

Flow Monitor Operation Manual



PF2A2□□/PF2W2□□/PF2D2□□

Thank you for purchasing an SMC PF2A2□□/PF2W2□□/PF2D2□□ Series Flow Monitor.
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

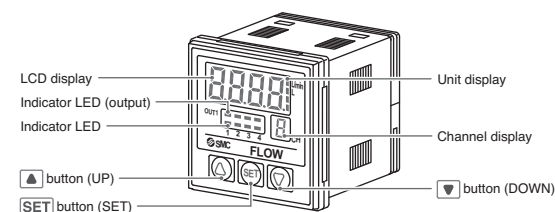
- Warning**
 - ◆ Do not disassemble, modify (including changing the printed circuit board) or repair. An injury or failure can result.
 - ◆ Do not operate the product outside of the specifications. Do not use for flammable or harmful fluids. Fire, malfunction, or damage to the product can result. Verify the specifications before use.
 - ◆ Do not operate in an atmosphere containing flammable, explosive or corrosive gas. Fire, explosion or corrosion can result. This product is not designed to be explosion proof.
 - ◆ 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 burn. 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 occurs from parts other than the piping, the product might be faulty. Disconnect the power supply and stop the fluid supply. Do not apply fluid under leaking conditions. Safety cannot be assured in the case of unexpected malfunction.

Maintenance

How to reset the product after a power cut or forcible de-energizing
The setting of the product will be retained as it was before a power cut or de-energizing.
The output condition is also basically recovered to that before a power cut or de-energizing, but may change depending on the operating environment. Therefore, check the safety of the whole installation before operating the product.

Summary of Product parts

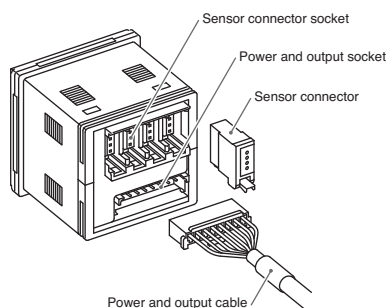
Front



Item	Description
Unit display	Indicates the unit currently selected, and automatically displays instantaneous flow or accumulated flow units according to the display mode.
LCD display	Displays the flow value, setting mode, and error indication.
Indicator LED (output)	Indicates the switch output status. LED is ON when the output is ON.
Indicator LED *	Indicates the reference condition selected. LED is ON (Red) when normal condition is selected. (Only the PF2A2□□)
Channel display	Indicates the channel selected (CH1 to CH4).
▲ button (UP)	Selects the mode or increases the ON/OFF Set value.
SET button (SET)	Press this button to change the mode and to set a value.
▼ button (DOWN)	Selects the mode or decreases the ON/OFF Set value.

*: Operate only the PF2A20□□ series.

Back



Item	Description
Sensor connector socket	Socket for the sensor connection.
Power and output socket	Socket for the power and output connection.
Sensor connector	Connector for attaching (crimping) to the sensor lead wire.
Power and output cable	Cable to supply power to the product and transmit outputs.

Mounting and Installation

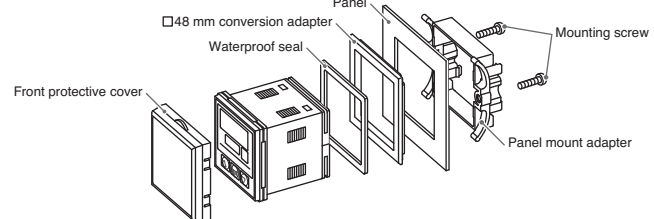
Installation

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

Installing

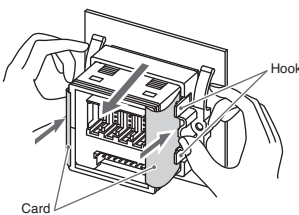
- ◆ **Mounting with the panel mount adapter**
 - Install the product as shown below. The □48 mm conversion adapter is available if required.
 - The panel mount adapter and the front cover can be rotated 90° for mounting.
 - Fix the panel mount adapter to the product with the mounting screws (nominal size: 3 x 8 L, 2 pcs.) supplied.
 - The front protective cover for panel mounting satisfies IP65 (when □48 mm conversion adapter is used, it satisfies IP40). However, if the panel mount adapter is not fixed securely or the instrument is not seated correctly, water might enter. After the product makes contact with the panel, the screws should be further tightened 1/4 to 1/2 turn.
 - The self tapping screws cannot be re-used.

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



Removing the panel mount adapter

- ◆ The product with panel mount adapter can be removed from the installation by removing 2 screws and releasing the hooks at the sides. The hooks can be released by inserting a suitable thin card.
- ◆ Pull the panel mount adapter to the front, and remove the product.
- ◆ If the panel mount adapter is pulled with the hook engaged, the product or the panel mount adapter will be damaged.

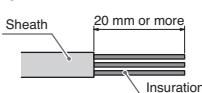


Wiring

- ◆ 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.

Connecting the wiring

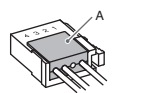
- ◆ **Attaching the sensor connector to the sensor wire**
 - Strip the sensor wire as shown.
 - Do not cut the insulator.



- ◆ Insert the corresponding wire colour shown in the table into the pin number printed on the sensor connector, to the bottom.

Pin number on connector	Wire colour (PF2□□□□□)	Wire colour (PF3W□□□)
1	Brown	Brown
2	(N.C.)	(N.C.)
3	Blue	Blue
4	White	Black

- ◆ Check that the above preparation has been performed correctly, then part A shown should be pressed in by hand to make temporary connection.



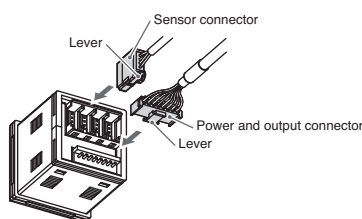
- ◆ Part A should then be pressed in using a suitable tool, such as pliers.



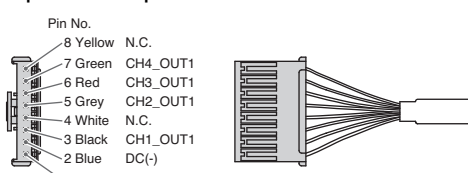
- ◆ The sensor connector cannot be re-used once it has been fully crimped.
- ◆ In cases of connection failure such as incorrect order of wires or incomplete insertion, please use a new connector.
- ◆ If the sensor is not connected correctly, [- -] will be displayed.

Connecting / Disconnecting

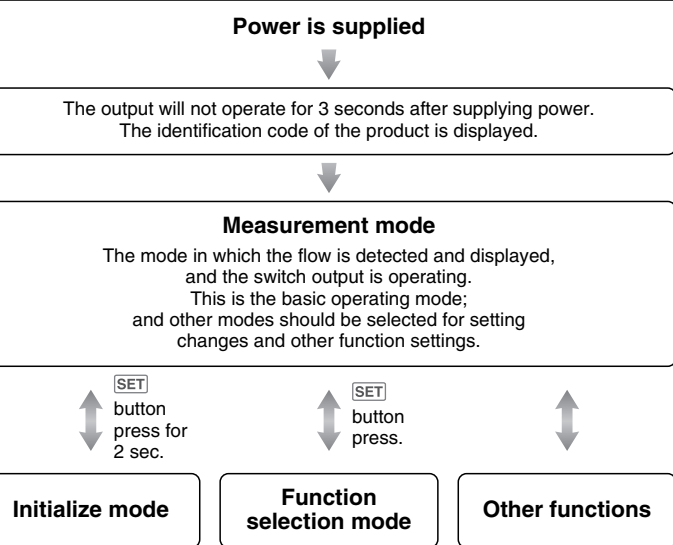
- ◆ When connecting, insert the connectors straight into the body until it clicks.
- ◆ When removing the connector, press down the lever to release the hook from the housing and pull the connector straight out.



Power / Output connector pin numbers



Outline of setting



Initialize mode

Items below can be set.

- ◆ Connected sensor
- ◆ Unit selection function
- ◆ Switch operation
- ◆ Display mode
- ◆ Output mode
- ◆ Reference condition

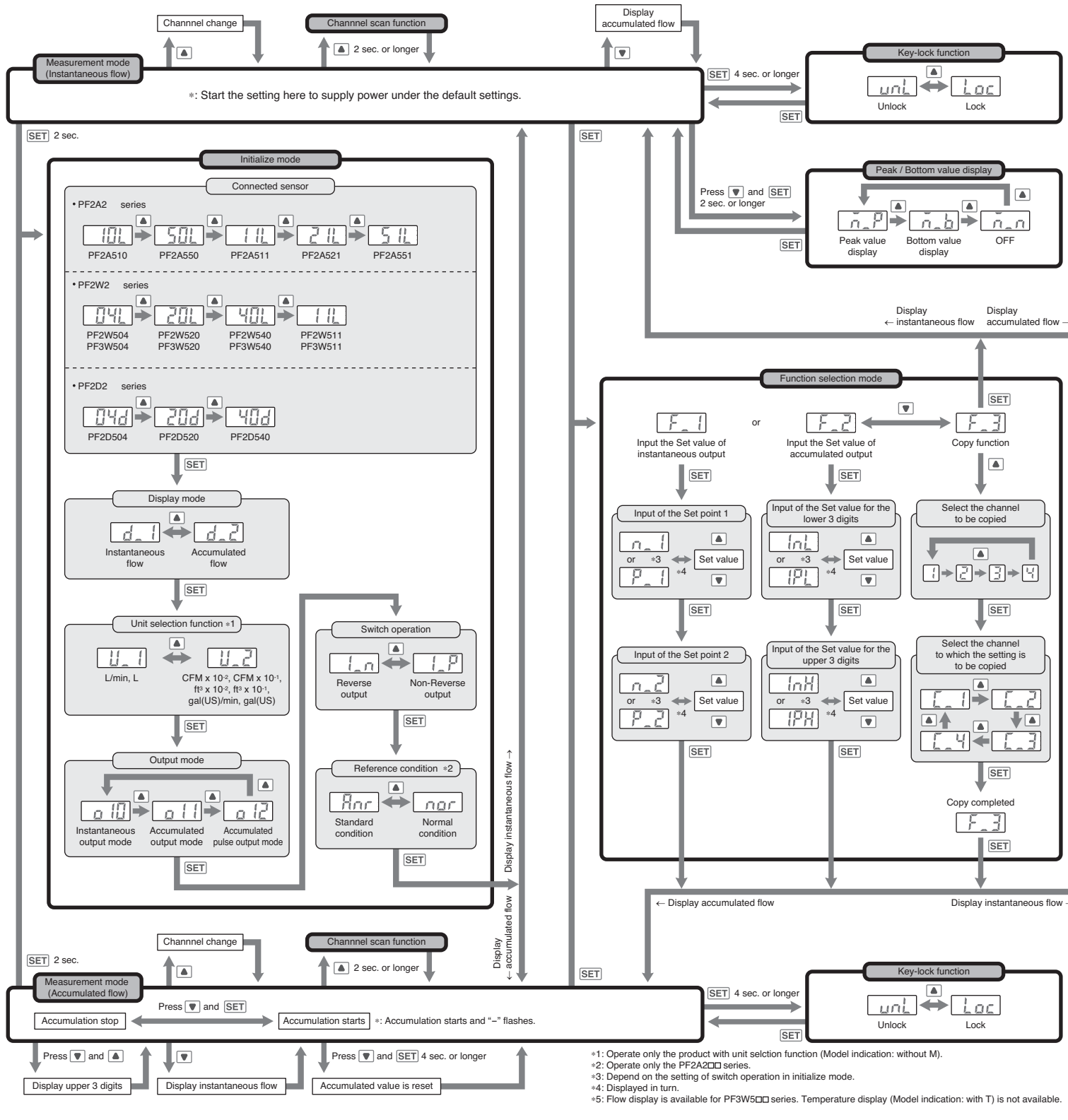
Default settings

The default settings are as follows. If this condition is acceptable, then keep these settings.

Item	Model	Default settings
Selection of the connected sensor	PF2A2□□ series	[10L] 1 to 10 L/min type (PF2A510)
	PF2W2□□ series	[04L] 0.5 to 4 L/min type (PF2W504) (PF3W504)
Selection of display mode	PF2D2□□ series	[04d] 0.4 to 4 L/min type (PF2D504)
	Common	[d_1] Display instantaneous flow
Unit selection function *	Common	[U_1] L/min
Selection of output mode	Common	[o10] Instantaneous output mode
Selection of switch operation	Common	[1_n] Reverse output
Selection of reference condition	PF2A2□□ series only	[Anr] Standard condition

*: Operate only the product with unit selection function.

Setting flow chart



Function selection mode

In measurement mode, press the [SET] button, to display [F_□]. This [F_□] indicates the mode for changing each functional setting.

*: When the output mode is set to instantaneous output mode, [F_1] is displayed. When the output mode is set to accumulated output mode, [F_2] is displayed. When the output mode is set to accumulated pulse output mode, [F_3] is displayed.

Default settings

The default settings are as follows. If this condition is acceptable, then keep these settings.

Item	Default setting
[F_1] Input the Set value of instantaneous output	[n_1] Input of the Set point 1 50% of max. rated flow
[F_2] Input the Set value of accumulated output	[n_2] Input of the Set point 2 50% of max. rated flow
[F_3] Copy function	[1nL] Input of the Set value for the lower 3 digits [1_0]
	[1_n] Input of the Set value for the upper 3 digits [0]
	[-] Copy function [-]

*: When Non-Reverse output is selected as the switching operation, n becomes P.

List of outputs

Find the diagram of the output required in the table below. Perform settings following the Set value column on the right.

Switch output diagram	Output mode	Switch operation	Set value
	Instantaneous output mode	Non-Reverse output	Set point 2 ≤ Set point 1 Hysteresis mode +2
	Instantaneous output mode	Reverse output	Set point 1 < Set point 2 Window comparator mode
	Accumulated output mode	Non-Reverse output	Set point 2 ≤ Set point 1 Hysteresis mode +2
	Accumulated output mode	Reverse output	Set point 1 < Set point 2 Window comparator mode
	Accumulated pulse output mode	Non-Reverse output	Upper 3 digits + Lower 3 digits
	Accumulated pulse output mode	Reverse output	Upper 3 digits + Lower 3 digits
	Accumulated pulse output mode	Non-Reverse output	No Set value input
	Accumulated pulse output mode	Reverse output	No Set value input

*1: In window comparator mode, the hysteresis is fixed at 3 digits. When setting, allow 7 digits or more between Set point 1 and Set point 2.
*2: When Set point 1 = Set point 2, chattering may occur.

Other functions

- Channel scan function
- Peak / Bottom value display
- Key-lock function

To set each of these functions, refer to the product catalogue or SMC website (URL <http://www.smcworld.com>) for more information about other functions.

Troubleshooting

Error indication

Error name	Error display	Error type	Troubleshooting method
Excessive instantaneous flow	---	Flow has exceeded the upper limit of the display flow range.	Reduce the flow.
Over current error	Er1	The switch output load current is more than 80 mA (OUT1).	Turn the power off and remove the cause of the over current. Then turn the power on again.
System error	Er0	Internal data error.	Contact SMC to repair.
	Er5		
	Er6		
	Er7		
Excessive accumulated flow	9999	The display flow range of accumulated flow has been exceeded.	To reset the accumulated flow value, press the [SET] button while the [▼] button is pressed for 4 seconds or longer.

*: If the error cannot be reset after the above measures are taken, then please contact SMC.

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 specifications and outline dimensions.