

Flow Monitor

Operation Manual



PF2A3□□/PF2W3□□/PF2D3□□

Thank you for purchasing an SMC PF2A3□□/PF2W3□□/PF2D3□□ 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

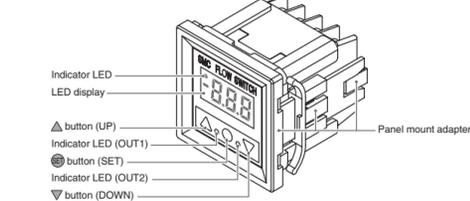
- Warning**
 - Do not disassemble, modify (including changing the printed circuit board) or repair. An injury or failure can result.
 - Do not operate the product outside of the specifications. Do not use for flammable or harmful fluids. Fire, malfunction, or damage to the product can result. Verify the specifications before use.
 - Do not operate in an atmosphere containing flammable, explosive or corrosive gas. Fire or an explosion 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.

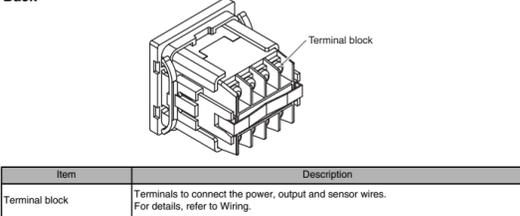
Summary of Product parts

Front



Item	Description
Indicator LED	Indicates the reference condition selected. LED is ON (Red) when normal condition is selected. (Only the PF2A3□□□)
LED display	Displays the flow value, setting mode, and error indication.
Indicator LED (OUT1)	Indicates the output status of OUT1. LED is ON (Green) when OUT1 is ON. The LED flashes when an over current error occurs. When the accumulated pulse output mode is selected, the indicator LED will turn OFF.
Indicator LED (OUT2)	Indicates the output status of OUT2. LED is ON (Red) when OUT2 is ON. The LED flashes when an over current error occurs. When the accumulated pulse output mode is selected, the indicator LED will turn OFF.
▲ button (UP)	Selects the mode or increases the ON/OFF Set value.
● button (SET)	Press this button to change to another mode and to set a value.
▼ button (DOWN)	Selects the mode or decreases the ON/OFF Set value.
Panel mount adapter	Adapter to mount the product to the panel.

Back



Item	Description
Terminal block	Terminals to connect the power, output and sensor wires. For details, refer to Wiring.

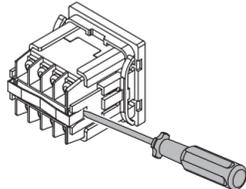
Mounting and Installation

Installation

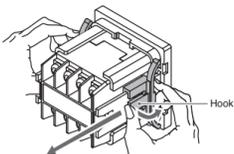
- Never mount the product in a location that will be used as a foothold.

Installing

- Removing the panel mount adapter**
 - Remove the panel mount adapter from the product if it has been delivered assembled.
 - Remove the mounting bracket using a flat blade screwdriver.



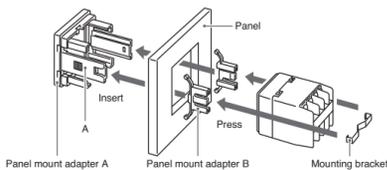
- Lever the hook to the outside to remove the adapter (See below).
- If the panel mount adapter is pulled with the hook engaged, the product or the panel mount adapter will be damaged.



Mounting with the panel mount adapter

- Install the product as shown below.
- Insert panel mount adapter B into section A of panel mount adapter A.
- Push panel mount adapter B from behind until the display is fixed onto the panel. The pin of panel mount adapter B engages the notched part of panel adapter section A to fix the display.

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



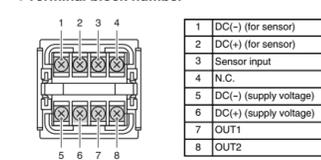
Wiring

- 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.

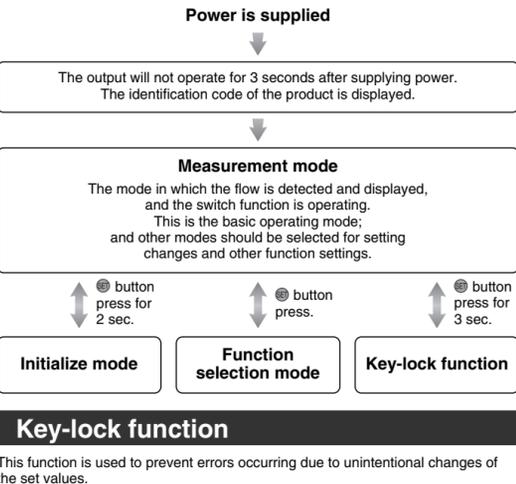
Connecting the wiring

- Use suitable crimp terminals for connection to the terminal block.
- Attention should be paid to the terminals to avoid short circuits.

Terminal block number



Outline of setting



Initialize mode

Items below can be set.

- Connected sensor
- Output mode (OUT1)
- Switch operation (OUT2)
- Display mode
- Output mode (OUT2)
- Reference condition
- Unit selection function
- Switch operation (OUT1)

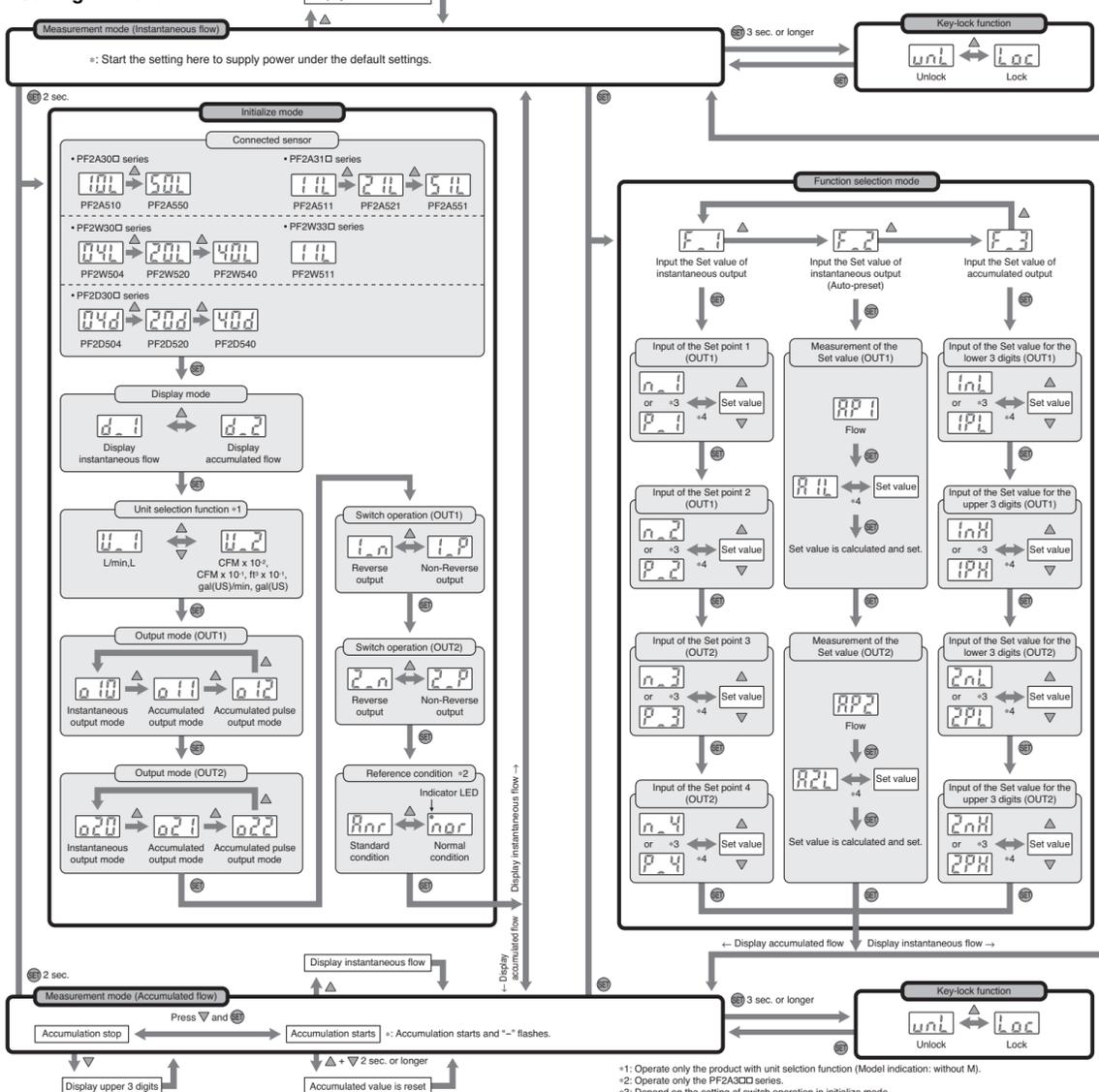
Default settings

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

Item	Model	Default settings
Selection of the connected sensor	PF2A30□ series	[10L] 1 to 10 L/min type (PF2A510)
	PF2A31□ series	[11L] 10 to 100 L/min type (PF2A511)
	PF2W30□ series	[04L] 0.5 to 4 L/min type (PF2W504)
	PF2W33□ series	[11L] 10 to 100 L/min type (PF2W511)
	PF2D30□ series	[04Q] 0.4 to 4 L/min type (PF2D504)
Selection of display mode	Common	[d_1] Display instantaneous flow
Unit selection function *	Common	[U_1] L/min
Selection of output mode (OUT1)	Common	[o10] Instantaneous output mode
Selection of output mode (OUT2)	Common	[o20] Instantaneous output mode
Selection of switch operation (OUT1)	Common	[1_n] Reverse output
Selection of switch operation (OUT2)	Common	[2_n] Reverse output
Selection of reference condition	PF2A3□ series only	[Anr] Standard condition

*: Operate only the product with unit selection function.

Setting flow chart



Function selection mode

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

*: When OUT1 or OUT2 is assigned to be instantaneous output mode during initialize mode, [F_1] and [F_2] are displayed. When OUT1 or OUT2 is assigned to be accumulated output mode, [F_3] is displayed.

Default settings

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

Item	Model	Default setting
[F_1] Input the Set value of instantaneous output	[n_1] Input of the Set point 1 (OUT1)	50% of max. rated flow
	[n_2] Input of the Set point 2 (OUT1)	50% of max. rated flow
[F_2] Input the Set value of instantaneous output (Auto-preset)	[n_3] Input of the Set point 3 (OUT2)	50% of max. rated flow
	[n_4] Input of the Set point 4 (OUT2)	50% of max. rated flow
[F_3] Input the Set value of accumulated output	[1nL] Input of the Set value for the lower 3 digits (OUT1)	[0]
	[1nH] Input of the Set value for the upper 3 digits (OUT1)	[0]
[F_3] Input the Set value of accumulated output	[2nL] Input of the Set value for the lower 3 digits (OUT2)	[0]
	[2nH] Input of the Set value for the upper 3 digits (OUT2)	[0]

*: 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. Characters in () are for OUT2.

Switch output diagram	Output mode	Switch operation	Set value
Hysteresis ON/OFF P_2 P_1 (P_4) (P_3) Instantaneous flow	Non-Reverse output (P P)	Non-Reverse output	Set point 2 Set point 1 P_2 P_2 ≤ P_1 P_1 Hysteresis mode +2
Hysteresis +1 ON/OFF P_1 P_2 (P_3) (P_4) Instantaneous flow	Instantaneous output mode (n n)	Non-Reverse output	Set point 1 Set point 2 P_1 P_1 ≤ P_2 P_2 Window comparator mode
Hysteresis ON/OFF n_2 n_1 (n_4) (n_3) Instantaneous flow	Reverse output (n n)	Reverse output	Set point 2 Set point 1 P_2 P_2 ≤ P_1 P_1 Hysteresis mode +2
Hysteresis +1 ON/OFF n_1 n_2 (n_3) (n_4) Instantaneous flow	Reverse output (n n)	Reverse output	Set point 1 Set point 2 P_1 P_1 < P_2 P_2 Window comparator mode
Accumulated flow ON/OFF 1PH+1PL (2PH+2PL) Time	Non-Reverse output (P P)	Non-Reverse output	Upper 3 digits Lower 3 digits (P P H) + (P P L)
Accumulated flow ON/OFF 1nH+1nL (2nH+2nL) Time	Reverse output (n n)	Reverse output	Upper 3 digits Lower 3 digits (n n H) + (n n L)

Accumulated pulse	Accumulated pulse output mode	Non-Reverse output	Reverse output
ON/OFF 50 ms Time	Accumulated pulse output mode (P P)	Non-Reverse output (P P)	Reverse output (n n)
ON/OFF 50 ms Time	Accumulated pulse output mode (n n)	Non-Reverse output (P P)	Reverse output (n n)

*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 (Set point 3 and Set point 4).
*2: When Set point 1 = Set point 2 (Set point 3 = Set point 4), chattering may occur.

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.
OUT1 over current error	E r 1	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.
OUT2 over current error	E r 2	The switch output load current is more than 80 mA (OUT2).	Turn the power off and remove the cause of the over current. Then turn the power on again.
System error	E r 4	The set data has been changed unexpectedly.	To reset, press ▲ and ▼ buttons simultaneously for 2 seconds or longer. Then set all data again.
Excessive accumulated flow	999	The display flow range of accumulated flow has been exceeded.	To reset the accumulated flow value, press ▲ and ▼ buttons simultaneously for 2 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.

Specification / Outline with Dimensions

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

SMC Corporation URL <http://www.smcworld.com>
Akhabara UDX 15F, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 100-0201, JAPAN
Phone: +81 3-5207-8249 Fax: +81 3-5298-5362
Note: Specifications are subject to change without prior notice and any obligation on the part of the manufacturer.
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*1: Operate only the product with unit selection function (Model indication: without M).
*2: Operate only the PF2A3□□ series.
*3: Depend on the setting of switch operation in initialize mode.
*4: Displayed in turn.