Stainless diaphragm
Oil-free (Single-layer diaphragm structure)

Sensor parts: Stainless steel 630
Fitting parts: Stainless steel 304
The sensor and fitting parts can be made to order with stainless steel 316L.

2-colour display
Irregular value at a glance

3-step setting
Adjust to set-value with buttons.
Finish setting

Choice of 2 piping directions
Rear ported
Bottom ported

Rated pressure range
0.0 to –101.0 kPa and –0.100 to 2.00 MPa added to series
RoHS compliant

Series ZSE80/ISE80
Leakage

\[ 1 \times 10^{-10} \text{ Pa} \cdot \text{m}^3/\text{s} \]
<VCR®- and Swagelok®-fitting compliant>

\[ 1 \times 10^{-5} \text{ Pa} \cdot \text{m}^3/\text{s} \]
<Threaded type (R, Rc, NPT, G)>

Sensor and fitting parts are electron-beam welded.
Choice of VCR® or Swagelok® fitting is available.

Applicable Fluid Examples

- Water
- Hydraulic fluid (JIS-K2213)
- Silicon oil (JIS-K2213)
- Lubricant (JIS-K6301)
- Fluorocarbon
- Argon
- Ammonia
- Carbon dioxide
- Air-containing drainage
- Nitrogen

* VCR® and Swagelok® are registered trademarks of Swagelok Company.

Applications

- Confirmation of the adsorption of work pieces containing moisture
- Confirmation of the supply pressure of cleaning lines
- Confirmation of the working pressure of a hydraulic cylinder
- Confirmation of the pressure after a lubricator unit

Restrictor installed fitting type (-X510)
A pressure switch that has a restrictor installed in the fitting is available so that it prevents the sensor from being damaged by water collision with rush inertia. (Refer to page 12 for details.)

Variations

<table>
<thead>
<tr>
<th>Series</th>
<th>ZSE80</th>
<th>ZSE80F</th>
<th>ISE80</th>
<th>ISE80H</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 1.000 MPa</td>
<td>–0.100 to 2.000 MPa</td>
</tr>
<tr>
<td>Withstand pressure</td>
<td>500 kPa</td>
<td>2 MPa</td>
<td>4 MPa</td>
<td></td>
</tr>
<tr>
<td>Minimum unit setting</td>
<td>0.1 kPa</td>
<td>0.001 MPa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.2%F.S.</td>
<td>±1 digit</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Features 1
2-color display (LCD)
Can select from 4 indicator patterns of colour combinations.

<table>
<thead>
<tr>
<th>ON</th>
<th>OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Red</td>
</tr>
<tr>
<td>2</td>
<td>Green</td>
</tr>
<tr>
<td>3</td>
<td>Red</td>
</tr>
<tr>
<td>4</td>
<td>Green</td>
</tr>
</tbody>
</table>

Output display
It lights when OUT1 or OUT2 outputs.

Convex rubber button
Convex button is adopted and provides IP65 rating. Improved maneuverability and operability.

Lead wire length
- 2 m (Standard)
- 3 m (Made to Order)

Piping
Rc1/8 (female threaded) is now available.
- R1/4 (M5 female threaded)
- NPT1/4 (M5 female threaded)
- G1/4 (M5 female threaded)
- Rc1/8
- URF1/4 (VCR® fitting compliant)
- TSJ1/4 (Swagelok® fitting compliant)

Security code setting
This ensures that only authorised persons can operate the switch when the key is locked.

Resolution switching function
It prevents minor variation of the indicated value.

Power-saving mode
Turning off the display can save power consumption. (Power consumption: Max. 18% reduced)

Resolution switching function
The numerical value disappears and the decimal points blink.

MPa/kPa switching function
The indication unit for vacuum, compound pressure and positive pressure can be integrated into either MPa or kPa.

Features 2
2-Colour Display Digital Pressure Switch
For General Fluids
Series ZSE80/ISE80

How to Order

Rated pressure range

-0.1 to 1 MPa
-0.1 to 2 MPa

For positive pressure
For vacuum/compound pressure

Option 1
- With unit display Note 1
- Fixed SI unit Note 2
- Initial value PSI
- Operating manual
- Calibration certificate

Option 2
- With bracket
- Rear ported
- Bottom ported
- Panel mount
- Panel mount + Front protection cover

Option 3
- Symbol
- Operating manual
- Calibration certificate
- Symbol
- Operating manual
- Calibration certificate

NPN open collector 1 output
NPN open collector 2 outputs
PNP open collector 1 output
PNP open collector 2 outputs
PNP open collector 2 outputs + Analogue voltage output/Auto-shift switching
PNP open collector 2 outputs + Analogue current output/Auto-shift switching

Note 1) Under the New Measurement Law, sales of switches with the unit switching function have not been allowed for use in Japan.
Note 2) Fixed unit ISE80: MPa
Others : MPa, kPa

Piping

Bottom ported
Rear ported

Table 1
Made to Order

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>-X500</td>
<td>Wetted parts: Stainless steel 316L</td>
</tr>
<tr>
<td>-X501</td>
<td>Lead wire length 3 m</td>
</tr>
<tr>
<td>-X510</td>
<td>Restrictor installed fitting</td>
</tr>
</tbody>
</table>

Note) Not applicable to the rated pressure range 0 to 2 MPa specification. Refer to page 12 for details.

Option
Bracket
Panel mount
Panel mount + Front protection cover

Part no.
ZS-24-A
ZS-24-D
ZS-35-A
ZS-35-B
ZS-35-C
ZS-35-D
ZS-35-E
ZS-35-F

Note) Rear ported only
## Specifications

### Piping Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>02</th>
<th>N02</th>
<th>F02</th>
<th>C01</th>
<th>A2</th>
<th>B2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port size</td>
<td>R1/4</td>
<td>NPT1/4</td>
<td>G1/4</td>
<td>Rc1/8</td>
<td>URJ1/4</td>
<td>TSJ1/4</td>
</tr>
<tr>
<td>Weight (Bottom ported)</td>
<td>117 g</td>
<td>118 g</td>
<td>—</td>
<td>114 g</td>
<td>120 g</td>
<td>111 g</td>
</tr>
<tr>
<td>Weight (Rear ported)</td>
<td>89 g</td>
<td>90 g</td>
<td>86 g</td>
<td>86 g</td>
<td>92 g</td>
<td>83 g</td>
</tr>
<tr>
<td>Leakage</td>
<td>$1 \times 10^{-5}$ Pa·m³/s</td>
<td>$1 \times 10^{-10}$ Pa·m³/s</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* G1/4 is available for rear ported only.

### Model | ZSE80 (Vacuum pressure) | ZSE80F (Compound pressure) | ISE80 (Positive pressure) | ISE80H (Positive pressure) |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></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 1.000 MPa</td>
<td>−0.100 to 2.00 MPa</td>
</tr>
<tr>
<td>Set pressure range</td>
<td>10.0 to −111.0 kPa</td>
<td>−110.0 to 110.0 kPa</td>
<td>−0.105 to 1.100 MPa</td>
<td>−0.105 to 2.20 MPa</td>
</tr>
<tr>
<td>Withstand pressure</td>
<td>500 kPa</td>
<td>2 MPa</td>
<td>4 MPa</td>
<td></td>
</tr>
<tr>
<td>Wetted parts material</td>
<td>Pressure sensor: Stainless steel 630, Fitting: Stainless steel 304</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applicable fluid</td>
<td>Fluids do not corrode stainless steel 630 and 304</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Port size</td>
<td>R1/4, NPT1/4, G1/4,*, URJ1/4, TSJ1/4, Rc1/8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piping direction: Rear/Bottom</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>12 to 24 VDC ±10%, Ripple (p-p) 10% or less (with power supply polarity protection)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current consumption</td>
<td>45 mA or less</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switch output</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum load current</td>
<td>NPN 1 output, NPN 2 outputs, PNP 1 output, PNP 2 outputs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum load voltage</td>
<td>28 V (at NPN output)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual voltage</td>
<td>1 V or less (with load current of 80 mA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response time</td>
<td>2.5 ms (with anti-chattering function: 20, 100, 500, 1000, 2000 ms)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short circuit protection</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.2% F.S. ±1 digit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hysteresis</td>
<td>Hysteresis mode</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Window comparator mode</td>
<td>Variable (0 or above)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage output</td>
<td>Output voltage (Rated pressure range)</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>Load impedance</td>
<td>Maximum load impedance: 300Ω (Power supply voltage 12 V)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>600Ω (Power supply voltage 24 V)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minimum load impedance: 50Ω</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current output</td>
<td>Output current (Rated pressure range)</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>Auto-shift input</td>
<td>Non-voltage input (Reed or Solid state), Low level: 0.4 V or less, 5 ms or longer input</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Display</td>
<td>3 1/2-digit, 7-segment, 2-color LCD (Red/Green)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Display accuracy</td>
<td>±2% F.S. ±1 digit (Ambient temperature of 25 ±3°C)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indicator light</td>
<td>Lights up when output is turned ON. OUT1, OUT2: Orange</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>Anti-chattering, Zero-out, Key lock function, Auto-preset, Auto-shift, Unit display switching, Power-saving mode</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enclosure</td>
<td>IP65</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>Operating: 0 to 50°C, Stored: −10 to 60°C (No freezing or condensation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating humidity range</td>
<td>Operating/Stored: 35 to 85% RH (No condensation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Withstand voltage</td>
<td>250 VAC for 1 minute between live parts and case</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>2 MΩ or more between live parts and case (at 50 VDC Megohmmeter)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>Maximum load impedance: 300Ω (Power supply voltage 12 V)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>600Ω (Power supply voltage 24 V)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minimum load impedance: 50Ω</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact resistance</td>
<td>250 kPa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature characteristics</td>
<td>±3% F.S. (Based on 25°C, within operating temperature range)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lead wire</td>
<td>Oilproof heavy-duty vinyl cable, 3 cores (N.P)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 cores (A.B)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 cores (R.T.S.V)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulator O.D.: 0.95 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standards</td>
<td>CE marking, UL/CSA, RoHS compliance</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Series ZSE80/ISE80

For General Fluids
Series ZSE80/ISE80

Analogue Output

Voltage output

Current output

<table>
<thead>
<tr>
<th>Range</th>
<th>Rated pressure range</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>For vacuum pressure</td>
<td>0.0 to –101.0 kPa</td>
<td>10.1 kPa</td>
<td>0</td>
<td>–101.0 kPa</td>
</tr>
<tr>
<td>For compound pressure</td>
<td>–100.0 to 100.0 kPa</td>
<td>–100.0 kPa</td>
<td>100.0 kPa</td>
<td></td>
</tr>
<tr>
<td>For positive pressure</td>
<td>–0.100 to 1.000 MPa</td>
<td>0</td>
<td>1.000 MPa</td>
<td></td>
</tr>
<tr>
<td></td>
<td>–0.100 to 2.00 MPa</td>
<td>0</td>
<td>2.00 MPa</td>
<td></td>
</tr>
</tbody>
</table>

Note) Analogue output is 0.8 [V] or 3.2 [mA] at pressure A.

Outputs

Output (OUT1) display (Orange)
Lights up when OUT1 is turned ON.

Output (OUT2) display (Orange)
Lights up when OUT2 is turned ON.

button
Use this button to select the mode or increase the ON/OFF set-value. It is also used for switching to the peak display mode.

button
Use this button to select the mode or decrease the ON/OFF set-value. It is also used for switching to the bottom display mode.

LCD
Displays the current pressure, set mode, selected display unit, and error code. Always use red or green display; or switch between green and red according to the output. Four different display settings are available.

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

button
Use this button to select the mode or confirm the set-value.
Internal Circuits and Wiring Examples

-N  NPN (1 output)

- P  PNP (1 output)

- A  NPN (2 outputs)

-B  PNP (2 outputs)

-R  NPN (2 outputs) + Analogue voltage output

-T  PNP (2 outputs) + Analogue voltage output

-T/-V  PNP (2 outputs) + Auto-shift input

-S  NPN (2 outputs) + Analogue current output

-V  PNP (2 outputs) + Analogue current output

Max. 28V, 80 mA
Residual voltage 1 V or less

Max. 80 mA
Residual voltage 1 V or less
### Dimensions

**Series ZSE80/ISE80**

**ZSE/ISE80**:
- **2L**: NPT 1/4
- **C01L**: Rc 1/8
- **A2L**: URJ 1/4
- **B2L**: TSJ 1/4

**Piping Ports**:
- **02L**: R 1/4
- **N02L**: NPT 1/4

**Dimensions**:

<table>
<thead>
<tr>
<th>Length</th>
<th>Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>8.8</td>
<td>8.8</td>
</tr>
<tr>
<td>29.5</td>
<td>29.5</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>64.8</td>
<td>64.8</td>
</tr>
<tr>
<td>58.8</td>
<td>58.8</td>
</tr>
<tr>
<td>25.2</td>
<td>25.2</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

**Atmospheric Vent Port**: ø2.6

**M5 Thread Depth**: 5

**2 x M3 Thread Depth**: 4

**Width Across Flats**: 17

**2-Color Display Digital Pressure Switch**: For General Fluids
Series ZSE80/ISE80

Dimensions

With bracket (Rear ported)
• ZS-24-A

With bracket (Rear ported)
• ZS-24-D

With bracket (Bottom ported)
Dimensions

Panel mount (Rear ported)

Panel-cut dimensions
**Dimensions**

**Panel mount (Bottom ported)**

Panel-cut dimensions

- Dimensions
- Panel-cut dimensions
- Series ZSE80/ISE80
- 9
Function Details

A Auto-shift function (F4)
When there are large fluctuations in the supply pressure, the switch may fail to operate correctly. The auto-shift function compensates such supply pressure fluctuations. It measures the pressure at the time of auto-shift signal input and uses it as the reference pressure to correct the set-value on the switch.

Set-value correction by auto-shift function

* Rectified value
When the auto-shift is selected, “ooo” will be displayed for approximately 1 second, and the pressure value at that point will be saved as a rectified value “C_5”. Based on the saved rectified values, the set-value (Note) of “P_1”, “H_1”, “P_2”, and “H_2” will likewise be rectified.

Note) When an output is reversed, “n_1”, “H_1”, “n_2”, “H_2” will be rectified.

Possible Set Range for Auto-Shift Input

<table>
<thead>
<tr>
<th></th>
<th>Regulating pressure range</th>
<th>Possible set range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compound pressure</td>
<td>–110.0 to 110.0 kPa</td>
<td>–220 to 220 kPa</td>
</tr>
<tr>
<td>Vacuum pressure</td>
<td>10.0 to –111.0 kPa</td>
<td>121.0 to –121.0 kPa</td>
</tr>
<tr>
<td>Positive pressure</td>
<td>–0.105 to 1.100 MPa</td>
<td>–1.205 to 1.205 MPa</td>
</tr>
<tr>
<td></td>
<td>–0.105 to 2.20 MPa</td>
<td>–2.31 to 2.31 MPa</td>
</tr>
</tbody>
</table>

Auto-shift zero
The basic function of auto-shift zero is the same as the function for auto-shift. Also, it corrects values on the display, based on a pressure value of 0, when the auto-shift is selected.

B Auto-preset function (F8)
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.

Suction Verification

Formula for Obtaining the Set-Value

\[
\begin{align*}
P_{-1} (P_{-2}) &= A - (A-B)/4 \\
n_{-1} (n_{-2}) &= B + (A-B)/4 \\
H_{-1} (H_{-2}) &= (A-B)/2
\end{align*}
\]

Note) When the precision indicator setting function is used, the set pressure value may change ±1 digit.

C Precision indicator setting function (F7)
Fine adjustment of the indicated value can be made within the range of ±5% of the read value. The scattering of the indicated value can be eliminated.

D Peak and bottom display function
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 Key lock function
This function prevents incorrect operations such as accidentally changing the set-value.

F Zero-out function
This function clears and resets the zero value on the display of measured pressure.
For the pressure switch with analogue output, the analogue output shifts according to the indication. A displayed value can be adjusted within ±10% F.S. of the pressure when ex-factory.
**Function Details**

### G Error indication function

<table>
<thead>
<tr>
<th>Error name</th>
<th>Error code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overcurrent error</td>
<td>Er1</td>
<td>Load current of switch output (OUT1) exceeds 80 mA.</td>
</tr>
<tr>
<td></td>
<td>Er2</td>
<td>Load current of switch output (OUT2) exceeds 80 mA.</td>
</tr>
<tr>
<td>Residual pressure error</td>
<td>Er3</td>
<td>It is still applied with pressure that is ±10% over the atmospheric pressure and the upper limit of the rated pressure range when it is cleared to zero. * After displaying the error code for 1 second, the switch automatically returns to the measuring mode. Due to individual product differences, the setting range varies ±1 digits.</td>
</tr>
<tr>
<td>Applied pressure error</td>
<td>HH</td>
<td>Supply pressure exceeds the maximum set pressure.</td>
</tr>
<tr>
<td></td>
<td>LL</td>
<td>Supply pressure is below the minimum set pressure.</td>
</tr>
<tr>
<td>Auto-shift error</td>
<td>or</td>
<td>The value measured at the time of auto-shift input is outside the set pressure range. * After displaying the error code for one second, the switch returns to the measuring mode.</td>
</tr>
<tr>
<td>System error</td>
<td>Er0</td>
<td>Internal data error</td>
</tr>
<tr>
<td></td>
<td>Er4</td>
<td>Internal data error</td>
</tr>
<tr>
<td></td>
<td>Er7</td>
<td>Internal data error</td>
</tr>
</tbody>
</table>

### H 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.

  ![Pressure diagram](image)

- **Available response time settings**
  - 20 ms, 100 ms, 500 ms, 1000 ms, 2000 ms

### I Unit display switching function (F0)

Display units can be switched with this function.

<table>
<thead>
<tr>
<th>Pressure range</th>
<th>For compound pressure</th>
<th>For vacuum pressure</th>
<th>For positive pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable pressure sensor</td>
<td>ZSE80F</td>
<td>ZSE80</td>
<td>ISE80</td>
</tr>
<tr>
<td>Set pressure range</td>
<td>–110 to 110 kPa</td>
<td>10 to –111 kPa</td>
<td>–0.1 to 1.1 MPa</td>
</tr>
<tr>
<td>kPa</td>
<td>0.1</td>
<td>0.1</td>
<td>1</td>
</tr>
<tr>
<td>MPa</td>
<td>—</td>
<td>—</td>
<td>0.001</td>
</tr>
<tr>
<td>kgf/cm²</td>
<td>0.001</td>
<td>0.001</td>
<td>0.01</td>
</tr>
<tr>
<td>bar</td>
<td>0.001</td>
<td>0.001</td>
<td>0.01</td>
</tr>
<tr>
<td>psi</td>
<td>0.02</td>
<td>0.02</td>
<td>0.1</td>
</tr>
<tr>
<td>inHg</td>
<td>0.1</td>
<td>0.1</td>
<td>—</td>
</tr>
<tr>
<td>mmHg</td>
<td>1</td>
<td>1</td>
<td>—</td>
</tr>
</tbody>
</table>

* ISE80H: Does not indicate the last digit when the pressure is 2.000 MPa or higher.

### J Power-saving mode (F9)

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.)

- **The numerical value disappears and the decimal points blink.**

### K Security code setting (F10)

It can be set whether code number input is required or not when key is locked. It is set to input no code number when ex-factory.

- **The set-value can be confirmed when the key is locked.**
1 Wetted parts: Stainless steel 316L

This pressure switch has better corrosion resistance that uses stainless steel 316L for the wetted parts (pressure sensor and fitting).

**How to Order**

* Refer to How to Order on page 1 for standard specifications.

```
ZSE80(F)/ISE80————X500
```

Piping* Output* Option*

Note 1) Not applicable to the rated pressure –0.1 to 2 MPa specifications (ISE80H).
Note 2) A restrictor (equivalent to -X510) is installed inside the fitting. (Piping specifications A2(L) and B2(L) are excluded.)

### Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>ZSE80(F)</th>
<th>ISE80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Withstand pressure</td>
<td>500 kPa</td>
<td>1.5 MPa</td>
</tr>
<tr>
<td>Applicable fluid</td>
<td>Fluids do not corrode stainless steel 316L</td>
<td></td>
</tr>
</tbody>
</table>

Models other than above are the same specifications as standard.

2 Lead wire length 3 m

It has a lead wire extended to 3 meters.

**How to Order**

* Refer to How to Order on page 1 for standard specifications.

```
ZSE80(F)/ISE80(H)————X501
```

Piping* Output* Option*

3 Restrictor installed fitting

A restrictor is installed inside the fitting in order to improve endurance of water collision with rush inertia in the piping when adsorption is broken.

**How to Order**

```
ZSE80(F)/ISE80(H)————X510
```

Piping Output Option*

Note 1) Not applicable for piping specifications A2(L) and B2(L).
Note 2) Sometimes does not work for suppressing the water hammer effect even if this product is used. Take other measures in such a case.
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.

<table>
<thead>
<tr>
<th>Labels</th>
<th>Explanation of the labels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Danger</td>
<td>In extreme conditions, there is a possible result of serious injury or loss of life.</td>
</tr>
<tr>
<td>Warning</td>
<td>Operator error could result in serious injury or loss of life.</td>
</tr>
<tr>
<td>Caution</td>
<td>Operator error could result in injury Note 3 or equipment damage Note 4</td>
</tr>
</tbody>
</table>

Note 1) ISO 4414: Pneumatic fluid power – General rules relating to systems
Note 2) JIS B 8370: General Rules for Pneumatic Equipment
Note 3) Injury indicates light wounds, burns and electrical shocks that do not require hospitalization or hospital visits for long-term medical treatment.
Note 4) Equipment damage refers to extensive damage to the equipment and surrounding devices.

Selection/Handling/Applications

1. The compatibility of the 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 post analysis and/or tests to meet the specific requirements. The expected performance and safety assurance are 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 catalogue 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 handled incorrectly. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced operators. (Understanding JIS B 8370 General Rules for Pneumatic Equipment, and other safety rules are included.)

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 driven objects have been confirmed.
   2. When equipment is removed, confirm that safety process as mentioned above. Turn off the supply pressure for this equipment and exhaust all residual compressed air in the system, and release all the energy (liquid pressure, spring, condenser, gravity).
   3. Before machinery/equipment is restarted, take measures to prevent quick extension of a cylinder piston rod, etc.

4. If the equipment will be used in the following conditions or environment, please contact SMC first and be sure to take all necessary safety precautions.
   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 and/or property, requiring special safety analysis.
   4. If the products are used in an interlock circuit, prepare a double interlock style circuit with a mechanical protection function for the prevention of a breakdown. And, examine the devices periodically if they function normally or not.

Exemption from Liability

1. SMC, its officers and employees shall be exempted from liability for any loss or damage arising out of earthquakes or fire, action by a third person, accidents, customer error with or without intention, product misuse, and any other damages caused by abnormal operating conditions.

2. SMC, its officers and employees shall be exempted from liability for any direct or indirect loss or damage, including consequential loss or damage, loss of profits, or loss of chance, claims, demands, proceedings, costs, expenses, awards, judgments and any other liability whatsoever including legal costs and expenses, which may be suffered or incurred, whether in tort (including negligence), contract, breach of statutory duty, equity or otherwise.

3. SMC is exempted from liability for any damages caused by operations not contained in the catalogues and/or instruction manuals, and operations outside of the specification range.

4. SMC is exempted from liability for any loss or damage whatsoever caused by malfunctions of its products when combined with other devices or software.
Series ZSE80/ISE80
Specific Product Precautions 1

Be sure to read this before handling.
Refer to back page 1 for Safety Instructions and “Precautions for Handling Pneumatic Devices” (M-03-E3A) for Pressure Switches Precautions.

Warning
Handling

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 internal parts of the sensor could be damaged and lead to malfunction.
2. The tensile strength of the cord is 49 N. Applying a greater pulling force on it can cause 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 13.6 N·m when connecting the pipe to the switch. Exceeding these values may cause the switch to malfunction.
4. Do not use pressure sensors with corrosive and/or flammable gases or liquids.

Warning
Connection

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

Warning
Operating Environment

1. This pressure switch is CE marked; however, it is not equipped with surge protection against lightning. Lightning surge countermeasures should be applied directly to system components as necessary.
2. This pressure switch does not have an explosion proof rating. Never use in the presence of an explosive gas as this may cause a serious explosion.

Caution

1. Do not use this product in an environment that gives oil or solvent splash over it.
2. When this pressure switch is used in a place where water and dust splash on, water and dust may enter inside the switch through the atmospheric vent port. Insert a ø4 tube (I.D. ø2.5) into the atmospheric vent port, and bring piping of the opposite side up to the safe position to keep it from water and dust. Do not bend the tubing or close the hole of it. It causes malfunction with the measurement of positive pressure.

Caution
Pressure Source

1. Use of poisonous and deleterious substance, corrosive or flammable gas.
The materials used for the pressure sensor and the fitting of this switch are stainless steel 630, stainless steel 304 and stainless steel 316L (made to order). Do not use fluids such as poisonous, deleterious substances and corrosive gases.
The switch is not protected against explosion. Do not use it with flammable gases, either.
2. Fluid compatibility
The fluid contact areas are stainless steel 630 (pressure sensor), stainless steel 304 (fitting), stainless steel 316L (pressure sensor, fittings, made to order). Use fluids that will not corrode materials.
(For the corrosiveness of a fluid, consult with the manufacturer of the fluid.)
3. Intrusion of water and drain
A pressure sensor of stainless steel diaphragm is used for this switch. The pressure sensor of this switch can be damaged by the rush inertia of water when the drain contained in the water and the air collide with the pressure sensor when vacuum is broken after vacuum adsorption is confirmed, and it may cause malfunction of the pressure indication. If there is a possibility of water or drainage getting in, narrow the diameter of the piping to the pressure switch, or make an orifice in the middle of the piping. Extra attention is needed when the rear surface piping type model is used.
4. Withstand pressure
When liquid fluids are used, rapid pressure change can be generated such as water hammer and surge pressure when a valve is turned ON/OFF. Install a dumper or an absorber or an accumulator as a countermeasure according to the necessity.

Helium leakage test

Helium leakage test is conducted on the welding parts. Use a ferrule by Swagelok (Swagelok® fittings) as the TSU fittings and packing, ground, etc. by Swagelok (VCR® fittings) as the URJ fittings. If a ferrule, packing or ground by other manufacturers is to be used, conduct a helium leakage test before using those products.

* Swagelok® and VCR® are registered trademarks of Swagelok Company.

* Make sure that the tubing is inserted to the end of the atmospheric vent port.
* Use SMC tubing, TU0425 (Material: Polyurethane, Tubing O.D. ø4, I.D. ø2.5).
## Mounting

### Caution

1. Mounting with panel mount adapter

   ![Diagram of panel mount adapter](image1)

   - Front protection cover (Option)
   - Panel mount adapter A
   - Panel mount adapter B

2. Mounting with brackets

   Mount a bracket using two M3 x 5L mounting screws and install on piping. The switch can be installed horizontally depending on the installation location.

   ![Diagram of bracket mounting](image2)

   - Mounting screw M3 x 5L
   - Bracket A
   - Bracket B

   The tightening torque for the bracket mounting screw should be 0.98 N·m or less.

## Set Pressure Range and Rated Pressure Range

### Caution

**Set the pressure within the rated pressure range.**

The set pressure range is the range of pressure that is possible to set within.

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></td>
<td>−100 kPa</td>
</tr>
<tr>
<td>For vacuum pressure</td>
<td>ZSE80</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>For compound pressure</td>
<td>ZSE80F</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>For positive pressure</td>
<td>ISE80</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Rated pressure range of switch
- Set pressure range of switch

Be sure to read this before handling.
Refer to back page 1 for Safety Instructions and “Precautions for Handling Pneumatic Devices” (M-03-E3A) for Pressure Switches Precautions.