Pressure Sensor
Series PSE530

How to Order

PSE530 M5

Pressure sensing range

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Part no.</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>High pressure [0 to 1 MPa]</td>
<td>ZS-26-E</td>
<td>4 pcs. per set</td>
</tr>
<tr>
<td>1</td>
<td>Vacuum [0 to –101 kPa]</td>
<td>ZS-26-F</td>
<td>Cable length: 3 m</td>
</tr>
<tr>
<td>2</td>
<td>Low pressure [0 to 101 kPa]</td>
<td>ZS-26-G</td>
<td>Cable length: 3 m</td>
</tr>
<tr>
<td>3</td>
<td>Compound pressure [–101 to 101 kPa]</td>
<td>ZS-26-G</td>
<td>Cable length: 3 m</td>
</tr>
</tbody>
</table>

Port size

M5 x 0.8

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 1 MPa</td>
<td>0 to –101 kPa</td>
<td>0 to 101 kPa</td>
<td>–101 to 101 kPa</td>
</tr>
<tr>
<td>Proof pressure</td>
<td>1.5 MPa</td>
<td></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 24 VDC (Ripple ±10% or less)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current consumption</td>
<td>15 mA or less</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output specification</td>
<td>Analog output (1 to 5 V, Output impedance: Approx. 1 kΩ)</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° ±3°C)</td>
<td></td>
<td>±1% F.S. or less</td>
<td></td>
</tr>
<tr>
<td>Linearity</td>
<td>±2% F.S. or less based on the analog output at 18 V ranging from 12 to 24 VDC</td>
<td></td>
<td>±1% F.S. or less</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 18 V ranging from 12 to 24 VDC</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° to 50°C; Stored: –10° to 70°C (No freezing or condensation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Withstand voltage</td>
<td>1000 VAC, 50/60Hz for 1 minute between external terminals and case</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>5 MΩ between external terminals and case (at 50 VDC)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>10 to 500 Hz at whichever is smaller of 1.5 mm amplitude or 98 m/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>980 m/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° to 50°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Port size</td>
<td>M5 x 0.8</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, 0.15 mm², 3 cores, 3 m</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>DC (–) GND</th>
<th>Analog output (1 to 5 V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown</td>
<td>Brown</td>
<td>Blue</td>
<td>Black</td>
</tr>
</tbody>
</table>

Main circuit:
- Brown
- Black
- Blue
- Load
- 12 to 24 VDC

Dimensions

PSE530-M5

Pressure port: ø2.5, ø13, ø12, ø7.2, ø2.7, ø10.4

With sensor cable:
- M5 x 0.8
- Pressure port
- 29.4
- 27.2
- 5
- 5.5
- 5.4
- 3.4
- 0.5
- 12
- 4
- 3
- 2
- 1.3

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### Pressure Sensor

**Warning**

1. Do not drop, bump, or apply excessive impacts (980 m/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 23 N. 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 3.5 N⋅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 (Option)

   Hold the female connector of the sensor cable with your fingers and carefully insert it into the connector.

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

**Warning**

1. Do not drop, bump, or apply excessive impacts (1000 m/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 50 N; that of the pressure sensor lead wire with connector is 25 N. 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.

### Connection

**Warning**

1. Incorrect wiring can damage the switch and cause a malfunction or erroneous switch output. Connections should be done while the power is turned off.

2. Do not attempt to insert or pull the pressure sensor or its connector when the power is on. Switch output may malfunction.

3. Wire separately from power lines and high voltage lines, avoiding wiring in the same conduit with these lines. Malfunctions may occur due to noise from these other lines.

4. If a commercial switching regulator is used, make sure that the F.G. terminal is grounded.

### Operating Environment

**Warning**

1. Our multi-channel pressure sensor controllers 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 color 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.

- Cut the sensor cable as shown below.
- Insert each lead wire into the corresponding connector number by following the chart provided below.
**Wiring**

**Caution**

3. Connecting to other series
   - Any pressure sensor (SW) can be connected as long as it generates analog output (1 to 5 V) 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 Ø.D.</th>
<th>Sensor part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZS-26-E</td>
<td>AWG24-26 (0.14 to 0.2 mm²)</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 0.2 mm²)</td>
<td>ø1.4 to 2.0</td>
<td>PSE521</td>
</tr>
<tr>
<td>ZS-26-E-2</td>
<td>AWG20-22 (0.3 to 0.5 mm²)</td>
<td>ø1.0 to 1.4</td>
<td>PSE520</td>
</tr>
<tr>
<td>ZS-26-E-3</td>
<td>AWG20-22 (0.3 to 0.5 mm²)</td>
<td>ø1.4 to 2.0</td>
<td></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.
(There is no shielding wire for Series PSE510 & PSE530.)
```

**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_1(n_1) to P_4(n_4).
   - 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.
Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by labels 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--General rules relating to 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 for the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements. The expected performance and safety assurance will be the responsibility of the person who has determined the compatibility of the system. This person should continuously review the suitability of all items specified, referring to the latest catalog information with a view to giving due consideration to any possibility of equipment failure when configuring a system.

2. Only trained personnel should operate pneumatically operated machinery and equipment.
   Compressed air can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair 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 once measures to prevent falling or runaway of the driver objects have been confirmed.
   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.

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, clutch and brake circuits in press applications, or safety equipment.
   3. An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.
## Selection

### Warning

1. Confirm the specifications.
   Products represented in this catalog are designed for use in compressed air applications only (including vacuum), unless otherwise indicated. Do not use the product outside their design parameters. Please contact SMC when using the products in applications other than compressed air (including vacuum).

## Mounting

### Warning

1. Instruction manual
   Install the products and operate them only after reading the instruction manual carefully and understanding its contents. Also keep the manual where it can be referred to as necessary.

2. Securing the space for maintenance
   When installing the products, please allow access for maintenance.

3. Tightening torque
   When installing the products, please follow the listed torque specifications.

## Piping

### Caution

1. Before piping
   Make sure that all debris, cutting oil, dust, etc, are removed from the piping.

2. Wrapping of pipe tape
   When screwing piping or fittings into ports, ensure that chips from the pipe threads or sealing material do not get inside the piping. Also, when the pipe tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.

## Air Supply

### Warning

1. Operating fluid
   Please consult with SMC when using the product in applications other than compressed air (including vacuum). Regarding products for general fluid, please ask SMC about applicable fluids.

2. Install an air dryer, aftercooler, etc.
   Excessive condensate in a compressed air system may cause valves and other pneumatic equipment to malfunction. Installation of an air dryer, after cooler etc. is recommended.

3. Drain flushing
   If condensate in the drain bowl is not emptied on a regular basis, the bowl will over flow and allow the condensate to enter the compressed air lines. If the drain bowl is difficult to check and remove, it is recommended that a drain bowl with the auto-drain option be installed.
   For compressed air quality, refer to “Air Preparation Equipment” catalog.
Reliable quality of products in the global market

To enable our customers throughout the world to use our products with even greater confidence, SMC has obtained certification for international standards "ISO 9001" and "ISO 14001", and created a complete structure for quality assurance and environmental controls. SMC products pursue to meet its customers’ expectations while also considering company’s contribution in society.

Quality management system
ISO 9001

This is an international standard for quality control and quality assurance. SMC has obtained a large number of certifications in Japan and overseas, providing assurance to our customers throughout the world.

Environmental management system
ISO 14001

This is an international standard related to environmental management systems and environmental inspections. While promoting environmentally friendly automation technology, SMC is also making diligent efforts to preserve the environment.
SMC products complying with EN/ISO, CSA/UL standards are supporting.

The CE mark indicates that machines and components meet essential requirements of all the EC Directives applied. It has been obligatory to apply CE marks indicating conformity with EC Directives when machines and components are exported to the member Nations of the EU. Once “A manufacturer himself” declares a product to be safe by means of CE marking (declaration of conformity by manufacturer), free distribution inside the member Nations of the EU is permissible.

- **CE Mark**
SMC provides CE marking to products to which EMC and Low Voltage Directives have been applied, in accordance with CETOP (European hydraulics and pneumatics committee) guide lines.

- **As of February 1998, the following 18 countries will be obliged to conform to CE mark legislation**
Iceland, Ireland, United Kingdom, Italy, Austria, Netherlands, Greece, Liechtenstein, Sweden, Spain, Denmark, Germany, Norway, Finland, France, Belgium, Portugal, Luxembourg

- **EC Directives and Pneumatic Components**
  - **Machinery Directive**
  The Machinery Directive contains essential health and safety requirements for machinery, as applied to industrial machines e.g. machine tools, injection molding machines and automatic machines. Pneumatic equipment is not specified in Machinery Directive. However, the use of SMC products that are certified as conforming to EN Standards, allows customers to simplify preparation work of the Technical Construction File required for a Declaration of Conformity.

  - **Electromagnetic Compatibility (EMC) Directive**
  The EMC Directive specifies electromagnetic compatibility. Equipment which may generate electromagnetic interference or whose function may be compromised by electromagnetic interference is required to be immune to electromagnetic affects (EMS/immunity) without emitting excessive electromagnetic affects (EMI/emission).

  - **Low Voltage Directive**
  This directive is applied to products, which operate above 50 VAC to 1000 VAC and 75 VDC to 1500 VDC operating voltage, and require electrical safety measures to be introduced.

  - **Simple Pressure Vessels Directive**
  This directive is applied to welded vessels whose maximum operating pressure (PS) and volume of vessel (V) exceed 50 bar/L. Such vessels require EC type examination and then CE marking.
national Standards

you to comply with EC directives and CSA/UL standards.

UL and CSA standards have been applied in North America (U.S.A. and Canada) symbolizing safety of electric products, and are defined to mainly prevent danger from electric shock or fire, resulting from trouble with electric products. Both UL and CSA standards are acknowledged in North America as the first class certifying body. They have a long experience and ability for issuing product safety certificate. Products approved by CSA or UL standards are accepted in most states and governments beyond question.

Since CSA is a test certifying body as the National Recognized Testing Laboratory (NRTL) within the jurisdiction of Occupational Safety and Health Administration (OSHA), SMC was tested for compliance with CSA Standards and UL Standards at the same time and was approved for compliance with the two Standards. The above CSA NRTL/C logo is described on a product label in order to indicate that the product is approved by CSA and UL Standards.

TSSA (MCCR) Registration Products

TSSA is the regulation in Ontario State, Canada. The products that the operating pressure is more than 5 psi (0.03 MPa) and the piping size is bigger than 1 inch. fall into the scope of TSSA regulation.

Products conforming to CE Standard

With CE symbol for simple visual recognition

In this catalog each accredited product series is indicated with a CE mark symbol. However, in some cases, every available models may not meet CE compliance. Please visit our web site for the latest selection of available models with CE mark.

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