



Installation & Maintenance Manual

Flow Sensor Monitor

Series PFM3



Safety Instructions

This manual contains essential information for the protection of users and others from possible injury and/or equipment damage.

- Read this manual before using the product, to ensure correct handling, and read the manuals of related apparatus before use.
- Keep this manual in a safe place for future reference.
- These instructions indicate the level of potential hazard by label of "Caution", "Warning" or "Danger", followed by important safety information which must be carefully followed.
- To ensure safety of personnel and equipment the safety instructions in this manual and the product catalogue must be observed, along with other relevant safety practices.

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.

This product is class A equipment that is intended for use in an industrial environment.

There may be potential difficulties in ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbances.

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 or explosive gases.**
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**
 - Stop the air supply, exhaust the residual pressure and verify that the air is released before performing maintenance.**
Otherwise an injury can be caused.

Safety Instructions (Continued)

Caution

- Do not touch the terminals and connectors while the power is on.**
Otherwise electric shock, malfunction or damage to the product can result.
- 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 is 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.

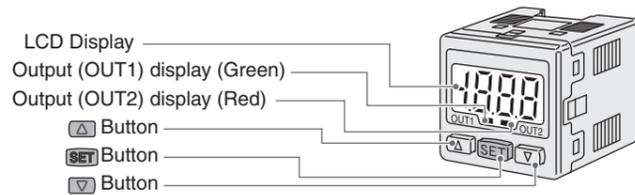
NOTE

- The direct current power supply to be used should be UL approved as follows:
Circuit (of class 2) which is of maximum 30 Vrms (42.4 V peak), with UL 1310 class 2 power supply unit or UL 1585 class 2 transformer.
- The Flow sensor monitor is a approved product only if it has a mark on the body.

Model Indication and How to Order

Refer to the operation manual and the product catalogue for more detailed information.

Names and Functions of Individual Parts



- Output (OUT1) Display (Green): Light is on when output OUT1 is on.
Output (OUT2) Display (Red): Light is on when output OUT2 is on.
LCD Display: Displays the current status of flow, setting mode, selected indication unit and error code. Four display modes can be selected: display always in red or green only, or changing from green to red linked to the output.
- button (UP): Selects the mode and increases the set ON/OFF value. Press this button to change to the peak display mode.
 - button (DOWN): Selects the mode and decreases the set ON/OFF value. Press this button to change to the bottom display mode.
 - button (SET): Press this button to change to each mode and to select a set value.

Installation

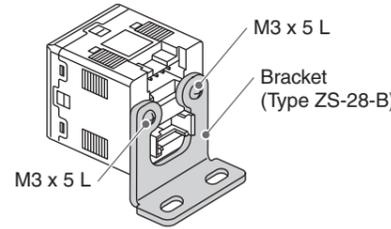
Installation

How to mount

- Mount the optional bracket and panel mount adapter to the controller.

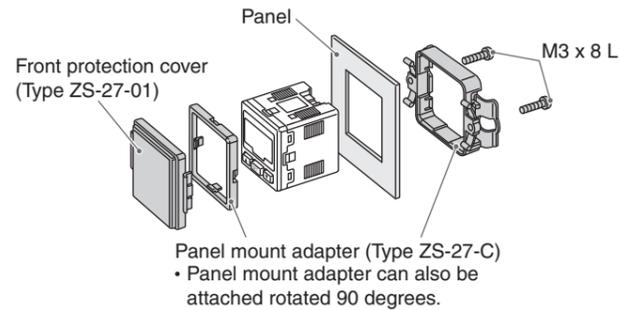
Mounting with bracket

(Fix the bracket to the controller with the set screws M3 x 5 L (2 pcs.) attached. (The tightening torque must be 0.5 to 0.7 Nm)



Mounting with panel mount adapter

- Fix the panel mount adapter to the controller with the set screws M3 x 8 L (2 pcs.) attached.



Wiring

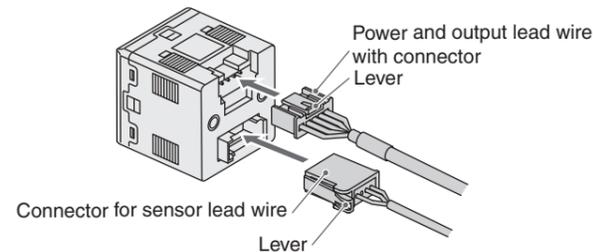
Connection

- Make connection after turning the power off.
- Install the lead wire separately from the route for power cable or high-voltage cable.
Otherwise, malfunction may potentially result due to noise.
- Be sure to ground Terminal FG when using a switching regulator obtained on the commercial market.
If analogue output is performed connecting to a switching regulator obtained on the market, switching noise will be superimposed and product specification can no longer be met. This can be prevented by inserting a noise filter, such as a line noise filter and a ferrite element, between the switching regulator and the controller, or by using a series power supply instead of a switching regulator.

Connector

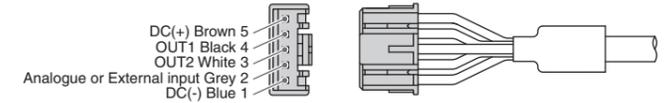
Connecting/Disconnecting

- (When connecting the connector, insert it straight onto the pin holding the lever and connector body between fingers and lock the connector by pushing the lever claw into the square groove in the housing until connector clicks.)
- When disconnecting the connector, push down the lever by thumb to disengage the lever claw from the square groove. Then pull the connector straight out.



Installation (Continued)

Pin no. of the connector for power and output lead wire

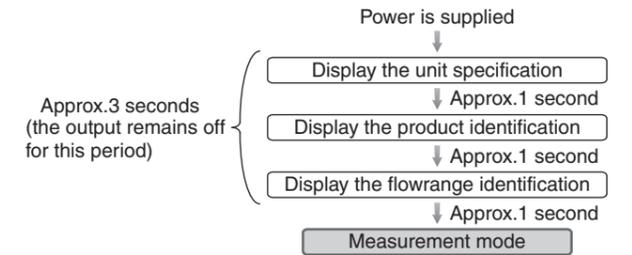


Setting

Measurement mode

The measurement mode is the condition where the flow is detected and indicated, and the switch function is operating.

This is the basic mode, other modes should be selected for set-point and other function setting change.

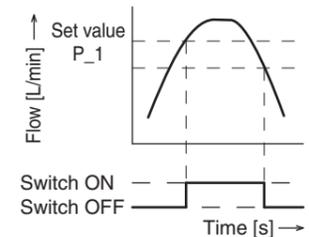


*: The display will show [LLL] when the sensor is not connected.

Set ON and OFF points of the Flow switch.

Switch operation

When a flow rate exceeds a setting point, the switch will be turned on. When the flow rate falls below the setting point by hysteresis or more, the switch will be turned off. The switch is adjusted such that it will be turned on with the centre point of a flow rate setting range for each product specification. If the operation shown below doesn't cause any problem, do not change the settings.



Setting (Continued)

<How to perform> *: The Product will also output during setting.

1. Press the **SET** button once in the measurement mode.



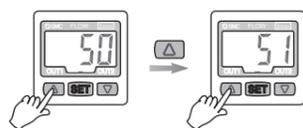
2. [P_1] or [n_1] and set value are displayed alternately.



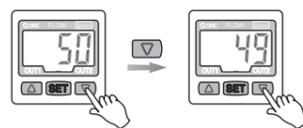
3. Press the **▲** or **▼** button to change the set value.

The **▲** button is to increase and the **▼** button is to decrease the set value.

•Press the **▲** button once to increase by one digit, press and hold to continuously increase.



•Press the **▼** button once to decrease by one digit, press and hold to continuously decrease.



4. Press the **SET** button to finish the setting of OUT1.

[P_2] is displayed to continue with settings for OUT2 as above.

Zero clear of indication

Indication is reset to zero when **▲** and **▼** buttons are pressed simultaneously for 1 second.

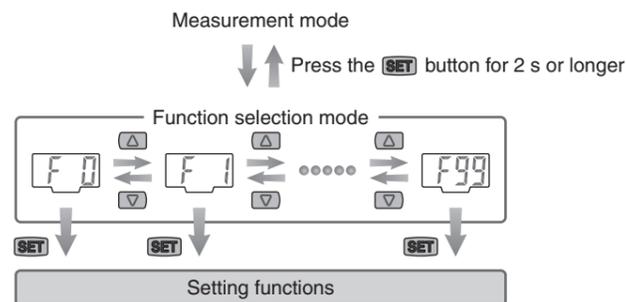
For initial use, implementation of zero clear is recommended.

Function setting

Function selection mode

In measurement mode, press the **SET** button for 2 seconds or longer to display [F 0].

Display[F□□], and point the mode to change the setting of each function. Press the **SET** button for 2 seconds or longer to return to measurement mode.



Function setting (Continued)

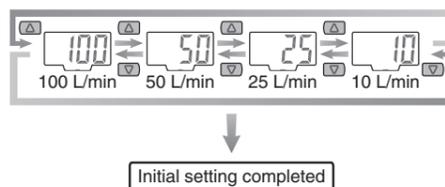
Default settings

At the time of shipment, the settings are performed as follows. If the setting is acceptable, keep it for use.

Caution for handling

When the setting is changed, since the different setting item appears in order depending on how many times the button is pressed, confirm the item which needs to be set appears to prevent undesired settings.

•[F 0] Select connected sensor



To set unit selection function, refer to the operation manual.

•[F 1] Operation of OUT1

Item	Explanation	Default setting
Output mode	Select output for instantaneous flow (hysteresis mode, window comparator mode) accumulated flow or accumulated pulse	Hysteresis mode
Reversed output	To select reversed output	Normal output
Flow setting	To set ON point or OFF point of the switch output	Medium value of flow setting range
Hysteresis	Chattering can be prevented by setting hysteresis	3%
Indication color	Select the color to indicate	ON: Green OFF: Red

•[F 2] Operation of OUT2

Same setting as [F 1] OUT1.
Display colour depends on the setting of OUT1.

Item	Default setting
[F 3] Select operating fluid	Dry air-N ₂
[F 4] Display unit selection	Standard condition (ANR)
[F 5] Setting of response time	1 second
[F 6] Select display mode	Instantaneous flow
[F 7] External input	Integrated value external reset
[F 8] Select display resolution	100-split
[F 9] Set auto pre-set	Manual
[F10] Hold accumulated value	OFF
[F11] Select analogue output filter	ON
[F12] Select power saving mode	OFF
[F13] Set security code input	OFF

Other Functions

- Peak/Bottom hold value indication
- Zero clear
- key lock

To set each function in detail, refer to the operation manual.

Maintenance

How to reset the product after power cut or 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 facility before operating the product.

Error indication Function (Continued)

Error Name	Error Display	Error type	Troubleshooting
System error	Er0	Condition is that of before the adjustment at factory. Internal circuit is possibly damaged.	Stop operation immediately and contact SMC Sales office.
	Er3	System error. Failed to memorize the data, or internal circuit is possibly damaged.	Reset using reset function.
Zero clear error	Er4	If fluid flows during zero clear setting (pressing UP and DOWN buttons simultaneously for less than 1 second), "Er4" is displayed for 1 second.	Please check that fluid doesn't flow at the time of zero clear setting.
Flow error	Accumulated Flow displayed	Accumulated flow range is exceeded.	Clear the accumulated flow. (If accumulated flow is not used, this is not a problem.)

If the error can not be reset after the above measures are taken, then please contact SMC.

Troubleshooting

Refer to the operation manual for this product.

Error indication Function

This function is to display error location and content when a problem or an error occurs.

Error Name	Error Display	Error type	Troubleshooting
Flow error	HHH	Flow exceeds the upper limit of the flow display range.	Reduce the flow.
	LLL	(1)5% or more flow in the reverse direction. (2)A sensor may be disconnected or wired incorrectly.	(1)Direct the flow to the proper direction. (2)Check connection and wiring of a sensor.
Overcurrent error	Er1	Load current of the switch output (OUT1) exceeds 80 mA.	Turn off the power supply and eliminate the cause of excess current. Then supply the power again.
	Er2	Load current of the switch output (OUT2) exceeds 80 mA.	

Specification

Refer to the operation manual and the product catalogue for more detailed information.

Outline with Dimensions (in mm)

Refer to the operation manual and the product catalogue for more detailed information.

Contact

AUSTRIA	(43) 2262 62280	NETHERLANDS	(31) 20 531 8888
BELGIUM	(32) 3 355 1464	NORWAY	(47) 67 12 90 20
CZECH REP.	(420) 541 424 611	POLAND	(48) 22 211 9600
DENMARK	(45) 7025 2900	PORTUGAL	(351) 21 471 1880
FINLAND	(358) 207 513513	SLOVAKIA	(421) 2 444 56725
FRANCE	(33) 1 6476 1000	SLOVENIA	(386) 73 885 412
GERMANY	(49) 6103 4020	SPAIN	(34) 945 184 100
GREECE	(30) 210 271 7265	SWEDEN	(46) 8 603 1200
HUNGARY	(36) 23 511 390	SWITZERLAND	(41) 52 396 3131
IRELAND	(353) 1 403 9000	UNITED KINGDOM	(44) 1908 563888
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