

# 2-Color Display

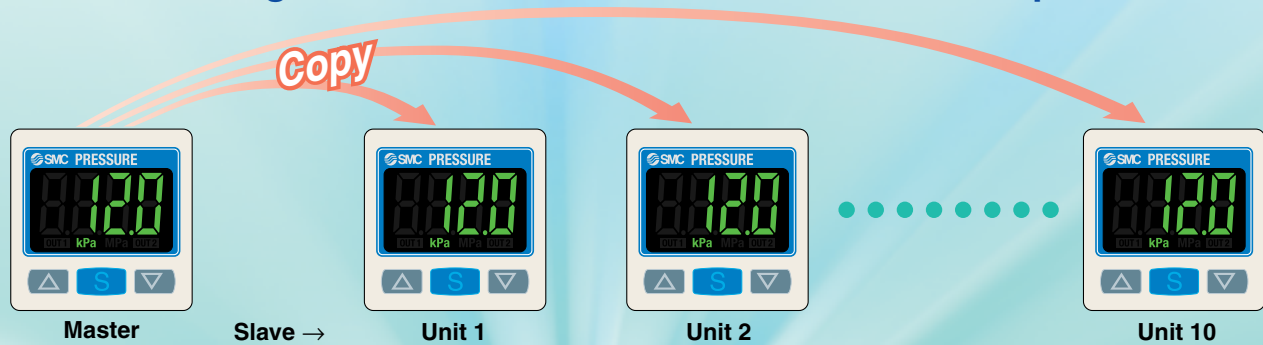


# High-Precision Digital Pressure Switch

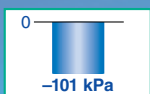
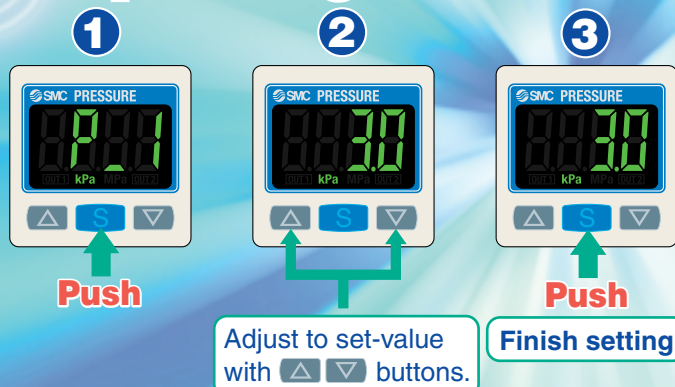
**Settings can be copied to up to 10 slave sensors at once.**

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

- Reduced setting efforts
- Reduced chance of set-value input error

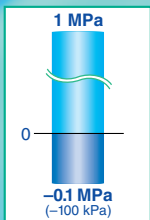


## 3-step setting



### Added vacuum range.

- Rated pressure range: 0.0 to -101.0 kPa



### Expanded pressure range for positive-pressure type to the vacuum range.

- Rated pressure range: -0.100 to 1.000 MPa

## 2 added outputs

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



RoHS compliant

# Series ZSE30A(F)/ISE30A

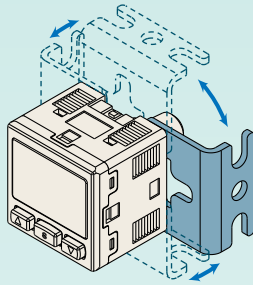


CAT.ES100-70A

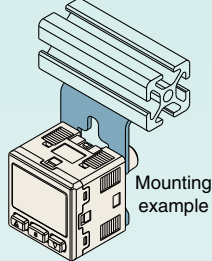
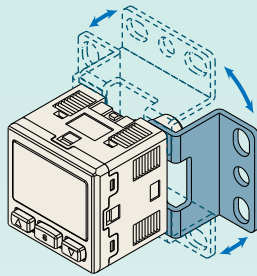
## ● Mounting

Bracket configuration allows mounting in four orientations.

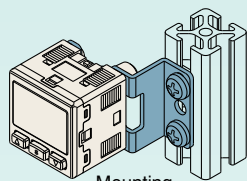
**Bracket A**



**Bracket B**



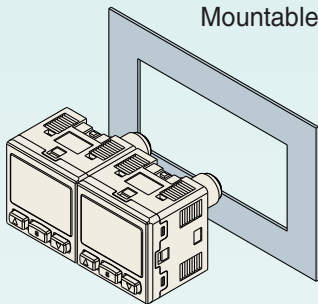
Mounting example



Mounting example

### Panel mount

Mountable side by side without clearance

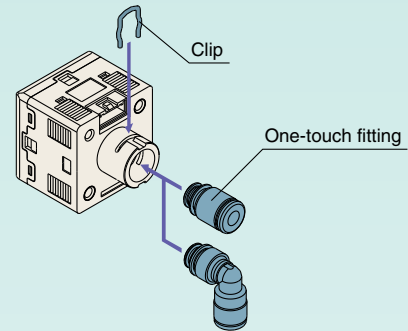


### One opening!

- Reduction of panel-cut job
- Space-saving

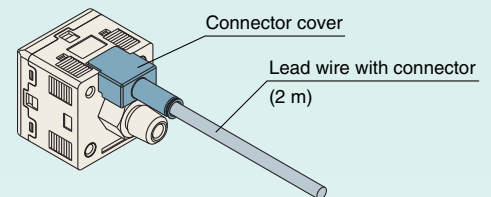
## ● Replaceable one-touch fittings

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



## ● Lead wire

Added the connector cover.



## ● 4-digit display

4-digit display allows easy reading of displayed values.

Example: 0.5 MPa



Series 30A  
(New)



Series 30  
(Conventional)

## ● Possible to check set-value during key locking

## ● Additional functions

### ◆ Secret code setting function

The key locking function keeps unauthorized persons from tampering with buttons.

### ◆ Power-saving function

Power consumption is reduced by turning off the monitor. (Reduce power consumption by up to 20%.)

### ◆ Resolution-switch function

It reduces the monitor to flicker.



1/1000

(Accuracy is not changed, only the displayed values.)



1/100

### ◆ MPa/kPa switch function

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



## ● Series

Series **ZSE30A** (vacuum) **ZSE30AF** (compound) **ISE30A** (positive)

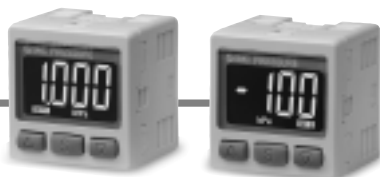


|                      |                                                                                                                                                      |                                            |                                                        |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------------------------------------|
| Rated pressure range | 0.0 to -101.0 kPa<br>-101 kPa                                                                                                                        | -100.0 to 100.0 kPa<br>100 kPa<br>-100 kPa | -0.100 to 1.000 MPa<br>1 MPa<br>-0.1 MPa<br>(-100 kPa) |
| Set pressure range   | 10.0 to -105.0 kPa                                                                                                                                   | -105.0 to 105.0 kPa                        | -0.105 to 1.050 MPa                                    |
| Withstand pressure   | 500 kPa                                                                                                                                              | 500 kPa                                    | 1.5 MPa                                                |
| Minimum unit setting | 0.1 kPa                                                                                                                                              | 0.1 kPa                                    | 0.001 MPa                                              |
| Output               | NPN or PNP open collector 1 output<br>NPN or PNP open collector 2 outputs<br>NPN or PNP open collector 1 output + Analog output (voltage or current) |                                            |                                                        |
| Piping               | R1/8, NPT1/8 (M5 female threaded)<br>ø4, ø6, ø5/32, ø1/4 one-touch fittings                                                                          |                                            |                                                        |

# 2-Color Display High-Precision Digital Pressure Switch



## Series ZSE30A(F)/ISE30A



### How to Order

For positive  
pressure

For vacuum/  
compound pressure

#### Rated pressure range

ISE30A -0.1 to 1 MPa

#### Rated pressure range

ZSE30A 0 to -101 kPa

ZSE30AF -100 to 100 kPa

#### Piping

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

\* Made to Order

#### Display unit

|     |                                                                                   |
|-----|-----------------------------------------------------------------------------------|
| Nil | With unit display <sup>Note 1)</sup><br>switching function                        |
| M   | Fixed SI unit <sup>Note 2)</sup>                                                  |
| P*  | With unit display <sup>Note 1)</sup><br>switching function<br>(Initial value PSI) |

\* Made to Order

Note 1) Under the New Measurement Law, sales of switches with the unit switching function have not been allowed for use in Japan.

Note 2) Fixed unit kPa, MPa

#### Output

|    |                                                     |
|----|-----------------------------------------------------|
| N  | NPN open collector 1 output                         |
| P  | PNP open collector 1 output                         |
| A  | NPN open collector 2 outputs                        |
| B  | PNP open collector 2 outputs                        |
| C* | NPN open collector 1 output + Analog voltage output |
| D* | NPN open collector 1 output + Analog current output |
| E* | PNP open collector 1 output + Analog voltage output |
| F* | PNP open collector 1 output + Analog current output |

\* Made to Order

#### Option 3

| Symbol | Operating manual<br>Booklet | CD-ROM | Calibration<br>certificate |
|--------|-----------------------------|--------|----------------------------|
| Nil    | ○                           | —      | —                          |
| Y      | —                           | —      | —                          |
| W      | —                           | ○      | —                          |
| K      | ○                           | —      | ○                          |
| T      | —                           | —      | ○                          |
| R      | —                           | ○      | ○                          |

#### Option 2

|     |                                                  |
|-----|--------------------------------------------------|
| Nil | None                                             |
| A1  | Bracket A<br>                                    |
| A2  | Bracket B<br>                                    |
| B   | Panel mount adapter<br>                          |
| D   | Panel mount adapter + Front protection cover<br> |

#### Option 1

|     |                                                                                                 |
|-----|-------------------------------------------------------------------------------------------------|
| Nil | Without lead wire<br>                                                                           |
| L   | Lead wire with connector<br>(Lead wire length 2 m) <sup>Note)</sup><br>                         |
| G   | Lead wire with connector<br>(Lead wire length 2 m) <sup>Note)</sup><br>With connector cover<br> |

Note) For output types N and P, the number of core of lead wires will be 3, and for other types, it will be 4.

# Series ZSE30A(F)/ISE30A

## Specifications

| Model                          |                                         | ZSE30A (Vacuum pressure)                                                                                                                              | ZSE30AF (Compound pressure)                                                                                                | ISE30A (Positive pressure) |
|--------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|----------------------------|
| Rated pressure range           |                                         | 0.0 to −101.0 kPa                                                                                                                                     | −100.0 to 100.0 kPa                                                                                                        | −0.100 to 1.000 MPa        |
| Set pressure range             |                                         | 10.0 to −105.0 kPa                                                                                                                                    | −105.0 to 105.0 kPa                                                                                                        | −0.105 to 1.050 MPa        |
| Withstand pressure             |                                         | 500 kPa                                                                                                                                               | 500 kPa                                                                                                                    | 1.5 MPa                    |
| Minimum unit setting           |                                         | 0.1 kPa                                                                                                                                               | 0.1 kPa                                                                                                                    | 0.001 MPa                  |
| Applicable fluid               |                                         | Air, Non-corrosive gas, Non-flammable gas                                                                                                             |                                                                                                                            |                            |
| Power supply voltage           |                                         | 12 to 24 VDC ±10%, Ripple (p-p) 10% or less (with power supply polarity protection)                                                                   |                                                                                                                            |                            |
| Current consumption            |                                         | 40 mA or less                                                                                                                                         |                                                                                                                            |                            |
| Switch output                  |                                         | NPN or PNP open collector 1 output, NPN or PNP open collector 2 outputs (selectable)                                                                  |                                                                                                                            |                            |
|                                | Maximum load current                    | 80 mA                                                                                                                                                 |                                                                                                                            |                            |
|                                | Maximum applied voltage                 | 28 V (at NPN output)                                                                                                                                  |                                                                                                                            |                            |
|                                | Residual voltage                        | 1 V or less (with load current of 80 mA)                                                                                                              |                                                                                                                            |                            |
|                                | Response time                           | 2.5 ms or less (with anti-chattering function: 20, 100, 500, 1000, 2000 ms)                                                                           |                                                                                                                            |                            |
|                                | Short circuit protection                | Yes                                                                                                                                                   |                                                                                                                            |                            |
| Repeatability                  |                                         | ±0.2% F.S. ±1 digit                                                                                                                                   |                                                                                                                            |                            |
| Hystere-<br>sis                | Hysteresis mode                         | Variable (0 or above) <sup>Note 1)</sup>                                                                                                              |                                                                                                                            |                            |
|                                | Window comparator mode                  |                                                                                                                                                       |                                                                                                                            |                            |
| Analog<br>output               | <sup>Note 2)</sup><br>Voltage<br>output | Output voltage (Rated pressure range)                                                                                                                 | 1 to 5V ±2.5% F.S.                                                                                                         | 0.6 to 5 V ±2.5% F.S.      |
|                                |                                         | Linearity                                                                                                                                             | ±1% F.S. or less                                                                                                           |                            |
|                                |                                         | Output impedance                                                                                                                                      | Approx. 1 kΩ                                                                                                               |                            |
|                                | <sup>Note 3)</sup><br>Current<br>output | Output current (Rated pressure range)                                                                                                                 | 4 to 20 mA ±2.5% F.S.                                                                                                      | 2.4 to 20 mA ±2.5% F.S.    |
|                                |                                         | Linearity                                                                                                                                             | ±1% F.S. or less                                                                                                           |                            |
|                                |                                         | Load impedance                                                                                                                                        | Maximum load impedance: Power supply voltage 12 V: 300 Ω, Power supply voltage 24 V: 600 Ω<br>Minimum load impedance: 50 Ω |                            |
| Display                        |                                         | 4-digit, 7-segment, 2-color LCD (Red/Green)                                                                                                           |                                                                                                                            |                            |
| Display accuracy               |                                         | ±2% F.S. ±1 digit (Ambient temperature of 25 ±3°C)                                                                                                    |                                                                                                                            |                            |
| Indicator light                |                                         | Lights up when switch output is turned ON. OUT1: Green, OUT2: Red                                                                                     |                                                                                                                            |                            |
| Environ-<br>ment<br>resistance | Enclosure                               | IP40                                                                                                                                                  |                                                                                                                            |                            |
|                                | Operating temperature range             | Operating: 0 to 50°C, Stored: −10 to 60°C (No freezing or condensation)                                                                               |                                                                                                                            |                            |
|                                | Operating humidity range                | Operating/Stored: 35 to 85% RH (No condensation)                                                                                                      |                                                                                                                            |                            |
|                                | Withstand voltage                       | 1000 VAC for 1 minute between live parts and case                                                                                                     |                                                                                                                            |                            |
|                                | Insulation resistance                   | 50 MΩ or more between live parts and case (at 500 VDC Mega)                                                                                           |                                                                                                                            |                            |
|                                | Vibration resistance                    | 10 to 150 Hz at whichever is smaller of 1.5 mm amplitude or 20 m/s <sup>2</sup> acceleration, in X, Y, Z directions, for 2 hours each (Non-energized) |                                                                                                                            |                            |
|                                | Impact resistance                       | 100 m/s <sup>2</sup> in X, Y, Z directions, 3 times each (Non-energized)                                                                              |                                                                                                                            |                            |
| Temperature characteristics    |                                         | ±2% F.S. (Based on 25°C)                                                                                                                              |                                                                                                                            |                            |
| Lead wire                      |                                         | Oilproof heavy-duty vinyl cable, 3 cores    ø3.5, 2 m<br>4 cores    Conductor area: 0.15 mm <sup>2</sup> (AWG26), Insulator O.D.: 1.0 mm              |                                                                                                                            |                            |
| Standards                      |                                         | CE Marking, UL/CSA, RoHS compliance                                                                                                                   |                                                                                                                            |                            |

Note 1) If applied pressure fluctuates near the set value, set the hysteresis above the fluctuation range to prevent chattering.

Note 2) When analog voltage output is selected, analog current output cannot be used together.

Note 3) When analog current output is selected, analog voltage output cannot be used together.

## Piping Specifications

| Model                 |                                                   | 01                                                | N01                | C4H                                                                             | C6H         | N7H             | C4L                             | C6L         | N7L             |
|-----------------------|---------------------------------------------------|---------------------------------------------------|--------------------|---------------------------------------------------------------------------------|-------------|-----------------|---------------------------------|-------------|-----------------|
| Port size             |                                                   | R1/8<br>M5 x 0.8                                  | NPT1/8<br>M5 x 0.8 | —                                                                               | —           | —               | —                               | —           | —               |
|                       | One-touch fitting, Straight type                  | —                                                 | —                  | $\phi 4$ mm<br>$\phi 5/32$ inch                                                 | $\phi 6$ mm | $\phi 1/4$ inch | —                               | —           | —               |
|                       | One-touch fitting, Elbow type                     | —                                                 | —                  | —                                                                               | —           | —               | $\phi 4$ mm<br>$\phi 5/32$ inch | $\phi 6$ mm | $\phi 1/4$ inch |
| Wetted parts material | Sensor pressure receiving area                    | Sensor pressure receiving area: Silicon           |                    |                                                                                 |             |                 |                                 |             |                 |
|                       | Piping port                                       | C3602 (electroless nickel plated)<br>O-ring: HNBR |                    | PBT, POM, Stainless steel 304, C3604 (electroless nickel plated)<br>O-ring: NBR |             |                 |                                 |             |                 |
| Weight                | Including lead wire with connector (3 cores, 2 m) | 81 g                                              |                    | 70 g                                                                            | 71 g        | 73 g            | 75 g                            | 73 g        | 75 g            |
|                       | Including lead wire with connector (4 cores, 2 m) | 85 g                                              |                    | 74 g                                                                            | 75 g        | 77 g            | 79 g                            | 77 g        | 79 g            |
|                       | Excluding lead wire with connector                | 43 g                                              |                    | 32 g                                                                            | 33 g        | 35 g            | 37 g                            | 35 g        | 37 g            |

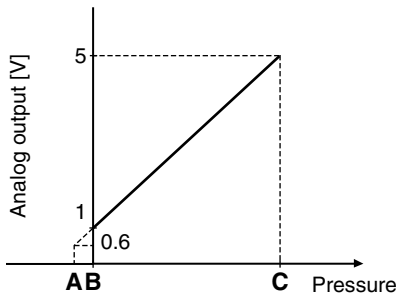
## Optional Part No.

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

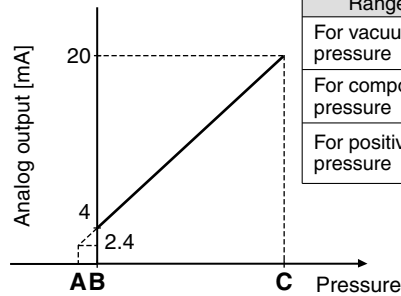
| Part no. | Option                                          | Note                                    | Part no.  | Option                                      | Note                            |
|----------|-------------------------------------------------|-----------------------------------------|-----------|---------------------------------------------|---------------------------------|
| ZS-38-A1 | Bracket A                                       | Mounting screw (with 2 pcs. of M3 x 5L) | ZS-38-5L  | Lead wire with a connector for copying      | 3 cores, copy function, 1 m     |
| ZS-38-A2 | Bracket B                                       | Mounting screw (with 2 pcs. of M3 x 5L) | ZS-38-U   | Lead wire unit with a connector for copying | Copy function (up to 10 slaves) |
| ZS-27-C  | Panel mount adapter                             | Mounting screw (with 2 pcs. of M3 x 8L) | ZS-38-C4H | One-touch fittings $\phi 4$ mm straight     | O-ring, one-touch clip included |
| ZS-27-D  | Panel mount adapter + Front protection cover    | Mounting screw (with 2 pcs. of M3 x 8L) | ZS-38-C6H | One-touch fittings $\phi 6$ mm straight     | O-ring, one-touch clip included |
| ZS-27-01 | Front protection cover                          |                                         | ZS-38-N7H | One-touch fittings $\phi 1/4$ inch straight | O-ring, one-touch clip included |
| ZS-38-3L | Lead wire with connector                        | 3 cores, for 1 output, 2 m              | ZS-38-C4L | One-touch fittings $\phi 4$ mm elbow        | O-ring, one-touch clip included |
| ZS-38-4L | Lead wire with connector                        | 4 cores, for 2 outputs, 2 m             | ZS-38-C6L | One-touch fittings $\phi 6$ mm elbow        | O-ring, one-touch clip included |
| ZS-38-3G | Lead wire with connector (with connector cover) | 3 cores, for 1 output, 2 m              | ZS-38-N7L | One-touch fittings $\phi 1/4$ inch elbow    | O-ring, one-touch clip included |
| ZS-38-4G | Lead wire with connector (with connector cover) | 4 cores, for 2 outputs, 2 m             | ZS-38-H   | Operating manual CD-ROM                     |                                 |

## Analog Output

### Voltage output



### Current output



| Range                 | Rated pressure range | A        | B        | C        |
|-----------------------|----------------------|----------|----------|----------|
| For vacuum pressure   | 0.0 to -101.0 kPa    | —        | 0        | -101 kPa |
| For compound pressure | -100.0 to 100.0 kPa  | —        | -100 kPa | 100 kPa  |
| For positive pressure | -0.100 to 1.000 MPa  | -0.1 kPa | 0        | 1 MPa    |

## Descriptions

### Unit display

Displays present unit (only for units of kPa and MPa).

### Output (OUT1) display (Green)

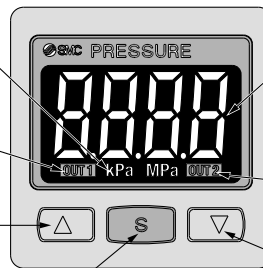
Lights up when switch output (OUT1) is turned ON.

### △ button (UP)

Use this button to select the mode or increase the ON/OFF set-value.  
It is also used for switching to the peak display mode.

### S button (SET)

Use this button to change the mode or confirm the set-value.



### LCD

Displays the current pressure, set mode, and error code. Always use red or green display; or switch between green and red according to the output. Four different display settings are available.

### Output (OUT2) display (Red)

Lights up when switch output (OUT2) is turned ON.

### ▽ button (DOWN)

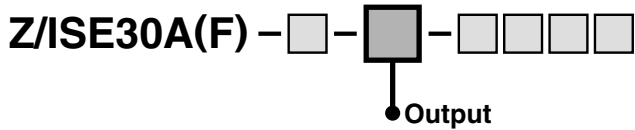
Use this button to select the mode or decrease the ON/OFF set-value.  
It is also used for switching to the bottom display mode.

## Functions (Refer to pages 10 and 11 for details.)

|                                                                 |                                                                                                                  |
|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>Copy function</b>                                            | Copies the settings of the master sensor to the slave sensors.                                                   |
| <b>Auto-preset function</b>                                     | Calculates and enters rough set values automatically from the actual operating conditions.                       |
| <b>Precision indicator setting function</b>                     | Evens out deviations in the displayed value.                                                                     |
| <b>Peak display function</b>                                    | Can retain the maximum pressure value displayed during measurement.                                              |
| <b>Bottom display function</b>                                  | Can retain the minimum pressure value displayed during measurement.                                              |
| <b>Key lock function (Security code input can be selected.)</b> | The key board can be locked to prevent any incorrect function of the operation switch.                           |
| <b>Zero-out function</b>                                        | The pressure display can be set at zero when the pressure is open to the atmosphere.                             |
| <b>Anti-chattering function</b>                                 | Prevents possible malfunction due to sudden fluctuations in the primary pressure by adjusting the response time. |
| <b>Unit display switching function</b>                          | Can convert the display value.                                                                                   |
| <b>Power-saving mode</b>                                        | Reduces power consumption.                                                                                       |
| <b>Display resolution-switch function</b>                       | Converts display resolution from the normal value of 1/1000 to 1/100.<br>It reduces the monitor to flicker.      |
| <b>kPa⇔MPa switch function</b>                                  | Converts the unit between kPa and MPa.                                                                           |

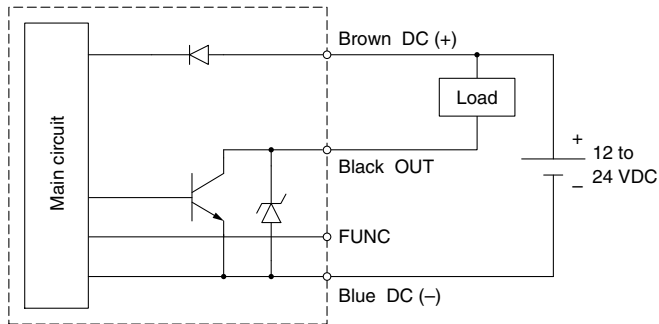
# Series ZSE30A(F)/ISE30A

## Internal Circuits and Wiring Examples



**N**

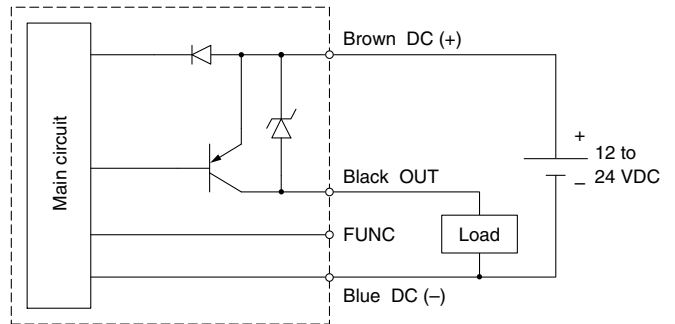
**NPN (1 output)**



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

**P**

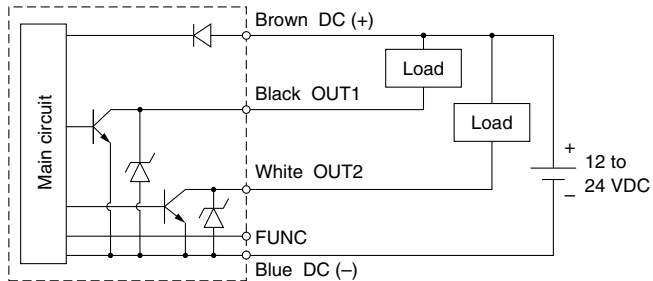
**PNP (1 output)**



Max. 80 mA  
Residual voltage 1 V or less

**A**

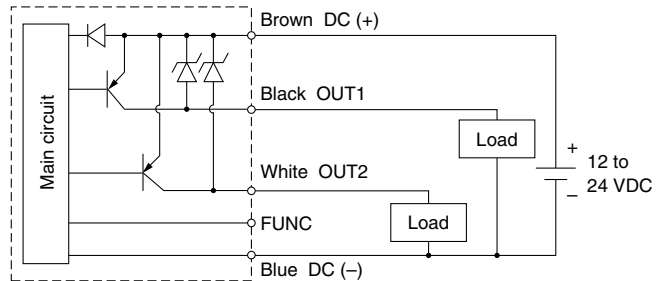
**NPN (2 outputs)**



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

**B**

**PNP (2 outputs)**

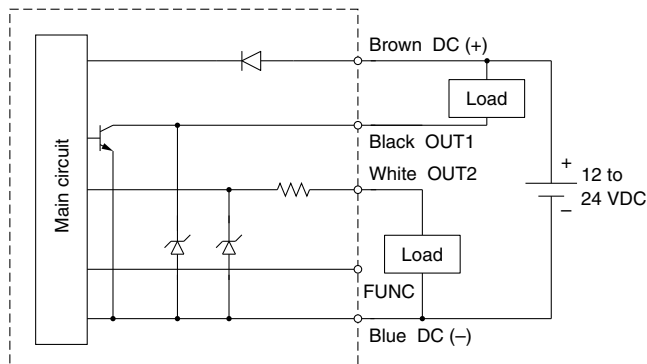


Max. 80 mA  
Residual voltage 1 V or less

\* The FUNC terminal is connected using a dedicated lead wire (ZS-38-5L or ZS-38-U) when the copy function is used. (Refer to "Copy function" on page 10.)

**C**

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

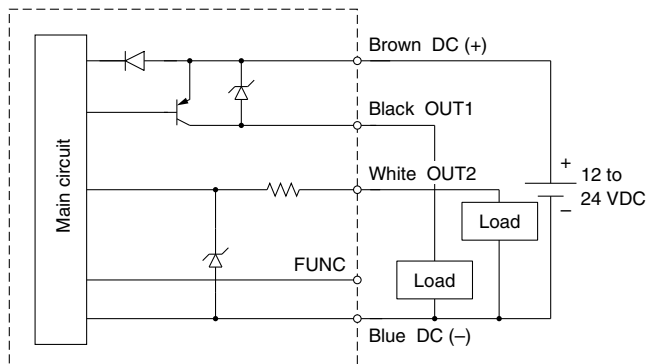


Max. 28 V, 80 mA  
Residual voltage 1 V or less

Analog voltage output  
Output impedance: Approx. 1 k $\Omega$

**E**

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

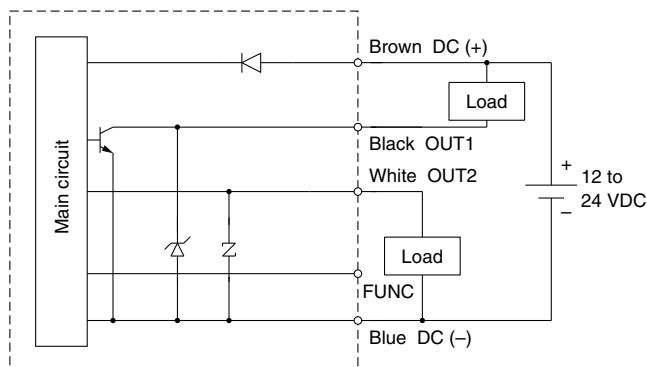


Max. 80 mA  
Residual voltage 1 V or less

Analog voltage output  
Output impedance: Approx. 1 k $\Omega$

**D**

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

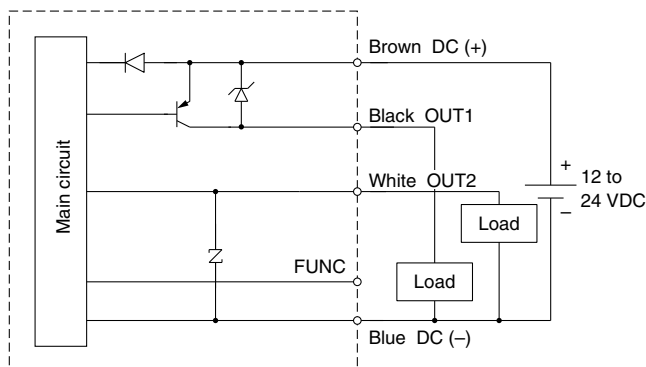


Max. 28 V, 80 mA  
Residual voltage 1 V or less

Analog current output  
Max. load impedance:  
Power supply voltage 12 V: 300  $\Omega$   
Power supply voltage 24 V: 600  $\Omega$   
Min. load impedance: 50  $\Omega$

**F**

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



Max. 80 mA  
Residual voltage 1 V or less

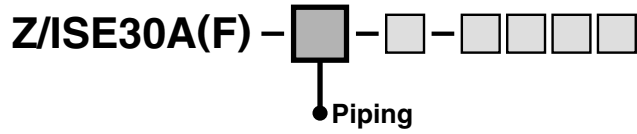
Analog current output  
Max. load impedance:  
Power supply voltage 12 V: 300  $\Omega$   
Power supply voltage 24 V: 600  $\Omega$   
Min. load impedance: 50  $\Omega$

\* The FUNC terminal is connected using a dedicated lead wire (ZS-38-5L or ZS-38-U) when the copy function is used. (Refer to "Copy function" on page 10.)

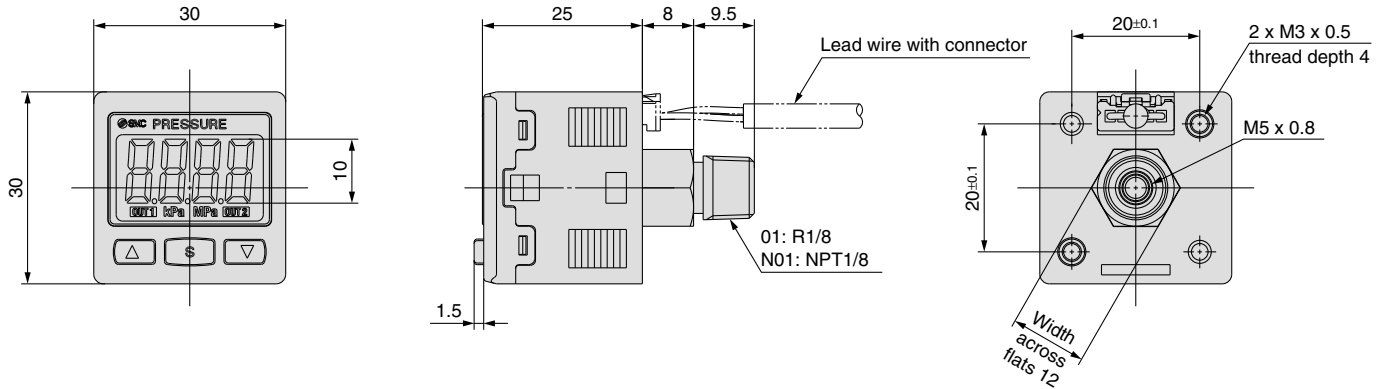


# Series ZSE30A(F)/ISE30A

## Dimensions

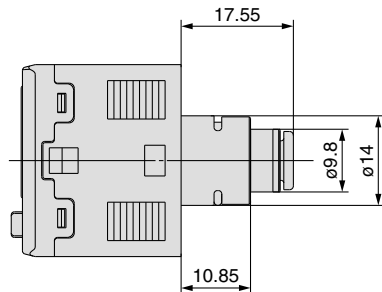


**01 / N01**



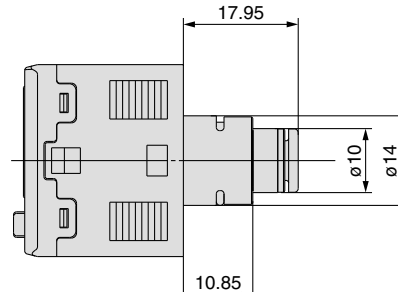
**C4H**

One-touch fitting  $\varnothing 4$  mm  
 $\varnothing 5/32$  inch straight



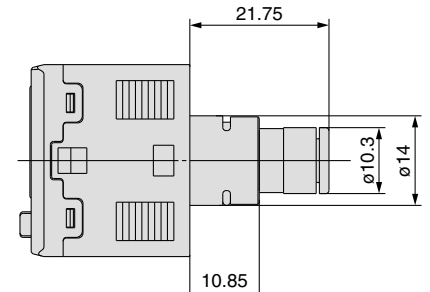
**C6H**

One-touch fitting  $\varnothing 6$  mm  
straight



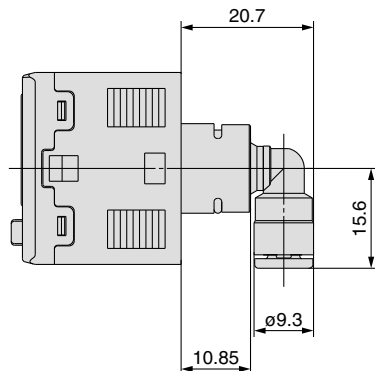
**N7H**

One-touch fitting  $\varnothing 1/4$  inch  
straight



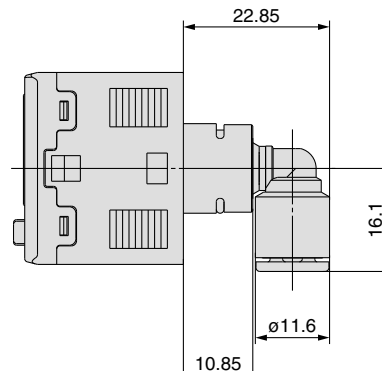
**C4L**

One-touch fitting  $\varnothing 4$  mm  
 $\varnothing 5/32$  inch elbow



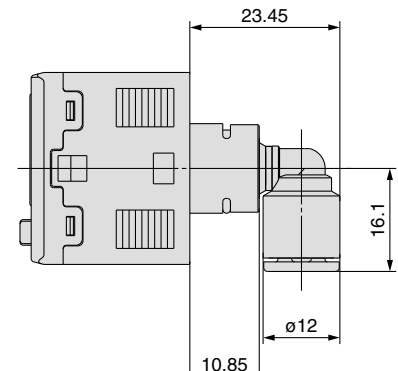
**C6L**

One-touch fitting  $\varnothing 6$  mm  
elbow



**N7L**

One-touch fitting  $\varnothing 1/4$  inch  
elbow





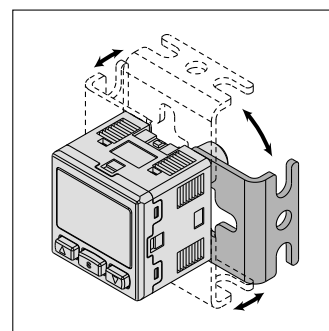
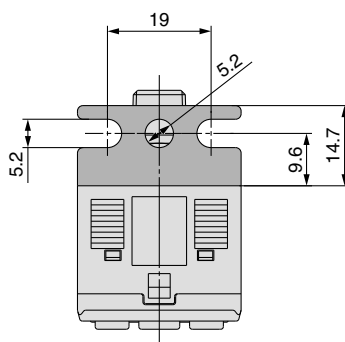
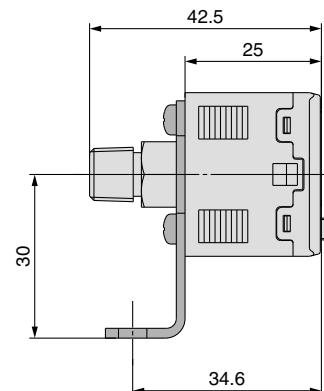
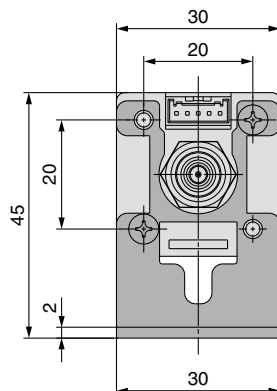
With bracket

Z/ISE30A(F) - □ - □ - □ - □ - □ - □

● Option 2

**A1**

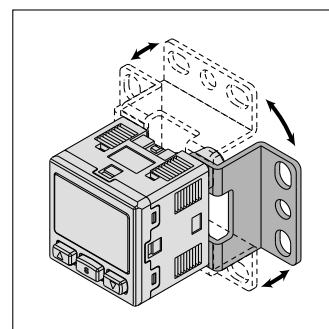
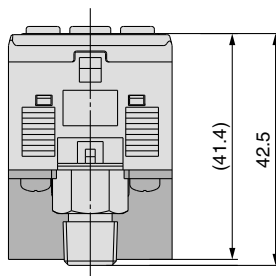
**Bracket A**  
(Option unit part no.: ZS-38-A1)



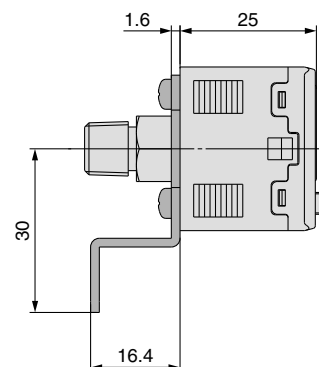
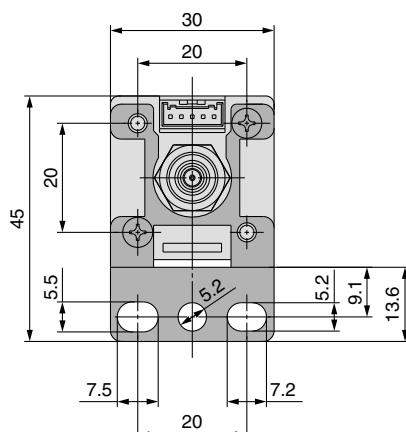
\* Bracket configuration allows mounting in four orientations.

**A2**

**Bracket B**  
(Option unit part no.: ZS-38-A2)



\* Bracket configuration allows mounting in four orientations.



# Series ZSE30A(F)/ISE30A

## Dimensions

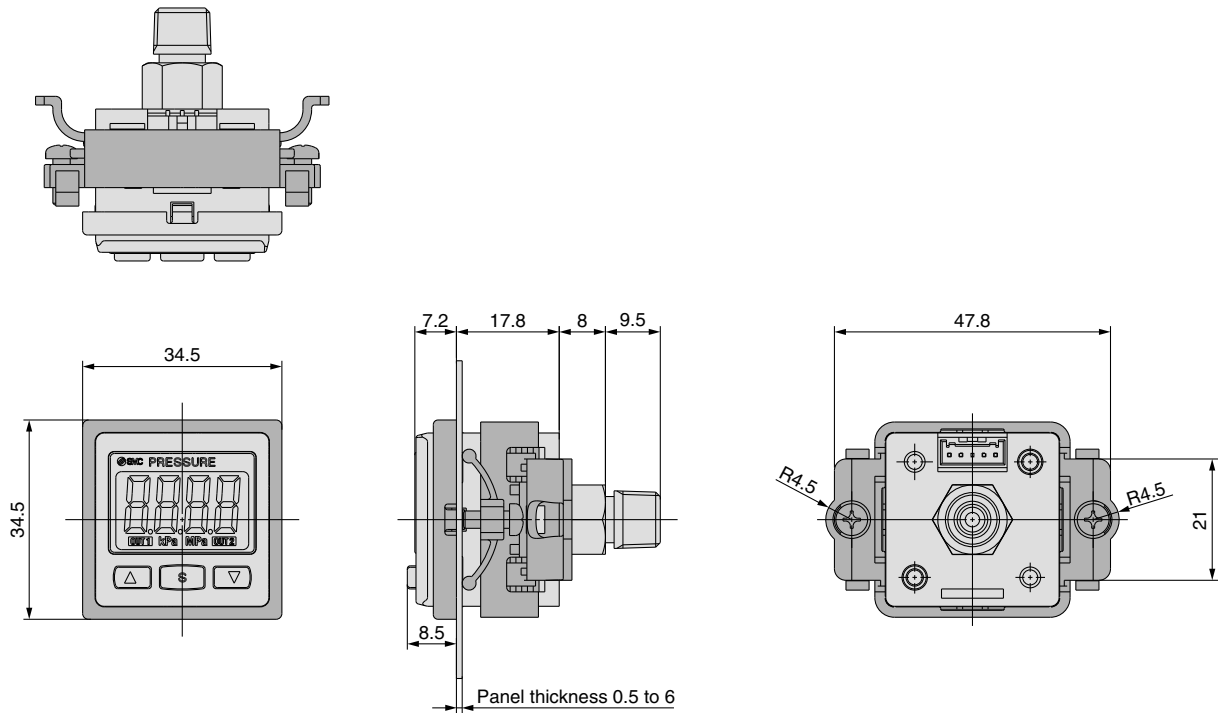
Panel mount

Z/ISE30A(F) -  -  -  -  -  - 

● Option 2

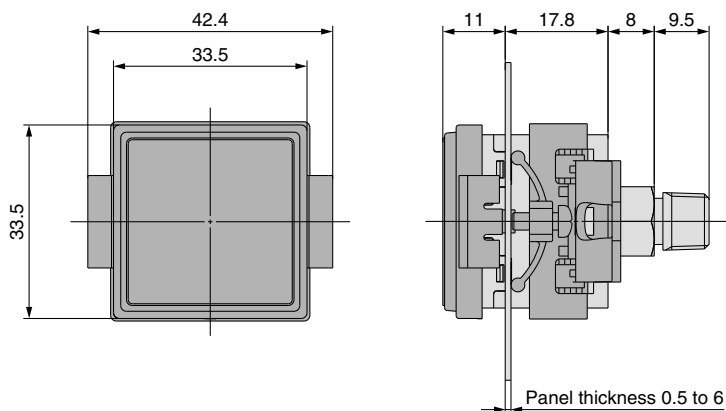
**B**

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



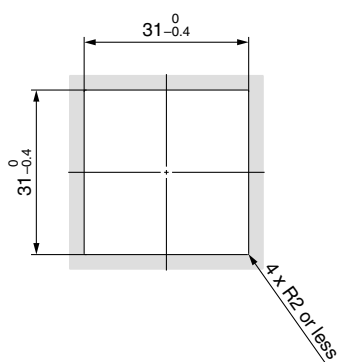
**D**

Panel mount adapter + Front protection cover  
(Option unit part no.: ZS-27-D)

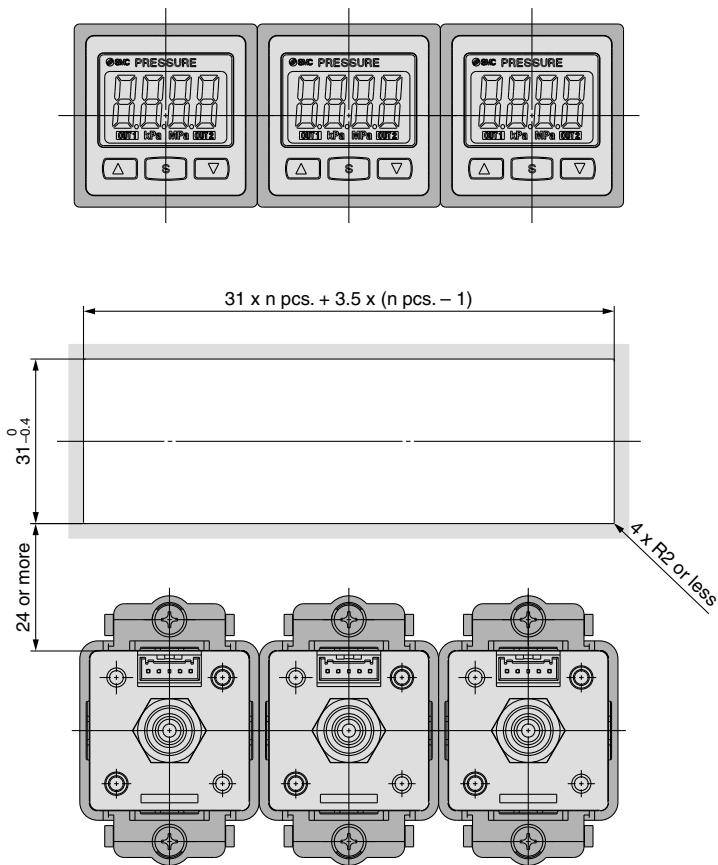


## Panel-cut dimensions

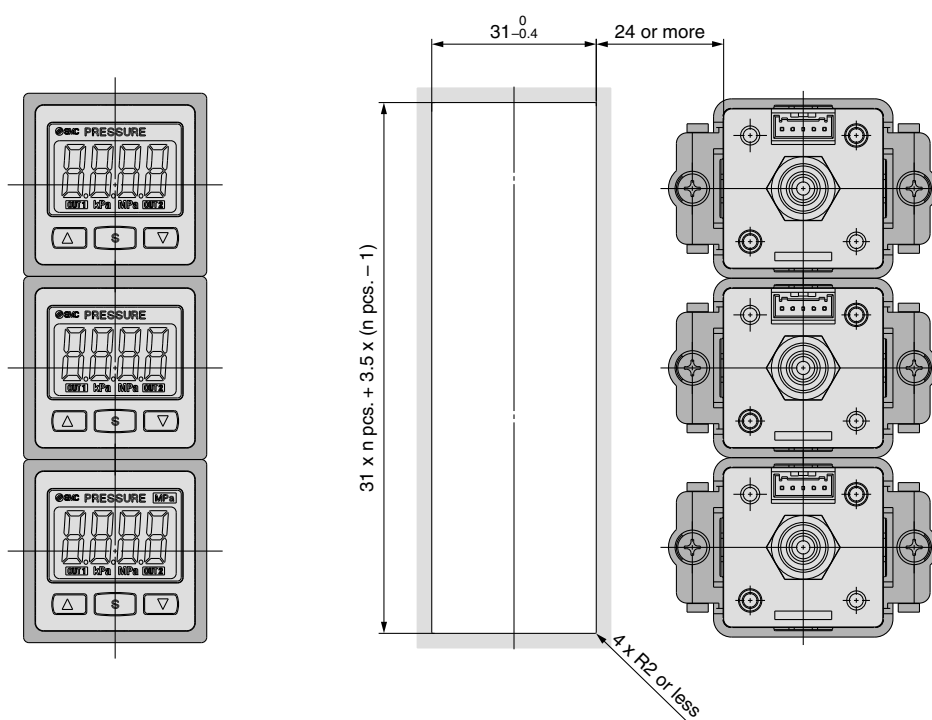
1 pc. mounting



Multiple (2 pcs. or more) horizontal mounting



Multiple (2 pcs. or more) vertical mounting



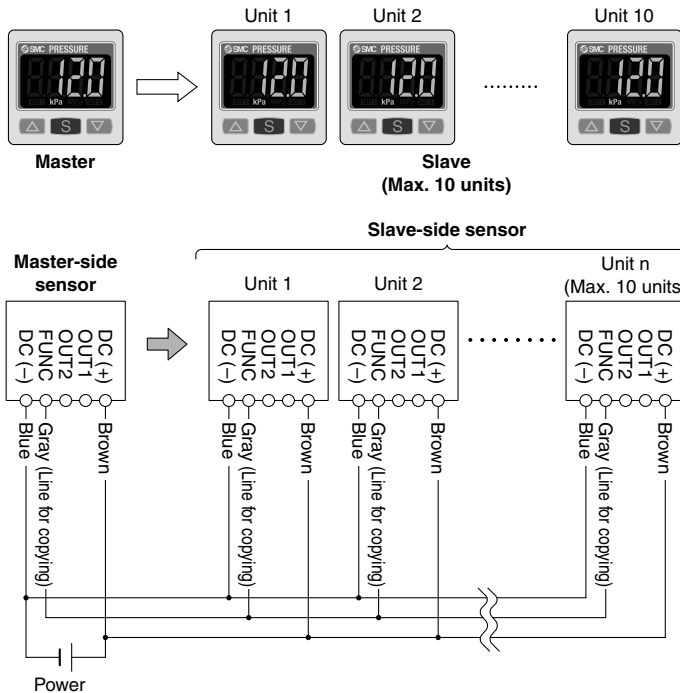
## Function Details

### A Copy function (F97)

The settings of the master sensor can be copied to the slave sensors.  
It is to reduce the time taken for setting and prevent the input of wrong values.

**Settings can be copied to up to 10 slave sensors at once.**

**(Max. transmission distance: 4 m)**



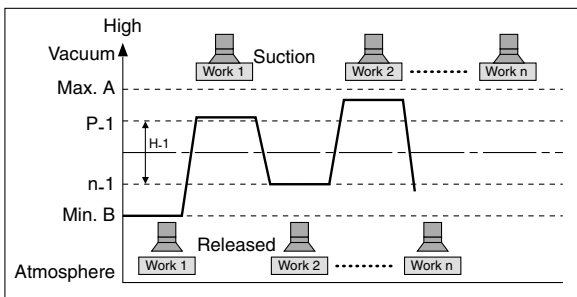
- 1) The sensors are connected by a dedicated lead wire (ZS-38-5L (for master and one slave) or ZS-38-U (for master and up to 10 slaves)). Copying is performed through a dedicated communication line.

- 2) Make the slave sensor which needs to be the master into the master by button operation. (Initially all sensors are set as slaves.)
- 3) Press the **[S]** button on the master sensor to start copying.

### B Auto-preset function (F5)

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

#### Suction Verification

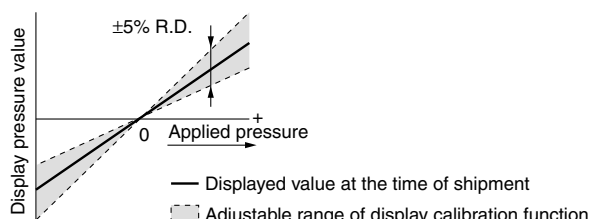


#### Formula for Obtaining the Set-Value

| P_1 or P_2                | H_1 or H_2            |
|---------------------------|-----------------------|
| $P_1 (P_2) = A - (A-B)/4$ | $H_1 (H_2) = (A-B)/2$ |
| $n_1 (n_2) = B + (A-B)/4$ |                       |

### C Precision indicator setting 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.



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

### D Peak and bottom display function

This function constantly detects and updates the maximum (minimum) value and allows to hold the maximum (minimum) pressure value.

When the **[Δ]** **[▽]** buttons are simultaneously pressed for 1 second or longer, while "holding", the held value will be reset.

### E Key lock function

This function prevents incorrect operations such as accidentally changing the set-value.

### F Zero-out function

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

For the pressure switch with analog output, the analog output shifts according to the indication. A displayed value can be adjusted within  $\pm 7\%$  F.S. of the pressure when ex-factory. ( $\pm 3.5\%$  F.S. for ZSE30AF (compound pressure))

□ in brackets stand for the function codes. Refer to the operating manual for how to operate and function codes in detail.

## G Error indication function

| Error name              | Error code | Description                                                                                                                                                                                                                                                                                                                                          | Solution                                                                                                                           |
|-------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Overcurrent error       | Er1        | Load current of switch output (OUT1) exceeds 80 mA.                                                                                                                                                                                                                                                                                                  | Shut off the power supply. After eliminating the output factor that caused the excess current, turn the power supply back on.      |
|                         | Er2        | Load current of switch output (OUT2) exceeds 80 mA.                                                                                                                                                                                                                                                                                                  |                                                                                                                                    |
| Residual pressure error | Er3        | A pressure of $\pm 7\%$ F.S. of atmospheric pressure is applied in the zero-out function. ( $\pm 3.5\%$ F.S. or more for ZSE30AF (compound pressure))<br>The switch will automatically return to measuring mode in 1 second, however. Due to individual product differences, the setting range of the zero-out function varies within $\pm 1\%$ F.S. | Bring the pressure back to atmospheric pressure and try using the zero-out function.                                               |
| Applied pressure error  | HHH        | Supply pressure exceeds the maximum set pressure.                                                                                                                                                                                                                                                                                                    | Bring the pressure back to within the set pressure range.                                                                          |
|                         | LLL        | Supply pressure is below the minimum set pressure.                                                                                                                                                                                                                                                                                                   |                                                                                                                                    |
| System error            | Er0        | Internal data error                                                                                                                                                                                                                                                                                                                                  | Shut off the power supply. Turn the power supply back on. If the switch will not recover to normal, consult SMC for investigation. |
|                         | Er4        |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                    |
|                         | Er6        |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                    |
|                         | Er7        |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                    |
|                         | Er8        |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                    |
|                         | Er9        |                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                    |

If the switch will not recover to normal even after all of the above-mentioned solutions have been applied, consult SMC for investigation.

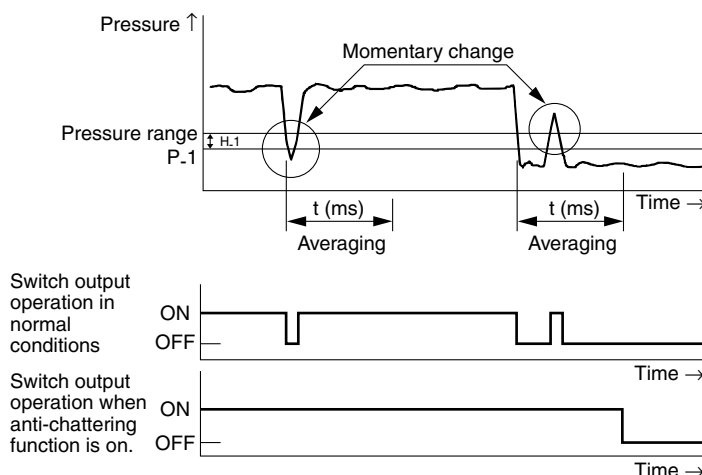
## H Anti-chattering function (F3)

A large bore cylinder or ejector consumes a large volume of air in operation and may experience a temporary drop in the supply pressure. This function prevents detection of such temporary drops in the supply pressure as an error.

| Available response time settings        |
|-----------------------------------------|
| 20 ms, 100 ms, 500 ms, 1000 ms, 2000 ms |

### Principle

This function averages pressure values measured during the response time set by the user and then compares the average pressure value with the pressure set point value to output the result on the switch.



## I Unit display switching function (F0)

Display units can be switched with this function.

| Display unit                   | PA  |       | GF                  | bAr   | PSi  | inH  | mmH  |
|--------------------------------|-----|-------|---------------------|-------|------|------|------|
| Min. unit setting              | kPa | MPa*  | kgf/cm <sup>2</sup> | bar   | psi  | inHg | mmHg |
| ZSE30A<br>(Vacuum pressure)    | 0.1 | 0.001 | 0.001               | 0.001 | 0.01 | 0.1  | 1    |
| ZSE30AF<br>(Compound pressure) | 0.1 | 0.001 | 0.001               | 0.001 | 0.01 | 0.1  | 1    |
| ISE30A<br>(Positive pressure)  | 1   | 0.001 | 0.01                | 0.01  | 0.1  |      |      |

\* For the ZSE30A (vacuum pressure) and ZSE30AF (compound pressure), when the display unit is MPa, setting and display resolutions are changed.

## J Power-saving mode (F7)

Power-saving mode can be selected.

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

## K Secret code setting (F8)

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



# Series ZSE30A(F)/ISE30A

## Specific Product Precautions 1

Be sure to read this before handling.

Refer to the back of pages 1 and 2 for Safety Instructions and “Precautions for Handling Pneumatic Devices” (M-03-E3A) for Pressure Switches Precautions.

### Handling

#### ⚠ Warning

1. Do not drop, bump, or apply excessive impacts (100 m/s<sup>2</sup>) while handling. Although the body of the sensor may not be damaged, the internal parts of the sensor could be damaged and lead to a malfunction.
2. The tensile strength of the cord is 35 N. Applying a greater pulling force on it can cause a malfunction. When handling, hold the body of the sensor—do not dangle it from the cord.
3. Do not exceed the screw-in torque of 7 to 9 N·m when connecting the pipe to the switch. Exceeding these values may cause the switch to malfunction.
4. Do not use pressure sensors with corrosive and/or flammable gases or liquids.
5. Allow a sufficient margin of tube length in piping in order to prevent application of torsional, tensile or moment load to the tubes and fittings.
6. When a brand of tubing other than SMC is used, make sure that the tolerance of the tube's O.D. satisfies the following specifications.
  - 1) Nylon tubing:  $\pm 0.1$  mm or less
  - 2) Soft nylon tubing:  $\pm 0.1$  mm or less
  - 3) Polyurethane tubing:  $+0.15$  mm or less,  $-0.2$  mm or less
7. The applicable fluid is air. Consult SMC if the switch is to be used with other types of fluids.

### Connection

#### ⚠ Warning

1. Incorrect wiring can damage the switch and cause a malfunction or erroneous switch output. Connections should be done while the power is turned off.
2. Do not attempt to insert or pull the pressure sensor or its connector when the power is on. A switch output malfunction may occur.
3. Wire separately from power lines and high voltage lines, avoiding wiring in the same conduit with these lines. Malfunctions may occur due to noise from these other lines.
4. If a commercial switching regulator is used, make sure that the F.G. terminal is grounded.

### Operating Environment

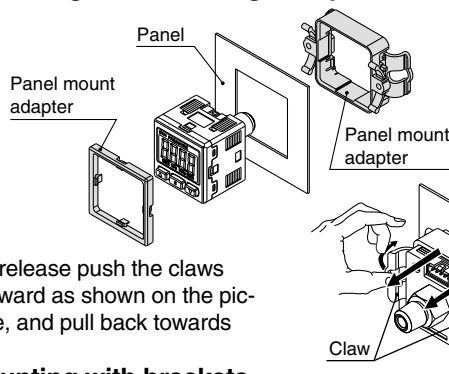
#### ⚠ Warning

1. This pressure switch is CE marked; however, it is not equipped with surge protection against lightning. Lightning surge countermeasures should be applied directly to system components as necessary.
2. This pressure switch does not have an explosion proof rating. Never use in the presence of an explosive gas as this may cause a serious explosion.
3. Do not use in an environment where static electricity can cause problems, otherwise system failure or malfunction may result.

### Mounting

#### ⚠ Caution

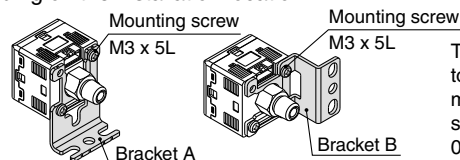
##### 1. Mounting and removing with panel mount adapter



To release push the claws outward as shown on the picture, and pull back towards

##### 2. Mounting with brackets

- Mount a bracket to the using two M3 x 5L mounting screws and install on piping. The switch can be installed horizontally depending on the installation location.

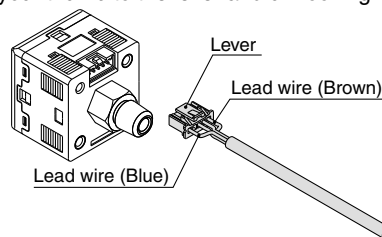


The tightening torque for bracket mounting screw should be 0.5 to 0.7 N·m.

- When using bracket B, take piping dimensions into consideration for installation.

### Connection/Removal of Connector

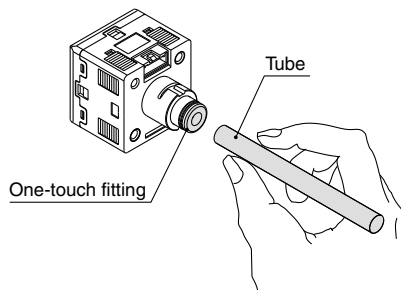
- To connect the connector, insert it straight while pinching the lever, and then push the lever into the jack of the housing and lock it.
- To remove the connector, pull it straight out while applying pressure with your thumb to the lever and unhooking it from the jack.



- Do not attempt to insert or pull the pressure sensor or its connector when the power is on. A switch output malfunction may occur.

### Piping

- Cut the tube perpendicularly.
- Hold the tube and insert it into the one-touch fitting carefully and securely all the way to the bottom.





# Series ZSE30A(F)/ISE30A

## Specific Product Precautions 2

Be sure to read this before handling.

Refer to the back of pages 1 and 2 for Safety Instructions and “Precautions for Handling Pneumatic Devices” (M-03-E3A) for Pressure Switches Precautions.

### Set Pressure Range and Rated Pressure Range

#### ⚠ Caution

**Set the pressure within the rated pressure range.**

The set pressure range is the range of pressure that is possible in setting.

The rated pressure range is the range of pressure that satisfies the specifications (accuracy, linearity, etc.) on the switch.

Although it is possible to set a value outside the rated pressure range, the specifications will not be guaranteed even if the value stays within the set pressure range.

| Switch                |         | Pressure range        |   |         |         |          |
|-----------------------|---------|-----------------------|---|---------|---------|----------|
|                       |         | -100 kPa              | 0 | 100 kPa | 500 kPa | 1 MPa    |
| For vacuum pressure   | ZSE30A  | -101 kPa              | 0 | 10 kPa  |         |          |
|                       |         | -105 kPa              |   |         |         |          |
| For compound pressure | ZSE30AF | -100 kPa              |   | 100 kPa |         |          |
|                       |         | -105 kPa              |   | 105 kPa |         |          |
| For positive pressure | ISE30A  | -100 kPa              |   |         |         | 1 MPa    |
|                       |         | -105 kPa (-0.105 MPa) |   |         |         | 1.05 MPa |

■ Rated pressure range of switch  
■ Set pressure range of switch