

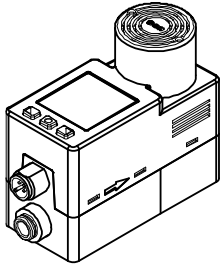


ORIGINAL INSTRUCTIONS

Instruction Manual

Digital Flow Controller for Air

PFCA7## series



The intended use of the digital flow controller for air is to monitor and control flow and provide an output signal.

1 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)<sup>\*1)</sup>, and other safety regulations.

<sup>\*1)</sup> ISO 4414: Pneumatic fluid power - General rules and safety requirements for systems and their components.  
ISO 4413: Hydraulic fluid power - General rules and safety requirements for systems and their components  
IEC 60204-1: Safety of machinery - Electrical equipment of machines - Part 1: General requirements  
ISO 10218-1: Robotics - Safety requirements - Part 1: Industrial robots.

- Refer to product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.
- Keep this manual in a safe place for future reference.

|  |                |                                                                                                                        |
|--|----------------|------------------------------------------------------------------------------------------------------------------------|
|  | <b>Danger</b>  | Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.     |
|  | <b>Warning</b> | Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury. |
|  | <b>Caution</b> | Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.   |

Warning

- Always ensure compliance with relevant safety laws and standards.
- All work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.
- This product is class A equipment intended for use in an industrial environment. There may be potential difficulties in ensuring electromagnetic compatibility in other environments due to conducted or radiated disturbances.
- Refer to the operation manual on the SMC website (URL: <https://www.smcworld.com>) for more safety instructions.

2 Specifications

2.1 General specifications

| Item        |                                 | Specifications                                                              |
|-------------|---------------------------------|-----------------------------------------------------------------------------|
| Environment | Enclosure                       | IP40 (IEC 60529)                                                            |
|             | Operating temperature           | Operating: 0 to 50 °C : Storage: -10 to 60 °C (no freezing or condensation) |
|             | Humidity range                  | 35 to 85% R.H. (no condensation)                                            |
|             | Withstand voltage               | 1000 VAC for 1 min. between terminals and housing                           |
|             | Insulation resistance           | 50 MΩ min (500 VDC Mega) between terminals and housing                      |
|             | Materials in contact with fluid | PPS, FKM, SUS, Brass, PTFE, Si, Au, GE4F                                    |

2 Specifications (continued)

2.2 PFCA7## specifications

| Model                  |                                                    |                                                                         | PFCA710                                                                                                                | PFCA725            | PFCA750                                                                                                           | PFCA711           |
|------------------------|----------------------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------------------------------------------------------------------------------------------------------|-------------------|
| Fluid                  | Applicable fluids * <sup>1</sup>                   |                                                                         | Dry air / N <sub>2</sub> / Ar / CO <sub>2</sub><br>(Air quality: JIS B8392-1 1.1.2 to 1.6.2, ISO8573-1 1.1.2 to 1.6.2) |                    |                                                                                                                   |                   |
|                        | Fluid temperature range                            |                                                                         | 0 to 50 °C                                                                                                             |                    |                                                                                                                   |                   |
| Flow                   | Detection method                                   |                                                                         | Heating type sensor                                                                                                    |                    |                                                                                                                   |                   |
|                        | Rated control flow rate range * <sup>2</sup>       | Dry air, N <sub>2</sub> , Ar                                            | 0.1 to 10 L/min                                                                                                        | 0.2 to 25 L/min    | 0.5 to 50 L/min                                                                                                   | 1 to 100 L/min    |
|                        |                                                    | CO <sub>2</sub>                                                         | 0.1 to 5 L/min                                                                                                         | 0.2 to 12.5 L/min  | 0.5 to 25 L/min                                                                                                   | 1 to 50 L/min     |
|                        | Set controlled flow rate range * <sup>2</sup>      | Dry air, N <sub>2</sub> , Ar                                            | 0.04 to 10.3 L/min                                                                                                     | 0.1 to 25.8 L/min  | 0.2 to 51.5 L/min                                                                                                 | 0.4 to 103 L/min  |
|                        |                                                    | CO <sub>2</sub>                                                         | 0.04 to 5.15 L/min                                                                                                     | 0.1 to 12.9 L/min  | 0.2 to 25.8 L/min                                                                                                 | 0.4 to 51.5 L/min |
|                        | Min. unit of set controlled flow rate              |                                                                         | 0.01 L/min                                                                                                             | 0.1 L/min          |                                                                                                                   |                   |
|                        | Set accumulated flow range                         |                                                                         | 0.0 to 99,999,999.9 L                                                                                                  | 0 to 999,999,999 L |                                                                                                                   |                   |
|                        | Min. unit of accumulated flow rate                 |                                                                         | 0.1 L                                                                                                                  | 1 L                |                                                                                                                   |                   |
|                        | Accumulated volume per pulse (Pulse width = 50 ms) |                                                                         | 0.1 L / Pulse                                                                                                          |                    |                                                                                                                   | 1 L / Pulse       |
|                        | Accumulated value hold function                    |                                                                         | Select every 2 or 5 minutes<br>(when the function is not set, power supply OFF reset)                                  |                    |                                                                                                                   |                   |
| Control * <sup>3</sup> | Control accuracy                                   |                                                                         | ±3% F.S.                                                                                                               |                    |                                                                                                                   |                   |
|                        | Analogue output accuracy * <sup>4</sup>            |                                                                         | ±3% F.S.                                                                                                               |                    |                                                                                                                   |                   |
|                        | Repeatability                                      |                                                                         | ±1% F.S.                                                                                                               |                    |                                                                                                                   |                   |
|                        | Temperature characteristics                        |                                                                         | ±5% F.S. (0 to 50 °C, Reference: 25 °C)                                                                                |                    |                                                                                                                   |                   |
|                        | Pressure characteristics                           |                                                                         | ±2% F.S. (Operating pressure range, reference operating pressure)                                                      |                    |                                                                                                                   |                   |
|                        | Settling time                                      |                                                                         | Reaches within ±3%F.S. of the commanded flow rate in 0.5 seconds or less (under reference conditions) * <sup>5</sup>   |                    | Reaches within ±3%F.S. of the commanded flow rate in 1 second or less (under reference conditions) * <sup>5</sup> |                   |
|                        | Control spec. method                               |                                                                         | IO-Link, local setting, analogue input                                                                                 |                    |                                                                                                                   |                   |
|                        | Operation when power supply is disconnected        |                                                                         | Fully closed (Normally closed (N.C.))                                                                                  |                    |                                                                                                                   |                   |
| Analogue input         | Voltage                                            | Input type                                                              | 1 to 5 V                                                                                                               |                    |                                                                                                                   |                   |
|                        |                                                    | Input impedance                                                         | 1 MΩ approx.                                                                                                           |                    |                                                                                                                   |                   |
|                        | Current                                            | Input type                                                              | 4 to 20 mA                                                                                                             |                    |                                                                                                                   |                   |
|                        |                                                    | Input impedance                                                         | 250 Ω or less                                                                                                          |                    |                                                                                                                   |                   |
|                        | Voltage                                            | Output type                                                             | Select 1 to 5 V or 0 to 10 V                                                                                           |                    |                                                                                                                   |                   |
|                        |                                                    | Output impedance                                                        | 1 kΩ approx.                                                                                                           |                    |                                                                                                                   |                   |
| Current                | Output type                                        | 4 to 20 mA                                                              |                                                                                                                        |                    |                                                                                                                   |                   |
|                        | Load impedance                                     | 50 to 600 Ω                                                             |                                                                                                                        |                    |                                                                                                                   |                   |
| Switch output          | Output type                                        |                                                                         | Select NPN or PNP open collector output                                                                                |                    |                                                                                                                   |                   |
|                        | Output mode                                        |                                                                         | Limit deviation tolerance mode, accumulated output, accumulated pulse output, error output, switch output off          |                    |                                                                                                                   |                   |
|                        | Switch operation                                   |                                                                         | Select normal or reversed output                                                                                       |                    |                                                                                                                   |                   |
|                        | Max. load current                                  |                                                                         | 80 mA                                                                                                                  |                    |                                                                                                                   |                   |
|                        | Max. applied voltage                               |                                                                         | 30 VDC (NPN only)                                                                                                      |                    |                                                                                                                   |                   |
|                        | Internal voltage drop (Residual voltage)           |                                                                         | 1.5 V or less (at 80 mA load current)                                                                                  |                    |                                                                                                                   |                   |
|                        | Delay time                                         |                                                                         | 5 ms or less, variable from 0 to 60 s / 0.01 s increments                                                              |                    |                                                                                                                   |                   |
| Protection             |                                                    | Switch output power supply polarity protection, over current protection |                                                                                                                        |                    |                                                                                                                   |                   |

2 Specifications (continued)

| Model      |                                                    |                        | PFCA710                                                                                                                          | PFCA725                                                       | PFCA750            | PFCA711                                |
|------------|----------------------------------------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|--------------------|----------------------------------------|
| Pressure   | Operating pressure range <sup>*6</sup>             |                        | 50 to 250 kPa                                                                                                                    | 100 to 300 kPa                                                | 150 to 300 kPa     | 250 to 350 kPa                         |
|            | Min. operating differential pressure <sup>*7</sup> |                        | 50 kPa                                                                                                                           | 100 kPa                                                       | 150 kPa            | 250 kPa                                |
|            | Reference operating pressure <sup>*8</sup>         |                        | 100 kPa                                                                                                                          | 150 kPa                                                       | 200 kPa            | 300 kPa                                |
|            | Withstand pressure                                 |                        | 1 MPa                                                                                                                            |                                                               |                    |                                        |
| Electrical | Power supply voltage                               |                        | 24 VDC ±10%                                                                                                                      |                                                               |                    |                                        |
|            | Current consumption <sup>*9</sup>                  |                        | 200 mA or less                                                                                                                   |                                                               |                    |                                        |
|            | Protection                                         |                        | Power supply polarity protection                                                                                                 |                                                               |                    |                                        |
| Display    | Reference condition <sup>*10</sup>                 |                        | Select standard condition (STD) or normal condition (NOR)                                                                        |                                                               |                    |                                        |
|            | Display mode                                       |                        | Instantaneous flow rate display (Main display)<br>Select set control flow display or accumulated flow rate display (Sub display) |                                                               |                    |                                        |
|            | Units <sup>*11</sup>                               | Instantaneous flow     | L/min, cfm                                                                                                                       |                                                               |                    |                                        |
|            |                                                    | Accumulated flow       | L, ft <sup>3</sup>                                                                                                               |                                                               |                    |                                        |
|            | Displayable range                                  | Instantaneous flow     | -0.5 to 10.5 L/min                                                                                                               | -1.3 to 26.3 L/min                                            | -2.5 to 52.5 L/min | -5 to 105 L/min                        |
|            |                                                    | Accumulated flow       | 0 to 99,999,999.9 L                                                                                                              | 0 to 999,999,999 L                                            |                    |                                        |
|            | Min. display units                                 | Instantaneous flow     | 0.01 L/min                                                                                                                       | 0.1 L/min                                                     |                    |                                        |
|            |                                                    | Accumulated flow       | 0.1 L                                                                                                                            | 1 L                                                           |                    |                                        |
|            | Display <sup>*12</sup>                             |                        | LCD (The display screen can be rotated by 90, 180, and 270°)                                                                     |                                                               |                    |                                        |
|            | Mounting orientation                               |                        |                                                                                                                                  | The controller cannot be mounted with the display facing down |                    |                                        |
| Piping     | Piping specification                               |                        | C4 (φ4) / C6 (φ6)                                                                                                                | C6 (φ6) / N7 (φ1/4") / C8 (φ8)                                |                    |                                        |
|            | Screw fitting                                      |                        | 01 (Rc1/8)<br>F1 (NPT1/8)<br>N1 (G1/8)                                                                                           |                                                               |                    | 02 (Rc1/4)<br>F2 (NPT1/4)<br>N2 (G1/4) |
| Weight     | Product                                            | With One-touch fitting | 255 g approx.                                                                                                                    |                                                               |                    |                                        |
|            |                                                    | With Screw fitting     | 305 g approx.                                                                                                                    |                                                               |                    |                                        |
|            | Lead wire                                          |                        | 180 g approx.                                                                                                                    |                                                               |                    |                                        |
|            | Mounting Bracket                                   |                        | 25 g approx.                                                                                                                     |                                                               |                    |                                        |

<sup>\*1</sup>: Refer to the recommended pneumatic circuit.  
<sup>\*2</sup>: The operation may be unstable outside the rated control flow range.  
<sup>\*3</sup>: Applicable fluid: The specification value when dry air is shown. For gas types other than air, the value is for reference.  
<sup>\*4</sup>: For the analogue voltage, option 1, lead wire with M12 connector (3 m long), is used. If the lead wire is different, the accuracy may fluctuate depending on the wiring resistance.  
<sup>\*5</sup>: The reference conditions are as follows: pressure: reference operating pressure; temperature: 25 °C; commanded flow rate: step change from 1% to 100%. In other conditions, the settling time may be delayed.  
<sup>\*6</sup>: The operating pressure range refers to the pressure that can be applied to the primary side of the product. This product cannot be used for negative pressure.  
<sup>\*7</sup>: The minimum operating differential pressure is the minimum differential pressure value (pressure difference between the primary and secondary sides) required for the product to operate normally. Do not mount a restrictor immediately on the secondary side of the product. Doing so may result in unstable control operation.  
<sup>\*8</sup>: Pressure on the secondary side of the product is open to atmosphere (0 kPa).  
<sup>\*9</sup>: Analogue output and switch output are not included. If there is no supply pressure, a consumption current beyond the product specifications may flow in the event of an error in control operation.  
<sup>\*10</sup>: Standard condition (STD): 20 °C, 101.3 kPa, 65% R.H. (The flow rate given in the specification is the value at the standard condition) Normal condition (NOR): 0 °C, 101.3 kPa, 0% R.H.  
<sup>\*11</sup>: This setting is only available for models with the units selection function. For models without the units selection function, the instantaneous flow is fixed to L/min and the accumulated flow (rate) is fixed to L.

2 Specifications (continued)

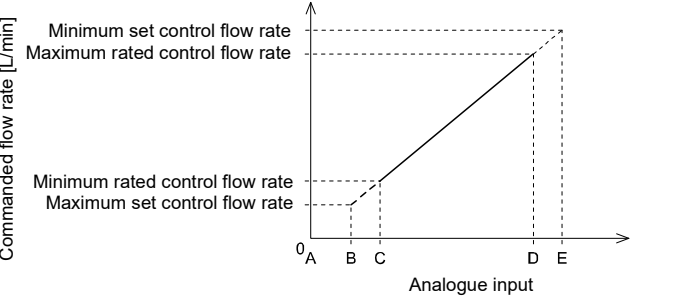
<sup>\*12</sup>: Typefaces included herein are solely developed by DvnaComware Taiwan Inc.  
<sup>\*13</sup>: SMC are working to improve quality. However, any products with tiny scratches, smear, dead-pixel, or variation in the display colour or brightness which does not affect the performance of the product, are verified as conforming products.

2.3 Cable specifications (ZS-53-A, ZS-53-D)

|           |                       |                           |
|-----------|-----------------------|---------------------------|
| Conductor | Nominal cross section | AWG21                     |
| Insulator | Outside diameter      | 1.60 mm approx.           |
|           | Colours               | Brown, White, Black, Blue |
| Sheath    | Material              | Oil resistant PVC         |
|           | Outer diameter        | φ6                        |

2.4 Characteristics data

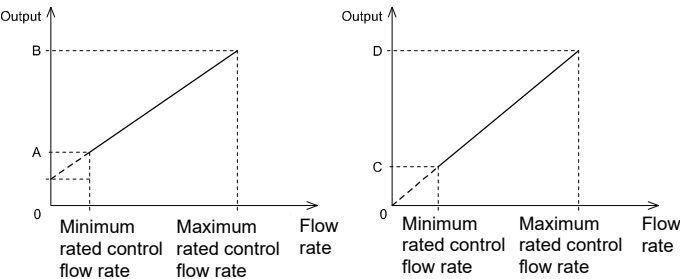
- Flow rate / Analogue input
- Analogue input values are converted into corresponding commanded flow rates.



|               | A    | B        | C                   |          | D     | E        |
|---------------|------|----------|---------------------|----------|-------|----------|
|               |      |          | PFCA710 / 750 / 711 | PFCA725  |       |          |
| Voltage input | 1 V  | 1.016 V  | 1.04 V              | 1.032 V  | 5 V   | 5.12 V   |
| Current input | 4 mA | 4.064 mA | 4.16 mA             | 4.128 mA | 20 mA | 20.48 mA |

- Flow rate / Analogue output

Analogue output is output according to the controlled flow rate.



|                           | 0 L/min | A                   |          | B     |
|---------------------------|---------|---------------------|----------|-------|
|                           |         | PFCA710 / 750 / 711 | PFCA725  |       |
| Voltage output (1 to 5 V) | 1 V     | 1.04 V              | 1.032 V  | 5 V   |
| Current output            | 4 mA    | 4.16 mA             | 4.128 mA | 20 mA |

|                                          | 0 L/min | C                   |         | D    |
|------------------------------------------|---------|---------------------|---------|------|
|                                          |         | PFCA710 / 750 / 711 | PFCA725 |      |
| Voltage output (0 to 10 V) <sup>*1</sup> | 0 V     | 0.1 V               | 0.08 V  | 10 V |

<sup>\*1</sup>: Set the current that flows from the connected equipment to the analogue output to 20 μA or less when selecting 0 to 10 V. When more than 20 μA current flows, the accuracy may not be satisfied below 0.5 V.

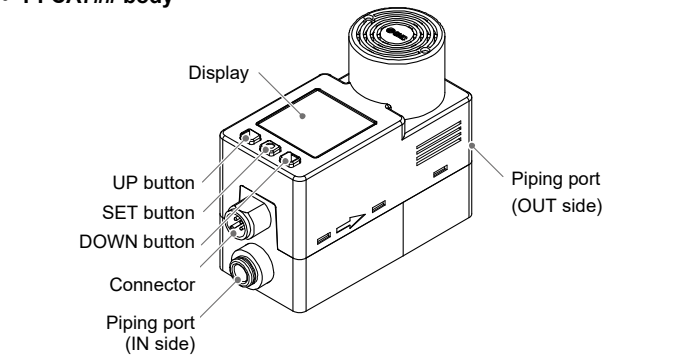
| Model   | Min. rated control flow rate | Max. rated control flow rate |
|---------|------------------------------|------------------------------|
| PFCA710 | 0.1 L/min                    | 10.0 L/min                   |
| PFCA725 | 0.2 L/min                    | 25.0 L/min                   |
| PFCA750 | 0.5 L/min                    | 50.0 L/min                   |
| PFCA711 | 1.0 L/min                    | 100.0 L/min                  |

Warning

- Special products (-X) might have specifications different from those shown in this section. Contact SMC for specific drawings.

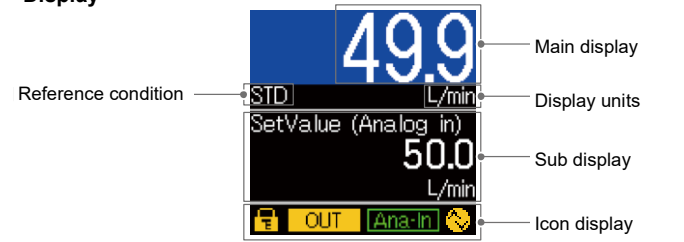
3 Name and function of parts

- PFCA7## body



| Item                     | Description                                                                                                                                                                                                            |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Display                  | Refer to the details below.                                                                                                                                                                                            |
| Piping port              | For piping connections. IN represents "inlet" and OUT represents "outlet".                                                                                                                                             |
| Connector                | For lead wire with M12 connection.                                                                                                                                                                                     |
| UP button<br>DOWN button | Use these buttons to select the mode and the display shown on the Sub display, or increase or decrease the numerical value. The assignment of the UP and DOWN buttons changes depending on the display rotation angle. |
| SET button               | Use this button to change the mode and to set a value.                                                                                                                                                                 |

- Display



| Item                | Description                                                                                                                           |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Main display        | Displays the flow rate value and the error codes.                                                                                     |
| Sub display         | Displays the commanded flow rate, peak/bottom value, accumulated flow rate value, switch output / communication mode, and line names. |
| Reference condition | Indicates the reference condition currently selected.                                                                                 |
| Display units       | Indicates the units currently selected.                                                                                               |
| Icon display        | Displays the function status. See below.                                                                                              |

- Icon display

| Icon | Name                  | Description                                                                                                                                          |
|------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
|      | Key-lock              | The Icon is ON when the buttons are locked.                                                                                                          |
|      | OUT status            | The Icon LED is ON when the output is ON.                                                                                                            |
|      | Analogue input status | Red: Analogue input warning (less than -5%).<br>Green: Analogue input normal.<br>Yellow: Analogue input warning (above 110%).                        |
|      | IO-Link status        | Yellow: Communicating with IO-Link.<br>White: Connecting to IO-Link (including communication disruption).<br>Light is OFF: Not connected to IO-Link. |

For more information about IO-Link communication status indication refer to the operation manual on the SMC website (URL: <https://www.smcworld.com>).

4 Installation

4.1 Installation

Warning

- Do not install the product unless the safety instructions have been read and understood.
- Use the product within the specified operating rated flow, operating pressure and temperature range.
- Tighten to the specified tightening torque.  
If the tightening torque is exceeded the mounting screws, brackets and the product can be broken. Insufficient torque can cause displacement of the product from its correct position.
- Do not drop, hit or apply excessive shock to the product.

4.2 Environment

Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use the product in a place where it could be splashed by oil or chemicals.
- Do not use in an area where electrical surges are generated.
- Do not use in an explosive atmosphere.
- Do not install in a location subject to vibration or impact in excess of the product specifications.
- Do not use the product in the presence of a magnetic field.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of the product specifications.
- Do not use the product in an environment that is exposed to temperature cycles.
- Do not expose to direct sunlight. Use a suitable protective cover.

4.3 Mounting

- Refer to the flow direction marked on the product before mounting.
- Never mount the product in a location that will be used as a foothold.
- Mount the bracket (SMC Part number ZS-40-L for side mounting or ZS-53-G for flow path mounting) to the product using screws supplied.

- The tightening torque of the bracket mounting screws must be 0.63 ±10% N•m.
- When the product is mounted using a bracket, use M3 screws (4 pcs.).
- Refer to the operation manual on the SMC website (URL: <https://www.smcworld.com>) for mounting dimensions.

4.4 Piping

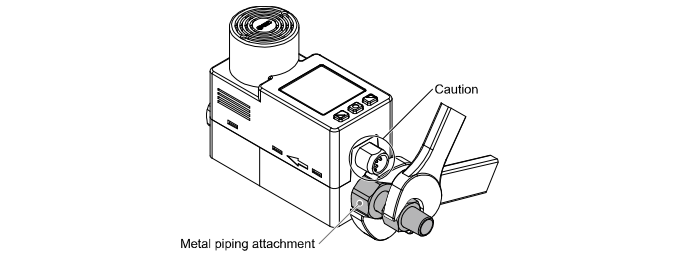
- The product should be flushed out by air blow to remove any dust left in the piping before connecting the piping.
- Do not mount the product with the display facing downward.
- Do not insert metal wires or other foreign matter into the piping ports. This can damage the sensor causing failure or malfunction.
- If there is a risk of foreign matter entering the fluid, install a filter or mist separator on the IN side (entry side) to avoid failure or malfunction.
- If the fluid flow on the IN side (entry side) of the product is unstable, correct measurement and flow rate control will not be possible. If a valve is used on the IN side (entry side) of the product, the flow may be disturbed due to the change of the effective area.
- Do not install a restrictor immediately on the product OUT side (outlet). Otherwise, the flow control action may be unstable.

Caution

- Before connecting piping make sure to clean up chips, cutting oil, dust etc.
- When installing piping or fittings, ensure sealant material (tape) does not enter inside the port.
- When connecting the piping, hold the specified part of the body with a spanner. Using a spanner on other parts may damage the product. Specifically, make sure that the spanner does not damage the connector.
- The required tightening torque of the fittings is given in the table below.

4 Installation (continued)

- If the tightening torque is exceeded, the product can be damaged. If the correct tightening torque is not applied, the fittings may become loose.
- Ensure there is no leakage after piping.



| Nominal thread size | Required torque |
|---------------------|-----------------|
| Rc(NPT)1/8          | 7 to 9 N•m      |
| Rc(NPT)1/4          | 12 to 14 N•m    |

| Nominal thread size          | Width across flats of attachment |
|------------------------------|----------------------------------|
| Rc(NPT)1/8, Rc(NPT)1/4, G1/8 | 17 mm                            |
| G1/4                         | 21 mm                            |

5 Wiring

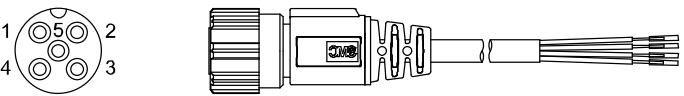
5.1 Wiring

Caution

- Wiring should only be performed with the power supply turned OFF.
- Confirm proper insulation of wiring.
- Avoid repeatedly bending, stretching or applying a heavy object to the lead wire.
- Use separate routes for the product wiring and any power or high voltage wiring. Otherwise, malfunction may result due to noise.
- Keep wiring as short as possible to prevent interference from electromagnetic noise and surge voltage.

- If a commercially available switching power supply is used, be sure to ground the frame ground (FG) terminal. If a commercially available switch-mode power supply is connected for use, switching noise will be superimposed and it will not be able to meet the product specifications.  
In that case, insert a noise filter such as a line noise filter/ferrite between the switching power supplies or change the switching power supply to a series power supply.

5.2 M12 Connector Pin numbers (ZS-53-A, ZS-53-D)



- When used as a switch output device

| Pin number | Wire colour | Name  | Description     |
|------------|-------------|-------|-----------------|
| 1          | Brown       | DC(+) | 24 VDC          |
| 2          | White       | OUT2  | Analogue output |
| 3          | Blue        | DC(-) | 0 V             |
| 4          | Black       | OUT1  | Switch output   |
| 5          | Grey        | IN    | Analogue input  |

- When used as an IO-Link device

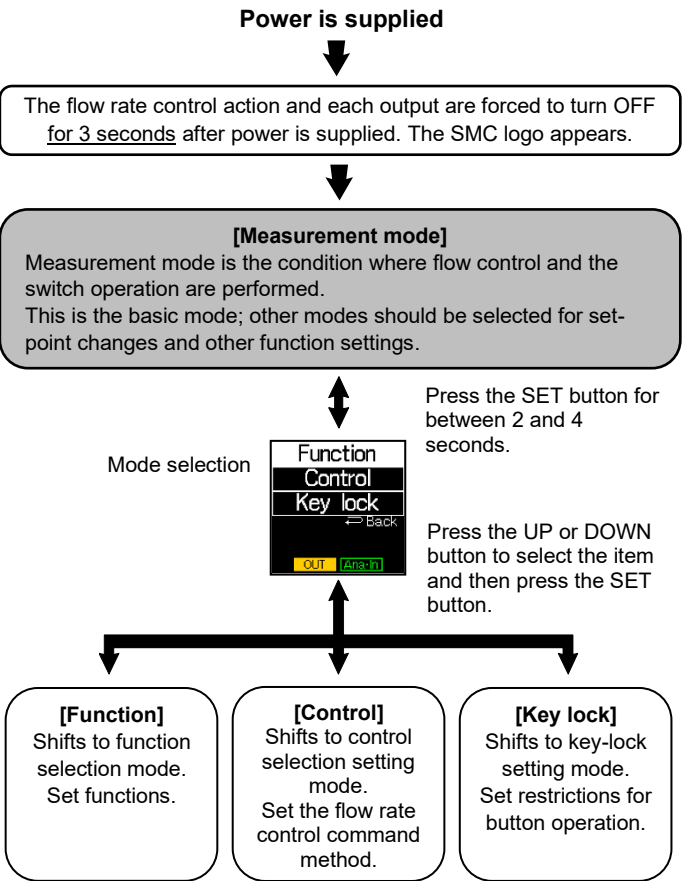
| Pin number | Wire colour | Name  | Description                  |
|------------|-------------|-------|------------------------------|
| 1          | Brown       | DC(+) | 24 VDC                       |
| 2          | White       | NC    | Not connected                |
| 3          | Blue        | DC(-) | 0 V                          |
| 4          | Black       | C/Q   | Communication data (IO-Link) |
| 5          | Grey        | NC    | Not connected                |

5 Wiring (continued)

5.3 Connecting

- Align the lead wire M12 connector (SMC part number ZS-53-A) with the connector key groove and insert vertically.
- Connection is complete when the knurled part is fully tightened. Check that the connection is not loose.

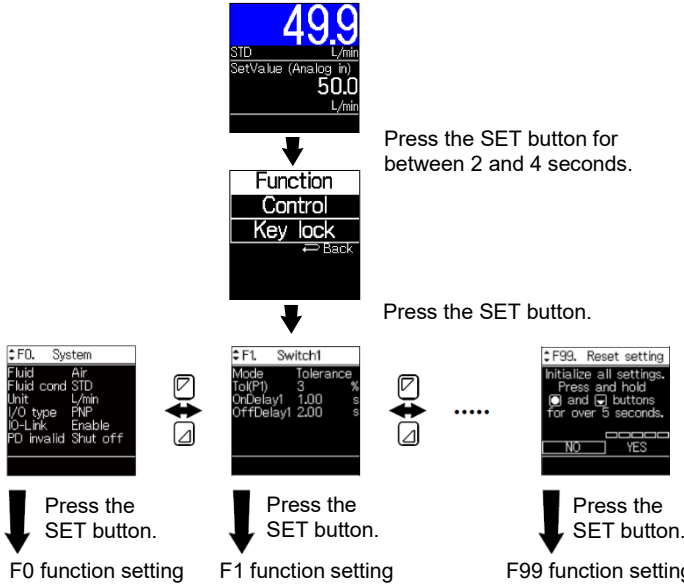
6 Outline of Settings



Refer to the operation manual on the SMC website (URL: <https://www.smcworld.com>) for further setting details.

7 Function selection mode

- In this mode, each function setting can be changed separately.
- In measurement mode, press the SET button for between 2 and 4 seconds, then select [Function] to enter function selection mode.
- Press the UP or DOWN button to change the number and each function that you want to change can be selected.



7 Function selection mode (continued)

- **When setting is complete:**  
Press the UP or DOWN button to select [Back], to return to function selection mode.  
Press the SET button for at least 2 seconds to return to measurement mode.

7.1 Default settings

| No    | Function                          | Item                                                       | Default setting                                                                          |
|-------|-----------------------------------|------------------------------------------------------------|------------------------------------------------------------------------------------------|
| [F0]  | System settings                   | [Fluid] Fluid settings                                     | [Air] Air                                                                                |
|       |                                   | [Fluid cond] Flow rate reference condition.                | [STD] Standard condition                                                                 |
|       |                                   | [Unit] Flow rate display units.                            | [L/min] L/min (L)                                                                        |
|       |                                   | [I/O type] NPN or PNP output selection.                    | [PNP] PNP output                                                                         |
|       |                                   | [IO-Link] IO-Link enable/disable setting.                  | [Enable] Enable                                                                          |
| [F1]  | OUT1 settings                     | [PD invalid] Output PD setting during communication error. | [Shut off] Output PD: 0                                                                  |
|       |                                   | [Mode] Output mode selection                               | [Tolerance] Limit deviation tolerance mode                                               |
|       |                                   | [tol(P1)] Limit deviation tolerance setting                | [ 3 %] 3% of rated control flow                                                          |
|       |                                   | [OnDelay1] ON delay time setting                           | [0.00 s] 0 second                                                                        |
|       |                                   | [OffDelay1] OFF delay time setting                         | [0.00 s] 0 second                                                                        |
| [F10] | Measurement setting               | [Resolution] Display resolution setting                    | [Low] 100 resolution                                                                     |
| [F22] | Analogue output settings          | [Type] Analogue output switching setting                   | [1-5V] 1 to 5 V (Analogue voltage type).<br>[4-20mA] 4 to 20 mA (Analogue current type). |
|       |                                   | [Free span] Analogue free range setting                    | [10.00L/min] 10 L/min (For the PFCA710, the upper limit of the rated control flow.)      |
| [F30] | Accumulated flow (rate) settings  | [Save intvl] Accumulation storage setting                  | [No save] Not to hold                                                                    |
|       |                                   | [Disp mode] Accumulated display direction setting          | [Increment] Addition direction                                                           |
|       |                                   | [Auto shut] Automatic accumulation shut-off enable/disable | [Disable] Disable                                                                        |
| [F80] | Display settings                  | [Colour] Select measurement value display colour           | [1onB,offR] ON: Blue; OFF: Red                                                           |
|       |                                   | [Display] Display OFF setting                              | [ON] Display ON                                                                          |
|       |                                   | [Rotation] Display rotation angle setting                  | [0deg] Rotation angle 0°                                                                 |
|       |                                   | [Brightness] Screen brightness setting                     | [100%] Brightness 100%                                                                   |
| [F81] | PIN code setting                  | [Line name] Line name display setting                      | [OFF] No line name displayed                                                             |
|       |                                   | Selection of PIN code                                      | [OFF] Not used                                                                           |
|       |                                   |                                                            |                                                                                          |
| [F91] | Device information                | -                                                          | Information check (No settings)                                                          |
| [F96] | Input check                       | -                                                          | Input check (No settings)                                                                |
| [F98] | Output check                      | -                                                          | [Normal] Normal output                                                                   |
| [F99] | Reset to factory default settings | -                                                          | [ oFF] Not to be reset                                                                   |

8 IO-Link Parameter settings

8.1 IODD file

- IODD (I/O Device Description) is a definition file which provides all properties and parameters required for establishing functions and communication of the device.
- The IODD includes the main IODD file and a set of image files such as vendor logo, device picture and device icon.
  - The IODD file for this product is as follows:

| Product number | IODD file *                           |
|----------------|---------------------------------------|
| PFCA7**-**-**  | SMC-PFCA7**-**-**-**-yyyymmdd-IODD1.1 |

- \*: "\*" indicates the product model which corresponds to each IODD file.
- \*: "yyyymmdd" indicates the date of creation of the file, with yyyy, mm, and dd representing the year, month, and date, respectively.
- The IODD file can be downloaded from the SMC website (URL: <https://www.smcworld.com>).

8.2 IO-Link specifications

| IO-Link type                  | Device                                    |
|-------------------------------|-------------------------------------------|
| IO-Link version               | V1.1                                      |
| Communication speed           | COM2 (38.4 kbps)                          |
| Min. cycle time               | 5.5 ms                                    |
| Process data length           | Input Data: 8 bytes, Output Data: 2 bytes |
| On request data communication | Available                                 |
| Data storage function         | Available                                 |
| Event function                | Available                                 |

9 Other Settings

- Reset operation
- Zero clear function

For further details refer to the operation manual on the SMC website (URL: <https://www.smcworld.com>).

10 How to Order

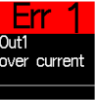
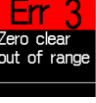
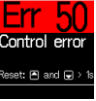
Refer to the operation manual or catalogue on the SMC website (URL: <https://www.smcworld.com>) for How to order information.

11 Outline Dimensions (mm)

Refer to the operation manual or catalogue on the SMC website (URL: <https://www.smcworld.com>) for Outline Dimensions.

12 Troubleshooting

12.1 Error display

| Error name                                    | Error display                                                                                                                                                                                                | Description                                                                                          | Measures                                                                                                                                                                                                                                                                                                                                                                                                     | Control operation during an error |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| System error (Err 0, 4, 6, 8, 16, 40, 82, 83) |                                                                                                                           | An internal data error has occurred.                                                                 | Turn off the power and check for any noise source, and then turn on the power again. If the failure cannot be solved, contact SMC.                                                                                                                                                                                                                                                                           | Stop                              |
| Over current error (Err 1)                    |                                                                                                                           | The switch output load current has exceeded 80 mA.                                                   | Remove the cause of the excessive current in the output.                                                                                                                                                                                                                                                                                                                                                     | Continuing                        |
| Zero clear error (Err 3)                      |                                                                                                                           | During a zero clear operation, a flow rate exceeding ±5%F.S. is applied.                             | Perform the zero-clear operation again when the flow rate is not applied.                                                                                                                                                                                                                                                                                                                                    | Continuing                        |
| Version does not match (Err 15)               |                                                                                                                           | The IO-Link version does not match with the master.                                                  | Align the master IO-Link version to the device.                                                                                                                                                                                                                                                                                                                                                              | Continuing                        |
| Control error (Err 50)                        | <br><br>*: When [Local] is selected | The controlled flow rate does not continuously reach the commanded flow rate for at least 5 seconds. | Use the product within the operating differential pressure and operating pressure range. Check to see if there is any air leakage from piping, etc. The controlled flow rate is restored by setting the commanded flow rate to zero. When [Local] is selected in control selection setting mode, the controlled flow rate is restored by pressing and holding the UP and DOWN button for 1 second or longer. | Stopped                           |
| Close error (Err 51)                          |                                                                                                                         | Flow rate exceeding ±5% F.S. is applied when commanded flow rate is less than ±1% F.S.               | Mount the product so that the fluid flow direction is the same as the arrow indicated on the side of the body.                                                                                                                                                                                                                                                                                               | Stopped                           |
| Abnormal power supply voltage (Err 60)        |                                                                                                                         | Power supply voltage is outside of the range 24 VDC±10%.                                             | Supply a power supply voltage within the range 24 VDC±10%.                                                                                                                                                                                                                                                                                                                                                   | Stopped                           |

Refer to the operation manual or catalogue on the SMC website (URL: <https://www.smcworld.com>) for Troubleshooting details.

13 Maintenance

13.1 General Maintenance



Caution

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
  - If handled improperly, compressed air can be dangerous.
  - Maintenance of pneumatic systems should be performed only by qualified personnel.
  - Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the air is released to atmosphere.
  - After installation and maintenance, apply operating pressure and power to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.
  - If any electrical connections are disturbed during maintenance, ensure they are reconnected correctly and safety checks are carried out as required to ensure continued compliance with applicable national regulations.
  - Do not make any modification to the product.
  - Do not disassemble the product, unless required by installation or maintenance instructions.
- **How to reset the product after a power cut or when the power has been unexpectedly removed**  
The settings of the product are retained from before the power cut or de-energizing.  
The output condition also recovers to that before the power cut or de-energizing, but may change depending on the operating environment. Therefore, check the safety of the whole system before operating the product.

14 Limitations of Use

14.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

15 Product disposal

This product should not be disposed of as municipal waste. Check your local regulations and guidelines to dispose of this product correctly, in order to reduce the impact on human health and the environment.

16 Contacts

Refer to [www.smcworld.com](http://www.smcworld.com) or [www.smc.eu](http://www.smc.eu) for your local distributor/importer.

SMC Corporation

URL : <https://www.smcworld.com> (Global) <https://www.smc.eu> (Europe)  
SMC Corporation, 1-5-5, Kyobashi, Chuo-ku, Tokyo 104-0031, JAPAN  
Specifications are subject to change without prior notice from the manufacturer.  
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