

# Multi Channel Pressure Sensor Controller

## Operation Manual



### PSE200 Series

Thank you for purchasing an SMC PSE200 Series Multi Channel 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

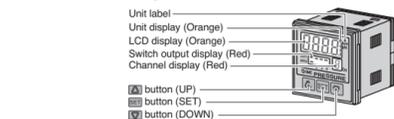
- ◆ This operation manual is intended for those who have knowledge of machinery using pneumatic equipment, and have sufficient knowledge of assembly, operation and maintenance of such equipment. Only those persons are allowed to perform assembly, operation and maintenance.
- ◆ Read and understand this operation manual carefully before assembling, operating or providing maintenance to the product.

## Safety Instructions

Warning	
<ul style="list-style-type: none"> <li>◆ Do not disassemble, modify (including changing the printed circuit board) or repair. An injury or failure can result.</li> <li>◆ 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.</li> <li>◆ 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.</li> <li>◆ Do not use the product in a place where static electricity is a problem. Otherwise it can cause failure or malfunction of the system.</li> <li>◆ If using the product in an interlocking circuit: <ul style="list-style-type: none"> <li>◆ Provide a double interlocking system, for example a mechanical system</li> <li>◆ Check the product regularly for proper operation</li> <li>◆ Otherwise malfunction can result, causing an accident.</li> </ul> </li> <li>◆ The following instructions must be followed during maintenance: <ul style="list-style-type: none"> <li>◆ Turn off the power supply</li> <li>◆ Stop the air supply, exhaust the residual pressure and verify that the air is released before performing maintenance work</li> <li>◆ Otherwise an injury can result.</li> </ul> </li> </ul>	
Caution	
<ul style="list-style-type: none"> <li>◆ Do not touch the terminals and connectors while the power is on. Otherwise electric shock, malfunction or damage to the product can result.</li> <li>◆ 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.</li> </ul>	

## Summary of Product parts

### Names of individual parts

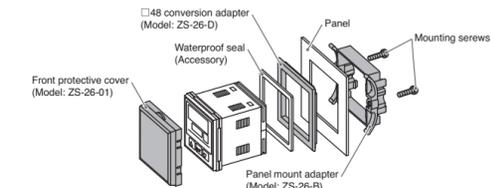


Description	Function
Switch output display (Red)	Indicates when OUT1 (CH1 to CH4) and/or OUT2 (CH1) is ON.
LCD display (Orange)	Displays the current status of pressure, setting mode, selected indication unit and error code.
[▲] button (UP)	Selects the mode or increases the ON/OFF set value.
[▼] button (DOWN)	Selects the mode or decreases the ON/OFF set value.
[SET] button (SET)	Press this button to change the mode or set a value.
Unit display (Orange)	Indicates the selected unit. For the Controller without unit selection function, the unit is fixed to SI (MPa or kPa).
Unit label	A label is attached for the unit selection function (kgf/cm <sup>2</sup> , bar, psi, inHg, mmHg).
Channel display (Red)	Indicates the channel selected (CH1 to CH4).

## Mounting and Installation

### Installation

- 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.
  - ◆ Panel mount adapter (Model: ZS-26-B)
  - ◆ Panel mount adapter + Front protective cover (Model: ZS-26-01)
  - ◆ 48 conversion adapter (Model: ZS-26-D)



- \*: The panel mount adapter can be rotated by 90 degrees for mounting.
- \*: Front panel of this Controller meets IP65 (if 48 conversion adapter is used, it meets IP40). However, if the panel mount adapter is not secure or the instrument is not seated correctly, water might enter. The screws should be further tightened 1/4 to 1/2 turns after assembly.

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

### 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.

#### 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. (1 pc.)
26-24 (28)	0.14-0.2 (0.08)	0.8 to 1.0	Red	ZS-28-C
		1.0 to 1.2	Yellow	ZS-28-C-1
		1.2 to 1.6	Orange	ZS-28-C-2
22-20	0.3-0.5	1.0 to 1.2	Green	ZS-28-C-3
		1.2 to 1.6	Blue	ZS-28-C-4
		1.6 to 2.0	Grey	ZS-28-C-5

- ◆ 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.

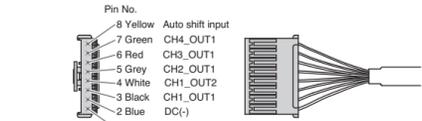
Pin No.	Wire colour
1	Brown (DC+)
2	NC
3	Blue (DC-)
4	Black (N: 1 to 5 V)

- ◆ 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 e-con 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, [---] or [---] will be displayed.

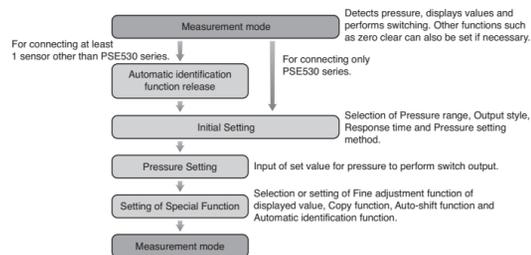
### Connector Connecting / Disconnecting

- ◆ 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



## Flow Setting



### Automatic identification function release

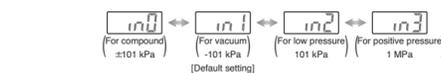
- (When at least 1 sensor other than PSE530 series will be connected.)
- ◆ Press the [▲] and [SET] buttons simultaneously for 2 seconds or more to display [FSI].
- ◆ Press the [SET] button to display [CfY].
- ◆ Press the [SET] button to display [SH1], and then press the [SET] button again.
- ◆ If [Aon] is displayed, press the [▲] or [▼] button to display [Aof], and then press the [SET] button.
- \*: The default setting for the automatic identification function is ON.

## Initial Setting

Initial setting is required for each channel. To start initialization, select the channel to be set by pressing the [▲] button, then press the [SET] button for 2 seconds or longer.

### 1. Setting of pressure range

- ◆ Select the pressure range suitable for the sensor connected.
- ◆ Press the [▲] or [▼] button and select the pressure range. Press the [SET] button to set.



- \*: When automatic identification mode is ON, the controller will change to the pressure range required for the connected pressure sensor (PSE530 only) when power is supplied.
- \*: When the pressure range setting is changed, the set value changes, so the pressure setting must be performed again.

### 2. Selection of display unit (with unit conversion function)

The indication unit can be selected freely. Pressing the [▲] or [▼] button will change the unit and will automatically convert set values. Press the [SET] button to set and to move to setting the output mode.

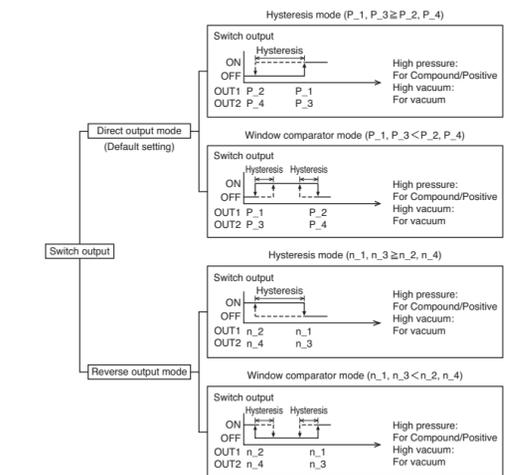
LCD display		PA	GF	bar	PSI	inHg	mmHg
Unit label	For compound and vacuum	kPa	kgf/cm <sup>2</sup>	bar	psi	inHg	mmHg
	For low pressure	kPa	kgf/cm <sup>2</sup>	bar	psi	/	/
	For positive pressure	MPa	kgf/cm <sup>2</sup>	bar	psi	/	/

In order to display the selected units, the appropriate units label is supplied. Select and use the appropriate label from the table. ◆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. ◆When [M] is not included in the controller model number (with unit conversion), the appropriate units label should be used from the table above.

LCD display	Unit display	(Compound)	(Vacuum)	(Low pressure)	(Positive pressure)
		kPa			MPa

### 3. Setting of output style

- 1) The output style for OUT1 can be set.
  - ◆ Press [▲] or [▼] button and select the normally open or the normally closed.
  - ◆ Next, press the [SET] button to set.
- 2) The operating mode and output style for OUT2 can be set. (only CH1)
  - ◆ Use the same procedure as for OUT1.



- ◆ When the hysteresis is set at 2 digits or less in hysteresis mode, if the input pressure fluctuates around the set value, switch output may cause chattering.
- ◆ In window comparator mode the hysteresis is fixed at 3 digits. When setting, allow 7 digits or more between P1 and P2 (and P3 and P4). → Less than 7 digits will not allow correct operation.

### 4. Setting of response time

- ◆ Set response time of switch output. Output chattering is prevented by setting the response time.
- ◆ Press the [▲] or [▼] button to select response time. Press the [SET] button to set.



### 5. Selection of pressure setting method

- ◆ There are two methods for pressure setting: 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.
- ◆ Press the [▲] or [▼] button to select pressure setting method. Press the [SET] 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 for each respective channel.

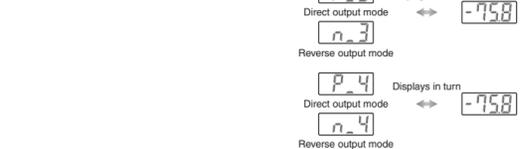
#### 1. Setting of OUT1 [P\_1] (for CH1 to CH4)

- ◆ Press the [▲] button during the Measurement mode to select channel, and then, press the [SET] button to display set values.
- ◆ [P\_1] or [n\_1] and set value are displayed in turn.
- ◆ Press the [▲] or [▼] button to change the set value.
- ◆ The [▲] button is to increase and the [▼] button is to decrease.
- ◆ Press the [▲] button once to increase by one digit, and press it continuously to keep increasing the set value.
- ◆ Press the [▼] button once to decrease by one digit, and press it continuously to keep decreasing the set value.
- ◆ Press the [SET] button to finish the setting.

#### 2. Setting of OUT1 [P\_2] (for CH1 to CH4)

- ◆ [P\_2] or [n\_2] and set value are displayed in turn.
- ◆ Press the [▲] or [▼] button to change the set value.

3. Setting of OUT2 [P\_3] and [P\_4] (CH1 only)
  - ◆ Press the [▲] or [▼] button to change the set value as in 1, 2 above.



#### 4. Setting of Auto-shift compensation

- ◆ [C\_5] ([C\_3] for CH2 to CH4) and the auto-shift corrected value will be displayed in turn.
- ◆ If the auto-shift input function is off, the correction value will display zero.
- ◆ Press the [SET] button to return to measurement mode.

### Auto-preset

When the auto-preset function is selected, the set pressure can be calculated and memorized from a measured value. The set value is automatically optimized by repeating suction and release.

#### 1. Selection of auto-preset OUT1

- ◆ Press the [▲] button in Measurement mode to select channel, and then, press the [SET] button to display [AP1].

#### 2. Preparation of OUT1 device

- ◆ Prepare the sensor for which OUT1 is to be set.

#### 3. Setting of auto-preset value of OUT1

- ◆ Press the [SET] button to display [A11].
- ◆ After measurement starts, operate the device and change the pressure.
- ◆ When the pressure change is detected, a set value will appear automatically.
- (When OUT1 setting is not necessary, press the [▲] and [▼] buttons simultaneously for 1 second or more to skip to [AP2]).

#### 4. Selection of auto-preset OUT2

- ◆ Press the [SET] button to display [AP2].

#### 5. Preparation and setting of OUT2 device

- ◆ Prepare the sensor for which OUT2 is to be set, and perform the setting of OUT2 in the same manner as that for OUT1.
- ◆ After [A2L] is displayed and measurement starts, when the pressure change is detected, a set value will appear automatically.
- (When OUT2 setting is not necessary, press the [▲] and [▼] buttons simultaneously for 1 second or more to return to measurement mode).

#### 6. Completion of setting

- ◆ Press the [SET] button and complete auto-preset mode. After that, measurement mode returns.

The set values are displayed in auto-preset as follows.  
ON = A - (A - B)/4      A = Max. pressure  
OFF = B + (A - B)/4      B = Min. pressure

## Setting of Special Function

- Fine adjustment function of displayed value
  - ◆ This removes irregularities between CH1 to CH4 output values, to allow the same displayed value.
  - ◆ It is possible to make fine adjustment within ±5%F.S. of the measured data on the displayed value for each pressure sensor.
- Copy function
  - ◆ With the Copy function, 5 items can be copied, Pressure setting value, Range setting, Display unit, Output type and Response time.
- Auto-shift function
  - ◆ This function corrects the set value of each switch output according to a change of pressure source. Even if the pressure source is changed, the controller can make a correction on switch output.
- Automatic identification function
  - ◆ This function identifies the pressure range of the sensor connected to the controller.
  - ◆ When [Aon] is set at the Auto identification mode, when power is re-applied this function activates.
  - (This function is only applicable for use with the SMC PSE530 series pressure sensors).

To set this function, refer to the SMC website (URL <http://www.smcworld.com>)

## Other Settings

- Peak / Bottom hold display
- Key lock
- Zero clear
- Channel selects
- Channel scans

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	OUT1 Er1	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.
	OUT2 Er2		
Zero-clear Error	Er3	During the zero clear operation, pressure above ±5%F.S. (±2.5%F.S. for compound pressure) has been applied. After 2 s, the mode will reset to the measurement mode.	Perform zero clear operation again after restoring the applied pressure to an atmospheric pressure condition.
Pressurizing Error	- - -	Pressure has exceeded the upper limit of the set pressure range.	Check the connection and wiring of each sensor. Adjust the applied pressure to a level within the set pressure range.
	- - - -		
System Error	Er5	A sensor may be disconnected or incorrectly wired. Pressure has exceeded the lower limit of the set pressure range.	Turn the power off and turn it on again. If resetting fails, an investigation by SMC CORPORATION will be required.
	Er6		
	Er7		
	Er8		

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.