

Pressure Sensor Controller

Operation Manual



PSE300 Series

Thank you for purchasing an SMC PSE300 Series Pressure Sensor Controller. 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 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.

Caution

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

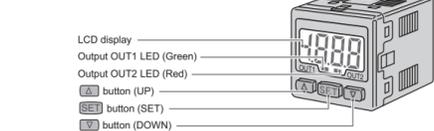
After maintenance is complete, perform appropriate functional inspections and leak tests. Stop operation if the equipment does not function properly or there is a leakage of fluid. When leakage occurred from other parts except piping, the product might break. Cut off power supply and stop supplying fluid. Do not apply fluid at leaking condition. 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) or less, with UL1310 Class 2 power supply unit or UL1585 Class 2 transformer.
- The product is a UL approved product only if it has a mark on the body.

Summary of Product parts

Names of individual parts



Output OUT1 LED (Green): LED is ON when OUT1 is ON.
Output OUT2 LED (Red): LED is ON when OUT2 is ON.
LCD display: Displays the current status of pressure, setting mode, selected indication unit and error code.

Four display modes can be selected: display always in red or green, or display changing from green to red, or red to green, according to the output status.

UP button (UP): Selects the mode or increases the ON/OFF set value.

Press this button to change to the peak display mode.

DOWN button (DOWN): Selects the mode or decreases the ON/OFF set value.

Press this button to change to the bottom display mode.

SET button (SET): Press this button to change the mode or set a value.

Mounting and Installation

Installation

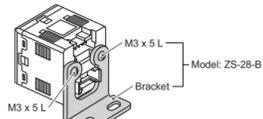
<PSE300>

Mounting

Mount the optional bracket or panel mount adapter to the controller.

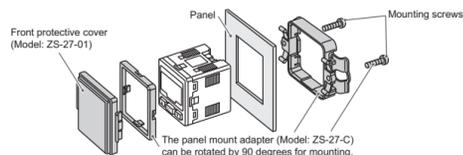
Mounting with bracket

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



Mounting with panel mount adapter

- Fix the panel mount adapter to the product with the mounting screws (nominal size: 3 x 8 L, 2 pcs.) supplied.



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

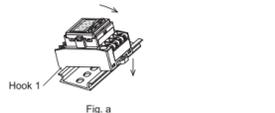
Notice when removing the controller

- The controller with panel mount adapter can be removed from the installation by removing 2 screws and releasing the hooks at the sides, as illustrated.

Take care not to damage the controller and panel mount adapter.

<PSE300>

Mounting



Fit Hook 1 on the base of the body on to the DIN rail, and press in the direction of the arrow to fix, as shown in Fig. a.

For removal, release the catch with a screwdriver in the direction of the arrow shown in Fig. b.

Wiring

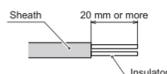
Connection

- Connections should only be made with the power supply turned off.
- Use separate routes for the controller 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 an inline 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.

<PSE300>

Attaching the connector to the sensor wire

- Strip the sensor wire as shown to the right.
- (Refer to the table below for corresponding connector and wire gauge.)



Lead wire table

AWG No.	Conductor size (mm)	Overall diameter (mm)	Connector colour	SMC product No.
24-26	0.14-0.2	ø0.8 to ø1.0	Red	ZS-28-C
		ø1.0 to ø1.2	Yellow	ZS-28-C-1
23	0.1-0.5	ø1.2 to ø1.6	Orange	ZS-28-C-2
		ø1.15 to ø1.35	Blue	ZS-28-CA-4
20-22	0.3-0.5	ø1.0 to ø1.2	Green	ZS-28-C-3
		ø1.2 to ø1.6	Blue	ZS-28-C-4
		ø1.6 to ø2.0	Grey	ZS-28-C-5

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

Pin number	Wire colour	
	PSE300 (Voltage input)	PSE310 (Current input)
	Pressure sensor 2-wire type	Pressure sensor 3-wire type
1	Brown (DC+)	Brown (LINE+)
2	N.C.	N.C.
3	Blue (DC-)	N.C.
4	Black (OUT: 1 to 5 V)	Blue (LINE-)
		Black (OUT: 4 to 20 mA)

- 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.



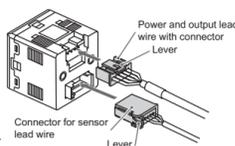
- The sensor connector cannot be re-used once it has been fully crimped. In cases of connection failure such as incorrect order of wires or incomplete insertion, please use a new connector.

Connector

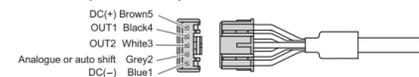
Connecting / Disconnecting

- When mounting the connector, insert it straight into the socket, holding the lever and connector body, and push the connector until the lever hooks into the housing, and locks.

- 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



<PSE300>

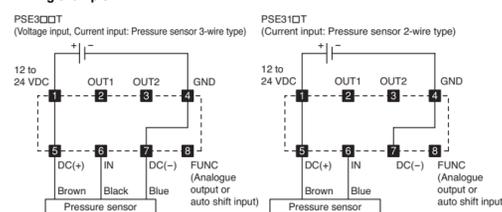
Applicable crimping terminal dimensions

- The terminal screw is M3.
- If using the crimping terminal, follow the specifications below.

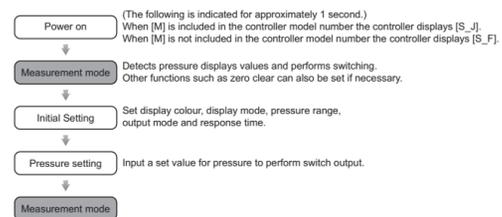


- Tighten the terminal screw at a torque of 0.3 to 0.35 Nm.

Wiring example



Setting



Initial Setting

Press the button for 2 seconds or more to display [Sor] and begin initial setting.

- Display colour setting
Select a colour for the LCD display.
When changing the display color, press the or button to select a display colour. Press the button to set.

- Output linked to display colour setting
(For selection of Sor and SoG only)
Select output linked to display colour, press the or button and select output. Press the button to set.

- Pressure range setting
Select the pressure range suitable for the sensor connected. Press the or button and select the pressure range. Press the button to set.



- Selection of display units (with unit selection function)
The indication unit can be selected freely. Pressing the or button will change the unit and will automatically convert set values. Press the button to set. (Refer to the following table for the units labels to be used)

LCD display	PA	GF	bAr	PS	inH	mmH
Unit	kPa	kgf/cm ²	bar	psi	inHg	mmHg
	kPa	kgf/cm ²	bar	psi		
	MPa	kgf/cm ²	bar	psi		
	kPa					mmH ₂ O

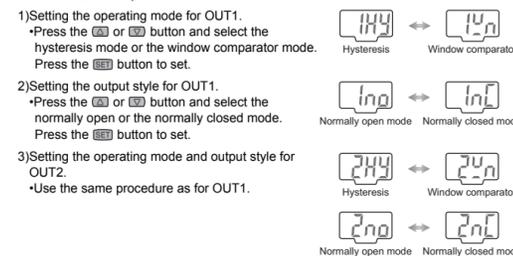
Units label

- In order to display the selected units, the appropriate units label is supplied.
- When [M] is included in the controller model number (fixed SI units), set up the controller to display the units according to the table below.

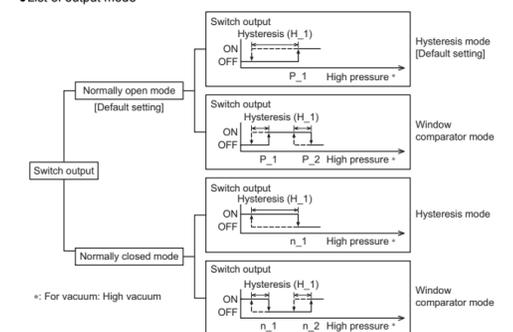
LCD display	in0	in1	in2	in3	in4	in5
Unit label		kPa	MPa		kPa	

Output mode setting

- Four output mode can be selected by an operating mode and by output style. One of these four output mode can be selected for each output.
- OUT1 and OUT2 can be set independently.
- Refer to "List of output mode".



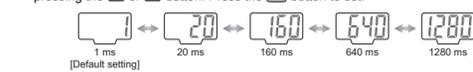
List of output mode



- Only hysteresis mode can be set at auto preset.
- The following is given using OUT1 as an example. The descriptions for OUT2 are the same as those for OUT1, under the conditions that [n_1] and [n_2] should be replaced by [n_3] and [n_4], [P_1] and [P_2] should be replaced by [P_3] and [P_4] and [H_1] should be replaced by [H_2].

Response time setting

- The response time for switch output can be set as required. Set the optimum response time to prevent the chattering of a switch.
- The response time currently set will be displayed. Select the required response time by pressing the or button. Press the button to set.



Pressure setting

- There are two methods for pressure set-up: manual and auto preset, either one of which can be selected. The auto preset is provided for an automatic optimum set-up by using a sample for a case in which switch output is used to check adsorption.
- The operation mode currently selected is displayed. Press the or button to select the set-up method to be used. Press the button to set.
- When both OUT1 and OUT2 are in window comparator mode, this setting is not available.

- Auto shift setting (PSE302(T)/305(T) models only)
1) Select the display mode of the pressure value at the time of auto shift operation.

- Either [AS (Auto shift)] or [ASO (Auto shift zero)] can be selected.

- AS (Auto shift): [AS] displays the differential pressure of the atmosphere and measurement pressure.
- ASO (Auto shift zero): [ASO] displays the differential pressure of the measurement pressure and the measurement pressure at the time of auto shift signal input.

- Press the or button to select the auto shift or auto shift zero. Press the button to set.

- Select the switch output to which auto shift mode applies, when the auto shift signal is input.

- Press the or button to select the A1, A2 or Ab. Press the button to set.

- All of the settings are completed, and the controller will return to measurement mode.

Pressure Setting

Manual setting

Manually select a set value for the controller.

- Selection of OUT1 [P_1] setting mode
Press the button during the measurement mode to display set values.
[P_1] or [n_1] and the set value are displayed in turn.
Press the or button to enter into the value changing mode, then change the set value. (See "Value setting")
Check the corrected value, then press the button to set.
- Selection of OUT1 [P_2] setting mode (Window comparator mode selected)
[P_2] or [n_2] and the set value are displayed in turn.
Press the or button to enter into the value changing mode, then change the set value. (See "Value setting")
Check the corrected value, then press the button to set.
- Selection of OUT1 [H_1] setting mode
[H_1] and the current set value are displayed in turn.
Press the or button to enter into the value changing mode, then change the set value. (See "Value setting")
Check the corrected value, then press the button to set.

- Selection of OUT2 setting mode
Set the values [P_3], [P_4] and OUT2 [H_2] as in OUT1. [P_3], [P_4] or [H_2] and the current set value are displayed in turn. (In normally closed mode [n_3], [n_4] or [H_2] and the set value are displayed in turn.)
Press the or button to enter into the value changing mode, then change the set value. (See "Value setting")
Check the corrected value, then press the button to set.

- Auto shift compensation value setting (PSE302(T)/305(T) models only)
[C_5] and the Auto shift compensated value are displayed in turn.
Check the corrected value, then press the button.
- The pressure settings are completed, and the controller will return to measurement mode.

Value setting

To input a value for pressure setting or other purposes:

- Press the or button to enter the set value change mode. The first digit will flash.
- Press the or button to set a desired value. (No operation for 30 seconds after the set value change mode was selected results in automatic setting of the value appearing in the display, and set value indication returns.)
- Press the button to move to the left digit. (If the left end digit is zero, [] or [] will flash.) [] means "+zero", [] means "-zero". (If the button is pressed in the left end digit, the 1st digit will flash.)
- Press the button for 1 second or more to set the value and return to displaying the set value.

Setting example



Other Settings

- Auto-preset function
- Auto shift function
- Peak / Bottom hold display
- Key lock
- Zero clear

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

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 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 20 to 30 minutes).

Troubleshooting

Error Indication

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

Error Name	Error Display	Error Type	Troubleshooting
Over current Error	Er1 Er2	The switch output load current is more than 80 mA.	Turn the power off and remove the cause of the over current. Then turn the power on.
Residual pressure Error	Er3	During the zero clear operation, pressure above ±7%F.S. has been applied. After 3 s, the mode will reset to the measurement mode. The zero clear range can vary 24 digits with individual product differences.	Perform zero clear operation again after restoring the applied pressure to an atmospheric pressure condition.
Applied pressure Error	HHH LLL	Pressure has exceeded the upper limit of the set pressure range. A sensor may be disconnected or incorrectly wired. Pressure has exceeded the lower limit of the set pressure range.	Check the connection and wiring of the sensor. Adjust the applied pressure to a level within the set pressure range.
Auto shift Error	or	The measured pressure at auto-shift input exceeded the set pressure range. After 1 s, measurement mode returns automatically.	Auto-shift input signal is invalid. Check the connected equipment and correct the signal.
System Error	Er4 Er6 Er7 Er8	Displayed in the case of an internal data error.	Turn the power off and turn it on again. If resetting fails, an investigation by SMC corporation will be required.

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 (in mm)

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

SMC Corporation URL: <http://www.smcworld.com>
Akihabara UDX 15F, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 100-0021, JAPAN
Phone: +81 3-5207-8249 Fax: +81 3-5298-5392

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