PSE3#AC-TFU11

Installation & Maintenance Manual
Sensor Monitor
Series PSE3#AC

1 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 work**

  Otherwise an injury can result.

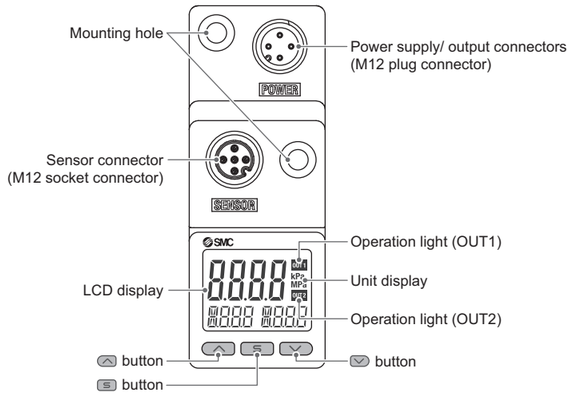
1 Safety Instructions (Continued)

⚠ 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 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.

Refer to the operation manual on the SMC website (URL http://www.smcworld.com).

2 Summary of Product parts



Name	Description
Power supply/ output connectors	Connector for power supply and output signals.
Sensor connector	Connector for the sensor.
Mounting hole	Mounting holes for installation screws (M4 or equivalent).
Operation light	Displays the switch operating condition.
LCD display	Displays the current status of pressure, setting mode, selected display units and error code. 4 types of display can be selected for the main display: Single colour of constant red or green; or switching from red to green or green to red corresponding to the output. The indication for the sub display is orange.
button	Increases mode and ON/OFF set values.
button	Decreases mode and ON/OFF set values.
button	Press this button to change mode and to confirm settings.
Unit display	Indicates the units currently selected. (Only for display units of kPa and MPa)

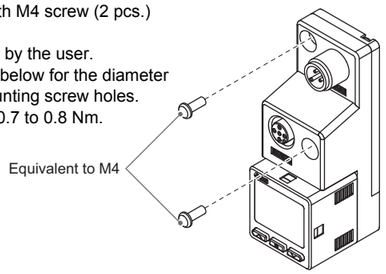
3 Specifications

Refer to the operation manual on SMC website (URL http://www.smcworld.com).

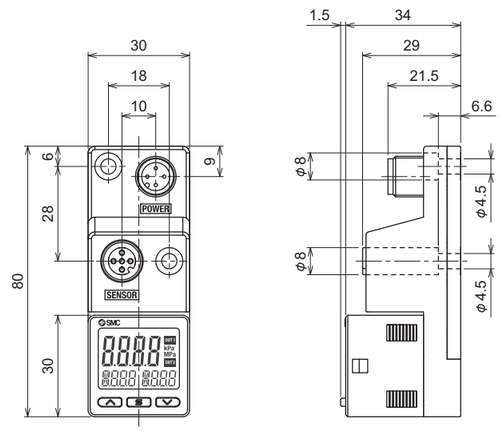
4 Mounting and Installation

■**Installation**

○**Direct mounting**
- Install the product with M4 screw (2 pcs.) or equivalent.
- Screws are prepared by the user.
- Refer to the drawing below for the diameter and depth of the mounting screw holes.
- Tightening torque is 0.7 to 0.8 Nm.



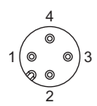
- Dimensions



■**Wiring**
- Connections should be made with the power supply turned off.
- Use a separate route for the product wiring and any power or high voltage wiring.
  Otherwise, malfunction may result due to noise.
- If a commercially available switching power supply is used, be sure to ground the frame ground (FG) terminal. If the switching 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 the series power supply.

○**Wiring connections**
- Align the cable connector body groove with the connector key to insert, and rotate the knurled part of the connector.
- Check that the connection is not loose.

•Power supply/ output connector pin No.
(M12 plug connector on body)



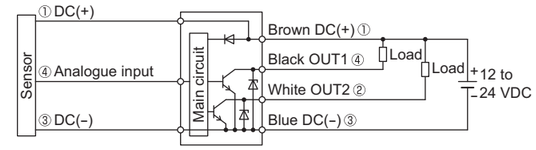
Pin No.	Description
1	DC(+)
2	OUT2
3	DC(–)
4	OUT1

•Sensor connector pin No.
(M12 socket connector on body)

Pin No.	Description	
	Pressure sensor 3-wire type	Pressure sensor 2-wire type
1	DC(+)	LINE(+)
2	N.C.	N.C.
3	DC(–)	N.C.
4	Sensor input (1 to 5 V, 4 to 20 mA)	LINE(–)
5	N.C.	N.C.

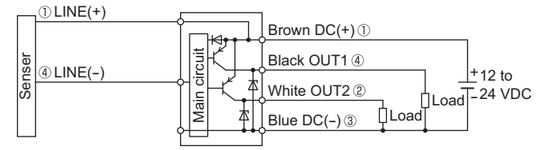
4 Mounting and Installation (Continued)

○**Internal circuit and wiring example**
- NPN open collector 2 outputs: Pressure sensor 3-wire type



Max. 30 V, 20 mA
Residual voltage: 1 V or less

- PNP open collector 2 outputs: Pressure sensor 2-wire type



Max. 20 mA
Residual voltage: 1 V or less

5 Outline of Settings

Power is supplied

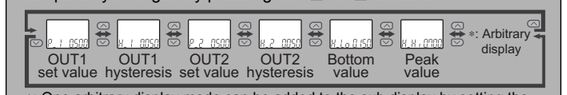
The product code is displayed for approximately 3 sec. after supplying power.
After that, measurement mode is displayed.
∗: Within approximately 0.2 second after power-on, the switch starts.

[Initial Setting]
Set the pressure range, display unit and switch output NPN/PNP specifications of the connected sensor.

[Measurement mode]
Detects the pressure after power is supplied, and indicates the display and switch operating status. This is the basic mode; other modes should be selected for set-point changes and other function settings.

Measurement mode screen

Sub display
In measurement mode, the display of the sub display can be temporarily changed by pressing the ▲ or ▼ buttons.



∗: One arbitrary display mode can be added to the sub display by setting the [F10] sub display setting.
If the sub display is switched during the arbitrary display setting, the display will be returned to the arbitrary display 30 seconds later.
(The default setting does not include arbitrary display.)

Press the S button once.

Press the S button between 1 and 3 sec.

Press the S button between 3 and 5 sec.

[3 step setting mode]
Set either of set value or hysteresis.

[Simple setting mode]
Select the set value, hysteresis and delay time.

[Function selection mode]
Change the function settings.

[Other Settings]
- Zero-clear function
- Key-lock function

∗: The outputs will continue to operate during setting.
∗: If a button operation is not performed for 3 seconds during the setting, the display will flash.
(This is to prevent the setting from remaining incomplete if, for instance, an operator were to leave during setting.)
∗: 3 step setting mode, simple setting mode and function selection mode settings are reflected each other.

6 Initial Setting

Set the pressure range, display unit and NPN/PNP output specifications of the connected sensor.

Measurement mode

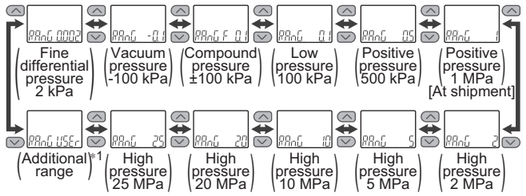
↓ Press the (S) button between 3 and 5 seconds.

[F 0] Display the switching function of the pressure range, display unit and switch output specifications.

Press the (S) button. ↓ Move on to pressure range setting.

Pressure range setting

Press the (∧) or (∨) button to select pressure range.

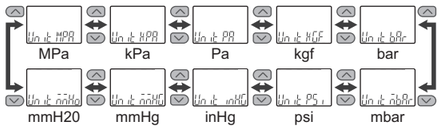


*1: For the pressure range setting, refer to the operation manual, available from the SMC website (URL http://www.smcworld.com) for selecting the additional range.

Press the (S) button to set. ↓ When selecting the buttons other than [USEr], move on to the display unit setting with (S) button.

Display unit setting

Press the (∧) or (∨) button to select the display unit.



*: The unit that can be displayed is different depending on the pressure range. (kPa/MPa/Pa can still be selected if the product does not have the units selection function.)
Refer to the operation manual, available from the SMC website (URL http://www.smcworld.com) for more detailed information.

Press the (S) button to set. ↓ Move on to the switch output NPN/PNP specification switching setting.

Switching setting of switch output NPN/PNP specifications

The switch output of this product can be switched to NPN or PNP output in accordance with the device construction.

Press the (∧) or (∨) button to select switch output specification.

Press the (S) button to set. ↓ Return to function selection mode.

[F 0] Setting of the switching function of the pressure range, display unit and switch output specifications is completed.

↓ Press the (S) button for 2 second or longer.

Measurement mode
(Initial setting is completed)

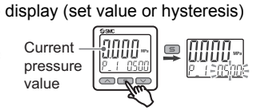
↓

Perform the setting with the 3 step setting mode, simple setting mode and function selection mode.

7 3Step Setting Mode

[3 step setting mode (hysteresis mode)]

In the 3 step setting mode, the set value (P_1 or n_1) and hysteresis (H_1) can be changed. Set the items on the sub display (set value or hysteresis) with (∧) or (∨) button. When changing the set value, follow the operation below. The hysteresis setting can be changed in the same way.



(1) Press the (S) button once when the item to be changed is displayed on the sub display. The set value on the sub display (right) will start flashing.

(2) Press the (∧) or (∨) button to change the set value.
The set value can be increased with (∧) button and can be reduced with (∨) button. When (∧) and (∨) buttons are pressed and held simultaneously for 1 second or longer, the set value is displayed as [- - -], and the set value will be the same as the current pressure value automatically (snap shot function).
Afterwards, it is possible to adjust the value by pressing (∧) or (∨) button.

(3) Press the (S) button to complete the setting.

The pressure switch turns on within a set pressure range (from P1L to P1H) during window comparator mode.
Set P1L, the lower limit of the switch operation, and P1H, the upper limit of the switch operation and WH1 (hysteresis) following the instructions given above.
(When reversed output is selected, the sub display (left) shows [n1L] and [n1H].)

*: Set OUT2 in the same way. (ex. P_2, H_2)

*: Setting of the normal/reverse output switching and hysteresis/window comparator mode switching are performed with the function selection mode [F 1] OUT1 setting and [F 2] OUT2 setting.

8 Simple Setting Mode

(1) Press and hold the (S) button between 1 and 3 seconds in measurement mode. [SEt] is displayed on the main display. When the button is released while in the [SEt] display, the current pressure value is displayed on the main display, [P_1] or [n_1] is displayed on the sub display (left), and the set value is displayed on the sub display (right) (Flashing).

(2) Change the set value with (∧) or (∨) button, and press the (S) button to set the value. Then, the setting moves to hysteresis setting.
(The snap shot function can be used.)

(3) Change the set value with (∧) or (∨) button, and press the (S) button to set the value. Then, the setting moves to the delay time of the switch output.
(The snap shot function can be used.)

(4) Press the (∧) or (∨) button, the delay time of the switch output can be selected.
Delay time setting can prevent the output from chattering.

(5) Press the (S) button for 2 seconds or longer to complete the setting.
*: If the button is pressed for less than 2 seconds, the setting moves to the OUT2 setting.

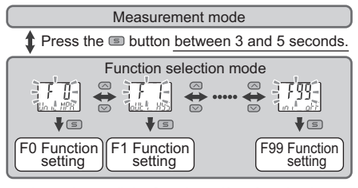
In the window comparator mode, set P1L, the lower limit of the switch operation, and P1H, the upper limit of the switch operation, WH1 (hysteresis) and dt1 (delay time) following the instructions given above.
(When reversed output is selected, the sub display (left) shows [n1L] and [n1H].)

*: Set OUT2 in the same way.

9 Function Selection Mode

■Function selection mode

In measurement mode, press the (S) button between 3 and 5 seconds, to display [F 0]. Select to display the function to be changed [F□□]. Press and hold the (S) button for 2 seconds or longer in function selection mode to return to measurement mode.



*: Some products do not have all the functions. If no function is available or selected due to configuration of other functions, [- - -] is displayed on the sub display (right).

9 Function Selection Mode (Continued)

■Default setting

The default setting is as follows.
If no problem is caused by this setting, keep these settings.

●Switching function of [F 0] Pressure range, display unit and switch output specifications

Item	Default setting
Connected sensor range	1 MPa
Display units	Units specification ["Nil" or M]: MPa
	Units specification [P]: psi
Switch output specifications	NPN

●[F 1] Setting of OUT1

Item	Default setting
Output mode	Hysteresis mode
Reversed output	Normal output
Pressure setting	0.500 MPa
Hysteresis	0.050 MPa
Delay time	1.0 ms or less
Display colour	Output ON: Green/ Output OFF: Red (Linked to OUT1)

●[F 2] Setting of OUT2
Same setting as [F 1] OUT1.

●Other parameter settings

Item	Default setting	Item	Default setting
[F 3] Digital filter setting	0 ms	[F81] Security code	OFF
[F 4] Auto-preset function	Not used	[F82] Input of line name	AAAA
[F 5]	No configurable items	[F90] Setting of all functions	OFF
[F 6] Fine adjustment of display value	0%	[F96]	No configurable items
[F10] Sub display setting	Std (Standard)	[F97]	No configurable items
[F11] Display resolution setting	1000-split	[F98] Output check	N/A (normal output)
[F80] Power saving mode	OFF	[F99] Reset to default settings	OFF

If you use the product by changing the setting, refer to the SMC website (URL http://www.smcworld.com) for more detailed information, or contact SMC.

10 Other Settings

○**Peak/bottom value indication**
The max. (min.) pressure when the power is supplied is detected and updated.
The value can be displayed on the sub display by pressing (∧) or (∨) button in measurement mode.

○**Snap shot function**
The current pressure value can be stored to the switch output ON/OFF set point.
When the set value and hysteresis are set, press the (∧) and (∨) buttons for 1 second or longer simultaneously. Then, the set value of the sub display (right) shows [- - -], and the values corresponding to the current pressure values are automatically displayed.

○**Zero-clear function**
In measurement mode, when the (∧) and (∨) buttons are pressed for 1 second or longer simultaneously, the main display shows [- - -], and the reset to zero.
The display returns to measurement mode automatically.

○**Key-lock function**

To set each of these functions, refer to the SMC website (URL http://www.smcworld.com) for more detailed information, or contact SMC.

11 How to Order

Refer to the operation manual on the SMC website (URL http://www.smcworld.com).

12 Outline Dimensions (mm)

Refer to the operation manual on the SMC website (URL http://www.smcworld.com).

13 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. If the installation is using accurate control, wait until the product has warmed up (approximately 10 to 15 minutes).

14 Troubleshooting

■Error indication function

This function is to display error location and content when a problem or error has occurred.

Error	Error displayed	Description	Measures
Over current error	Er 1 (oC1) / Er 2 (oC2)	The switch output load current is 20 mA or more.	Turn the power off and remove the cause of the over current. Then supply the power again.
Residual pressure error	Er 3 (ZEro)	During zero clear operation, pressure greater than ±7%F.S. (±3.5%F.S.for compound pressure) is present. Note that the mode is returned to measurement mode automatically 1 second later. The zero clear range varies by ±1%F.S. due to variation between individual products.	Release the applied pressure to atmospheric pressure, and retry the zero clear operation.
Pressurizing error	HHH	Pressure exceeding the upper limit of the set pressure range is applied.	Reset applied pressure to a level within the set pressure range.
	LLL	Pressure exceeding the lower limit of the set pressure range is applied.	
System error	Er 0 / Er 4 / Er 6 / Er 7 / Er 8 / Er 9	Displayed if an internal data error has occurred.	Turn the power off and on again. If the failure cannot be solved, contact SMC.

If the error cannot be reset after the above measures are taken, or errors other than above are displayed, please contact SMC.
Refer to the SMC website (URL http://www.smcworld.com) for more information about troubleshooting.

15 Contacts

AUSTRIA	(43) 2262 62280-0	LATVIA	(371) 781 77 00
BELGIUM	(32) 3 355 1464	LITHUANIA	(370) 5 264 8126
BULGARIA	(359) 2 974 4492	NETHERLANDS	(31) 20 531 8888
CZECH REP.	(420) 541 424 611	NORWAY	(47) 67 12 90 20
DENMARK	(45) 7025 2900	POLAND	(48) 22 211 9600
ESTONIA	(372) 651 0370	PORTUGAL	(351) 21 471 1880
FINLAND	(358) 207 513513	ROMANIA	(40) 21 320 5111
FRANCE	(33) 1 6476 1000	SLOVAKIA	(421) 2 444 56725
GERMANY	(49) 6103 4020	SLOVENIA	(386) 73 885 412
GREECE	(30) 210 271 7265	SPAIN	(34) 945 184 100
HUNGARY	(36) 23 511 390	SWEDEN	(46) 8 603 1200
IRELAND	(353) 1 403 9000	SWITZERLAND	(41) 52 396 3131
ITALY	(39) 02 92711	UNITED KINGDOM	(44) 1908 563888

SMC Corporation

URL http://www.smcworld.com (Global) http://www.smceu.com (Europe)