
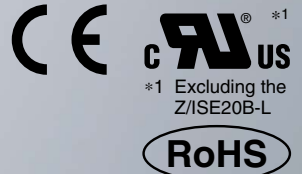


## 3-Screen Display

# High-Precision Digital Pressure Switch

**New** The  **IO-Link** compatible type has been added to the 20B series.



## Setting is possible while checking

**Main screen** Measured value (Current pressure value)

## the measured value.

**Sub screen** Label (Display item), Set value (Threshold value)



**Visualization of settings**

|                             |      |            |     |                  |     |
|-----------------------------|------|------------|-----|------------------|-----|
| Set value (Threshold value) | P-1  | Peak value | H-H | Hysteresis value | H-L |
| Bottom value                | H-Lo | Delay time | dt1 |                  |     |

| Applicable fluid | Series                                | Output type  | Enclosure | Copy function | Piping           |                       |                               |
|------------------|---------------------------------------|--|-----------|---------------|------------------|-----------------------|-------------------------------|
|                  |                                       |  |           |               | M5 female thread | 1/8 (R, NPT)          | 1/4 (R, NPT, G) (URJ*1/TSJ*2) |
| Air              | ZSE20(F)/ISE20<br>p. 9                | 1 output   | IP40      | —             | ●                | ●                     | —                             |
|                  | ZSE20A(F)/ISE20A<br>p. 11             | 2 outputs<br>Analog output (Voltage/Current)                                     | IP40      | ●             | ●                | ●                     | —                             |
|                  | ZSE20B(F)-(L)/ISE20B-(L)<br>p. 13, 15 | 2 outputs<br>Analog output (Voltage/Current)<br><br>IO-Link/<br>Switch: 1 output | IP65      | ●<br><br>—*4  | ●                | ●                     | —                             |
| General fluids   | ZSE20C(F)/ISE20C(H)<br>p. 24          | 2 outputs<br>Analog output (Voltage/Current)                                     | IP65      | ●             | ●*3              | ●<br>(Rc thread only) | ●                             |

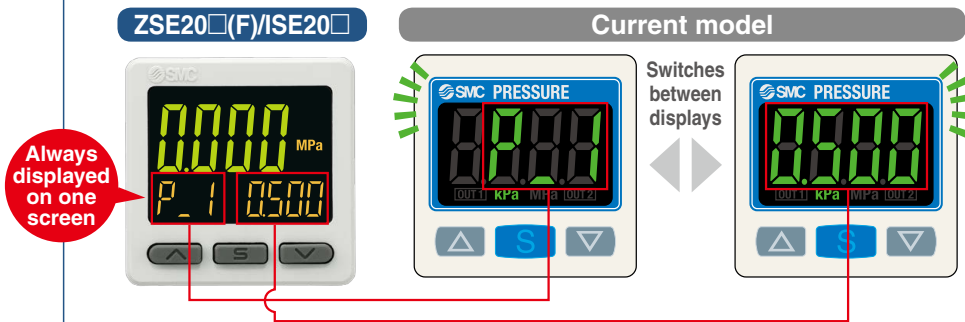
\*1 Face seal fitting \*2 Compression fitting \*3 With 1/4 (R, NPT, G) M5 female threaded \*4 A block parameter or data storage function is provided with the IO-Link compatible type.

## ZSE20□(F)/ISE20□ Series

# Improved Operability

## Visualization of Settings

The sub screen (label) shows the item to be set.



### Mode Examples

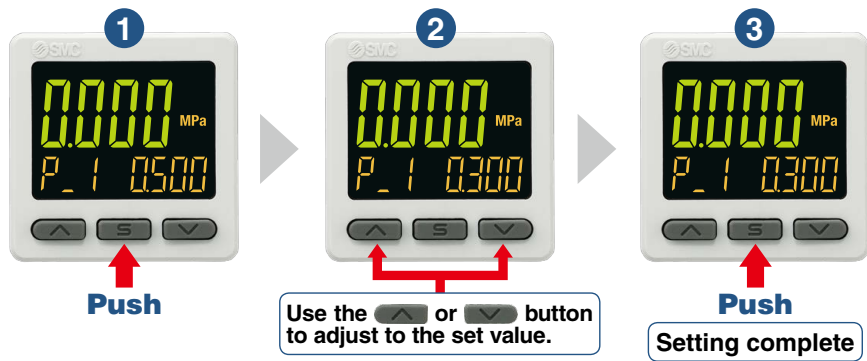
| Hysteresis mode |                             |                 |                             |
|-----------------|-----------------------------|-----------------|-----------------------------|
| Normal output   | Set value (Threshold value) | Reversed output | Set value (Threshold value) |
| P_1             | 0500                        | n_1             | 0500                        |
| Hysteresis      | Set hysteresis value        |                 |                             |
| H_1             | 0050                        |                 |                             |

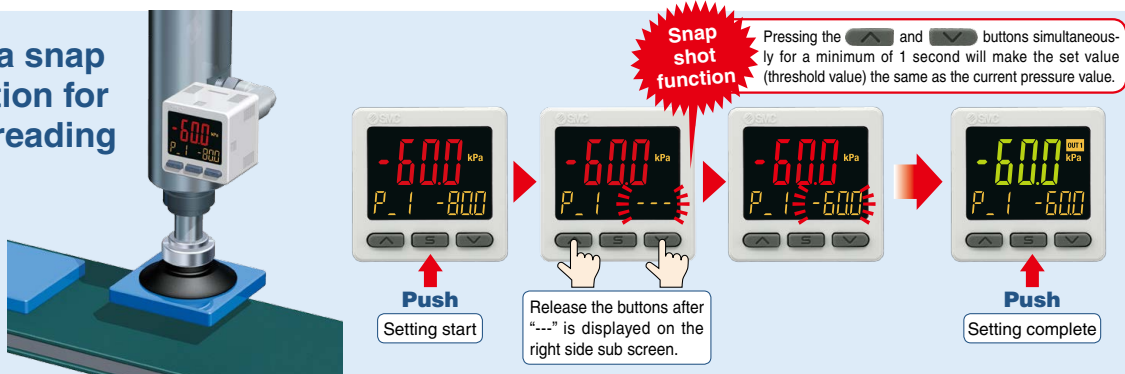
| Window comparator mode  |                             |                         |                             |
|-------------------------|-----------------------------|-------------------------|-----------------------------|
| Normal output/Lo side   | Set value (Threshold value) | Normal output/Hi side   | Set value (Threshold value) |
| P_L                     | 0300                        | P_H                     | 0600                        |
| Reversed output/Lo side | Set value (Threshold value) | Reversed output/Hi side | Set value (Threshold value) |
| n_L                     | 0300                        | n_H                     | 0600                        |

## Simple 3-Step Setting

When the S button is pressed and the set value (P\_1) is being displayed, the set value (threshold value) can be set. When the S button is pressed and the hysteresis (H\_1) is being displayed, the hysteresis value can be set.

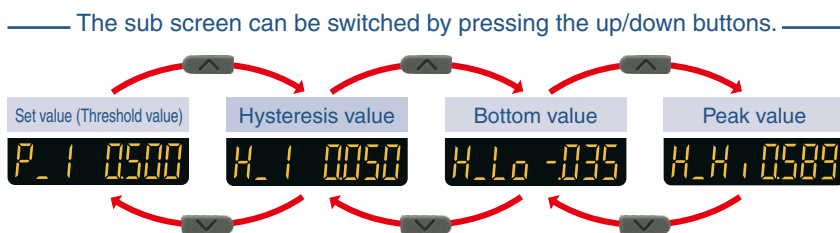
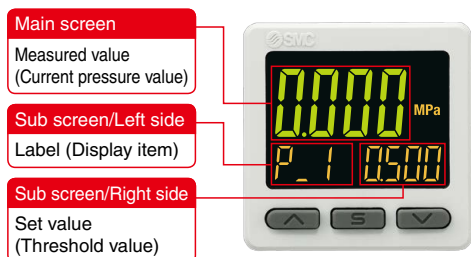


## Now with a snap shot function for set value reading



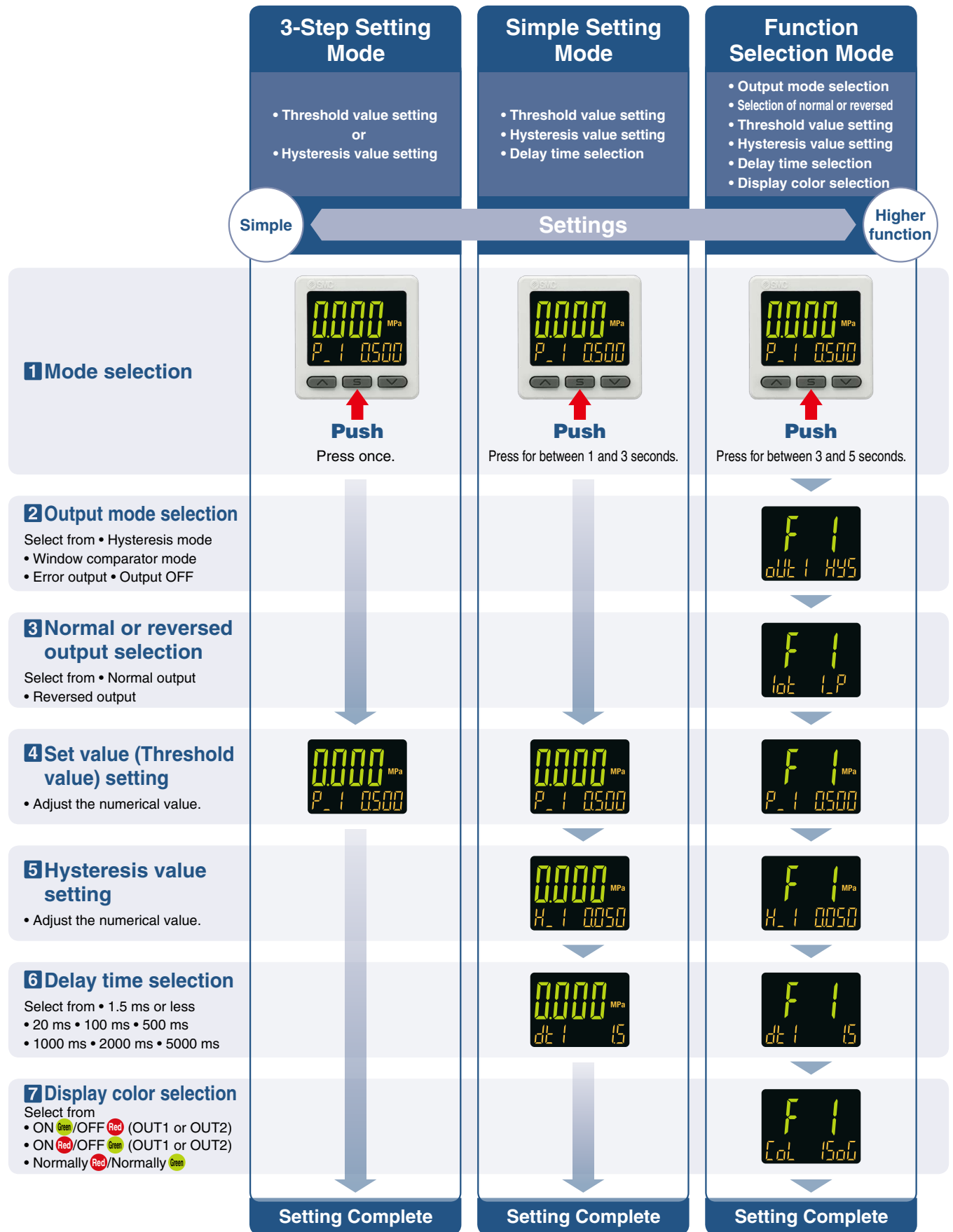
## Easy Screen Switching

It is possible to change the settings while checking the measured value.



\* One additional arbitrary display mode can be added via the function settings. (Refer to p. 3.)  
 \* Example for 1 output

### 3 Setting Modes Select the setting mode that best meets your needs.



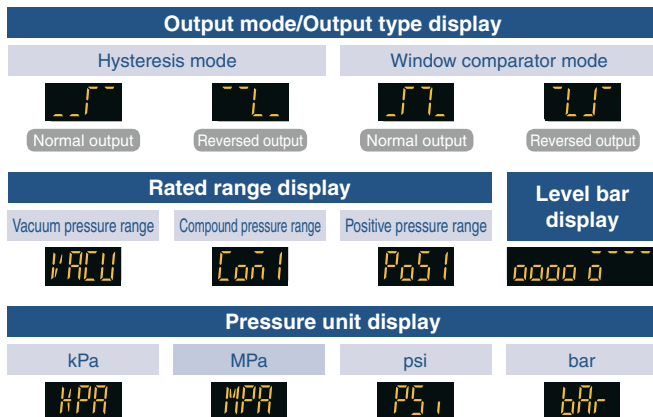
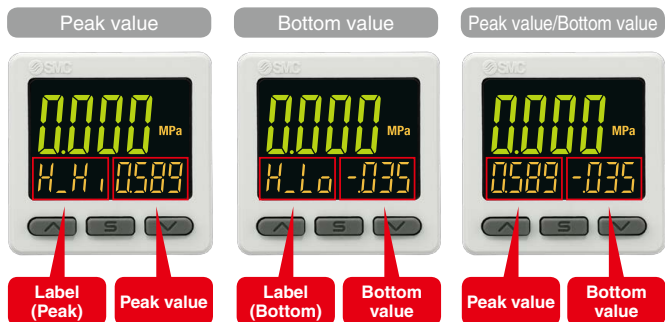
\* For 1 output

# Improved Operability

## Other Sub Screen Display

The peak value or bottom value, or both values can be displayed on one screen!

\* Peak and bottom values are maintained even if the power supply is cut.



\* A combination of the displays shown above and the set values can be displayed on the 2 sub screens.

# Delay Time 1.5 ms\*1 or less

\*1 Select from 1.5 ms or less, 20 ms, 100 ms, 500 ms, 1000 ms, 2000 ms, or 5000 ms.

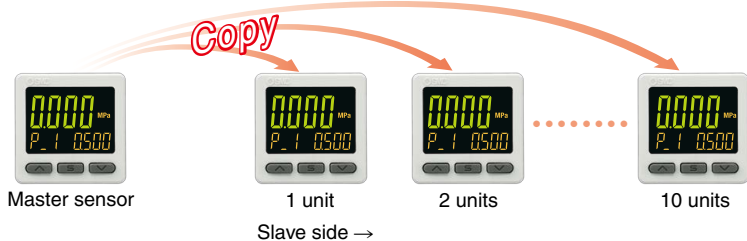
# Convenient Functions

p. 17, 26

| Functions | Copy function | Auto-shift function | Security code | Power saving mode | Resolution switch function | MPa/kPa switch function |
|-----------|---------------|---------------------|---------------|-------------------|----------------------------|-------------------------|
| 20        | —             | —                   | ●             | ●                 | ●                          | ●                       |
| 20A       | ●             | ●                   | ●             | ●                 | ●                          | ●                       |
| 20B       | ●             | ●                   | ●             | ●                 | ●                          | ●                       |
| 20B-L     | —             | —                   | ●             | ●                 | ●                          | ●                       |
| 20C       | ●             | ●                   | ●             | ●                 | ●                          | ●                       |

### ● Copy function

The settings of the master sensor can be copied to the slave sensors.



### ● Auto-shift function

This measures the pressure at the time of external input and uses it as a reference to correct the on-off point of the switch.

### ● Security code

The key locking function keeps unauthorized persons from tampering with the settings.

### ● Power saving mode

Power consumption is reduced by turning off the monitor.

| Series  | Current consumption | Reduction rate*1      |
|---------|---------------------|-----------------------|
| 20      | 25 mA or less       | Approx. 60% reduction |
| 20A     | 35 mA or less       | Approx. 40% reduction |
| 20B(-L) |                     |                       |
| 20C     |                     |                       |

\*1 In power saving mode

### ● Display resolution switch function

Reduces monitor flickering



(Only the displayed values are changed; the accuracy remains the same.)

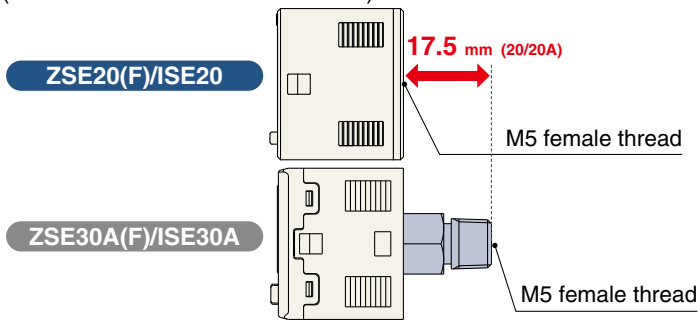
### ● MPa/kPa switch function

Vacuum, compound, and/or positive pressure can be displayed in MPa or kPa.

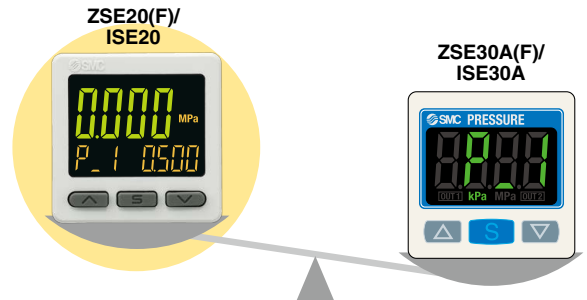


## Compact & Lightweight

- **Compact: Max. 17.5 mm shorter**  
(When an M5 female thread is used.)



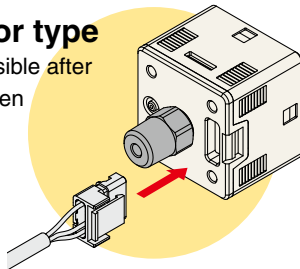
- **Lightweight: Max. 21 g lighter**  
(When an M5 female thread is used.)



## Improved Installability

### Connector type

Wiring is possible after piping has been connected.

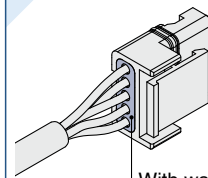


Grommet type  
ZSE/ISE40, 80 Series



## Enclosure

### Connector structure



With waterproof cover  
(20B, 20C)

### Available Mounting Options

| Series  | IP40 | IP65 |
|---------|------|------|
| 20      | ●    | —    |
| 20A     | ●    | —    |
| 20B(-L) | —    | ●    |
| 20C     | —    | ●    |

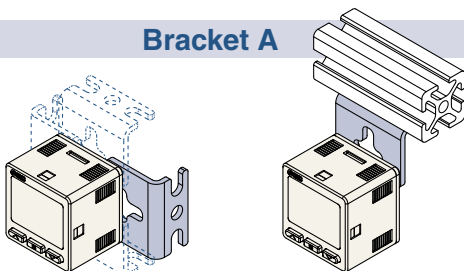
## Mounting

### Available Mounting Options

| Series  | Bracket A | Bracket B | Bracket C | Panel mount |
|---------|-----------|-----------|-----------|-------------|
| 20      | ●         | ●         | —         | ●           |
| 20A     | ●         | ●         | —         | ●           |
| 20B(-L) | ●         | ●         | —         | ●           |
| 20C     | ●         | —         | ●         | ●           |

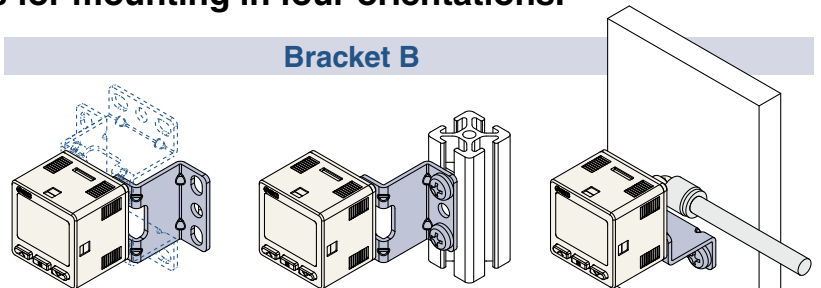
The bracket configuration allows for mounting in four orientations.

### Bracket A



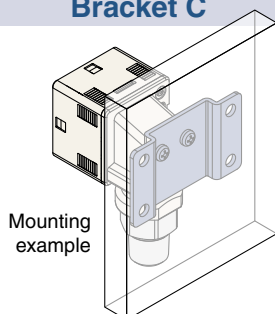
Mounting example

### Bracket B



Mounting example

### Bracket C



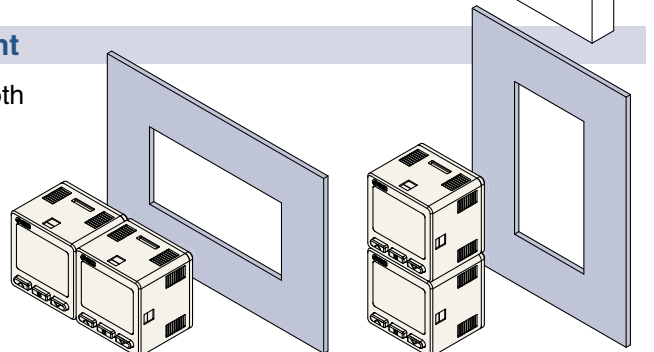
Mounting example

### Panel mount

Mountable side by side both vertically and horizontally

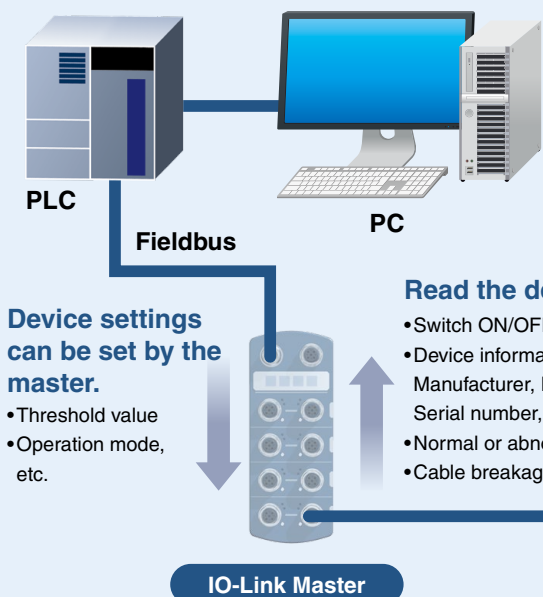
### One opening!

- Reduced panel fitting labor
- Space saving



# IO-Link Compatible ZSE20B(F)-L/ISE20B-L p. 15

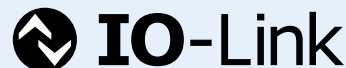
Visualization of operation/equipment status/Remote monitoring and control by communication



**Configuration File (IODD File\*1)**

- Manufacturer
- Product part no.
- Set value

**\*1 IODD File:**  
IODD is an abbreviation of IO Device Description. This file is necessary for setting the device and connecting it to a master. Save the IODD file on the PC to be used to set the device prior to use.



IO-Link is an open communication interface technology between the sensor/actuator and the I/O terminal that is an international standard, IEC61131-9.

### Read the device data.

- Switch ON/OFF signal and analog value
- Device information: Manufacturer, Product part number, Serial number, etc.
- Normal or abnormal device status
- Cable breakage



IO-Link Compatible Device ZSE20B(F)-L/ISE20B-L

## Implement diagnostic bits in the process data.

The diagnostic bit in the cyclic process data makes it easy to find problems with the equipment. It is possible to find problems with the equipment in real time using the cyclic (cycle) data and to monitor such problems in detail with the noncyclic (aperiodic) data.

### Process Data

| Bit offset | Item                    | Note                  |
|------------|-------------------------|-----------------------|
| 0          | OUT1 output             | 0: OFF 1: ON          |
| 1          | OUT2 output             | 0: OFF 1: ON          |
| 2          | Diagnosis               | 0: Normal 1: Abnormal |
| 3 to 15    | Measured pressure value | Unsigned 13 bit       |

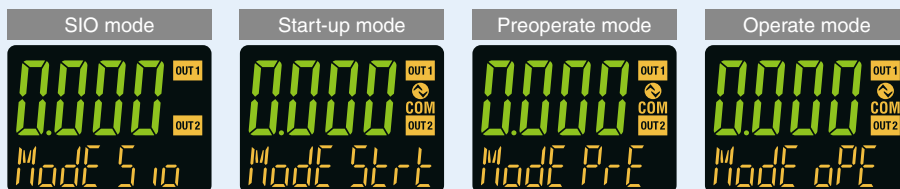
### Diagnosis items

- Internal product malfunction
- Outside of zero-clear range
- Outside of rated pressure range
- Upper temperature limit exceeded inside the product

| Bit offset | 15                      | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2         | 1    | 0    |
|------------|-------------------------|----|----|----|----|----|---|---|---|---|---|---|---|-----------|------|------|
| Item       | Measured pressure value |    |    |    |    |    |   |   |   |   |   |   |   | Diagnosis | OUT2 | OUT1 |

## Display function

Displays the output communication status and indicates the presence of communication data



### Operation and Display

| Communication with master | IO-Link status indicator light | Status                      | Screen display*3                                       | Description   |   |
|---------------------------|--------------------------------|-----------------------------|--|---|---|
| Yes                       | COM*1                          | IO-Link mode                | Operate  | Mode oPE  | Normal communication status (readout of measured value)<br><br>At the start of communication                                |
|                           |                                |                             | Start up   | Mode Start  |   |
|                           |                                |                             | Preoperate   | Mode Pre-E  |   |
|                           |                                | Abnormal                    | Version does not match                                 | Er 15<br>V 1.0  | IO-Link version does not match that of the master. The master uses version 1.0.<br>* The applicable IO-Link version is 1.1. |
| Lock                      | Mode Loc                       |                             | Back-up and re-store required due to data storage lock |   |   |
| No                        | OFF                            | Communication disconnection | Mode oPE<br>Mode Start<br>Mode Pre-E                   | Normal communication was not received for 1 second or longer. |   |
|                           |                                | SIO mode                    | Mode S io  | General switch output   |   |

\*1 The COM indicator is ON when communication with the master is established. \*2 In IO-Link mode, the IO-Link indicator is ON or flashes. \*3 When the sub screen is set to Mode

## For General Fluids ZSE20C(F)/ISE20C(H) p. 24

### Stainless Diaphragm

Oil-free (Single-layer diaphragm structure)

**Sensor unit : Stainless steel 630**

**Fitting parts: Stainless steel 304**

A stainless steel 316L option is also available for the sensor unit and fitting parts.



**Enclosure: IP65**

### Leakage

**$1 \times 10^{-10} \text{ Pa} \cdot \text{m}^3/\text{s}$**

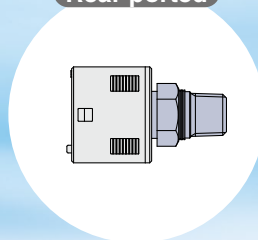
<Face seal and compression fitting>

**$1 \times 10^{-5} \text{ Pa} \cdot \text{m}^3/\text{s}$**

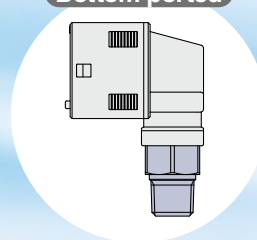
<Threaded type (R, Rc, NPT, G)>

### Select from 2 Piping Directions.

Rear ported



Bottom ported



### Welded structure for sensor units and fitting parts

Select from a face seal or compression fitting.

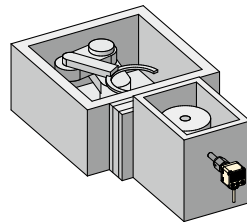
Face seal



Compression



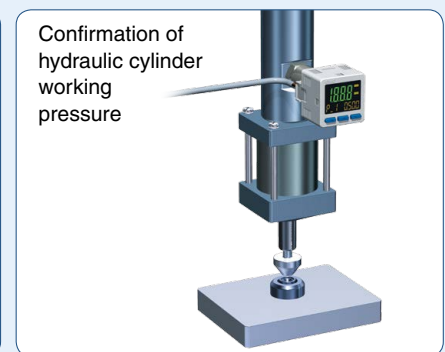
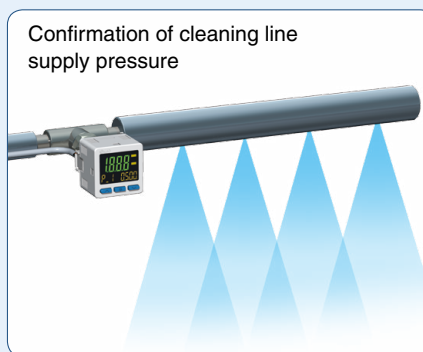
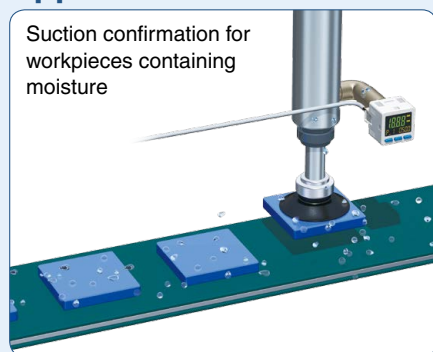
Confirmation of the atmospheric pressure of a load lock chamber



### Applicable Fluid Examples

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

### Applications



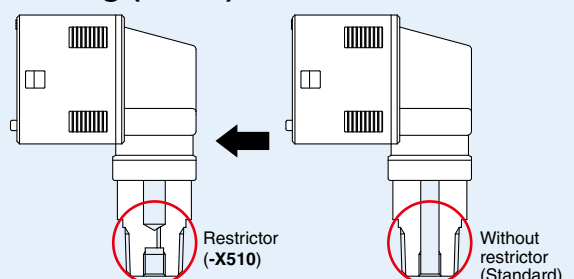
### Made to Order

#### ● Parts in Contact with Fluid: Stainless Steel 316L


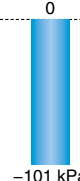
This pressure switch has increased corrosion resistance due to the use of stainless steel 316L for the parts in contact with fluid (pressure sensor and fitting).

#### ● Restrictor-installed Fitting (-X510)

A pressure switch that has a restrictor installed in the fitting is available to prevent the sensor from being damaged by water hammer or fluid inertia. (Refer to p. 38 for details.)



## Introduction of Series

|                      | 1 output IP40 ZSE/ISE20 p. 9   |   |  | 2 outputs IP40 ZSE/ISE20A p. 11  |  |   |
|----------------------|--|---|--|--|--|---|
| Applicable fluid     |  Air                                    |   |  |  |  |   |
| Model                | For vacuum pressure<br><br><b>ZSE20</b> | For compound pressure<br><br><b>ZSE20F</b> | For positive pressure<br><br><b>ISE20</b> | For vacuum pressure<br><br><b>ZSE20A</b> | For compound pressure<br><br><b>ZSE20AF</b> | For positive pressure<br><br><b>ISE20A</b> |
| Rated pressure range | <br>0<br>-101 kPa                      | <br>100 kPa<br>-100 kPa                   | <br>1 MPa<br>-100 kPa                    | <br>0<br>-101 kPa                       | <br>100 kPa<br>-100 kPa                    | <br>1 MPa<br>-100 kPa                     |
| Withstand pressure   | 500 kPa  |   | 1.5 MPa  | 500 kPa  |  | 1.5 MPa   |
| Output specification | 1 output (NPN/PNP)   |   |  | 2 outputs (NPN/PNP)  |  |   |
|                      |  |   |  | Analog (Voltage/Current)   |  |   |
| Enclosure            | IP40   |   |  | IP40   |  |   |
| Piping               | M5 female thread, R1/8, NPT1/8   |   |  |  |  |   |
| Note                 | —  |   |  | Copy function, Auto-shift function   |  |   |

## CONTENTS










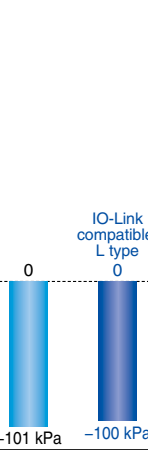
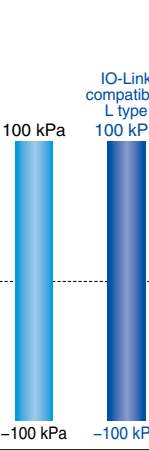
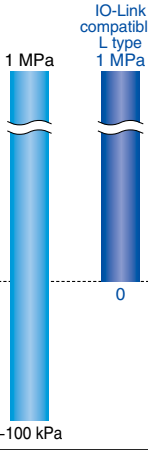
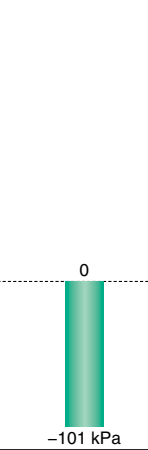
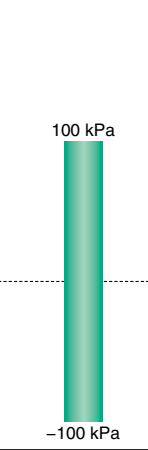
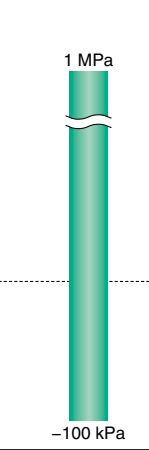
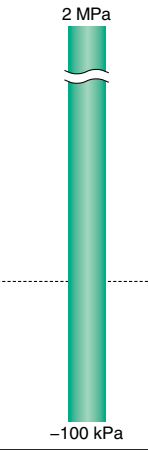
### 3-Screen Display High-Precision Digital Pressure Switch ZSE20(F)/ISE20 Series

|   |       |
|---|-------|
| How to Order                                | p. 9  |
| Specifications                              | p. 10 |
| Set Pressure Range and Rated Pressure Range | p. 17 |
| Analog Output                               | p. 17 |
| IO-Link: Process Data                       | p. 17 |
| Functions                                   | p. 17 |
| Internal Circuits and Wiring Examples       | p. 18 |
| Dimensions                                  | p. 20 |

### 3-Screen Display High-Precision Digital Pressure Switch ZSE20A(F)/ISE20A Series

|   |       |
|---|-------|
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| Specifications                              | p. 12 |
| Set Pressure Range and Rated Pressure Range | p. 17 |
| Analog Output                               | p. 17 |
| IO-Link: Process Data                       | p. 17 |
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|   |  |  |   |   |  |  |
|---|--|--|---|---|--|--|
| <b>2 outputs IP65 ZSE/ISE20B p. 13</b>  |  |  | <b>2 outputs IP65 ZSE/ISE20C p. 24</b>  |   |  |  |
| <b>IO-Link 1 output IP65 ZSE/ISE20B-L p. 15</b>                                       |  |  |   |   |  |  |
|  Air |  |  |  General fluids |   |  |  |
| For vacuum pressure   | For compound pressure  | For positive pressure  | For vacuum pressure   | For compound pressure   | For positive pressure (1 MPa)  | For positive pressure (2 MPa)  |
|      |   |   |                  |   |   |   |
| <b>ZSE20B(-L)</b>   | <b>ZSE20BF(-L)</b>   | <b>ISE20B</b>  | <b>ZSE20C</b>   | <b>ZSE20CF</b>  | <b>ISE20C</b>  | <b>ISE20C</b>  |
|     |  |  |                 |  |  |  |
| 500 kPa   | 500 kPa  | 1.5 MPa  | 500 kPa   | 500 kPa   | 2 MPa  | 4 MPa  |
| 2 outputs (NPN/PNP)/IO-Link*4   |  |  | 2 outputs (NPN/PNP)   |   |  |  |
| Analog (Voltage/Current)*5  |  |  | Analog (Voltage/Current)  |   |  |  |
| IP65  |  |  | IP65  |   |  |  |
| M5 female thread, R1/8, NPT1/8  |  |  | R1/4*1, NPT1/4*1, G1/4*1, Rc1/8, URJ1/4*2, TSJ1/4*3   |   |  |  |
| Copy function*5, Auto-shift function*5  |  |  | Copy function, Auto-shift function  |   |  |  |

\*4 1 output in SIO mode (NPN or PNP switching type)  
 \*5 This function is not provided with the IO-Link compatible type.

\*1 M5 female threaded \*2 Face seal fitting \*3 Compression fitting

**3-Screen Display High-Precision Digital Pressure Switch ZSE20B(F)/ISE20B Series**

How to Order ..... p. 13  
 Specifications ..... p. 14

**3-Screen Display High-Precision Digital Pressure Switch/IO-Link Compatible ZSE20B(F)-L/ISE20B-L Series**

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 Specifications ..... p. 16  
 Set Pressure Range and Rated Pressure Range ..... p. 17  
 Analog Output ..... p. 17  
 IO-Link: Process Data ..... p. 17  
 Functions ..... p. 17  
 Internal Circuits and Wiring Examples ..... p. 19  
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**3-Screen Display High-Precision Digital Pressure Switch for General Fluids ZSE20C(F)/ISE20C(H) Series**

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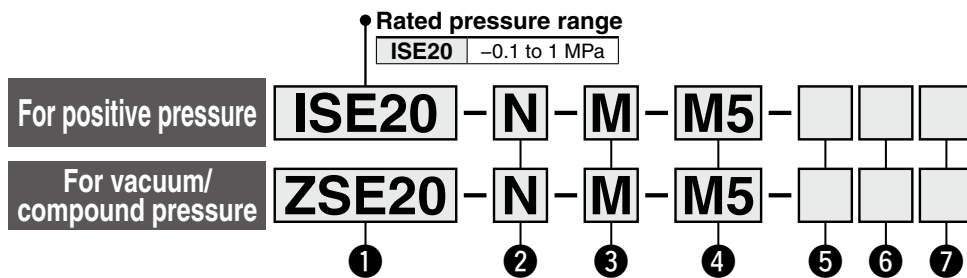
1 Output

# 3-Screen Display High-Precision Digital Pressure Switch

# ZSE20(F)/ISE20 Series



## How to Order



### ① Rated pressure range

|        |                 |
|--------|-----------------|
| ZSE20  | 0 to -101 kPa   |
| ZSE20F | -100 to 100 kPa |

### ② Output specification

| Symbol | Description                 |
|--------|-----------------------------|
| N      | NPN open collector 1 output |
| P      | PNP open collector 1 output |

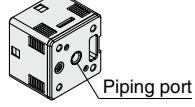
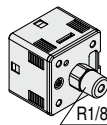
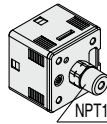
### ③ Unit specification

| Symbol | Description                                    |
|--------|--|
| Nil    | Units selection function*1                     |
| M      | SI unit only*2                                 |
| P      | Units selection function (Initial value psi)*1 |

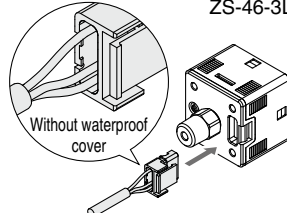
\*1 Under the New Measurement Act, switches with the units selection function are not permitted for use in Japan.

\*2 Fixed unit: kPa, MPa

### ④ Piping specification

| Symbol | Description   |
|--------|---|
| M5     | M5 female thread<br>                         |
| O1     | R1/8<br>R1/8 Piping adapter ZS-46-N1<br>     |
| N01    | NPT1/8<br>NPT1/8 Piping adapter ZS-46-N2<br> |

### ⑤ Option 1

| Symbol | Description   |
|--------|---|
| Nil    | Without lead wire   |
| L      | Lead wire with connector (3-core, 2 m lead wire)<br> |

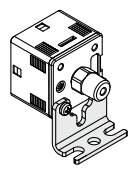
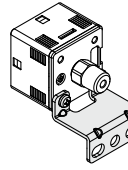
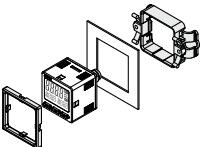
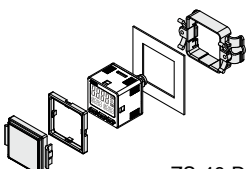
\* For the lead wire with M12 connector, refer to p. 38.

### ⑦ Option 3

| Symbol | Operation manual*1 | Calibration certificate*1 |
|--------|--------------------|---------------------------|
| Nil    | ○                  | —                         |
| Y      | —                  | —                         |
| K      | ○                  | ○                         |
| T      | —                  | ○                         |

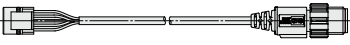


\*1 All texts are in both English and Japanese.

### ⑥ Option 2

| Symbol | Description   |
|--------|---|
| Nil    | None  |
| A1     | Bracket A (Vertical mounting)<br>                |
| A2     | Bracket B (Horizontal mounting)<br>              |
| B      | Panel mount adapter<br>                          |
| D      | Panel mount adapter + Front protection cover<br> |

## Options/Part Nos.

When only optional parts are required, order with the part numbers listed below.

| Description                                  | Part no.    | Note  |
|--|-------------|---|
| Bracket A                                    | ZS-46-A1    | Tapping screw: Nominal size 3 x 8 L (2 pcs.)  |
| Bracket B                                    | ZS-46-A2    | Tapping screw: Nominal size 3 x 8 L (2 pcs.)  |
| Panel mount adapter                          | ZS-46-B     | —   |
| Panel mount adapter + Front protection cover | ZS-46-D     | —   |
| Lead wire with connector                     | ZS-46-3L    | 3-core, 2 m, Non-waterproof (Without waterproof cover)  |
| Lead wire with M12 connector (Made to Order) | ZS-46-5LM12 |    |
| Front protection cover                       | ZS-27-01    | —   |
| R1/8 Piping adapter                          | ZS-46-N1    | R1/8  NPT1/8  |
| NPT1/8 Piping adapter                        | ZS-46-N2    |   |

# 3-Screen Display High-Precision Digital Pressure Switch **ZSE20(F)/ISE20 Series**

For details on the specific product precautions, refer to the "Operation Manual" on the SMC website. Click [here](#) for details.

## Specifications

| Model                                     |   | ZSE20 (Vacuum pressure)  | ZSE20F (Compound pressure) | ISE20 (Positive pressure)                |  |
|---|---|--|----------------------------|--|--|
| <b>Applicable fluid</b>                   |   | Air, Non-corrosive gas, Non-flammable gas  |                            |  |  |
| <b>Pressure</b>                           | <b>Rated pressure range</b>                     | 0.0 to -101.0 kPa  | -100.0 to 100.0 kPa        | -0.100 to 1.000 MPa                      |  |
|   | <b>Display/Set pressure range</b>               | 10.0 to -105.0 kPa   | -105.0 to 105.0 kPa        | -0.105 to 1.050 MPa                      |  |
|   | <b>Display/Smallest settable increment</b>      | 0.1 kPa  |                            | 0.001 MPa                                |  |
|   | <b>Withstand pressure</b>                       | 500 kPa  |                            | 1.5 MPa                                  |  |
| <b>Power supply</b>                       | <b>Power supply voltage</b>                     | 12 to 24 VDC ±10%, Ripple (p-p) 10% or less  |                            |  |  |
|   | <b>Current consumption</b>                      | 25 mA or less  |                            |  |  |
|   | <b>Protection</b>                               | Polarity protection  |                            |  |  |
| <b>Accuracy</b>                           | <b>Display accuracy</b>                         | ±2% F.S. ±1 digit (Ambient temperature of 25 ±3°C)   |                            |  |  |
|   | <b>Repeatability</b>                            | ±0.2% F.S. ±1 digit  |                            |  |  |
|   | <b>Temperature characteristics</b>              | ±2% F.S. (25°C standard)   |                            |  |  |
| <b>Switch output</b>                      | <b>Output type</b>                              | NPN or PNP open collector 1 output   |                            |  |  |
|   | <b>Output mode</b>                              | Hysteresis mode, Window comparator mode, Error output, Output OFF  |                            |  |  |
|   | <b>Switch operation</b>                         | Normal output, Reversed output   |                            |  |  |
|   | <b>Max. load current</b>                        | 80 mA  |                            |  |  |
|   | <b>Max. applied voltage (NPN only)</b>          | 28 V   |                            |  |  |
|   | <b>Internal voltage drop (Residual voltage)</b> | 1 V or less (at load current of 80 mA)   |                            |  |  |
|   | <b>Delay time*1</b>                             | 1.5 ms or less (with anti-chattering function: 20, 100, 500, 1000, 2000, 5000 ms)                                  |                            |  |  |
|   | <b>Hysteresis</b>                               | <b>Hysteresis mode</b>   | Variable from 0*2          |  |  |
|   |   | <b>Window comparator mode</b>  |                            |  |  |
| <b>Short circuit protection</b>           | Yes   |  |                            |  |  |
| <b>Display</b>                            | <b>Unit*3</b>                                   | MPa, kPa, kgf/cm <sup>2</sup> , bar, psi, inHg, mmHg   |                            | MPa, kPa, kgf/cm <sup>2</sup> , bar, psi |  |
|   | <b>Display type</b>                             | LCD  |                            |  |  |
|   | <b>Number of screens</b>                        | 3-screen display (Main screen, Sub screen x 2)   |                            |  |  |
|   | <b>Display color</b>                            | 1) Main screen: Red/Green<br>2) Sub screen: Orange   |                            |  |  |
|   | <b>Number of display digits</b>                 | 1) Main screen: 4 digits (7 segments)<br>2) Sub screen: 4 digits (Upper 1 digit 11 segments, 7 segments for other) |                            |  |  |
|   | <b>Indicator light</b>                          | Lights up when switch output is turned ON. OUT1: Orange  |                            |  |  |
| <b>Digital filter*4</b>                   | 0, 10, 50, 100, 500, 1000, 5000 ms              |  |                            |  |  |
| <b>Environment</b>                        | <b>Enclosure</b>                                | IP40   |                            |  |  |
|   | <b>Withstand voltage</b>                        | 1000 VAC for 1 minute between terminals and housing  |                            |  |  |
|   | <b>Insulation resistance</b>                    | 50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing                                     |                            |  |  |
|   | <b>Operating temperature range</b>              | Operating: -5 to 50°C, Stored: -10 to 60°C (No condensation or freezing)   |                            |  |  |
|   | <b>Operating humidity range</b>                 | Operating/Stored: 35 to 85%RH (No condensation)  |                            |  |  |
| <b>Standards</b>                          | UL/CSA (E216656), CE, RoHS                      |  |                            |  |  |
| <b>Length of lead wire with connector</b> | 2 m   |  |                            |  |  |

\*1 Value without digital filter (at 0 ms)

\*2 If the applied pressure fluctuates around the set value, the hysteresis must be set to a value greater than the amount of fluctuation, or chattering will occur.

\*3 Setting is only possible for models with the units selection function. Only MPa or kPa is available for models without this function.

\*4 The response time indicates when the set value is 90% in relation to the step input.

\* Products with tiny scratches, marks, or display color or brightness variations which do not affect the performance of the product are verified as conforming products.

## Piping Specifications and Weights

| Model   |                                       | M5   | 01   | N01    |
|---|---------------------------------------|--|--|--------|
| <b>Port size</b>                                |                                       | M5 x 0.8                                     | R1/8   | NPT1/8 |
| <b>Materials of parts in contact with fluid</b> | <b>Sensor pressure receiving area</b> | Silicon                                      |  |        |
|   | <b>Piping port (Common)</b>           | PBT, CB156, Heat-resistant PPS, O-ring: HNBR |  |        |
|   | <b>Piping port</b>                    | —  | C3604 (Electroless nickel plating), Stainless steel 304, NBR |        |
| <b>Weight</b>                                   | <b>Body</b>                           | 22 g   | 32 g   | 34 g   |
|   | <b>Lead wire with connector</b>       | +35 g  |  |        |

## Cable Specifications

|                       |                              |                             |
|-----------------------|------------------------------|-----------------------------|
| <b>Conductor area</b> | 0.15 mm <sup>2</sup> (AWG26) |                             |
| <b>Insulator</b>      | <b>O.D.</b>                  | 1.0 mm                      |
|                       | <b>Color</b>                 | Brown, Blue, Black (3-core) |
| <b>Sheath</b>         | <b>Finished O.D.</b>         | ø3.4                        |

"Set Pressure Range and Rated Pressure Range," "Functions" → p. 17  
 "Internal Circuits and Wiring Examples" → p. 18 "Dimensions" → From p. 20

2 Outputs + Analog Output (Voltage/Current)



# 3-Screen Display High-Precision Digital Pressure Switch

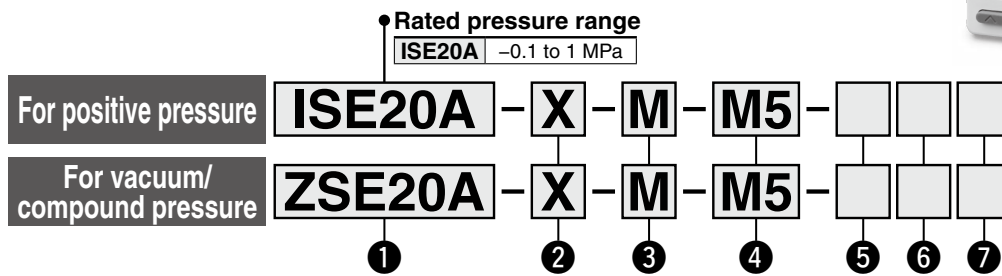
RoHS

IP40

# ZSE20A(F)/ISE20A Series



## How to Order



### ① Rated pressure range

|         |                 |
|---------|-----------------|
| ZSE20A  | 0 to -101 kPa   |
| ZSE20AF | -100 to 100 kPa |

### ② Output specification

| Symbol | Description   |
|--------|---|
| R      | NPN open collector 2 outputs + Analog voltage output *1 |
| S      | NPN open collector 2 outputs + Analog current output *1 |
| T      | PNP open collector 2 outputs + Analog voltage output *1 |
| V      | PNP open collector 2 outputs + Analog current output *1 |
| X      | NPN open collector 2 outputs + Copy function            |
| Y      | PNP open collector 2 outputs + Copy function            |

\*1 Can be switched to auto-shift or copy function

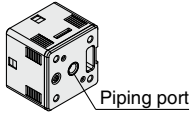
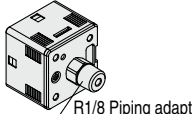
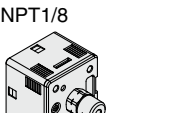
### ③ Unit specification

| Symbol | Description                                     |
|--------|---|
| Nil    | Units selection function *1                     |
| M      | SI unit only *2                                 |
| P      | Units selection function (Initial value psi) *1 |

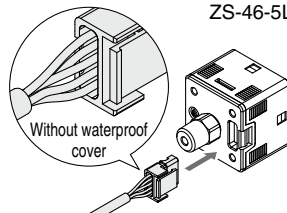
\*1 Under the New Measurement Act, switches with the units selection function are not permitted for use in Japan.

\*2 Fixed unit: kPa, MPa

### ④ Piping specification

| Symbol | Description  |
|--------|--|
| M5     | M5 female thread<br>                            |
| 01     | R1/8<br>R1/8 Piping adapter<br>ZS-46-N1<br>     |
| N01    | NPT1/8<br>NPT1/8 Piping adapter<br>ZS-46-N2<br> |

### ⑤ Option 1

| Symbol | Description   |
|--------|---|
| Nil    | Without lead wire   |
| J      | Lead wire with connector (5-core, 2 m lead wire)<br> |

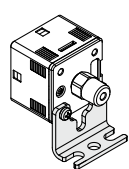
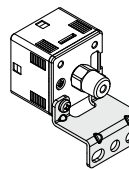
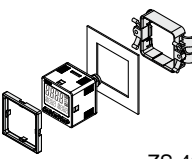
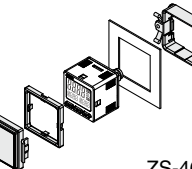
\* For the lead wire with M12 connector, refer to p. 38.

### ⑦ Option 3

| Symbol | Operation manual *1 | Calibration certificate *1 |
|--------|---------------------|----------------------------|
| Nil    | ○                   | —                          |
| Y      | —                   | —                          |
| K      | ○                   | ○                          |
| T      | —                   | ○                          |

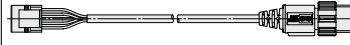


\*1 All texts are in both English and Japanese.

### ⑥ Option 2

| Symbol | Description   |
|--------|---|
| Nil    | None  |
| A1     | Bracket A (Vertical mounting)<br>                |
| A2     | Bracket B (Horizontal mounting)<br>              |
| B      | Panel mount adapter<br>                          |
| D      | Panel mount adapter + Front protection cover<br> |

## Options/Part Nos.

When only optional parts are required, order with the part numbers listed below.

| Description                                  | Part no.    | Note  |
|--|-------------|---|
| Bracket A                                    | ZS-46-A1    | Tapping screw: Nominal size 3 x 8 L (2 pcs.)  |
| Bracket B                                    | ZS-46-A2    | Tapping screw: Nominal size 3 x 8 L (2 pcs.)  |
| Panel mount adapter                          | ZS-46-B     | —   |
| Panel mount adapter + Front protection cover | ZS-46-D     | —   |
| Lead wire with connector                     | ZS-46-5L    | 5-core, 2 m, Non-waterproof (Without waterproof cover)  |
| Lead wire with M12 connector (Made to Order) | ZS-46-5LM12 |    |
| Front protection cover                       | ZS-27-01    | —   |
| R1/8 Piping adapter                          | ZS-46-N1    | R1/8  NPT1/8  |
| NPT1/8 Piping adapter                        | ZS-46-N2    |   |

# 3-Screen Display High-Precision Digital Pressure Switch **ZSE20A(F)/ISE20A Series**

For details on the specific product precautions, refer to the "Operation Manual" on the SMC website. Click [here](#) for details.

## Specifications

| Model                                     |   | ZSE20A (Vacuum pressure)   | ZSE20AF (Compound pressure)   | ISE20A (Positive pressure)   |  |
|---|---|--|---|------------------------------|--|
| <b>Applicable fluid</b>                   |   | Air, Non-corrosive gas, Non-flammable gas  |   |                              |  |
| <b>Pressure</b>                           | <b>Rated pressure range</b>                     | 0.0 to -101.0 kPa  | -100.0 to 100.0 kPa   | -0.100 to 1.000 MPa          |  |
|   | <b>Display/Set pressure range</b>               | 10.0 to -105.0 kPa   | -105.0 to 105.0 kPa   | -0.105 to 1.050 MPa          |  |
|   | <b>Display/Smallest settable increment</b>      | 0.1 kPa  |   | 0.001 MPa                    |  |
|   | <b>Withstand pressure</b>                       | 500 kPa  |   | 1.5 MPa                      |  |
| <b>Power supply</b>                       | <b>Power supply voltage</b>                     | 12 to 24 VDC ±10%, Ripple (p-p) 10% or less  |   |                              |  |
|   | <b>Current consumption</b>                      | 35 mA or less  |   |                              |  |
|   | <b>Protection</b>                               | Polarity protection  |   |                              |  |
| <b>Accuracy</b>                           | <b>Display accuracy</b>                         | ±2% F.S. ±1 digit (Ambient temperature of 25 ±3°C)   |   |                              |  |
|   | <b>Repeatability</b>                            | ±0.2% F.S. ±1 digit  |   |                              |  |
|   | <b>Analog output accuracy</b>                   | ±2.5% F.S. (Ambient temperature of 25 ±3°C)  |   |                              |  |
|   | <b>Analog output linearity</b>                  | ±1% F.S.   |   |                              |  |
|   | <b>Temperature characteristics</b>              | ±2% F.S. (25°C standard)   |   |                              |  |
| <b>Switch output</b>                      | <b>Output type</b>                              | NPN or PNP open collector 2 outputs  |   |                              |  |
|   | <b>Output mode</b>                              | Hysteresis mode, Window comparator mode, Error output, Output OFF  |   |                              |  |
|   | <b>Switch operation</b>                         | Normal output, Reversed output   |   |                              |  |
|   | <b>Max. load current</b>                        | 80 mA  |   |                              |  |
|   | <b>Max. applied voltage (NPN only)</b>          | 28 V   |   |                              |  |
|   | <b>Internal voltage drop (Residual voltage)</b> | 1 V or less (at load current of 80 mA)   |   |                              |  |
|   | <b>Delay time*1</b>                             | 1.5 ms or less (with anti-chattering function: 20, 100, 500, 1000, 2000, 5000 ms)                                  |   |                              |  |
|   | <b>Hysteresis</b>                               | <b>Hysteresis mode</b>   | Variable from 0*2   |                              |  |
|   |   | <b>Window comparator mode</b>  |   |                              |  |
|   | <b>Short circuit protection</b>                 | Yes  |   |                              |  |
| <b>Analog output</b>                      | <b>Voltage output</b>                           | <b>Output type</b>   | Voltage output: 1 to 5 V  | Voltage output: 0.6 to 5 V   |  |
|   |   | <b>Output impedance</b>  | Approx. 1 kΩ  |                              |  |
|   | <b>Current output</b>                           | <b>Output type</b>   | Current output: 4 to 20 mA  | Current output: 2.4 to 20 mA |  |
|   |   | <b>Load impedance</b>  | Maximum load impedance at power supply voltage of 12 V: 300 Ω<br>at power supply voltage of 24 V: 600 Ω<br>Minimum load impedance: 50 Ω |                              |  |
| <b>Auto-shift input</b>                   | <b>Input type</b>                               | Non-voltage input: 0.4 V or less   |   |                              |  |
|   | <b>Input mode</b>                               | Select from Auto-shift or Auto-shift zero.   |   |                              |  |
|   | <b>Input time</b>                               | 5 ms or more   |   |                              |  |
| <b>Display</b>                            | <b>Unit*3</b>                                   | MPa, kPa, kgf/cm <sup>2</sup> , bar, psi, inHg, mmHg   | MPa, kPa, kgf/cm <sup>2</sup> , bar, psi  |                              |  |
|   | <b>Display type</b>                             | LCD  |   |                              |  |
|   | <b>Number of screens</b>                        | 3-screen display (Main screen, Sub screen x 2)   |   |                              |  |
|   | <b>Display color</b>                            | 1) Main screen: Red/Green<br>2) Sub screen: Orange   |   |                              |  |
|   | <b>Number of display digits</b>                 | 1) Main screen: 4 digits (7 segments)<br>2) Sub screen: 4 digits (Upper 1 digit 11 segments, 7 segments for other) |   |                              |  |
|   | <b>Indicator light</b>                          | Lights up when switch output is turned ON. OUT1, OUT2: Orange  |   |                              |  |
| <b>Digital filter*4</b>                   | 0, 10, 50, 100, 500, 1000, 5000 ms              |  |   |                              |  |
| <b>Environment</b>                        | <b>Enclosure</b>                                | IP40   |   |                              |  |
|   | <b>Withstand voltage</b>                        | 1000 VAC for 1 minute between terminals and housing  |   |                              |  |
|   | <b>Insulation resistance</b>                    | 50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing                                     |   |                              |  |
|   | <b>Operating temperature range</b>              | Operating: -5 to 50°C, Stored: -10 to 60°C (No condensation or freezing)   |   |                              |  |
| <b>Operating humidity range</b>           | Operating/Stored: 35 to 85%RH (No condensation) |  |   |                              |  |
| <b>Standards</b>                          | UL/CSA (E216656), CE, RoHS                      |  |   |                              |  |
| <b>Length of lead wire with connector</b> | 2 m   |  |   |                              |  |

\*1 Value without digital filter (at 0 ms)

\*2 If the applied pressure fluctuates around the set value, the hysteresis must be set to a value greater than the amount of fluctuation, or chattering will occur.

\*3 Setting is only possible for models with the units selection function. Only MPa or kPa is available for models without this function.

\*4 The response time indicates when the set value is 90% in relation to the step input.

\* Products with tiny scratches, marks, or display color or brightness variations which do not affect the performance of the product are verified as conforming products.

## Piping Specifications and Weights

| Model   |                                       | M5  | 01   | N01    |
|---|---------------------------------------|---|------|--------|
| <b>Port size</b>                                |                                       | M5 x 0.8  | R1/8 | NPT1/8 |
| <b>Materials of parts in contact with fluid</b> | <b>Sensor pressure receiving area</b> | Silicon   |      |        |
|   | <b>Piping port (Common)</b>           | PBT, CB156, Heat-resistant PPS, O-ring: HNBR                      |      |        |
|   | <b>Piping port</b>                    | —<br>C3604 (Electroless nickel plating), Stainless steel 304, NBR |      |        |
| <b>Weight</b>                                   | <b>Body</b>                           | 24 g  | 34 g | 36 g   |
|   | <b>Lead wire with connector</b>       | +39 g   |      |        |

## Cable Specifications

|                       |                      |  |
|-----------------------|----------------------|--|
| <b>Conductor area</b> |                      | 0.15 mm <sup>2</sup> (AWG26)             |
| <b>Insulator</b>      | <b>O.D.</b>          | 1.0 mm                                   |
|                       | <b>Color</b>         | Brown, Blue, Black, White, Gray (5-core) |
| <b>Sheath</b>         | <b>Finished O.D.</b> | ø3.5                                     |

"Set Pressure Range and Rated Pressure Range," "Functions" → p. 17  
"Internal Circuits and Wiring Examples" → From p. 18 "Dimensions" → From p. 20

2 Outputs + Analog Output (Voltage/Current)



# 3-Screen Display High-Precision Digital Pressure Switch

RoHS

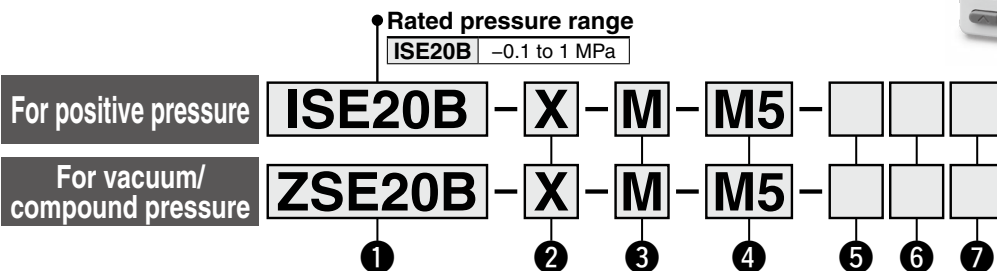
IP65

# ZSE20B(F)/ISE20B Series



For the IO-Link compatible type, refer to p. 15.

## How to Order



### ① Rated pressure range

|         |                 |
|---------|-----------------|
| ZSE20B  | 0 to -101 kPa   |
| ZSE20BF | -100 to 100 kPa |

### ② Output specification

| Symbol | Description   |
|--------|---|
| R      | NPN open collector 2 outputs + Analog voltage output *1 |
| S      | NPN open collector 2 outputs + Analog current output *1 |
| T      | PNP open collector 2 outputs + Analog voltage output *1 |
| V      | PNP open collector 2 outputs + Analog current output *1 |
| X      | NPN open collector 2 outputs + Copy function            |
| Y      | PNP open collector 2 outputs + Copy function            |

\*1 Can be switched to auto-shift or copy function

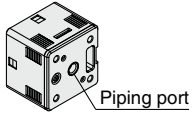
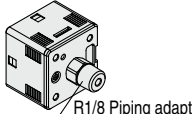
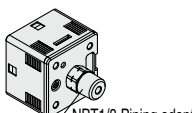
### ③ Unit specification

| Symbol | Description                                    |
|--------|--|
| Nil    | Units selection function*1                     |
| M      | SI unit only*2                                 |
| P      | Units selection function (Initial value psi)*1 |

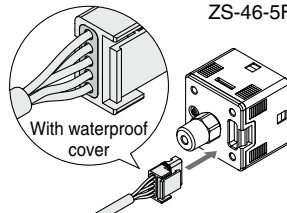
\*1 Under the New Measurement Act, switches with the units selection function are not permitted for use in Japan.

\*2 Fixed unit: kPa, MPa

### ④ Piping specification

| Symbol | Description   |
|--------|---|
| M5     | M5 female thread<br>                         |
| 01     | R1/8<br>R1/8 Piping adapter ZS-46-N1<br>     |
| N01    | NPT1/8<br>NPT1/8 Piping adapter ZS-46-N2<br> |

### ⑤ Option 1

| Symbol | Description  |
|--------|--|
| Nil    | Without lead wire  |
| W      | Lead wire with connector (5-core, 2 m lead wire, With waterproof cover)<br> |

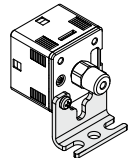
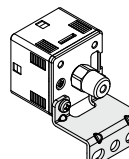
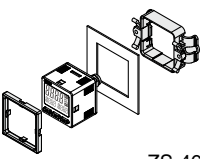
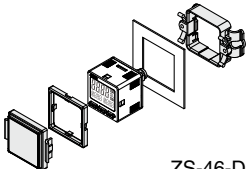
\* For the lead wire with M12 connector, refer to p. 38.

### ⑦ Option 3

| Symbol | Operation manual*1 | Calibration certificate*1 |
|--------|--------------------|---------------------------|
| Nil    | ○                  | —                         |
| Y      | —                  | —                         |
| K      | ○                  | ○                         |
| T      | —                  | ○                         |

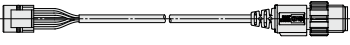


\*1 All texts are in both English and Japanese.

### ⑥ Option 2

| Symbol | Description   |
|--------|---|
| Nil    | None  |
| A1     | Bracket A (Vertical mounting)<br>                |
| A2     | Bracket B (Horizontal mounting)<br>              |
| B      | Panel mount adapter<br>                          |
| D      | Panel mount adapter + Front protection cover<br> |

## Options/Part Nos.

When only optional parts are required, order with the part numbers listed below.

| Description                                  | Part no.    | Note  |
|--|-------------|---|
| Bracket A                                    | ZS-46-A1    | Tapping screw: Nominal size 3 x 8 L (2 pcs.)  |
| Bracket B                                    | ZS-46-A2    | Tapping screw: Nominal size 3 x 8 L (2 pcs.)  |
| Panel mount adapter                          | ZS-46-B     | —   |
| Panel mount adapter + Front protection cover | ZS-46-D     | —   |
| Lead wire with connector                     | ZS-46-5F    | 5-core, 2 m, Waterproof (With waterproof cover)   |
| Lead wire with M12 connector (Made to Order) | ZS-46-5FM12 |    |
| Front protection cover                       | ZS-27-01    | —   |
| R1/8 Piping adapter                          | ZS-46-N1    | R1/8  NPT1/8  |
| NPT1/8 Piping adapter                        | ZS-46-N2    |   |

# 3-Screen Display High-Precision Digital Pressure Switch **ZSE20B(F)/ISE20B Series**

For details on the specific product precautions, refer to the "Operation Manual" on the SMC website. Click [here](#) for details.

## Specifications

| Model                                     |   | ZSE20B (Vacuum pressure)   | ZSE20BF (Compound pressure)   | ISE20B (Positive pressure)   |  |
|---|---|--|---|------------------------------|--|
| <b>Applicable fluid</b>                   |   | Air, Non-corrosive gas, Non-flammable gas  |   |                              |  |
| <b>Pressure</b>                           | <b>Rated pressure range</b>                     | 0.0 to -101.0 kPa  | -100.0 to 100.0 kPa   | -0.100 to 1.000 MPa          |  |
|   | <b>Display/Set pressure range</b>               | 10.0 to -105.0 kPa   | -105.0 to 105.0 kPa   | -0.105 to 1.050 MPa          |  |
|   | <b>Display/Smallest settable increment</b>      | 0.1 kPa  |   | 0.001 MPa                    |  |
|   | <b>Withstand pressure</b>                       | 500 kPa  |   | 1.5 MPa                      |  |
| <b>Power supply</b>                       | <b>Power supply voltage</b>                     | 12 to 24 VDC ±10%, Ripple (p-p) 10% or less  |   |                              |  |
|   | <b>Current consumption</b>                      | 35 mA or less  |   |                              |  |
|   | <b>Protection</b>                               | Polarity protection  |   |                              |  |
| <b>Accuracy</b>                           | <b>Display accuracy</b>                         | ±2% F.S. ±1 digit (Ambient temperature of 25 ±3°C)   |   |                              |  |
|   | <b>Repeatability</b>                            | ±0.2% F.S. ±1 digit  |   |                              |  |
|   | <b>Analog output accuracy</b>                   | ±2.5% F.S. (Ambient temperature of 25 ±3°C)  |   |                              |  |
|   | <b>Analog output linearity</b>                  | ±1% F.S.   |   |                              |  |
|   | <b>Temperature characteristics</b>              | ±2% F.S. (25°C standard)   |   |                              |  |
| <b>Switch output</b>                      | <b>Output type</b>                              | NPN or PNP open collector 2 outputs  |   |                              |  |
|   | <b>Output mode</b>                              | Hysteresis mode, Window comparator mode, Error output, Output OFF  |   |                              |  |
|   | <b>Switch operation</b>                         | Normal output, Reversed output   |   |                              |  |
|   | <b>Max. load current</b>                        | 80 mA  |   |                              |  |
|   | <b>Max. applied voltage (NPN only)</b>          | 28 V   |   |                              |  |
|   | <b>Internal voltage drop (Residual voltage)</b> | 1 V or less (at load current of 80 mA)   |   |                              |  |
|   | <b>Delay time*1</b>                             | 1.5 ms or less (with anti-chattering function: 20, 100, 500, 1000, 2000, 5000 ms)                                  |   |                              |  |
|   | <b>Hysteresis</b>                               | <b>Hysteresis mode</b>   | Variable from 0*2   |                              |  |
|   |   | <b>Window comparator mode</b>  |   |                              |  |
|   | <b>Short circuit protection</b>                 | Yes  |   |                              |  |
| <b>Analog output</b>                      | <b>Voltage output</b>                           | <b>Output type</b>   | Voltage output: 1 to 5 V  | Voltage output: 0.6 to 5 V   |  |
|   |   | <b>Output impedance</b>  | Approx. 1 kΩ  |                              |  |
|   | <b>Current output</b>                           | <b>Output type</b>   | Current output: 4 to 20 mA  | Current output: 2.4 to 20 mA |  |
|   |   | <b>Load impedance</b>  | Maximum load impedance at power supply voltage of 12 V: 300 Ω<br>at power supply voltage of 24 V: 600 Ω<br>Minimum load impedance: 50 Ω |                              |  |
| <b>Auto-shift input</b>                   | <b>Input type</b>                               | Non-voltage input: 0.4 V or less   |   |                              |  |
|   | <b>Input mode</b>                               | Select from Auto-shift or Auto-shift zero.   |   |                              |  |
|   | <b>Input time</b>                               | 5 ms or more   |   |                              |  |
| <b>Display</b>                            | <b>Unit*3</b>                                   | MPa, kPa, kgf/cm <sup>2</sup> , bar, psi, inHg, mmHg   | MPa, kPa, kgf/cm <sup>2</sup> , bar, psi  |                              |  |
|   | <b>Display type</b>                             | LCD  |   |                              |  |
|   | <b>Number of screens</b>                        | 3-screen display (Main screen, Sub screen x 2)   |   |                              |  |
|   | <b>Display color</b>                            | 1) Main screen: Red/Green<br>2) Sub screen: Orange   |   |                              |  |
|   | <b>Number of display digits</b>                 | 1) Main screen: 4 digits (7 segments)<br>2) Sub screen: 4 digits (Upper 1 digit 11 segments, 7 segments for other) |   |                              |  |
|   | <b>Indicator light</b>                          | Lights up when switch output is turned ON. OUT1, OUT2: Orange  |   |                              |  |
| <b>Digital filter*4</b>                   | 0, 10, 50, 100, 500, 1000, 5000 ms              |  |   |                              |  |
| <b>Environment</b>                        | <b>Enclosure</b>                                | IP65   |   |                              |  |
|   | <b>Withstand voltage</b>                        | 1000 VAC for 1 minute between terminals and housing  |   |                              |  |
|   | <b>Insulation resistance</b>                    | 50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing                                     |   |                              |  |
|   | <b>Operating temperature range</b>              | Operating: -5 to 50°C, Stored: -10 to 60°C (No condensation or freezing)   |   |                              |  |
|   | <b>Operating humidity range</b>                 | Operating/Stored: 35 to 85%RH (No condensation)  |   |                              |  |
| <b>Standards</b>                          | UL/CSA (E216656), CE, RoHS                      |  |   |                              |  |
| <b>Length of lead wire with connector</b> |   | 2 m  |   |                              |  |

\*1 Value without digital filter (at 0 ms)

\*2 If the applied pressure fluctuates around the set value, the hysteresis must be set to a value greater than the amount of fluctuation, or chattering will occur.

\*3 Setting is only possible for models with the units selection function. Only MPa or kPa is available for models without this function.

\*4 The response time indicates when the set value is 90% in relation to the step input.

\* Products with tiny scratches, marks, or display color or brightness variations which do not affect the performance of the product are verified as conforming products.

## Piping Specifications and Weights

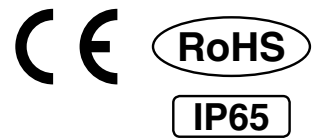
| Model   |                                       | M5  | 01   | N01    |
|---|---------------------------------------|---|------|--------|
| <b>Port size</b>                                |                                       | M5 x 0.8  | R1/8 | NPT1/8 |
| <b>Materials of parts in contact with fluid</b> | <b>Sensor pressure receiving area</b> | Silicon   |      |        |
|   | <b>Piping port (Common)</b>           | PBT, CB156, Heat-resistant PPS, O-ring: HNBR                      |      |        |
|   | <b>Piping port</b>                    | —<br>C3604 (Electroless nickel plating), Stainless steel 304, NBR |      |        |
| <b>Weight</b>                                   | <b>Body</b>                           | 24 g  | 34 g | 36 g   |
|   | <b>Lead wire with connector</b>       | +39 g   |      |        |

## Cable Specifications

|                       |                      |  |
|-----------------------|----------------------|--|
| <b>Conductor area</b> |                      | 0.15 mm <sup>2</sup> (AWG26)             |
| <b>Insulator</b>      | <b>O.D.</b>          | 1.0 mm                                   |
|                       | <b>Color</b>         | Brown, Blue, Black, White, Gray (5-core) |
| <b>Sheath</b>         | <b>Finished O.D.</b> | ø3.5                                     |

"Set Pressure Range and Rated Pressure Range," "Functions" → p. 17  
"Internal Circuits and Wiring Examples" → From p. 18 "Dimensions" → From p. 20

IO-Link Compatible (1 Output)



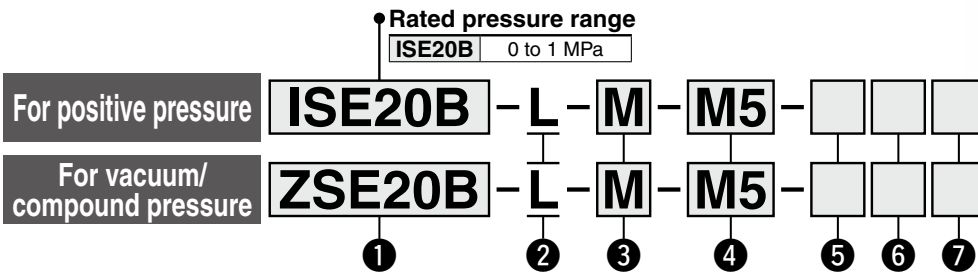
# 3-Screen Display High-Precision Digital Pressure Switch

# ZSE20B(F)-L/ISE20B-L Series



For 2 outputs + analog output type, refer to p. 13.

## How to Order



### ① Rated pressure range

|                |                 |
|----------------|-----------------|
| <b>ZSE20B</b>  | 0 to -100 kPa   |
| <b>ZSE20BF</b> | -100 to 100 kPa |

### ② Output specification

| Symbol   | Description   |
|----------|---|
| <b>L</b> | IO-Link/Switch: 1 output ←<br>(PNP or NPN switching type for switch output) |

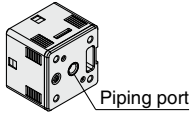
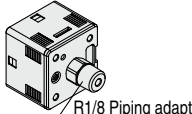
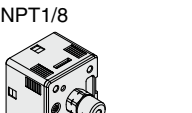
### ③ Unit specification

| Symbol     | Description                                    |
|------------|--|
| <b>Nil</b> | Units selection function*1                     |
| <b>M</b>   | SI unit only*2                                 |
| <b>P</b>   | Units selection function (Initial value psi)*1 |

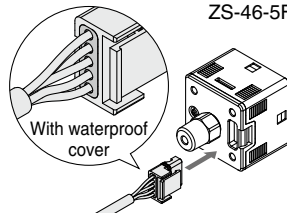
\*1 Under the New Measurement Act, switches with the units selection function are not permitted for use in Japan.

\*2 Fixed unit: kPa, MPa

### ④ Piping specification

| Symbol     | Description   |
|------------|---|
| <b>M5</b>  | M5 female thread<br> |
| <b>01</b>  | R1/8<br>             |
| <b>N01</b> | NPT1/8<br>           |

### ⑤ Option 1

| Symbol     | Description  |
|------------|--|
| <b>Nil</b> | Without lead wire  |
| <b>W</b>   | Lead wire with connector (5-core, 2 m lead wire, With waterproof cover)<br> |

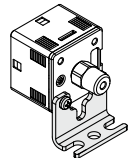
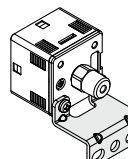
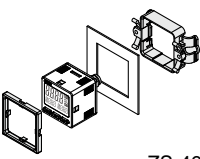
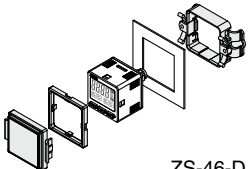
\* For the lead wire with M12 connector, refer to p. 38.

### ⑦ Option 3

| Symbol     | Operation manual*1 | Calibration certificate*1 |
|------------|--------------------|---------------------------|
| <b>Nil</b> | ○                  | —                         |
| <b>Y</b>   | —                  | —                         |
| <b>K</b>   | ○                  | ○                         |
| <b>T</b>   | —                  | ○                         |




\*1 All texts are in both English and Japanese.

### ⑥ Option 2

| Symbol     | Description   |
|------------|---|
| <b>Nil</b> | None  |
| <b>A1</b>  | Bracket A (Vertical mounting)<br>                |
| <b>A2</b>  | Bracket B (Horizontal mounting)<br>              |
| <b>B</b>   | Panel mount adapter<br>                          |
| <b>D</b>   | Panel mount adapter + Front protection cover<br> |

## Options/Part Nos.

When only optional parts are required, order with the part numbers listed below.

| Description                                  | Part no.           | Note  |
|--|--------------------|---|
| Bracket A                                    | <b>ZS-46-A1</b>    | Tapping screw: Nominal size 3 x 8 L (2 pcs.)  |
| Bracket B                                    | <b>ZS-46-A2</b>    | Tapping screw: Nominal size 3 x 8 L (2 pcs.)  |
| Panel mount adapter                          | <b>ZS-46-B</b>     | —   |
| Panel mount adapter + Front protection cover | <b>ZS-46-D</b>     | —   |
| Lead wire with connector                     | <b>ZS-46-5F</b>    | 5-core, 2 m, Waterproof (With waterproof cover)   |
| Lead wire with M12 connector (Made to Order) | <b>ZS-46-5FM12</b> |    |
| Front protection cover                       | <b>ZS-27-01</b>    | —   |
| R1/8 Piping adapter                          | <b>ZS-46-N1</b>    | R1/8  NPT1/8  |
| NPT1/8 Piping adapter                        | <b>ZS-46-N2</b>    |   |



# 3-Screen Display High-Precision Digital Pressure Switch **ZSE20B(F)-L/ISE20B-L Series**

For details on the specific product precautions, refer to the "Operation Manual" on the SMC website. Click [here](#) for details.

## Specifications/IO-Link Compatible

| Model                                     |   | ZSE20B-L (Vacuum pressure)   | ZSE20BF-L (Compound pressure) | ISE20B-L (Positive pressure)             |
|---|---|--|-------------------------------|--|
| <b>Applicable fluid</b>                   |   | Air, Non-corrosive gas, Non-flammable gas  |                               |  |
| <b>Pressure</b>                           | <b>Rated pressure range</b>                     | 0.0 to -100.0 kPa  | -100.0 to 100.0 kPa           | 0.000 to 1.000 MPa                       |
|   | <b>Display/Set pressure range</b>               | 10.0 to -105.0 kPa   | -105.0 to 105.0 kPa           | -0.105 to 1.050 MPa                      |
|   | <b>Display/Smallest settable increment</b>      | 0.1 kPa  |                               | 0.001 MPa                                |
|   | <b>Withstand pressure</b>                       | 500 kPa  |                               | 1.5 MPa                                  |
| <b>Power supply</b>                       | <b>Power supply voltage</b>                     | 12 to 24 VDC ±10% with 10% voltage ripple or less  |                               |  |
|   |   | 18 to 30 VDC, including ripple (p-p) 10%   |                               |  |
|   | <b>Current consumption</b>                      | 35 mA or less  |                               |  |
|   | <b>Protection</b>                               | Polarity protection  |                               |  |
| <b>Accuracy</b>                           | <b>Display accuracy</b>                         | ±2% F.S. ±1 digit (Ambient temperature of 25 ±3°C)   |                               |  |
|   | <b>Repeatability</b>                            | ±0.2% F.S. ±1 digit  |                               |  |
|   | <b>Temperature characteristics</b>              | ±2% F.S. (25°C standard)   |                               |  |
| <b>Switch output (SIO mode)</b>           | <b>Output type</b>                              | Select from NPN or PNP open collector output.  |                               |  |
|   | <b>Output mode</b>                              | Hysteresis, Window comparator, Error output, Output OFF  |                               |  |
|   | <b>Switch operation</b>                         | Normal output, Reversed output   |                               |  |
|   | <b>Max. load current</b>                        | 80 mA  |                               |  |
|   | <b>Max. applied voltage</b>                     | 30 V (NPN output)  |                               |  |
|   | <b>Internal voltage drop (Residual voltage)</b> | 1.5 V or less (at load current of 80 mA)   |                               |  |
|   | <b>Delay time*1</b>                             | 1.5 ms or less, variable from 0 to 60 s/0.01 s increments  |                               |  |
|   | <b>Hysteresis</b>                               | Variable from 0*2  |                               |  |
|   |   | <b>Hysteresis mode</b>   |                               |  |
|   |   | <b>Window comparator mode</b>  |                               |  |
| <b>Display</b>                            | <b>Short circuit protection</b>                 | Yes  |                               |  |
|   | <b>Unit*3</b>                                   | MPa, kPa, kgf/cm <sup>2</sup> , bar, psi, inHg, mmHg   |                               | MPa, kPa, kgf/cm <sup>2</sup> , bar, psi |
|   | <b>Display type</b>                             | LCD  |                               |  |
|   | <b>Number of screens</b>                        | 3-screen display (Main screen, Sub screen x 2)   |                               |  |
|   | <b>Display color</b>                            | Main screen: Red/Green, Sub screen: Orange   |                               |  |
|   | <b>Number of display digits</b>                 | Main screen: 4 digits (7 segments), Sub screen: 4 digits (Upper 1 digit 11 segments, 7 segments for other) |                               |  |
|   | <b>Indicator light</b>                          | Lights up when switch output is turned ON (OUT1, OUT2: Orange)   |                               |  |
| <b>Digital filter*4</b>                   | Variable from 0 to 30 s/0.01 s increments       |  |                               |  |
| <b>Length of lead wire with connector</b> | 2 m   |  |                               |  |
| <b>Environment</b>                        | <b>Enclosure</b>                                | IP65   |                               |  |
|   | <b>Withstand voltage</b>                        | 1000 VAC for 1 minute between terminals and housing  |                               |  |
|   | <b>Insulation resistance</b>                    | 50 MΩ or more (500 VDC measured via megohmmeter) between terminals and housing                             |                               |  |
|   | <b>Operating temperature range</b>              | Operating: -5 to 50°C, Stored: -10 to 60°C (No condensation or freezing)                                   |                               |  |
|   | <b>Operating humidity range</b>                 | Operating/Stored: 35 to 85%RH (No condensation)  |                               |  |
| <b>Standards</b>                          | CE, RoHS  |  |                               |  |
| <b>Communication (IO-Link mode)</b>       | <b>IO-Link type</b>                             | Device   |                               |  |
|   | <b>IO-Link version</b>                          | V1.1   |                               |  |
|   | <b>Communication speed</b>                      | COM2 (38.4 kbps)   |                               |  |
|   | <b>Configuration file</b>                       | IODD file*5  |                               |  |
|   | <b>Minimum cycle time</b>                       | 2.3 ms   |                               |  |
|   | <b>Process data length</b>                      | Input data: 2 bytes, Output data: 0 bytes  |                               |  |
|   | <b>On request data communication</b>            | Yes  |                               |  |
|   | <b>Data storage function</b>                    | Yes  |                               |  |
|   | <b>Event function</b>                           | Yes  |                               |  |
|   | <b>Vendor ID</b>                                | 131 (0 x 0083)   |                               |  |

\*1 Value without digital filter (at 0 ms)

\*2 If the applied pressure fluctuates around the set value, the hysteresis must be set to a value greater than the amount of fluctuation, or chattering will occur.

\*3 Setting is only possible for models with the units selection function. Only MPa or kPa is available for models without this function.

\*4 The response time indicates when the set value is 90% in relation to the step input.

\*5 The configuration file can be downloaded from the SMC website, <http://www.smcworld.com>

\* Products with tiny scratches, marks, or display color or brightness variations which do not affect the performance of the product are verified as conforming products.

## Piping Specifications and Weights

| Model   |                                       | M5   | 01   | N01    |
|---|---------------------------------------|--|--|--------|
| <b>Port size</b>                                |                                       | M5 x 0.8                                     | R1/8   | NPT1/8 |
| <b>Materials of parts in contact with fluid</b> | <b>Sensor pressure receiving area</b> | Silicon                                      |  |        |
|   | <b>Piping port (Common)</b>           | PBT, CB156, Heat-resistant PPS, O-ring: HNBR |  |        |
|   | <b>Piping port</b>                    | —  | C3604 (Electroless nickel plating), Stainless steel 304, NBR |        |
| <b>Weight</b>                                   | <b>Body</b>                           | 24 g   | 34 g   | 36 g   |
|   | <b>Lead wire with connector</b>       | +39 g  |  |        |

## Cable Specifications

|                       |                      |  |
|-----------------------|----------------------|--|
| <b>Conductor area</b> |                      | 0.15 mm <sup>2</sup> (AWG26)             |
| <b>Insulator</b>      | <b>O.D.</b>          | 1.0 mm                                   |
|                       | <b>Color</b>         | Brown, Blue, Black, White, Gray (5-core) |
| <b>Sheath</b>         | <b>Finished O.D.</b> | ø3.5                                     |

"Set Pressure Range and Rated Pressure Range," "Functions" → p. 17  
 "Internal Circuits and Wiring Examples" → p. 19 "Dimensions" → From p. 20

# ZSE20□(F)/ISE20□ Series

## Set Pressure Range and Rated Pressure Range

Set the pressure within the rated pressure range.

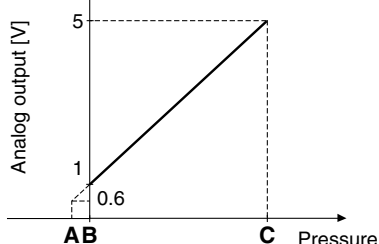
The set pressure range is the range of pressure within which setting is possible. The rated pressure range is the range of pressure that satisfies the specifications (accuracy, linearity, etc.) of the switch. Although it is possible to set a value outside the rated pressure range, the specifications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

| Switch   | Pressure range |        |         |         |          |
|--|----------------|--------|---------|---------|----------|
|  | -100 kPa       | 0      | 100 kPa | 500 kPa | 1 MPa    |
| For vacuum pressure<br>ZSE20<br>ZSE20A<br>ZSE20B<br>ZSE20B-L       | -101 kPa       | 0      |         |         |          |
|  | -105 kPa       | 10 kPa |         |         |          |
|  | -100 kPa       | 0      |         |         |          |
| For compound pressure<br>ZSE20F<br>ZSE20AF<br>ZSE20BF<br>ZSE20BF-L | -100 kPa       |        | 100 kPa |         |          |
|  | -105 kPa       |        | 105 kPa |         |          |
|  | -100 kPa       |        | 100 kPa |         |          |
| For positive pressure<br>ISE20<br>ISE20A<br>ISE20B<br>ISE20B-L     | -100 kPa       |        |         |         | 1 MPa    |
|  | -105 kPa       |        |         |         | 1.05 MPa |
|  | (-0.105 MPa)   | 0      |         |         | 1 MPa    |

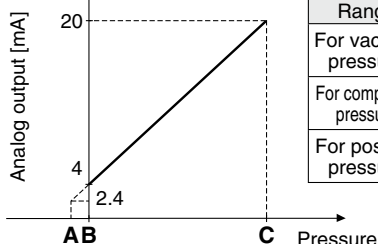
Rated pressure range of the switch   
  Set pressure range of the switch   
  Rated pressure range of the IO-Link product

## Analog Output<sup>\*1</sup>

### Voltage output



### Current output



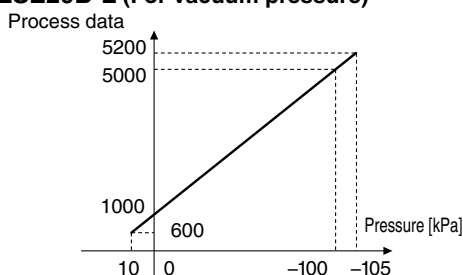
| Range                 | Rated pressure range | A          | B          | C          |
|-----------------------|----------------------|------------|------------|------------|
| For vacuum pressure   | 0.0 to -101.0 kPa    | 10.1 kPa   | 0          | -101.0 kPa |
| For compound pressure | -100.0 to 100.0 kPa  | —          | -100.0 kPa | 100.0 kPa  |
| For positive pressure | -0.100 to 1.000 MPa  | -0.100 MPa | 0          | 1.000 MPa  |

\*1 Excluding the 20/20B(F)-L

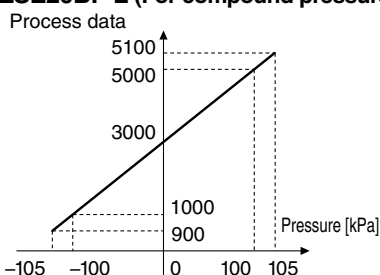
## IO-Link: Process Data

### Relationship between the process data and pressure value

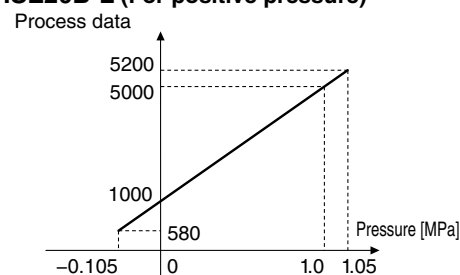
#### ZSE20B-L (For vacuum pressure)



#### ZSE20BF-L (For compound pressure)



#### ISE20B-L (For positive pressure)

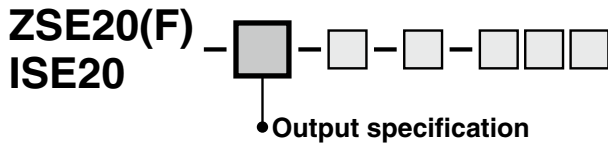


## Functions

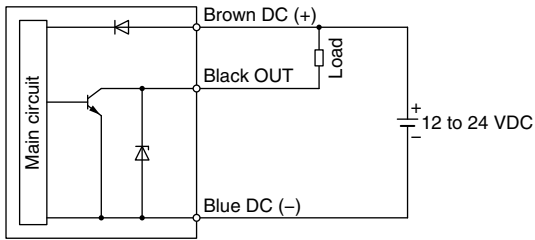
|   |   |
|---|---|
| Sub screen setting function                 | The display of the sub screen can be selected.  |
| Auto-preset function                        | This function calculates a rough set value automatically based on the on-going operation.                             |
| Display value fine adjustment function      | Evens out deviations in the displayed value   |
| Peak value indication function              | Can retain the maximum pressure value displayed during measurement  |
| Bottom value indication function            | Can retain the minimum pressure value displayed during measurement  |
| Keylock function (Selectable security code) | The keyboard can be locked to prevent the accidental operation of the operation switch.                               |
| Zero-clear function                         | The pressure display can be set to zero when the pressure is open to the atmosphere.                                  |
| Error indication function                   | This function displays the error location and content when a problem or error has occurred.                           |
| Anti-chattering function                    | Prevents possible malfunctions due to sudden fluctuations in the primary pressure by adjusting the delay time         |
| Units selection function                    | Can convert the display value   |
| Power saving mode                           | Reduces power consumption   |
| Display resolution switch function          | Converts the display resolution from the normal value of 1/1000 to 1/100<br>Can reduce flickering of the monitor      |
| kPa ↔ MPa switch function                   | Converts the unit between kPa and MPa   |
| Copy function <sup>*1</sup>                 | The settings of the master sensor can be copied to the slave sensors.   |
| Auto-shift function <sup>*1</sup>           | Measures the pressure at the time of external input and uses it as a reference to correct the set value of the switch |

\*1 Not available for the 20/20B-L

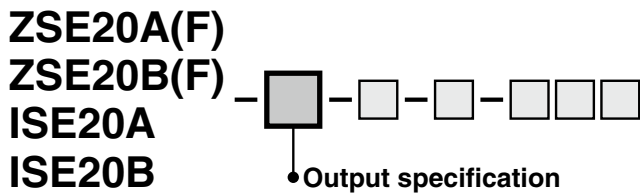
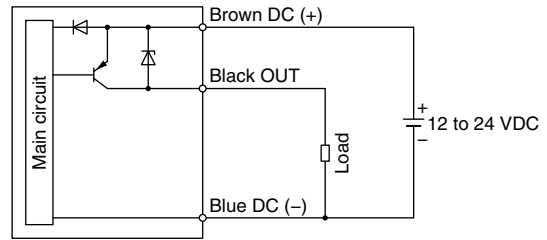
**Internal Circuits and Wiring Examples**



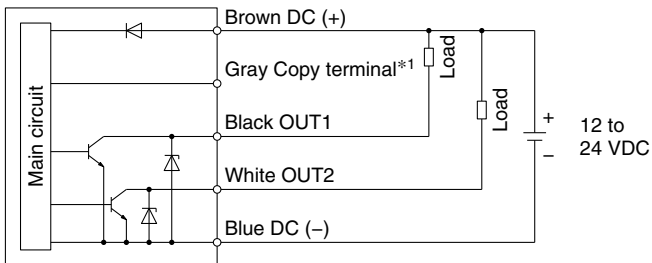
**-N**  
**NPN (1 output)**



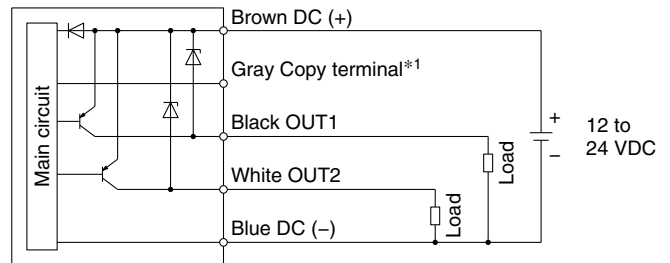
**-P**  
**PNP (1 output)**



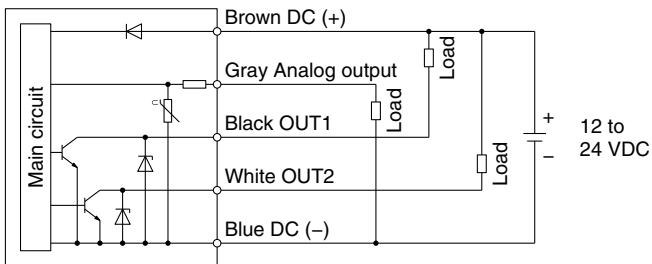
**-X**  
**NPN (2 outputs) + Copy function**



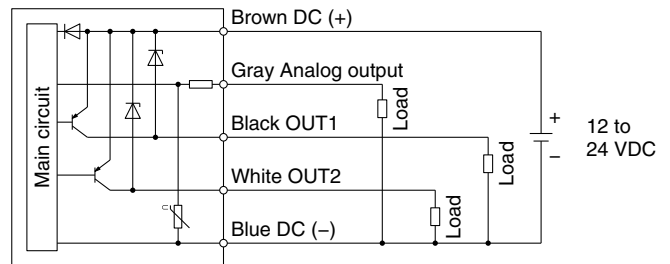
**-Y**  
**PNP (2 outputs) + Copy function**



**-R: NPN (2 outputs) + Analog voltage output**  
**-S: NPN (2 outputs) + Analog current output**



**-T: PNP (2 outputs) + Analog voltage output**  
**-V: PNP (2 outputs) + Analog current output**



\*1 Refer to p. 37.

ZSE20(F)/ISE20

ZSE20A(F)/ISE20A

ZSE20B(F)/ISE20B

ZSE20B(F)-L/ISE20B-L

ZSE20C(F)/ISE20C(H)

Function Details

Made to Order

# ZSE20□(F)/ISE20□ Series

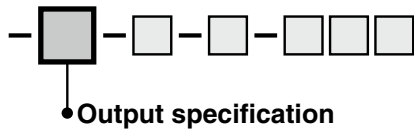
## Internal Circuits and Wiring Examples

### ZSE20A(F)

### ZSE20B(F)

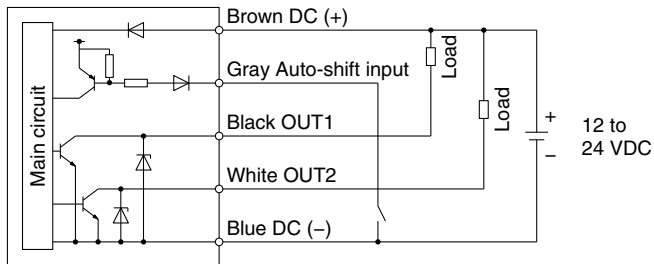
### ISE20A

### ISE20B



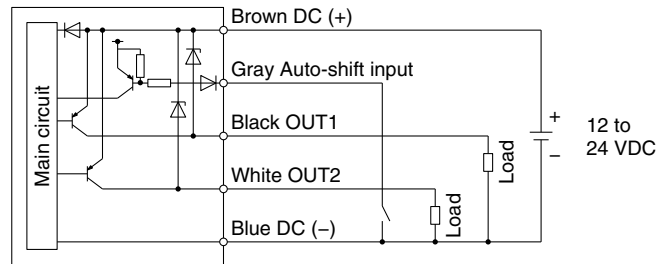
**-R: NPN (2 outputs) + Auto-shift input**

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



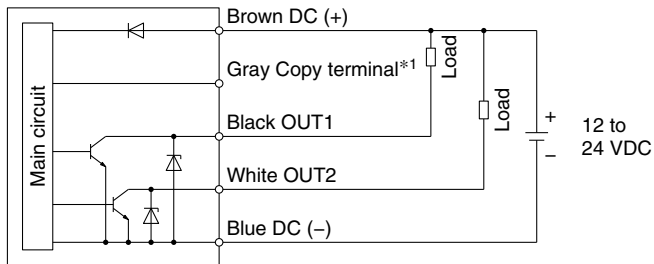
**-T: PNP (2 outputs) + Auto-shift input**

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



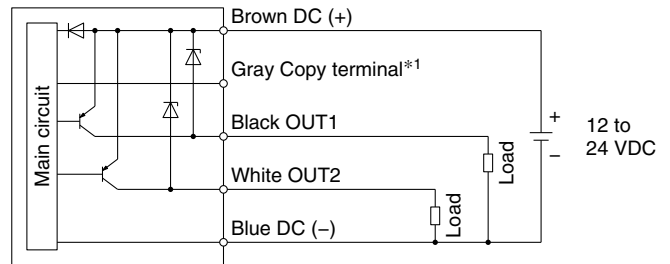
**-R: NPN (2 outputs) + Copy function**

**-S: NPN (2 outputs) + Copy function**



**-T: PNP (2 outputs) + Copy function**

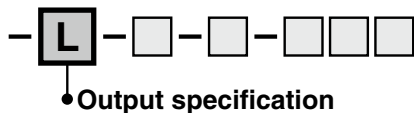
**-V: PNP (2 outputs) + Copy function**



\*1 Refer to p. 37.

### ZSE20B(F)

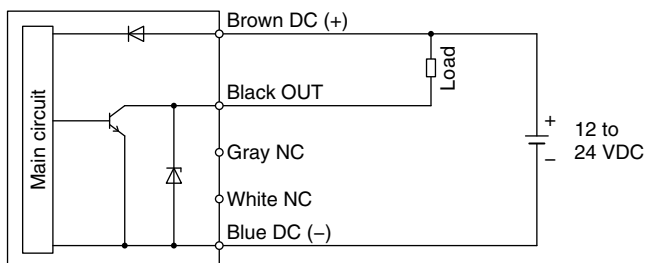
### ISE20B



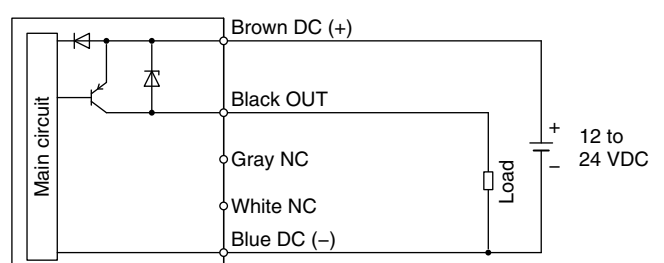
**-L: (IO-Link/Switch: 1 output)**

**When used as a switch output device (When not used as an IO-Link device = When in SIO mode)**

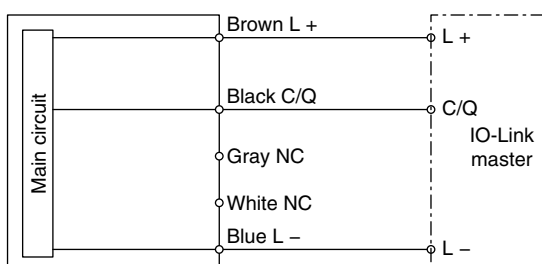
**NPN open collector 1 output setting**



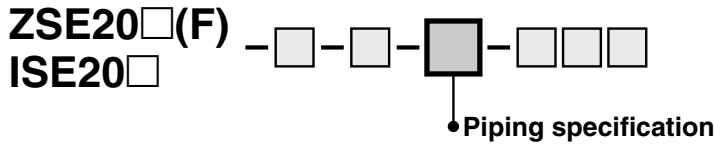
**PNP open collector 1 output setting**



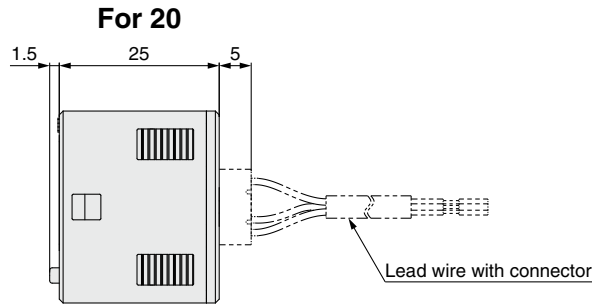
**When used as an IO-Link device**



**Dimensions**

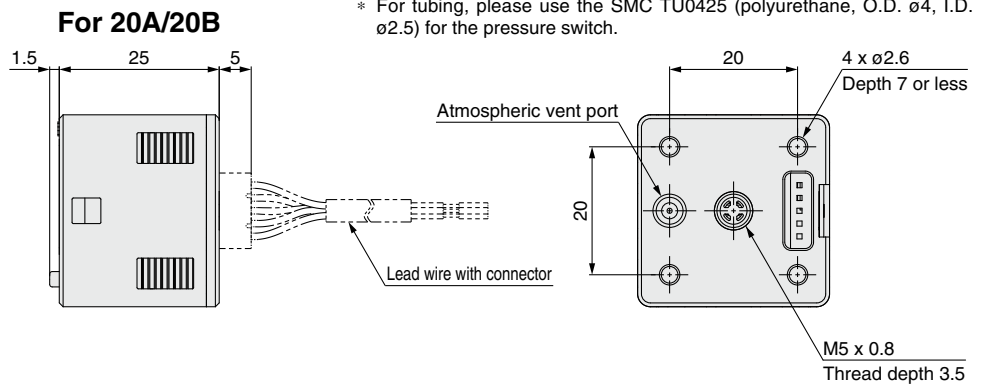
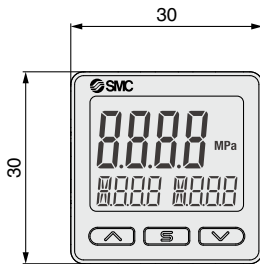


**M5**  
M5 female thread



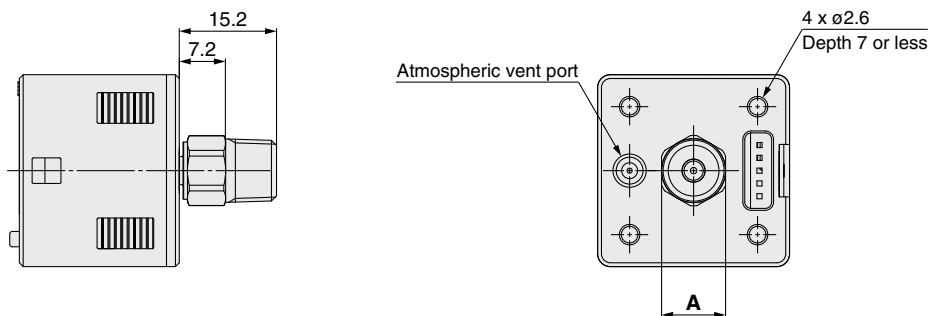
If there is a possibility that the atmospheric vent port of the switch will be exposed to water or dust, insert a tube into the atmospheric vent port and route the other end of the tube to a safe place away from water or dust. (Z/ISE20B)

\* For tubing, please use the SMC TU0425 (polyurethane, O.D.  $\phi 4$ , I.D.  $\phi 2.5$ ) for the pressure switch.



**01**  
R1/8

**N01**  
NPT1/8



| Piping specification | Port size | A                     |
|----------------------|-----------|-----------------------|
| <b>01</b>            | R1/8      | Width across flats 10 |
| <b>N01</b>           | NPT1/8    | Width across flats 12 |

ZSE20(F)/ISE20

ZSE20A(F)/ISE20A

ZSE20B(F)/ISE20B

ZSE20B(F)-L/ISE20B-L

ZSE20C(F)/ISE20C(H)

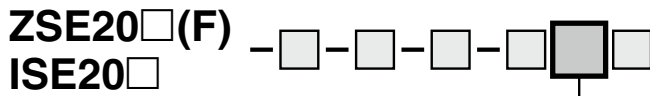
Function  
Details

Made to  
Order

# ZSE20□(F)/ISE20□ Series

## Dimensions

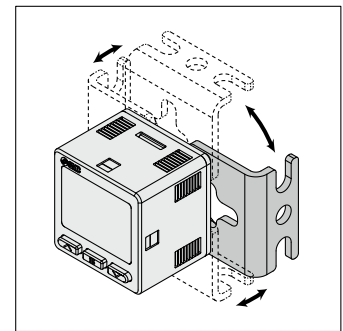
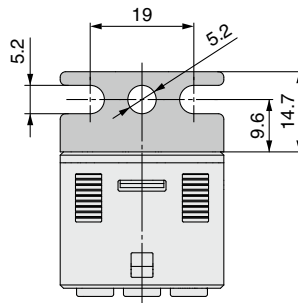
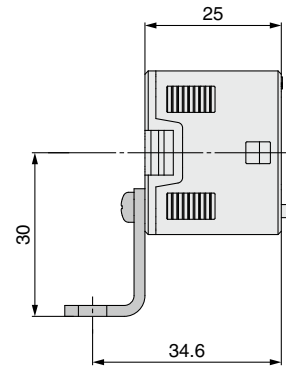
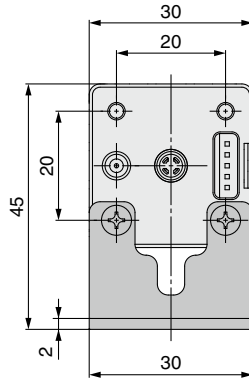
With bracket



• Option 2

### A1

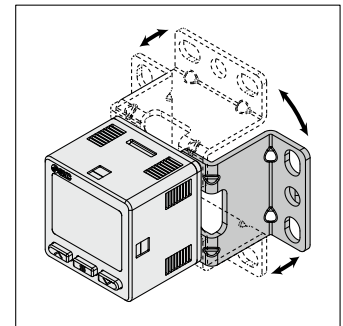
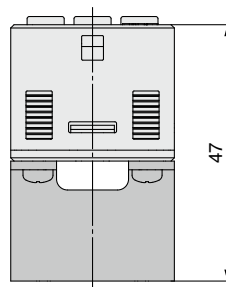
Bracket A  
 (Part no.: ZS-46-A1)



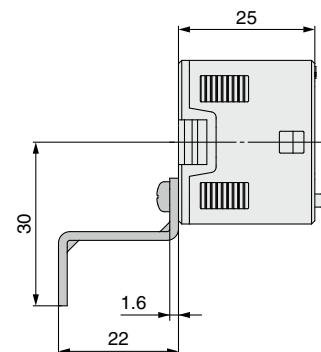
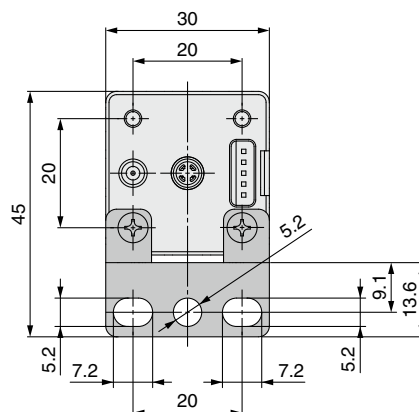
\* The bracket configuration allows for mounting in four orientations.

### A2

Bracket B  
 (Part no.: ZS-46-A2)



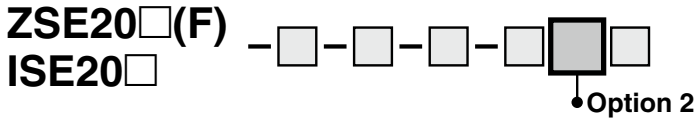
\* The bracket configuration allows for mounting in four orientations.



\* When using the bracket B, install it by taking the dimensions of the piping part into consideration.

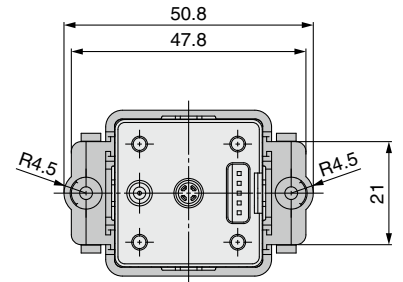
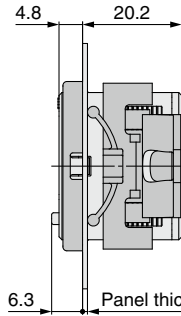
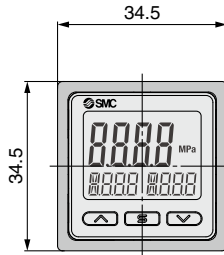
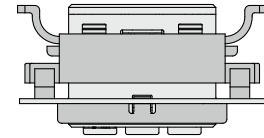
**Dimensions**

**Panel mount adapter**



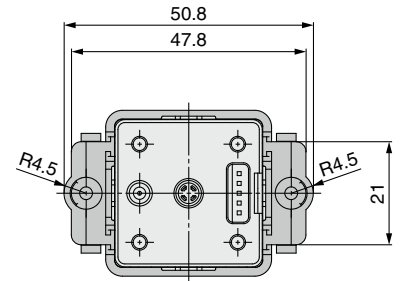
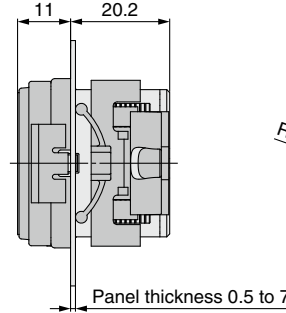
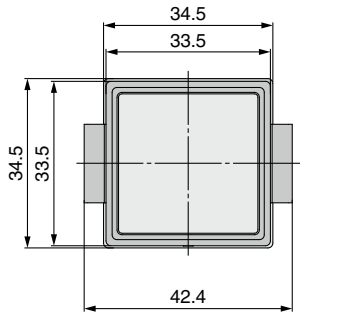
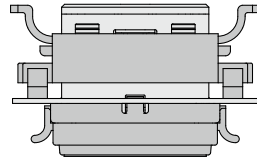
**B**

**Panel mount adapter  
(Part no.: ZS-46-B)**



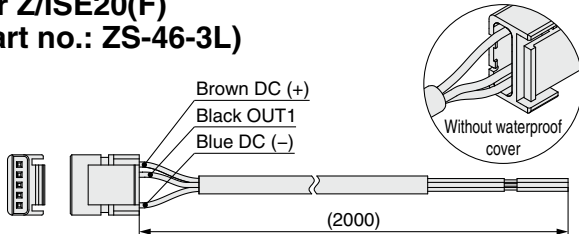
**D**

**Panel mount adapter + Front protection cover  
(Part no.: ZS-46-D)**

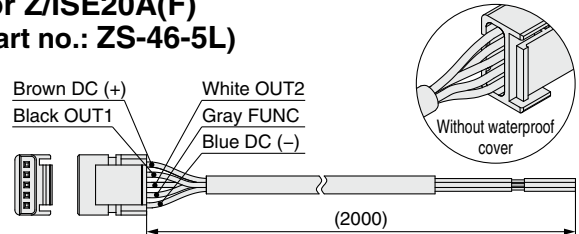


**Lead wire with connector**

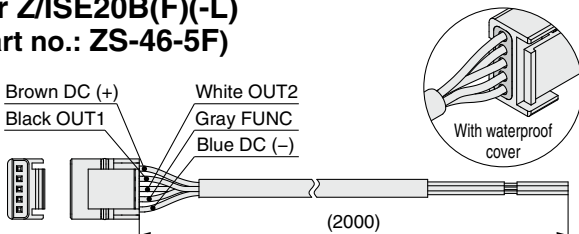
**For Z/ISE20(F)  
(Part no.: ZS-46-3L)**



**For Z/ISE20A(F)  
(Part no.: ZS-46-5L)**



**For Z/ISE20B(F)(-L)  
(Part no.: ZS-46-5F)**



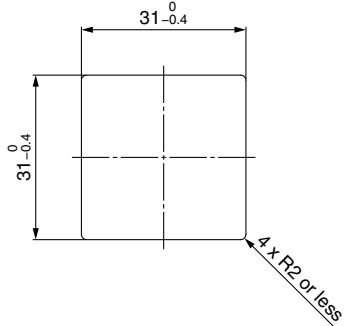
\* For the lead wire with M12 connector, refer to p. 38.

# ZSE20□(F)/ISE20□ Series

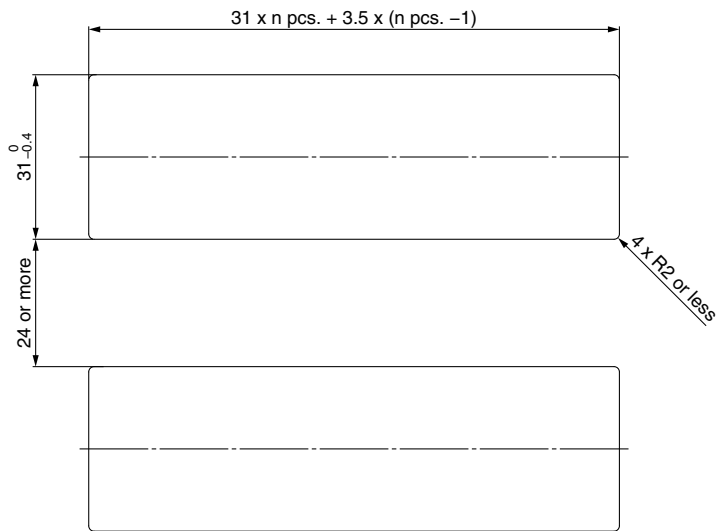
## Dimensions

### Panel fitting dimensions

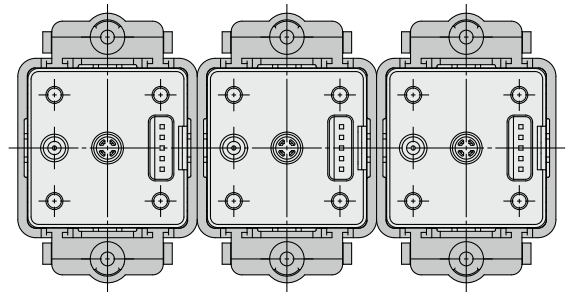
#### Individual mounting



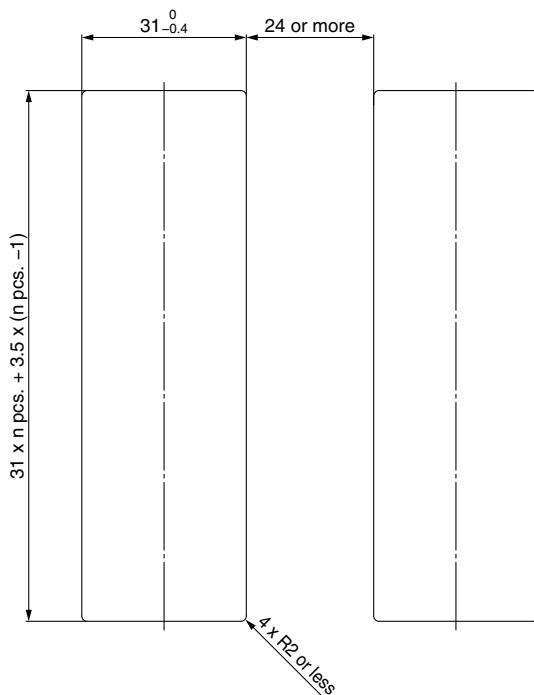
#### Multiple (2 pcs. or more) secure mounting <Horizontal>



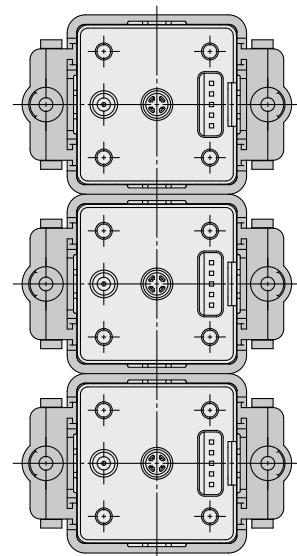
#### Panel mount example <Horizontal>



#### <Vertical>



#### Panel mount example <Vertical>





2 Outputs + Analog Output (Voltage/Current)



# 3-Screen Display High-Precision Digital Pressure Switch for General Fluids

RoHS

IP65

# ZSE20C(F)/ISE20C(H) Series



## How to Order

### Rated pressure range

|         |               |
|---------|---------------|
| ISE20C  | -0.1 to 1 MPa |
| ISE20CH | -0.1 to 2 MPa |

For positive pressure

**ISE20C** - **X** - **M** - **02** [ ] - [ ] - [ ] - [ ] - [ ]

For vacuum/compound pressure

**ZSE20C** - **X** - **M** - **02** [ ] - [ ] - [ ] - [ ] - [ ]

### Made to Order

(→ p. 38)

|             |   |
|-------------|---|
| <b>X500</b> | Parts in contact with fluid: Stainless steel 316L |
| <b>X510</b> | Restrictor-installed fitting                      |

### 1 Rated pressure range

|                |                 |
|----------------|-----------------|
| <b>ZSE20C</b>  | 0 to -101 kPa   |
| <b>ZSE20CF</b> | -100 to 100 kPa |

### 2 Output specification

| Symbol   | Description  |
|----------|--|
| <b>R</b> | NPN open collector 2 outputs + Analog voltage output*1 |
| <b>S</b> | NPN open collector 2 outputs + Analog current output*1 |
| <b>T</b> | PNP open collector 2 outputs + Analog voltage output*1 |
| <b>V</b> | PNP open collector 2 outputs + Analog current output*1 |
| <b>X</b> | NPN open collector 2 outputs + Copy function           |
| <b>Y</b> | PNP open collector 2 outputs + Copy function           |

\*1 Can be switched to auto-shift or copy function

### 3 Unit specification

| Symbol     | Description                                    |
|------------|--|
| <b>Nil</b> | Units selection function*2                     |
| <b>M</b>   | SI unit only*3                                 |
| <b>P</b>   | Units selection function (Initial value psi)*3 |

\*2 Under the New Measurement Act, switches with the units selection function are not permitted for use in Japan.

\*3 Fixed unit: kPa, MPa

### 4 Piping specification

| Symbol     | Description                  |
|------------|------------------------------|
| <b>02</b>  | R1/4 (M5 female threaded)    |
| <b>N02</b> | NPT1/4 (M5 female threaded)  |
| <b>F02</b> | G1/4 (M5 female threaded)    |
| <b>C01</b> | Rc1/8                        |
| <b>A2</b>  | URJ1/4 (Face seal fitting)   |
| <b>B2</b>  | TSJ1/4 (Compression fitting) |

### 7 Option 2

\* Note that the optional parts that can be used vary depending on the piping direction.

| Symbol     | Description |
|------------|-------------|
| <b>Nil</b> | None        |

### Rear ported (5 Piping direction: Nil)

| Symbol    | Description                                  | Symbol   | Description         |
|-----------|--|----------|---------------------|
| <b>A1</b> | Bracket A                                    | <b>B</b> | Panel mount adapter |
| <b>D</b>  | Panel mount adapter + Front protection cover |          |                     |

### 5 Piping direction

|            |               |
|------------|---------------|
| <b>Nil</b> | Rear ported   |
| <b>L</b>   | Bottom ported |

### 6 Option 1

| Symbol     | Description   |
|------------|---|
| <b>Nil</b> | Without lead wire   |
| <b>W</b>   | Lead wire with connector, 5-core (2 m lead wire, With waterproof cover) |

\* For the lead wire with M12 connector, refer to p. 38.

### Bottom ported (5 Piping direction: L)

| Symbol    | Description                                  |
|-----------|--|
| <b>A3</b> | Bracket C                                    |
| <b>E</b>  | Panel mount adapter                          |
| <b>F</b>  | Panel mount adapter + Front protection cover |

## Options/Part Nos.

When only optional parts are required, order with the part numbers listed below.

| Description                                  | Part no.           | Note  |
|--|--------------------|---|
| Bracket A                                    | <b>ZS-46-A1</b>    | For rear ported/Tapping screw: Nominal size 3 x 8 L (2 pcs.)    |
| Bracket C                                    | <b>ZS-46-E</b>     | For bottom ported/Tapping screw: Nominal size 3 x 10 L (2 pcs.) |
| Panel mount adapter                          | <b>ZS-46-B</b>     | Rear ported   |
|  | <b>ZS-35-B</b>     | Bottom ported   |
| Panel mount adapter + Front protection cover | <b>ZS-46-D</b>     | Rear ported   |
|  | <b>ZS-35-E</b>     | Bottom ported   |
| Lead wire with connector                     | <b>ZS-46-5F</b>    | 5-core, 2 m, Waterproof (With waterproof cover)                 |
| Lead wire with M12 connector (Made to Order) | <b>ZS-46-5FM12</b> |   |
|  | <b>ZS-27-01</b>    | Rear ported   |
| Front protection cover                       | <b>ZS-35-01</b>    | Bottom ported   |

### 8 Option 3

| Symbol     | Operation manual*4 | Calibration certificate*4 |
|------------|--------------------|---------------------------|
| <b>Nil</b> | ○                  | —                         |
| <b>Y</b>   | —                  | —                         |
| <b>K</b>   | ○                  | ○                         |
| <b>T</b>   | —                  | ○                         |

\*4 All texts are in both English and Japanese.

# ZSE20C(F)/ISE20C(H) Series

For details on the specific product precautions, refer to the "Operation Manual" on the SMC website. Click [here](#) for details.

## Specifications

| Model                                     |   | ZSE20C (Vacuum pressure)   | ZSE20CF (Compound pressure)   | ISE20C (Positive pressure)   | ISE20CH (Positive pressure)  |  |
|---|---|--|---|------------------------------|------------------------------|--|
| <b>Applicable fluid</b>                   |   | Liquids and gases that do not corrode stainless steel 630 and 304  |   |                              |                              |  |
| <b>Pressure</b>                           | <b>Rated pressure range</b>                     | 0.0 to -101.0 kPa  | -100.0 to 100.0 kPa   | -0.100 to 1.000 MPa          | -0.100 to 2.000 MPa          |  |
|   | <b>Display/Set pressure range</b>               | 10.0 to -105.0 kPa   | -105.0 to 105.0 kPa   | -0.105 to 1.050 MPa          | -0.105 to 2.100 MPa          |  |
|   | <b>Display/Smallest settable increment</b>      | 0.1 kPa  |   | 0.001 MPa                    |                              |  |
|   | <b>Withstand pressure</b>                       | 500 kPa  |   | 2 MPa                        | 4 MPa                        |  |
| <b>Power supply</b>                       | <b>Power supply voltage</b>                     | 12 to 24 VDC ±10% with 10% voltage ripple or less  |   |                              |                              |  |
|   | <b>Current consumption</b>                      | 35 mA or less  |   |                              |                              |  |
|   | <b>Protection</b>                               | Polarity protection  |   |                              |                              |  |
| <b>Accuracy</b>                           | <b>Display accuracy</b>                         | ±2% F.S. ±1 digit (Ambient temperature of 25 ±3°C)   |   |                              |                              |  |
|   | <b>Repeatability</b>                            | ±0.2% F.S. ±1 digit  |   |                              |                              |  |
|   | <b>Analog output accuracy</b>                   | ±2.5% F.S. (Ambient temperature of 25 ±3°C)  |   |                              |                              |  |
|   | <b>Analog output linearity</b>                  | ±1% F.S.   |   |                              |                              |  |
|   | <b>Temperature characteristics</b>              | ±3% F.S. (25°C standard)   |   |                              |                              |  |
| <b>Switch output</b>                      | <b>Output type</b>                              | NPN or PNP open collector 2 outputs  |   |                              |                              |  |
|   | <b>Output mode</b>                              | Hysteresis mode, Window comparator mode, Error output, Output OFF  |   |                              |                              |  |
|   | <b>Switch operation</b>                         | Normal output, Reversed output   |   |                              |                              |  |
|   | <b>Max. load current</b>                        | 80 mA  |   |                              |                              |  |
|   | <b>Max. applied voltage (NPN only)</b>          | 28 V   |   |                              |                              |  |
|   | <b>Internal voltage drop (Residual voltage)</b> | 1 V or less (at load current of 80 mA)   |   |                              |                              |  |
|   | <b>Delay time*1</b>                             | 1.5 ms or less (with anti-chattering function: 20, 100, 500, 1000, 2000, 5000 ms)                                  |   |                              |                              |  |
|   | <b>Hysteresis</b>                               | <b>Hysteresis mode</b>   | Variable from 0*2   |                              |                              |  |
|   |   | <b>Window comparator mode</b>  |   |                              |                              |  |
| <b>Short circuit protection</b>           | Yes   |  |   |                              |                              |  |
| <b>Analog output</b>                      | <b>Voltage output</b>                           | <b>Output type</b>   | Voltage output: 1 to 5 V  | Voltage output: 0.6 to 5 V   | Voltage output: 0.8 to 5 V   |  |
|   |   | <b>Output impedance</b>  | Approx. 1 kΩ  |                              |                              |  |
|   | <b>Current output</b>                           | <b>Output type</b>   | Current output: 4 to 20 mA  | Current output: 2.4 to 20 mA | Current output: 3.2 to 20 mA |  |
|   |   | <b>Load impedance</b>  | Maximum load impedance at power supply voltage of 12 V: 300 Ω<br>at power supply voltage of 24 V: 600 Ω<br>Minimum load impedance: 50 Ω |                              |                              |  |
| <b>Auto-shift input</b>                   | <b>Input type</b>                               | Non-voltage input: 0.4 V or less   |   |                              |                              |  |
|   | <b>Input mode</b>                               | Select from Auto-shift or Auto-shift zero.   |   |                              |                              |  |
|   | <b>Input time</b>                               | 5 ms or more   |   |                              |                              |  |
| <b>Display</b>                            | <b>Unit*3</b>                                   | MPa, kPa, kgf/cm <sup>2</sup> , bar, psi, inHg, mmHg   | MPa, kPa, kgf/cm <sup>2</sup> , bar, psi  |                              |                              |  |
|   | <b>Display type</b>                             | LCD  |   |                              |                              |  |
|   | <b>Number of screens</b>                        | 3-screen display (Main screen, Sub screen x 2)   |   |                              |                              |  |
|   | <b>Display color</b>                            | 1) Main screen: Red/Green<br>2) Sub screen: Orange   |   |                              |                              |  |
|   | <b>Number of display digits</b>                 | 1) Main screen: 4 digits (7 segments)<br>2) Sub screen: 4 digits (Upper 1 digit 11 segments, 7 segments for other) |   |                              |                              |  |
|   | <b>Indicator light</b>                          | Lights up when switch output is turned ON (OUT1, OUT2: Orange)   |   |                              |                              |  |
| <b>Digital filter*4</b>                   | 0, 10, 50, 100, 500, 1000, 5000 ms              |  |   |                              |                              |  |
| <b>Environment</b>                        | <b>Enclosure</b>                                | IP65   |   |                              |                              |  |
|   | <b>Withstand voltage</b>                        | 250 VAC for 1 minute between terminals and housing   |   |                              |                              |  |
|   | <b>Insulation resistance</b>                    | 2 MΩ or more (50 VDC measured via megohmmeter) between terminals and housing                                       |   |                              |                              |  |
|   | <b>Operating temperature range</b>              | Operating: -5 to 50°C, Stored: -10 to 60°C (No condensation or freezing)   |   |                              |                              |  |
|   | <b>Operating humidity range</b>                 | Operating/Stored: 35 to 85%RH (No condensation)  |   |                              |                              |  |
| <b>Standards</b>                          | UL/CSA (E216656), CE, RoHS                      |  |   |                              |                              |  |
| <b>Length of lead wire with connector</b> | 2 m   |  |   |                              |                              |  |

\*1 Value without digital filter (at 0 ms)

\*2 If the applied pressure fluctuates around the set value, the hysteresis must be set to a value greater than the amount of fluctuation, or chattering will occur.

\*3 Setting is only possible for models with the units selection function. Only MPa or kPa is available for models without this function.

\*4 The response time indicates when the set value is 90% in relation to the step input.

\* Products with tiny scratches, marks, or display color or brightness variations which do not affect the performance of the product are verified as conforming products.

## Piping Specifications and Weights

| Model   | 02   | N02    | F02  | C01   | A2     | B2     |
|---|--|--------|------|-------|--------|--------|
| <b>Port size</b>                                | R1/4   | NPT1/4 | G1/4 | Rc1/8 | URJ1/4 | TSJ1/4 |
| <b>Materials of parts in contact with fluid</b> | Pressure sensor: Stainless steel 630, Fitting: Stainless steel 304 |        |      |       |        |        |
| <b>Weight</b>                                   | <b>Body (Rear ported)</b>  | 51 g   | 51 g | 48 g  | 47 g   | 46 g   |
|   | <b>Body (Bottom ported)</b>  | 77 g   | 78 g | 74 g  | 65 g   | 72 g   |
|   | <b>Lead wire with connector</b>                                    | +39 g  |      |       |        |        |

## Cable Specifications

|                       |                              |  |
|-----------------------|------------------------------|--|
| <b>Conductor area</b> | 0.15 mm <sup>2</sup> (AWG26) |  |
| <b>Insulator</b>      | <b>O.D.</b>                  | 1.0 mm                                   |
|                       | <b>Color</b>                 | Brown, Blue, Black, White, Gray (5-core) |
| <b>Sheath</b>         | <b>Finished O.D.</b>         | ø3.5                                     |

## Set Pressure Range and Rated Pressure Range

### Set the pressure within the rated pressure range.

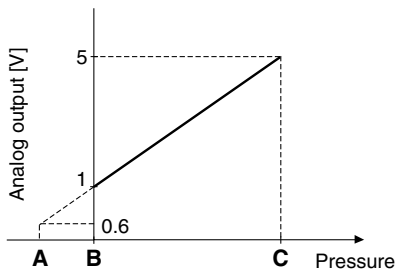
The set pressure range is the range of pressure within which setting is possible. The rated pressure range is the range of pressure that satisfies the specifications (accuracy, linearity, etc.) of the switch. Although it is possible to set a value outside the rated pressure range, the specifications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

| Switch                                  | Pressure range        |        |         |         |          |         |
|---|-----------------------|--------|---------|---------|----------|---------|
|   | -100 kPa              | 0      | 100 kPa | 500 kPa | 1 MPa    | 2 MPa   |
| For vacuum pressure<br><b>ZSE20C</b>    | -101 kPa              | 0      |         |         |          |         |
|   | -105 kPa              | 10 kPa |         |         |          |         |
| For compound pressure<br><b>ZSE20CF</b> | -100 kPa              |        | 100 kPa |         |          |         |
|   | -105 kPa              |        | 105 kPa |         |          |         |
| For positive pressure<br><b>ISE20C</b>  | -100 kPa              |        |         |         | 1 MPa    |         |
|   | -105 kPa (-0.105 MPa) |        |         |         | 1.05 MPa |         |
| <b>ISE20CH</b>                          | -100 kPa              |        |         |         |          | 2 MPa   |
|   | -105 kPa (-0.105 MPa) |        |         |         |          | 2.1 MPa |

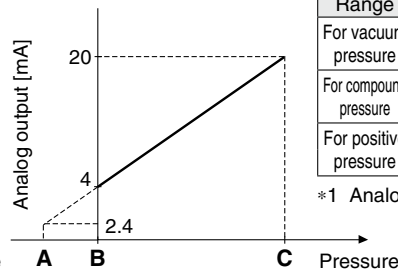
Rated pressure range of the switch    
  Set pressure range of the switch

## Analog Output

### Voltage output



### Current output



| Range                 | Rated pressure range | A            | B          | C          |
|-----------------------|----------------------|--------------|------------|------------|
| For vacuum pressure   | 0.0 to -101.0 kPa    | 10.1 kPa     | 0          | -101.0 kPa |
| For compound pressure | -100.0 to 100.0 kPa  | —            | -100.0 kPa | 100.0 kPa  |
| For positive pressure | -0.100 to 1.000 MPa  | -0.100 MPa   | 0          | 1.000 MPa  |
|                       | -0.100 to 2.00 MPa   | -0.100 MPa*1 | 0          | 2.00 MPa   |

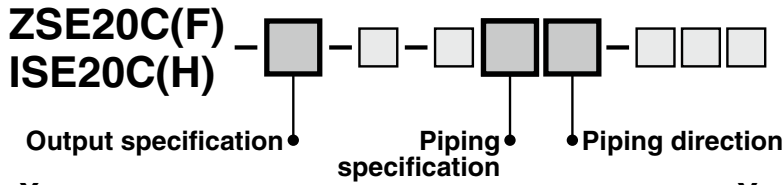
\*1 Analog output is 0.8 [V] or 3.2 [mA] at the pressure A.

## Functions

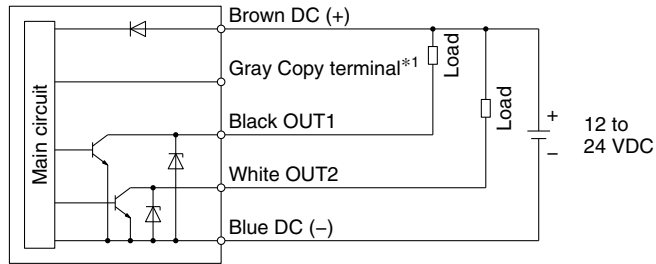
|  |   |
|--|---|
| <b>Sub screen setting function</b>                 | The display of the sub screen can be selected.  |
| <b>Auto-preset function</b>                        | This function calculates a rough set value automatically based on the on-going operation.                             |
| <b>Display value fine adjustment function</b>      | Evens out deviations in the displayed value   |
| <b>Peak value indication function</b>              | Can retain the maximum pressure value displayed during measurement  |
| <b>Bottom value indication function</b>            | Can retain the minimum pressure value displayed during measurement  |
| <b>Keylock function (Selectable security code)</b> | The keyboard can be locked to prevent the accidental operation of the operation switch.                               |
| <b>Zero-clear function</b>                         | The pressure display can be set to zero when the pressure is open to the atmosphere.                                  |
| <b>Error indication function</b>                   | This function displays the error location and content when a problem or error has occurred.                           |
| <b>Anti-chattering function</b>                    | Prevents possible malfunctions due to sudden fluctuations in the primary pressure by adjusting the delay time         |
| <b>Units selection function</b>                    | Can convert the display value   |
| <b>Power saving mode</b>                           | Reduces power consumption   |
| <b>Display resolution switch function</b>          | Converts the display resolution from the normal value of 1/1000 to 1/100  |
| <b>kPa ↔ MPa switch function</b>                   | Can reduce flickering of the monitor  |
| <b>kPa ↔ MPa switch function</b>                   | Converts the unit between kPa and MPa   |
| <b>Copy function</b>                               | The settings of the master sensor can be copied to the slave sensors.   |
| <b>Auto-shift function</b>                         | Measures the pressure at the time of external input and uses it as a reference to correct the set value of the switch |

# ZSE20C(F)/ISE20C(H) Series

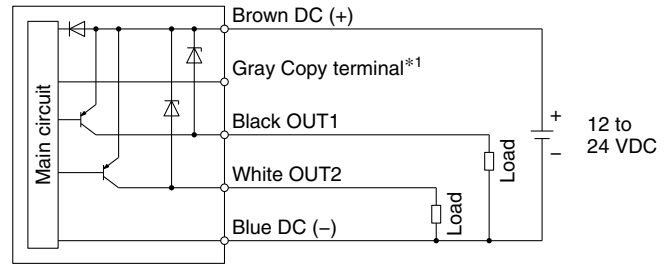
## Internal Circuits and Wiring Examples



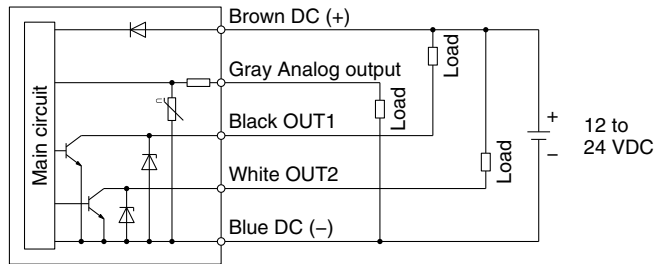
**-X**  
**NPN (2 outputs) + Copy function**



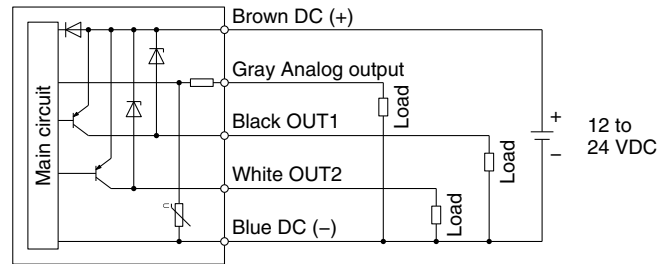
**-Y**  
**PNP (2 outputs) + Copy function**



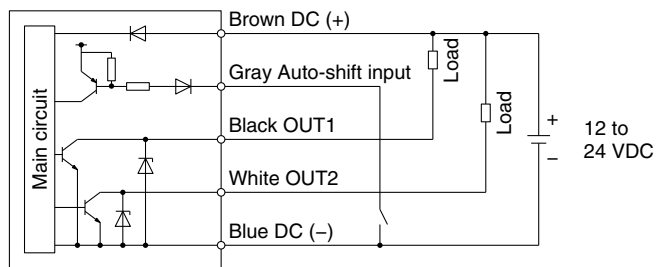
**-R: NPN (2 outputs) + Analog voltage output**  
**-S: NPN (2 outputs) + Analog current output**



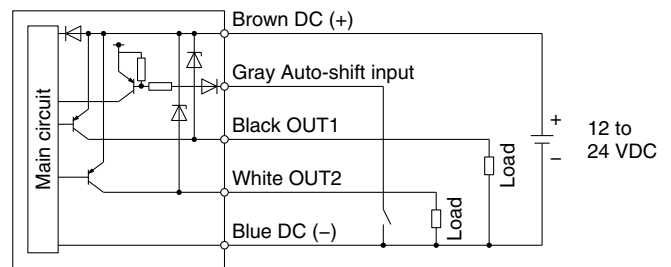
**-T: PNP (2 outputs) + Analog voltage output**  
**-V: PNP (2 outputs) + Analog current output**



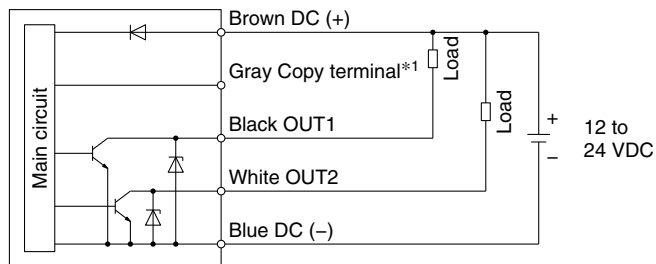
**-R: NPN (2 outputs) + Auto-shift input**  
**-S: NPN (2 outputs) + Auto-shift input**



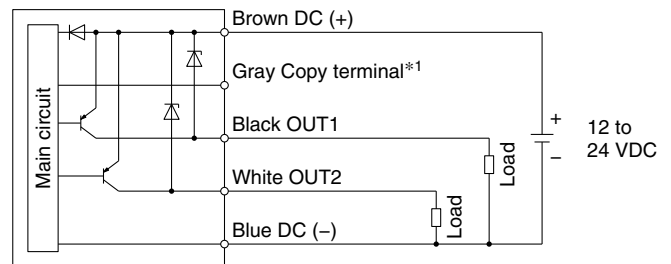
**-T: PNP (2 outputs) + Auto-shift input**  
**-V: PNP (2 outputs) + Auto-shift input**



**-R: NPN (2 outputs) + Copy function**  
**-S: NPN (2 outputs) + Copy function**



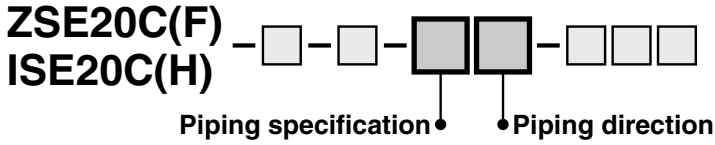
**-T: PNP (2 outputs) + Copy function**  
**-V: PNP (2 outputs) + Copy function**



\*1 Refer to p. 37.

# 3-Screen Display High-Precision Digital Pressure Switch for General Fluids **ZSE20C(F)/ISE20C(H) Series**

## Dimensions

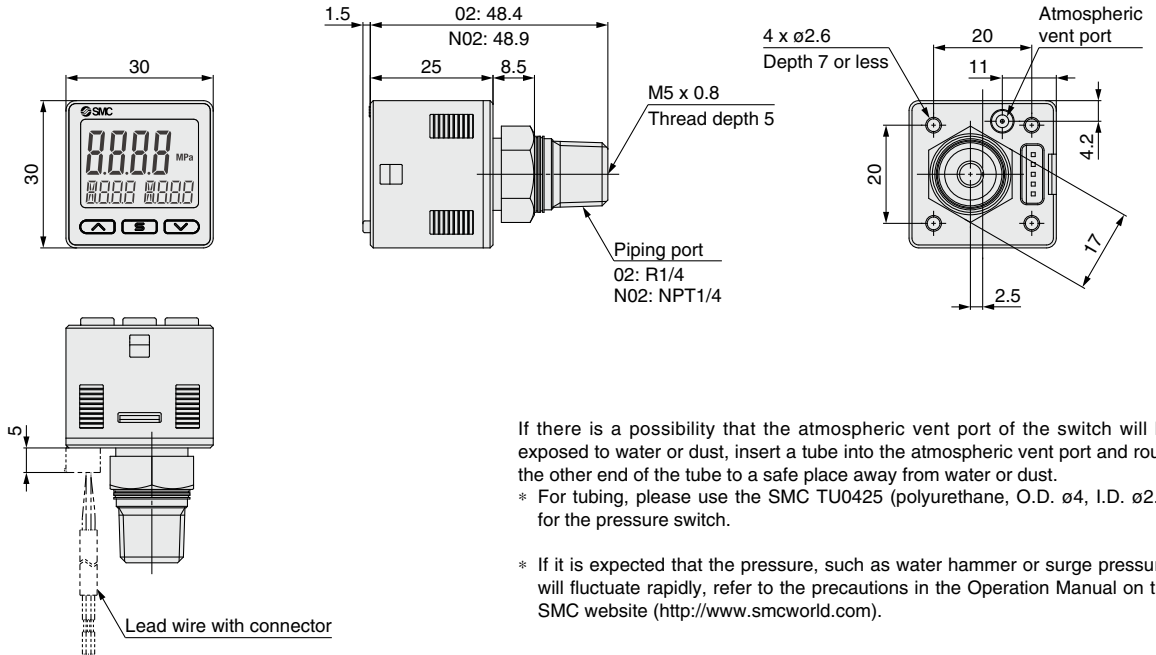


**02**

R1/4

**N02**

NPT1/4



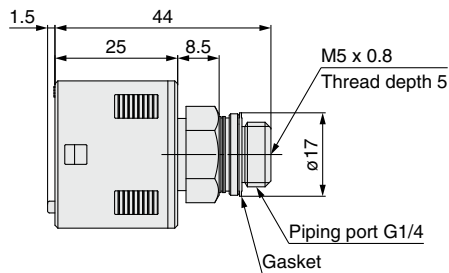
If there is a possibility that the atmospheric vent port of the switch will be exposed to water or dust, insert a tube into the atmospheric vent port and route the other end of the tube to a safe place away from water or dust.

\* For tubing, please use the SMC TU0425 (polyurethane, O.D. ø4, I.D. ø2.5) for the pressure switch.

\* If it is expected that the pressure, such as water hammer or surge pressure, will fluctuate rapidly, refer to the precautions in the Operation Manual on the SMC website (<http://www.smcworld.com>).

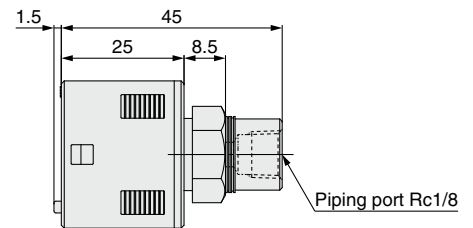
**F02**

G1/4



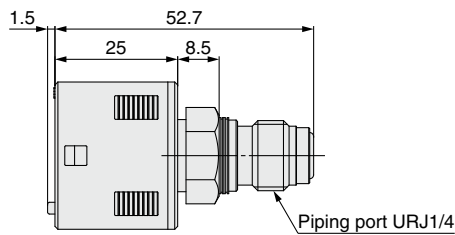
**C01**

Rc1/8



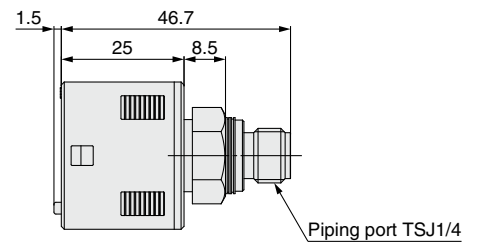
**A2**

URJ1/4



**B2**

TSJ1/4



ZSE20(F)/ISE20

ZSE20A(F)/ISE20A

ZSE20B(F)/ISE20B

ZSE20B(F)-L/ISE20B-L

ZSE20C(F)/ISE20C(H)

Function Details

Made to Order

# ZSE20C(F)/ISE20C(H) Series

## Dimensions

ZSE20C(F)  
ISE20C(H)

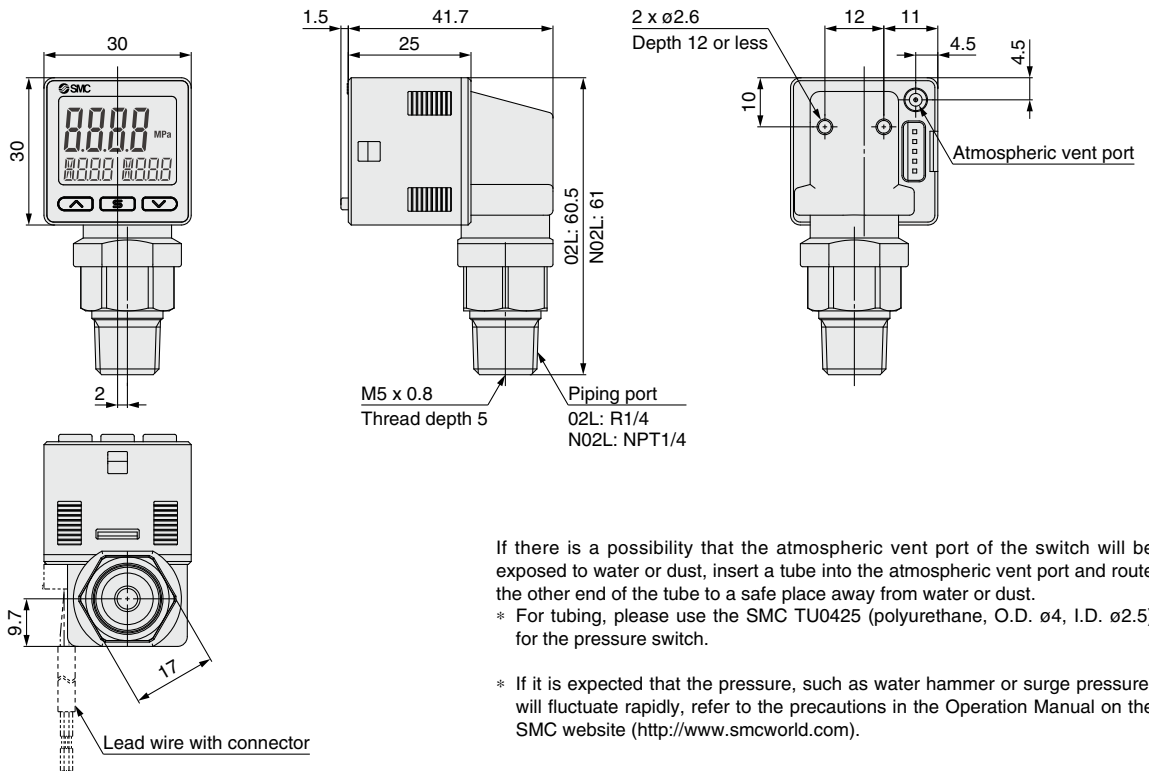
Piping specification      Piping direction

**O2L**

R1/4

**N02L**

NPT1/4



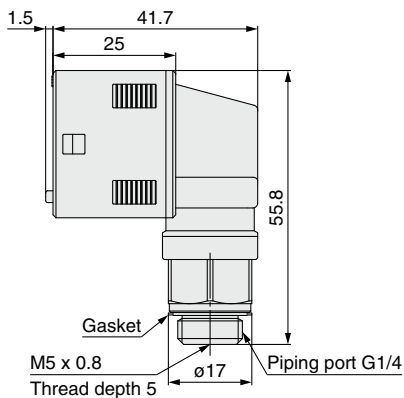
If there is a possibility that the atmospheric vent port of the switch will be exposed to water or dust, insert a tube into the atmospheric vent port and route the other end of the tube to a safe place away from water or dust.

\* For tubing, please use the SMC TU0425 (polyurethane, O.D.  $\phi 4$ , I.D.  $\phi 2.5$ ) for the pressure switch.

\* If it is expected that the pressure, such as water hammer or surge pressure, will fluctuate rapidly, refer to the precautions in the Operation Manual on the SMC website (<http://www.smcworld.com>).

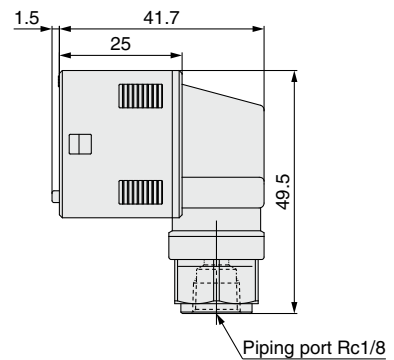
**F02L**

G1/4



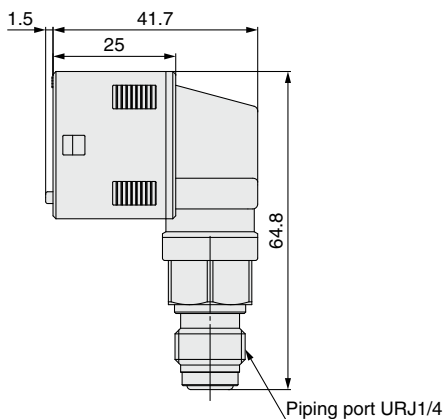
**C01L**

Rc1/8



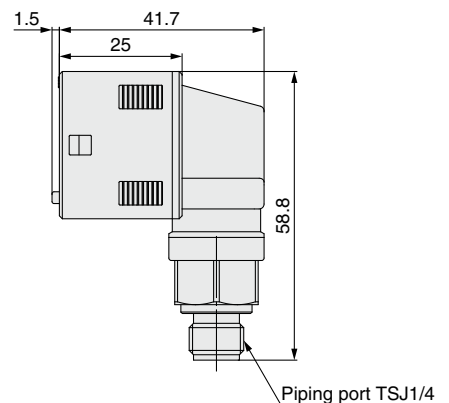
**A2L**

URJ1/4



**B2L**

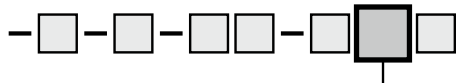
TSJ1/4



**Dimensions**

With bracket

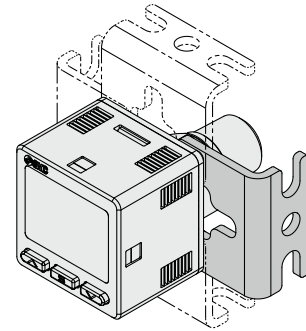
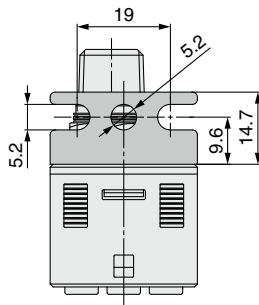
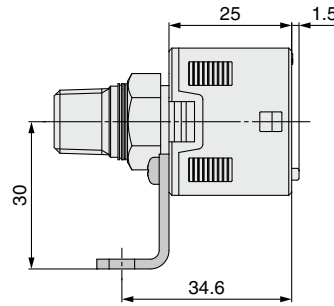
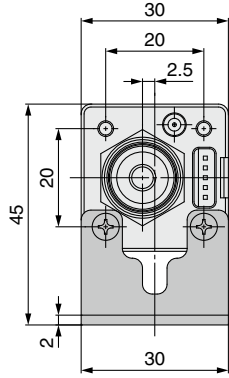
**ZSE20C(F)**  
**ISE20C(H)**



• Option 2

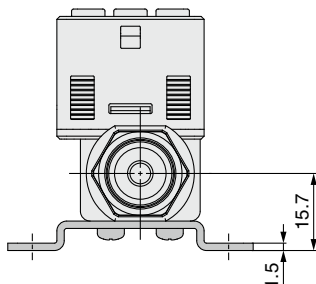
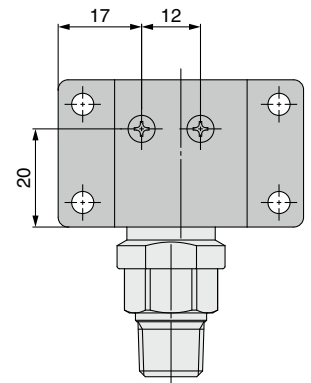
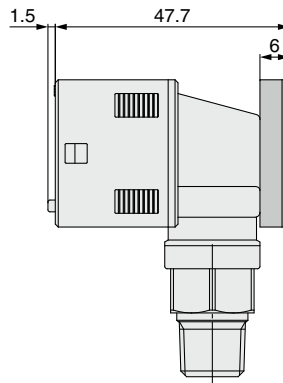
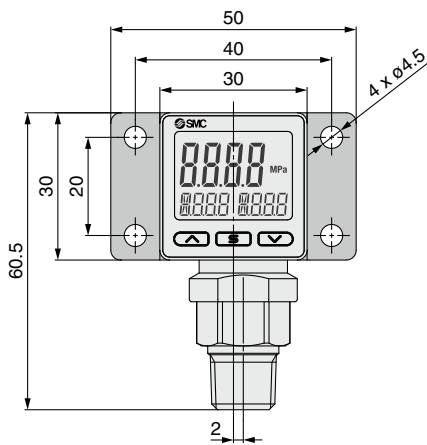
**A1**

**Bracket A (Rear ported)**  
(Part no.: ZS-46-A1)



**A3**

**Bracket C (Bottom ported)**  
(Part no.: ZS-46-E)



ZSE20(F)/ISE20

ZSE20A(F)/ISE20A

ZSE20B(F)/ISE20B

ZSE20B(F)-L/ISE20B-L

ZSE20C(F)/ISE20C(H)

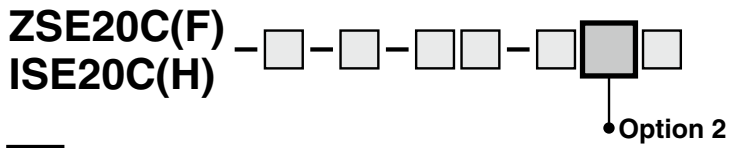
Function Details

Made to Order

# ZSE20C(F)/ISE20C(H) Series

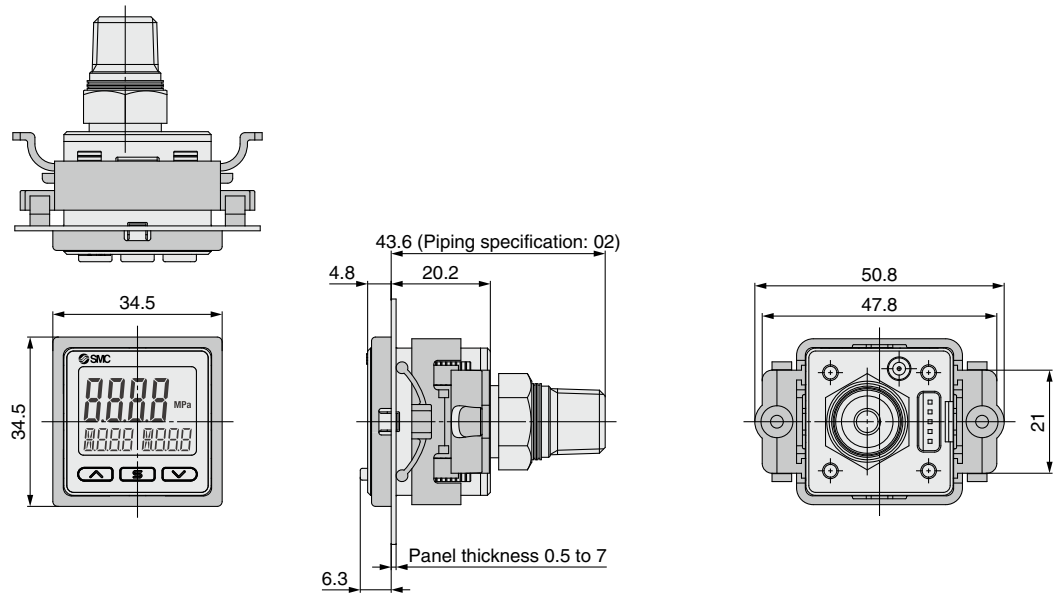
## Dimensions

### Panel mount adapter



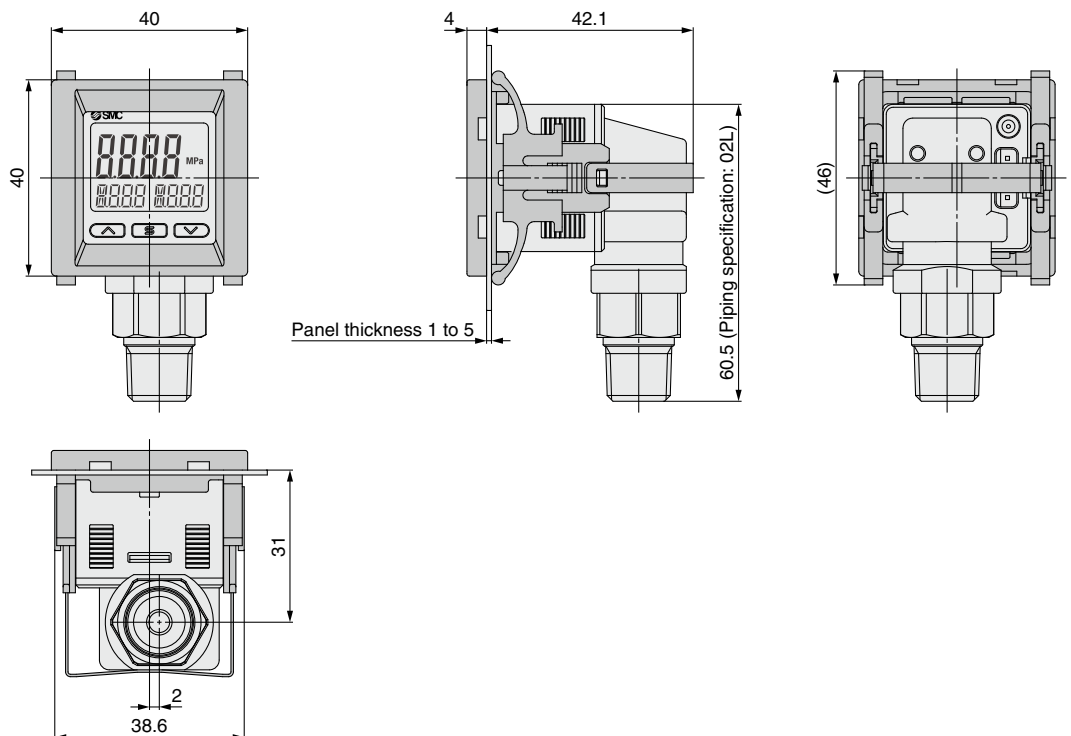
### **B**

#### Panel mount adapter (Rear ported) (Part no.: ZS-46-B)



### **E**

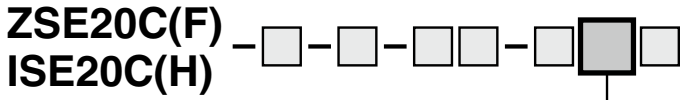
#### Panel mount adapter (Bottom ported) (Part no.: ZS-35-B)





**Dimensions**

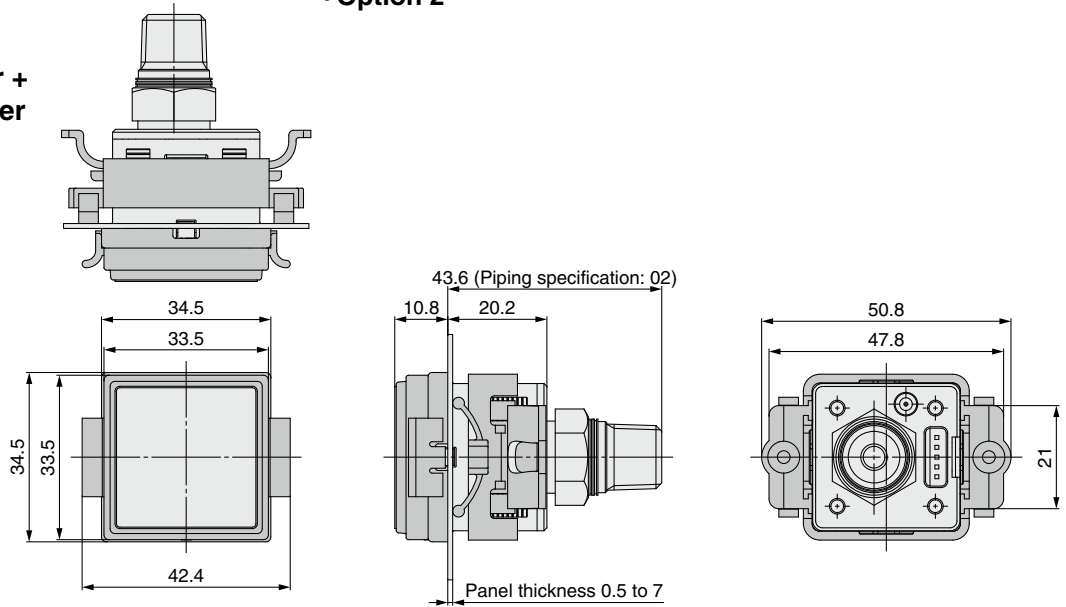
**Panel mount adapter**



• Option 2

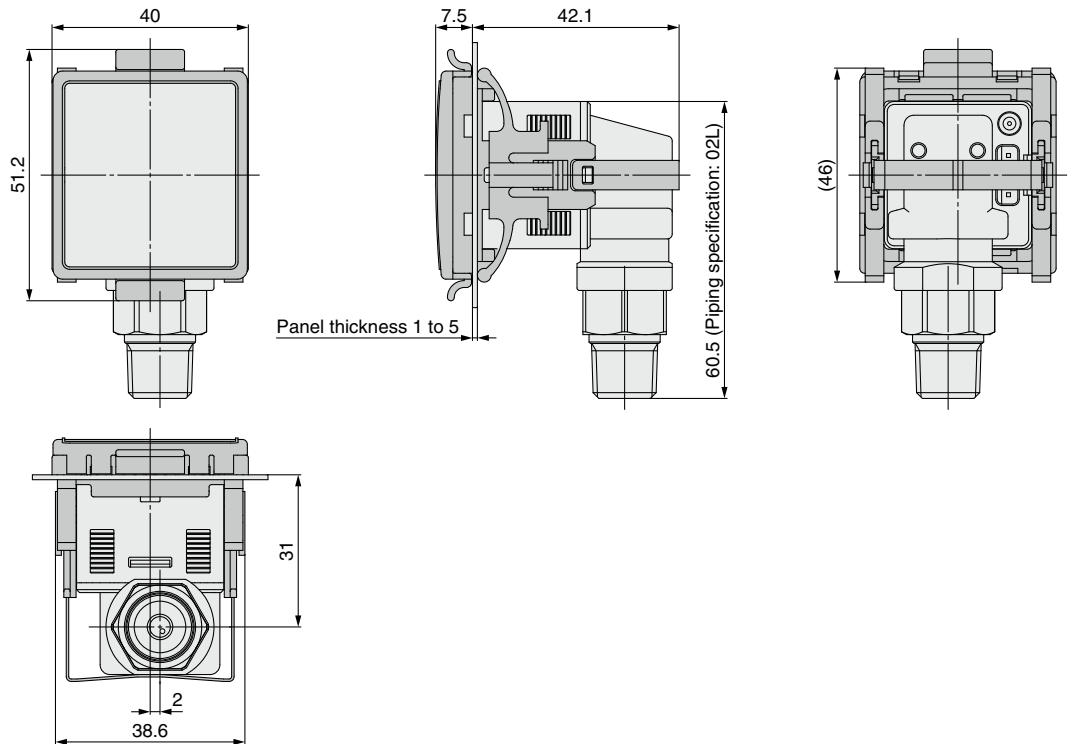
**D**

**Panel mount adapter + Front protection cover (Rear ported)**  
(Part no.: ZS-46-D)

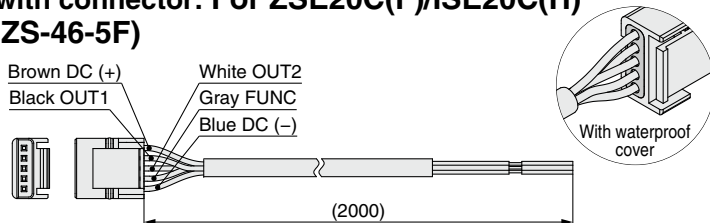


**F**

**Panel mount adapter + Front protection cover (Bottom ported)**  
(Part no.: ZS-35-E)



**Lead wire with connector: For ZSE20C(F)/ISE20C(H)**  
(Part no.: ZS-46-5F)



\* For the lead wire with M12 connector, refer to p. 38.

ZSE20(F)/ISE20

ZSE20A(F)/ISE20A

ZSE20B(F)/ISE20B

ZSE20B(F)-L/ISE20B-L

ZSE20C(F)/ISE20C(H)

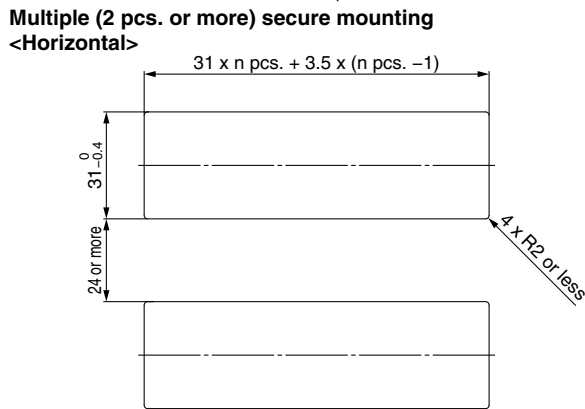
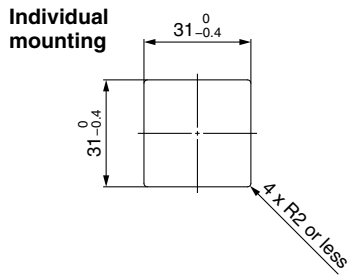
Function Details

Made to Order

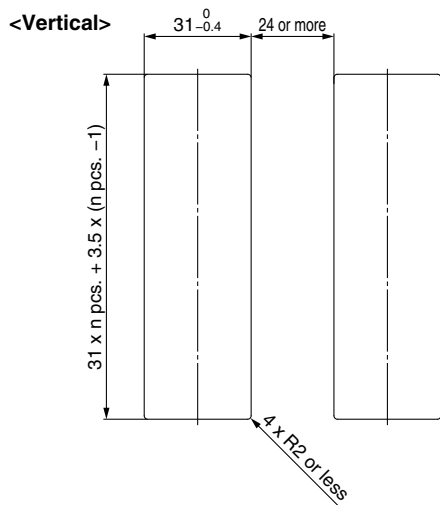
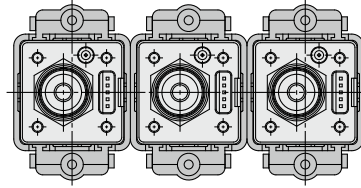
# ZSE20C(F)/ISE20C(H) Series

## Dimensions

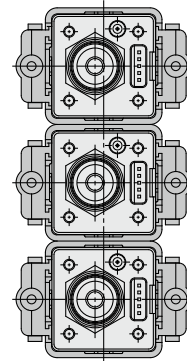
### Panel fitting dimensions (Rear ported)



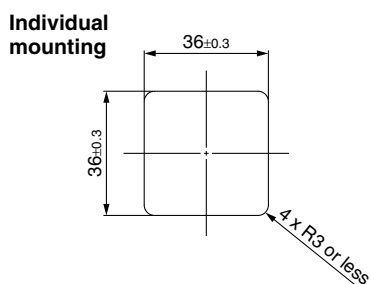
**Panel mount example  
<Horizontal>**



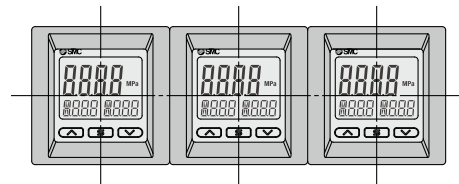
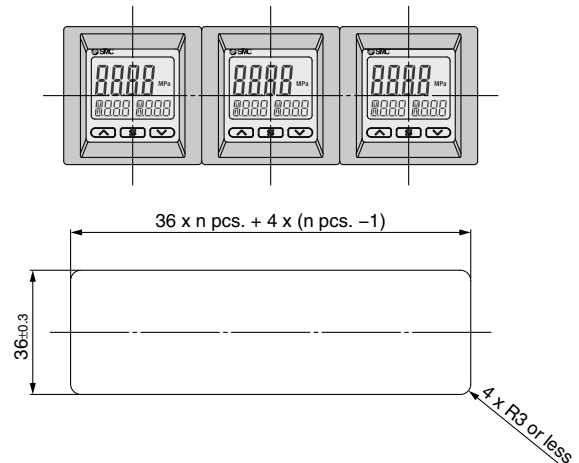
**Panel mount example  
<Vertical>**



### Panel fitting dimensions (Bottom ported)



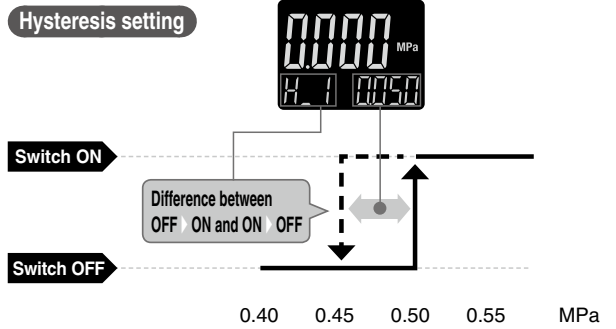
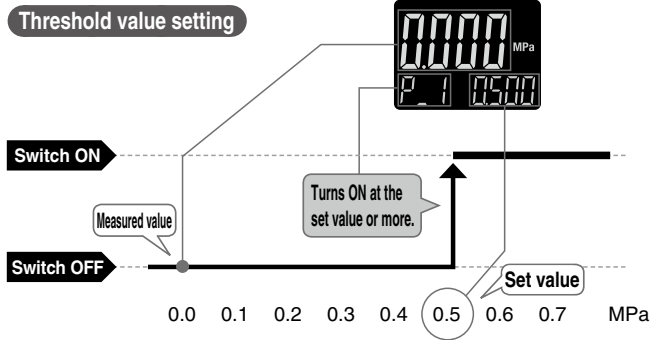
**Multiple (2 pcs. or more) secure mounting  
<Horizontal>**



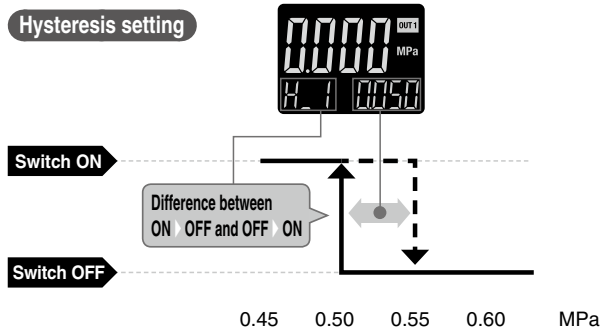
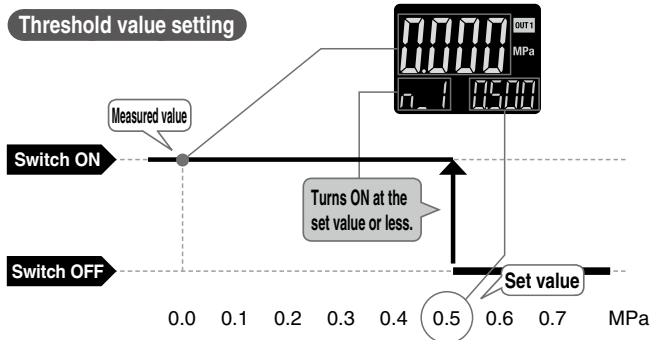
# ZSE20□(F)/ISE20□ Series Function Details

Display examples of the main and sub (set value) screens of each mode. (For ISE20□ (for Positive pressure))

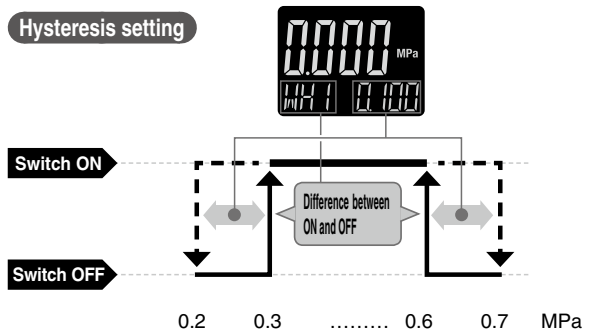
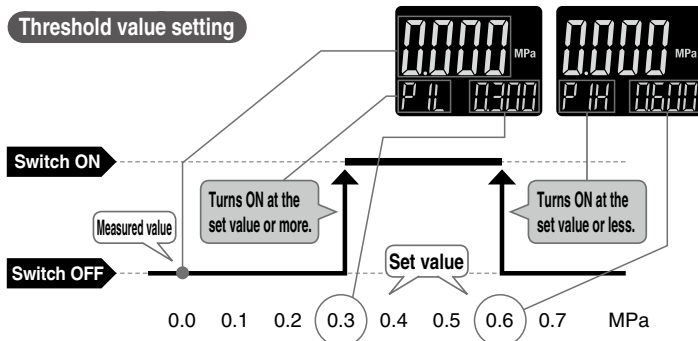
## Hysteresis mode Normal output



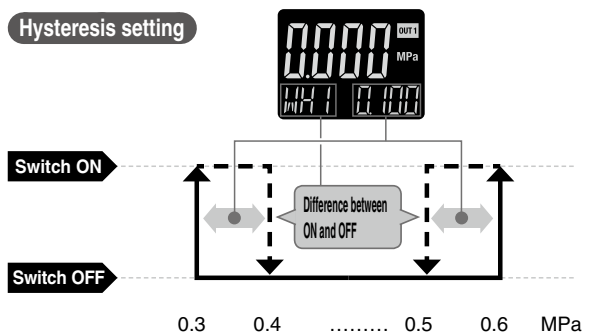
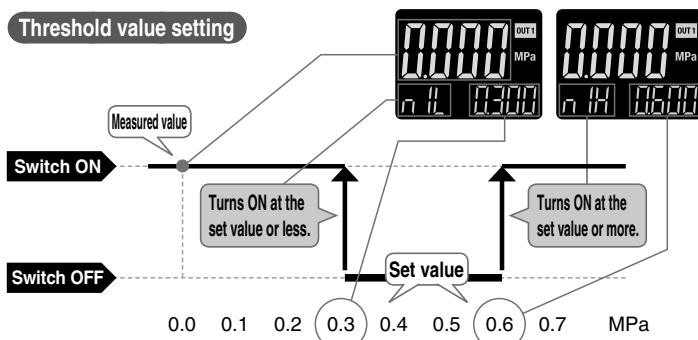
## Hysteresis mode Reversed output



## Window comparator mode Normal output



## Window comparator mode Reversed output



ZSE20(F)/ISE20

ZSE20A(F)/ISE20A

ZSE20B(F)/ISE20B

ZSE20B(F)-L/ISE20B-L

ZSE20C(F)/ISE20C(H)

Function  
Details

Made to  
Order

# ZSE20□(F)/ISE20□ Series

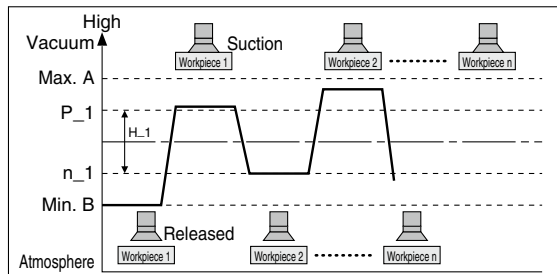
The F□ in ( ) shows the function code number. Refer to the operation manual for details about operation procedures and function codes.

## Function Details

### A Auto-preset function (F4)

Auto-preset function, when selected in the initial setting, calculates and stores the set value from the measured pressure. For example, if this function is used for suction verification, the optimum set value is determined automatically by performing suction and release of several workpieces.

#### Suction Verification



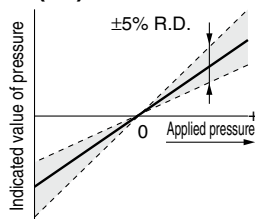
\* When using with IO-Link, the set values cannot be changed by communication.

#### Formula for Obtaining the Set Value

| P_1 or n_1              | H_1                   |
|-------------------------|-----------------------|
| $P_1 = A - (A - B) / 4$ | $H_1 =  (A - B) / 2 $ |
| $n_1 = B + (A - B) / 4$ |                       |

### B Display value fine adjustment function (F6)

Fine adjustment of the indicated value of the pressure sensor can be made within the range of  $\pm 5\%$  of the read value. (The scattering of the indicated value can be eliminated.)



— Indicated value at the time of shipment  
 [Shaded Area] Adjustable range of display value fine adjustment function

\* When the display value fine adjustment function is used, the set pressure value may change  $\pm 1$  digit.

### C Peak/Bottom value display

This function constantly detects and updates the maximum (minimum) pressure when the power is supplied, and allows to hold the maximum (minimum) pressure value.

The held value is maintained even if the power supply is cut.

When the and buttons are simultaneously pressed for 1 second or longer, while “holding”, the held value will be reset.

### D Keylock function

Prevents operation errors such as accidentally changing setting values

### E Zero-clear function

This function clears and resets the zero value on the display of measured pressure.

The indicated value can be adjusted within  $\pm 7\%$  F.S. of the pressure when ex-factory. (ZSE20□F (for compound pressure):  $\pm 3.5\%$  F.S.)

### F Error display function

When an error or abnormality arises, the location and contents are displayed.

| Error name                   | Error code | Description  | Action   |
|------------------------------|------------|--|--|
| Over current error           |            | Load current of 80 mA or more is applied to the switch output.   | Turn the power off and remove the cause of the over current. Then supply the power again.  |
| Residual pressure error      |            | During zero-clear operation, pressure over $\pm 7\%$ F.S. ( $\pm 3.5\%$ F.S. for compound pressure) is present. Note that the mode is returned to measurement mode automatically 1 second later. The zero clear range varies by $\pm 1\%$ F.S. due to variation between individual products. | Perform zero-clear operation again after restoring the applied pressure to an atmospheric pressure condition.  |
| Applied pressure error       |            | Supply pressure exceeds the maximum set pressure.  | Reset applied pressure to a level within the set pressure range  |
|                              |            | Supply pressure is below the minimum set pressure.   |  |
| System error                 | <br><br>   | Internal data error  | Turn the power off and then on again. If the failure cannot be solved, please contact SMC for investigation.   |
| Copy error                   |            | The copy function does not operate properly.   | After clearing the error by pressing the  and  buttons simultaneously for a minimum of 1 second, check the wiring and the model, and then attempt to copy again. |
| IO-Link master version error |            | IO-Link version does not match that of the master.   | Ensure that the master IO-Link version matches the device version.   |

If the error cannot be reset after the above measures are taken, or errors other than those above are displayed, please contact SMC for investigation.

The F□ in ( ) shows the function code number. Refer to the operation manual for details about operation procedures and function codes.

## Function Details

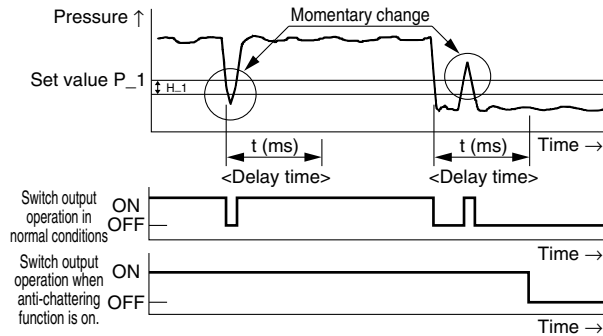
### G Anti-chattering function (Simple setting mode or F1)

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 by changing the delay time setting.

| Available delay time settings                                    |
|--|
| 1.5 ms or less, 20 ms, 100 ms, 500 ms, 1000 ms, 2000 ms, 5000 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.



### H Units selection function (F0)

Display units can be switched with this function.

| Display unit                | MPa   | kPa | kGF                 | bAr   | PSi  | inCH | mmHG |
|-----------------------------|-------|-----|---------------------|-------|------|------|------|
| Smallest settable increment | MPa*1 | kPa | kgf/cm <sup>2</sup> | bar   | psi  | inHg | mmHg |
| ZSE20□ (Vacuum pressure)    | 0.001 | 0.1 | 0.001               | 0.001 | 0.01 | 0.1  | 1    |
| ZSE20□F (Compound pressure) | 0.001 | 0.1 | 0.001               | 0.001 | 0.02 | 0.1  | 1    |
| ISE20□ (Positive pressure)  | 0.001 | 1   | 0.01                | 0.01  | 0.1  |      |      |
| ISE20□H (Positive pressure) | 0.001 | 1   | 0.01                | 0.01  | 0.2  |      |      |

\*1 The ZSE20□ (vacuum pressure) and ZSE20□F (compound pressure) will have different setting and display resolution when the unit is set to MPa.

### I Selection of power saving mode (F80)

The 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.) at a time of shipment from the factory.

(During power saving mode, [ECo] will flash in the sub screen and the operation light will be ON (only when the switch is ON).)

### J Setting of security code (F81)

The user can select whether a security code must be entered to release the key lock.

At a time of shipment from the factory, it is set such that a security code is not required.

ZSE20(F)/ISE20

ZSE20A(F)/ISE20A

ZSE20B(F)/ISE20B

ZSE20B(F)-L/ISE20B-L

ZSE20C(F)/ISE20C(H)

Function Details

Made to Order

# ZSE20□(F)/ISE20□ Series

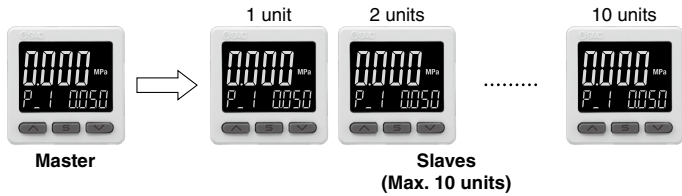
The □ in ( ) shows the function code number. Refer to the operation manual for details about operation procedures and function codes.

## Function Details

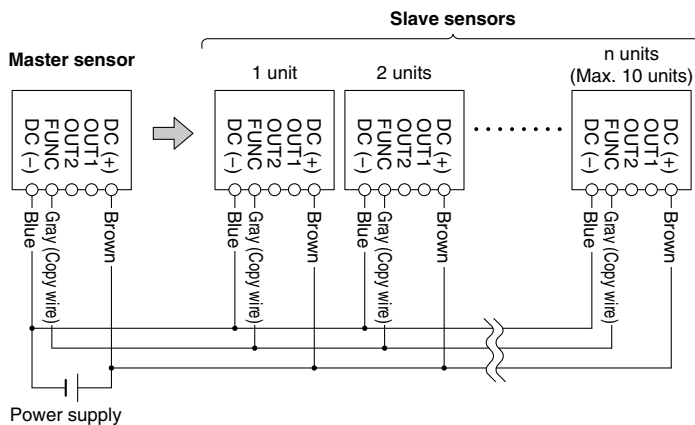
### **K** Copy function (F97) (Z/ISE20A, 20B, 20C series only)

The settings of the master sensor can be copied to the slave sensors, reducing setting labor and minimizing the risk of setting mistakes.

**The set value can be copied to up to 10 switches simultaneously.**  
(Maximum transmission distance: 4 m)



\* This function is not provided with the IO-Link compatible type.

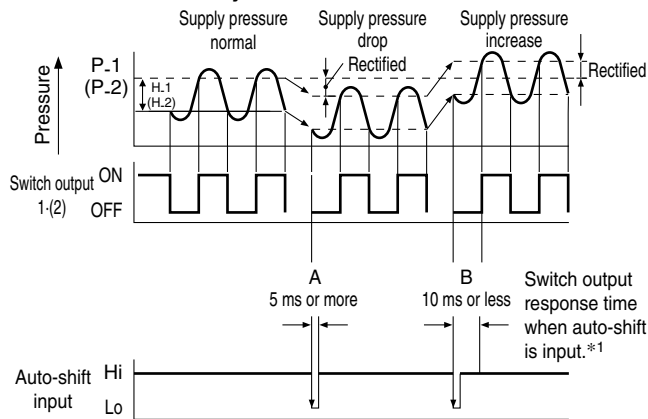


- 1) Wire as shown in the figure on the left.
- 2) Select the slave sensor which is to be the master, and change it into a master using the buttons. (In the default setting, all sensors are set as slaves.)
- 3) Press the **S** button on the master sensor to start copying.

### **L** Auto-shift function (F5) (Z/ISE20A, 20B, 20C series only)

When there are large fluctuations in the supply pressure, the switch may fail to operate correctly. The auto-shift function compensates for 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



\*1 When delay time is 1.5 ms or less

When the auto-shift function is selected, "RS in 000" will be displayed on the sub screen for about 1 second, and the pressure value at that point will be saved as reference value "C\_5." Based on the saved reference value, output on-off points controlled by set values\*2 such as "P\_1," "H\_1," "P\_2," and "H\_2" will also be rectified.

\*2 When an output is reversed, output on-off points displayed at "n\_1," "H\_1," "n\_2," and "H\_2" will be rectified.

The above is an example in hysteresis mode. On-off points are similarly rectified in window comparator mode. Outputs that enable the auto-shift function can be changed via the settings.

\* This function is not provided with the IO-Link compatible type.

#### Settable Range for Auto-Shift Input

|                     | Set pressure range  | Settable range      |
|---------------------|---------------------|---------------------|
| Compound pressure   | -105.0 to 105.0 kPa | -210 to 210 kPa     |
| Vacuum pressure     | 10.0 to -105.0 kPa  | 115.0 to -115.0 kPa |
| Positive pressure   | -0.105 to 1.050 MPa | -1.155 to 1.155 MPa |
| Positive pressure*3 | -0.105 to 2.100 MPa | -2.20 to 2.205 MPa  |

\*3 Z/ISE20C series only

#### Auto-shift zero

The basic function of auto-shift zero is the same as that of auto-shift. However, it corrects values on the display based on a pressure value of "0", which is set as the reference value when auto-shift function is selected.

# ZSE20□(F)/ISE20□ Series

## Made to Order

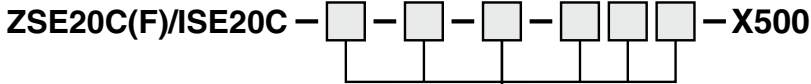
Please contact SMC for detailed dimensions, specifications, and delivery times.



### 1 Parts in Contact with Fluid: Stainless Steel 316L

This pressure switch has better corrosion resistance because it uses stainless steel 316L for the parts in contact with fluid (pressure sensor and fitting).

#### How to Order



Enter the standard product number. (Refer to p. 24.)

- \* Not applicable to the rated pressure -0.1 to 2 MPa specifications (ISE20CH).
- \* A restrictor (equivalent to -X510) is installed inside the fitting. (Piping specifications A2(L) and B2(L) are excluded.)

#### Specifications

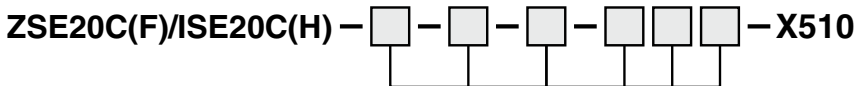
| Model              | ZSE20C(F)  | ISE20C  |
|--------------------|--|---------|
| Withstand pressure | 500 kPa  | 1.5 MPa |
| Applicable fluid   | Liquids and gases do not corrode stainless steel 316L. |         |

Models other than those above have the same specifications as the standard product.

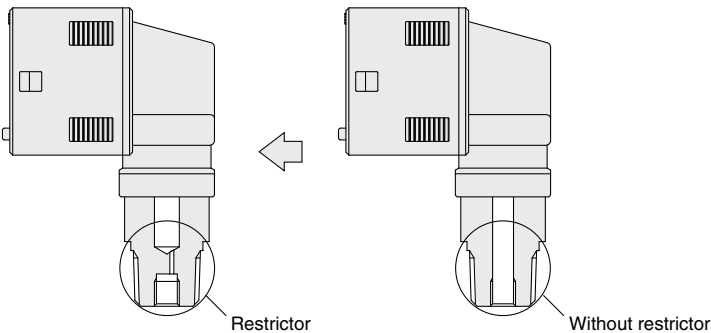
### 2 Restrictor-installed Fitting

A restrictor is installed inside the fitting in order to reduce the effects of water collision with inertia force in the piping when adsorption is broken.

#### How to Order



Enter the standard product number. (Refer to p. 24.)



Made to Order: "-X510"

Standard

- \* Not applicable for piping specifications A2(L) and B2(L).
- \* There are cases in which this product will not effectively suppress the effects of water hammer. It is advised that other measures be taken in such cases.

### 3 Lead Wire with M12 Connector

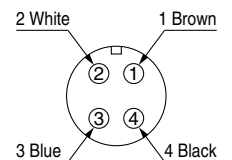
A lead wire applicable to the M12 4-pin pre-wired connector  
The lead wire length is 100 mm.

| Series                       | 20 | 20A | 20B(-L) | 20C |
|------------------------------|----|-----|---------|-----|
| ZS-46-5LM12 (Non-waterproof) | ○  | ○   | —       | —   |
| ZS-46-5FM12 (Waterproof)     | —  | —   | ○       | ○   |

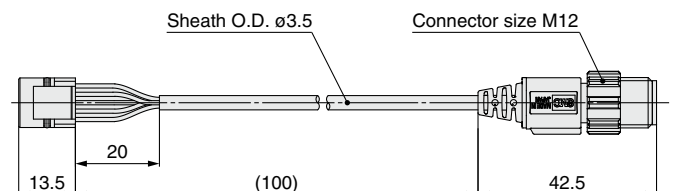
\* If you wish for the sensor (switch body) and the lead wire to be shipped together, please contact SMC.

| Body side pin no. | Pin name | Lead wire color | M12 pin no. |
|-------------------|----------|-----------------|-------------|
| 1                 | DC (-)   | Blue            | 3           |
| 2                 | Function | Gray            | —           |
| 3                 | OUT (2)  | White           | 2           |
| 4                 | OUT (1)  | Black           | 4           |
| 5                 | DC (+)   | Brown           | 1           |

#### Connector pin assignment



\* Nothing is connected to "Function."  
If you intend to make a connection to "Function," please contact SMC.



ZSE20(F)/ISE20

ZSE20A(F)/ISE20A

ZSE20B(F)/ISE20B

ZSE20B(F)-L/ISE20B-L


ZSE20C(F)/ISE20C(H)


Function Details


Made to Order

## Safety Instructions

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.

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

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

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

\*1) ISO 4414: Pneumatic fluid power – General rules relating to systems.  
ISO 4413: Hydraulic fluid power – General rules relating to systems.  
IEC 60204-1: Safety of machinery – Electrical equipment of machines.  
(Part 1: General requirements)  
ISO 10218-1: Manipulating industrial robots – Safety.  
etc.

### Warning

#### 1. The compatibility of the product is the responsibility of the person who designs the equipment 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 referring to its latest catalog information, with a view to giving due consideration to any possibility of equipment failure when configuring the equipment.

#### 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 runaway 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 given specifications, 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 and recreation, or equipment in contact with food and beverages, emergency stop circuits, clutch and brake circuits in press applications, safety equipment or other applications unsuitable for the standard specifications described in the product catalog.
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.

### Caution

#### 1. The product is provided for use in manufacturing industries.

The product herein described is basically provided for peaceful use in manufacturing industries.  
If considering using the product in other industries, consult SMC beforehand and exchange specifications or a contract if necessary.  
If anything is unclear, contact your nearest sales branch.

### 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, whichever is first.\*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 catalog for the particular products.

##### \*2) Vacuum pads are excluded from this 1 year warranty.

A vacuum pad is a consumable part, so it is warranted for a year after it is delivered.  
Also, even within the warranty period, the wear of a product due to the use of the vacuum pad or failure due to the deterioration of rubber material are not covered by the limited warranty.

#### 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.

### Caution

#### SMC products are not intended for use as instruments for legal metrology.

Measurement instruments that SMC manufactures or sells have not been qualified by type approval tests relevant to the metrology (measurement) laws of each country. Therefore, SMC products cannot be used for business or certification ordained by the metrology (measurement) laws of each country.

#### Revision History

|                  |  |    |
|------------------|--|----|
| <b>Edition B</b> | * New variations (for general fluids, IP65, 2 outputs, and analog output) have been added. |    |
|                  | * Number of pages has been increased from 16 to 36.  | VX |
| <b>Edition C</b> | * The IO-Link compatible type has been added.  |    |
|                  | * Number of pages has been increased from 36 to 40.  | WR |

## Safety Instructions

Be sure to read the “Handling Precautions for SMC Products” (M-E03-3) and “Operation Manual” before use.



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