2-Colour Display High Precision Digital Pressure Switch

New
M8 connector type

Air, Non-corrosive gas, Non-flammable gas

Can copy to up to 10 switches simultaneously.

The settings of the master pressure switch (source of copy) can be copied to the slave pressure switches.

- Reduction in setting work
- Prevention of mistakes in setting

Easy handling!

Raised rubber switch buttons for easy and comfortable operation

3-step setting

1. Push
2. Push
3. Push

Adjust to the set-value by the or button.

Completion of setting

2-colour display

See abnormal values at a glance.

Series ZSE40A(F)/ISE40A

Applicable fluid

Can copy to up to 10 switches simultaneously.

3-switch setting

1 switch
2 switches
10 switches

New
RoHS
IP65

SME

CAT.EUS100-79Aa-UK
**Features 1**

### Piping Variations

- R1/8, NPT1/8 (M5 x 0.8)
- Rc1/8, G1/8
- ø4, ø6 one-touch fitting

### Space-saving

Interchangeable with the ZSE40/ISE40 series for mounting

### Mounting Variations

- Bracket A
- Bracket B
- Bracket D
- Direct mounting (Wall mounting)
- Panel mounting

### Series

#### ZSE40A (vacuum pressure)
- Rated pressure range: 0.0 to –101.3 kPa
- Set pressure range: 10.0 to –105.0 kPa
- Withstand pressure: 500 kPa
- Min. unit setting: 0.1 kPa

#### ZSE40AF (compound pressure)
- Rated pressure range: –100.0 to 100.0 kPa
- Set pressure range: –105.0 to 105.0 kPa
- Withstand pressure: 500 kPa
- Min. unit setting: 0.1 kPa

#### ISE40A (positive pressure)
- Rated pressure range: –0.100 to 1.000 MPa
- Set pressure range: –0.105 to 1.050 MPa
- Withstand pressure: 1.5 MPa
- Min. unit setting: 0.1 kPa

### Outputs

- NPN or PNP open collector 2 outputs
- Analogue output (voltage or current)
- Auto-shift input

### Secret code setting function

A function to prevent operation by anyone other than the designated operator while the keys are locked.

*The set-value can be checked while the keys are locked.*

### Power-saving function

The display can be turned off to save the power consumption. (Power consumption reduced by max. 20%)

### Resolution conversion function

The flickering on the display can be eliminated.

### MPa/kPa switching function

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

---

An optional 3-digit value is entered.

The value disappears and decimal points start flashing.

1/1000 (Only the displayed value is changed, and there is no effect on the accuracy.)

Stick the label (enclosed with the product) of a desired unit seal.
2-Colour Display High Precision
Digital Pressure Switch
Series ZSE40A(F)/ISE40A

How to Order

Rated pressure range
ISE40A: –0.1 to 1.000 MPa
ZSE40A: 0.0 to –101.3 kPa
–100.0 to 100 kPa

For positive pressure
ISE40A

For vacuum/compound pressure
ZSE40A

Output specifications
PNP open collector 2 outputs + Analogue voltage/Auto-shift switching
PNP open collector 2 outputs + Copy function
NPN open collector 2 outputs + Analogue voltage/Auto-shift switching
NPN open collector 2 outputs + Copy function
NPN open collector 2 outputs + Analogue current/Auto-shift switching
NPN open collector 2 outputs + Analogue current/Auto-shift switching
NPN open collector 2 outputs + Copy function
NPN open collector 2 outputs + Copy function

Option 1

Bracket A
Bracket B
Bracket D
Panel mount adapter
Panel mount adapter + Front protective cover

Option 2
Symbo|Calibration certificate
X501|Lead wire length 3 m
X531|M12 4-pin pre-wired connector (Lead wire length 100 mm)

For vacuum/compound pressure
ZSE40A

Piping specifications
R1/8 (With M5 female thread)
NPT1/8 (With M5 female thread)
Rc1/8
Rc1/8, G1/8
M5 x 0.8 (Female thread)
ø4 one-touch fitting
ø6 one-touch fitting

Rated pressure range
ZSE40A: 0.0 to –101.3 kPa
–100.0 to 100 kPa
ZSE40AF: –100.0 to 100 kPa

Note) Made to Order
Combination of piping specifications with option 1 and part numbers of options

Unit specifications
With unit switching function
Fixed SI unit

Options/Part No.
Part no. | Option
--- | ---
ZS-24-A | Bracket A, With 2 mounting screws each of M3 x 5L and M4 x 5L
ZS-24-B | Bracket B, With 2 mounting screws M4 x 5L
ZS-24-D | Bracket D, With 2 mounting screws each of M3 x 5L and M4 x 5L
ZS-35-C | Panel mount adapter (Piping: For 01/N01)
ZS-35-D | Panel mount adapter + Front protective cover (Piping: For W1/WF1/M5/C4/C6)
ZS-35-F | Panel mount adapter (Piping: For W1/WF1/M5/C4/C6)
ZS-35-G | Panel mount adapter + Front protective cover (Piping: For 01/N01)

Note) Some options are unavailable depending on the piping specifications. Refer to “Combination of piping specifications with option 1 and part numbers of options”.

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

Refer to page 20 for details.
How to Order [For M8 (3 pins) connector]

**Rated pressure range**

**ISE40A** −0.1 to 1.000 MPa

**For vacuum**

**ZSE40A** −0.1 to −101.3 kPa

**Piping specifications**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>R1/8 (M5 female threaded)</td>
</tr>
<tr>
<td>N01</td>
<td>NPT 1/8 (M5 female threaded)</td>
</tr>
</tbody>
</table>

**Output specifications**

- **N**: NPN open collector 1 output
- **P**: PNP open collector 1 output

**Unit specifications**

- **A**: With unit display switching function
- **B**: Fixed SI unit Note 1)
- **M**: With unit switching function (Initial value psi)

**Note 1)** Unit kPa, MPa

**Options 1/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>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZS-24-A</td>
<td>Bracket A</td>
<td>Mounting screw M3 x 5L, M4 x 5L (2 pcs. for each)</td>
</tr>
<tr>
<td>ZS-24-D</td>
<td>Bracket D</td>
<td>Mounting screw M3 x 5L, M4 x 5L (2 pcs. for each)</td>
</tr>
</tbody>
</table>

**M8 connector type**

* No lead wires are connected.
Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>ZSE40A (vacuum pressure)</th>
<th>ZSE40AF (compound pressure)</th>
<th>ISE40A (positive pressure)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated pressure range</td>
<td>0.0 to –101.3 kPa</td>
<td>–100.0 to 100.0 kPa</td>
<td>–0.100 to 1.000 MPa</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 1.050 MPa</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>
<tr>
<td>Applicable fluid</td>
<td>Air, Non-corrosive gas, Non-flammable gas</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>
</tr>
<tr>
<td>Current consumption</td>
<td>45 mA or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switch output</td>
<td>NPN or PNP open collector 1 output or 2 outputs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum load current</td>
<td>80 mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum applied voltage</td>
<td>28 V (at NPN output)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual voltage</td>
<td>1 V or less</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>
</tr>
<tr>
<td>Short circuit protection</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeat accuracy</td>
<td>±0.2% F.S. ±1 digit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hysteresis</td>
<td>Variable (0 or above) Note 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hysteresis mode</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Window comparator mode</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog output</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage output</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output voltage (Rated pressure range)</td>
<td>1 to 5 V ±2.5% F.S.</td>
<td>0.6 to 5 V ±2.5% F.S.</td>
<td></td>
</tr>
<tr>
<td>Linearity</td>
<td>±1% F.S.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output impedance</td>
<td>Approx. 1 kΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current output</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output current (Rated pressure range)</td>
<td>4 to 20 mA ±2.5% F.S.</td>
<td>2.4 to 20 mA ±2.5% F.S.</td>
<td></td>
</tr>
<tr>
<td>Linearity</td>
<td>±1% F.S.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load impedance</td>
<td>Maximum load impedance: 300 Ω (Power supply voltage 12 V)</td>
<td>600 Ω (Power supply voltage 24 V)</td>
<td></td>
</tr>
<tr>
<td>Minimum load impedance: 50 Ω</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 less input</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>
</tr>
<tr>
<td>Display accuracy</td>
<td>±2% F.S. ±1 digit (Ambient temperature of 25 ±3°C)</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>
</tr>
<tr>
<td>Environment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enclosure</td>
<td>IP65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating temperature range Note 4)</td>
<td>Operating: –5 to 50°C, Stored: –10 to 60°C (No freezing or condensation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating humidity range</td>
<td>Operating/Store: 35 to 85% RH (No condensation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Withstand voltage</td>
<td>1000 VAC for 1 minute between terminals and housing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature characteristics</td>
<td>±2% F.S. (25°C reference)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lead wire Note 5)</td>
<td>Oilproof heavy-duty vinyl cable 5 cores</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Φ3.5, 2 m</td>
<td>Conductor area: 0.15 mm² (AWG26)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulator O.D.: 0.95 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standards</td>
<td>CE, UL, CSA, RoHS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note 1) 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.
Note 2) When the analog voltage output is selected, the analog current output cannot be selected.
Note 3) When the analog current output is selected, the analog voltage output cannot be selected.
Note 4) UL temperature rating: The maximum ambient temperature is 50°C.
Note 5) For details about wiring and thread type, refer to the Operation Manual that can be downloaded from SMC website (http://www.smcworld.com).

Piping Specifications

<table>
<thead>
<tr>
<th>Part no.</th>
<th>01</th>
<th>N01</th>
<th>W1</th>
<th>WF1</th>
<th>M5</th>
<th>C4</th>
<th>C6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port size</td>
<td>R1/8 (With M5 female thread)</td>
<td>NPT1/8 (With M5 female thread)</td>
<td>Rc1/8</td>
<td>G1/8 Note 5)</td>
<td>M5 × 0.8 female thread</td>
<td>ø4 One-touch fitting</td>
<td>ø6 One-touch fitting</td>
</tr>
<tr>
<td>Material of parts in contact with fluid</td>
<td>Sensor pressure receiving area</td>
<td>Silicon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piping port</td>
<td>C3602 (Electroless nickel plating) O-ring: HNBR</td>
<td>ZDC2 O-ring: HNBR</td>
<td>ZDC2, POM, Stainless steel 304, C3604 (Electroless nickel plating) O-ring: HNBR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>78 g</td>
<td>79 g</td>
<td>97 g</td>
<td>104 g</td>
<td>101 g</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M8 connector</td>
<td>46 g</td>
<td>46 g</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Analogue Output

### Voltage output

<table>
<thead>
<tr>
<th><img src="image1.png" alt="Analogue output graph" /></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
</tr>
<tr>
<td>0.6</td>
</tr>
</tbody>
</table>

### Current output

<table>
<thead>
<tr>
<th><img src="image2.png" alt="Analogue output graph" /></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
</tr>
<tr>
<td>2.4</td>
</tr>
</tbody>
</table>

### 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.

### 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 −101.3 kPa</td>
<td>10.1 kPa</td>
<td>0</td>
<td>−101.3 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>100.0 kPa</td>
</tr>
<tr>
<td>For positive pressure</td>
<td>−0.100 to 1.000 MPa</td>
<td>−0.100 MPa</td>
<td>0</td>
<td>1.000 MPa</td>
</tr>
</tbody>
</table>
2-Colour Display High Precision
Digital Pressure Switch  Series ZSE40A(F)/ISE40A

Internal Circuits and Wiring Examples

- **R**
  NPN (2 outputs) +
  Analogue voltage output

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

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

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

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

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

- **X**
  NPN (2 outputs) +
  Copy function

- **Y**
  PNP (2 outputs) +
  Copy function

- **N**
  NPN (1 output)

- **P**
  PNP (1 output)

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

The lead wire with connector is not included with the product.
Please order separately.
**Dimensions**

**ZSE40A(F)/ISE40A-01 -N01**

- Atmospheric vent port ø2.6
- M5 x 0.8 thread depth 5
- 2 x M3 x 0.5 thread depth 4
- Piping port 01: R1/8
- Width across flats 12
- Thread depth 4
- 2 x M4 x 0.7 thread depth 4
- W1: Rc1/8
- WF1: G1/8

**ZSE40A(F)/ISE40A-W1 -WF1**

- Atmospheric vent port ø2.6
- 2 x M3 x 0.5 thread depth 4
- Piping port 01: R1/8
- N01: NPT1/8
- Thread depth 5
- 20
- Width across flats 12
- Thread depth 4
- 2 x M4 x 0.7 thread depth 4
- W1: Rc1/8
- WF1: G1/8

**Series ZSE40A(F)/ISE40A**

ZSE40A(F)/ISE40A-01
ZSE40A(F)/ISE40A-N01
ZSE40A(F)/ISE40A-W1
ZSE40A(F)/ISE40A-WF1
Dimensions/For M8 (3-pin) connector

ZSE40A/ISE40A-01-□-□L
-N01-□-□L

M8 (3-pin) cable with connector
V100-49-1-□

PCA-1557772
Series ZSE40A(F)/ISE40A

Dimensions

ZSE40A(F)/ISE40A-C4

-C6

One-touch fitting ø4, ø6

-M5-

M5 x 0.8 thread depth 5
## Dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>With bracket A</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZSE40A(F)/ISE40A-01-□-□A□</td>
<td></td>
</tr>
<tr>
<td>ZSE40A(F)/ISE40A-N01-□-□A□</td>
<td></td>
</tr>
<tr>
<td>For M8 (3-pin) connector</td>
<td></td>
</tr>
<tr>
<td>ZSE40A/ISE40A-01-□-□LA</td>
<td></td>
</tr>
<tr>
<td>ZSE40A/ISE40A-N01-□-□LA</td>
<td></td>
</tr>
</tbody>
</table>

*Note: Dimensions are in millimeters.*

---

2-Colour Display High Precision Digital Pressure Switch *Series ZSE40A(F)/ISE40A*
Series ZSE40A(F)/ISE40A

Dimensions

ZSE40A(F)/ISE40A-01-□-□D□
-N01-□-□D□
With bracket D

For M8 (3-pin) connector
ZSE40A/ISE40A-01-□-□LD
-N01-□-□LD
With bracket D
2-COLOUR DISPLAY HIGH PRECISION
DIGITAL PRESSURE SWITCH Series ZSE40A(F)/ISE40A

Dimensions

ZSE40A(F)/ISE40A-W1-□-□A□
-WF1-□-□B□

With bracket A

ZSE40A(F)/ISE40A-W1-□-□B□
-WF1-□-□B□

With bracket B
Series ZSE40A(F)/ISE40A

Dimensions

ZSE40A(F)/ISE40A-W1-□-□D□ -WF1-□-□D□

With bracket D
2-Colour Display High Precision Digital Pressure Switch Series ZSE40A(F)/ISE40A

Dimensions

**ZSE40A(F)/ISE40A-01-□-□E□**
- **-N01-□-□E□**

Panel mounting

**ZSE40A(F)/ISE40A-01-□-□F□**
- **-N01-□-□F□**

Panel mounting + Front protective cover

Panel thickness 1 to 5
Series **ZSE40A(F)/ISE40A**

**Dimensions**

ZSE40A(F)/ISE40A-W1-□-□E□  
-WF1-□-□E□

Panel mounting

ZSE40A(F)/ISE40A-W1-□-□F□  
-WF1-□-□F□

Panel mounting + Front protective cover
2-Colour Display High Precision Digital Pressure Switch *Series ZSE40A(F)/ISE40A*

**Dimensions**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZSE40A(F)/ISE40A-C4-□E□</td>
<td>Panel mounting</td>
</tr>
<tr>
<td>ZSE40A(F)/ISE40A-C6-□E□</td>
<td>Panel mounting + Front protective cover</td>
</tr>
</tbody>
</table>

![Diagram of ZSE40A(F)/ISE40A-C4-□E□](image1)

![Diagram of ZSE40A(F)/ISE40A-C6-□E□](image2)

*Panel thickness 1 to 5*

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZSE40A(F)/ISE40A-C4-□E□</td>
<td>41.2</td>
</tr>
<tr>
<td>ZSE40A(F)/ISE40A-C6-□E□</td>
<td>43.6</td>
</tr>
</tbody>
</table>

**Note:**

- □E□ represents the color code.
- □F□ represents the front protective cover option.
- Dimensions are provided for reference and may vary depending on specific model and manufacturer guidelines.
Series ZSE40A(F)/ISE40A

**Dimensions**

**Panel fitting dimensions**

- Panel thickness 1 to 5 mm
- 36 ±0.3
- 4 x R3 or less
- 67 or more
- 36 x n pcs. + 4 x (n pcs. – 1)

Note) This is the minimum value for the piping method 01 or N01.
Take the piping material and tubing into account for design. When the corner is to have radius, it must be R3 or less.
Function Details

A Copy function (F97)

The settings of the master pressure switch can be copied to several slave pressure switches. This can reduce the labour for setting and prevent the entry of incorrect set-values.

The set-value can be copied to up to 10 switches simultaneously.
(Maximum communication distance 4 m)

1) Wire 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 (F 4)

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 work piece several times.

C Display calibration function (F 6)

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 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-clear 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. The indicated value can be adjusted within ±7% F.S. of the pressure when ex-factory. (ZSE40AF (for compound pressure) ±3.5% F.S.)
G Error indication function

<table>
<thead>
<tr>
<th>Error name</th>
<th>Error code</th>
<th>Description</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overcurrent error</td>
<td>Er 1</td>
<td>Load current of switch output (OUT1) exceeds 80 mA.</td>
<td>Turn the power off and remove the output factor for the overcurrent. Then turn the power on.</td>
</tr>
<tr>
<td></td>
<td>Er 2</td>
<td>Load current of switch output (OUT2) exceeds 80 mA.</td>
<td></td>
</tr>
<tr>
<td>Residual pressure error</td>
<td>Er 3</td>
<td>During zero-clear operation, pressure over ±7% F.S. is applied. (ZSE40AF (compound) ±3.5% F.S.)</td>
<td>Perform zero-clear operation again after restoring the applied pressure to an atmospheric pressure condition.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>After 1 second, the mode will reset to measurement mode. ±1% F.S. of the zero-clear range varies between individual products.</td>
<td></td>
</tr>
<tr>
<td>Applied pressure error</td>
<td>HHH</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></td>
<td>LLL</td>
<td>Supply pressure is below the minimum set pressure.</td>
<td></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.</td>
<td>The controller does not respond to the auto-shift signal. Check the equipment and machinery for this point.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+ After displaying the error code for about 1 second, the switch returns to the measuring mode.</td>
<td></td>
</tr>
<tr>
<td>System error</td>
<td>Er 0</td>
<td>Internal data error</td>
<td>Turn the power off and turn it on again. If the failure cannot be solved, ask SMC for repair.</td>
</tr>
<tr>
<td></td>
<td>Er 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Er 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Er 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Er 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Er 9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If the above remedy cannot recover the operation, ask SMC for repair.

H Anti-chattering function (F 3)

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.

![Image of anti-chattering function](chart.png)

I Display unit switching function (F 0)

Display units can be switched with this function.

<table>
<thead>
<tr>
<th>Display unit</th>
<th>kPa</th>
<th>MPa (Note)</th>
<th>kgf/cm²</th>
<th>bar</th>
<th>psi</th>
<th>inHg</th>
<th>mmHg</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZSE40A (vacuum pressure)</td>
<td>0.1</td>
<td>0.001</td>
<td>0.001</td>
<td>0.01</td>
<td>0.1</td>
<td>0.1</td>
<td>1</td>
</tr>
<tr>
<td>ZSE40AF (compound pressure)</td>
<td>0.1</td>
<td>0.001</td>
<td>0.001</td>
<td>0.01</td>
<td>0.1</td>
<td>0.1</td>
<td>1</td>
</tr>
<tr>
<td>ISE40A (positive pressure)</td>
<td>1</td>
<td>0.001</td>
<td>0.01</td>
<td>0.01</td>
<td>0.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note) The ZSE40A (vacuum pressure) and ZSE40AF (compound pressure) will have different setting and display resolution when the unit is set to MPa.
**J 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.)

**K Secret code setting (F81)**

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

**L Auto-shift function (F 5)**

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**

<table>
<thead>
<tr>
<th>Pressure (Differential)</th>
<th>Rectified value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply pressure normal</td>
<td></td>
</tr>
<tr>
<td>Supply pressure drop</td>
<td>Rectified value</td>
</tr>
<tr>
<td>Supply pressure increase</td>
<td></td>
</tr>
</tbody>
</table>

- **Rectified value**

  When the auto-shift is selected, “000°” will be displayed for about 1 second, and the pressure value at that point will be saved as a rectified value “$.5“”. Based on the saved rectified values, the set-values $P_1$, $P_2$, and $H_1$, $H_2$ will likewise be rectified.

  **Note** When an output is reversed, “$n_1“”, “$n_2“, “$n_2", “$H_2"” will be rectified.

**Possible Set Range for Auto-Shift Input**

<table>
<thead>
<tr>
<th>Pressure Type</th>
<th>Regulating pressure range</th>
<th>Possible set range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compound pressure</td>
<td>–105.0 to 105.0 kPa</td>
<td>–210 to 210 kPa</td>
</tr>
<tr>
<td>Vacuum pressure</td>
<td>10.0 to –105.0 kPa</td>
<td>115.0 to –115.0 kPa</td>
</tr>
<tr>
<td>Positive pressure</td>
<td>–0.105 to 1.050 MPa</td>
<td>–1.155 to 1.155 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.
**Series ZSE40A(F)/ISE40A**

**Made to Order**

Please contact SMC for detailed dimensions, specifications, and lead times.

1. **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.

   

   **ZSE40A(F)/ISE40A**

   **-X501**

   

   **Piping specifications**

   **Output specifications**

   **Option**

2. **M12 4-pin pre-wired connector (Lead wire length 100 mm)**

   **How to Order**

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

   

   **ZSE40A(F)/ISE40A**

   **-X531**

   

   **Output specifications**

   X: NPN open collector 2 outputs

   Y: PNP open collector 2 outputs

   

   **Unit specifications/option**

   

   **Piping specifications**

   

   **Pin arrangement**

   2 OUT1
   3 DC (–)
   4 OUT1
   1 DC (+)
### Handling

**Caution**

1. Do not drop, bump, or apply excessive impacts (100 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 a malfunction.
2. The tensile strength of the cord is 49 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 7 to 9 N·m when connecting the pipe to the switch. Exceeding this torque may cause the switch to malfunction.
4. Do not use pressure sensors with corrosive and/or flammable gases or liquids.

### Connection

**Caution**

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

### Operating Environment

**Warning**

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.

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**Connection Diagram:**

- 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 tube or close the hole of it. It causes malfunction with the measurement of positive pres-

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

3. 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.
**Mounting**

**Caution**

1. Mounting with panel mount adapter

2. Mounting with bracket

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

**Caution**

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></td>
<td>–100 kPa</td>
</tr>
<tr>
<td><strong>ZSE40A</strong></td>
<td>–101.3 kPa</td>
</tr>
<tr>
<td></td>
<td>–105 kPa</td>
</tr>
<tr>
<td><strong>ZSE40AF</strong></td>
<td>–100 kPa</td>
</tr>
<tr>
<td></td>
<td>–105 kPa</td>
</tr>
<tr>
<td><strong>ISE40A</strong></td>
<td>–100 kPa</td>
</tr>
<tr>
<td></td>
<td>–105 kPa</td>
</tr>
<tr>
<td></td>
<td>(–0.105 MPa)</td>
</tr>
</tbody>
</table>

The tightening torque for bracket mounting screw should be 0.5 to 0.7 N·m for M3 and 1.4 to 1.6 N·m for M4.
## Related Equipment

### 2-Colour Display High Precision Digital Pressure Switch  ZSE/ISE30A

<table>
<thead>
<tr>
<th>Series</th>
<th>Type</th>
<th>Rated pressure range</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZSE30AF</td>
<td>Compound pressure</td>
<td>−100.0 to 100.0 kPa</td>
</tr>
<tr>
<td>ZSE30A</td>
<td>Low pressure/vacuum</td>
<td>0.0 to −101.0 kPa</td>
</tr>
<tr>
<td>ISE30A</td>
<td>Positive pressure</td>
<td>0.100 to 1.000 MPa</td>
</tr>
</tbody>
</table>

**Features**
- With one-touch fitting (Straight, Elbow)
- Space-saving, capable of vertical and horizontal contact mounting
- With display calibration function
- Simultaneous copying is possible for maximum 10 units.
- IP40

### 2-Colour Display Digital Pressure Switch  ZSE/ISE80

<table>
<thead>
<tr>
<th>Series</th>
<th>Type</th>
<th>Rated pressure range</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZSE80F</td>
<td>Compound pressure</td>
<td>−100.0 to 100.0 kPa</td>
</tr>
<tr>
<td>ZSE80</td>
<td>Vacuum pressure</td>
<td>−101.0 to 0.0 kPa</td>
</tr>
<tr>
<td>ISE80</td>
<td>Positive pressure</td>
<td>−0.100 to 1.000 MPa</td>
</tr>
<tr>
<td>ISE80H</td>
<td>Positive pressure</td>
<td>−0.100 to 2.000 MPa</td>
</tr>
</tbody>
</table>

**Features**
- Suitable for a wide variety of fluids with stainless diaphragm
- IP65
- RoHS compliant
- Low leakage. VCR®，Swagelok® compatible fittings can be selected.
- With one-touch fittings (Straight, Elbow)
- Back piping, underside piping

*Note) VCR® and Swagelok® are trademarks of Swagelok Company.*
Safety Instructions

Caution:
A hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

Warning:
A hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

Danger:
A hazard with a high level of risk which, if not avoided, will result in death or serious injury.

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “Caution,” “Warning” or “Danger.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)*1, and other safety regulations.

1. The compatibility of the product is the responsibility of the person who designs the product or decides its specifications.
Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the person who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the person who has determined its compatibility with the product. This person should also continuously review all specifications of the product catalogue and consider all possible situations, such as installation or use, which, if not avoided, will result in death or serious injury.

2. Only personnel with appropriate training should operate machinery and equipment.
The product specified here may become unsafe if handled incorrectly. The assembly, operation and maintenance of machines or equipment including our products must be performed by an operator who is appropriately trained and experienced.

3. Do not service or attempt to remove product and machinery/equipment until safety is confirmed.
1. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling or runway of the driven objects have been confirmed.
2. When the product is to be removed, confirm that the safety measures as mentioned above are implemented and the power from any appropriate source is cut, and read and understand the specific product precautions of all relevant products carefully.
3. Before machinery/equipment is restarted, take measures to prevent unexpected operation and malfunction.

4. Contact SMC beforehand and take special consideration of safety measures if the product is to be used in any of the following conditions.
1. Conditions and environments outside of the specified options, or use outdoors or in a place exposed to direct sunlight.
2. Installation on equipment in conjunction with atomic energy, railways, air navigation, space, shipping, vehicles, military, medical treatment, combustion or other applications unsuitable for the standard specifications described in the product catalogue.
3. An application which could have negative effects on people, property, or animals requiring special safety analysis.
4. Use in an interlock circuit, which requires the provision of double interlock for possible failure by using a mechanical protective function, and periodical checks to confirm proper operation.

Limited warranty and Disclaimer/ Compliance Requirements

The product used is subject to the following “Limited warranty and Disclaimer” and “Compliance Requirements”. Read and accept them before using the product.

Limited warranty and Disclaimer

1. The warranty period of the product is 1 year in service or 1.5 years after the product is delivered. (2)
Also, the product may have specified durability, running distance or replacement parts. Please consult your nearest sales branch.

2. For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided.
This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.

3. Prior to using SMC products, please read and understand the warranty terms and disclaimers noted in the specified catalogue for the particular products. (3)

Compliance Requirements

1. The use of SMC products with production equipment for the manufacture of weapons of mass destruction (WMD) or any other weapon is strictly prohibited.

2. The exports of SMC products or technology from one country to another are governed by the relevant security laws and regulations of the countries involved in the transaction. Prior to the shipment of a SMC product to another country, assure that all local rules governing that export are known and followed.

Safety Instructions

Be sure to read “Handling Precautions for SMC Products” (M-E03-3) before using.