2-Color Display High-Precision Digital Pressure Switch

**ZSE30A(F)/ISE30A Series**

The settings of the master sensor can be copied to the slave sensors.
- Reducing setting labor
- Minimizing risk of mistakes in setting

Can copy to up to 10 switches simultaneously.

3-step setting

1. Adjust to the set-value by the ▲ or ▼ button.
2. Push
3. Completion of setting

Added vacuum range.
- Rated pressure range: 0.0 to –101.0 kPa

Expanded pressure range for positive-pressure type to the vacuum range.
- Rated pressure range: –0.100 to 1.000 MPa

2 added outputs
- NPN or PNP open collector 2 outputs
- NPN or PNP open collector 1 output + Analog output (1 to 5 V or 4 to 20 mA)

The ZSE30A(F)/ISE30A series now features 2 new models: the ZSE20(F)/ISE20 and the ZSE20A(F)/ISE20A. Click [here](#) for details.
Mounting
Bracket configuration allows mounting in four orientations.

Bracket A
Bracket B Mounting example
Bracket C Mounting example

Panel mount
Mountable side by side without clearance

Replaceable One-touch fittings
The clip type allows easy removal of fittings. Fitting's type and size can be changed.

Lead wire
Added the connector cover.

4-digit display
4-digit display allows easy reading of displayed values. Example: 0.5 MPa

Series

<table>
<thead>
<tr>
<th>Series</th>
<th>ZSE30A (vacuum)</th>
<th>ZSE30AF (compound)</th>
<th>ISE30A (positive)</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>
</tr>
<tr>
<td>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>Minimum unit setting</td>
<td>0.1 kPa</td>
<td>0.1 kPa</td>
<td>0.001 MPa</td>
</tr>
<tr>
<td>Output</td>
<td>NPN or PNP open collector 1 output</td>
<td>NPN or PNP open collector 2 outputs</td>
<td>NPN or PNP open collector 1 output + Analog output (voltage or current)</td>
</tr>
<tr>
<td>Piping</td>
<td>R1/8, NPT1/8 (M5 female threaded)</td>
<td>ø4, ø6, ø5/32, ø1/4 One-touch fittings</td>
<td></td>
</tr>
</tbody>
</table>

Additional functions
- Secret code setting function
  The key locking function keeps unauthorized persons from tampering with buttons.
- Power-saving function
  Power consumption is reduced by turning off the monitor. (Reduce power consumption by up to 20%.)
- Resolution-switch function
  It reduces the monitor to flicker.
- MPa/kPa switch function
  Vacuum, compound and/or positive pressure can be displayed in MPa or kPa.
# 2-Color Display High-Precision Digital Pressure Switch

**ZSE30A(F)/ISE30A Series**

## How to Order

- **For vacuum/compound pressure**
  - ZSE30A - 01 - N - M
  - ZSE30AF - 01 - N - M

- **For positive pressure**
  - ISE30A - 01 - N - M

## Output specifications

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>NPN open collector 1 output</td>
</tr>
<tr>
<td>P</td>
<td>PNP open collector 1 output</td>
</tr>
<tr>
<td>A</td>
<td>NPN open collector 2 outputs</td>
</tr>
<tr>
<td>B</td>
<td>PNP open collector 2 outputs</td>
</tr>
<tr>
<td>C</td>
<td>NPN open collector 1 output + Analog voltage output</td>
</tr>
<tr>
<td>D</td>
<td>NPN open collector 1 output + Analog current output</td>
</tr>
<tr>
<td>E</td>
<td>PNP open collector 1 output + Analog voltage output</td>
</tr>
<tr>
<td>F</td>
<td>PNP open collector 1 output + Analog current output</td>
</tr>
</tbody>
</table>

## Rated pressure range

<table>
<thead>
<tr>
<th>Model</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZSE30A</td>
<td>0 to –101 kPa</td>
</tr>
<tr>
<td>ZSE30AF</td>
<td>–100 to 100 kPa</td>
</tr>
</tbody>
</table>

## Piping specifications

- **01** R1/8 (M5 female threaded)
- **N01** NPT1/8 (M5 female threaded)
- **C4H** One-touch fitting ø4 mm, ø5/32 inch
- **C6H** One-touch fitting ø6 mm
- **N7H** One-touch fitting ø1/4 inch
- **C4L** One-touch fitting ø4 mm, ø5/32 inch
- **C6L** One-touch fitting ø6 mm
- **N7L** One-touch fitting ø1/4 inch

## Unit specifications

- **Nil** With display unit (Note 1) switching function
- **M** Fixed SI unit (Note 2) switching function (Initial value psi)
- **P** With display unit (Note 1) switching function

## Option 1

- **Nil** Without lead wire
- **L** Lead wire with connector (Lead wire length 2 m) (Note)
- **G** Lead wire with connector (Lead wire length 2 m) (Note) With connector cover

## Option 2

- **Nil** None
- **A1** Bracket A
- **A2** Bracket B
- **A3** Bracket C
- **B** Panel mount adapter
- **D** Panel mount adapter + Front protection cover

## Note

- Made to Order (P.43)
- X510 For M12 4-pin pre-wired connector
- Available only for output specifications "A", "B", and option 1 "G".

---

The ZSE30A(F)/ISE30A series now features 2 new models: the ZSE20(F)/ISE20 and the ZSE20A(F)/ISE20A. Click [here](#) for details.

---

*Made to Order (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) Unit: kPa, MPa
### Specifications

#### ZSE30A (Vacuum pressure)
- **Rated pressure range**: 0.0 to 101.0 kPa
- **Display/Set pressure range**: 10.0 to 105.0 kPa
- **Withstand pressure**: 500 kPa
- **Display/Minimum unit setting**: 0.1 kPa
- **Applicable fluid**: Air, Non-corrosive gas, Non-flammable gas
- **Power supply voltage**: 12 to 24 VDC ±10%, Ripple (p-p) 10% or less (with power supply polarity protection)
- **Current consumption**: 40 mA or less
- **Switch output**: NPN or PNP open collector 1 output, NPN or PNP open collector 2 outputs
- **Maximum load current**: 80 mA
- **Maximum applied voltage**: 28 V (at NPN output)
- **Residual voltage**: 1 V or less (with load current of 80 mA)
- **Response time**: 2.5 ms or less (with anti-chattering function: 20, 100, 500, 1000, 2000 ms)
- **Short circuit protection**: Yes

#### ZSE30AF (Compound pressure)
- **Rated pressure range**: −100.0 to 100.0 kPa
- **Display/Set pressure range**: −105.0 to 105.0 kPa
- **Withstand pressure**: 500 kPa
- **Display/Minimum unit setting**: 0.1 kPa

#### ISE30A (Positive pressure)
- **Rated pressure range**: −100.0 to 100.0 kPa
- **Display/Set pressure range**: −105.0 to 105.0 kPa
- **Withstand pressure**: 1.5 MPa
- **Display/Minimum unit setting**: 0.001 MPa

### Piping Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>ZSE30A</th>
<th>ZSE30AF</th>
<th>ISE30A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port size</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>O1</td>
<td>N01</td>
<td>C4H</td>
</tr>
<tr>
<td>R1/8 M5 x 0.8</td>
<td></td>
<td>NPT1/8 M5 x 0.8</td>
<td></td>
</tr>
<tr>
<td>O1-touch fitting, Straight type</td>
<td></td>
<td></td>
<td>ø4 mm</td>
</tr>
<tr>
<td>O1-touch fitting, Elbow type</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Option/Part No.

#### Part no. | Option | Note |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ZS-38-A1</td>
<td>Bracket A</td>
<td>Mounting screw (with 2 pcs. of M3 x 8L)</td>
</tr>
<tr>
<td>ZS-38-A2</td>
<td>Bracket B</td>
<td>Mounting screw (with 2 pcs. of M3 x 5L)</td>
</tr>
<tr>
<td>ZS-38-A3</td>
<td>Bracket C</td>
<td>Mounting screw (with 2 pcs. of M3 x 5L)</td>
</tr>
<tr>
<td>ZS-27-C</td>
<td>Panel mount adapter</td>
<td>Mounting screw (with 2 pcs. of M3 x 8L)</td>
</tr>
<tr>
<td>ZS-27-D</td>
<td>Panel mount adapter + Front protection cover</td>
<td>Mounting screw (with 2 pcs. of M3 x 8L)</td>
</tr>
<tr>
<td>ZS-27-01</td>
<td>Front protection cover</td>
<td></td>
</tr>
<tr>
<td>ZS-38-3L</td>
<td>Lead wire with connector</td>
<td>3 cores, for 1 output, 2 m</td>
</tr>
<tr>
<td>ZS-38-4L</td>
<td>Lead wire with connector</td>
<td>4 cores, for 2 outputs, 2 m</td>
</tr>
<tr>
<td>ZS-38-3G</td>
<td>Lead wire with connector (with connector cover)</td>
<td>3 cores, for 1 output, 2 m</td>
</tr>
</tbody>
</table>

#### Part no. | Option | Note |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ZS-38-4G</td>
<td>Lead wire with connector (with connector cover)</td>
<td>4 cores, for 2 outputs, 2 m</td>
</tr>
<tr>
<td>ZS-38-5L</td>
<td>Lead wire with a connector for copying</td>
<td>Copy function (up to 10 slaves)</td>
</tr>
<tr>
<td>ZS-38-6U</td>
<td>Lead wire unit with a connector for copying</td>
<td>Copy function (up to 10 slaves)</td>
</tr>
<tr>
<td>ZS-38-C4H</td>
<td>One-touch fittings ø4 mm straight</td>
<td>O-ring, one-touch clip included</td>
</tr>
<tr>
<td>ZS-38-C4H</td>
<td>One-touch fittings ø5/32 inch straight</td>
<td>O-ring, one-touch clip included</td>
</tr>
<tr>
<td>ZS-38-C6H</td>
<td>One-touch fittings ø6 mm straight</td>
<td>O-ring, one-touch clip included</td>
</tr>
<tr>
<td>ZS-38-C6H</td>
<td>One-touch fittings ø5/32 inch straight</td>
<td>O-ring, one-touch clip included</td>
</tr>
<tr>
<td>ZS-38-C4H</td>
<td>One-touch fittings ø1/4 inch straight</td>
<td>O-ring, one-touch clip included</td>
</tr>
<tr>
<td>ZS-38-C4H</td>
<td>One-touch fittings ø4 mm elbow</td>
<td>O-ring, one-touch clip included</td>
</tr>
<tr>
<td>ZS-38-C4H</td>
<td>One-touch fittings ø6 mm elbow</td>
<td>O-ring, one-touch clip included</td>
</tr>
<tr>
<td>ZS-38-N7H</td>
<td>One-touch fittings ø1/4 inch elbow</td>
<td>O-ring, one-touch clip included</td>
</tr>
<tr>
<td>ZS-38-N7H</td>
<td>One-touch fittings ø4 mm elbow</td>
<td>O-ring, one-touch clip included</td>
</tr>
<tr>
<td>ZS-38-N7H</td>
<td>One-touch fittings ø6 mm elbow</td>
<td>O-ring, one-touch clip included</td>
</tr>
</tbody>
</table>

### Note
1. If applied pressure fluctuates near the set value, set the hysteresis above the fluctuation range to prevent chattering.
2. When analog voltage output is selected, analog current output cannot be used together.
3. When analog current output is selected, analog voltage output cannot be used together.

Set Pressure Range and Rated Pressure Range

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

<table>
<thead>
<tr>
<th>Switch</th>
<th>Pressure range</th>
</tr>
</thead>
<tbody>
<tr>
<td>For vacuum pressure</td>
<td>ZSE30A</td>
</tr>
<tr>
<td></td>
<td>ZSE30AF</td>
</tr>
<tr>
<td>For positive pressure</td>
<td>ISE30A</td>
</tr>
</tbody>
</table>

Analog Output

Voltage output

Current output

Functions (Refer to pages 41 and 42 for details.)

Copy function
Copies the settings of the master sensor to the slave sensors.

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

Display calibration function
Evens out deviations in the displayed value.

Peak display function
Can retain the maximum pressure value displayed during measurement.

Bottom display function
Can retain the minimum pressure value displayed during measurement.

Keylock function (Selectable secret code)
The key board can be locked to prevent any incorrect function of the operation switch.

Zero-clear function
The pressure display can be set at zero when the pressure is open to the atmosphere.

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

Unit display switching function
Can convert the display value.

Power-saving mode
Reduces power consumption.

Display resolution-switch function
Converts display resolution from the normal value of 1/1000 to 1/100.
It reduces the monitor to flicker.

kPa ↔ MPa switch function
Converts the unit between kPa and MPa.
ZSE30A(F)/ISE30A Series

Internal Circuits and Wiring Examples

**-N**
NPN (1 output)

**-P**
PNP (1 output)

**-A**
NPN (2 outputs)

**-B**
PNP (2 outputs)

**-C**
NPN (1 output) + Analog voltage output

**-D**
NPN (1 output) + Analog current output

**-E**
PNP (1 output) + Analog voltage output

**-F**
PNP (1 output) + Analog current output

* The FUNC terminal is connected when using the copy function. (Refer to “Copy function” on page 41.)
When using the bracket B or C, install it by taking the dimensions of the piping part into consideration.

Bracket configuration allows mounting in four orientations.

<table>
<thead>
<tr>
<th>Option 2</th>
<th>[\text{Bracket A} ] (Option unit part no.: ZS-38-A1)</th>
<th>[\text{Bracket B} ] (Option unit part no.: ZS-38-A2)</th>
<th>[\text{Bracket C} ] (Option unit part no.: ZS-38-A3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>![Bracket A Diagram]</td>
<td>![Bracket B Diagram]</td>
<td>![Bracket C Diagram]</td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>![Bracket A Diagram]</td>
<td>![Bracket B Diagram]</td>
<td>![Bracket C Diagram]</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>![Bracket A Diagram]</td>
<td>![Bracket B Diagram]</td>
<td>![Bracket C Diagram]</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>![Bracket A Diagram]</td>
<td>![Bracket B Diagram]</td>
<td>![Bracket C Diagram]</td>
</tr>
<tr>
<td><strong>Option</strong></td>
<td>![Bracket A Diagram]</td>
<td>![Bracket B Diagram]</td>
<td>![Bracket C Diagram]</td>
</tr>
<tr>
<td><strong>Part No.</strong></td>
<td>![Bracket A Diagram]</td>
<td>![Bracket B Diagram]</td>
<td>![Bracket C Diagram]</td>
</tr>
</tbody>
</table>

**Dimensions**

With bracket

Z/ISE30A(F) – [ ] – [ ] – [ ] – [ ]

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bracket B</td>
<td>41.4</td>
</tr>
<tr>
<td>Bracket C</td>
<td>53</td>
</tr>
</tbody>
</table>

* When using the bracket B or C, install it by taking the dimensions of the piping part into consideration.
Panel mount adapter
Z/ISE30A(F) – □ – □ – □ – □ – □ – □

Option 2

Panel mount adapter
(Option unit part no.: ZS-27-C)

Panel thickness 0.5 to 6

Lead wire with connector
(Option unit part no.: ZS-38-3L)

(Option unit part no.: ZS-38-4L)
**Dimensions**

**Panel fitting dimensions**

1 pc. mounting

Multiple (2 pcs. or more) horizontal mounting

\[31 \div 0.4\]

\[31 \div 0.4\]

\[31 \div 0.4\]

\[31 \div 0.4\]

\[
31 \times n \text{ pcs.} + 3.5 \times (n \text{ pcs.} - 1)
\]

4 x R2 or less

4 x R2 or less

4 x R2 or less

4 x R2 or less

Multiple (2 pcs. or more) vertical mounting

\[31 \div 0.4\]

\[31 \div 0.4\]

\[31 \div 0.4\]

\[31 \div 0.4\]

\[
31 \times n \text{ pcs.} + 3.5 \times (n \text{ pcs.} - 1)
\]

4 x R2 or less

4 x R2 or less

4 x R2 or less

4 x R2 or less
Function Details

A Copy function (F97)
The settings of the master sensor can be copied to the slave sensors, reducing setting labor and minimizing risk of mistakes in setting. Can copy to up to 10 switches simultaneously. (Maximum transmission distance 4 m)

1) The sensors are connected by a dedicated lead wire (ZS-38-5L (for master and one slave) or ZS-38-U (for master and up to 10 slaves)). Copying is performed through a dedicated communication line.
2) Select the slave switch which is to be the master, and change it into a master using the buttons. (In the default setting, all switches are set as slaves.)
3) Press the button of the master switch to start copying.

B Auto-preset function (F5)
Auto-preset function, when selected in the initial setting, calculates and stores the set-value from the measured pressure. The optimum set-value is determined automatically by repeating vacuum and break with the target workpiece several times.

Suction Verification

C Display calibration function (F6)
Fine adjustment of the indicated value of the pressure sensor can be made within the range of ±5% of the read value. (The scattering of the indicated value can be eliminated.)

D Peak/Bottom value indication
This function constantly detects and updates the maximum (minimum) value and allows to hold the maximum (minimum) pressure value. When the buttons are simultaneously pressed for 1 second or longer, while “holding”, the held value will be reset.

E Keylock function
Prevents operation errors such as accidentally changing setting values.

F Zero-clear function
This function clears and resets the zero value on the display of measured pressure. For the pressure switch with analog output, the analog output shifts according to the indication. The indicated value can be adjusted within ±7% F.S. of the pressure when ex-factory. (ZSE30AF (for compound pressure) ±3.5% F.S.)
Function Details

Error indication function

<table>
<thead>
<tr>
<th>Error name</th>
<th>Error code</th>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overcurrent error</td>
<td>Er 1</td>
<td>Load current of 80 mA or more is applied to the switch output (OUT1).</td>
<td>Eliminate the cause of the over current by turning off the power supply, and then turn on it again.</td>
</tr>
<tr>
<td></td>
<td>Er 2</td>
<td>Load current of 80 mA or more is applied to the switch output (OUT2).</td>
<td></td>
</tr>
<tr>
<td>Residual pressure</td>
<td>Er 3</td>
<td>During zero-clear operation, pressure over ±7% F.S. is applied. (ZSE30AF (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>error</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</td>
<td>Er 0</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>error</td>
<td>Er 1</td>
<td>Supply pressure is below the minimum set pressure.</td>
<td></td>
</tr>
<tr>
<td>System error</td>
<td>Er 2</td>
<td>Internal data error</td>
<td>Turn off the power supply and then turn on it again.</td>
</tr>
<tr>
<td></td>
<td>Er 3</td>
<td>Internal data error</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Er 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Er 5</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 failure cannot be solved after the above instructions are performed, please contact SMC for investigation.

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.

![Diagram of pressure averaging and anti-chattering function](image)

Display unit switching function (F0)

Display units can be switched with this function.

<table>
<thead>
<tr>
<th>Display unit</th>
<th>PA</th>
<th>QF</th>
<th>bAr</th>
<th>PSI</th>
<th>inH</th>
<th>mmHg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. unit setting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ZSE30A (Vacuum pressure)</td>
<td>0.1</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
<td>0.1</td>
<td>1</td>
</tr>
<tr>
<td>ZSE30AF (Compound pressure)</td>
<td>0.1</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
<td>0.1</td>
<td>1</td>
</tr>
<tr>
<td>ISE30A (Positive pressure)</td>
<td>1</td>
<td>0.001</td>
<td>0.01</td>
<td>0.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The ZSE30A (vacuum pressure) and ZSE30AF (compound pressure) will have different setting and display resolution when the unit is set to MPa.

Power-saving mode (F7)

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

Setting of secret code (F8)

Users can select whether a secret code must be entered to release key lock. At the time of shipment from the factory, it is set such that the secret code is not required.
ZSE30A(F)/ISE30A Series
Made to Order
Please contact SMC for detailed dimensions, specifications and lead times.

How to Order

ZSE30A(F)/ISE30A X510

Piping specifications

Unit specifications

Output specifications
A: NPN open collector 2 outputs
B: PNP open collector 2 outputs

Option cable
ZS-38-4GM12

Connector pin numbers
1 Brown
2 White
3 Blue
4 Black

Pin no. Pin description
1 DC (+)
2 OUT (2)
3 DC (–)
4 OUT (1)