Compact Digital Pressure Switch

ZSE10(F)/ISE10 Series

Low profile 9.8 mm

Vertical mounting space reduced to approx. 1/2!

Reduced in depth!

Can copy to up to 10 switches simultaneously.

The settings of the master sensor (source of copy) can be copied to the slave sensors.

- Reducing setting labor
- Minimizing risk of mistakes in setting

3-step setting

1. Push
2. Adjust to the set-value by the [P+] or [P-] button.
3. Push

Completion of setting

RoHS
Improved visibility from multiple directions

The vacuum suction and burst pressure can be checked at a glance by indicator lights.

Multi-angle indicator

- Green light ON: OUT1 output
- Red light ON: OUT2 output

Pressure range of the positive pressure type expanded to vacuum area.

- Rated pressure range: -0.100 to 1.000 MPa
- Vacuum burst pressure
  - OUT2 threshold
  - OUT1 threshold
  - -100 kPa

- Min. unit setting
  - 1.5 MPa
  - 500 kPa
  - 0.1 kPa

- Power-saving function
  - The display can be turned off to save the power consumption.
  - The value disappears and decimal points start flashing.
  (Power consumption reduced by up to 20%)
Compact Digital Pressure Switch

**ZSE10(F)/ISE10 Series**

### How to Order

**Rated pressure range**
- **ISE10**: –0.100 to 1.000 MPa
- **ZSE10**: 0.0 to –101.0 kPa
- **ZSE10F**: –100.0 to 100 kPa

**Piping specifications**
- **M5**
  - M5 female thread/Side ported
  - Piping port
- **M5R**
  - M5 female thread/Rear ported
  - Piping port

**Output specifications**
- **A**: NPN open collector 2 outputs
- **B**: PNP open collector 2 outputs
- **C**: NPN open collector 1 output + Analog voltage
- **E**: PNP open collector 1 output + Analog voltage

**Unit specifications**
- **M**: Fixed SI unit (Note 4)
- **P**: With unit switching function (Note 3)

**Option 1**
- **Nill**: Without lead wire
- **G**: Lead wire with connector (Lead wire length: 2 m)
  - With connector cover

**Option 2**
- **Nill**: Panel mount adapter + Front protective cover
- **D**: DIN rail adapter (Note 5)
- **R**: DIN rail adapter (Note 5)

**Option 3**
- **Symbol Calibration certificate (Note)**
  - **Nil**: —
  - **K**: —

Note: All texts in both English and Japanese.

### Options/Part No.

When optional parts are required separately, use the following part numbers to place an order.

<table>
<thead>
<tr>
<th>Part no.</th>
<th>Option</th>
<th>Part no.</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZS-39-5G</td>
<td>Lead wire with connector (with connector cover) (5 cores, 2 m)</td>
<td>ZS-39-01</td>
<td>Front protective cover</td>
</tr>
<tr>
<td>ZS-39-D</td>
<td>Panel mount adapter + Front protective cover</td>
<td>ZS-39-N2*</td>
<td>NPT1/8 piping adapter</td>
</tr>
<tr>
<td>ZS-39-R</td>
<td>DIN rail adapter</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Made to Order

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Note 1) For piping specifications 01 and N01, the tight mounting or direct mounting cannot be made since the fitting interferes with the piping.

Note 2) When using the tight mounting or direct mounting, select an appropriate fitting while referring to the dimensions (pages 72 and 73).

Note 3) Under the New Measurement Law, sales of switches with the unit switching function are not allowed for use in Japan.

Note 4) Unit: kPa, MPa

Note 5) Not available for piping specifications of 01 and N01.

Note 6) Not available for piping specifications of M5R, 01 and N01.

Note 7) The DIN rail needs to be prepared by the customer.
Specifications

**Model**

<table>
<thead>
<tr>
<th>Model</th>
<th>ZSE10 (vacuum pressure)</th>
<th>ZSE10F (compound pressure)</th>
<th>ISE10 (positive pressure)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated pressure range</td>
<td>0.0 to –101.0 kPa</td>
<td>–100.0 to 100.0 kPa</td>
<td>–0.100 to 1000.0 kPa</td>
</tr>
<tr>
<td>Display/Set pressure range</td>
<td>10.0 to –105.0 kPa</td>
<td>–105.0 to 105.0 kPa</td>
<td>–0.105 to 1050.0 kPa</td>
</tr>
<tr>
<td>Withstand pressure</td>
<td>500 kPa</td>
<td>500 kPa</td>
<td>1.5 MPa</td>
</tr>
<tr>
<td>Display/Minimum unit setting</td>
<td>0.1 kPa</td>
<td>0.1 kPa</td>
<td>0.001 MPa</td>
</tr>
</tbody>
</table>

**Fluid**

Air, Non-corrosive gas, Non-flammable gas

**Power supply voltage**

12 to 24 VDC ±10%, Ripple (p-p) 10% or less (With power supply polarity protection)

**Current consumption**

40 mA or less

**Switch output**

Maximum load current: NPN or PNP open collector 2 outputs

**Maximum applied voltage**

80 mA

**Residual voltage**

2 V or less (With load current of 80 mA)

**Response time**

2.5 ms or less (Response time selections with anti-chattering function: 20, 100, 500, 1000, 2000 ms)

**Display accuracy**

±0.2% F.S. ±1 digit

**Indicator light**

Lights up when output is turned ON. OUT1: Green OUT2: Red

**Environment**

Operating temperature range: –5 to 50°C, Stored: –10 to 60°C (No freezing or condensation)

**Withstand voltage**

1000 VAC for 1 minute between terminals and housing

**Insulation resistance**

50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing

**Temperature characteristics**

±2% F.S. (at 25°C ±3°C ambient temperature)

**Lead wire with connector**

Oilproof heavy-duty vinyl cable

**Standard**

CE marking (EMC directive/RoHS directive), UL/CSA (E216656)

**Note**

If the applied pressure fluctuates around the set-value, the hysteresis must be set to a value more than the fluctuating width, otherwise chattering will occur.

Piping Specifications

**Model**

<table>
<thead>
<tr>
<th>Model</th>
<th>M5 x 0.8 (Side ported)</th>
<th>M5 x 0.8 (Rear ported)</th>
<th>R1/8 (Side ported)</th>
<th>NPT1/8 (Side ported)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetted part material</td>
<td>Sensor pressure receiving area</td>
<td>Sensor pressure receiving area: Silicon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piping port</td>
<td>C3604 (Electroless nickel plating) O-ring: NBR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>With lead wire with connector (5 cores, 2 m)</td>
<td>56 g</td>
<td>63 g</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Without lead wire with connector</td>
<td>15 g</td>
<td>23 g</td>
<td></td>
</tr>
</tbody>
</table>

Functions

Refer to pages 76 and 77 for details.

**Copy function**

The settings of the master pressure switch can be copied to the slave pressure switches.

**Auto-preset function**

This function is to calculate a rough set-value automatically based on the on-going operation.

**Display calibration function**

The scattering of the indicated value can be eliminated.

**Peak display function**

Can retain the maximum pressure value displayed during measurement.

**Bottom display function**

Can retain the minimum pressure value displayed during measurement.

**Keylock function (Selective secret code)**

Key operation can be locked to prevent any incorrect function of the operation switch.

**Zero-clear function**

The pressure display can be set at zero when the pressure is open to the atmosphere.

**Anti-chattering function**

Prevents possible malfunction due to sudden fluctuations in the primary pressure by adjusting the response time.

**Display unit switching function**

Can convert the display value.

**Power-saving mode**

Reduces power consumption.

**Display resolution conversion function**

Changes the display resolution from the default value 1000 to 100.

The flickering on the display can be eliminated.

**kPa MPa conversion function**

The unit can be changed between kPa and MPa.
Set Pressure Range and Rated Pressure Range

Set the pressure within the rated pressure range.
The set pressure range is the range of pressure that is possible in setting.
The rated pressure range is the range of pressure that satisfies the specifications (accuracy, linearity, etc.) on the switch.
Although it is possible to set a value outside the rated pressure range, the specifications will not be guaranteed even if the value stays within the set pressure range.

<table>
<thead>
<tr>
<th>Switch</th>
<th>Pressure range</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZSE10</td>
<td>–101 kPa</td>
</tr>
<tr>
<td></td>
<td>–105 kPa</td>
</tr>
<tr>
<td>ZSE10F</td>
<td>–100 kPa</td>
</tr>
<tr>
<td></td>
<td>–105 kPa</td>
</tr>
<tr>
<td>ISE10</td>
<td>–100 kPa</td>
</tr>
<tr>
<td></td>
<td>–105 kPa</td>
</tr>
</tbody>
</table>

Analog Output

Voltage output

Internal Circuits and Wiring Examples

-A NPN (2 outputs)

-B PNP (2 outputs)

-C NPN (1 output) + Analog voltage output

-E PNP (1 output) + Analog voltage output

* The FUNC terminal is connected when using the copy function. (Refer to “Copy function” on page 76.)
Dimensions (For details about lead wires, refer to the product specifications.)

ZSE10(F)/ISE10 – M5 –

ZSE10(F)/ISE10 – M5R –
Dimensions

ZSE10(F)/ISE10 – M5 – □ □ □ D □
Panel mount adapter + Front protective cover

ZSE10(F)/ISE10 – M5R – □ □ □ D □
Panel mount adapter + Front protective cover

Lead wire with connector ZS-39-5G
Compact Digital Pressure Switch **ZSE10(F)/ISE10 Series**

**Panel fitting dimensions**

For side ported models, dimensions differ depending on the fittings and tubing.

**ZSE10(F)/ISE10**

**M5 - □ - □ □ R □**

*With DIN rail*

The DIN rail needs to be prepared by the customer.
**Function Details**

**A Copy function (F97)**

The settings of the master sensor can be copied to the slave sensors, reducing setting labor and minimizing risk of mistakes in setting.

Can copy to up to 10 switches simultaneously.

(Maximum transmission distance 4 m)

1) Connect the power supply and copy line as shown in the left figure.
2) Select the slave switch which is to be the master, and change it into a master using the buttons. (In the default setting, all switches are set as slaves.)
3) Press the button of the master switch to start copying.

**B Auto-preset function (F5)**

Auto-preset function, when selected in the initial setting, calculates and stores the set-value from the measured pressure. The optimum set-value is determined automatically by repeating vacuum and break with the target workpiece several times.

**C Display calibration function (F6)**

Fine adjustment of the indicated value of the pressure sensor can be made within the range of ±5% of the read value.

(The scattering of the indicated value can be eliminated.)

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

**D Peak/Bottom value indication**

This function constantly detects and updates the maximum (minimum) value and allows to hold the maximum (minimum) pressure value.

When the buttons are simultaneously pressed for 1 second or longer, while "holding", the hold value will be reset.

**E Keylock function**

Prevents operation errors such as accidentally changing setting values.

**F Zero-clear function**

This function clears and resets the zero value on the display of measured pressure.

For the pressure switch with analog output, the analog output shifts according to the indication. The indicated value can be adjusted within ±3.5% F.S. of the pressure when ex-factory.

(ZSE10F (for compound pressure) ±3.5% F.S.)
Anti-chattering function (F3)

A large bore cylinder or ejector consumes a large volume of air in operation and may experience a temporary drop in the supply pressure. This function prevents detection of such temporary drops in the supply pressure as an error.

<Principle>
This function averages pressure values measured during the response time set by the user and then compares the average pressure value with the pressure set point value to output the result on the switch.

<table>
<thead>
<tr>
<th>Error name</th>
<th>Error code</th>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overcurrent error</td>
<td>E r 1, E r 2</td>
<td>Load current of 80 mA or more is applied to the switch output (OUT1).</td>
<td>Eliminate the cause of the over current by turning off the power supply, and then turn on it again.</td>
</tr>
<tr>
<td>Zero-clear error</td>
<td>E r 3</td>
<td>During zero-clear operation, pressure over ±7% F.S. is applied. (ZSE10F (compound) ±3.5% F.S.) After 1 s, the mode will reset to measurement mode. ±1% F.S. of the zero-clear range varies between individual products.</td>
<td>Perform zero-clear operation again after restoring the applied pressure to an atmospheric pressure condition.</td>
</tr>
<tr>
<td>Applied pressure error</td>
<td>HHH, LLL</td>
<td>Supply pressure exceeds the maximum set pressure.</td>
<td>Reset applied pressure to a level within the set pressure range.</td>
</tr>
<tr>
<td>System error</td>
<td>E r 4, E r 5, E r 6, E r 7, E r 8, E r 9</td>
<td>Internal data error</td>
<td>Turn off the power supply and then turn on it again. If the failure cannot be solved, please contact SMC for investigation.</td>
</tr>
</tbody>
</table>

If the failure cannot be solved after the above instructions are performed, please contact SMC for investigation.

Error indication function

Power-saving mode (F80)

Power-saving mode can be selected. It shifts to the power-saving mode without button operation for 30 seconds. It is set to the normal mode (Power-saving mode is OFF.) when ex-factory. (Decimal points and operation indicator light (only when the switch output is turned ON.) blink in the power-saving mode.)

Setting of secret code (F81)

Users can select whether a secret code must be entered to release key lock. At the time of shipment from the factory, it is set such that the secret code is not required.