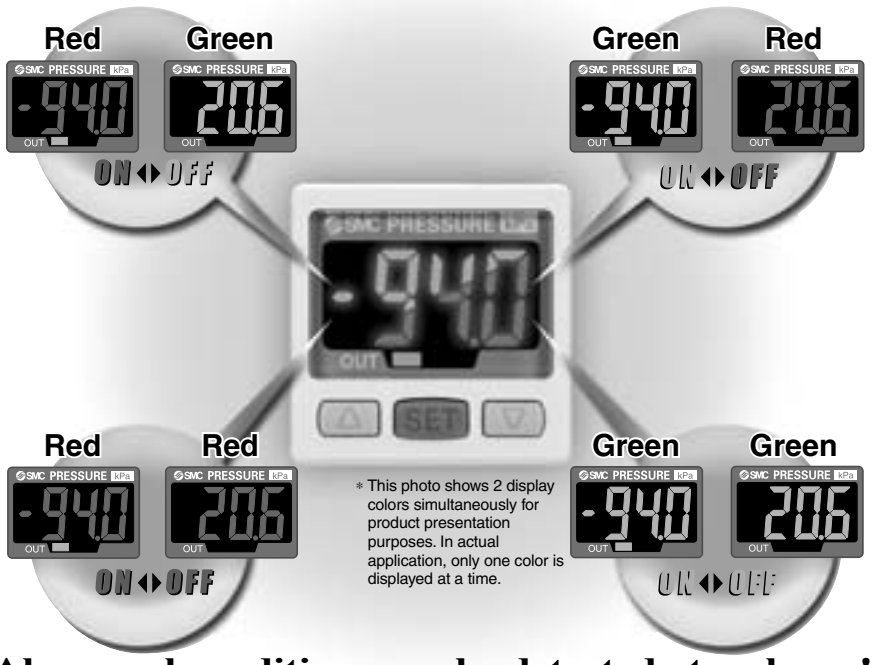
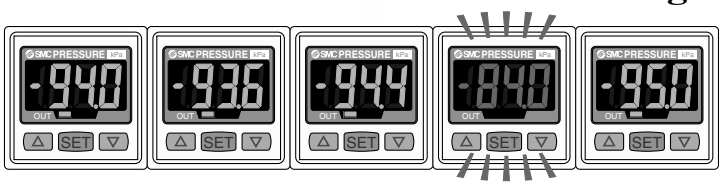
2-Color Display High-Precision Digital Pressure Switch

Series ZSE30/ISE30

2-color digital display allows you to choose the setting according to your application requirements. 4 different display settings are available.



Abnormal conditions can be detected at a glance!

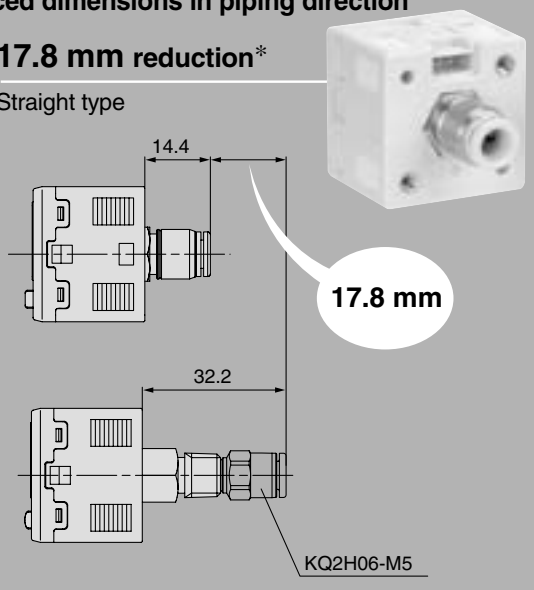


With One-touch fitting (ø4, ø6, ø5/32", ø1/4")

Reduced dimensions in piping direction

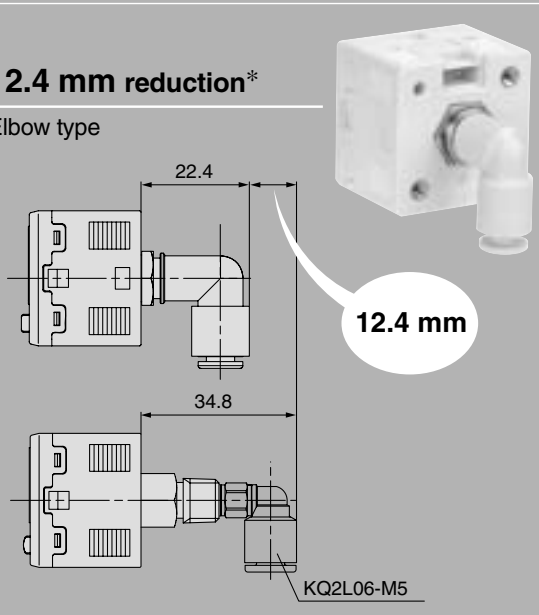
17.8 mm reduction*

Straight type



12.4 mm reduction*

Elbow type

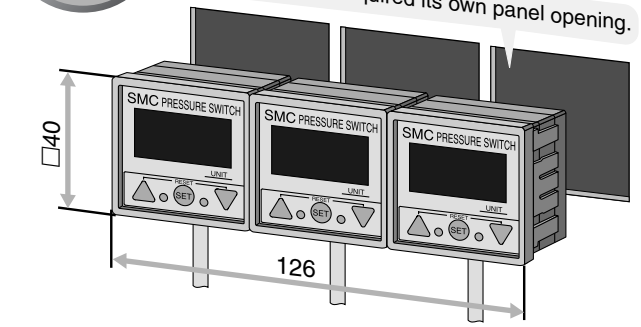


* Comparison when One-touch fittings (KQ2H06-M5 / KQ2L06-M5) are connected to the piping ports (M5 x 0.8)

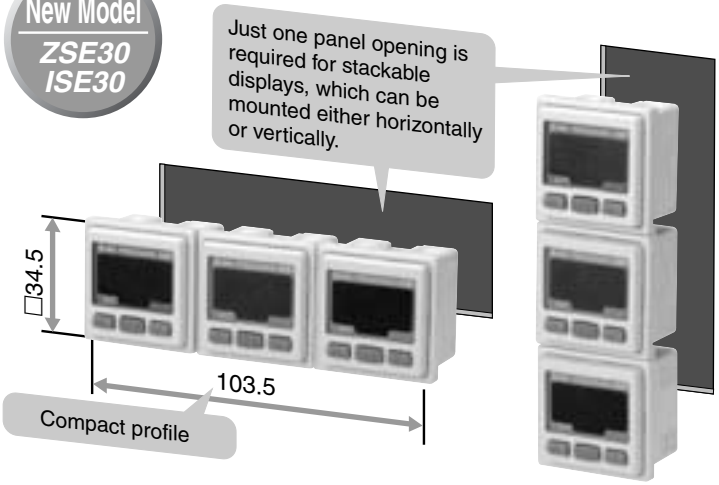
Space-saving improvement

Economical use of space

Old Model
ZSE4E
ISE4E

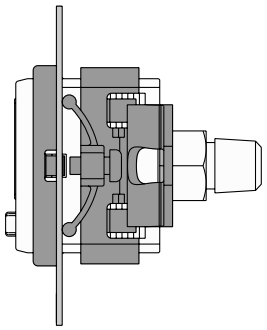


New Model
ZSE30
ISE30



Applicable panel thickness is up to 6 mm.

(Panel mounting)



With analog output

In addition to the conventional voltage output type (1 to 5 V)

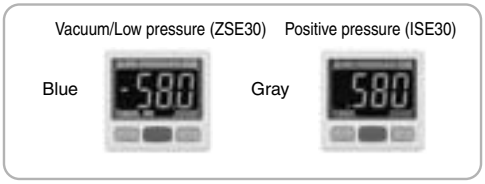
Current output type (4 to 20 mA)

is now available.

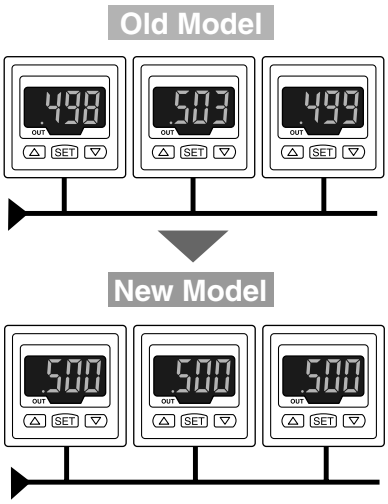
- Convenient when longer wiring is required
- Excellent noise resistance

Switches for vacuum and positive pressure can be easily distinguished.

The different display panel frame colors easily tell them apart.

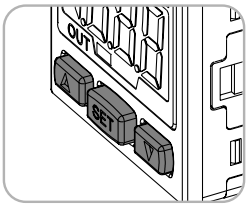


Display calibration

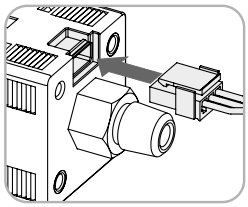


This function allows uniformity in the numbers displayed.

More user-friendly controls



Raised rubber button controls are clearly set apart, simple to operate, soft to the touch.



Plug-type connectors take the burden out of wiring work and maintenance.

High-precision resolution: 1/1000

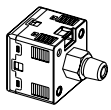
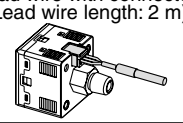
Variations

		Vacuum/Low pressure ZSE30	Positive pressure ISE30
Rated pressure range		100 kPa / 0 / −100 kPa	1 MPa / 0
Setting/Display resolution		0.2 kPa	0.001 MPa
Output	Switch output	NPN/PNP open collector (1 output)	
	Analog output	Voltage output: 1 to 5 V; Current output: 4 to 20 mA	
Current consumption		45 mA or less (70 mA or less for current output)	
Option		Panel mount/Bracket	

2-Color Display
High-Precision Digital Pressure Switch
Series ZSE30/ISE30

How to Order

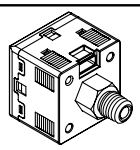
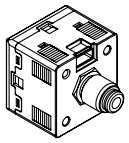
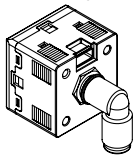
Option 1

Nil	Without lead wire 
L	Lead wire with connector (Lead wire length: 2 m) 

For positive pressure ISE30 – 01 – 25 – M

For vacuum/low pressure ZSE30 – 01 – 25 – M

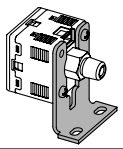
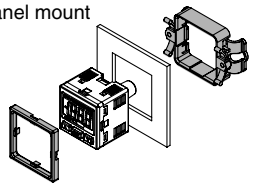
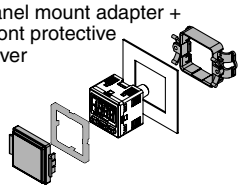
Piping specifications

01	R 1/8 (With M5 female thread)	
T1	NPT 1/8 (With M5 female thread)	
C4H	ø4 One-touch fitting ø5/32" One-touch fiting	Straight type 
C6H	ø6 One-touch fitting	
N7H	ø1/4" One-touch fitting	
C4L	ø4 One-touch fitting ø5/32" One-touch fitting	Elbow type 
C6L	ø6 One-touch fitting	
N7L	ø1/4" One-touch fitting	

Output specifications

25	NPN output
65	PNP output
26	1 to 5 V output
28	4 to 20 mA output

Option 2

Nil	None
A	Bracket 
B	Panel mount 
D	Panel mount adapter + Front protective cover 

Unit specifications

Nil	With unit switching function
M	Fixed SI unit (International System of Units) Note)

Note) Fixed unit:
For vacuum/Low pressure: kPA
For positive pressure: MPa

Option Part No.

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

Option	Part no.	Note
Lead wire with connector	ZS-27-A	Lead wire length: 2 m
Bracket	ZS-27-B	With mounting screws (M3 x 5L: 2 pcs.)
Panel mount adapter	ZS-27-C	With M3 x 8L (2 pcs.)
Panel mount adater + Front protective cover	ZS-27-D	With M3 x 8L (2 pcs.)
Front protective cover	ZS-27-01	1 pc.

Specifications

Model			ZSE30 (Vacuum/Low pressure)	ISE30 (Positive pressure)
Rated pressure range			–100.0 to 100.0 kPa	0.000 to 1.000 MPa
Regulating pressure range			–101.0 to 101.0 kPa	–0.100 to 1.000 MPa
Extended analog output range			—	–0.100 to 0 Mpa
Proof pressure			500 kPa	1.5 MPa
Min. regulating unit			0.2 kPa	0.001 MPa
Fluid			Air, Inert 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			45 mA or less (at no load)	
Switch output Note 1)			NPN or PNP open collector output: 1 output	
		Max. load current	80 mA	
		Max. applied voltage	30 V (With NPN output)	
		Residual voltage	1 V or less (With load current of 80 mA)	
		Response time	2.5 ms or less (Response time selections with anti-chattering function: 20, 160, 640, 1280 ms)	
		Short circuit protection	Yes	
Repeatability			±0.2% F.S. ±2 digit or less	±0.2% F.S. ±1 digit or less
Analog output		Voltage output Note 2)	Output voltage: 1 to 5 V ±2.5% F.S. or less (With rated pressure range) 0.6 to 1 V ±5% F.S. or less (Extended analog output range) Linearity: ±1% F.S. or less, Output impedance: Approx. 1 kΩ	
		Current output Note 3)	Output current: 4 to 20 mA ±2.5% F.S. or less (With rated pressure range) 2.4 to 4 mA ±5% F.S. or less (Extended analog output range) Linearity: ±1% F.S. or less Maximum load impedance: 300 Ω with power supply voltage of 12 V; 600 Ω with power supply voltage of 24 V Minimum load impedance: 50 Ω	
Hysteresis		Hysteresis mode	Adjustable (can be set from 0)	
		Window comparator mode		
Display			3 1/2 digit, 7-segment indicator, 2-color display (Red and green) Sampling cycle: 5 times/s	
Display accuracy			±2% F.S. ±2 digit (at 25°C ambient temperature)	±2% F.S. ±1 digit (at 25°C ambient temperature)
Indicator light			Light up when output is ON (Green)	
Temperature characteristics			±2% F.S. or less (based on 25°C)	
Environmental resistance		Enclosure	IP40	
		Operating temperature range	Operating: 0 to 50°C, Stored: –10 to 60°C (No freezing or condensation)	
		Operating humidity range	Operating and stored: 35 to 85% RH (No condensation)	
		Withstand voltage	1000 VAC for 1 min. between live parts and enclosure	
		Insulation resistance	50 MΩ or more between live parts and enclosure (at 500 VDC)	
		Vibration resistance	10 to 150 Hz, 1.5 mm or 20 m/s² amplitude in X, Y, Z directions for 2 hours each (De-energized)	
		Impact resistance	100 m/s² in X, Y, Z directions 3 times each (De-energized)	
Lead wire Note 4)			Oil-resistant vinyl cabtire cable 3 cores ø3.4 2 m Cross section: 0.2 mm² Insulator O.D.: 1.12 mm	
Standard			Compliant with CE Marking and UL (CSA) standards	

Note 1) When switch output is selected, analog output is not available.
Note 2) When voltage output is selected, a simultaneous selection of switch output and current output is not available.
Note 3) When current output is selected, a simultaneous selection of switch output and voltage output is not available.
Note 4) With lead wire with a connector (ZS-27-A)

Piping Specifications

Part no.		01	T1	C4H	C6H	N7H	C4L	C6L	N7L
Port size		R 1/8 M5 x 0.8	NPT 1/8 M5 x 0.8	—	—	—	—	—	—
	One-touch fitting Straight type	—	—	ø4 mm ø5/32 inch	ø6 mm	ø1/4 inch	—	—	—
	One-touch fitting Elbow type	—	—	—	—	—	ø4 mm ø5/32 inch	ø6 mm	ø1/4 inch
Wetted part material		Sensor pressure receiving area: Silicon, Piping port: C3602 (Electroless nickel plated), O-ring: HNBR							
				O-ring: NBR			O-ring: NBR, fitting: PBT		
Mass	With lead wire with connector (2 m)	81 g		76 g			78 g		
	Without lead wire with connector	43 g		38 g			40 g		

Function

Various additional functions are available for easy measurement, switch operation and confirmation of measured values suitable for the conditions of the measured fluid.

Anti-chattering function	Prevents possible malfunction due to sudden fluctuations in the primary pressure by adjusting the response time.
Key lock function	Key operation can be locked to prevent any incorrect function of the operation switch.
Peak hold function	Can retain the maximum pressure value displayed during measurement.
Bottom hold function	Can retain the minimum pressure value displayed during measurement.
Zero-out function	The pressure display can be set at zero when the pressure is open to the atmosphere.
Unit conversion	Can convert the display value.

Description

Indication light (Green)
Displays the switch operation status.

▲UP button
Use this button to change the mode or increase the ON/OFF set value. It also allows you to switch to the peak value display mode.

SET button
Use this button to switch the mode and set the set value.

LCD display
Displays the current pressure condition, setting mode conditions, selected display unit, and error codes. A display color type can be selected from either a single color display with red or green, or 2-color display in which green and red are switched according to the output.

▼DOWN button
Use this button to change the mode or decrease the ON/OFF set value. It also allows you to switch to the bottom value display mode.

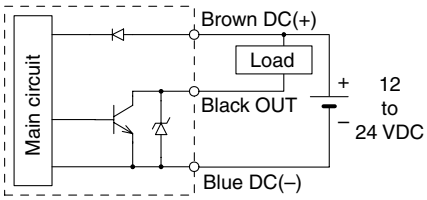
Error Correction

Take the following corrective solutions when errors occur.

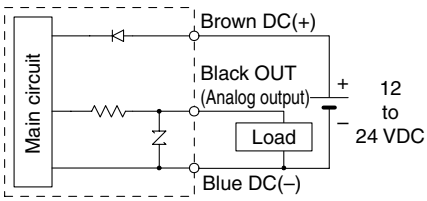
Error description	LCD display	Condition	Solution
over-current error	Er 1	Load current of switch output is more than 80 mA.	Shut off the power supply. After eliminating the output factor that caused the excess current, turn the power supply back on.
Residual pressure error	Er 3	Pressure is applied during the zero out operation as follows: When the switch for positive pressure is used: ±0.071 MPa or more. When the switch positive pressure is used: ±7.1 kPa or more. After displaying for 3 seconds, it will return to the measuring mode.	Bring the pressure back to atmospheric pressure and try using the zero out function.
Applied pressure error	HHH	Supply pressure exceeds the maximum regulating pressure.	Reduce/Increase supply pressure to within the regulating pressure range.
	LLL	Supply pressure is below the minimum regulating pressure.	
System error	Er 4	Internal data error	Shut off the power supply. Turn the power supply back on. If the power should not come back on, please contact SMC for an inspection.
	Er 6	Internal data error	
	Er 7	Internal data error	
	Er 8	Internal data error	

Example of Internal Circuit and Wiring

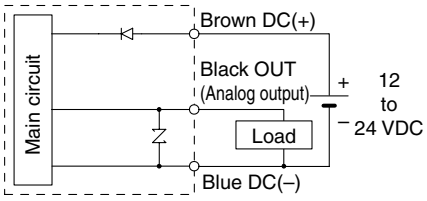
-25
NPN open collector output
Maximum 30 V, 80 mA
Residual voltage:
1 V or less



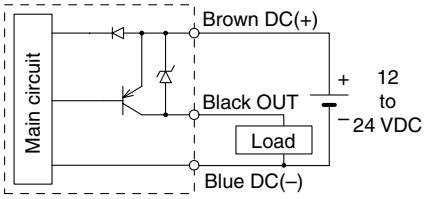
-26
Analog output type
1 to 5 V (±2.5% F.S.)
Output impedance:
1 kΩ



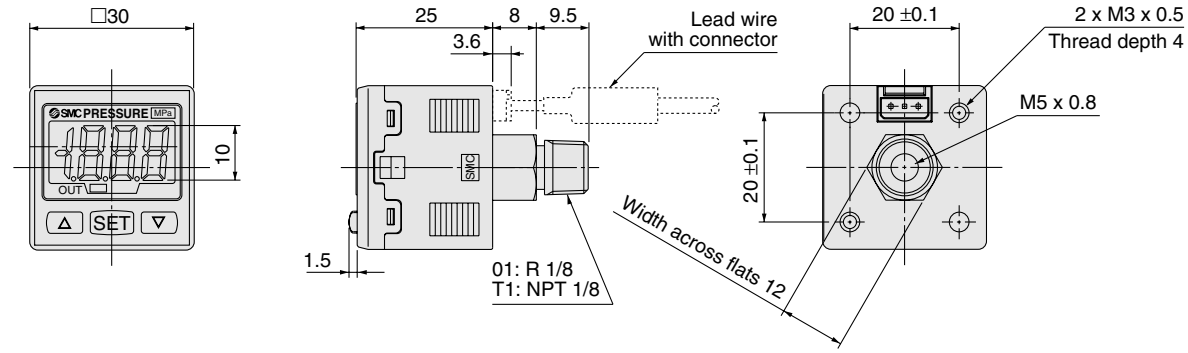
-28
Analog output type
4 to 20 mA (±2.5% F.S.)
Maximum load impedance:
Power supply voltage 12 V: 300 Ω
Power supply voltage 24 V: 600 Ω
Minimum load impedance: 50 Ω

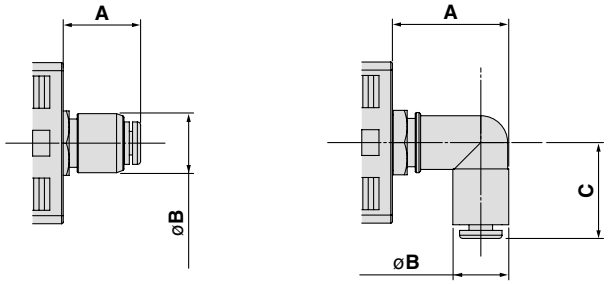


-65
PNP open collector
Maximum 80 mA



Dimensions





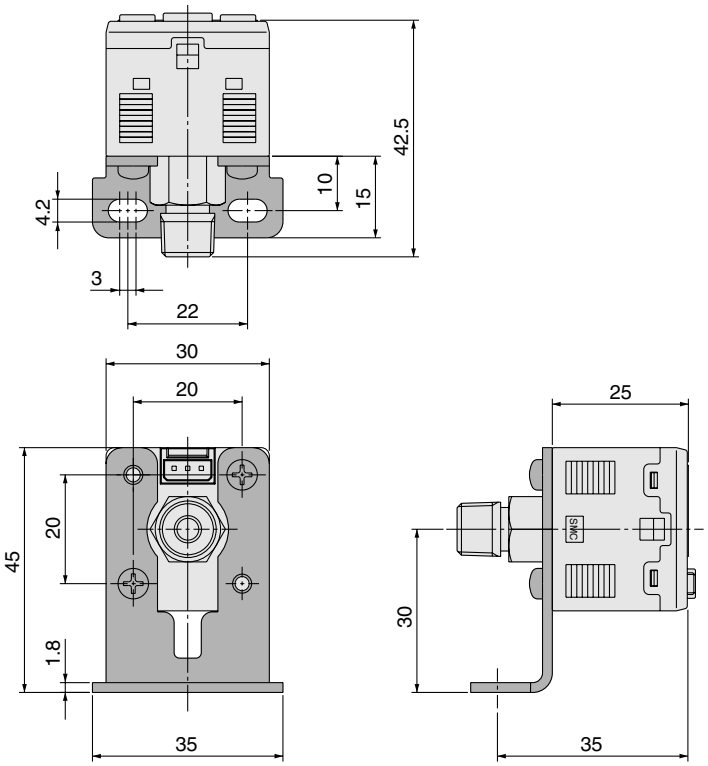
Straight Elbow

With One-touch fitting

(mm)

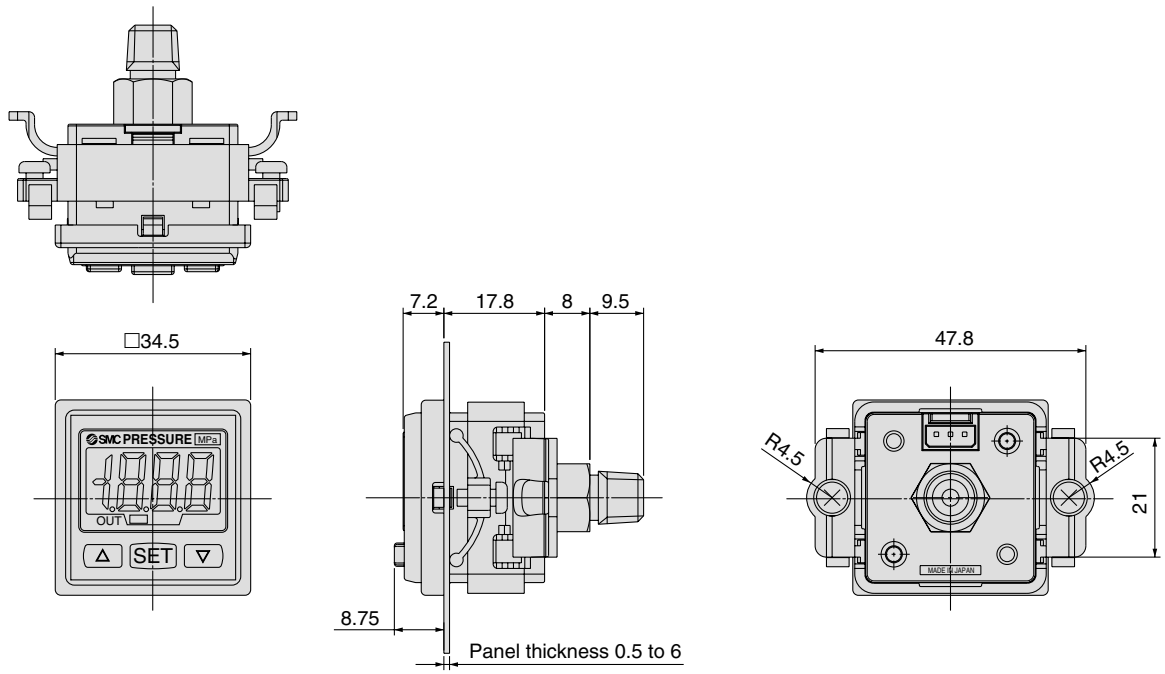
One-touch fitting size	Straight		Elbow		
	A	B	A	B	C
ø4, ø5/32"	14.4	11.2	20	10.4	18
ø6			22.4	12.8	20
ø1/4"			22.8	13.2	20.5

With bracket

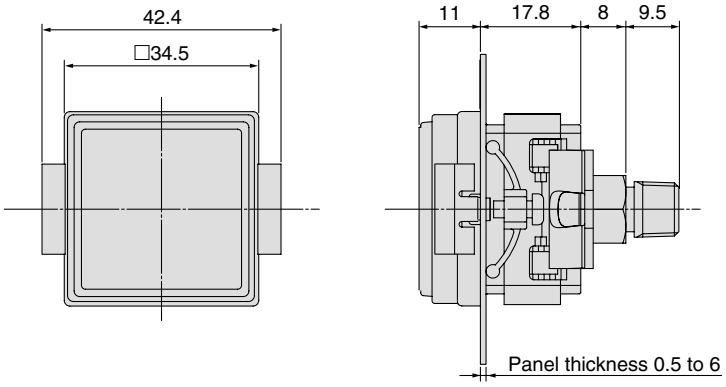


Dimensions

Panel mount



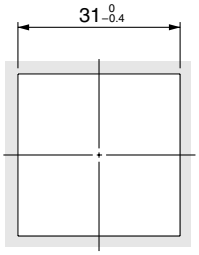
Panel mount adapter + Front protective cover



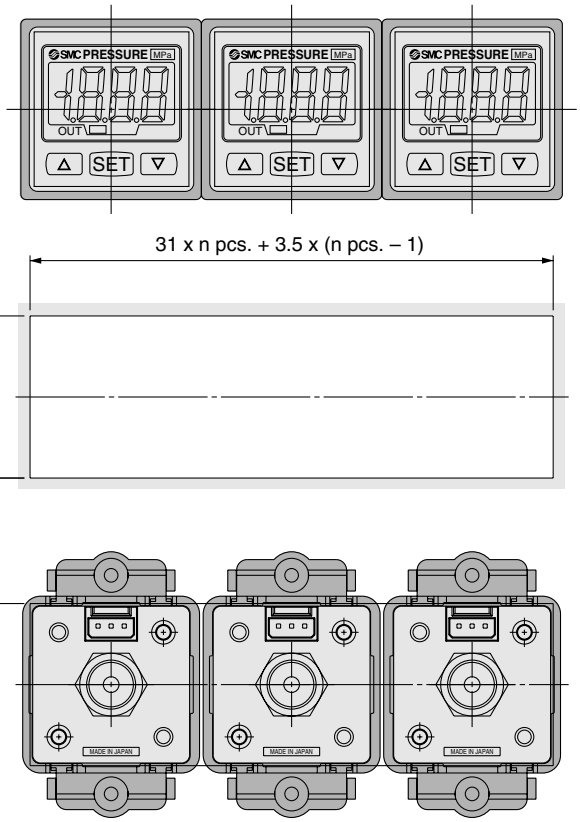
Dimensions

Panel fitting dimension

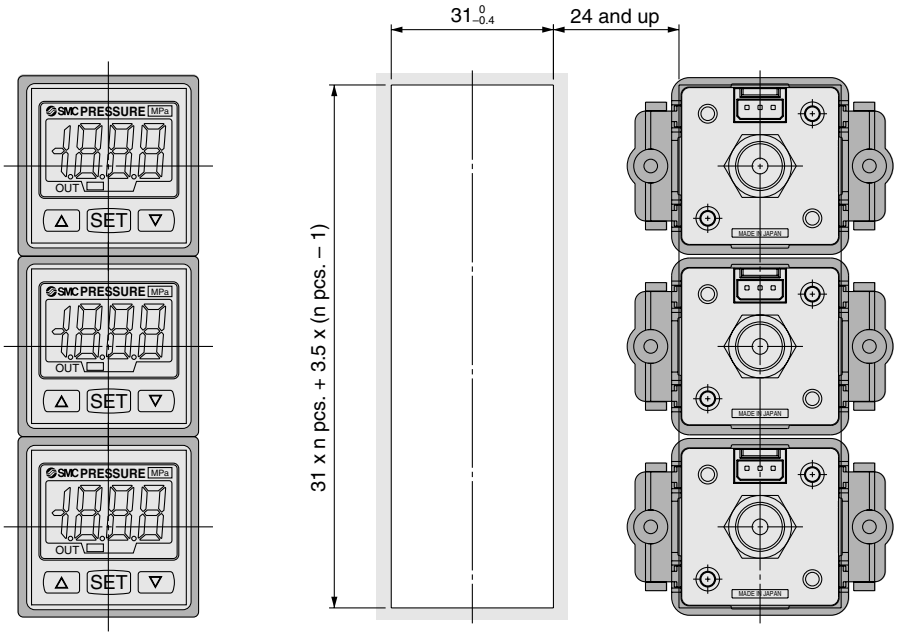
1-pc. mounting



Multiple (2 pcs. or more) horizontal mounting



Multiple (2 pcs. or more) vertical mounting



Series ZSE30/ISE30
Specific Product Precautions 1

Be sure to read before handling. Refer to front matters 58 and 59 for Safety Instructions and pages 687 to 691 for Pressure Switch Precautions.

Handling

⚠Warning

1. **Do not drop, bump, or apply excessive impacts (980 m/s^2) 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 installing piping. Exceeding this value may cause malfunctioning of the sensor.**
4. **Do not use pressure sensors with toxic, corrosive and/or flammable gases.**
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: ±0.1 mm or less
   2) Soft nylon tubing: ±0.1 mm or less
   3) Polyurethane tubing: +0.15 mm or less, –0.2 mm or less
7. **The applicable fluid is air. Please consult with 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 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

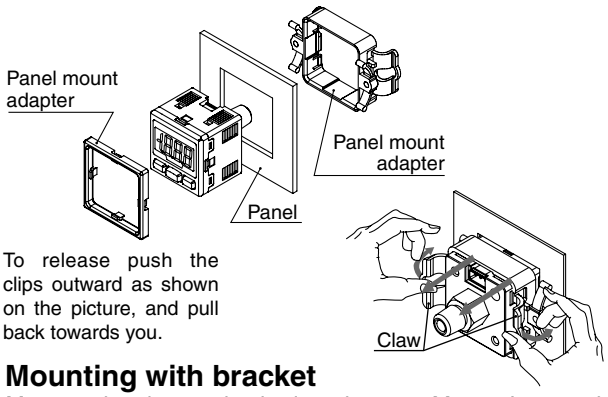
⚠Warning

1. **Our pressure switches are CE marked; however, they are not equipped with surge protection against lightning. Lightning surge countermeasures should be applied directly to system components as necessary.**
2. **Our pressure switches do 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

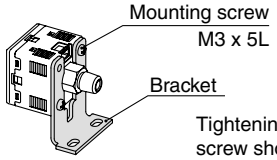
⚠Caution

1. Mounting with panel mount adapter



2. Mounting with bracket

Mount a bracket to the body using two M3 x 5L mounting screws and install on piping with hexagon socket head cap screws. The switch can be installed horizontally depending on the installation location.



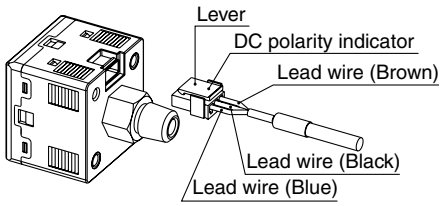
Tightening torque for bracket mounting screw should be 0.5 to 0.7 N·m.

Series ZSE30/ISE30
Specific Product Precautions 2

Be sure to read before handling. Refer to front matters 58 and 59 for Safety Instructions and pages 687 to 691 for Pressure Switch Precautions.

Connection/Removal of Connector

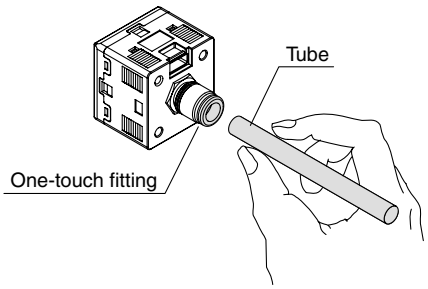
- To connect the connector, insert it straight while pinching the lever, and then push the lever into the jack of the housing and lock it.
- To remove the connector, pull it straight out while applying pressure with your thumb to the lever and unhooking it from the jack.



- Do not attempt to insert or pull the 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.



Regulating Pressure Range and Rated Pressure Range

⚠Caution

Set the pressure within the rated pressure range.

The regulating 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 sensor.
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 regulating pressure range.

Switch		Pressure range
		–100 kPa 0 100 kPa 500 kPa 1 MPa
For vacuum/ low pressure	**ZSE30**	–100 kPa 100 kPa –101 kPa 101 kPa
For positive pressure	**ISE30**	0 1 MPa –100 kPa (–0.1 MPa) 1 MPa

Rated pressure range of switch
Regulating pressure range of switch