

Series 10-PSE300 Controller

How to Order



Input/Output specifications

0	NPN2 output + 1 to 5V output
1	NPN2 output + 4 to 20mA output
2	NPN2 output + Auto shift input
3	PNP2 output + 1 to 5V output
4	PNP2 output + 4 to 20mA output
5	PNP2 output + Auto shift input

Unit specifications

Nil	With unit conversion function ^{Note 1)}
M	Fixed SI unit ^{Note 2)}

Note 1) The new Weight and Measure Act does not allow use of a product with the unit display conversion function in Japan.

Note 2) Fixed unit

For vacuum/low pressure/low differential pressure/compound pressure: kPa
For positive pressure: MPa (for 1MPa)
kPa (for 500 kPa)

10—PSE30 0—M

•Clean series

Option 1

Nil	Without cable
	Power supply / Output connection cable
L	Power supply/Output connection cable 10-ZS-28-A

Note) At the factory, the cable is packed together without being connected.

•Option 3

Nil	Without connector
	With sensor connector
C	Sensor connector (e-con connector)

Note) At the factory, the connector is packed together without being connected.

•Option 2

Nil	None
	Bracket
A	M3 x 5L Bracket M3 x 5L
	Panel mount adapter
B	Panel Panel mount adapter Mounting screw (M3 x 8L)
	Panel mount adapter + Front protective cover
D	Panel Front protective cover Panel mount adapter Mounting screw (M3 x 8L)

Note) These options are unassembled in the factory, but are included with the shipment.

Option / Part no.

Description	Part no.	Note
Power supply / Output connection cable (2m)	10-ZS-28-A	
Bracket	10-ZS-28-B	With M3 x 5L (2 pcs.)
Sensor connector	10-ZS-28-C	1 pc.
Panel mount adapter	10-ZS-27-C	With M3 x 8L (2 pcs.)
Panel mount adapter + Front protective cover	10-ZS-27-D	With M3 x 8L (2 pcs.)

Specifications

Model		10-PSE30□					
Set (differential) pressure range		−101 to 101kPa	10 to −101kPa	−10 to 100kPa	−0.1 to 1MPa	−50 to 500kPa	−0.2 to 2kPa
Pressure range Note 1)		For compound pressure	For vacuum pressure	For low pressure	For positive pressure		For low differential pressure
Rated (differential) pressure range		−100 to 100kPa	0 to −101kPa	0 to 100kPa	0 to 1MPa	0 to 500kPa	0 to 2kPa
Power supply voltage		12 to 24VDC, Ripple (p-p) 10% or less (with power supply polarity protection)					
Current consumption		50mA or less (Current consumption for sensor is not included.)					
		1 to 5VDC (Input impedance: Approx. 1MΩ)					
Sensor input	No. of inputs	1 input					
	Input protection	With excess voltage protection (up to 26.4V)					
Hysteresis		Hysteresis mode: Variable, Window comparator mode: Variable					
		NPN or PNP open collector output: 2 outputs					
Switch output	Maximum load current	80mA					
	Maximum load voltage	30VDC (at NPN output)					
	Residual voltage	1V or less (with load current of 80mA)					
	Output protection	With short-circuit protection					
Response time		1ms or less					
	Anti-chattering function	Response time selections with anti-chattering function: 20ms, 160ms, 640ms, 1280ms					
Repeatability		±0.1%F.S. or less					
Analog output	Voltage output Note 2)	Output voltage: 1 to 5V (within rated (differential) pressure range); Output impedance: Approx. 1kΩ Linearity: ±0.2% F.S. or less (not including sensor accuracy); Response time: 150ms or less					
	Accuracy (to display value) (25°C)	±0.6%F.S. or less				±1.0%F.S. or less	±1.5%F.S. or less
	Current output Note 2)	Output current: 4 to 20mA (within rated (differential) pressure range) Maximum load impedance: 300Ω (12VDC), 600Ω(24VDC), Minimum load impedance: 50Ω Linearity: ±0.2% F.S. or less (not including sensor accuracy), Response time: 150 ms or less					
	Accuracy (to display value) (25°C)	±1.0%F.S. or less				±1.5%F.S. or less	±2.0%F.S. or less
Display accuracy (ambient temperature 25°C)		±0.5%F.S. ±2 digits or less	±0.5%F.S. ±1digit or less				
Display		3+1/2 digit, 7 segment indicator, 2 color display (red/green), Sampling cycle: 5 times/sec					
Indicator light		OUT1: Lights up when ON (green), OUT2: Lights up when ON (red)					
Auto shift input Note 2)		No-voltage input (reed or solid state), Low level input: 5ms or more, Low level: 0.4V or less					
Environment resistance	Enclosure	IP40					
	Operating temperature range	Operating: 0 to 50°C; Stored: -10 to 60°C (with no freezing or condensation)					
	Operating humidity range	Operating and stored: 35 to 85% RH (with no condensation)					
	Withstand voltage	1000VAC for 1min. between live parts and case					
	Insulation resistance	50MΩ or more (measured by 500VDC mega meter) between live parts and case					
	Vibration resistance	10 to 150Hz, at whichever is smaller of 1.5mm amplitude or 98m/s ² acceleration, in X, Y, Z directions, for 2 hours each (de-energized)					
	Impact resistance	100m/s ² , in X, Y, Z directions 3 times each (de-energized)					
Temperature characteristics		±0.5% F.S. or less (based on 25°C)					
Connection		Power supply/Output connection: 5P connector, Sensor connection: 4P connector					
Material		Front case: PBT; Rear case: PBT					
Weight	With power supply and output connection cable	85g					
	Without power supply and output connection cable	30g					
Particle generation grade (Refer to front matters 13 to 22 for details.)		Grade 1					

Note 1) Pressure range can be selected during initial setting.

Note 2) Auto shift function can not be selected when analog output option is selected.

Also, analog output option can not be selected when auto shift function is selected.

Note 3) The following units can be selected with unit conversion function:

For vacuum/compound pressure: KPa·kgf/cm²·bar·psi·mmHg·inHg

For positive/low pressure: MPa·kPa·kgf/cm²·bar·psi

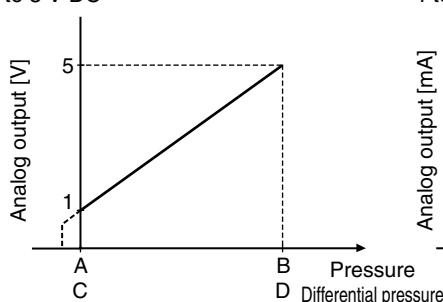
For low differential pressure: KPa·mmH₂O

Caution

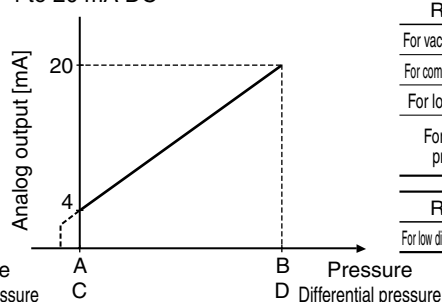
This product is blown with air and double packed in a Class M3.5 (ISO Class 5) clean room.

Analog output

1 to 5 V DC



4 to 20 mA DC

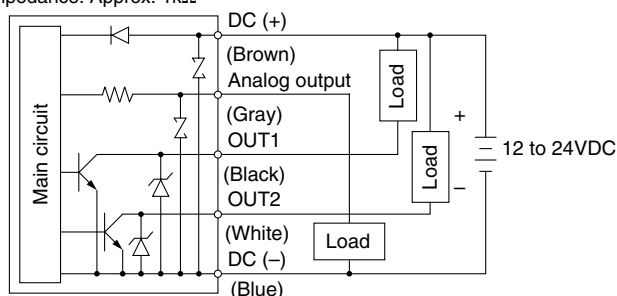


Range	Rated pressure range	A	B
For vacuum pressure	0 to −101kPa	0	−101kPa
For compound pressure	−100kPa to 100kPa	−100kPa	100kPa
For low pressure	0 to 100kPa	0	100kPa
For positive pressure	0 to 1MPa	0	1 MPa
	0 to 500kPa	0	500kPa
Range	Rated differential pressure range	C	D
For low differential pressure	0 to 2kPa	0	2kPa

Internal circuit

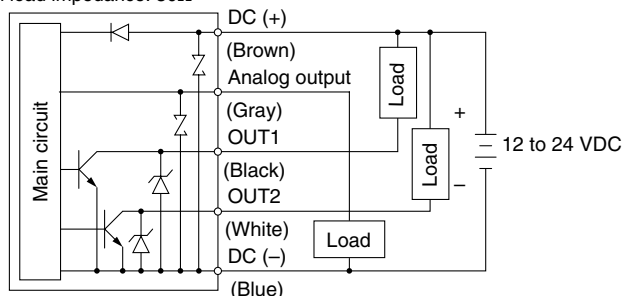
10-PSE300

NPN open collector output: 2 outputs,
Maximum 30V, 80mA, Residual voltage: 1V or less
Analog output: 1 to 5V
Output impedance: Approx. 1k Ω



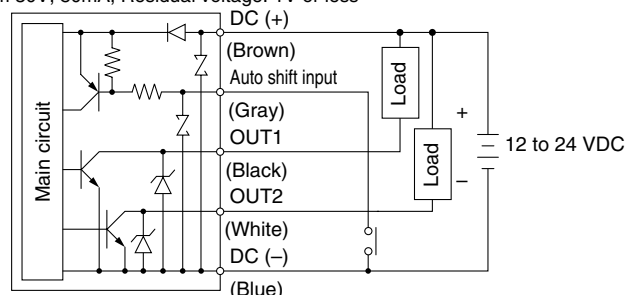
10-PSE301

NPN open collector output: 2 outputs,
Maximum 30V, 80mA, Residual voltage: 1V or less
Analog output: 4 to 20mA
Maximum load impedance: 300 Ω (12VDC) 600 Ω (24VDC)
Minimum load impedance: 50 Ω



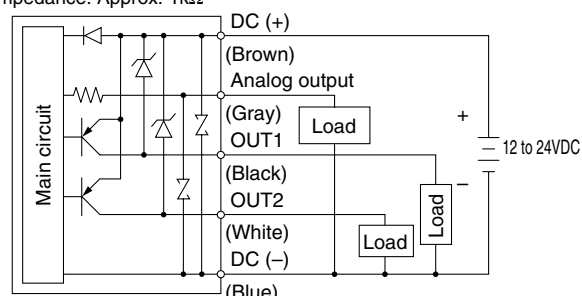
10-PSE302

NPN open collector output with auto shift input: 2 outputs,
Maximum 30V, 80mA, Residual voltage: 1V or less



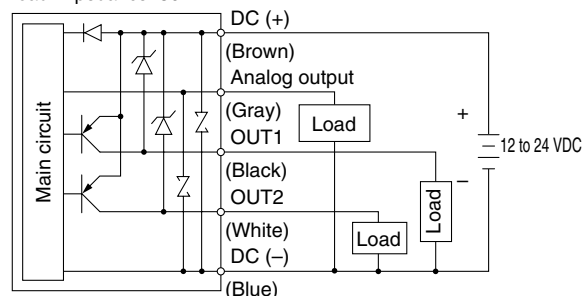
10-PSE303

PNP open collector output: 2 outputs,
Maximum 80mA, Residual voltage: 1V or less
Analog output: 1 to 5V
Output impedance: Approx. 1k Ω



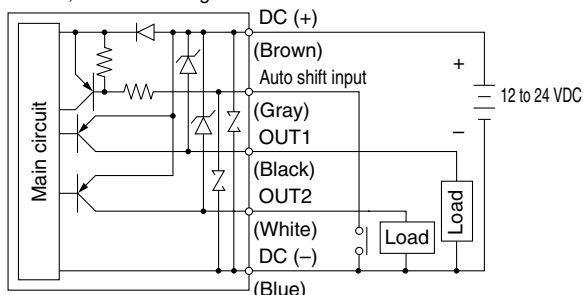
10-PSE304

PNP open collector output: 2 outputs,
Maximum 80mA, Residual voltage: 1V or less
Analog output: 4 to 20mA
Maximum load impedance: 300 Ω (12VDC) 600 Ω (24VDC)
Minimum load impedance: 50 Ω



10-PSE305

PNP open collector output with auto shift input: 2 outputs,
Maximum 80mA, Residual voltage: 1V or less



Descriptions

LCD display

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

Output (OUT1) display (Green)

Lights up when OUT1 is ON.

△ button

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.



Output (OUT2) display (Red)

Lights up when OUT2 is ON.

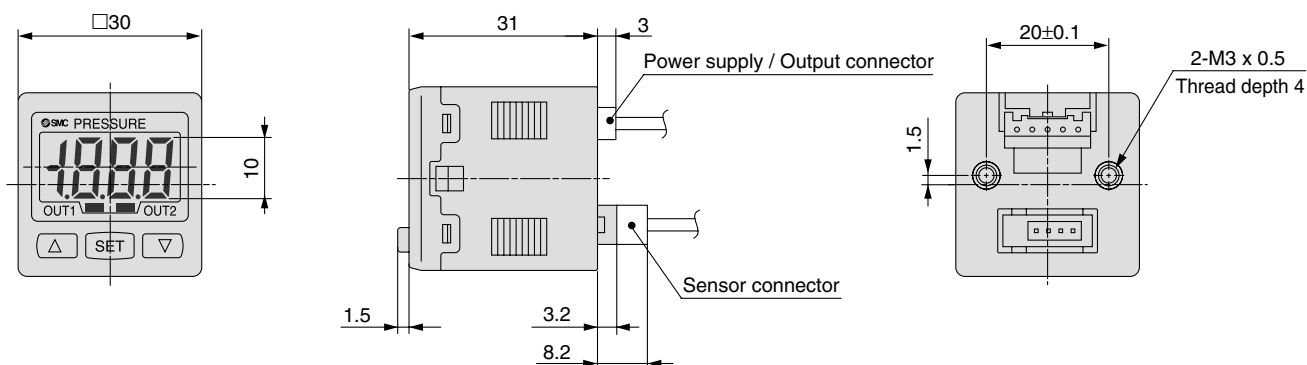
SET button

Use this button to change the mode and confirm the set value.

▽ button

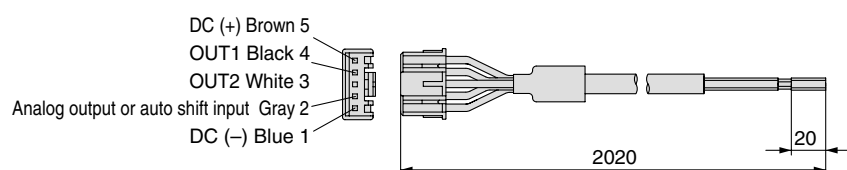
Use this button to select the mode or decrease the ON/OFF set value. It is also used for switching to the bottom display mode.

Dimensions

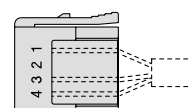


Power supply / Output connection cable (10-ZS-28-A)

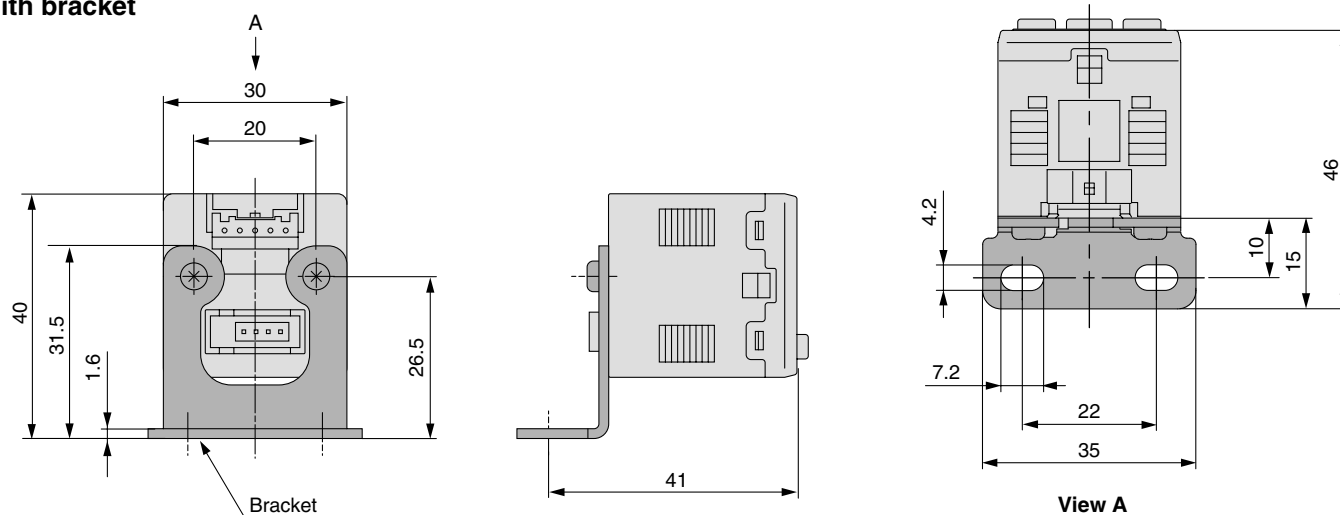
Sensor connector



PIN no.	Terminal
1	DC (+)
2	N.C.
3	DC (-)
4	IN (1 to 5V)

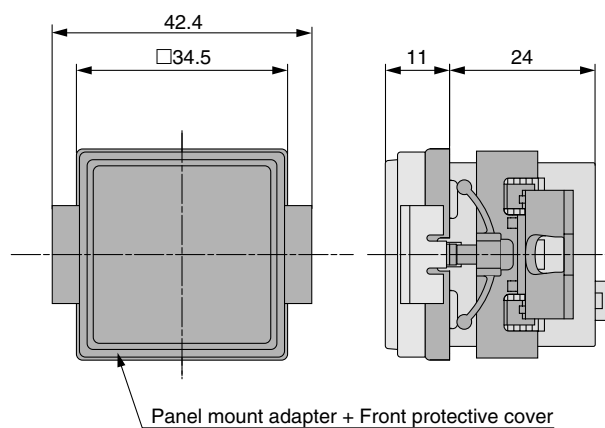
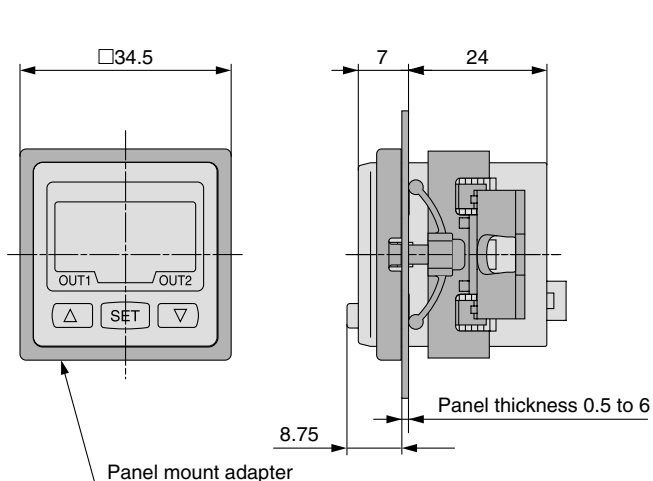


With bracket



With panel mount adapter

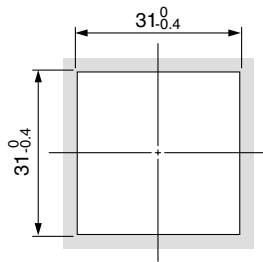
With panel mount adapter + Front protective cover



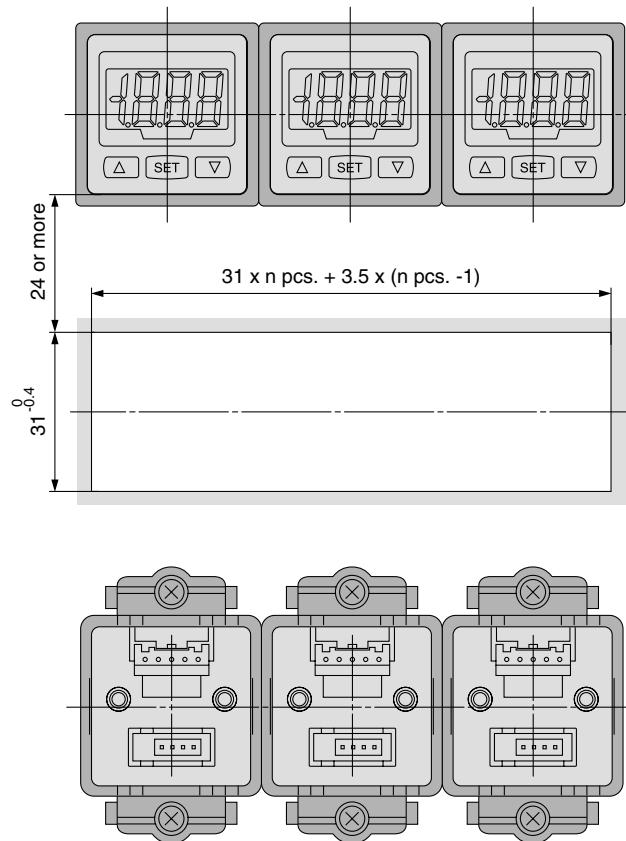
Dimensions

Panel fitting dimensions

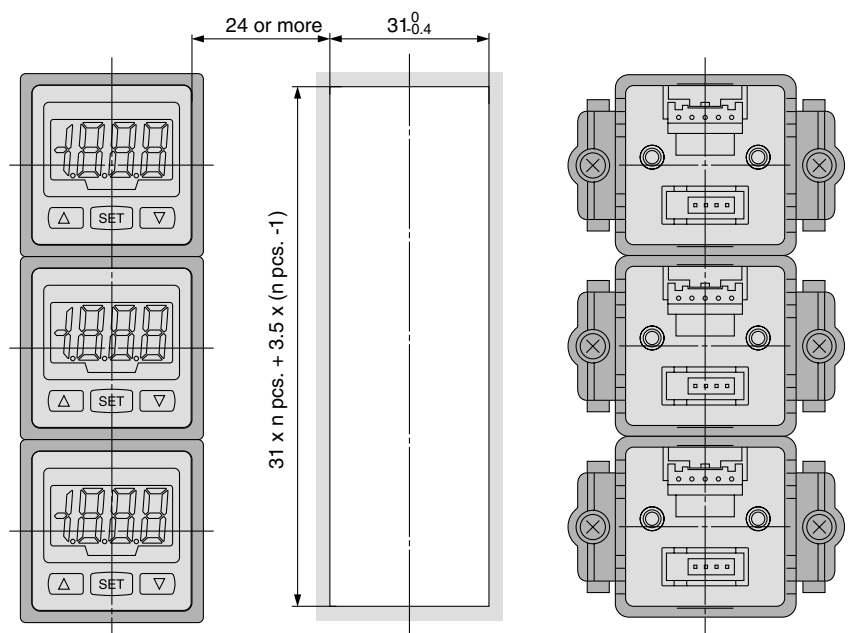
1 pc. mounting



Stacking mount of multiple units (n pcs.) (horizontal)



Stacking mounting of multiple units (n pcs.) (vertical)

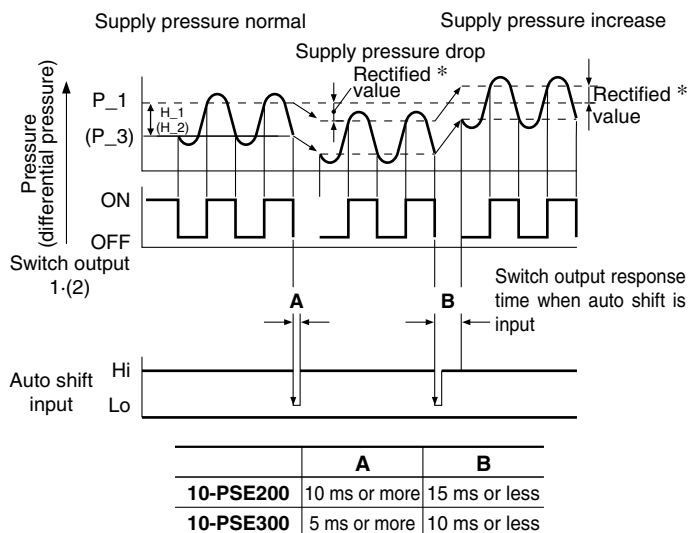


Functions

A Auto shift function

When there are large fluctuations in the supply pressure, the switch may fail to operate correctly. The auto shift function rectifies such supply pressure fluctuations. It measures the differential pressure at the time of auto shift signal input and uses it as the reference (differential) pressure to correct the set value on the switch.

Set value correction by auto shift function



* Rectified value

When the auto shift is input, "ooo" will be displayed for approx. 1 second, and the pressure value at that point will be saved as a rectified value "C_5"(CH1 for 10-PSE200 and 10-PSE300) or "C_3" (CH2 to CH4 for 10-PSE200). Based on the saved rectified values, the set value Note "P_1" to "P_4" (10-PSE200) or "P_1", "H_1", "P_3", and "H_2" (10-PSE300) will be rectified.

Note) Upon reverse output, "n_1" to "n_4" (10-PSE200) or "n_1", "H_1", "n_3", and "H_2" (10-PSE300) are rectified.

Possible set range for auto shift input

10-PSE200	Set (differential) pressure range	Possible set range
Compound pressure	-101.0 to 101.0kPa	-101.0 to 101.0kPa
Vacuum pressure	10.0 to -101.0kPa	-101.0 to 101.0kPa
Low pressure	-10.0 to 101.0kPa	-100.0 to 101.0kPa
Positive pressure	-0.1 to 1.000MPa	-1.000 to 1.000MPa
	-	-
Low differential pressure	-	-

10-PSE300	Set (differential) pressure range	Possible set range
Compound pressure	-101.0 to 101.0kPa	-101.0 to 101.0kPa
Vacuum pressure	10.0 to -101.0kPa	-101.0 to 101.0kPa
Low pressure	-10 to 100.0kPa	-100.0 to 100.0kPa
Positive pressure	-0.1 to 1.000MPa	-1.000 to 1.000MPa
	-50 to 500kPa	-500 to 500kPa
Low differential pressure	-0.2 to 2.00kPa	-2.00 to 2.00kPa

Auto shift zero (10-PSE300 only)

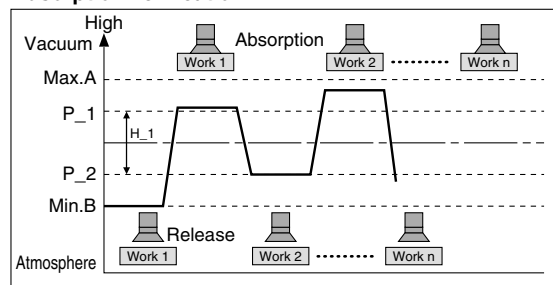
Basic function of auto shift zero is the same as the auto shift function. The only difference is that assuming the pressure value when an auto shift is input to be "0", display value is also rectified.

B Auto preset function

When auto preset function is selected in the initial setting, it calculates and stores the set value from the measured (differential) pressure.

The optimum set value is determined automatically by repeating vacuum and release with the target workpiece several times.

Adsorption verification

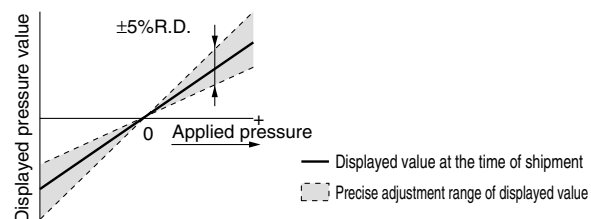


Formula for calculating the set value

	P_1 or P_3	P_2(H_1) or P_4(H_2)
10-PSE200	P_1(P_3)=A-(A-B)/4	P_2(P_4) = B + (A-B)/4
10-PSE300		H_1(H_2) = (A-B)/2

C Display calibration function

This function eliminates slight differences in the output values and allows uniformity in the numbers displayed. Displayed values of the pressure sensors can be adjusted to within $\pm 5\%$.



Note) When the precision indicator setting function is used, the set (differential) pressure value may change ± 1 digit.

D Peak/Bottom hold display function

This function constantly detects and updates the maximum and minimum values and allows to hold the display value.

Series 10-PSE300 allows the hold value to be reset by pressing $\uparrow$ and $\downarrow$ at the same time for one second or more while holding the display value.

E Key lock function

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

F Reset function

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

It is possible to rectify within $\pm 7\%$ F.S. from the factory-set value.

Functions

G Error indication function

Error name	Error indication function		Description
	10-PSE200	10-PSE300	
Overcurrent error	Er 1	Er 1	Current exceeding 80 mA is applied to switch output (OUT1).
	Er 2	Er 2	Current exceeding 80 mA is applied to switch output OUT2.
Residual pressure error	Er 3	Er 3	Pressure exceeding $\pm 7\%$ F.S. is applied during the zero reset operation. * After displaying the error code for 3 seconds, the switch automatically returns to the measuring mode. Due to individual product differences, the setting range varies ± 4 digits.
Applied pressure error	---	HHH	Supply pressure exceeds the maximum set (differential) pressure or upper limit of the display pressure.
	---	LLL	A sensor may not be unconnected or miswired. Or, supply pressure is below the minimum set (differential) pressure or lower limit of the display pressure.
Auto shift error		or	The value measured at the time of auto shift input is outside the set (differential) pressure range. * After displaying the error code for approx. 1 second, the switch returns to the measuring mode.
System error	Er 5	Er 4	Displayed when internal data error has occurred.
	Er 6	Er 6	Displayed when internal data error has occurred.
	Er 7	Er 7	Displayed when internal data error has occurred.
	Er 8	Er 8	Displayed when internal data error has occurred.

H Copy function (10-PSE200 only)

Information that can be copied includes the following: (1)Pressure set values (2)Range settings (3)Display units (4)Output modes (5)Response times.

- When CH1 is copied to CH2, CH3, and CH4, information of OUT1 in CH1 will be copied.
- When CH2, CH3, or CH4 is copied to CH1, information of OUT1 in CH2, CH3, or CH4 will be copied only to OUT1 in CH1.

Note 1) When the copy function is used, the regulating pressure value of the copied channel may change ± 1 digit.

I Auto identification function (10-PSE200 only)

This function automatically identifies the pressure range of the pressure sensor that is connected to the multi-channel pressure sensor monitor, thus eliminating the need of having to reset the range again after replacing the sensor.

This function will be activated either when "Aon" is set in the auto identification mode or when the power is turned back on in that condition. However, this function only works in conjunction with specific pressure sensors (SMC: Series PSE53□).

When other pressure sensors are used, this function will not work. When using other types of pressure sensors, first set the auto identification mode to "AoF" and then proceed to the range setting.

Turning the power back on while in the "Aon" setting can cause a malfunction.

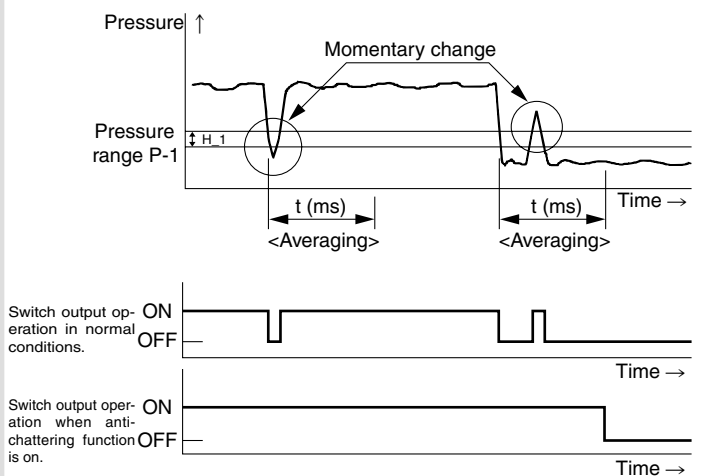
J Anti-chattering function

Devices such as large bore cylinders and high-flow vacuum ejectors consume a large volume of air when they operate, and this may cause a momentary drop in the supply pressure. This function prevents such momentary drops from being detected as abnormal pressures by changing the response time setting.

	Possible response time settings
10-PSE200	20ms, 160ms, 640ms
10-PSE300	20ms, 160ms, 640ms, 1280ms

<Principle>

The pressure values measured within the response time that are selected by the user are averaged. By comparing this average pressure value with the set pressure value, switch output (ON/OFF) is determined.



K Channel selection function (10-PSE200 only)

This function displays the measured pressure of any channel.

L Channel scan function (10-PSE200 only)

This function displays measured pressure for each channel in order at approx. 2-second intervals.

Functions

M Unit conversion function

Display units can be switched with this function.

Units that can be set vary depending on the range of the pressure sensors connected to the controller.

10-PSE200

Pressure range		For compound pressure	For vacuum pressure	For low pressure	For positive pressure
Applicable pressure sensor		10-PSE533	10-PSE531		10-PSE530
		10-PSE543	10-PSE541	10-PSE532	10-PSE540
		10-PSE563	10-PSE561		10-PSE560
Set (differential) pressure range		−101 to 101kPa	10 to −101kPa	−10 to 100kPa	−0.1 to 1MPa
PA	kPa	0.1	0.1	0.1	—
	MPa	—	—	—	0.001
GF	kgf/cm ²	0.001	0.001	0.001	0.01
bar	bar	0.001	0.001	0.001	0.01
PSI	psi	0.02	0.01	0.01	0.1
inHg	inHg	0.1	0.1	—	—
mmHg	mmHg	1	1	—	—

10-PSE300

Pressure range		For compound pressure	For vacuum pressure	For low pressure	For positive pressure		For low differential pressure
Applicable pressure sensor		10-PSE533	10-PSE531		10-PSE530		
		10-PSE543	10-PSE541	10-PSE532	10-PSE540	10-PSE564	10-PSE550
		10-PSE563	10-PSE561		10-PSE560		
Set (differential) pressure range		−101 to 101kPa	10 to −101kPa	−10 to 100kPa	−0.1 to 1MPa	−50 to 500kPa	−0.2 to 2.00kPa
PA	kPa	0.2	0.1	0.1	—	1	0.01
	MPa	—	—	—	0.001	—	—
GF	kgf/cm ²	0.002	0.001	0.001	0.01	0.01	—
bar	bar	0.002	0.001	0.001	0.01	0.01	—
PSI	psi	0.05	0.02	0.02	0.2	0.1	—
inHg	inHg	0.1	0.1	—	—	—	—
mmHg	mmHg	2	1	—	—	—	1mmH ₂ O



Specific Product Precautions 1

Be sure to read before handling.

Controller

Handling

Warning

1. Do not drop, bump or apply excessive impacts (10-PSE200: 980m/s², 10-PSE300: 100m/s²) while handling. Although the body of the monitor may not be damaged, the inside of the monitor could be damaged and lead to a malfunction.
2. The tensile strength of the cord is 50N for power cable or connection cable, and 25N for connector lead for pressure sensor. If the applied force exceeds this specification, the monitor will be damaged.

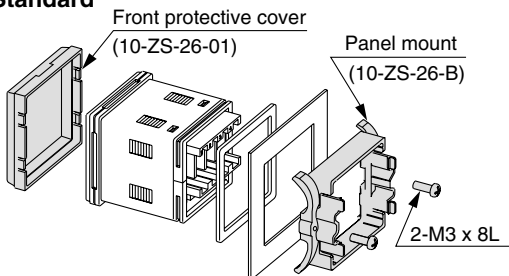
Mounting

Caution

(10-PSE200)

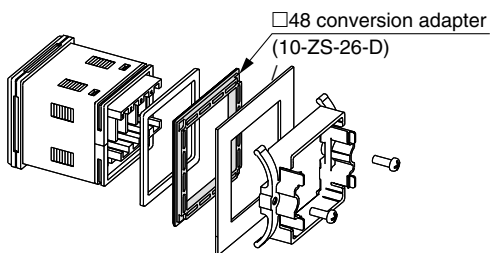
The front face of the panel mount conforms to IP65 (IP40 when using the □48 conversion adapter); however, there is a possibility of liquid penetration if the panel mount adapter is not installed securely and properly. Securely fix the adaptor with screws as shown below.

Standard



Tighten screws 1/4 to 1/2 turn after the heads are touched with the panel.

When using □48 conversion adapter



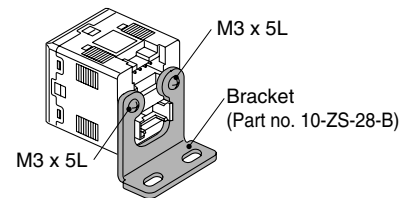
Mounting

Caution

(10-PSE300)

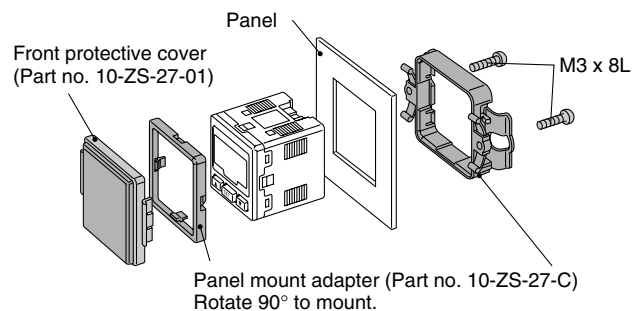
1. Mounting with bracket

Mount the bracket on the body with two M3 x 5L mounting screws. Tighten the bracket mounting screws at a tightening torque of 0.5 to 0.7 N-m.



2. Mounting with panel mount adapter

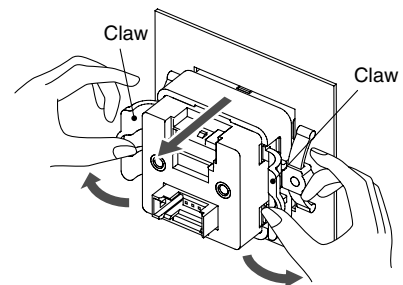
Secure the panel mount adapter with two M3 x 8L mounting screws.



3. Panel mount adapter removal

To remove the controller with panel mount adapter from the equipment, remove the two mounting screws, and pull out the monitor while pushing the claws outward.

Failure to follow this procedure can cause damage to the monitor and panel mount adapter.



Air cylinder

Rotary actuator

Air gripper

Directional control valve

Flow control equipment

Filter, Pressure control equipment

Fittings & Tubing

Air preparation equipment

Pressure switch

Clean gas filter



Specific Product Precautions 2

Be sure to read before handling.

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 out the pressure sensor or its connector when the power is on. Switch output may malfunction.
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.

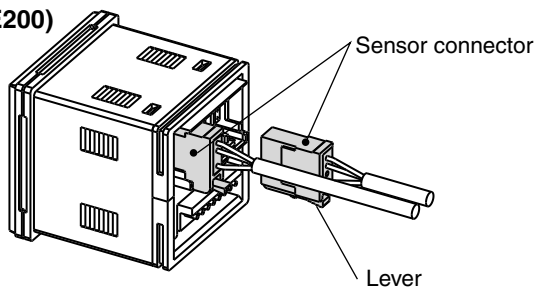
Wiring

⚠ Caution

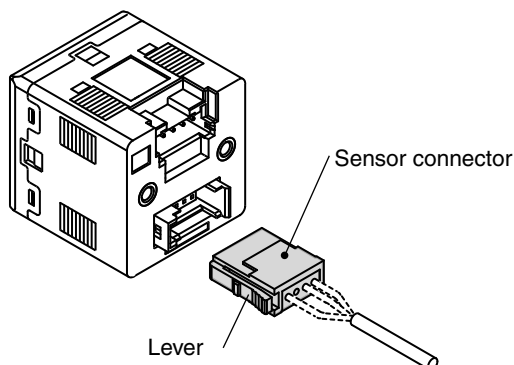
1. Connection and removal of sensor connector

- Hold the lever and connector body with two fingers and insert the connector straight into the pin until it is locked with a click sound.
- To remove the connector, pull it out straight while pressing the lever with a finger.

(10-PSE200)



(10-PSE300)



2. Connecting power supply/output connection cable

- To connect the power supply/output connection cable to the monitor, insert the cable until the cable connector is locked with a click sound.

Operating environment

⚠ Warning

1. Our pressure sensor monitors 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.

(10-PSE200)

- Enclosure "IP65" applies only to the front face of the panel when mounting. Do not use in an environment where oil splashing or spraying are anticipated.