2-Colour Display
Digital Pressure Switch

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**
  - 1: Push
  - 2: Adjust to set-value with buttons.
  - 3: Push

- **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

CAT.EUS100-71A-UK
Leakage

$1 \times 10^{-10}$ Pa·m$^3$/s
<VCR®- and Swagelok®-fitting compliant>

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

Applicable Fluid Examples

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

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 atmospheric pressure of a load lock chamber

Variations

Series | ZSE80 | ZSE80F | ISE80 | ISE80H
---|---|---|---|---
Rated pressure range | 0.0 to $-101.0$ kPa | $-100.0$ to $100.0$ kPa | $-0.100$ to $1.000$ MPa | $-0.100$ to $2.000$ MPa
Withstand pressure | 500 kPa | 2 MPa | 4 MPa | 2 MPa
Minimum unit setting | 0.1 kPa | 0.001 MPa | | 0.001 MPa
Repeatability | ±0.2% F.S. ±1 digit | | | |
**Security code setting**
This ensures that only authorised persons can operate the switch when the key is locked.

- **Input an arbitrary three-digit value.**
- *The set-value can be confirmed even when the key is locked.*

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

- The numerical value disappears and the decimal points blink.

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

- **1/1000**
- **1/100**
- *Only the indicated value changes without changing precision.*

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

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**Panel mount**
Suitable for side-by-side mounting
- Requires less installation space and panel cutting.

**Bracket mount**

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**Features 2**
2-Colour Display Digital Pressure Switch
For General Fluids

Series ZSE80/ISE80

How to Order

- Rated pressure range
  - 80H: –0.1 to 2 MPa
  - 80: –0.1 to 1 MPa

Made to Order

Refer to Table 1 below.

Table 1

<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

- Option 1
  - With unit display: 4 to 20 mA, 1 to 5 V

- Option 2
  - With bracket

- Option 3
  - Fixed SI unit: PSI
  - Initial value:

Nil          | None
A            | With bracket
B            | With bracket (Note)
C            | Panel mount
D            | Panel mount + Front protection cover

Note) Rear ported only
## Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>ZSE80 (Vacuum pressure)</th>
<th>ZSE80F (Compound pressure)</th>
<th>ISE80 (Positive pressure)</th>
<th>ISE80H (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 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>Piping direction: Rear/Bottom</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>
</tbody>
</table>

### Switch output

- **Maximum load current**: NPN 1 output, NPN 2 outputs, PNP 1 output, PNP 2 outputs
- **Maximum load voltage**: 28 V (at NPN output)
- **Residual voltage**: 1 V or less (with load current of 80 mA)
- **Response time**: 2.5 ms (with anti-chattering function: 20, 100, 500, 2000 ms)
- **Short circuit protection**: Yes
- **Repeatability**: ±0.2% F.S. ±1 digit
- **Hysteresis Hysteresis mode**: Variable (0 or above)
- **Window comparator mode**: |

### Analogue output

- **Voltage output**
  - Output voltage (Rated pressure range): 1 to 5 V ±2.5% F.S.
  - Linearity: ±1% F.S. or less
  - Output impedance: Approx. 1 kΩ
- **Current output**
  - Output current (Rated pressure range): 4 to 20 mA ±2.5% F.S.
  - Linearity: ±1% F.S. or less
  - Load impedance: Maximum load impedance: 300 Ω (Power supply voltage 12 V) 600 Ω (Power supply voltage 24 V)
  - Minimum load impedance: 50 Ω

### Auto-shift input

- Non-voltage input (Reed or Solid state), Low level: 0.4 V or less, 5 ms or longer input

### Display

- 3 1/2-digit, 7-segment, 2-color LCD (Red/Green)
- ±2% F.S. ±1 digit (Ambient temperature of 25 ±3°C)
- Lights up when output is turned ON. OUT1, OUT2: Orange

### Indicator light

- Anti-chattering, Zero-out, Key lock function, Auto-preset, Auto-shift, Unit display switching, Power-saving mode

### Enclosure

- IP65

### Operating temperature range

- Operating: 0 to 50°C, Stored: –10 to 60°C (No freezing or condensation)

### Operating humidity range

- Operating/Stored: 35 to 85% RH (No condensation)

### Withstand voltage

- 250 VAC for 1 minute between live parts and case

### Insulation resistance

- 2 MΩ or more between live parts and case (at 50 VDC Mega)

### Vibration resistance

- 10 to 150 Hz if amplitude smaller than 15 mm or acceleration lower than 20 m/s², in X, Y, Z directions, for 2 hours each (De-energised)
- 100 m/s² in X, Y, Z directions, 3 times each (De-energised)

### Impact resistance

- ±3% F.S. (Based on 25°C, within operating temperature range)

### Lead wire

- Oilproof heavy-duty vinyl cable, 3 cores (N-P) ø3.5, 2 m
- 4 cores (A-B) Conductor area: 0.15 mm² (AWG26)
- 5 cores (R.T.S.V) Insulator O.D.: 0.95 mm

### Standards

- CE marking, UL/CSA, RoHS compliance

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* G1/4 is available for rear ported only.

## 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 x 10⁻⁸ Pa·m³/s</td>
<td>1 x 10⁻¹⁰ Pa·m³/s</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Analogue Output

#### Voltage output

<table>
<thead>
<tr>
<th>Analogue output [V]</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>0.6</td>
</tr>
<tr>
<td>C</td>
<td>5</td>
</tr>
</tbody>
</table>

#### Current output

<table>
<thead>
<tr>
<th>Analogue output [mA]</th>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>2.4</td>
</tr>
<tr>
<td>C</td>
<td>20</td>
</tr>
</tbody>
</table>

**Range**

<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</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>—</td>
<td>–100.0 kPa</td>
<td>100.0 kPa</td>
</tr>
<tr>
<td>For positive pressure</td>
<td>–0.100 to 1.000 MPa</td>
<td>–0.100</td>
<td>0</td>
<td>1.000 MPa</td>
</tr>
<tr>
<td></td>
<td>–0.100 to 2.00 MPa</td>
<td>–0.100</td>
<td>0</td>
<td>2.00 MPa</td>
</tr>
</tbody>
</table>

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

### Descriptions

- **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.

- **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 decrease the ON/OFF set-value. It is also used for switching to the bottom display mode.
2-Colour Display Digital Pressure Switch
For General Fluids  
**Series ZSE80/ISE80**

### Internal Circuits and Wiring Examples

#### -N
**NPN (1 output)**

- **Main circuit**
  - Brown DC (+)
  - Black OUT
  - Blue DC (–)

- **Load**
  - 12 to 24 VDC

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

#### -P
**PNP (1 output)**

- **Main circuit**
  - Brown DC (+)
  - Black OUT
  - Blue DC (–)

- **Load**
  - 12 to 24 VDC

Max. 80 mA
Residual voltage 1 V or less

#### -A
**NPN (2 outputs)**

- **Main circuit**
  - Brown DC (+)
  - Black OUT1
  - Blue DC (–)
  - White OUT2

- **Load**
  - 12 to 24 VDC

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

#### -B
**PNP (2 outputs)**

- **Main circuit**
  - Brown DC (+)
  - Black OUT1
  - Blue DC (–)
  - White OUT2

- **Load**
  - 12 to 24 VDC

Max. 80 mA
Residual voltage 1 V or less

#### -S
**NPN (2 outputs) + Analogue current output**

- **Main circuit**
  - Brown DC (+)
  - Grey Analogue output
  - Black OUT1
  - White OUT2

- **Load**
  - 12 to 24 VDC

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

#### -T
**PNP (2 outputs) + Analogue voltage output**

- **Main circuit**
  - Brown DC (+)
  - Grey Analogue output
  - Black OUT1
  - White OUT2

- **Load**
  - 12 to 24 VDC

Max. 80 mA
Residual voltage 1 V or less

#### -R/S
**NPN (2 outputs) + Auto-shift input**

- **Main circuit**
  - Grey Auto-shift input

Max. 80 mA
Residual voltage 1 V or less

#### -V
**PNP (2 outputs) + Analogue current output**

- **Main circuit**
  - Brown DC (+)
  - Grey Analogue output
  - Black OUT1
  - White OUT2

- **Load**
  - 12 to 24 VDC

Max. 80 mA
Residual voltage 1 V or less
**Series ZSE80/ISE80**

**Dimensions**

**ZSE/ISE8□□-□□□-□□□-□□□**

- **Atmospheric vent port**: ø2.6
- **Piping port**: 02: R1/4, N02: NPT1/4, G1/4, TSJ1/4
- **Piping port**: 02L: R1/4, N02L: NPT1/4
- **Thread depth**: M5 (5mm), M3 (3mm)
- **Width across flats**: 17mm

- **-C01**: Rc1/8
- **-F02**: G1/4
- **-A2**: URJ1/4
- **-B2**: TSJ1/4

**Diagram:**

1. **ZSE/ISE8□□-□□□-□□□-□□□**
2. **Atmospheric vent port**: ø2.6
3. **Piping port**: 02: R1/4, N02: NPT1/4
4. **Piping port**: 02L: R1/4, N02L: NPT1/4
5. **Thread depth**: M5 (5mm), M3 (3mm)
6. **Width across flats**: 17mm
7. **-C01**: Rc1/8
8. **-F02**: G1/4
9. **-A2**: URJ1/4
10. **-B2**: TSJ1/4
2-Color Display Digital Pressure Switch  
For General Fluids  
Series ZSE80/ISE80

Dimensions

ZSE/ISE80□□-□□-□□-□□-□□

Atmospheric vent port ø2.6

M5 thread depth 5

ø3.5

Piping port 02L: R1/4
N02L: NPT1/4

Piping port
02L: R1/4
N02L: NPT1/4

Piping port
-CO1L: Rc1/8
-A2L: URJ1/4
-B2L: TSJ1/4

2 x M3 thread depth 4

Width across flats 17

-(N02L: 61.5)

ø2.6

M5 thread depth 5

ø3.5

49.5

64.8

58.8
**Series ZSE80/ISE80**

**Dimensions**

With bracket (Rear ported)
- **ZS-24-A**

With bracket (Rear ported)
- **ZS-24-D**

With bracket (Bottom ported)
2-Colour Display Digital Pressure Switch
For General Fluids  
**Series ZSE80/ISE80**

**Dimensions**

Panel mount (Rear ported)

Panel-cut dimensions
Series ZSE80/ISE80

Dimensions
Panel mount (Bottom ported)

Panel-cut dimensions

Function Details

- A Auto-shift function (F4)
- C Precision indicator setting function (F7)
- D Peak and bottom display function
- E Key lock function
- F Zero-out function
- B Auto-preset function (F8)

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

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.

Differential Pressure
Rectified value

Formula for Obtaining the Set-Value

\[
P_1 = A - \frac{A-B}{4}\\n_1 = B + \frac{A-B}{4}\\P_1 or P_2 H_1 or H_2\\H_1 = \frac{A-B}{2}\\P_1 (P_2) = A - \frac{A-B}{4}\\n_1 (n_2) = B + \frac{A-B}{4}\\\]

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.

Switch output response time when auto-shift is input.

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.

∗ 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.

Supply pressure 

Vacuum pressure

–110.0 to 110.0 kPa
10.0 to –111.0 kPa
–0.105 to 1.100 MPa
–0.105 to 2.20 MPa

Positive pressure

Possible set range

Possible Set Range for Auto-Shift Input

–220 to 220 kPa
121.0 to –121.0 kPa
–1.205 to 1.205 MPa
–2.31 to 2.31 MPa

(Differential)
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

![Diagram showing 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

\[ \begin{align*}
P_1 \ (P_2) &= A - \frac{A-B}{4} \\
n_1 \ (n_2) &= B + \frac{A-B}{4} \\
H_1 \ (H_2) &= (A-B)/2
\end{align*} \]

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

![Diagram showing precision indicator setting function]

Note) When the precision indicator setting function is used, the set-pressure value may change \( \pm 1 \) digit.

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 \( \textcircled{A} \textcircled{B} \) buttons are simultaneously pressed for 1 second or longer, while "holding", the hold value will be reset.

E  Lock key 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 \( \pm 10\% \) 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>( E_r )</td>
<td>Load current of switch output (OUT1) exceeds 80 mA.</td>
</tr>
<tr>
<td>Overcurrent error</td>
<td>( E_r )</td>
<td>Load current of switch output (OUT2) exceeds 80 mA.</td>
</tr>
<tr>
<td>Residual pressure error</td>
<td>( E_r )</td>
<td>It is still applied with pressure that is ±10% over 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>Supply pressure exceeds the maximum set pressure.</td>
<td>( HH )</td>
<td>Supply pressure exceeds the maximum set pressure.</td>
</tr>
<tr>
<td>Supply pressure is below the minimum set pressure.</td>
<td>( LL )</td>
<td>Supply pressure is below the minimum set pressure.</td>
</tr>
<tr>
<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>
<td>( or )</td>
<td>Internal data error</td>
</tr>
<tr>
<td>Internal data error</td>
<td>( E_r )</td>
<td>Internal data error</td>
</tr>
<tr>
<td>Internal data error</td>
<td>( E_r )</td>
<td>Internal data error</td>
</tr>
<tr>
<td>Internal data error</td>
<td>( E_r )</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.

Available response time settings

| t (ms) | 20 ms, 100 ms, 500 ms, 1000 ms, 2000 ms |

<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 range

Momentary change

Pressure range \( P \)

Switch output operation in normal conditions

Switch output operation when anti-chattering function is on.

I Unit display switching function (F0)

Display units can be switched with this function.

<table>
<thead>
<tr>
<th>Pressure range for compound pressure</th>
<th>For vacuum pressure</th>
<th>For positive pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZSE80F</td>
<td>ZSE80</td>
<td>ISE80</td>
</tr>
<tr>
<td>( P ) kPa</td>
<td>0.1</td>
<td>1</td>
</tr>
<tr>
<td>( P ) MPa</td>
<td>—</td>
<td>0.001</td>
</tr>
<tr>
<td>( bF ) kgf/cm(^2)</td>
<td>0.001</td>
<td>0.01</td>
</tr>
<tr>
<td>( bR ) bar</td>
<td>0.001</td>
<td>0.01</td>
</tr>
<tr>
<td>( P ) psi</td>
<td>0.02</td>
<td>0.1</td>
</tr>
<tr>
<td>( inH ) inHg</td>
<td>0.1</td>
<td>—</td>
</tr>
<tr>
<td>( inH ) mmHg</td>
<td>1</td>
<td>1</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.)

K Security code setting (F10)

Input an arbitrary three-digit value.

* The set-value can be confirmed when the key is locked.

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.
Series ZSE80/ISE80
Made to Order
Please contact SMC for detailed dimensions, specifications, and lead times.

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

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

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.

### Explanation of the Labels

<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 runway 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.

---

**Handling**

**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 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.

---

**Operating Environment**

**Caution**

3. Some fluids may generate static electricity when resin piping is used for piping. Take measures against static electricity with equipment when this switch is used in connection with resin piping. Also, the ground should be separate from that of the units that generate strong electromagnetic noise or high frequency, otherwise, the switch can be damaged by static electricity.

---

**Connection**

**Warning**

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.

---

**Operating Environment**

**Caution**

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.

---

**Piping specifications A2(L), B2(L)**

**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.

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* 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).
### Caution

1. **Mounting with panel mount adapter**

   ![Diagram of panel mount adapter](image)

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](image)

   - 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>ZSE80</td>
<td>–101 kPa</td>
</tr>
<tr>
<td></td>
<td>–111 kPa</td>
</tr>
<tr>
<td>ZSE80F</td>
<td>–100 kPa</td>
</tr>
<tr>
<td></td>
<td>–110 kPa</td>
</tr>
<tr>
<td>ISE80</td>
<td>–0.1 MPa</td>
</tr>
<tr>
<td></td>
<td>–0.105 MPa</td>
</tr>
<tr>
<td>ISE80H</td>
<td>–0.1 MPa</td>
</tr>
<tr>
<td></td>
<td>–0.105 MPa</td>
</tr>
</tbody>
</table>

- **Rated pressure range of switch**
- **Set pressure range of switch**
Caution

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 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.

Switch

<table>
<thead>
<tr>
<th>Pressure range for compound pressure</th>
<th>Pressure range for positive pressure</th>
<th>Pressure range for vacuum pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>–100 kPa</td>
<td>–0.1 MPa</td>
<td>–101 kPa</td>
</tr>
<tr>
<td>0</td>
<td>10 kPa</td>
<td>0</td>
</tr>
<tr>
<td>100 kPa</td>
<td>110 kPa</td>
<td>1 MPa</td>
</tr>
<tr>
<td>1 MPa</td>
<td>1.1 MPa</td>
<td>2 MPa</td>
</tr>
<tr>
<td>2 MPa</td>
<td>–0.105 MPa</td>
<td>–0.105 MPa</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Mounting with panel mount adapter
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.

Caution

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

Panel

Front protection cover (Option)

Panel mount adapter

Panel mount adapter A

Panel mount adapter B

Mounting screw M3 x 5L

Bracket A

Bracket B

Series ZSE80/ISE80

Specific Product Precautions

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.
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