**For General Pneumatics**

**SMC PRESSURE SWITCH**

**Reset Set**

**kPa**

**Choice of display units**

Display units can be easily selected and changed, making these switches globally acceptable.

- **Vacuum**
  - kPa ⇔ mmHg ⇔ PSI ⇔ bar

- **Positive press. (high)**
  - MPa ⇔ kgf/cm² ⇔ PSI ⇔ bar

- **Positive press. (low)**
  - kPa ⇔ kgf/cm² ⇔ PSI ⇔ bar

- **MPa** ⇔ kgf/cm² ⇔ PSI ⇔ bar

**Variety of switch output modes**

- **Hysteresis mode**
  - ON
  - OFF

- **Window comparator mode**
  - ON
  - OFF

**Self-diagnostic function**

- **Over-voltage**
- **Over-pressure**
- **Data error**

**Panel mounting available.**

A special adaptor permits panel mounting.

**Dust/Splash proof cover (Optional)**

Refer to the p.3.2-21 to 3.2-24.

**Calibration data**

The calibration data is stored in an EEPROM. The EEPROM is rated to keep its memory for 100,000 hours (approx. 11 years) without having power supplied.
How to Order

Setting pressure range

<table>
<thead>
<tr>
<th></th>
<th>0 to 10MPa</th>
<th>0 to 100kPa</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Positive pressure

ISE4

Vacuum

ZSE4

Lead wire length (Grommet)

<table>
<thead>
<tr>
<th></th>
<th>0.6m</th>
<th>3m</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Output specifications

<table>
<thead>
<tr>
<th></th>
<th>25</th>
<th>26</th>
<th>65</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NPN Open collector/1 output (Sinking)</td>
<td>Analog output (1 to 5V)</td>
<td>PNP Open collector/1 output (Sourcing)</td>
</tr>
</tbody>
</table>

Style

<table>
<thead>
<tr>
<th></th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dust/Splash proof</td>
</tr>
</tbody>
</table>

Port size

<table>
<thead>
<tr>
<th></th>
<th>Rp(PT) 1/8</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NPTF 1/8</td>
</tr>
</tbody>
</table>

Note) Standard: M5 x 0.8 (Female)

Caution

Be sure to read before handling. Refer to p.0-26 and 0-27 for Safety Instructions and common precautions on the products mentioned in this catalog and refer to p.3.0-7 to 3.0-9 for precautions on every series.
## Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Operating pressure range</th>
<th>Positive pressure: 100kPa</th>
<th>Positive pressure: 1MPa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vacuum</td>
<td>ZSE4</td>
<td>0 to –101kPa</td>
<td>0 to 100kPa</td>
</tr>
<tr>
<td>Max. pressure</td>
<td></td>
<td>200kPa</td>
<td>1MPa</td>
</tr>
</tbody>
</table>

### Min. display unit

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Temperature characteristics</th>
<th>Repeatability</th>
<th>Supply voltage</th>
<th>Output specification</th>
<th>Current consumption</th>
<th>Error display</th>
<th>Pressure display</th>
<th>Self-diagnostic function</th>
<th>Operating temperature range</th>
<th>Noise resistance</th>
<th>Voltage resistance</th>
<th>Insulation resistance</th>
<th>Vibration resistance</th>
<th>Shock resistance</th>
<th>Lead wire</th>
<th>Weight</th>
<th>Protective construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td>-3% F.S. or less</td>
<td>±1% F.S. or less</td>
<td>12 to 24V DC (Ripple≤10% or less)</td>
<td>NPN open collector 30V, 80mA or less</td>
<td>PNP open collector 80mA or less</td>
<td>25mA or less</td>
<td>Red light blinks, Display the error code on LCD</td>
<td>3 1/2 digits (10 mm-size numerals)</td>
<td>0 to 50°C (No condensation)</td>
<td>1000Vp-p, Pulse width: 1 S Standing: 1µS</td>
<td>Between external terminals and housing 1000V AC 50/60Hz for 1 min.</td>
<td>Between external terminals and housing 2MΩ (500V DC by megometer)</td>
<td>10 to 500 Hz Pulse width 1.5mm or acceleration 980 m/s² (smaller vibrations) to X, Y, Z direction (2 hrs)</td>
<td>980 m/s² to X, Y, Z direction (3 times for each direction)</td>
<td>Grommet oil-resistant vinyl cable wire code ø3.4 0.2 mm² 3 core</td>
<td>Standard: 40g (including 0.6m-long lead wire), Dust/Splash proof: 110g</td>
<td></td>
</tr>
</tbody>
</table>

### Notes

1. Hysteresis mode: When the values of P1 and P2 are the same or when P1>P2 within 3 digits, the hysteresis will be automatically 3 digits for the set value of P1.
2. Window comparator mode: The hysteresis is 3 digits, so separate P1 from P2 by 7 digits or more and set them. 1 digit is the minimum pressure display unit. (See the table above.)
3. Refer to p.3.2-21 to p.3.2-24 for the details about the dust/splash proof specifications.

## Description

**SET key**
Switches the mode. Used for unit change and output mode change by pressing the button for at least 1 second.

**RESET key**
Clears abnormalities. Displays "0".

**UP key**
Increases ON/OFF set point. Switched to peak mode high by pressing the key during normal operation.

**DOWN key**
Decreases ON/OFF set point. Switched to peak mode low by pressing the key during normal operation. Used for unit change and output mode change.

**LCD**
Displays present pressure. Displays ON/OFF setting value. Displays error code. Displays unit.

**LED (Green)**
Displays OUT1 operation condition.

**LED (Red)**
Blinks on and off when an error occurs.

3.2-17
Calibration Procedures

Procedures

Initial setup
Select “Display units” and “Output mode”.

Calibration
Calibrates set point for switch output.

Normal operation
Measured pressure displayed, switch operation occurs.

Table 1 Output mode

<table>
<thead>
<tr>
<th>Output mode</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUT1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Initial setup mode
Press the “SET” button for at least 1 second. “1.3” is displayed and the display blinks.

2. Selection of “Display unit”
Select “Display unit” by pressing the H button.
For High prss. MPa → kgf/cm² → PSI → bar
Low prss. kPa → kgf/cm² → PSI → bar
For vacuum kPa → mmHg → PSI → bar

3. Selection of “Output mode”
Select “Output mode” by pressing the P button.
H (Fixed hysteresis) ≥ 3 digits
Hysteresis mode

Table 1

Calibration procedures

1. Set point value input mode
2. Input set point value (1)
3. Input set point value (2)

Press the “SET” button.
▲ button: Increase set point value
▼ button: Decrease set point value

By pressing the “SET” button, the calibration is completed.

3.2-18
ZSE4/ISE4

Other Functions

- **Peak Mode High**
  
  To display the high peak pressure (highest degree of vacuum), press the UP button during normal operation. The LCD displays "H". To return back to normal operation press the UP button again.

- **Peak Mode Low**
  
  To display the low peak pressure (lowest degree of vacuum), press the DOWN button during normal operation. The LCD displays "L". To return back to normal operation press the DOWN button again.

- **Reset Function**
  
  Simultaneously pressing the UP and DOWN button will reset the switch.
  1. Reset will cause the following during normal operation:
     - Peak high is cleared.
     - Peak low is cleared.
     - Zero is reset.
  2. Reset will cause the following when error has occurred:
     - Switch will assume normal operation (all calibration data has retained).
     - In case of data error, reset the setup mode and then switch will assume normal operation. (Note) In the setup mode, the reset function does not work.

Internal Circuit and Wiring

Load wire colors inside ( ) are those prior to conformity with IEC standards.

- **25 NPN Open Collector**
  
  Max.30V, 80mA
  Residual voltage: 1V or less

- **26 Analog Output**
  
  1 to 5V (±5% F.S.)
  Load impedance: 1kΩ

- **65 PNP Open Collector**
  
  Max.80mA

Error Codes

<table>
<thead>
<tr>
<th>Display</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>ε 1 dE</td>
<td>Calibration was changed by accident, reason unknown.</td>
<td>Push RESET to reset all the data.</td>
</tr>
<tr>
<td>(1) ε 2 CE 1</td>
<td>Output 1 output current is exceeding 80mA.</td>
<td>Turn off the power and verify the load connected output 1.</td>
</tr>
<tr>
<td>Output 1 (Black wire) could be shorted out.</td>
<td>Verify that the output is not shorted out and reset the switch.</td>
<td></td>
</tr>
<tr>
<td>ε 3 PE</td>
<td>Max. operating pressure has been exceeded for more than 2 seconds.</td>
<td>Reduce the supply pressure to below the max. pressure rating and then reset the switch.</td>
</tr>
<tr>
<td>ε 4 HP</td>
<td>When zeroing out the gauge, pressure differences ±0.07MPa for ISE 4 and ±7kPa for ZSE 4 have occurred.</td>
<td>Apply atmospheric pressure and then reset the switch.</td>
</tr>
</tbody>
</table>

Note 1) Does not apply to Analog output.
LCD Readout Digital Pressure Switch ZSE4/ISE4

Dimensions

Standard

With bracket

Panel mounting

Cutout dimensions for panel mounting

Thickness of panel: 1 to 3.2mm

3.2-20
For General Pneumatics

Dust/Splash proof specification is available on all the standard models.
(Refer to pages of every series for detailed functions.)

ZSE4E/ISE4E
ZSE4B/ISE4B
ZSE4/ISE4

Dust/Splash Proof (IP66)
Digital Pressure Switch

Series ZSE4□D
(For vacuum)

ISE4□□D
(For positive pressure)

Lightweight: 110g
Resin construction

DIN rail mounting
Easy mounting and removal

For applications in adverse environments where water/dust are present.
How to Order

<table>
<thead>
<tr>
<th>Setting pressure range</th>
<th>ISE4/E, ISE4E</th>
<th>ISE4</th>
</tr>
</thead>
<tbody>
<tr>
<td>–</td>
<td>–0.1 to 1MPa</td>
<td>0 to 1MPa</td>
</tr>
<tr>
<td>L</td>
<td>–10 to 100kPa</td>
<td>0 to 100kPa</td>
</tr>
</tbody>
</table>

Positive pressure

ISE4  D  —  —  —

Vacuum

ZSE4  D  —  —  —

Indication

—  LCD
B  LCD (Backlight)
E  LED

Output specifications

| 25  | NPN Open collector 1 output: ZSE4, ZSE4B (Sinking) |
| 26  | Analog output (1 to 5V) |
| 27  | NPN Open collector 2 outputs: ZSE4E (Sinking) |
| 65  | PNP Open collector 1 output: ZSE4, ZSE4B (Sourcing) |
| 67  | PNP Open collector 2 outputs: ZSE4E (Sourcing) |

Lead wire length (Grommet)

—  0.6m
L  3m

Output specifications

| 25  | NPN Open collector 1 output: ZSE4, ZSE4B (Sinking) |
| 26  | Analog output (1 to 5V) |
| 27  | NPN Open collector 2 outputs: ZSE4E (Sinking) |
| 65  | PNP Open collector 1 output: ZSE4, ZSE4B (Sourcing) |
| 67  | PNP Open collector 2 outputs: ZSE4E (Sourcing) |

Note: Please suffix "-X1" to the part number if the oilproof cover must be made of nylon. Ex.) ZSE4BD-01-25-X1

Specifications (Mechanical specifications of optional cover)

<table>
<thead>
<tr>
<th>Model</th>
<th>ZSE4□D/ISE4□D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature range</td>
<td>0 to 50°C (No condensation)</td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>10 to 500Hz Pulse width 1.5mm or acceleration $980^{\text{m/s}^2}$ (smaller vibrations) to X, Y, Z direction (2 hrs)</td>
</tr>
<tr>
<td>Shock resistance</td>
<td>$980^{\text{m/s}^2}$ to X, Y, Z direction (3 times for each direction)</td>
</tr>
<tr>
<td>Lead wire</td>
<td>Gromment oil-resistant vinyl cable with code –25, –26, –65 ø3.4 0.2mm² 3core –27, –67 ø3.5 0.14mm² 4core</td>
</tr>
<tr>
<td>Weight</td>
<td>110g (Including 0.6m-long lead wire)</td>
</tr>
<tr>
<td>Port size</td>
<td>01: Rc(PT) 1/8 T1: NPTF 1/8</td>
</tr>
</tbody>
</table>

Refer to the following pages for the details of each series.

- ZSE4/EISE4 Series   → P.3.2-17
- ZSE4B/EISE4B Series  → P.3.2-11
- ZSE4E/EISE4E Series  → P.3.2-3

IP66
Parts List

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body</td>
<td>PBT</td>
</tr>
<tr>
<td>2</td>
<td>DIN rail stopper</td>
<td>PBT</td>
</tr>
<tr>
<td>3</td>
<td>Bush stopper</td>
<td>PBT</td>
</tr>
<tr>
<td>4</td>
<td>Cover A</td>
<td>PC</td>
</tr>
<tr>
<td>5</td>
<td>Gasket A</td>
<td>NBR</td>
</tr>
<tr>
<td>6</td>
<td>Reed bush</td>
<td>NBR</td>
</tr>
<tr>
<td>7</td>
<td>Gasket B</td>
<td>NBR</td>
</tr>
<tr>
<td>8</td>
<td>Cover B</td>
<td>SECC</td>
</tr>
<tr>
<td>9</td>
<td>Insert nut</td>
<td>A2011</td>
</tr>
<tr>
<td>10</td>
<td>Lead wire</td>
<td>PVC (Vinyl sheath)</td>
</tr>
<tr>
<td>11</td>
<td>Digital pressure switch (4-type)</td>
<td>—</td>
</tr>
</tbody>
</table>

Be sure to read before handling. Refer to p.0-26 and 0-27 for Safety Instructions and common precautions on the products mentioned in this catalog and refer to p.3.0-7 to 3.0-9 for precautions on every series.

Selection

⚠️ Caution

1. If the unit is to be used in an area where it will be exposed to oil based liquids, please order the "X1" option. (Made to Order)

Piping

⚠️ Caution

1. If this product is to be applied in an area where water and dust might enter the atmospheric pressure port, please attach a section of ø4 mm tubing to the port nipple and route the other end to an area where water and dust can not enter the tubing.

Installation

⚠️ Caution

1. Apply cover. Hook the cover on the projection parts of the body and push down as shown below. Be careful not to twist the gasket at that time. To remove the cover, lift the hook of the cover with a screw driver.

Recommended DIN rail: OMRON, PFP-(50)N
Dust/Splash Proof (IP66) Digital Pressure Switch

**Protective Construction (IP Equivalent)**

Definition: The first digit defines the amount of protection against penetration of solid objects into the housing. The second digit defines the amount of protection against liquids penetrating the housing.

**Degree of Protection against Contact and Entrance of Solid Foreign Bodies**

<table>
<thead>
<tr>
<th>Digit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No protection</td>
</tr>
<tr>
<td>1</td>
<td>Protection against foreign objects &gt; 50mm.</td>
</tr>
<tr>
<td>2</td>
<td>Protection against foreign objects &gt; 12mm.</td>
</tr>
<tr>
<td>3</td>
<td>Protection against foreign objects &gt; 2.5mm.</td>
</tr>
<tr>
<td>4</td>
<td>Protection against foreign objects &gt; 1.0mm.</td>
</tr>
<tr>
<td>5</td>
<td>Protection against harmful deposits of dust.</td>
</tr>
<tr>
<td>6</td>
<td>Protection against penetration of dust.</td>
</tr>
</tbody>
</table>

**Degree of Protection against Ingress of Liquid**

- **0**: No protection
- **1**: Protection against drops of condensed water.
- **2**: Protection against drops of liquids when housing is tilted to 15° from vertical.
- **3**: Protection against rain < 60° from vertical.
- **4**: Protection against splashing.
- **5**: Protection against water jets.
- **6**: Protection against conditions on ships' decks. Water from heavy seas will not enter.
- **7**: Protection against immersion in water.
- **8**: Protection against indefinite immersion in water under a specified pressure.

**Dimensions**

- Mounting hole: M4
- Lead wire length: 300 (2200)
- Atmosphere releasing port:
  - For tube size ø4: Rc(PT)1/8
  - T1: NPTF1/8

**Piping ports**:
- R1: Rc(PT)1/8
- T1: NPTF1/8

**Other Standards**:
- PSE
- GS
- PS
- ISA