

Series 10-PSE200

Multi-channel controller

How to Order



• Clean series

10-PSE20 0-M

Input/Output specifications

0	NPN 5 outputs + Auto shift input
1	PNP 5 outputs + Auto shift input

Unit specifications

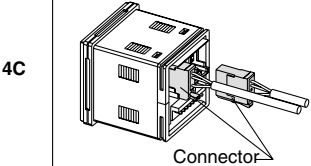
Nil	With unit conversion function ^{Note 1)}
M	Fixed SI unit ^{Note 2)}

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

Note 2) Fixed unit:
For vacuum/low pressure /compound pressure: kPa
For positive pressure: MPa

Option 2

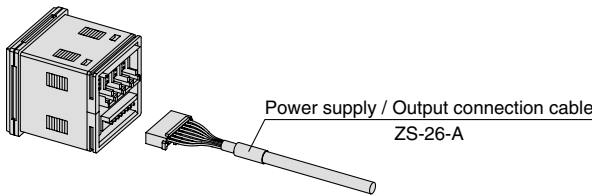
Nil	Without connector
4C	Sensor connectors (4 pcs.)



Option 1

Nil	Without panel mount/protective cover
A	Panel mount adapter Waterproof seal (Accessory) Panel mount adapter Panel Mounting screws (M3 x 8L) (Accessory)
B	Front protective cover + Panel mount adapter Front protective cover Waterproof seal (Accessory) Panel mount adapter Panel Mounting screws (M3 x 8L) (Accessory)

Accessory: Power supply/Output connection cable (2m)
Attached to the controller.



Option

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

Description	Part no	Note
Panel mount adapter	10-ZS-26-B	With waterproof seal and mounting screw
Front protective cover + Panel mount adapter	10-ZS-26-C	With waterproof seal and mounting screw
☐ 48 conversion adapter This adapter is used to mount PSE200 on the panel fitting of PSE100.	10-ZS-26-D ☐ 48 conversion adapter	Order panel mount adapter separately.
Sensor connector	10-ZS-28-C (1 pc. per set)	

Specifications

Model		10-PSE200	10-PSE201	
Power-supply voltage		12 to 24VDC, Ripple(p-p) 10% or less (with power supply polarity protection)		
Current consumption		55mA or less (Current consumption for sensor is not included.)		
Power supply voltage for sensor		[Power supply voltage] –1.5V		
Power supply current for sensor ^{Note 1)}		40mA maximum (100mA maximum for the total power supply current when 4 sensors are input)		
		1 to 5 VDC (Input impedance: Approx. 800kΩ)		
Sensor input	No. of inputs	4 inputs		
	Input protection	With excess voltage protection (up to 26.4V)		
Switch output		NPN open collector: 5 outputs (Sensor input CH: 2 outputs, CH2 to 4: 1 output)	PNP open collector: 5 outputs (CH: 2 outputs, CH2 to 4: 1 output)	
	Maximum load current	80mA		
	Maximum applied voltage	30V	—	
	Residual voltage	1V or less (with load current of 80mA)		
	Response time	5ms or less (With anti-chattering function, Response time selection: 20ms, 160ms, 640ms)		
	Short-circuit protection	With short-circuit protection		
Repeatability		±0.1%F.S.±1digit or less		
Hysteresis	Hysteresis mode	Adjustable (can be set from 0)		
	Window comparator mode	Fixed (3 digits)		
Display		For measured value display: 4-digit, 7-segment indicator, Display color: Orange (Sampling interval: 4 times/1s) For channel display: 1-digit, 7-segment indicator, Display color: Red		
Display accuracy (at operating temperature 25°C)		±0.5%F.S.±1digit or less		
Indicator light		Red (Lights up when output is ON.)		
Auto shift input		Non-voltage input (reed or solid state), Input 10ms or more, Independently controllable auto shift function ON/OFF		
Auto identification function		With auto identification function ^{Note 2)}		
Environment resistance	Enclosure	Front face: IP65 (with panel mount), Other: IP40		
	Ambient temperature range	Operating: 0 to 50°C, Stored: –10 to 60°C (with no condensation or freezing)		
	Ambient humidity range	Operating/Stored: 35 to 85% RH (with no condensation)		
	Vibration resistance	10 to 500Hz, 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	980m/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: 8P connector, Sensor connection: e-con		
Material		Case: PBT; Display: Transparent nylon; Back rubber cover: CR		
Weight		Approx. 60g (Power supply/Output connection cable not included)		
Particle generation grade (Refer to front matters 13 to 22 for details.)		Grade 1		

Pressure range	For compound pressure	For vacuum pressure	For low pressure	For positive pressure
Applicable pressure sensor	10-PSE533	10-PSE531	10-PSE532	10-PSE530
	10-PSE543	10-PSE541		10-PSE560
	10-PSE563	10-PSE561		
Set pressure range	–101 to 101kPa	10 to –101kPa	–10 to 101kPa	–0.1 to 1MPa
Set pressure resolution	0.1kPa	0.1kPa	0.1kPa	0.001MPa

Note 1) If the Vcc and 0 V side of the sensor input connector are short circuited, the inside of the monitor is damaged.

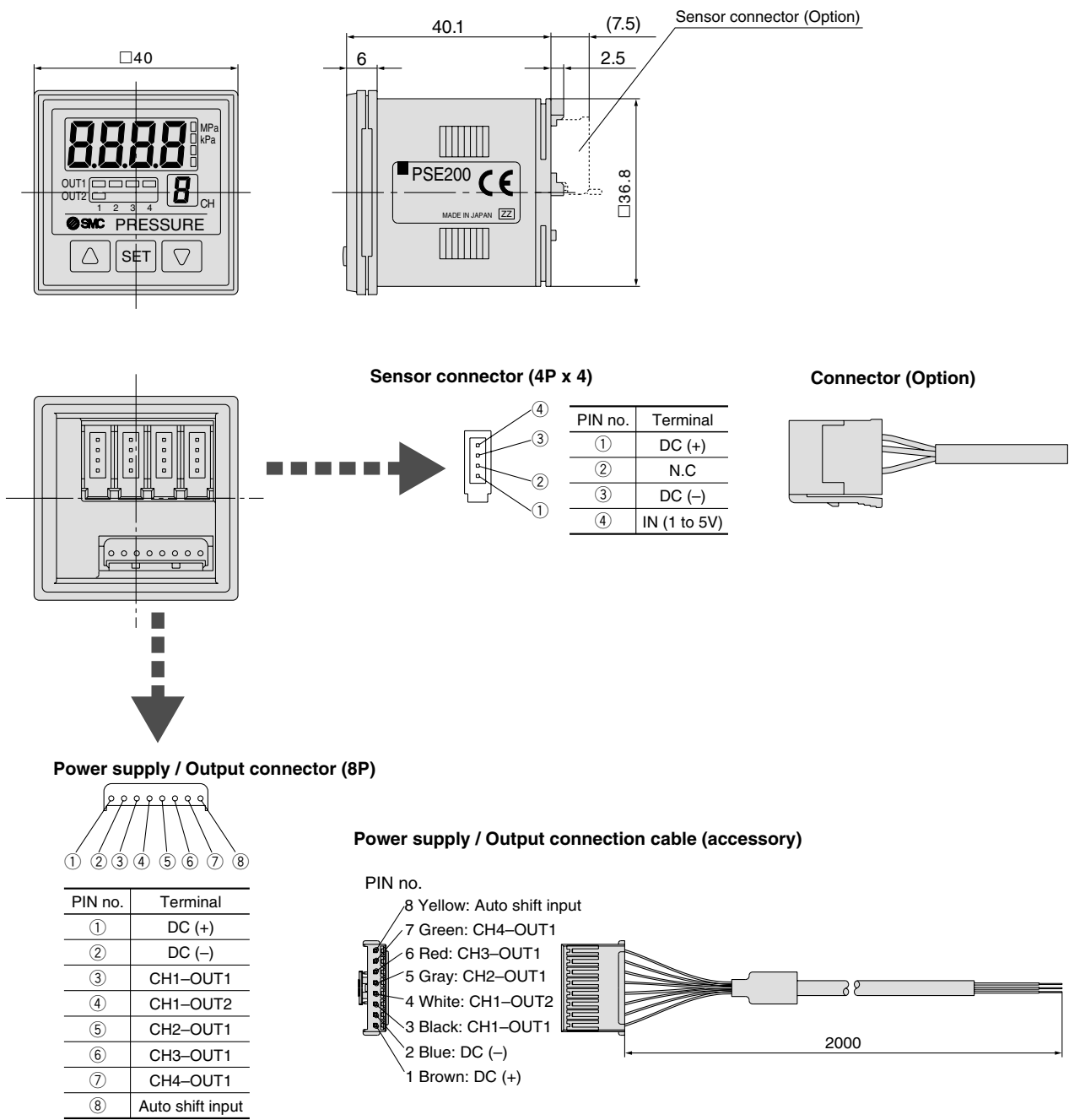
Note 2) Auto identification function comes with "Series PSE53□" pressure sensor only. Other SMC series (PSE510, PSE520, PSE540 and PSE560) are not equipped with this function.

⚠ Caution

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

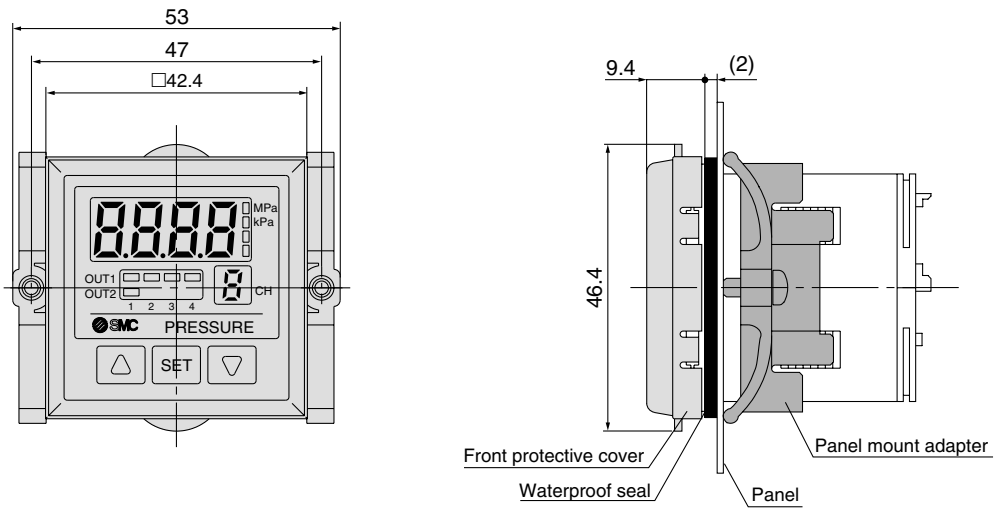
Dimensions

10-PSE200/201

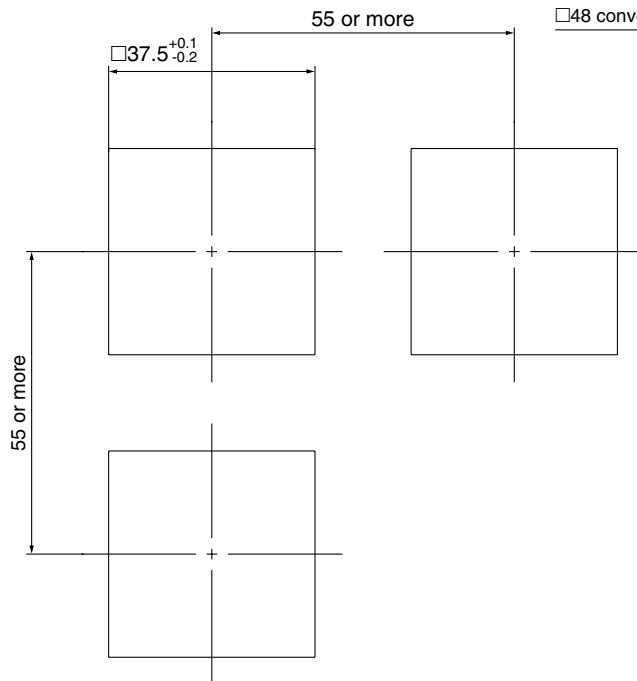
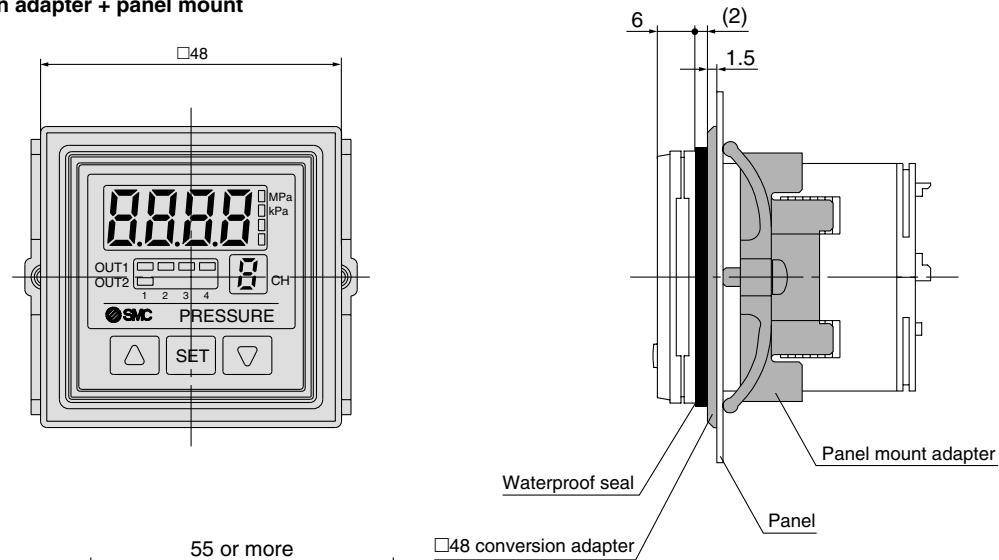


Dimensions

Front protective cover + Panel mount



□48 conversion adapter + panel mount



Panel fitting dimension

Applicable panel thickness: 0.5 to 8mm

Descriptions

4-digit display

Displays the measured pressure value, content for each setting, and error code.

Switch output display

Displays the output status of OUT1 (CH1 to CH4) and OUT2 (CH1 only). Lights up when it is ON.

UP button

Use this button to change the mode or set value.

SET button

Use this button to set the mode or set value.

Unit display

The selected unit lights up. Use unit labels for units other than MPa and kPa.

Unit labels

kgf/cm² bar PSI inHg mmHg

Channel display

Displays the selected channel.

DOWN button

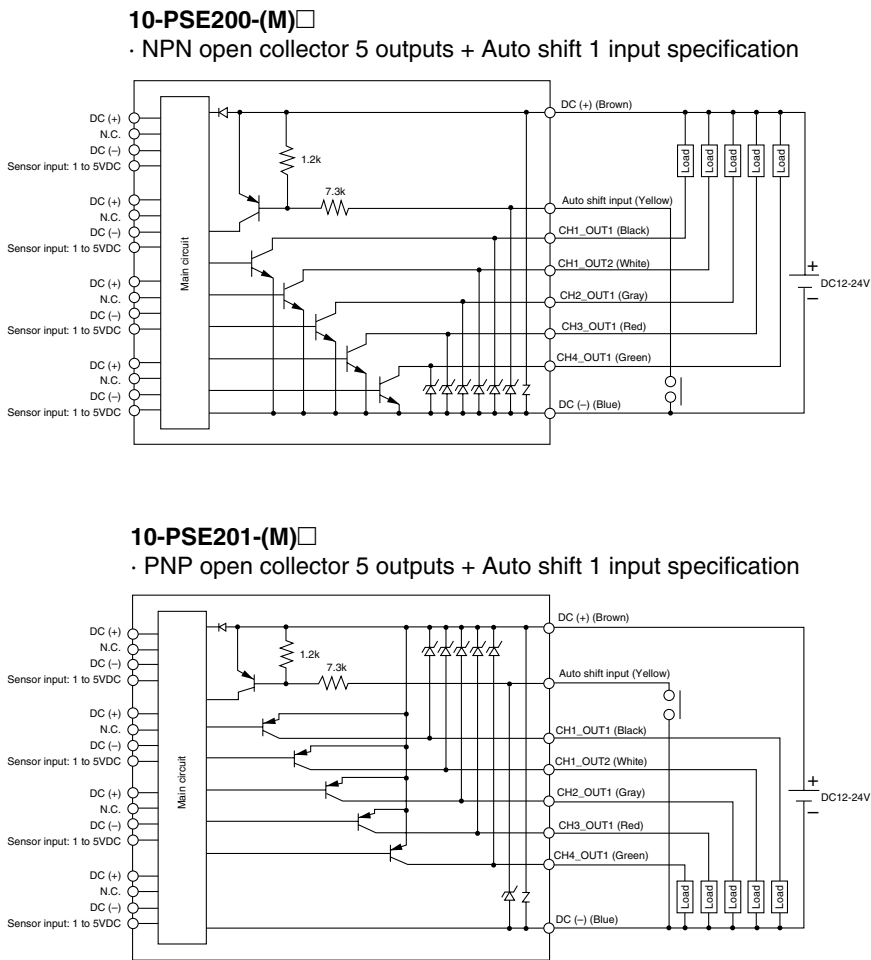
Use this button to change the mode or set value.

Error code & solution

Error description	LED display	Contents	Solution
Excess current error	Er 1	Excess current is flowing into the switch output of OUT1.	Shut off the power supply. After eliminating the output factor that caused the excess current, turn the power supply back on.
	Er 2	Excess current is flowing into the switch output of OUT2.	
Residual pressure error	Er 3	Zero point adjustment Pressure is applied to a pressure sensor during the reset operation as follows: When compound pressure is used: ±2.5% F.S. or more. When pressure other than compound pressure is used: ±5% F.S. or more. * After displaying for 2 seconds, it will return to the measuring mode.	Bring the pressure back to atmospheric pressure and use the reset function (zero point adjustment) again.
Applied pressure error	---	The DC (-) line of the sensor is not connected or supply pressure exceeds the set pressure range.	Confirm the connection and the wiring for the sensor, and set the pressure within the set pressure range.
	----	The sensor is not set or connected incorrectly, or the pressure applied is below the set pressure range.	
System error	Er 5	Internal data error	Shut off the power supply and turn it on again.
	Er 6	Internal data error	
	Er 7	Internal data error	
	Er 8	Internal data error.	

* Contact SMC for further investigation if it cannot be recovered after above measures have been taken.

Internal circuits and connections

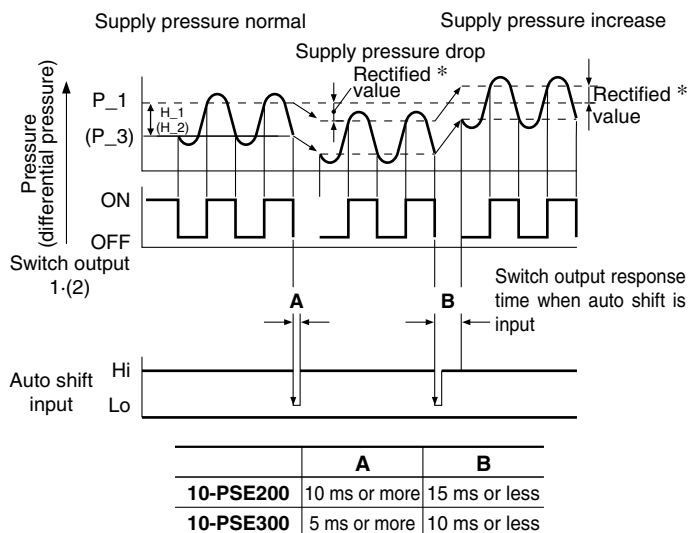


Functions

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)

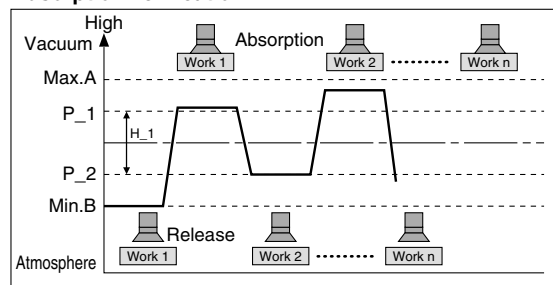
Basic function of auto shift zero is the same as the auto shift function. The only difference is that assuming the pressure value when an auto shift is input to be "0", display value is also rectified.

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

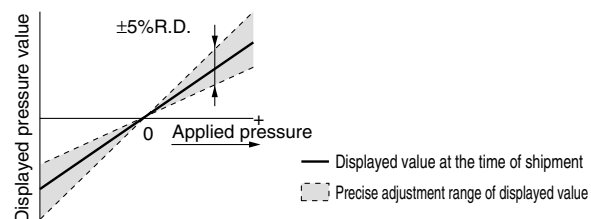


Formula for calculating the set value

	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.

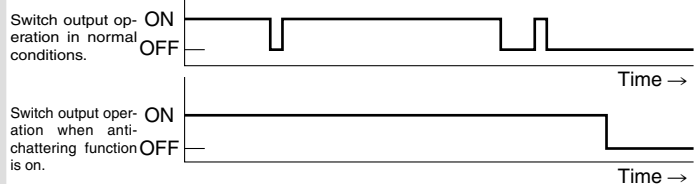
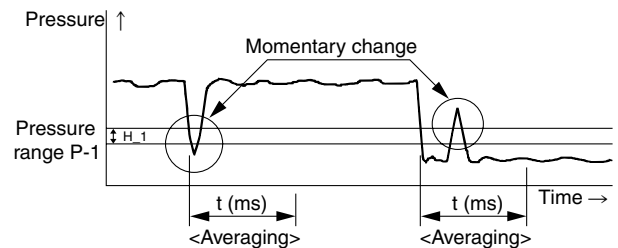
J Anti-chattering function

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.

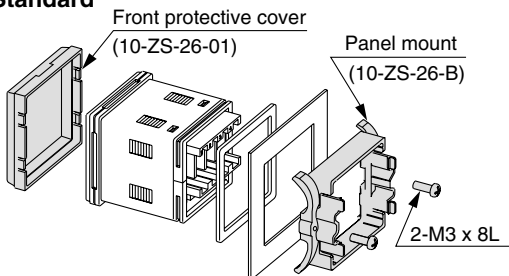
Mounting

Caution

(10-PSE200)

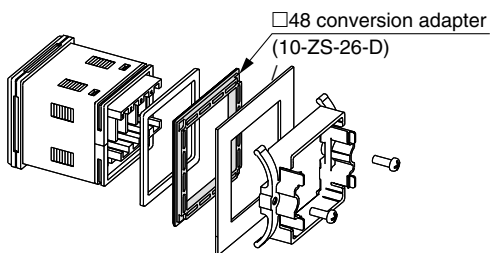
The front face of the panel mount conforms to IP65 (IP40 when using the □48 conversion adapter); however, there is a possibility of liquid penetration if the panel mount adapter is not installed securely and properly. Securely fix the adaptor with screws as shown below.

Standard



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

When using □48 conversion adapter



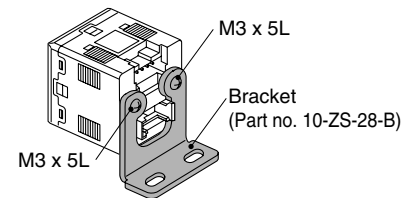
Mounting

Caution

(10-PSE300)

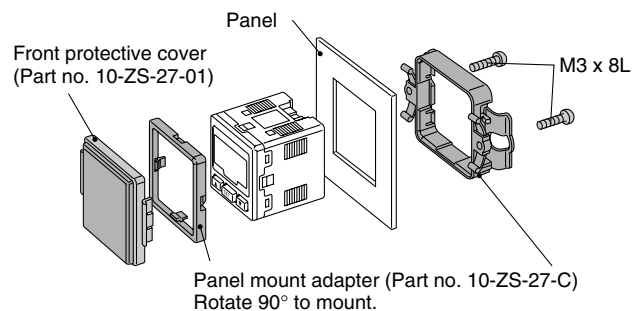
1. Mounting with bracket

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

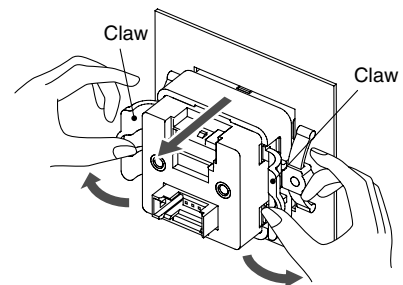
Secure the panel mount adapter with two M3 x 8L mounting screws.



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.

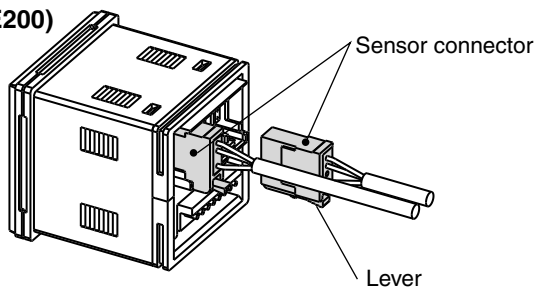
Wiring

⚠ Caution

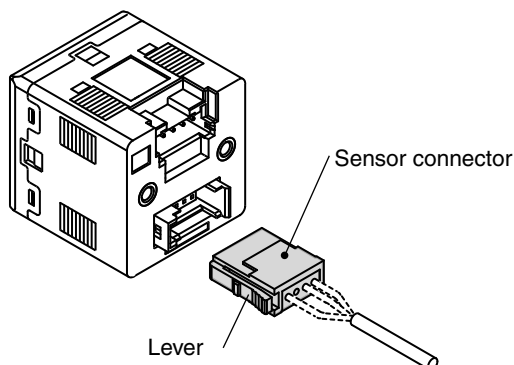
1. Connection and removal of sensor connector

- 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.