

Flow Sensor Operation Manual



PF2A5□□/PF2W5□□

Thank you for purchasing an SMC PF2A5□□/PF2W5□□ Series Flow Sensor. Please read this manual carefully before operating the product and make sure you understand its capabilities and limitations. Please keep this manual handy for future reference.

To obtain more detailed information about operating this product, please refer to the SMC website (URL <http://www.smcworld.com>) or contact SMC directly.

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) and other safety regulations.

- Caution:** CAUTION indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
- Warning:** WARNING indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
- Danger:** DANGER indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

Operator

- ◆ This operation manual is intended for those who have knowledge of machinery using pneumatic equipment, and have sufficient knowledge of assembly, operation and maintenance of such equipment. Only those persons are allowed to perform assembly, operation and maintenance.
- ◆ Read and understand this operation manual carefully before assembling, operating or providing maintenance to the product.

Safety Instructions

Warning

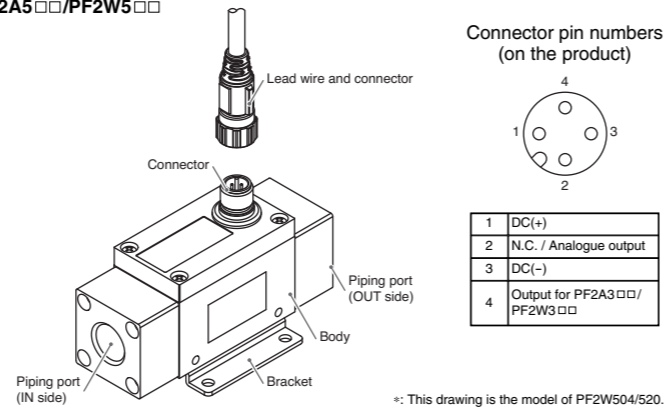
- Do not disassemble, modify (including changing the printed circuit board) or repair. An injury or failure can result.
- Do not operate the product outside of the specifications. Do not use for flammable or harmful fluids. Fire, malfunction, or damage to the product can result. Verify the specifications before use.
- Do not operate in an atmosphere containing flammable, explosive or corrosive gas. Fire or an explosion can result. This product is not designed to be explosion proof.
- Do not use the product for flammable or highly permeable fluids. A fire or explosion can result.
- Do not use the product in a place where static electricity is a problem. Otherwise it can cause failure or malfunction of the system.
- If using the product in an interlocking circuit:
 - Provide a double interlocking system, for example a mechanical system
 - Check the product regularly for proper operation
 - Otherwise malfunction can result, causing an accident.
- The following instructions must be followed during maintenance:
 - Turn off the power supply
 - Ensure the flow is shut off before performing maintenance
 - Otherwise an injury can result.

Caution

- Do not touch the terminals and connectors while the power is on. Otherwise electric shock, malfunction or damage to the product can result.
- Do not touch the piping or its connected parts when the fluid is at high temperature. It may lead to burnt. Ensure the piping cools sufficiently before touching.
- After maintenance is complete, perform appropriate functional inspections and leak tests. Stop operation if the equipment does not function properly or there is a leakage of fluid. When leakage occurred from parts other than the piping, the product might be faulty. Disconnect the power supply and stop supplying fluid. Do not apply fluid under leaking conditions. Safety cannot be assured in the case of unexpected malfunction.

Summary of Product parts

PF2A5□□/PF2W5□□



| Item | Description |
|-------------------------|--|
| Lead wire and connector | Lead wire to supply power and transmit output signals. |
| Connector | Connector for electrical connections. |
| Piping port | Connected to the fluid inlet at IN side and to the fluid outlet at OUT side. |
| Bracket | Bracket for mounting the product. |
| Body | The body of the product. |

Mounting and Installation

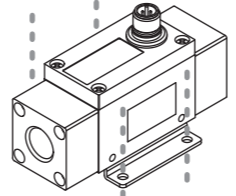
Installation

- Never mount the product in a location that will be used as a foothold.

Installing

- Install the product (with bracket) using the M4 screws (4 pcs).
- Bracket thickness is approximately 1.6 mm (approximately 2.0 mm for PF2W511).

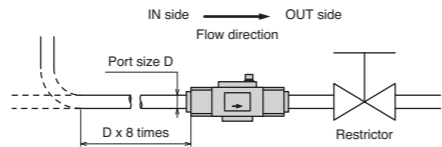
Refer to the product catalogue or SMC website (URL <http://www.smcworld.com>) for more information about mounting hole dimensions.



*: This drawing is the model of PF2W504/520.

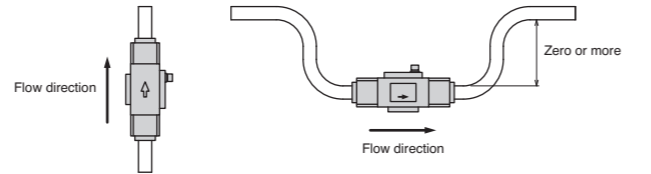
Piping

- Use the product within the specified operating pressure range and temperature range.
- Proof pressure is 1.0 MPa for air and 1.5 MPa for water.
- Connect the piping to the fittings.
- Mount the product so that the fluid direction is the same as the arrow indicated on the product.
- Never mount the product for air upside down.
- The piping on the IN side must have a straight section of piping whose length is 8 times the piping diameter or more.
- Avoid sudden changes in the piping size on the IN side of the product.



*: This drawing is the model of PF2W504/520.

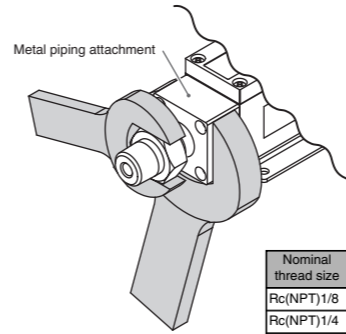
- Bubbles may be generated depending on the piping design. Refer to an example of recommended piping system. (If the fluid detection path is always filled with liquid, there will be no problem.) (only PF2W)



*: This drawing is the model of PF2W504/520.

Connecting the piping

- Ensure that the metal piping attachments are tightened to the required torque (refer to the table below).
- If the tightening torque is exceeded, the product can be broken. If the tightening torque is insufficient, the fittings may become loose.
- When connecting piping to the product, a spanner should be used on the metal piping attachment only. Using a spanner on other parts may damage the product.
- Avoid any sealing tape from entering inside the piping.
- Ensure that there is no leakage from loose piping.



*: This drawing is the model of PF2W504/520.

| Model | Width across flats of attachment |
|------------|----------------------------------|
| PF2A510 | 24 mm |
| PF2A550 | |
| PF2A511 | |
| PF2A521 | 30 mm |
| PF2A551 | |
| Rc(NPT)3/8 | 34 mm |
| Rc(NPT)1/2 | |
| Rc(NPT)3/4 | |
| Rc(NPT)1 | |
| PF2W504(T) | 34 mm |
| PF2W520(T) | |
| PF2W540(T) | 45 mm |
| PF2W511 | |

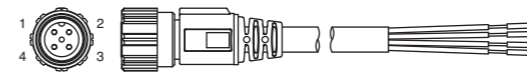
Wiring

- Connections should only be made with the power supply turned off.
- Use separate routes for the product wiring and any power or high voltage wiring. Otherwise, malfunction may result due to noise.
- Ensure that the FG terminal is connected to ground when using a commercially available switch-mode power supply. When a switch-mode power supply is connected to the product, switching noise will be superimposed and the product specification can no longer be met. This can be prevented by inserting a noise filter, such as a line noise filter and ferrite core, between the switch-mode power supply and the product, or by using a series power supply instead of a switch-mode power supply.

Connector Pin numbers

When the lead wire and connector designated for the PF2A5/PF2W5 is used, the wire colours will apply as shown in the diagram.

Connector Pin numbers (on the lead wire)

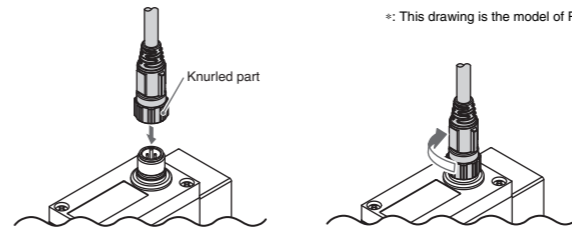


| Pin number | Content | Colour |
|------------|----------------------------|--------|
| 1 | DC(+) | Brown |
| 2 | N.C. / Analogue output | White |
| 3 | DC(-) | Blue |
| 4 | Output for PF2A3□□/PF2W3□□ | Black |

Connecting the wiring

How to connect the body and the lead wire and connector

- Align the lead wire connector 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.

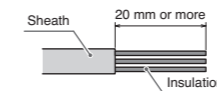


*: This drawing is the model of PF2W504/520.

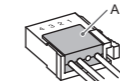
Attaching the sensor connector to the lead wire (When the product connects to the PF2A2□□/PF2W2□□)

Refer to the PF2A2□□/PF2W2□□ operation manual for details of the sensor connector pin numbers.

- Strip the lead wire as shown. Do not cut the insulator.



- Insert the corresponding wire colour into the pin number printed on the sensor connector, to the bottom, then part A shown should be pressed in by hand to make temporary connection.



- Part A should then be pressed in using a suitable tool, such as pliers.

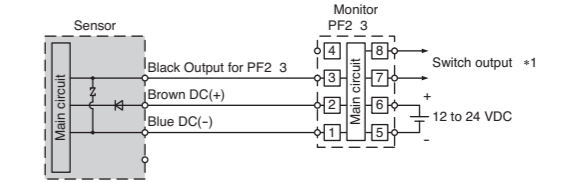


*: The connector cannot be re-used once it has been fully crimped. In cases of connection failure such as incorrect order of wires or incomplete insertion, please use the new connector.

Internal circuit and wiring example

When the lead wire and connector designated for the PF2A5/PF2W5 is used, the wire colours will apply as shown in the diagram.

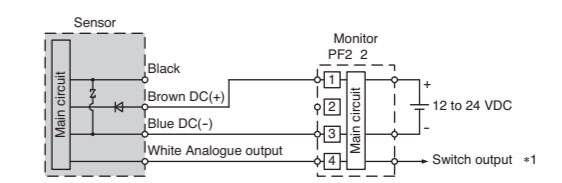
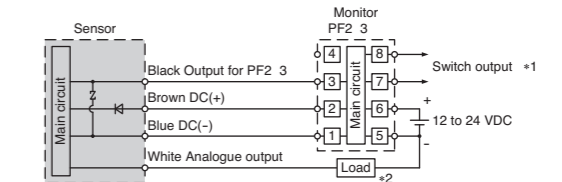
Output for PF2A3□□ type: PF2A5□□-□□□□-□□
Output for PF2W3□□ type: PF2W5□□-□□□□-□□



Output impedance: 1 kΩ

*1: Refer to the PF2A3□□/PF2W3□□ operation manual for details of the flow monitor.

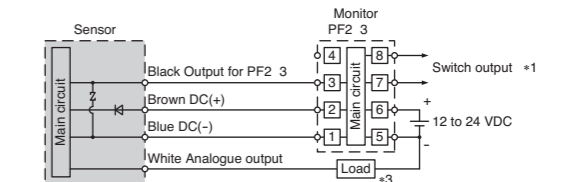
Output for PF2A3□□ + Analogue (1 to 5 V) type: PF2A5□□-□□□□-1-□□
Output for PF2W3□□ + Analogue (1 to 5 V) type: PF2W5□□-□□□□-1-□□



Analogue output: 1 to 5 V
Output impedance: 100 kΩ

*1: Refer to the PF2A3□□/PF2W3□□ or PF2A2□□/PF2W2□□ operation manual for details of the flow monitors.
*2: Load indicates analogue input equipment such as a voltmeter.

Output for PF2A3□□ + Analogue (4 to 20 mA) type: PF2A5□□-□□□□-2-□□
Output for PF2W3□□ + Analogue (4 to 20 mA) type: PF2W5□□-□□□□-2-□□



Analogue output: 4 to 20 mA
Max. load impedance: 300 Ω (12 VDC)
600 Ω (24 VDC)

*1: Refer to the PF2A3□□/PF2W3□□ operation manual for details of the flow monitor.
*3: Load indicates analogue input equipment such as an ammeter.

Troubleshooting

Refer to the SMC website (URL <http://www.smcworld.com>) for more information about troubleshooting.

Specifications / Outline with Dimensions

Refer to the product catalogue or SMC website (URL <http://www.smcworld.com>) for more information about the product specification and outline dimensions.

SMC Corporation URL <http://www.smcworld.com>

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Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.
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