3-Color Display

Digital Flow Switch for Large Flow

- **Flow range**: Max. 12000 L/min
- **Flow ratio**\(^1\) 100:1 Wide range of flow measurement with one product
  \(^1\) The flow ratio is 20:1 for the current model (PF2A7□□H/Large flow type).

<table>
<thead>
<tr>
<th>Port size</th>
<th>Applicable flow range [L/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>PF3A703H</td>
<td>30 3000 L type</td>
</tr>
<tr>
<td>PF3A706H</td>
<td>60 6000 L type</td>
</tr>
<tr>
<td>PF3A712H</td>
<td>120 12000 L type</td>
</tr>
</tbody>
</table>

- **Improved drainage and resistance to foreign matter**
- **Pressure loss**: 75% reduction\(^1\) (20 kPa → 5 kPa)
  \(^1\) Compared with the current model (PF2A7□□H/Large flow type).

- **Through bore construction**
  Reduced pressure loss
  Maintenance-free fluid passage

**Flow range**

**Applicable fluid** Air, N₂

**PF3A7□□H Series**
### 3-color/ 2-screen display

- 2-screen display: 2-row display of main screen and sub screen

**Upper Main display:** Green At set point

- Instantaneous flow rate
- (Upper Main display)

**Upper Main display:** Red At set point

- Accumulated value
- Line name

- Either “input of line name” or “Display OFF” can be added via the function settings.

### Smallest settable increment: 2 L/min

Current model (PF2A7□H/Large flow type): 5 L/min

### Grease-free

### Display rotates 90° and can be reversed.

The display can be rotated in increments of 90° according to the installation. The display can be reversed for easy operation.

#### Installation Example

- Reversed display OFF
- (Can be set with the “Reversible display mode.”)
### Functions
(Refer to pages 20 and 21 for details.)

- Output operation
- Simple setting mode
- Display color
- Reference condition
- Response time
- FUNC output switching function
  - (Analog output ⇄ External input)
- Selectable Analog output function
- External input function
- Forced output function
- Accumulated value hold
- Peak/Bottom value display
- Display OFF mode
- Setting of security code
- Keylock function
- Reset to the default settings
- Reversible display mode
- Zero cut function
- Selection of display on sub screen
- Analog output free range function
- Error display function

### Application
- Flow control of equipment, main line, and branch line

Remote control is possible with accumulated pulse.

### 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.

### Energy Saving Program
For details, refer to the SMC website.

[http://www.smcworld.com](http://www.smcworld.com) SMC Model Selection Software

---

**Energy Saving Program**

Allows you to perform various calculations necessary to improve the pneumatic energy saving.

This software is the evaluation version. After downloading the software, refer to the user manual or contact the factory.

Download the program

Ver.4,1.02 2017/03/23 Update

How to Install
3-Screen Display  Digital Flow Monitor
PFG300 Series  p.14

Allows for the Monitoring of Remote Lines

Centralized flow control

The flow rate of a flow switch installed in a distant location can be confirmed!

Visualization of Settings

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

Current model

Switches between displays

Current model

Current model

Current model

Current model

New PFG300

Always displayed on one screen

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.

1

Push

Use the or button to adjust to the set value.

2

Push

Setting complete

3

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.

<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.

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

**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/Botom 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**

The bracket configuration allows for mounting in four orientations.

**Compact & Lightweight**

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

**Input Range Selection (for Pressure/Flow rate)**

The displayed value to the sensor input can be set as required.

(Voltage input: 1 to 5 V / Current input: 4 to 20 mA)

Pressure switch/Flow switch can be displayed.

A is displayed for 1 V (or 4 mA).
B is displayed for 5 V (or 20 mA).

The range can be set as required.

---

**Selection of display on sub screen**

- 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>Smallest settable increment</th>
<th>Rated flow range [L/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>PF2A</td>
<td>Air, N₂</td>
<td>Thermal type (MEMS)</td>
<td>0.1 L/min</td>
<td>0.2, 3, 5, 10, 20, 50, 100, 200, 300, 600, 1000, 2000, 3000, 6000, 12000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Thermal type (Thermistor)</td>
<td>0.5 L/min</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Thermal type (Platinum sensor)</td>
<td>2 L/min</td>
<td>0.5, 10, 50, 100, 200, 500, 1000, 2000, 3000, 6000, 12000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bypass flow type</td>
<td>20 L/min</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>50 L/min</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>100 L/min</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>200 L/min</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>500 L/min</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1000 L/min</td>
<td></td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2000 L/min</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>3000 L/min</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6000 L/min</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>12000 L/min</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PF3A7□H**

- **PFG300**
- Applicable fluid: Air, N₂
- Detection method: Thermal type (Platinum sensor)
- Rated flow range [L/min]: 0.1, 0.5, 2 L/min
- Bypass flow type

**PFM**

- Applicable fluid: Dry air, N₂, Ar, CO₂
- Detection method: Thermal type (MEMS)
- Rated flow range [L/min]: 0.01, 0.5, 1 L/min

**PFMB**

- Applicable fluid: Dry air, N₂
- Detection method: Thermal type (MEMS)
- Rated flow range [L/min]: 0.5, 1 L/min

**PFMC**

- Applicable fluid: Dry air, N₂
- Detection method: Thermal type (MEMS)
- Rated flow range [L/min]: 0.5, 1 L/min

**PFMV**

- Applicable fluid: Dry air, N₂
- Detection method: Thermal type (MEMS)
# 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>N2, Air, Ar, CO₂</td>
<td>N2, Air, Ar, CO₂</td>
<td>N2, Air, Ar, CO₂</td>
<td>N2, Air</td>
<td>N2, Air</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 to 0.5 L/min, 0.5 to 25 L/min, 1 to 50 L/min, 2 to 100 L/min</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, 10 to 1000 L/min, 20 to 2000 L/min</td>
<td>1 to 10 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°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>±5% F.S. (0 to 50°C)</td>
<td></td>
</tr>
<tr>
<td>Repeatability</td>
<td>±1% F.S. (Fluid: Dry air) ±5% F.S.</td>
<td>±1% F.S. (Fluid: Dry air) ±5% F.S.</td>
<td>±1% F.S. (Fluid: Dry air) ±5% F.S.</td>
<td>±1% F.S. (Fluid: Dry air) ±5% F.S.</td>
<td>±1% F.S. (PP2A7□1) ±2% F.S. (PF2A7□10)</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></td>
</tr>
<tr>
<td>Hysteresis mode: Window comparator mode</td>
<td>Variable</td>
<td>Variable</td>
<td>Variable</td>
<td>Variable</td>
<td>Variable</td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td>NPN/PNP open collector Analog voltage output Analog current output</td>
<td>NPN/PNP open collector Accumulated pulse output Analog voltage output Analog current output</td>
<td>NPN/PNP open collector Accumulated pulse output Analog voltage output Analog current output</td>
<td>NPN/PNP open collector Accumulated pulse output Analog voltage output Analog current output</td>
<td>NPN/PNP open collector Accumulated pulse output Analog voltage output Analog current output</td>
<td></td>
</tr>
<tr>
<td>Display</td>
<td>2-color LED 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 for Large Flow *PF3A7 H Series*

**3-Screen Display**  Digital Flow Monitor *PFG300 Series*

### 3-Color Display  Digital Flow Switch for Large Flow PF3A7 H Series
- How to Order .................................................. p. 9
- Specifications .................................................. p. 10
- Flow Range ...................................................... p. 11
- Analog Output ................................................... p. 11
- Pressure Loss ..................................................... p. 11
- IN Side Straight Section and Accuracy ....................... p. 12
- Internal Circuits and Wiring Examples ......................... p. 12
- Construction: Parts in Contact with Fluid .................... p. 13
- Dimensions ....................................................... p. 13

### 3-Screen Display  Digital Flow Monitor PFG300 Series
- How to Order .................................................. p. 14
- Specifications .................................................. p. 15
- Internal Circuits and Wiring Examples ......................... p. 16
- Dimensions ....................................................... p. 17

**PF3A7 H/Function Details** ........................................ p. 20
**PFG300/Function Details** ....................................... p. 22
**Safety Instructions** ........................................... Back Cover
How to Order

**PF3A7**

- **Type**: Integrated display
- **Rated flow range**:
  - 03: 30 to 3000 L/min
  - 06: 60 to 6000 L/min
  - 12: 120 to 12000 L/min
- **Large flow type**
- **Thread type**:
  - Nil
  - Rc
  - N
  - NPT
  - F
- **Port size**:
  - Symbol: OUT
  - Func: 2
  - Applicable monitor unit model:
    - CS: NPN Analog voltage output ⇒ External input
    - DS: NPN Analog current output ⇒ External input
    - ES: PNP Analog voltage output ⇒ External input
    - FS: PNP Analog current output ⇒ External input

**Output specification**

- **Symbol**: OUT
- **Func**: 2
- **Applicable monitor unit model**:
  - CS: NPN Analog voltage output ⇒ External input
  - DS: NPN Analog current output ⇒ External input
  - ES: PNP Analog voltage output ⇒ External input
  - FS: PNP Analog current output ⇒ External input

**Options**

- **Option/Part No.**
  - When only optional parts are required, order with the part number listed below.
  - **Part no.**: ZS-37-A
  - **Option**: Lead wire and M12 connector
  - **Note**: Length: 3 m

### Notes
- **Calibration certificate**: Nil
  - Yes
- **Unit specification**:
  - Nil
  - M: SI unit only
- **Thread type**: Nil
  - Rc
  - N
  - NPT
  - F
- **Port size**: Nil
  - Length: 3 m
- **Flow type**: Nil
  - Large flow type
- **Unit selection function**: Nil
  - M: SI unit only
- **Flow units**: Nil
  - Fixed unit: Instantaneous flow: L/min
  - Accumulated flow: L
- **Options**
  - Nil
  - With lead wire and M12 connector (3 m)
  - Without lead wire and M12 connector
- **Options**
  - Option is shipped together, but not assembled.

---

*This product is for overseas use only according to the New Measurement Act. (The SI unit type is provided for use in Japan.)*

*Made to order*
### Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>PF3A703H</th>
<th>PF3A706H</th>
<th>PF3A712H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluid</td>
<td>Applicable fluid&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Air, Nitrogen</td>
<td>Air, Nitrogen</td>
</tr>
<tr>
<td>Fluid temperature</td>
<td>0 to 50°C</td>
<td>0 to 50°C</td>
<td>0 to 50°C</td>
</tr>
<tr>
<td>Detection method</td>
<td>Thermal type</td>
<td>Thermal type</td>
<td>Thermal type</td>
</tr>
<tr>
<td>Rated flow range</td>
<td>30 to 3000 L/min</td>
<td>60 to 6000 L/min</td>
<td>120 to 12000 L/min</td>
</tr>
<tr>
<td>Set point range&lt;sup&gt;2&lt;/sup&gt;</td>
<td>referenced for 30 to 3150 L/min</td>
<td>60 to 6300 L/min</td>
<td>120 to 6300 L/min</td>
</tr>
<tr>
<td>Smallest settable volume&lt;sup&gt;2&lt;/sup&gt;</td>
<td>referenced for 0 to 999,999,999,990 L</td>
<td>5 L/min</td>
<td>10 L/min</td>
</tr>
<tr>
<td>Accumulated volume per pulse&lt;sup&gt;2&lt;/sup&gt; (Pulse width = 50 ms)</td>
<td>Select from 100 L/pulse or 1000 L/pulse.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accumulated value hold function&lt;sup&gt;3&lt;/sup&gt;</td>
<td>Interval of 2 or 5 minutes can be selected.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Pressure

<table>
<thead>
<tr>
<th></th>
<th>Rated pressure range</th>
<th>0.1 to 1.5 MPa</th>
<th>0.1 to 1.5 MPa</th>
<th>0.1 to 1.5 MPa</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Proof pressure</td>
<td>2.25 MPa</td>
<td>2.25 MPa</td>
<td>2.25 MPa</td>
</tr>
<tr>
<td></td>
<td>Pressure loss</td>
<td>Refer to “Pressure Loss” graph</td>
<td>Refer to “Pressure Loss” graph</td>
<td>Refer to “Pressure Loss” graph</td>
</tr>
</tbody>
</table>

### Electrical

<table>
<thead>
<tr>
<th></th>
<th>Power supply voltage</th>
<th>24 VDC ±10%</th>
<th>24 VDC ±10%</th>
<th>24 VDC ±10%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Current consumption</td>
<td>150 mA or less</td>
<td>150 mA or less</td>
<td>150 mA or less</td>
</tr>
<tr>
<td></td>
<td>Protection</td>
<td>Polarity protection</td>
<td>Polarity protection</td>
<td>Polarity protection</td>
</tr>
</tbody>
</table>

### Accuracy

<table>
<thead>
<tr>
<th></th>
<th>Display accuracy</th>
<th>±3% F.S.</th>
<th>±3% F.S.</th>
<th>±3% F.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Repeatability</td>
<td>Switch output/Display: ±1.0% F.S.</td>
<td>Analog output: ±1.0% F.S.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Accuracy</td>
<td>±5% F.S. (Ambient temperature of 0 to 50°C, 25°C standard)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Switch output

<table>
<thead>
<tr>
<th></th>
<th>Max. load current</th>
<th>80 mA</th>
<th>80 mA</th>
<th>80 mA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Max. applied voltage (NPN only)</td>
<td>28 VDC</td>
<td>28 VDC</td>
<td>28 VDC</td>
</tr>
<tr>
<td></td>
<td>Internal voltage drop</td>
<td>NPN output type: 1 V or less (at load current of 80 mA)</td>
<td>PNP output type: 2 V or less (at load current of 80 mA)</td>
<td></td>
</tr>
</tbody>
</table>

### Analog output<sup>7</sup>

<table>
<thead>
<tr>
<th></th>
<th>Output type</th>
<th>PNP open collector</th>
<th>PNP open collector</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Impedance voltage output</td>
<td>1 to 5 V (at load current of 20 mA)</td>
<td>1 to 5 V (at load current of 20 mA)</td>
</tr>
<tr>
<td></td>
<td>Current output</td>
<td>Maximum load impedance: Approx. 600 Ω</td>
<td>Maximum load impedance: Approx. 600 Ω</td>
</tr>
<tr>
<td></td>
<td>Response time&lt;sup&gt;8&lt;/sup&gt;</td>
<td>Linked with the response time of the switch output.</td>
<td>Linked with the response time of the switch output.</td>
</tr>
</tbody>
</table>

### Environmental

<table>
<thead>
<tr>
<th></th>
<th>Enclosure</th>
<th>IP65</th>
<th>IP65</th>
<th>IP65</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Withstand voltage</td>
<td>1000 VAC for 1 minute between terminals and housing</td>
<td>1000 VAC for 1 minute between terminals and housing</td>
<td>1000 VAC for 1 minute between terminals and housing</td>
</tr>
<tr>
<td></td>
<td>Insulation resistance</td>
<td>50 MΩ (500 VDC measured via megohmmeter) between terminals and housing</td>
<td>50 MΩ (500 VDC measured via megohmmeter) between terminals and housing</td>
<td>50 MΩ (500 VDC measured via megohmmeter) between terminals and housing</td>
</tr>
<tr>
<td></td>
<td>Operating temperature range</td>
<td>Operating: 0 to 50°C, Stored: −10 to 60°C (No freezing or condensation)</td>
<td>Operating: 0 to 50°C, Stored: −10 to 60°C (No freezing or condensation)</td>
<td>Operating: 0 to 50°C, Stored: −10 to 60°C (No freezing or condensation)</td>
</tr>
<tr>
<td></td>
<td>Operating humidity range</td>
<td>Operating/Storage: 35 to 85% RH (No condensation)</td>
<td>Operating/Storage: 35 to 85% RH (No condensation)</td>
<td>Operating/Storage: 35 to 85% RH (No condensation)</td>
</tr>
</tbody>
</table>

### Main materials of parts in contact with fluid

- Aluminum alloy, PPS, HNBR
- [Sensor: Pt, Au, Fe, Lead glass (exempted from the RoHS application), Al2O3]

### For flow switch precautions and specific product precautions, refer to the “Operation Manual” on the SMC website. Click [here](#) for details.

---

<sup>1</sup> Air quality grade is JIS B 8392-1:2012 [3.6-1] and ISO 8573-1:2010 [3.6-1].

<sup>2</sup> Set point range will change according to the setting of the zero cut function.

<sup>3</sup> When using the accumulated value hold function, use the operating conditions to calculate the product life, and do not exceed it. The maximum update 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 = 14.3 years
- 2 min interval: life is calculated as 2 min x 1.5 million = 3 million = 5.7 years

If the accumulated flow external reset is repeatedly used, the product life will be shorter than calculated life.

<sup>4</sup> When the pressure range is 1.0 to 1.5 MPa, the pressure characteristics will be ±5% F.S. (standard pressure is 0.5 MPa). Do not release the OUT side piping port of the product to the atmosphere without connecting piping. If the product is used with the piping port re-leas to atmosphere, accuracy may vary.

<sup>5</sup> 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.

<sup>6</sup> 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.

<sup>7</sup> Analog output or external input can be selected by pressing the buttons.

<sup>8</sup> Refer to the graph for analog output.

<sup>9</sup> 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.

<sup>10</sup> No-voltage input: 0.4 V or less

<sup>11</sup> Main screen: 5 digits, 7 segment, Sub screen: 6 digits, 7 segment

<sup>12</sup> Select from Accumulated value external reset or Peak/Bottom value reset.

---

**PF3A7 Series**

Digital Flow Switch for Large Flow

**PF3A7**

For flow switch precautions and specific product precautions, refer to the “Operation Manual” on the SMC website. Click [here](#) for details.
Flow Range

<table>
<thead>
<tr>
<th>Model</th>
<th>Flow range</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 L/min</td>
<td>1000 L/min</td>
<td>3000 L/min</td>
<td>6000 L/min</td>
<td>12000 L/min</td>
</tr>
<tr>
<td>PF3A703H</td>
<td>30 L/min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30 L/min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 L/min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PF3A706H</td>
<td>60 L/min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>60 L/min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 L/min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PF3A712H</td>
<td>120 L/min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>120 L/min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 L/min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Analog Output

Flow/Analog Output

<table>
<thead>
<tr>
<th>Voltage output (1 to 5 V)</th>
<th>1 V</th>
<th>1.04 V</th>
<th>5 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current output</td>
<td>4 mA</td>
<td>4.16 mA</td>
<td>20 mA</td>
</tr>
</tbody>
</table>

| Voltage output (0 to 10 V) | 0 V | 0.1 V | 10 V |

<table>
<thead>
<tr>
<th>Model</th>
<th>Minimum value of rated flow range</th>
<th>Maximum value of rated flow range</th>
</tr>
</thead>
<tbody>
<tr>
<td>PF3A703H</td>
<td>30 L/min</td>
<td>3000 L/min</td>
</tr>
<tr>
<td>PF3A706H</td>
<td>60 L/min</td>
<td>6000 L/min</td>
</tr>
<tr>
<td>PF3A712H</td>
<td>120 L/min</td>
<td>12000 L/min</td>
</tr>
</tbody>
</table>

*1 Analog output accuracy is within ±3% F.S.
*2 A and C will change according to the setting of the zero cut function.
*3 The analog output current from the connected equipment should be 20 μA or less when selecting 0 to 10 V. When more than 20 μA current flows, it is possible that the accuracy is not satisfied below 0.5 V.
*4 The minimum value of the rated flow range will change according to the setting of the zero cut function.

Pressure Loss (Reference Data)

PF3A703H (for 3000 L/min)

PF3A706H (for 6000 L/min)

PF3A712H (for 12000 L/min)
IN Side Straight Section and Accuracy (Reference Data)

**PF3A703H (for 3000 L/min)**

- With ø1/2" connected
- With ø3/4" connected
- Elbow piping (1°)

**PF3A706H (for 6000 L/min)**

- With ø1" connected
- With ø1 1/4" connected
- Elbow piping (1 1/2°)

**PF3A712H (for 12000 L/min)**

- With ø1 1/4" connected
- With ø1 1/2" connected
- Elbow piping (2°)

Do not connect equipment or piping which may generate a fluctuation in the flow or drift at the IN side of the product. When installing a regulator at the IN side of the product, make sure that hunting is not generated.

- The piping on the IN side must have a straight section of piping whose length is more than 8 times the piping I.D.

If a straight section of piping is not installed, the accuracy may vary by ±3% F.S. or more.

- "Straight section" means a section of piping without any bends or rapid changes in the cross sectional area.

Internal Circuits and Wiring Examples

**NPN + Analog output selected**

**PF3A7□H□□□□CS/DS□□□□**

- Max. applied voltage: 28 V
- Max. load current: 80 mA
- Internal voltage drop: 1 V or less
- Output impedance: 1 kΩ
- CS: Analog output: 1 to 5 V or 0 to 10 V
- DS: Analog output: 4 to 20 mA
- Max. load impedance: 600 Ω
- Min. load impedance: 50 Ω

**NPN + External input selected**

**PF3A7□H□□□□CS/DS□□□□**

- Max. applied voltage: 28 V
- Max. load current: 80 mA
- Internal voltage drop: 1 V or less
- External input: Input voltage 0.4 V or less (Reed or Solid state input) for 30 ms or longer

**PNP + Analog output selected**

**PF3A7□H□□□□ES/FS□□□□**

- Max. load current: 80 mA
- Internal voltage drop: 2 V or less
- Output impedance: 1 kΩ
- ES: Analog output: 1 to 5 V or 0 to 10 V
- FS: Analog output: 4 to 20 mA
- Max. load impedance: 600 Ω
- Min. load impedance: 50 Ω

**PNP + External input selected**

**PF3A7□H□□□□ES/FS□□□□**

- Max. load current: 80 mA
- Internal voltage drop: 2 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

**PF3A7□H□□□□CS/DS□□□□**

- Max. 28 V
- 80 mA

**PF3A7□H□□□□ES/FS□□□□**

- Max. 80 mA
PF3A7□H Series

Construction: Parts in Contact with Fluid

PF3A703H/706H/712H

Component Parts

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body</td>
<td>Aluminum alloy</td>
<td>Anodized</td>
</tr>
<tr>
<td>2</td>
<td>Branch passage</td>
<td>PPS</td>
<td>—</td>
</tr>
<tr>
<td>3</td>
<td>Gasket</td>
<td>HNBR</td>
<td>—</td>
</tr>
<tr>
<td>4</td>
<td>Sensor base</td>
<td>PPS</td>
<td>—</td>
</tr>
<tr>
<td>5</td>
<td>Gasket</td>
<td>HNBR</td>
<td>—</td>
</tr>
<tr>
<td>6</td>
<td>Sensor</td>
<td>Au, Pt, Al₂O₃</td>
<td>—</td>
</tr>
</tbody>
</table>

Dimensions

Cable Specifications

<table>
<thead>
<tr>
<th>Conductor Nominal cross section</th>
<th>AWG23</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulator Outside diameter</td>
<td>Approx. 1.1 mm</td>
</tr>
<tr>
<td>Color</td>
<td>Brown, Blue, Black, White</td>
</tr>
<tr>
<td>Sheath Finished outside diameter</td>
<td>ø4</td>
</tr>
</tbody>
</table>

Lead wire and M12 connector (Part no.: ZS-37-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>FUNC</td>
<td>White</td>
</tr>
<tr>
<td>3</td>
<td>DC(−)</td>
<td>Blue</td>
</tr>
<tr>
<td>4</td>
<td>OUT</td>
<td>Black</td>
</tr>
</tbody>
</table>

4-wire type lead wire and M12 connector used for the PF3A series.
**3-Screen Display Digital Flow Monitor**

**PFG300 Series**

---

**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>PF3A7_H-CS/ES series</td>
</tr>
<tr>
<td>1</td>
<td>Current input</td>
<td>PF3A7_H-DS/FS series</td>
</tr>
</tbody>
</table>

**Output specification**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Applicable flow switch model</th>
</tr>
</thead>
<tbody>
<tr>
<td>RT</td>
<td>2 outputs (NPN/PNP switching type) + Analog voltage output*1, 2</td>
<td></td>
</tr>
<tr>
<td>SV</td>
<td>2 outputs (NPN/PNP switching type) + Analog current output*2</td>
<td></td>
</tr>
<tr>
<td>XY</td>
<td>2 outputs (NPN/PNP switching type) + Copy function</td>
<td></td>
</tr>
</tbody>
</table>

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

**Unit specification**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Nil</th>
<th>Units selection function*3</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>Si unit only*4</td>
<td>Nil</td>
<td>None</td>
</tr>
</tbody>
</table>

*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

**Unit specification**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Nil</th>
<th>Operation manual</th>
<th>Calibration certificate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>Y (2 outputs)</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>K</td>
<td>K (2 outputs)</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>T</td>
<td>T (Copy function)</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
</tbody>
</table>

**Option 1**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>Without lead wire</td>
</tr>
</tbody>
</table>

- **Option 2**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Bracket A (Vertical mounting)</td>
</tr>
<tr>
<td>ZS-46-A1</td>
<td></td>
</tr>
</tbody>
</table>

- **Option 3**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2</td>
<td>Bracket B (Horizontal mounting)</td>
</tr>
<tr>
<td>ZS-46-A2</td>
<td></td>
</tr>
</tbody>
</table>

- **Option 4**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Panel mount adapter</td>
</tr>
<tr>
<td>ZS-46-B</td>
<td></td>
</tr>
</tbody>
</table>

- **Connection Example**

---

**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-28-CA-4</td>
<td>Sensor connector</td>
<td>For PF3A7_H</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-46-5L</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>

---

**Connection Example**

---

**Sensor connector**

- Lead wire and M12 connector (Option for PF3A7\_H)
- Power supply/output connection lead wire
# Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>PF3A703H</th>
<th>PF3A706H</th>
<th>PF3A712H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable SMC flow switch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated flow range</td>
<td>30 to 3000 L/min</td>
<td>60 to 6000 L/min</td>
<td>120 to 12000 L/min</td>
</tr>
</tbody>
</table>

## Flow

<table>
<thead>
<tr>
<th>Set point range</th>
<th>Instantaneous flow</th>
<th>Accumulated flow</th>
<th>Accumulated volume per pulse</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>–150 to 3150 L/min</td>
<td>–300 to 6300 L/min</td>
<td>10 L/pulse</td>
</tr>
<tr>
<td>Smallest settable increment</td>
<td>2 L/min</td>
<td>5 L/min</td>
<td>10 L</td>
</tr>
</tbody>
</table>

Accumulated value hold function: Intervals of 2 or 5 minutes can be selected. The stored accumulated flow is held even when the power supply is OFF.

## Electrical

<table>
<thead>
<tr>
<th>Power supply voltage</th>
<th>12 to 24 VDC ±10% (24 VDC when the PF3A712H is connected)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current consumption</td>
<td>25 mA or less</td>
</tr>
<tr>
<td>Protection</td>
<td>Polarity protection</td>
</tr>
</tbody>
</table>

### Accuracy

| Display accuracy | ±0.5% F.S. ± Minimum display unit (Ambient temperature of 25°C) |
| Analog output accuracy | ±0.5% F.S. (Ambient temperature of 25°C) |
| Repeatability | ±0.1% F.S. ± Minimum display unit |
| Temperature characteristics | ±0.5% F.S. (Ambient temperature: 0 to 50°C, 25°C standard) |

### Switch output

| Output type | Select from NPN or PNP open collector output. |
| Output mode | Select from Hysteresis, Window comparator, Accumulated output, Accumulated pulse output, Error output, or Switch output OFF modes. |
| Switch operation | Select from Normal or Reversed output. |

### Analog output

| Output type | Voltage output: 1 to 5 V, 0 to 10 V (only when the power supply voltage is 24 VDC) |
| Impedance | Voltage output: 1 to 5 V, 0 to 10 V (only when the power supply voltage is 24 VDC) |
| Response time | 0.5 ms or less |

### External input

| Input type | Voltage input: 1 to 5 VDC (Input impedance: 1 MΩ), Current input: 4 to 20 mA DC (Input impedance: 51 Ω) |
| Input mode | Select from Accumulated value external reset or Peak/Bottom value reset. |

### Sensor input

| Display mode | Select from instantaneous flow or Accumulated flow. |
| Display | 3-screen display (Main screen, Sub screen) |

### Display

| 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) |

### Digital filter

| Indicator LED | LED ON when switch output is ON. OUT1/2: Orange |
| Enclosure | IP40 |
| Withstand voltage | 1000 VAC for 1 minute 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) |

### Environment

| Weight | 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 2 min interval: life is calculated as 2 min x 1.5 million = 3 million min = 5.7 years If the accumulated value external reset is repeatedly used, the product life will be shorter than the calculated life.
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. 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 10° lights up. 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.
Internal Circuits and Wiring Examples

-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

PNP (2 outputs) + Copy function

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

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

Accumulated pulse output wiring examples

NPN (2 outputs) type

PNP (2 outputs) type
Bracket configuration allows for mounting in four orientations.

Bracket A
(Part no.: ZS-46-A1)

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

*1 1 to 5 V or 4 to 20 mA

Conductor cross section 0.15 mm² (AWG26)
Insulator Outside diameter 1.0 mm
Color Brown, Blue, Black, White, Gray (5-core)
Sheath Finished outside diameter ø3.5
Dimensions

Panel fitting dimensions

Individual mounting

Multiple (2 pcs. or more) secure mounting

<Horizontal>

Panel mount example

<Horizontal>

<Vertical>

Panel mount example

<Vertical>
**PF3A7□H Series**

**Function Details**

For setting of functions and operation method, refer to the Operation Manual from the SMC website Documents/Download -> Instruction Manuals. Click here for 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.

<table>
<thead>
<tr>
<th>Green for ON, Red for OFF</th>
<th>Red for ON, Green for OFF</th>
<th>Red all the time</th>
<th>Green all the time</th>
</tr>
</thead>
</table>

**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 101.3 kPa (absolute pressure)
- Normal condition: Flow rate converted to a volume at 0°C and 101.3 kPa (absolute pressure)

**Response time**

The response time can be selected to suit the application. (Default setting: 1 s) The effect of fluctuation and flickering of the display can be reduced by setting the response time to 2 seconds or 5 seconds.

<table>
<thead>
<tr>
<th>1 s</th>
<th>2 s</th>
<th>5 s</th>
</tr>
</thead>
</table>

**FUNC output switching function**

Analog output or external input 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 confirmation of the 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, the 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**

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.

**Display OFF mode**

This function will turn the display OFF. In the display OFF mode, three digits " _ _ _ " on the right of the sub display will flash. If any button is pressed during this mode, the display reverts to normal for 30 seconds to allow checking of the flow, etc.

When the flow monitor (PFG300 series) is connected, the displayed values might be different due to an error. When the flow monitor display is used, it is recommended to set this product to the display OFF mode.

**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 the security code is not required.

**Key-lock function**

Prevents operation errors such as accidentally changing setting values

**Reset to the default settings**

The product can be returned to its factory default settings.

**Reversible display mode**

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

**Zero cut function**

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

Example) Vertical mounting, with fluid direction: Bottom to top
Selection of display on sub screen

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

<table>
<thead>
<tr>
<th>Accumulated value display</th>
<th>Set value display</th>
<th>Peak value display</th>
</tr>
</thead>
<tbody>
<tr>
<td>Displays the accumulated value</td>
<td>Displays the set 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</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 turn it on again.</td>
</tr>
<tr>
<td></td>
<td>error</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HXH</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>99999999 flashes x 10^6</td>
<td>Accumulated flow error</td>
<td>The flow rate exceeds the accumulated flow rate.</td>
<td>Clear the accumulated flow rate.</td>
</tr>
<tr>
<td>Er 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Er 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Er 8</td>
<td>System error</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Er 10</td>
<td>Internal data error</td>
<td></td>
<td>Turn the power off and then on again.</td>
</tr>
<tr>
<td>Er 12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Er 13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Er 14</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If the error cannot be solved after the instructions above 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 a time of shipment from the factory, it is set such that a security code is not required.

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

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

- **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>
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<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>
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<th>OFF</th>
</tr>
</thead>
<tbody>
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<td>Displays the line name (Up to 5 alphanumeric characters can be input.)</td>
<td>Displays nothing</td>
</tr>
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### 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.

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<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>EHHH</td>
<td>Reverse flow error</td>
<td>There is a reverse flow equivalent to –5% or more. (Except PF3A7H series)</td>
<td>Change the flow to the correct direction.</td>
</tr>
<tr>
<td>LLL</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 0</td>
<td>System error</td>
<td>Internal data error</td>
<td>Turn the power off and then on again.</td>
</tr>
<tr>
<td>Er 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Er 6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Er 7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Er 8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Er 14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Er 13</td>
<td>Copy error</td>
<td>The copy function does not operate properly.</td>
<td>After clearing the error by pressing the ( \text{□} ) and ( \text{□} ) 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.

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**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)\(^1\), and other safety regulations.

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

### 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.

### 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.

### Limited warranty and Disclaimer

**Compliance Requirements**

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”.

**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.\(^2\)

   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.

   \(\ast\) 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 wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

**Compliance Requirements**

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.

2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

**Caution**

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

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

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**Revision History**

- Edition 2: The digital flow monitor PFG300 series has been added.
- Number of pages has been increased from 16 to 28.

**Safety Instructions**

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