



Instruction Manual Multi Channel Pressure Sensor Controller PSE200 / PSE201



The intended use of the multi channel pressure sensor controller is to monitor and display information from up to four pressure sensors.

1 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.

^{*)} ISO 4414: Pneumatic fluid power - General rules relating to systems.
ISO 4413: Hydraulic fluid power - General rules relating to systems.
IEC 60204-1: Safety of machinery - Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1: Manipulating industrial robots - Safety, etc.

- Refer to product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.
- Keep this manual in a safe place for future reference.

	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.

Warning

- Always ensure compliance with relevant safety laws and standards.**
- All work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.
- This product is class A equipment intended for use in an industrial environment. There may be potential difficulties in ensuring electromagnetic compatibility in other environments due to conducted or radiated disturbances.
- Refer to the operation manual on the SMC website (URL: <https://www.smcworld.com>) for more safety instructions.

Warning

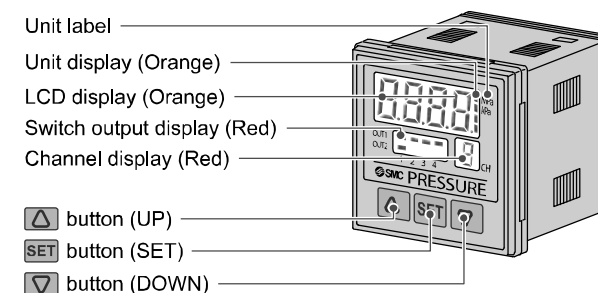
Special products (-X) might have specifications different from those shown in the specifications section. Contact SMC for specific drawings.

2 Specifications

2.1 General specifications

Model No.	PSE20#			
Pressure range	For positive pressure	For vacuum	For low pressure	For compound
Rated pressure range	0 to 1 MPa	0 to -101 kPa	0 to 101 kPa	-101 to 101 kPa
Set pressure range	-0.1 to 1 MPa	10 to -101 kPa	-10 to 101 kPa	-101 to 101 kPa
Setting/Display resolution	0.1 kPa	0.1 kPa	0.1 kPa	0.001 MPa
Power supply voltage	12 to 24 VDC, ripple (p-p) 10% or less (Protected against inverse connection)			
Current consumption	55 mA or less (except for current for sensor)			
Power supply voltage for sensor	[Power supply voltage] -1.5 V			
Power supply current for sensor	Max. 40 mA or less (Max. total consumed current is 100 mA for 4 sensors)			
Sensor input	Input signal	1 to 5 VDC (Input impedance: approx. 800 kΩ)		
	Number of input	4 inputs		
	Input protection	With over voltage protection (applicable to voltage up to 26.4 V)		
	Automatic identification	Provided		
Switch output	Hysteresis	Hysteresis mode: Variable Window comparator mode: Fixed 3 digits		
	Output type	NPN or PNP open collector output		
	Number of outputs	5 outputs (2 outputs for sensor input CH1, and 1 output each for CH2 to CH4)		
	Max. load current	80 mA		
	Max. applied voltage	30 VDC (At NPN output)		
Residual voltage	Residual voltage	1 V or less (At 80 mA load current)		
	Output protection	With short circuit protection		
Response time	Response time	5 ms or less		
	Anti-chattering function	20, 160, 640 ms selectable		
Repeatability	±0.1%F.S. ±1 digit			
Indicator accuracy (Ambient temp. 25 °C)	±0.5%F.S. ±1 digit			
Display method	Display method	Display for measured value: 4 digits, 7-segment (Orange) Display for channel: 1 digit, 7-segment (Red)		
	Indicator	Light when ON (Red)		
Auto-shift input	Auto-shift input	Non-voltage input (Reed or solid state), Input 10 ms or less, Setting ON/OFF is possible independently		
	Enclosure	Front part: IP65 (panel mounting), Others: IP40		
Environment	Ambient temp. range	Operation: 0 to 50 °C, Storage: -10 to 60 °C (no condensation or freezing)		
	Ambient humidity range	Operation, Storage: 35 to 85% RH (no condensation)		
	Withstand voltage	1000 VAC, 1 min. between lead block and case		
	Insulation resistance	50 MΩ or more (at 500 VDC) between lead block and case		
Temp. characteristics	±0.5% F.S. (at 25 °C reference)			
Connection	Power supply and output connection: 8P connector, Sensor connection: e-con			
Power supply/Output connection cable	Oil resistance vinyl cabtyre cable, 8 cores φ4.8 2 m Sectional area of conductor: 0.15 mm ² Outside diameter of insulator: 0.9 mm			
Material	Body: PBT, Display: Transparent nylon, Rubber cover for the rear: CR			
Weight	55 g (not including lead wire) 113 g (including lead wire)			

3 Names and function of parts



Switch output display (Red): ON when OUT1 (CH1 to CH4) and/or OUT2 (only CH1) is ON.

LCD display (Orange): Displays the current status of pressure, setting mode, selected indication unit and error code.

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

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

button (SET): Changes the mode and sets a set value.

Unit display (Orange): Lit ON the indicator of selected unit. For the Controller without unit selection function, the unit is fixed to SI (MPa or kPa).

Unit label: Attach the unit label (kgf/cm², bar, psi, inHg, mmHg) with the unit selection function.

Channel display (Red): Indicate the CH1 to CH4 that is selected at that time.

4 Installation

4.1 Installation

Warning

- Do not install the product unless the safety instructions have been read and understood.

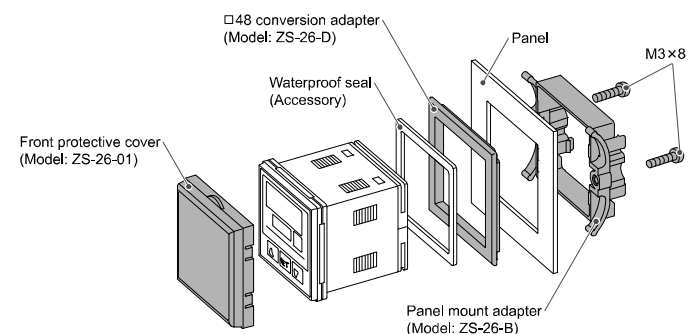
4.2 Environment

Warning

- Do not use in an environment where corrosive gases, oil, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact in excess of the product's specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures in excess of the product's specifications.

4.3 Mounting with Panel mount adapter

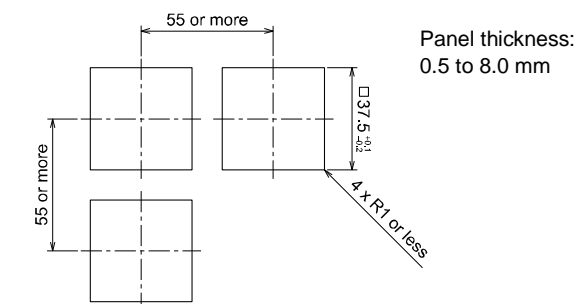
- Fix the panel mount adapter to the controller using the set screws M3 x 8L (2 pcs.) supplied.
Panel mount adapter (Model: ZS-26-B)
Panel mount adapter + Front protective cover (Model: ZS-26-01)
□48 conversion adapter (Model: ZS-26-D)



- Panel mounting of the controller conforms to IP65 rating, if the panel mount adapter is installed correctly and the sensor monitor is seated correctly (if the □48 conversion adapter is used then IP40). Tighten the screws by 1/4 to 1/2 turn more after the head makes contact with the panel.

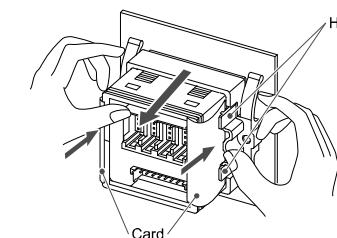
4 Installation (continued)

4.4 Panel cut-out dimensions



Note: When removing the Controller

- The controller with panel mount adapter can be removed from the installation after removing two screws, by using a thin card to release the hook on both sides, pull the panel mount adapter forward and remove it. If the panel mount adapter is drawn forward with the hook caught, the adapter and controller may be damaged.



5 Wiring

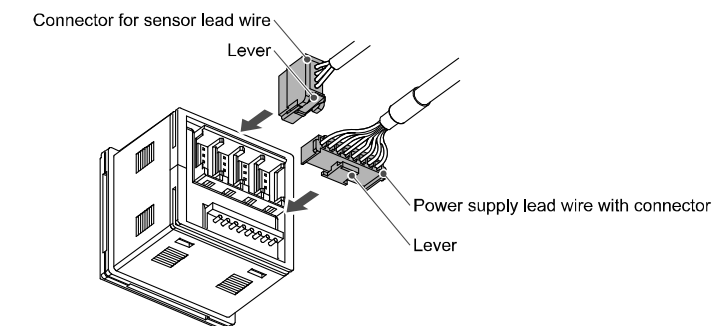
5.1 Wiring Connection

- Connections should be made with the power supply turned OFF.
- Do not insert or remove the sensor connector with the power ON.
- Use a separate route for the product wiring and any power or high voltage wiring. Otherwise, malfunction may result due to noise.

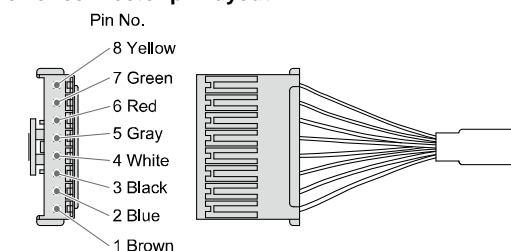
- Ensure that the FG terminal is connected to ground when using a commercially available switch-mode power supply.

Connector Connecting / Disconnecting

- When connecting the connector, insert it straight onto the pins and lock the connector into the groove in the housing until the connector clicks.
- When removing the connector, press down the lever to disengage the lever and pull the connector straight out.



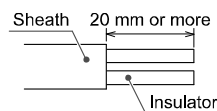
5.2 Power connector pin layout



5 Wiring (continued)

5.3 Sensor e-CON connector wiring

- Attach the connector to the lead wire. The sensor wire should be stripped as shown in the figure. Refer to the table below for corresponding connector and wire gauge.



AWG No.	Conductor size (mm ²)	Outer diameter (mm)	Colour	SMC product No. (1 pc.)
26-24 (28)	0.14-0.2 (0.08)	φ0.8 to φ1.0	Red	ZS-28-C
		φ1.0 to φ1.2	Yellow	ZS-28-C-1
		φ1.2 to φ1.6	Orange	ZS-28-C-2
22-20	0.3-0.5	φ1.0 to φ1.2	Green	ZS-28-C-3
		φ1.2 to φ1.6	Blue	ZS-28-C-4
		φ1.6 to φ2.0	Grey	ZS-28-C-5

- Do not cut the insulator.
- The core of the corresponding colour is placed into the pin number marked on the connector to the back.

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

- Check that the above-mentioned wire preparation has been performed correctly, then part A shown in the figure is pushed in by hand to make temporary connection.

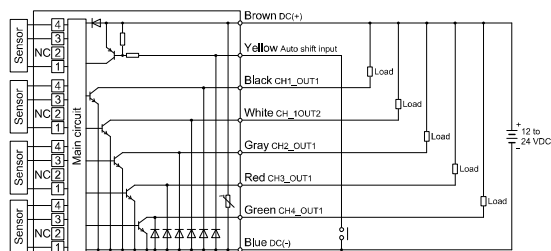


- Part A centre should be pressed straight in using a suitable tool, such as pliers.
- The e-CON connector cannot be re-used once it has been completely crimped. In case of connection failure or when a pin is mis-wired, please use a new e-CON connector. When the sensor is not connected correctly, [----] or [---] will be displayed.

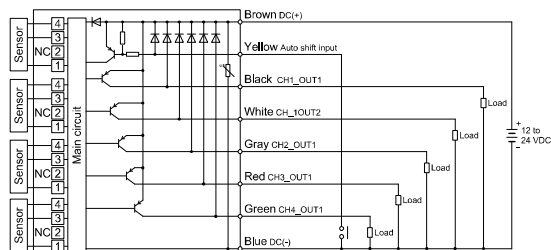
5.4 Output Wiring

- When the SMC power and output lead wire (Model: ZS-26-A) is used, the wire colours (Brown, Blue, White, Grey, Red, Green Yellow) will apply as shown on circuit diagram.

PSE200-(M)#: NPN open collector 5 outputs + Auto-shift 1 input
Max. 30 V, 80 mA, Residual voltage 1 V max.



PSE201-(M)#: PNP open collector 5 outputs + Auto-shift 1 input
Max. 80 mA, Residual voltage 1 V max.



6 Function Settings

6.1 Setting procedure

Measurement mode
Detects pressure, displays values and performs switching. Other functions such as zero clear can also be set if necessary.

For connecting at least 1 sensor other PSE530 series.

Automatic identification function release

For connecting only PSE530 series.

Initial setting
Selection of Pressure range, Output style, Response time and Pressure setting method.

Pressure Setting
Input of set value for pressure to perform switch output.

Setting of Special Function
Selection or setting of Fine adjustment function of displayed value, Copy function, Auto-shift function and Automatic identification function.

Measurement mode

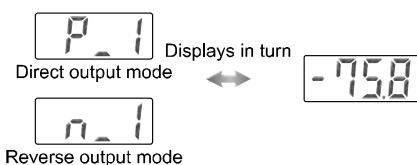
Refer to the operation manual or catalogue on the SMC website (URL: <https://www.smcworld.com>) for further function setting details.

7 Pressure Setting

7.1 Manual Setting

Selection of OUT1 [P_1] setting mode

- Press the button during the Measurement mode to select channel, and then, press the 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 for increase and the button is for decrease. Press the button once to increase by one figure, and press it continuously to keep set figure increased. Press the button once to decrease by one figure, and press it continuously to keep set figure decrease.
- Press the button to finish the setting.

Selection of OUT1 [P_2] setting mode, OUT2 [P_3, P_4] setting mode (only for CH1) and the Auto-shift compensation value setting procedure are the same as above.

7.2 Auto-preset setting

When auto-preset is selected during initialization, the set pressure can be calculated and memorized from measured value. The set value is automatically optimized by repeating the suction and release of the object for the setting.

Refer to the operation manual or catalogue on the SMC website (URL: <https://www.smcworld.com>) for pressure setting details.

8 Special Function Settings

8.1 Fine adjustment of displayed value

This function 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. (for compound ±2.5% F.S.) of the measured data on the displayed value for each pressure sensor.

8.2 Copy function

5 items can be copied: pressure setting value, pressure range, display unit, output style and response time. If copied from CH1 to CH2, CH3 and CH4, CH1 OUT1 information is copied. CH2, CH3, CH4 information is only copied into OUT1 of CH1 if copied from CH2, CH3, CH4 to CH1.

8.3 Auto-shift function

This function corrects the setting value of each switch output according to a change to the pressure source. Even if the pressure source is changed, the controller can make a correction on the switch output.

8.4 Automatic Identification function

This function identifies the pressure range of the sensor connected to the controller. When [Aon] is set at the automatic identification mode, and when power is re-applied at [Aon] status, this function activates. This function is applicable only to a special pressure sensor (SMC PSE530 series). Other pressure sensors are not applicable.

Refer to the operation manual or catalogue on the SMC website (URL: <https://www.smcworld.com>) for more special function setting details.

9 Other Settings

9.1 Peak / bottom hold display

The maximum and minimum pressure values are detected during measurement. The displayed value can be held.

9.2 Key-lock function

The key lock function is used to prevent errors occurring due to unintentional changes of the set values. Set [LoC] (lock mode) in order not to accept button operation.

9.3 Zero clear function

The displayed value can be adjusted to zero if the pressure being measured is within ±5% F.S (±2.5% F.S. for compound pressure) of the pressure at the ambient pressure.

9.4 Channel select function

For each button press, channel selection can be carried out, like [1→2→3→4→1→...]. The display shows the pressure value, which is measured for the channel selected.

9.5 Channel scan function

Press and hold the button for 2 seconds or longer. The display indicates each channel measurement value for 2 seconds and then scans to the next channel.

To release this function, press the button again for 2 seconds or longer.

Refer to the operation manual or catalogue on the SMC website (URL: <https://www.smcworld.com>) for other setting details.

10 How to Order

Refer to the operation manual or catalogue on the SMC website (URL: <https://www.smcworld.com>) for How to Order information.

11 Outline Dimensions

Refer to the operation manual or catalogue on the SMC website (URL: <https://www.smcworld.com>) for Outline Dimensions.

12 Troubleshooting

12.1 Error indication

Error Name	Error Display	Error Type	Troubleshooting Method
Over current Error	OUT1 Er1	A load current of switch output is 80 mA or more.	Turn the power off and remove the output factor for the over current. Then turn the power on.
	OUT2 Er2		
Zero-clear Error	Er3	During zero clear operation, pressure over ±5%F.S. (±2.5%F.S for compound pressure) is 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 connection and wiring of a sensor. And reset applied pressure to a level within the set pressure range.
	----	A sensor has the possibility of un-connecting and miswiring. Pressure has exceeded the lower limit of the set pressure range.	
System Error	Er5 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, or errors other than above are displayed, please contact SMC.

13 Maintenance

13.1 General Maintenance

Caution

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- If handled improperly, compressed air can be dangerous.
- Maintenance of pneumatic systems should be performed only by qualified personnel.
- Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the air is released to atmosphere.
- After installation and maintenance, apply operating pressure and power to the equipment and perform appropriate functional and leakage tests to make sure the equipment is installed correctly.
- If any electrical connections are disturbed during maintenance, ensure they are reconnected correctly and safety checks are carried out as required to ensure continued compliance with applicable national regulations.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.

How to reset the product after 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 Limitations of Use

14.1 Limited warranty and Disclaimer/Compliance Requirements

Refer to Handling Precautions for SMC Products.

15 Product Disposal

This product shall not be disposed of as municipal waste. Check your local regulations and guidelines to dispose of this product correctly, in order to reduce the impact on human health and the environment.

16 Contacts

Refer to www.smcworld.com or www.smc.eu for your local distributor / importer.

SMC Corporation

URL: <https://www.smcworld.com> (Global) <https://www.smc.eu> (Europe)
SMC Corporation, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, Japan
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