### Specifications

**Model**

<table>
<thead>
<tr>
<th>PFA710</th>
<th>PFA750</th>
<th>PFA711</th>
<th>PFA721</th>
<th>PFA751</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured fluid</td>
<td>Dry air, N₂</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detection type</td>
<td>Heater type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow rate measurement range</td>
<td>1 to 10l/min</td>
<td>5 to 50l/min</td>
<td>10 to 100l/min</td>
<td>20 to 200l/min</td>
</tr>
<tr>
<td>Minimum setting unit</td>
<td>1% of maximum flow rate</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note 1)** Display units

- Flow rate: l/min, CFM x 10⁻²
- Accumulated flow: l, ft³ x 10⁻¹

**Operator specification**

- Operating temperature range: 0°C to 50°C (with no condensation)
- Linearity: ±5% F.S. or less
- Repeatability: ±2% F.S. or less
- Temperature characteristics: ±3% F.S. or less (15°C to 35°C), ±5% F.S. or less (0°C to 50°C)

**Output specifications**

- Switch output
  - NPN open collector: Maximum load current: 80mA; Internal voltage drop: 1V or less (with load current of 80mA)
  - PNP open collector: Maximum load current: 80mA; Internal voltage drop: 1.5V or less (with load current of 80mA)
- Analog output: —

**Indicator lights**

- 27, 67: Lights up when output is ON
- OUT1: Green; OUT2: Red
- 28, 68: Lights up when output is ON
- OUT1: Green; OUT2: Red

**Response time**

- 1 sec. or less

**Hysteresis**

- Hysteresis mode: Variable (can be set from 0), Window comparator mode: 3-digit fixed

**Power supply voltage**

- 12 to 24VDC (ripple ±10% or less)

**Current consumption**

- 150mA or less
- 160mA or less
- 170mA or less

**Withstand voltage**

- 1000VAC for 1 min. between external terminal and case

**Insulation resistance**

- 50MΩ (500VDC) between external terminal and case

**Noise resistance**

- 1000Vp-p, Pulse width 1μs, Rise time 1ns

**Vibration resistance**

- 10 to 500Hz at whichever is smaller: 1.5mm amplitude or 98m/s² acceleration, in X, Y, Z directions for 2 hrs. each

**Impact resistance**

- 490m/s² in X, Y, Z directions 3 times each

**Weight**

- 250g (without lead wire)
- 290g (without lead wire)

**Enclosure**

- IP65

**Port size (Rc, NPT, G)**

- 1/8, 1/4
- 3/8
- 1/2

Note 1) For digital flow switch with unit switching function. (Fixed SI unit [l/min or l] will be set for switch types without the unit switching function.)

Note 2) The output functions operate only for the real-time flow rate display, and do not operate for the accumulated flow display.

Note 3) Window comparator mode — Since hysteresis will reach 3 digits, keep P1 and P2 apart by 7 digits or more. The minimum setting unit is 1 digit. (Refer to the table above.)

* Flow rate units measured under the following conditions: 0°C and 101.3kPa.
Series PFA

Sensor Unit Construction

PFA710, PFA750
PFA510, PFA550

1 2 3 4 5

Parts list

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Attachment</td>
<td>ADC</td>
</tr>
<tr>
<td>2</td>
<td>Seal</td>
<td>NBR</td>
</tr>
<tr>
<td>3</td>
<td>Mesh</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>4</td>
<td>Body</td>
<td>PBT</td>
</tr>
<tr>
<td>5</td>
<td>Sensor</td>
<td>PBT</td>
</tr>
</tbody>
</table>

PFA711, PFA721, PFA751
PFA511, PFA521, PFA551

1 2 3 4 5 6

Parts list

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<td>Spacer</td>
<td>PBT</td>
</tr>
<tr>
<td>4</td>
<td>Mesh</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>5</td>
<td>Body</td>
<td>PBT</td>
</tr>
<tr>
<td>6</td>
<td>Sensor</td>
<td>PBT</td>
</tr>
</tbody>
</table>

Operating Unit Descriptions

RESET Buttons
Press the ▲ and ▼ buttons simultaneously to activate the RESET function.
This clears the unit when an abnormality occurs and resets the accumulated flow display to "0".

Output (OUT1) Indicator: Green
Lights up when OUT1 is ON.
Blinks when an overcurrent error occurs on OUT1.

Output (OUT2) Indicator: Red
Lights up when OUT2 is ON.
Blinks when an overcurrent error occurs on OUT2.

Error Correction

Take the following corrective solutions when errors occur.

<table>
<thead>
<tr>
<th>LED display</th>
<th>Contents</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Er 1</td>
<td>A current of more than 80mA is flowing to OUT1.</td>
<td>Check the load and wiring for OUT1.</td>
</tr>
<tr>
<td>Er 2</td>
<td>A current of more than 80mA is flowing to OUT2.</td>
<td>Check the load and wiring for OUT2.</td>
</tr>
<tr>
<td>Er 4</td>
<td>The setting data has changed for whatever reasons.</td>
<td>Perform the RESET operation, and reset all data again.</td>
</tr>
<tr>
<td>- - -</td>
<td>The flow rate is over the flow rate measurement range (for air only).</td>
<td>Reduce the flow rate until it is within the flow rate measurement range, using an adjustment valve.</td>
</tr>
</tbody>
</table>
Flow Rate Setting

Setting procedure

1. Initial Setting Mode
   - Press the SET button and hold for 1 second or longer.
   - Release the SET button once the display changes from $P_1$ to $d_1$ or $d_2$.

2. Selection of the Display Mode
   - Press the SET button.
   - Set the display mode.
   - Use the $\Delta$ button to switch.
   - $d_1$: Display for real-time flow rate
   - $d_2$: Display for accumulated flow
   - For -M (fixed SI unit)
   - (Refer to Table 1)

3. Selection of Display Units
   - Press the SET button.
   - Set the display unit.
   - Note 1)
   - Use the $\Delta$ and $\nabla$ buttons to switch.
   - $U_1$: Unit number
   - (Refer to Table 1)

4. Selection of OUT1 Output Mode
   - Press the SET button.
   - Set the output mode for OUT1.
   - Use the $\Delta$ button to switch the output mode for OUT1.
   - $P$: Non-inverted output
   - $n$: Inverted output
   - (Refer to Table 2)

5. Selection of OUT2 Output Mode
   - Press the SET button.
   - Set the output mode for OUT2.
   - Use the $\Delta$ button to switch the output mode for OUT2.
   - $P$: Non-inverted output
   - $n$: Inverted output
   - (Refer to Table 2)

Table 1

<table>
<thead>
<tr>
<th>For air</th>
<th>Display</th>
<th>Real-time flow rate</th>
<th>Accumulated flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>$U_1$</td>
<td>l/min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$U_2$</td>
<td>CFM x $10^{-1}$, CFM x $10^{-2}$</td>
<td>ft$^3$ x $10^{-1}$</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>For water</th>
<th>Display</th>
<th>Real-time flow rate</th>
<th>Accumulated flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>$U_1$</td>
<td>l/min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$U_2$</td>
<td>GPM</td>
<td>gal (US)</td>
<td></td>
</tr>
</tbody>
</table>

Note 1) For digital flow switch with unit switching function
(Fixed SI unit (l/min or ft$^3$/min) will be set for the type without
the unit switching function.)

Note 2) Output mode is set to inverted output at the factory
before shipment.

Table 2

<table>
<thead>
<tr>
<th>Output type</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hysteresis mode</td>
<td>$P_1 \geq P_2$</td>
<td></td>
</tr>
<tr>
<td>Window comparator mode</td>
<td>$n_1 \neq n_2$</td>
<td></td>
</tr>
</tbody>
</table>

Note 1) For digital flow switch with unit switching function
(Fixed SI unit (l/min or ft$^3$/min) will be set for the type without
the unit switching function.)

Note 2) Output mode is set to inverted output at the factory
before shipment.
Flow Rate Setting

Flow rate setting mode (manual)

1. Set Value Input
   Mode (Manual)
   - Press the SET button.
   (Refer to Table 2 for the relationship between each value and the switch output.)

2. Manual Mode Setting
   - Press the SET button when \( F \) is displayed.

3. Setting the first (1) Value for OUT 1
   - Set the first (1) value for OUT 1.
   The value you set and \( P \) (or \( n \)) will be alternately displayed.
   ▲ button: Increases the set value.
   ▼ button: Decreases the set value.

4. Setting the second (2) Value for OUT 1
   - Set the second (2) value for OUT 1.
   The value you set and \( P \) (or \( n \)) will be alternately displayed.
   ▲ button: Increases the set value.
   ▼ button: Decreases the set value.

5. Setting the first (1) Value for OUT 2
   - Set the first (1) value for OUT 2.
   The value you set and \( P \) (or \( n \)) will be alternately displayed.
   ▲ button: Increases the set value.
   ▼ button: Decreases the set value.

6. Setting the second (2) Value for OUT 2
   - Set the second (2) value for OUT 2.
   The value you set and \( P \) (or \( n \)) will be alternately displayed.
   ▲ button: Increases the set value.
   ▼ button: Decreases the set value.

Flow rate setting mode (auto preset)

1. Set Value Input
   Mode
   - Press the SET button, and release it as soon as \( F \) is displayed.

2. Setting in the Auto Preset Mode
   - Press the ▲ button to switch the display to \( F \).

3. Auto Preset Preparations
   - This mode prepares equipment for the OUT 1 setting. Flow for switch output will start.
   - When the OUT 1 setting is not required, press the ▲ and ▼ buttons simultaneously in this mode.

4. OUT1 Auto Preset
   - When the SET button is pressed at this point, the optimum value will be calculated and input automatically.
   \( R \) and the input value will be alternately displayed.

5. Auto Preset Preparations
   - Prepares equipment for the OUT 2 setting.
   - When the OUT 2 setting is not required, press the ▲ and ▼ buttons simultaneously in this mode.

6. OUT2 Auto Preset
   - When the SET button is pressed at this point, the optimum value will be calculated and input automatically.
   \( R \) and the input value will be alternately displayed.

<table>
<thead>
<tr>
<th>ON point</th>
<th>OFF point</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 3 digits</td>
<td>0 – 3 digits</td>
</tr>
</tbody>
</table>

(1 digit is the minimum setting unit.)
Other functions

- **Accumulated flow function**
  
  **Start of Accumulation**
  
  Start accumulation. Press the SET button while pressing the button at the same time. The mark blinks and accumulation begins.

  ![Start of Accumulation](image)

  ![Start of Accumulation](image)

- **Stopping Accumulation**
  
  Press the button to verify the real-time flow rate during accumulation.

  ![Stopping Accumulation](image)

  ![Stopping Accumulation](image)

- **Switching the flow rate range of the remote type (for air)**

  **Switching Flow Rate Range**
  
  Press the SET button and hold it for 4 seconds or longer. The values shown in Table 3 will be displayed.

  ![Switching Flow Rate Range](image)

  ![Switching Flow Rate Range](image)

  ![Switching Flow Rate Range](image)

- **Key lock mode**
  
  **Start of Key Lock Function**
  
  Press the SET button and hold it for 3 seconds or longer. Release the SET button when the display changes from F. 1 to F. 1 and displays unL.

  ![Start of Key Lock Function](image)

  ![Start of Key Lock Function](image)

  ![Start of Key Lock Function](image)

- **Release of Key Lock Function**
  
  Press the SET button and hold it for 3 seconds or longer. Release the SET button when Loc is displayed.

  ![Release of Key Lock Function](image)

  ![Release of Key Lock Function](image)

  ![Release of Key Lock Function](image)

**Table 3**

<table>
<thead>
<tr>
<th>Display</th>
<th>Flow rate range</th>
<th>Applicable model</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 to 10 l/min</td>
<td>For PFA30.</td>
</tr>
<tr>
<td>l</td>
<td>5 to 50 l/min</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>10 to 100 l/min</td>
<td>For PFA31.</td>
</tr>
<tr>
<td>3</td>
<td>20 to 200 l/min</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>50 to 500 l/min</td>
<td></td>
</tr>
</tbody>
</table>
**Dimensions: Integrated Display Type for Air**

**Series PFA**

**PFA710, PFA750**

- **Flow direction**
  - **Internal circuits and wiring examples**

**PFA711, PFA721, PFA751**

- **Flow direction**

**Connector pin numbers**

<table>
<thead>
<tr>
<th>Pin no.</th>
<th>Pin description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DC(+)</td>
</tr>
<tr>
<td>2</td>
<td>OUT2/Analog output</td>
</tr>
<tr>
<td>3</td>
<td>DC(–)</td>
</tr>
<tr>
<td>4</td>
<td>OUT1</td>
</tr>
</tbody>
</table>

**Series PFA**

**Internal circuits and wiring examples**

- **2-Port size**

**Flow direction**