 to 50°C, 25°C standard)</td>
<td>±5% F.S. (0 to 50°C, 25°C standard)</td>
<td>±5% F.S. (0 to 50°C, 25°C standard)</td>
</tr>
<tr>
<td><strong>Switch output</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output type</td>
<td>NPN open collector</td>
<td>NPN open collector</td>
<td>NPN open collector</td>
</tr>
<tr>
<td>Output mode</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>
<td>Select from Hysteresis, Window comparator, Accumulated output or Accumulated pulse output modes.</td>
</tr>
<tr>
<td>Switch operation</td>
<td>Select from Normal or Reversed output.</td>
<td>Select from Normal or Reversed output.</td>
<td>Select from Normal or Reversed output.</td>
</tr>
<tr>
<td>Max. load current</td>
<td>80 mA</td>
<td>80 mA</td>
<td>80 mA</td>
</tr>
<tr>
<td>Max. applied voltage (V)</td>
<td>28 VDC</td>
<td>28 VDC</td>
<td>28 VDC</td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>10 to 1050 L/min</td>
<td>10 to 1050 L/min</td>
<td>10 to 1050 L/min</td>
</tr>
<tr>
<td>Current consumption</td>
<td>55 mA or less</td>
<td>55 mA or less</td>
<td>55 mA or less</td>
</tr>
<tr>
<td>Protection</td>
<td>Polarity protection</td>
<td>Polarity protection</td>
<td>Polarity protection</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Display accuracy</td>
<td>±5% F.S. (0 to 0.8 MPa, 0.6 MPa standard)</td>
<td>±5% F.S. (0 to 0.8 MPa, 0.6 MPa standard)</td>
<td>±5% F.S. (0 to 0.8 MPa, 0.6 MPa standard)</td>
</tr>
<tr>
<td>Analog output accuracy</td>
<td>±3% F.S.</td>
<td>±3% F.S.</td>
<td>±3% F.S.</td>
</tr>
<tr>
<td>Repeatability</td>
<td>±1% F.S. (±2% F.S. when response time is set to 0.05 s)</td>
<td>±1% F.S. (±2% F.S. when response time is set to 0.05 s)</td>
<td>±1% F.S. (±2% F.S. when response time is set to 0.05 s)</td>
</tr>
<tr>
<td>Temperature characteristics</td>
<td>±5% F.S. (0 to 50°C, 25°C standard)</td>
<td>±5% F.S. (0 to 50°C, 25°C standard)</td>
<td>±5% F.S. (0 to 50°C, 25°C standard)</td>
</tr>
<tr>
<td><strong>Digital Display</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main screen display</td>
<td></td>
<td>4 digits, 7 segments</td>
<td>6 digits, 11 segments</td>
</tr>
<tr>
<td>Sub screen display</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main screen: Red/Green</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub screen: White</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LCD, 2-screen display (Main screen/Sub screen)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum load impedance: 50 kΩ or more (50 VDC measured via megohmmeter) between terminals and housing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum load impedance: 50 kΩ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum load impedance: 50 kΩ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response time</td>
<td>Linked with the response time of the switch output.</td>
<td>Linked with the response time of the switch output.</td>
<td>Linked with the response time of the switch output.</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>Variable from 0</td>
<td>Variable from 0</td>
<td>Variable from 0</td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enclosure</td>
<td>IP65</td>
<td>IP65</td>
<td>IP65</td>
</tr>
<tr>
<td>Withstand voltage</td>
<td>250 VAC for 1 min between terminals and housing</td>
<td>250 VAC for 1 min between terminals and housing</td>
<td>250 VAC for 1 min between terminals and housing</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>2 MΩ or more (50 VDC measured via megohmmeter) between terminals and housing</td>
<td>2 MΩ or more (50 VDC measured via megohmmeter) between terminals and housing</td>
<td>2 MΩ or more (50 VDC measured via megohmmeter) between terminals and housing</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>Operating: 0 to 50°C, Stored: –10 to 60°C (No condensation or freezing)</td>
<td>Operating: 0 to 50°C, Stored: –10 to 60°C (No condensation or freezing)</td>
</tr>
<tr>
<td>Operating humidity range</td>
<td>Operating/Store: 35 to 80% RH (No condensation or freezing)</td>
<td>Operating/Store: 35 to 80% RH (No condensation or freezing)</td>
<td>Operating/Store: 35 to 80% RH (No condensation or freezing)</td>
</tr>
</tbody>
</table>

**Notes:**
1. 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:
   - 5 min interval: life is calculated as 2 min x 1 million = 5 million min = 9 years
   - 2 min interval: life is calculated as 2 min x 1 million = 2 million min = 3.6 years
2. If the accumulated value external reset is repeatedly used, the product life will be shorter than the calculated life.
3. If the product is used with the piping port released to the atmosphere without connecting piping, the product life will be shorter than the calculated life.
4. If the fluid flow rate changes from 0 to the maximum flow provided by the switch, the output may change by up to 1% of the rated flow rate.
5. Other than scratching, may 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>PFMC7501</td>
<td>5 L/min</td>
<td>500 L/min</td>
</tr>
<tr>
<td>PFMC7102</td>
<td>10 L/min</td>
<td>1000 L/min</td>
</tr>
<tr>
<td>PFMC7202</td>
<td>20 L/min</td>
<td>2000 L/min</td>
</tr>
</tbody>
</table>

Analog Output

<table>
<thead>
<tr>
<th>Flow/Analog Output</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage output</td>
<td>1 V</td>
<td>1.04 V</td>
<td>5 V</td>
</tr>
<tr>
<td>Current output</td>
<td>4 mA</td>
<td>4.16 mA</td>
<td>20 mA</td>
</tr>
</tbody>
</table>

Pressure Loss (Reference Data)

<table>
<thead>
<tr>
<th>Model</th>
<th>Flow Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFMC7501 (for 500 L/min)</td>
<td>-100 to 500 L/min</td>
</tr>
<tr>
<td>PFMC7102 (for 1000 L/min)</td>
<td>-50 to 525 L/min</td>
</tr>
<tr>
<td>PFMC7202 (for 2000 L/min)</td>
<td>-100 to 2100 L/min</td>
</tr>
</tbody>
</table>

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.
- If a straight section of piping is not installed, the accuracy can vary by approximately ±2% F.S.
- “Straight section” means a part of the piping without any bends or rapid changes in the cross-sectional area.
- When the PFMC7501 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.
Internal Circuits and Wiring Examples

NPN (2 outputs) type
PFMC7-\-A

NPN (1 output) + Analog (1 to 5 V) output type
PFMC7-\-C

NPN (1 output) + Analog (4 to 20 mA) output type
PFMC7-\-D

NPN (1 output) + External input type
PFMC7-\-G

PNP (2 outputs) type
PFMC7-\-B

PNP (1 output) + Analog (1 to 5 V) output type
PFMC7-\-E

PNP (1 output) + Analog (4 to 20 mA) output type
PFMC7-\-F

PNP (1 output) + External input type
PFMC7-\-H

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

C: Analog output: 1 to 5 V
Output impedance: 1 kΩ
D: Analog output: 4 to 20 mA
Max. load impedance: 600 Ω
Min. load impedance: 50 Ω

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

E: Analog output: 1 to 5 V
Output impedance: 1 kΩ
F: Analog output: 4 to 20 mA
Max. load impedance: 600 Ω
Min. load impedance: 50 Ω

Max. load current: 80 mA, Internal voltage drop: 1.5 V or less
External input: Input voltage 0.4 V or less (Reed or Solid state input) for 30 ms or longer

Accumulated pulse output wiring examples

NPN (2 outputs) type
PFMC7-\-A

NPN (1 output) + Analog output type
PFMC7-\-C

NPN (1 output) + External input type
PFMC7-\-G

Max. 28 V, 80 mA

PFG300 PFMC

Function Details
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>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>Aluminum alloy Anodized</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>Holder</td>
<td>Stainless steel 304</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>C retaining ring</td>
<td>Stainless steel 304</td>
<td></td>
</tr>
</tbody>
</table>
**Dimensions**

**PFMC7501/7102/7202**

![Diagram of PFMC7501/7102/7202 dimensions]

<table>
<thead>
<tr>
<th>Model</th>
<th>Symbol</th>
<th>Port size</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>PFMC7501/1102</td>
<td></td>
<td>Rc1/2, NPT1/2</td>
<td>70</td>
<td>30</td>
<td>60.6</td>
<td>41.2</td>
<td>15</td>
<td>14</td>
<td>26</td>
<td>18</td>
<td>13.6</td>
</tr>
<tr>
<td>PFMC7202</td>
<td></td>
<td>Rc3/4, NPT3/4, G3/4</td>
<td>90</td>
<td>35</td>
<td>66.1</td>
<td>46.7</td>
<td>17.5</td>
<td>24</td>
<td>31</td>
<td>28</td>
<td>16.8</td>
</tr>
<tr>
<td>PFMC7501/7102</td>
<td></td>
<td>G1/2</td>
<td>76</td>
<td>30</td>
<td>60.6</td>
<td>41.2</td>
<td>15</td>
<td>14</td>
<td>26</td>
<td>18</td>
<td>13.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Symbol</th>
<th>Bracket dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFMC7501/7102</td>
<td></td>
<td>S 24 22 32 40 50</td>
</tr>
<tr>
<td>PFMC7202</td>
<td></td>
<td>30 30 42 48 58</td>
</tr>
</tbody>
</table>

**Lead wire and M8 connector**

(Part no.: ZS-40-A)

<table>
<thead>
<tr>
<th>Pin no.</th>
<th>Pin name</th>
<th>Wire color</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DC (+)</td>
<td>Brown</td>
</tr>
<tr>
<td>2</td>
<td>OUT2</td>
<td>White</td>
</tr>
<tr>
<td>3</td>
<td>DC (−)</td>
<td>Blue</td>
</tr>
<tr>
<td>4</td>
<td>OUT1</td>
<td>Black</td>
</tr>
</tbody>
</table>

* 4-wire type lead wire and M8 connector used for the PFMC7 series
* Refer to the operation manual in our website for wiring.

**Cable Specifications**

- **Conductor**: Nominal cross section AWG23
- **Outside diameter**: Approx. 0.7 mm
- **Material**: Heat-resistant PVC
- **Outside diameter**: Approx. 1.1 mm
- **Color**: Brown, White, Black, Blue
- **Sheath Material**: Heat-and oil-resistant PVC
- **Finished outside diameter**: Ø4
3-Screen Display
Digital Flow Monitor

PFG300 Series

How to Order

PFG 3 0 0 – RT – M – L

Type

Option 3

Option 4

Nil None
Y — —
K 0 0
T — —

Operation manual Calibration certificate

Symbol Description Applicable flow switch model
0 Voltage input PFMC7:C/E series
1 Current input PFMC7:D/F series

Output specification

Option 2

Symbol Description
Nil None
A1 Bracket A (Vertical mounting)
A2 Bracket B (Horizontal mounting)

Unit specification

nil Units selection function*3
M SI unit only*4

*3 This product is for overseas use only according to the New Measurement Act. (The SI unit type is provided for use in Japan.)
*4 Fixed unit: Instantaneous flow: L/min Accumulated flow: L

Input specification

Options/Part Nos.
When only optional parts are required, order with the part numbers listed below.

Part no. Description
ZS-28-CA-4 Sensor connector For PFMC
ZS-46-A1 Bracket A Tapping screw: Nominal size 3 x 8 L (2 pcs.)
ZS-46-A2 Bracket B Tapping screw: Nominal size 3 x 8 L (2 pcs.)
ZS-46-B Panel mount adapter
ZS-46-D Panel mount adapter + Front protection cover
ZS-46-5L Power supply/output connection lead wire 5-core, 2 m
ZS-27-01 Front protection cover

Connection Example

Sensor connector

Power supply/output connection lead wire

Lead wire and M8 connector (Option for PFMC)
## Specifications

### Flow

<table>
<thead>
<tr>
<th>Model</th>
<th>PFMC7501</th>
<th>PFMC7102</th>
<th>PFMC7202</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated flow range</td>
<td>5 to 500 L/min</td>
<td>10 to 1000 L/min</td>
<td>20 to 2000 L/min</td>
</tr>
</tbody>
</table>

#### Set point range
- Instantaneous flow<br>- Accumulated flow

#### Smallest settable increment
- Instantaneous flow<br>- Accumulated flow

#### Accuracy
- Instantaneous flow: ±0.5% F.S.<br>- Accumulated flow: ±0.1% F.S. (at 0.00 s)

### Switch output

- Power supply voltage: 12 to 24 VDC ±10%
- Current consumption: 25 mA or less
- Max. load current: 80 mA
- Max. applied voltage (NPN only): 30 VDC
- Internal voltage drop (Residual voltage): NPN output: 1 V or less (at load current of 80 mA), PNP output: 1.5 V or less (at load current of 80 mA)
- Response time: 3 ms or less

#### Output mode
- Select from Hysteresis, Window comparator, Accumulated output, Accumulated pulse output, Error output, or Switch output OFF modes.

#### Protection
- Short circuit protection
- Polarity protection

### Analog output

- **Output type**: Voltage output: 1 to 5 V, 0 to 10 V (only when the power supply voltage is 24 VDC)
  - Current output: 4 to 20 mA (0 L/min to maximum value of the rated flow)
- **Impedance**: Output impedance: 1 kΩ
- **Response time**: 50 ms or less

#### External input

- Input mode: Select from Accumulated value external reset or Peak/Bottom value reset.

### Sensor input

- **Input type**: Voltage input: 1 to 5 VDC (Input impedance: 1 MΩ), Current input: 4 to 20 mA DC (Input impedance: 51 Ω)
- **Minimum display unit**: (0 L/min to maximum value of the rated flow)
- **Input voltage**: 0.4 V or less (Reed or Solid state) for 30 ms or longer

### Display

- **Display mode**: Select from Instantaneous flow or Accumulated flow.
- **Unit**: L/min, cfm (ft³/min)
- **Display range**: L/min, L x 10⁶, ft³/min, ft³ x 10⁶
- **Minimum display unit**: 1 L/min
- **Display type**: LCD
- **Number of displays**: 3-screen display (Main screen, Sub screen)
- **Display color**: 1) Main screen: Red/Green, 2) Sub screen: Orange
- **Number of display digits**: 1) Main screen: 5 digits (7 segments), 2) Sub screen: 9 digits (7 segments)
- **Indicator LED**: LED ON when switch output is ON, OUT1/2: Orange

### Digital filter

- **Select from**: 0.00, 0.05 to 0.1 s (increment of 0.01 s), 0.1 to 1.0 s (increment of 1 s), 1 s to 10 s (increment of 1 s), 20 s, 30 s, 40 s, 50 s, or 60 s

### Environment

- **Enclosure**: IP40
- **Withstand voltage**: 1000 VAC for 1 min between terminals and housing
- **Insulation resistance**: 50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing
- **Operating temperature range**: Operating: 0 to 50°C, Stored: −10 to 60°C (No condensation or freezing)
- **Operating humidity range**: Operating/Stored: 35 to 85% RH (No condensation or freezing)

### Standards

- CE, RoHS

### Weight

- **Body**: 25 g (Excluding the power supply/output connection lead wire)
- **Lead wire with connector**: +39 g

---

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, use 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
   - 1 min interval: life is calculated as 2 min x 1.5 million = 3 million min = 5.7 years
4. If the flow fluctuates around the set value, be sure to keep a sufficient margin. 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. The accumulated flow display is the upper 6-digit and lower 6-digit (total of 12 digits) display. When the upper digits are displayed, x 10⁶ lights up.
10. Products with tiny scratches, smears, or display color or brightness variations which do not affect the performance of the product are verified as conforming products.
11. The response time indicates when the set value is 90% in relation to the step input.
12. Setting is only possible for models with external input.
13. The response time indicates when the set value is 90% in relation to the step input.
14. Setting is only possible for models with external input.
15. The response time indicates when the set value is 90% in relation to the step input.
16. Setting is only possible for models with external input.
17. The response time indicates when the set value is 90% in relation to the step input.
Internal Circuits and Wiring Examples

-XY
-RT
-SV
NPN (2 outputs) + Copy function

-RT: NPN (2 outputs) + Analog voltage output
-SV: NPN (2 outputs) + Analog current output

-RT: NPN (2 outputs) + External input
-SV: NPN (2 outputs) + External input

Accumulated pulse output wiring examples

NPN (2 outputs) type

PNP (2 outputs) type
Bracket A
(Part no.: ZS-46-A1)

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

Bracket configuration allows for mounting in four orientations.
PFG300 Series

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-CA-4)

Cable Specifications

<table>
<thead>
<tr>
<th>Pin no.</th>
<th>Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DC (+)</td>
</tr>
<tr>
<td>2</td>
<td>N.C.</td>
</tr>
<tr>
<td>3</td>
<td>DC (−)</td>
</tr>
<tr>
<td>4</td>
<td>IN⁺⁺</td>
</tr>
</tbody>
</table>

PFG300 Series

Panel thickness 0.5 to 7

Conductor area | 0.15 mm² (AWG26)
O.D.           | 1.0 mm
Color          | Brown, Blue, Black, White, Gray (5-core)
Sheath Finished O.D. | ø3.5

=1 1 to 5 V or 4 to 20 mA
Panel fitting dimensions

Individual mounting

Multiple (2 pcs. or more) secure mounting

Panel mount example

<Horizontal>

<Vertical>

Panel mount example

<Horizontal>

<Vertical>
**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.

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

**Display color**

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

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

**Reference condition**

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

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

**Display mode**

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

- Instantaneous flow display
- Accumulated flow display

**Response time**

The response time can be selected to suit the application.

- Default setting: 1 s
- 0.05 s
- 0.1 s
- 0.5 s
- 1 s
- 2 s

**Selection of display on sub screen**

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

- Set value display
  - Displays the set value (The set value of OUT2 cannot be displayed.)
- Accumulated value display
  - Displays the accumulated value (The accumulated value of OUT2 cannot be displayed.)
- Peak value display
  - Displays the peak value
- Bottom value display
  - Displays the bottom value
- Line name display
  - Displays the line name (Up to 6 alphanumeric characters can be input.)
- OFF
  - Displays nothing

**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 the 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. 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.

- 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 20 mA, and when OFF, it will be 1 V or 4 mA.

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

**Accumulated value hold**

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.

**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.

**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.

**Error display function**

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

<table>
<thead>
<tr>
<th>Display</th>
<th>Description</th>
<th>Contents</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Er1</td>
<td>OUT1 over current</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>Er2</td>
<td>OUT2 over current</td>
<td>Load current of 80 mA or more is applied to the switch output (OUT2).</td>
<td></td>
</tr>
<tr>
<td>HHHH</td>
<td>Instantaneous flow</td>
<td>The flow rate exceeds the maximum value of the display range.</td>
<td>Decrease the flow rate.</td>
</tr>
<tr>
<td>LLLL</td>
<td>Reverse flow</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>999999999</td>
<td>Accumulated flow</td>
<td>The flow rate exceeds the accumulated flow rate range.</td>
<td>Clear the accumulated flow rate.</td>
</tr>
<tr>
<td>PFMC7501 PFMC7102 PFMC7202</td>
<td>error</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ErD</td>
<td>System error</td>
<td>Displayed if an internal error has occurred.</td>
<td>Turn the power off and then on again.</td>
</tr>
<tr>
<td>Er4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Er6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Er8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

- **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 the 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>Display</th>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displays the set value</td>
<td>Eliminate the cause of the over current by turning off the power supply and then turning it on again.</td>
<td></td>
</tr>
<tr>
<td>Displays the accumulated value</td>
<td>Decrease the flow rate.</td>
<td></td>
</tr>
<tr>
<td>Displays the peak value</td>
<td>Change the flow to the correct direction.</td>
<td></td>
</tr>
<tr>
<td>Displays the bottom value</td>
<td>Clear the accumulated flow rate.</td>
<td></td>
</tr>
<tr>
<td>Displays nothing</td>
<td></td>
<td></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.

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

<table>
<thead>
<tr>
<th>Display</th>
<th>Description</th>
<th>Contents</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<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>
<td></td>
</tr>
<tr>
<td>Instantaneous flow error</td>
<td>The flow rate exceeds the maximum value of the display range.</td>
<td>Decrease the flow rate.</td>
<td></td>
</tr>
<tr>
<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>
<td></td>
</tr>
<tr>
<td>Accumulated flow error</td>
<td>The flow rate exceeds the accumulated flow rate range.</td>
<td>Clear the accumulated flow rate.</td>
<td></td>
</tr>
<tr>
<td>System error</td>
<td>Displayed if an internal error has occurred.</td>
<td>Turn the power off and then on again.</td>
<td></td>
</tr>
<tr>
<td>Copy error</td>
<td>The copy function does not operate properly.</td>
<td>After clearing the error by pressing the ( \text{[button]} ) and ( \text{[button]} ) buttons simultaneously for a minimum of 1 second, check the wiring and the model, and then attempt to copy again.</td>
<td></td>
</tr>
</tbody>
</table>

If the error cannot be solved after the above instructions 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**

The power-saving mode can be selected. With this function, if no buttons are pressed for 30 s, it shifts to power-saving mode.

At the time of shipment from the factory, the product is set to the normal mode (the power-saving mode is turned off).
(During power-saving mode, [ECo] will flash in the sub screen and the operation light will be 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.
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.

\(^1\) 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.

### Safety Instructions

**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.

### 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.**

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.

**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.

**Notice:** The digital flow monitor PFG300 series has been added.

### Warning

**1. Hazard “Danger”**

As indicated in the information, “Danger” (indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

**2. Hazard “Caution”**

As indicated in the information, “Caution” (indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

**3. Hazard “Warning”**

As indicated in the information, “Warning” (indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

### 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 use 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.**

### 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.

**2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.**

This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

**3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalog for the particular products.**

- 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.

### 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 use 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.

### Revision History

- The digital flow monitor PFG300 series has been added.
- Number of pages has been increased from 16 to 28.

**VU**