Multi-Channel Controller  Series PSE200
Pressure Sensor  Series PSE530

A single controller monitors up to 4 pressure sensors.
A single controller monitors

Pressure Sensor
Series PSE530

Multi-Channel Controller
Series PSE200

Space saving

- 40mm
- 165mm

76% reduction in installation space
(Compared to the panel mounted ZSE40/ISE40.)

Simplified application

The use of connector literally makes wiring work a snap.

No tools required

Thanks to a tool-free module press-in connector, all you need to do is to simply snap-in the lead wire and lock it! Crimping tools are not required.

The connection cable is a halogen-free heavy-duty cord. (ISO14000 compatible)

Low power consumption: 55mA or less (controller)
The new controller provides energy savings without compromising display brightness quality thanks to the use of transparent (negative) LCD and a backlight.

Features 1
up to 4 pressure sensors.

**3 Multifunction**

- **Auto shift function (page 14)** Allows stable switch output even when supply pressure changes.
- **Auto preset (page 11)** Automatically sets the pressure value.
- **Auto identification function (page 14)** Can automatically identify the pressure range of a connected SMC sensor.
- **Copy function (page 14)** Each channel's information can be copied to another channel.
  - CH1 setting can be copied to CH2, CH3, and CH4.
- **Display calibration (page 14)** Each channel has an adjustable display function.
  - Although supply pressure for each channel is the same, slightly different values are displayed.
  - Displays exact the same pressure values for all channels.
- **Channel scan function (page 15)** Allows constant monitoring of the displayed pressure value for each channel.
  - Reset function
  - Key lock function
  - Displays peak & bottom pressure values

- **Anti-chattering function (page 9)** Prevents malfunction due to sudden pressure changes.

**4 Application**

- **A single controller monitors various applications.**
  - Suction verification
  - Ejector supply pressure verification
  - Leak test
  - Placement verification

- **Connectable to SMC’s other series (Series PSE510 & PSE521)**
  - Connecting to general purpose pressure sensor PSE521 allows the sensor to verify hydraulic or liquid pressure rather than air pressure.

Note: Connector types vary depending on the core wire size of the sensor cable and the outside diameter of insulation. Refer to “Connecting to other series” on page 22.
Pressure Sensor
Series PSE530

How to Order

PSE530 M5

Pressure sensing range

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>High pressure [0 to 1MPa]</td>
</tr>
<tr>
<td>1</td>
<td>Vacuum [0 to –101kPa]</td>
</tr>
<tr>
<td>2</td>
<td>Low pressure [0 to 101kPa]</td>
</tr>
<tr>
<td>3</td>
<td>Compound pressure [–101 to 101kPa]</td>
</tr>
</tbody>
</table>

Port size

Options

When only optional parts are required, order using the part numbers listed below.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part no.</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector</td>
<td>ZS-26-E</td>
<td>4 pcs. per set</td>
</tr>
<tr>
<td>Sensor cable</td>
<td>ZS-26-F</td>
<td>Cable length: 3m</td>
</tr>
<tr>
<td>Connector + Sensor cable</td>
<td>ZS-26-G</td>
<td>Cable length: 3m</td>
</tr>
</tbody>
</table>

Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>PSE530-M5</th>
<th>PSE531-M5</th>
<th>PSE532-M5</th>
<th>PSE533-M5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated pressure range</td>
<td>0 to 1MPa</td>
<td>0 to –101kPa</td>
<td>0 to 101kPa</td>
<td>–101 to 101kPa</td>
</tr>
<tr>
<td>Proof pressure</td>
<td>1.5MPa</td>
<td>500kPa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluid</td>
<td>Air, Non-corrosive gas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>12 to 24VDC (Ripple ±10% or less)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current consumption</td>
<td>15mA or less</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output specification</td>
<td>Analogue output (1 to 5V, Output impedance: Approx. 1kΩ)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accuracy</td>
<td>±2% F.S. or less (within rated pressure range, Ambient temperature 25°C ±3°C)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linearity</td>
<td>±1% F.S. or less</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeatability</td>
<td>±1% F.S. or less</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply voltage effect</td>
<td>±1% F.S. or less based on the analog output at 18V ranging from 12 to 24VDC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistance</td>
<td>IP40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature range</td>
<td>0°C to 50°C; Stored: –10°C to 70°C (with no condensation and no freezing)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Withstand voltage</td>
<td>1000VAC, 50/60Hz for 1 minute between external terminals and case</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>5MΩ between external terminals and case (at 50VDC)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>10 to 500Hz at whichever is smaller of 1.5mm amplitude or 98m/s² acceleration, in X, Y, Z directions, for 2 hours each (de-energized)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact resistance</td>
<td>980m/s² in X, Y, Z directions, 3 times each (de-energized)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature characteristics (based on 25°C)</td>
<td>±2% F.S. or less based on the analog output value at 25°C from a range of 0°C to 50°C:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Port size</td>
<td>M5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td>Body: Stainless steel Grade 303, Internal enclosure: PPE; Pressure sensor: Silicon; O-ring: NBR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensor cable/Option</td>
<td>Halogen-free heavy-duty cord, ø2.7, 0.15mm², 3 cores, 3m</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note) At the factory, the connector is not connected to the cable, but packed together with it for shipment.
Internal Circuit

<table>
<thead>
<tr>
<th>Sensor cable color</th>
<th>DC(+) Power supply</th>
<th>Brown</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DC(–) GND</td>
<td>Blue</td>
</tr>
<tr>
<td>Analog output (1 to 5V)</td>
<td></td>
<td>Black</td>
</tr>
</tbody>
</table>

Main circuit

- Brown
- DC 12 to 24V
- Black
- Blue
- Load

Dimensions

PSE53□-M5

With sensor cable

- ø10.4
- ø2.7
- ø1.3
- ø2.2
- 12
- 29.4
- 27.2
- 3.4
- 3
- 5
- 5.5
- 6.72
- 7.2
- 12
- 13
- 7.2
- 1.3
- 2.2
- 10.4
- 2.7
- 1.3
- 2.2
- 12
**Multi-channel Controller**

**Series PSE200**

**How to Order**

**PSE20**

**0**

**M**

---

**Input/Output specifications**

<table>
<thead>
<tr>
<th>0</th>
<th>NPN 5 outputs + Auto shift input</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PNP 5 outputs + Auto shift input</td>
</tr>
</tbody>
</table>

**Unit specifications**

<table>
<thead>
<tr>
<th>Nil</th>
<th>With unit display switching function</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>Fixed SI unit Note)</td>
</tr>
</tbody>
</table>

*Note: Fixed units*

For vacuum low pressure & compound pressure: kPa
For high pressure: MPa

---

**Option 1**

**Without panel mount/protective cover**

- A
  - Panel mount adapter
  - Mounting screws (M3 x 8L) (accessory)
  - Panel
  - Waterproof seal (accessory)

- B
  - Front protective cover + Panel mount adapter
  - Mounting screws (M3 x 8L) (accessory)
  - Panel
  - Waterproof seal (accessory)

**Option 2**

**Without connector**

- Sensor connector (4 pcs.)

---

**Accessory: Power supply/Output connection cable (2m)**

Included with the controller.

---

**Options**

When only optional parts are required, order with the part numbers listed below.

<table>
<thead>
<tr>
<th>Description</th>
<th>Part no.</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel mount adapter</td>
<td>ZS-26-B</td>
<td>Waterproof seal, screws included</td>
</tr>
<tr>
<td>Front protective cover</td>
<td>ZS-26-01</td>
<td></td>
</tr>
<tr>
<td>Front protective cover + Panel mount adapter</td>
<td>ZS-26-C</td>
<td>Waterproof seal, screws included</td>
</tr>
</tbody>
</table>

- ZS-26-D 48 conversion adapter

This adapter is used to mount Series PSE200 on the panel fitting of Series PS100.

- ZS-26-E 48 conversion adapter

Order panel mount adapter separately.

---

**ZS-26-A**

Power supply/Output connection cable

---

**ZS-26-D**

48 conversion adapter

---

**ZS-26-E** (4 pcs. per set)
## Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>PSE200</th>
<th>PSE201</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output specification</td>
<td>NPN open collector</td>
<td>PNP open collector</td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>12 to 24VDC ±10%, Ripple (p-p) 10% or less (with power supply polarity protection)</td>
<td></td>
</tr>
<tr>
<td>Current consumption</td>
<td>55mA or less (Current consumption for sensor is not included.)</td>
<td></td>
</tr>
<tr>
<td>Power supply voltage for sensor</td>
<td>[Power supply voltage] –1.5V</td>
<td></td>
</tr>
<tr>
<td>Power supply current for sensor (Note 1)</td>
<td>40mA maximum (100mA maximum for the total power supply current when 4 sensors are input.)</td>
<td></td>
</tr>
<tr>
<td>Sensor input</td>
<td>No. of inputs 1 to 5VDC (Input impedance: Approx. 800kΩ)</td>
<td>4 inputs</td>
</tr>
<tr>
<td></td>
<td>Input protection</td>
<td>With excess voltage protection (up to 26.4V)</td>
</tr>
<tr>
<td>Hysteresis</td>
<td>No. of outputs Variable</td>
<td>3-digit fixed</td>
</tr>
<tr>
<td></td>
<td>Hysteresis mode</td>
<td>3-digit fixed</td>
</tr>
<tr>
<td></td>
<td>Window comparator mode</td>
<td>3-digit fixed</td>
</tr>
<tr>
<td>Switch output</td>
<td>No. of outputs</td>
<td>5 outputs (CH1: 2 outputs, CH2 to 4: 1 output)</td>
</tr>
<tr>
<td></td>
<td>Maximum load current</td>
<td>80mA</td>
</tr>
<tr>
<td></td>
<td>Maximum load voltage</td>
<td>30VDC (with NPN)</td>
</tr>
<tr>
<td></td>
<td>Residual voltage</td>
<td>1V or less (with load current of 80mA)</td>
</tr>
<tr>
<td></td>
<td>Output protection</td>
<td>With short circuit protection</td>
</tr>
<tr>
<td>Response time</td>
<td>Anti-chattering function</td>
<td>5ms or less</td>
</tr>
<tr>
<td></td>
<td>Repeatability</td>
<td>±0.1% F.S. or less</td>
</tr>
<tr>
<td>Setting/Display accuracy</td>
<td>±0.5% F.S. ±1 digit or less (at ambient temperature of 25°C ±3°C)</td>
<td></td>
</tr>
<tr>
<td>Display</td>
<td>For measured value display: 4-digit, 7-segment indicator, Display colour: Yellow</td>
<td>For channel display: 1-digit, 7-segment indicator, Display colour: Red</td>
</tr>
<tr>
<td>Indication light</td>
<td>Red (Lights up when output is ON.)</td>
<td></td>
</tr>
<tr>
<td>Auto shift input</td>
<td>Non-voltage input (reed or solid state), Input 10ms or more, Independently controllable auto shift function ON/OFF</td>
<td></td>
</tr>
<tr>
<td>Auto identification function (Note 2)</td>
<td>With auto identification function</td>
<td></td>
</tr>
<tr>
<td>Resistance</td>
<td>Enclosure</td>
<td>Front face: IP65, Other: IP40</td>
</tr>
<tr>
<td></td>
<td>Ambient temperature range</td>
<td>Operating: 0°C to 50°C, Stored: –10°C to 60°C (with no condensation or freezing)</td>
</tr>
<tr>
<td></td>
<td>Ambient humidity range</td>
<td>Operating/Stored: 3% to 85% RH (with no condensation)</td>
</tr>
<tr>
<td></td>
<td>Vibration resistance</td>
<td>10 to 500Hz at whichever is smaller of 1.5mm amplitude or 98m/s² acceleration, in X, Y, Z directions for 2 hrs. each (de-energized)</td>
</tr>
<tr>
<td></td>
<td>Impact resistance</td>
<td>980m/s² in X, Y, Z directions, 3 times each (de-energized)</td>
</tr>
<tr>
<td>Temperature characteristics</td>
<td>±0.5% F.S. or less based on 25°C</td>
<td></td>
</tr>
<tr>
<td>Connection</td>
<td>Power supply/Output connection: 8P connector, Sensor connection: 4P connector</td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td>Enclosure: PBT; Display: Transparent nylon; Back rubber cover: CR</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 60g (power supply/output connecting cable not included)</td>
<td></td>
</tr>
</tbody>
</table>

### Applicable pressure sensor

<table>
<thead>
<tr>
<th>Regulating pressure range</th>
<th>PSE530 (for high pressure)</th>
<th>PSE531 (for vacuum)</th>
<th>PSE532 (for low pressure)</th>
<th>PSE533 (for compound pressure)</th>
</tr>
</thead>
<tbody>
<tr>
<td>kPa</td>
<td>–0.1 to 1MPa</td>
<td>10 to –101kPa</td>
<td>–10 to 101kPa</td>
<td>–101 to 101kPa</td>
</tr>
<tr>
<td>MPa</td>
<td>0.001</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>kgf/cm²</td>
<td>0.01</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>bar</td>
<td>0.01</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>psi</td>
<td>0.1</td>
<td>0.01</td>
<td>0.01</td>
<td>0.02</td>
</tr>
<tr>
<td>mmHg</td>
<td>–</td>
<td>1</td>
<td>–</td>
<td>1</td>
</tr>
<tr>
<td>Torr</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>1</td>
</tr>
<tr>
<td>InHg</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Note 1) If the Vcc and 0V side of the sensor input connector are short circuited, the inside of the controller will be damaged.

Note 2) Auto identification function comes with “Series PSE53L” pressure sensor only. Other SMC series (PSE510 and PSE520) are not equipped with this function.

Note 3) For controllers with unit display switching function. (Either of SI units, [kPa] or [MPa], will be the set unit for those controllers without unit switching function.)
Series PSE200

Dimensions
PSE200 & PSE201

Power supply/Output connector (8P)

Sensor connector (4P x 4)

Connector (optional)

Power supply/Output connection cable (included)

**Dimensions**

**PSE200 & PSE201**

**Pin no.**

1. DC(+)
2. IN (1 to 5V)
3. DC(–)
4. N.C.

**Sensor connector (4P x 4)**

**Connector (optional)**

**Power supply/Output connection cable (included)**

Pin no.

1. Auto shift input
2. CH4_OUT1
3. CH3_OUT1
4. CH2_OUT1
5. CH1_OUT2
6. CH1_OUT1
7. DC(–)
8. DC(+)
Dimensions

Front protective cover + Panel mount

Panel fitting dimension
Applicable panel thickness: 0.5 to 8mm
**Series PSE**

**Descriptions**

- **4-digit display**
  Displays the measured pressure value, content for each setting, and error code.

- **Switch output display**
  Displays the output status of OUT1 (CH1 to CH4), OUT2 (CH1 only).
  Lights up when it is ON.

- **UP button**
  Use this button to change the mode or set value.

- **SET button**
  Use this button to set the mode or set value.

- **Unit display**
  The selected unit lights up. Use unit labels for units other than MPa and kPa.

- **Unit labels**
  kgf/cm²  bar  PSI  mHg  mmHg

- **Channel display**
  Displays the selected channel.

- **DOWN button**
  Use this button to change the mode or set value.

**Error Code & Solution**

<table>
<thead>
<tr>
<th>LED display</th>
<th>Contents</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Er 1</strong></td>
<td>Excess current is flowing into the switch output of OUT1.</td>
<td>Shut off the power supply. After eliminating the output factor that caused the excess current, turn the power supply back on.</td>
</tr>
<tr>
<td><strong>Er 2</strong></td>
<td>Excess current is flowing into the switch output of OUT2.</td>
<td>Bring the pressure back to atmospheric pressure and use the reset function (zero point adjustment) again.</td>
</tr>
<tr>
<td><strong>Er 3</strong></td>
<td>Pressure is applied to a pressure sensor during the reset operation (a zero point adjustment) as follows: When compound pressure is used: ± 2.5% F.S. or more. When pressure other than compound pressure is used: ± 5% F.S. or more. After displaying for 2 seconds, it will return to the measuring mode.</td>
<td></td>
</tr>
<tr>
<td><strong>Er 5</strong></td>
<td>Internal data error.</td>
<td>Contact SMC.</td>
</tr>
<tr>
<td><strong>Er 6</strong></td>
<td>Internal data error.</td>
<td></td>
</tr>
<tr>
<td><strong>Er 7</strong></td>
<td>Internal data error.</td>
<td>Shut off the power supply and turn it back on. Contact SMC if it does not recover.</td>
</tr>
<tr>
<td><strong>Er 8</strong></td>
<td>Internal data error.</td>
<td></td>
</tr>
</tbody>
</table>

**Internal Circuits and Connections**

**PSE200-(M)**
- NPN open collector 5 outputs + Auto shift 1 input specification

**PSE201-(M)**
- PNP open collector 5 outputs + Auto shift 1 input specification
Operation 1: Initial Setting

1 Channel selection

Press button and hold for 2 seconds or longer.

2 Range setting

If the controller is equipped with a unit switching function, unit setting can be changed. (Refer to page 14 for details.)

3 Output mode setting

OUT1 setting

OUT2 setting (CH1 only)
Operation 1: Initial Setting

4 Response time setting

Press SET button.

Anti-chattering function
Devices such as large bore cylinders and high-flow vacuum ejectors consume a large volume of air when they operate, and this may cause a momentary drop in the supply pressure. This function prevents such momentary drops from being detected as abnormal pressures by changing the response time setting.

<Principle>
The pressure values measured within the response time that is selected by the user are averaged. By comparing this average pressure value with the set pressure value, switch output (ON/OFF) is determined.

5 Manual setting/Auto preset

Press SET button.

CH1 setting is completed when the channel display changes from blinking to lights on. Repeat the same setting steps for CH2 to CH4.
Operation 2: Pressure Setting

Manual setting

Channel selection

OUT1 setting (1)
For normally open
Displays alternately
For normally closed

OUT1 setting (2)
For normally open
Displays alternately
For normally closed

OUT2 setting (1)/CH1 only
For normally open
Displays alternately
For normally closed

OUT2 setting (2)/CH1 only
For normally open
Displays alternately
For normally closed

Output mode
Hysteresis mode: Hysteresis of the switch output can be set arbitrarily.
<Normally open>
Switch output 1 & 2
P2 > P1: High pressure: Compound pressure type
P2 ≤ P1: Positive pressure type
P2 > P1: High vacuum: Vacuum type

<Normally closed>
Switch output 1 & 2
n2 > n1: High pressure: Compound pressure type
n2 ≤ n1: Positive pressure type
n2 > n1: High vacuum: Vacuum type

Note) If the hysteresis is set for less than 2 digits, the switch output may possibly chatter when the input pressure changes around the set value.

Window comparator mode: allows the switch output to be turned ON or OFF within any set pressure range.
<Normally open>
Switch output 1 & 2
P1 > P2: High pressure: Compound pressure type
P1 ≤ P2: Positive pressure type
P1 > P2: High vacuum: Vacuum type

<Normally closed>
Switch output 1 & 2
n1 > n2: High pressure: Compound pressure type
n1 ≤ n2: Positive pressure type
n1 > n2: High vacuum: Vacuum type

Note) The hysteresis is set to 3 digits. When setting the pressure, allow 7 digits or more.

Regulating pressure range
<table>
<thead>
<tr>
<th>Main application</th>
<th>Display</th>
<th>Hysteresis mode</th>
<th>Window comparator mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>−101.0 to 101.0kPa</td>
<td>Adsorption and vacuum release verification</td>
<td>n0</td>
<td>P2(n2) ≤ P1(n1)</td>
</tr>
<tr>
<td>10.0 to −101.0kPa</td>
<td>Adsorption verification</td>
<td>n1</td>
<td>P2(n2) ≥ P1(n1)</td>
</tr>
<tr>
<td>−10.0 to 101.0kPa</td>
<td>Supply pressure verification</td>
<td>n2</td>
<td>P2(n2) ≥ P1(n1)</td>
</tr>
<tr>
<td>−0.1 to 1000.0MPa</td>
<td>Leak test</td>
<td>n3</td>
<td>P2(n2) ≤ P1(n1)</td>
</tr>
</tbody>
</table>

Note 1) Window comparator mode
Note 2) The hysteresis is set to 3 digits. When setting the pressure, allow 7 digits or more.

Note 3) If the allowance is less than 7 digits, the controller will not operate.

If the allowance is less than 7 digits, the controller will not operate.
**Series PSE**

**Operation 2 : Pressure Setting**

### Auto preset

**Channel selection**

- **OUT1 auto preset preparation**
  - Prepare the equipment to be set in this mode.

- **OUT1 auto preset**
  - For adsorption verification: In this mode, repeat the adsorption and release of the workpiece for a few times. The optimum values will be set automatically.
  - For supply pressure verification: The optimum values will be set automatically.

- **OUT2 auto preset preparation (CH1 only)**
  - For adsorption verification: Change the conditions of the workpiece such as the suction nozzle with vacuum pad attachment and supply vacuum pressure.
  - For supply pressure verification: Prepare the equipment for the OUT2 setting in this mode.

- **OUT2 auto preset (CH1 only)**
  - For adsorption verification: In this mode, repeat the adsorption and release of the workpiece for a few times. The optimum values will be set automatically.
  - For supply pressure verification: The optimum values will be set automatically.

**Adsorption verification**

- **Max. A**: Maximum pressure value when workpiece is adsorbed.
- **Min. B**: Minimum pressure value when workpiece is not adsorbed.

**Operation**

- Pressure Setting
- Measuring mode
- Auto preset mode

**Set**

**Channel**

- CH1
- CH2
- CH3
- CH4

**Pressure**

- OUT1
- OUT2

**Symbol**

- +
- -
### Operation 3: Special Setting

#### 1 Precision indicator setting
Refer to A Display calibration function on page 14 for details.

After setting all 4 channels, press button. Proceed to the copy mode.

#### 2 Copy setting
Refer to B Copy setting function on page 14 for details.

Press and hold for 2 seconds or longer.

### Calibration mode
Displays the supply pressure value
- button increases the value.
- button decreases the value.

### Channel selection
Setting is complete (CH1).
Return to calibration mode. Repeat the setting procedure for CH2 to CH4.

### Copy mode
Displays alternately
- Displays the adjusted amount of pressure since the time of shipment (+5% R.D. or less).

### Selection of the channel to be copied
Setting is complete. Return to the copy mode.
Operation 3: Special Setting

3 Auto shift
Refer to Auto shift function on page 14 for details.

Auto shift mode

1. CH1
2. CH2
3. CH3
4. CH4

Displays alternately

Setting is complete.
Proceed to the auto identification mode.

4 Auto identification
Refer to Auto identification function on page 14 for details.

Auto identification mode

ON.

OFF.

Setting is complete.

To measuring mode
A Display calibration function
This function eliminates slight differences in the output values of all 4 channels and allows uniformity in the numbers displayed. Displayed values of the pressure sensors can be adjusted to within ±5%.

![Display calibration function diagram]

Note) When the display calibration function is used, the regulating pressure value may change ±1 digit.

B Auto shift function
If there is a fluctuation in the supply pressure, erroneous operation may occur (e.g., in the case of adsorption verification, the switch does not turn ON even though the work piece is being adsorbed, or does not turn OFF even though the work piece is no longer being adsorbed.) The auto shift function rectifies pressure changes to ensure proper ON/OFF switch response during such fluctuations.

<Principle>
At the point where the supply pressure fluctuates, the set pressure value is rectified by setting the auto shift input (external input) to Lo (no-voltage input), using the pressure measured at that point as a standard.

- This function is good only for those channels whose function selection is turned “on” during the auto shift mode setting.
- Maintain the constant pressure for 10ms or more after a drop in the auto shift input.
- When the auto shift is input, “ooo” will be displayed for approximately 1 second, and the pressure value at that point will be saved as a rectified value “C_5” (for CH1) or “C_3” (for CH2 and CH3). Based on the saved rectified values, the set value “P_1” to “P_4” or “n_1” to “n_4” will likewise be rectified.
- The time from the moment the auto shift is input, to the moment the switch output actually operates is 15ms or less.
- If the set value rectified by the auto shift input exceeds the regulating pressure range, it will be rectified once more to within the values of the regulating pressure range.
- When the auto shift function is turned “off”, the shift value will be zero.
- When all of the auto shift functions are turned “off”, “ooo” will not be displayed even if the auto shift input is set to Lo (no-voltage input).
- Values “C_5” and “C_3”, rectified after the auto shift is input, will be lost once the power is turned off.
- Values “C_5” and “C_3”, rectified after the auto shift function is used, will be reset to zero (initial value) when the power is turned back on again.

Note) rectified values are not saved in EEPROM.

C Auto identification function
This function automatically identifies the pressure range of the pressure sensor that is connected to the multi-channel pressure sensor controller, thus eliminating the need of having to reset the range again after replacing the sensor. This function will be activated either when “Aon” is set in the auto identification mode or when the power is turned back on in that condition. However, this function only works in conjunction with specific pressure sensors (SMC Series PSE53C). When other pressure sensors are used, this function will not work. When using other types of pressure sensors, first set the auto identification mode to “Aof”, and then proceed to setting the range. Turning the power back on while in the “Aon” setting can cause a malfunction.

D Copy function
Information that can be copied includes the following: ① Pressure set values Range settings ② Display units ③ Output modes ④ Response times.
- When CH1 is copied to CH2, CH3, and CH4, information of OUT1 in CH1 will be copied.
- When CH2, CH3, or CH4 is copied to CH1, information of OUT1 in CH2, CH3, or CH4 will be copied only to OUT1 in CH1.

Note) When the copy function is used, the regulating pressure value of the copied channel may change ±1 digit.

E Unit display switching function
Display units can be switched with this function. Units that can be displayed vary depending on the range of the pressure sensors connected to the controller.

Display units can be selected using either or .

<table>
<thead>
<tr>
<th>Applicable pressure sensor</th>
<th>PSE530</th>
<th>PSE531</th>
<th>PSE532</th>
<th>PSE533</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulating pressure range</td>
<td>0.1 to 1MPa</td>
<td>10 to -101kPa</td>
<td>-10 to 101kPa</td>
<td>-101 to 101kPa</td>
</tr>
<tr>
<td>PR</td>
<td>kPa</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>MPa</td>
<td>0.001</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>LF</td>
<td>kgf/cm²</td>
<td>0.01</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>BR</td>
<td>bar</td>
<td>0.01</td>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>PS</td>
<td>psi</td>
<td>0.1</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>mmHg</td>
<td>—</td>
<td>1</td>
</tr>
<tr>
<td>RH</td>
<td>inHg</td>
<td>—</td>
<td>0.1</td>
<td>—</td>
</tr>
</tbody>
</table>
Operation 4: Other Functions

**Reset**

Press and hold for 1 second or longer.

**Key Lock**

Lock/Unlock selection

- Press and hold for 4 seconds or longer.
- Lock
- Unlock
- To measuring mode

Note: Channel selection and channel scan operation will not be locked even if the key lock function is on.

**Peak/Bottom display**

Peak/Bottom selection

- Press and hold for 2 seconds or longer.
  - Peak/Bottom mode OFF
  - Peak mode
  - Bottom mode

- Peak value blinks
- Bottom value blinks

To return to the measuring mode, press any of these keys.

* If any buttons other than above are pressed during the peak/bottom mode, the peak/bottom mode will be deactivated.

**Channel Scan**

Press and hold for 2 seconds or longer.

Channel scan function deactivated. Return to the measuring mode.

* Pressure value for each channel are displayed at 2-second intervals.
These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by a label of "Caution", "Warning" or "Danger". To ensure safety, be sure to observe ISO 4414 Note 1), JIS B 8370 Note 2) and other safety practices.

⚠️ Caution : Operator error could result in injury or equipment damage.

⚠️ Warning : Operator error could result in serious injury or loss of life.

⚠️ Danger : In extreme conditions, there is a possible result of serious injury or loss of life.

Note 1) ISO 4414: Pneumatic fluid power – Recommendations for the application of equipment to transmission and control systems

Note 2) JIS B 8370: General Rules for Pneumatic Equipment

---

⚠️ Warning

1. **The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.**
   Since the products specified here are used in various operating conditions, their compatibility with the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements.

2. **Only trained personnel should operate pneumatically operated machinery and equipment.**
   Compressed air can be dangerous if handled incorrectly. Assembly, handling or maintenance of pneumatic systems should be performed by trained and experienced operators.

3. **Do not service machinery/equipment or attempt to remove components until safety is confirmed.**
   1. Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out control positions.
   2. When equipment is to be removed, confirm the safety process as mentioned above. Cut the supply pressure for this equipment and exhaust all residual compressed air in the system.
   3. Before machinery/equipment is restarted, take measures to prevent shooting-out of cylinder piston rod, etc. (Bleed air into the system gradually to create back pressure.)

4. **Contact SMC if the product is to be used in any of the following conditions:**
   1. Conditions and environments beyond the given specifications, or if product is used outdoors.
   2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, press applications, or safety equipment.
   3. An application which has the possibility of having negative effects on people, property, or animals, and therefore requires special safety analysis.
**Series PSE**

*Pressure Switch Precautions*

Be sure to read before handling. Refer to pages 17 through 19 for general safety instructions and common precautions, and to pages 20 through 22 for specific product precautions.

---

**Design & Selection**

**Warning**

1. Operate the switch only within the specified voltage.

   Use of the switch outside the range of the specified voltage can cause not only malfunction and damage of the switch but also electrocution and fire.

2. Do not exceed the maximum allowable load specification.

   A load exceeding the maximum load specification can cause damage to the switch or shorten its operating life span.

3. Do not use a load that generates surge voltage.

   Although surge protection is installed in the circuit at the output side of the switch, damage may still occur if a surge is applied repeatedly. When a surge generating a load such as a relay or solenoid is directly driven, use a type of switch with a built-in surge absorbing element.

4. Since the type of fluid varies depending on the product, be sure to verify the specifications.

   The switches do not have an explosion proof rating. To prevent a possible fire hazard, do not use with flammable gases or fluids.

5. Operate the switch within the regulating pressure range and maximum operating pressure.

   Malfunction can occur if the pressure sensor is used outside the specified pressure range, and the sensor may be permanently damaged if used at a pressure that is above the maximum operating pressure.

**Wiring**

**Warning**

1. Verify the colour and terminal number when wiring.

   Incorrect wiring can cause the switch to be damaged and malfunction. Verify the color and the terminal number in the instruction manual when wiring.

2. Avoid repeatedly bending or stretching the lead wire.

   Repeatedly applying bending stress or stretching force to the lead wire will cause it to break. If you believe the lead wire is damaged and likely to cause malfunctions, replace it.

3. Confirm proper insulation of wiring.

   Make sure that there is no faulty wiring insulation (contact with other circuits, ground fault, improper insulation between terminals, etc.). Damage may occur due to excess current flow into a switch.

**Operating Environment**

**Warning**

1. Never use in an atmosphere of explosive gases.

   The switches do not have an explosion proof rating. Never use in the pressure of an explosive gas as this may cause a serious explosion.

**Maintenance**

**Warning**

1. Perform a periodical inspections for proper operation of the switch.

   Unexpected malfunctions may cause possible danger.

2. Take precautions when using the switch for an interlock circuit.

   When a pressure switch is used for an interlock circuit, devise a multiple interlock system to avoid trouble. Verify the operation of the switch and interlock function on a regular basis.

---

**Mounting**

**Warning**

1. If the equipment is not operating properly, do not continue to use it.

   Connect air and power after installation, repairs, or modifications, and verify proper installation. The switch should be checked for proper operation and possible leaks.

2. Mount switches using the proper tightening torque.

   When a switch is tightened beyond the specified tightening torque, the mounting screws, mounting bracket, or switch may be damaged. On the other hand, tightening below the specified tightening torque may cause the installation screws to come loose during operation. Connection thread: M5

<table>
<thead>
<tr>
<th>Nominal thread size</th>
<th>Tightening torque (N·m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M5</td>
<td>1/6 rotation after tightening by hand</td>
</tr>
</tbody>
</table>

3. Apply wrench only to that is integrated with the piping when installing the pressure switch onto the system piping.

   Do not apply a wrench to the resin part as this may damage the switch.
**Series PSE**

Digital Pressure Switch Precautions

Be sure to read before handling. Refer to pages 17 through 19 for general safety instructions and common precautions, and to pages 20 through 22 for specific product precautions.

---

**Selection**

⚠️ **Warning**

1. Monitor the internal voltage drop of the switch.

When operating below a specified voltage, it is possible that the load may be ineffective even though the pressure switch function is normal. Therefore, the formula below should be satisfied after confirming the minimum operating voltage of the load.

\[
\text{Supply voltage} - \text{Internal voltage drop of switch} > \text{Minimum operating voltage of load}
\]

⚠️ **Caution**

1. Data of the multi-channel controller will be stored even after the power is turned off.

Input data (set pressure, etc.) will be stored in EEPROM so that the data will not be lost after the pressure switch is turned off. (Data will be stored for up to 100,000 hours after the power is turned off.)

---

**Mounting**

⚠️ **Warning**

1. Operation

Refer to the instruction manual for the operation of the digital pressure switch.

2. **Do not touch the LCD indicator.**

Do not touch the LCD indicator face of the pressure switch during operation. Static electricity can change the readout.

3. Pressure port

Do not introduce wire, needles, or similar objects to the pressure port as this may damage the pressure sensor and cause malfunctions.

---

**Wiring**

⚠️ **Warning**

1. Do not wire in conjunction with power lines or high voltage lines.

Wire separately from power lines and high voltage lines, avoiding wiring in the same conduit with these lines. Control circuits including switches may malfunction due to noise from these other lines.

2. **Do not allow loads to short circuit.**

(3-wire type)

Although digital pressure switches indicate excess current error if loads are short circuited, all incorrect wiring connections cannot be protected. Take precautions to avoid incorrect wiring.

As for other pressure switches, the switches will be instantly damaged if loads are short circuited. Take special care to avoid reverse wiring between the brown power supply line and the black output line on 3-wire type switches.

3. **Connect a DC(–) wire (blue) as close as possible to the DC power supply GND terminal.**

Connecting the power supply away from the GND terminal can cause malfunctions due to noise from devices that are connected to the GND terminal.

---

**Air supply**

⚠️ **Warning**

1. Use the switch within the specified fluid and ambient temperature range.

Ambient and fluid temperature operation is as follows:

- Digital pressure switches: 0°C to 50°C
- Other pressure switches: 0°C to 60°C

Take measures to prevent freezing moisture in circuits when below 5°C, since this may cause damage to the O-ring and lead to a malfunction. The installation of an air dryer is recommended for eliminating condensate and moisture. Never use the switch in an environment where there are drastic temperature changes even when these temperatures are within the specified temperature range.

2. **Vacuum switch**

An instant pressure pulse of up to 0.5MPa (at the time of vacuum release) will not affect the performance of the switch. However, a constant pressure of 0.2MPa or more should be avoided.

---

**Operating Environment**

⚠️ **Warning**

1. **Do not use in an area where surges are generated.**

When there are units that generate a large amount of surge in the area around pressure switches, (e.g., solenoid type lifters, high frequency induction furnaces, motors) this may cause deterioration or damage to the switch's internal circuitry. Avoid sources of surge generation and crossed lines.

2. **Operating environment**

In general, the digital pressure switches featured here are not dust or splash proof. Avoid using in an environment where the likelihood of splashing or spraying of liquids exists. If used in such an environment, use a dustproof and splash proof type switch.

---

**Maintenance**

⚠️ **Caution**

1. **Cleaning of the switch body**

Wipe off dirt with a soft cloth. If dirt does not come off easily, use a neutral detergent diluted with water to dampen a soft cloth. Wipe the switch only after squeezing the excess water out of the dampened cloth. Then finish off by wiping with a dry cloth afterwards.
### Pressure Sensor

<table>
<thead>
<tr>
<th>Handling</th>
</tr>
</thead>
</table>

**Danger**

1. **Warning**: Do not drop, bump, or apply excessive impacts (980m/s²) while handling. Although the body of the sensor may not be damaged, the inside of the sensor could be damaged and lead to a malfunction.

2. The tensile strength of the cord is 23N. Applying a greater pulling force on it can cause a malfunction. When handling, hold the body of the sensor – do not dangle it from the cord.

3. Do not exceed the screw-in torque of 3.5N⋅m when installing piping. Exceeding this value may cause malfunctioning of the sensor.

4. Do not use pressure sensors with corrosive and/or inflammable gases or liquids.

5. **Connecting the sensor cable (optional)**
   
   Hold the female connector of the sensor cable with your fingers and carefully insert it into the connector.

   ![Sensor Diagram](image)

   A connector cover is provided as part of the cable assembly (see the figure below). It is designed to keep the female connector from slipping out of the sensor. To lock the connector cover in place, first make sure it is facing in the right direction as you slip it over the female connector, then lock it to the sensor body by turning it clockwise. To remove the cover, first unlock it by turning it counterclockwise, then pull back on it. To remove the female connector, grab it with your fingers and pull back on it. Do not pull on the cable.

### Controller

<table>
<thead>
<tr>
<th>Handling</th>
</tr>
</thead>
</table>

**Danger**

1. **Warning**: Do not drop, bump, or apply excessive impacts (1000m/s²) while handling. Although the body of the controller case may not be damaged, the inside of the controller could be damaged and cause a malfunction.

2. The tensile strength of the power supply/output connection cable is 50N; that of the pressure sensor lead wire with connector is 25N. Applying a greater pulling force than the applicable specified tensile strength to either of these components can lead to a malfunction. When handling, hold the body of the controller – do not dangle it from the cord.

3. **Connecting the sensor cable (optional)**
   
   Hold the female connector of the sensor cable with your fingers and carefully insert it into the connector.

   ![Sensor Diagram](image)

   A connector cover is provided as part of the cable assembly (see the figure below). It is designed to keep the female connector from slipping out of the sensor. To lock the connector cover in place, first make sure it is facing in the right direction as you slip it over the female connector, then lock it to the sensor body by turning it clockwise. To remove the cover, first unlock it by turning it counterclockwise, then pull back on it. To remove the female connector, grab it with your fingers and pull back on it. Do not pull on the cable.

### Operating Environment

**Danger**

1. The pressure sensors are CE marked; however, they are not equipped with surge protection against lightning. Lightning surge countermeasures should be applied directly to system components as necessary.

2. Our multi-channel pressure sensor controllers do not have an explosion proof rating. Never use pressure sensors in the presence of inflammable or explosive gases.

3. Enclosure “IP65” applies only to the front face of the panel when mounting. Do not use in an environment where oil splashing or spraying are anticipated.
**Mounting**

⚠️ **Caution**

The front face of the panel mount conforms to IP65 (IP40 when using the 48 conversion adapter); however, there is a possibility of liquid filtration if the panel mount adapter is not installed securely and properly. Securely fix the adaptor with screws as shown below.

**Standard**

- Front protective cover (ZS-26-01)
- Panel mount (ZS-26-B)

Tighten screws 1/4 to 1/2 turn after the heads are flush with the panel.

**When using 48 conversion adapter**

- 48 conversion adapter (ZS-26-D)

Wiring

⚠️ **Caution**

1. Connecting sensor cable and connector (ZS-26-E)
   - Cut the sensor cable as shown below.
   - Insert each lead wire into the corresponding connector number by following the chart provided below.

<table>
<thead>
<tr>
<th>Connector no.</th>
<th>Core wire color of sensor cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown (DC+)</td>
</tr>
<tr>
<td>2</td>
<td>Black (analog output)</td>
</tr>
<tr>
<td>3</td>
<td>Blue (DC–)</td>
</tr>
<tr>
<td>4</td>
<td>N.C.</td>
</tr>
</tbody>
</table>

   - Make sure that the number of connector and the core wire colour match. After verifying that the wires are inserted all the way, temporarily hold the connector down manually.
   - Using pliers, snap A into B as shown below so that there is no gap between A and B, and secure the connector.
   - The A and B portion of the sensor connector are already tacked down temporarily at the time of shipment. Do not snap the A portion in place before inserting the cable. Note that the connector cannot be taken apart to be reused once it is crimped. Use a new sensor connector in case wiring or the snapping of A into B are done incorrectly.
   - To connect the connector to the multi-channel pressure sensor, push the connector with its A portion facing toward you into the socket until it clicks as shown below.
   - To remove the connector, pull it straight out while applying pressure to the fingers on both sides.

2. Connecting power supply/output connection cable
   - To connect the power supply/output connection cable to the controller, insert the cable connector with the C part facing down until it clicks.
Wiring

Caution

3. Connecting to other series

- Any pressure sensor (SW) can be connected as long as it generates analogue output (1 to 5V) signal. However, the pressure range must match.
- SMC pressure sensors, Series PSE510 & PSE520, are also connectable.
- When connecting to pressure sensors other than the series PSE530, connector types will vary depending on the wire core size of the cable and the outside diameter of the insulation cover. Refer to the table provided below.

<table>
<thead>
<tr>
<th>Connector part no.</th>
<th>Wire core size</th>
<th>Insulation cover O.D.</th>
<th>Sensor part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZS-26-E</td>
<td>AWG24-26 (0.14 to 0.2mm²)</td>
<td>ø1.0 to 1.4</td>
<td>PSE510, PSE530</td>
</tr>
<tr>
<td>ZS-26-E-1</td>
<td>AWG24-26 (0.14 to 0.2mm²)</td>
<td>ø1.4 to 2.0</td>
<td></td>
</tr>
<tr>
<td>ZS-26-E-2</td>
<td>AWG20-22 (0.3 to 0.5mm²)</td>
<td>ø1.0 to 1.4</td>
<td>PSE521</td>
</tr>
<tr>
<td>ZS-26-E-3</td>
<td>AWG20-22 (0.3 to 0.5mm²)</td>
<td>ø1.4 to 2.0</td>
<td>PSE520</td>
</tr>
</tbody>
</table>

- Refer to the following diagram for connecting Series PSE520 to the connector.

Connect the shielding wire to the frame ground (F.G.) or F.G. terminal.

Regulating Pressure Range & Rated Pressure Range

Caution

1. Regulating pressure range: refers to allowable pressure range in a pressure setting mode.
   - Setting range is between \( P_{n1} \) to \( P_{n4} \).
   - For series PSE200, the regulating pressure range and the setting pressure range that can be displayed are the same.

2. Rated pressure range: refers to the pressure range that satisfies the product specifications.
   - Pressure range that satisfies the product specifications (accuracy and linearity) for PSE530.
OTHER SUBSIDIARIES WORLDWIDE:
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