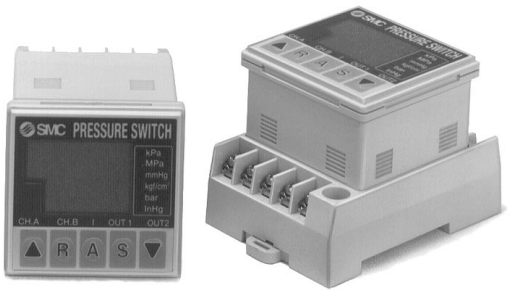
Controller
Series PSE100



How to Order

PSE10 □ — □ □

Output specifications

0	NPN output
1	PNP output

Option

—	Without cover
C	With cover

Mounting

A	Panel mounting
B	Wall mounting, DIN rail*

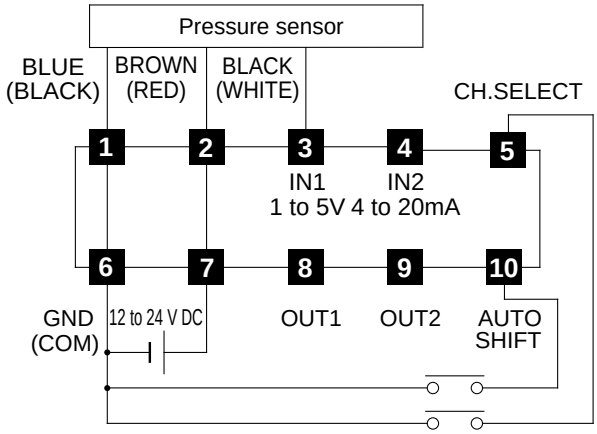
∗Refer to p.3.1-14 for DIN rail part number.

Controller Specifications

Model		**PSE100-□**	**PSE101-□**
Output specifications		NPN Open Collector 30V 80mA max.	PNP Open Collector 80mA max.
Number of outputs		2CH X 2 outputs	
Pressure display range		–101 to 10kPa (For vacuum), –10 to 100kPa (For low press.), –0.1 to 1MPa (For high press.)	
Display resolution		0.1kPa (For vacuum, low pressure), 1kPa (For high pressure)	
Display unit	**For vacuum pressure and low pressure**	kPa, mmHg, kgf/cm^2, bar, InHg	
	For high pressure	kPa, MPa, kgf/cm^2, bar	
Operating display		Light at ON. (Switch output 1: Green, Switch output 2: Red)	
Frequency response		100Hz (10ms)	
Hysteresis		Hysteresis mode: Variable, Window comparator mode: Fixed (2% F.S.)	
Temp characteristics (25°C standard)	**25 ± 10°C**	±0.3% F.S. or less	
	0 to 50°C	±0.5% F.S. or less	
Repeatability		±0.2% F.S. or less	
Supply voltage		12 to 24V DC (Ripple ±10% or less)	
Current consumption		250mA or less	
Error display		Error display at 7 segment LED	
Display specifications		4 figures X 2, 7 segment LED dispay, Sampling cycle 4 times/sec.	
Self diagnostic function		Excess pressure, Excess current, NO sensor connection, Data error (Pressure presence at zero clear)	
Additional function		Auto preset: Possible to set adsorption confirmation by pressing button only.	
		Auto shift: Possible to zero clear by input terminal	
Operating temperature range		0 to 50°C (No condensation)	
Noise resistance		500Vp-p, Pulse width 1μs, Standing 1ns	
Voltage resistance		Between external terminal and case 1000V AC, 50/60Hz for 1 min.	
Insulation resistance		Between external terminal and case 2MΩ (500V DC by megameter)	
Vibration resistance		10 to 500Hz Width: 1.5mm or acceleration 98m/s^2 (at the smaller vibration) to X, Y, Z direction (2 hours)	
Shock resistance		980m/s^2 to X, Y, Z direction (3 times for each direction)	
Protective construction		Panel mounting type: IP66 (Used gasket at panel mount part only), Wall mounting, DIN rail type: IP40	
Mounting		A: Panel mounting, B: Wall mounting, DIN rail	
Weight		A: Approx. 90g B: Approx. 110 g	
Sensor connection	**Supply voltage**	Same as power supply	
	Voltage input	1 to 5V (Input impedance 100KΩ)	
	Current input	4 to 20mA (Input impedance 250Ω)	

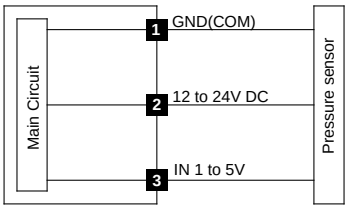
Input/Output Circuit and Connection

Connection diagram

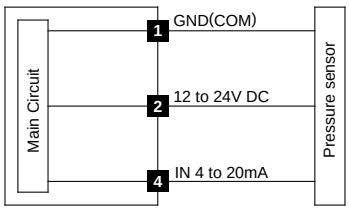


Sensor connection

Voltage input type

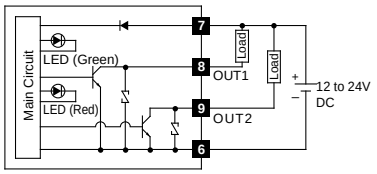


Current input type

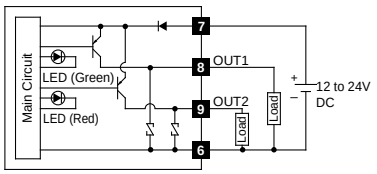


Input/Output circuit diagram

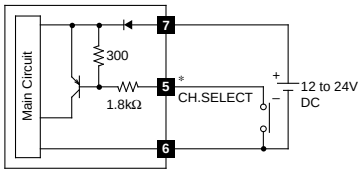
NPN output circuit diagram



PNP output circuit diagram



Input circuit diagram (Autoshift, channel selection)



∗Same as **10** AUTO SHIFT.

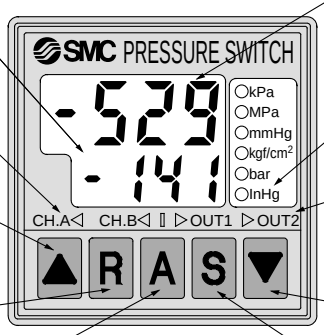
How to use the auto shift function

Connect the autoshift terminal **10** to GND **6**. This forces the unit to accept a new zero point, the display will indicate "0". After disconnecting the autoshift terminal from GND, the display will indicate relative pressure based on the new zero point.
Note) To invoke the autoshift function the autoshift terminal has to be connected to GND for at least 10 msec. LED1 will display "0" during connection to GND.

How to select channel

When CH.SELECT terminal **5** is open, channel A is selected. When it is connected to GND **6**, channel B is selected.
Note) There is a 10 msec. time delay from making contact and the actual selection of the channel.

Description



Display of peak, bottom and absolute pressure
(LED2)

Display of present pressure
(LED1)

Display of channels

Display of units

UP button (▲)
Increases calibration value.

Display of outputs
Light turns on when output is ON.

Reset button (R)
Clears abnormality. Displays "0".

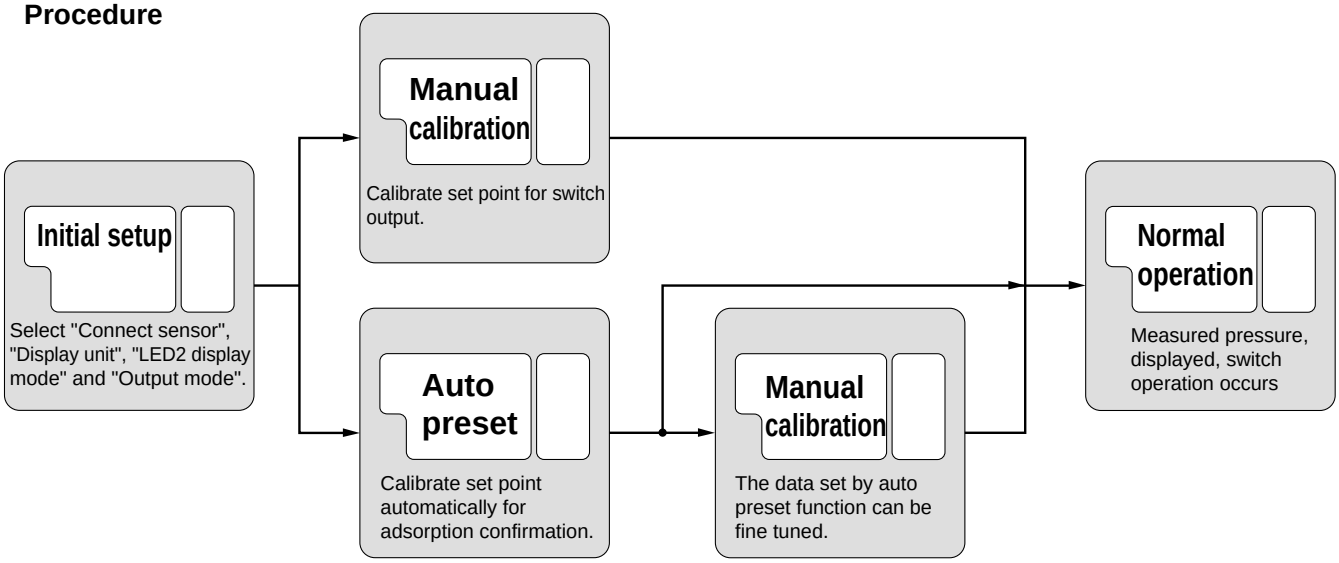
DOWN button (▼)
Decreases calibration values.

Auto preset button (A)
Reads present pressure directly.

Set button (S)
Changes calibration value and modes.

Calibration Procedure

Procedure



Method of calibration/1, 2, 3

Table 1 Sensor types and min. display unit

Sensor type \ Display unit	kPa	MPa	mmHg	kgf/cm²	bar	InHg
PSE511(–100kPa)	–0.1	–	–1	–0.001	–0.001	–0.1
PSE512(100kPa)	0.1	–	1	0.001	0.001	0.1
PSE510, 520(1MPa)	1	0.001	–	0.01	0.01	–

Table 2 LED2 display

LED2 (green) display indicates the following 3 mode options.

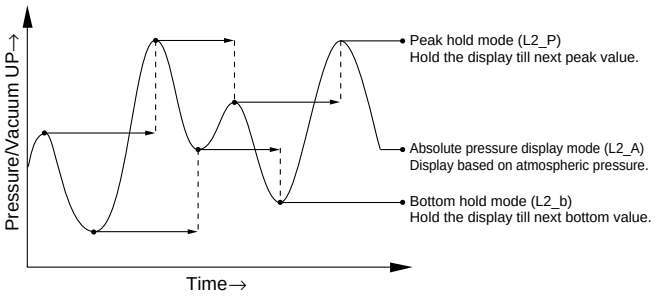
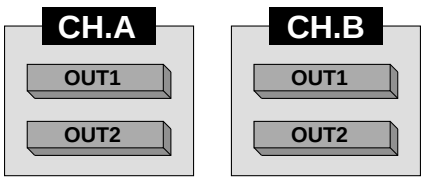


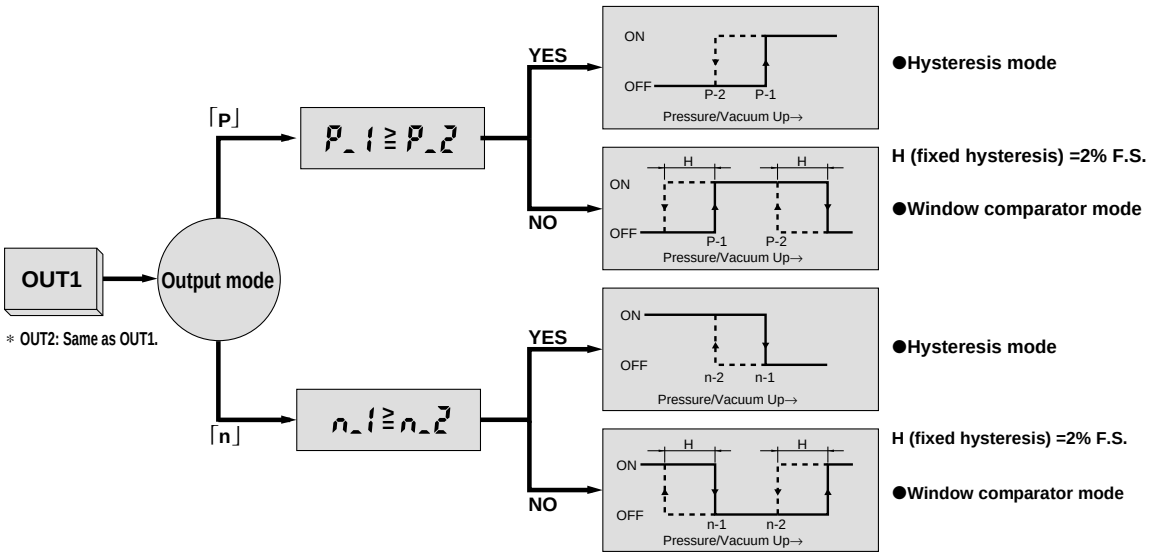
Table 3 Output type

One output type can be selected from 4 types according to output modes and relation of each calibration values.
Two separate outputs, OUT1 and OUT2, can be set per channel and two channels, A and B can be selected from outside.



CH.A and CH.B can be selected by external signal.

Refer to p.3.1-8 "Channel selection" for further information.



●Hysteresis mode

H (fixed hysteresis) =2% F.S.

●Window comparator mode

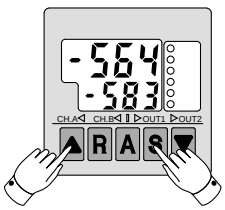
●Hysteresis mode

H (fixed hysteresis) =2% F.S.

●Window comparator mode

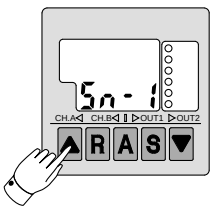
Initial setup

1. Initial setup mode



Press the button "S" at least 3 seconds while holding down the ▲ button.

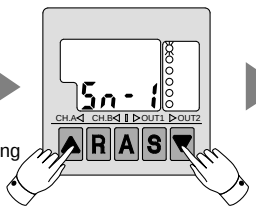
2. Selection of "Connect sensor"



Select "Connect sensor" by pressing the ▲ button.
LED2 display
- Sn -1: PSE511 (For –100kPa)
- Sn 1: PSE512 (For 100kPa)
- Sn 10: PSE510/520 (For 1MPa)

"Display unit" is entered by pressing the button "S".

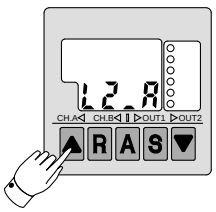
3. Selection of "Display unit"



Select "Display unit" by pressing the ▲ or ▼ button. (Refer to p.3.1-9 **Table1**.)

"LED Display mode" is entered by pressing the button "S".

4. Selection of "LED2 display mode"

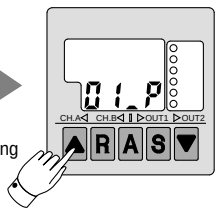


Select "LED2 display mode" by pressing the ▲ button.
LED2 display
- L2_A: Absolute pressure
- L2_P: Peak hold
- L2_b: Bottom hold

(Refer to p.3.1-9 **Table 2**.)

"Output mode" is entered by pressing the button "S".

5. Selection of "OUT1 output mode"

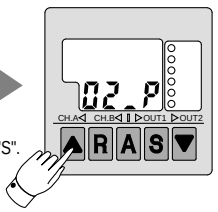


Select "OUT1 output mode" by pressing the ▲ button.
LED2 display
- 01_P: Normal mode
- 01_n: Reversed output mode

(Refer to p.3.1-9 **Table 3**.)

Press the button "S".

6. Selection of "OUT2 output mode"

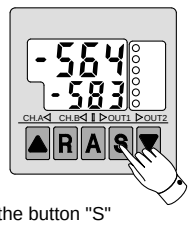


Select "OUT2 output mode" by pressing the ▲ button.
LED2 display
- 02_P: Normal mode
- 02_n: Reversed output mode

By pressing the button "S", the calibration is completed.

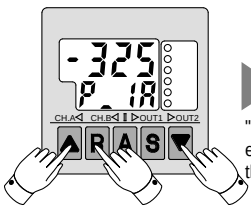
Manual calibration

1. Calibration value input mode (manual)



Press the button "S"
3 seconds or less: Selected channel
3 seconds or more: Not selected channel

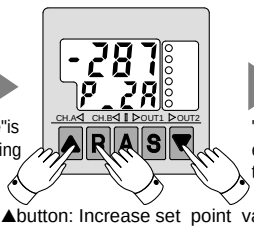
2. Input set point value for OUT1 (1)



▲button: Increase set point value
▼button: Decrease set point value
R button: Reads the pressure value at that moment
(Refer to p.3.1-9 **Table 3**.)

"OUT1(2) mode"is enterd by pressing the button "S"

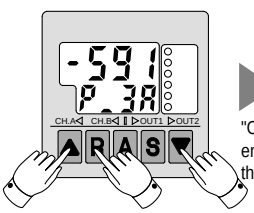
3. Input set point value for OUT1 (2)



▲button: Increase set point value
▼button: Decrease set point value
R button: Reads the pressure value at that moment

"Out2(3) mode" is enterd by pressing the button "S"

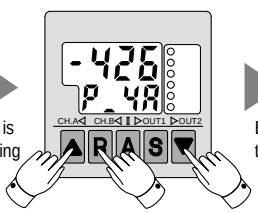
4. Input set point value for OUT2 (3)



▲button: Increase set point value
▼button: Decrease set point value
R button: Reads the pressure value at that moment

"OUT2(4) mode" is entered by pressing the button "S".

5. Input set point value for OUT2 (4)



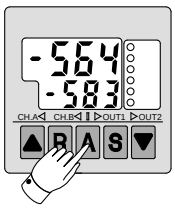
▲button: Increase set point value
▼button: Decrease set point value
R button: Reads the pressure value at that moment

By pressing the button "S" the calibration is completed.

Calibration Procedure

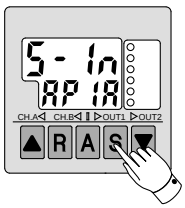
Auto preset

1. Auto preset mode



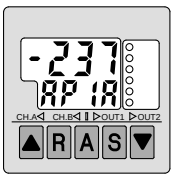
Press the button "A" for 3 to 6 seconds for selected channel, and for more than 6 seconds for not selected channel.

2. Preparation for auto preset



When the initial conditions for adsorption confirmation are met, press the button "S". Press the ▼ button when it is not required to calibrate OUT1.

3. OUT1 auto preset



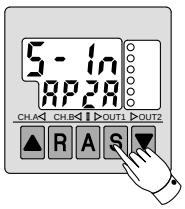
Repeat the steps adsorption and no adsorption several times. This will set the best values automatically.

After pressing button "S", OUT1 auto preset is completed.

(When the button "A" is pressed, calibration is not completed.)

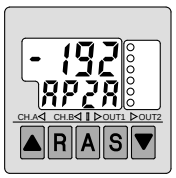
∗ Initial condition for adsorption confirmation means that conditions are met for operation to begin.

4. Preparation for auto preset



When the initial condition for adsorption confirmation are met, press the button "S". Press the ▼ button when it is not required to calibrate OUT2.

5. OUT2 auto preset



Repeat the steps adsorption and no adsorption several times. This will set the best values automatically.

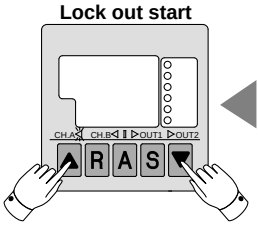
After pressing button "S", OUT2 auto preset is completed.

(When the button "A" is pressed, calibration is not completed.)

Other function

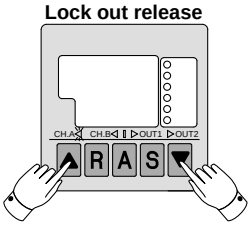
Lock out

Lock out start



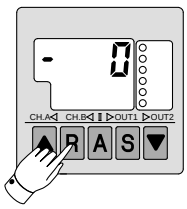
Press the ▼and ▲buttons simultaneously for at least 3 seconds. Display starts to blink.

Lock out release



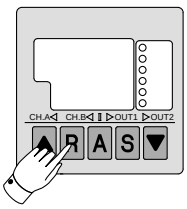
Press the ▲ and ▼buttons simultaneously for at least 3 seconds. Lock out is released. During malfunction lockout is released automatically.

Reset display to "0"



Press the button "R" for at least 3 seconds to reset the display to zero. If pressure is higher than ± 2% of rated pressure, reset of the display is not possible.

Clear auto shift



Press the button "R" for at least 2 seconds but no longer than 3 seconds. This clears the auto shift function.

Error Codes

Error codes

Display	Cause	Solution
-FFF	Sensor is not connected.	Connect sensor.
FFFF	Operating pressure over max. limit.	Lower operating pressure.
Err 1	Calibration data lost.	Contact SMC.
Err2 OU-1	Current draw on Output 1 too high (>120mA).	Check load and/or wiring for Output 1.
Err2 OU-2	Current draw on Output 2 too high (>120mA).	Check load and/or wiring for Output 2.
Err2 OU-A	Current draw on Output 1 and 2 too high (>120mA).	Check load and/or wiring for Output 1 and 2.
- - - -	Pressure is 2% above rated pressure during 0 clear.	Apply atmospheric pressure then do 0 clear.

⚠ Precautions

Be sure to read before handling. Refer to p.0-26 and 0-27 for Safety Instructions and common precautions on the products mentioned in this catalog, and refer to p.3.0-7 to 3.0-9 for precautions on every series.

Wiring

⚠Warning

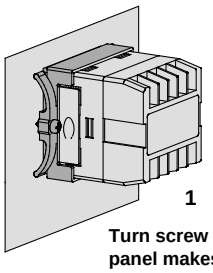
①Connect FG to ground when using switching power supply as a power source.
②Every input signal needs to be longer than 10ms to be recognized by the PSE.

Installation

⚠Caution

①Front plate of the PSE100 meets IP66 rating. However if the panel mount adaptor is used and the instrument is not seated correctly, water might enter.
②As illustrated below, hook the nail located on the bottom of the body on the DIN rail and press down in the direction of the arrow. To remove from the DIN rail lift the switch up with a bladed screw driver, etc. in the direction of the arrow.
③Be careful not to apply excessive force to the wiring during mounting on panel or DIN rail.

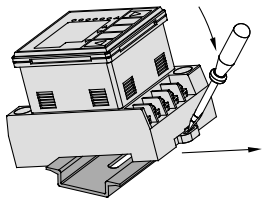
Panel mount



1

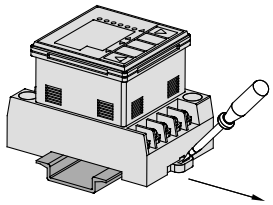
Turn screw 1/4 to 1/2 turn after panel makes contact with the sealing surface of the PSE.

Mounting on DIN rail



2a

Removal from DIN rail



2b

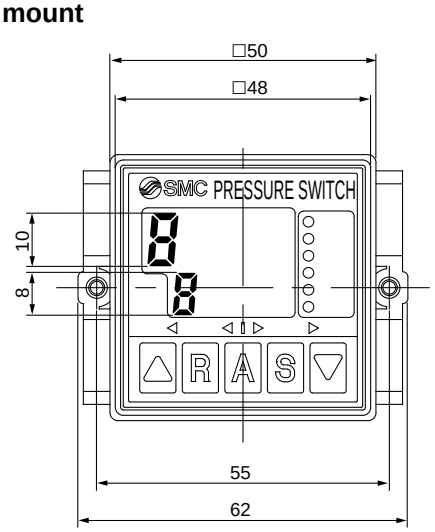
Others

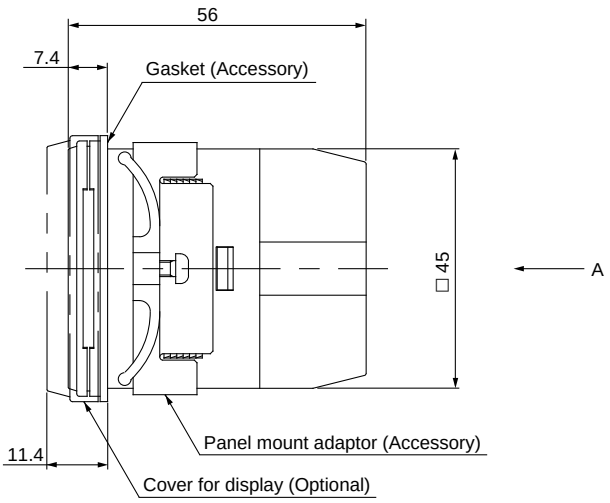
⚠Caution

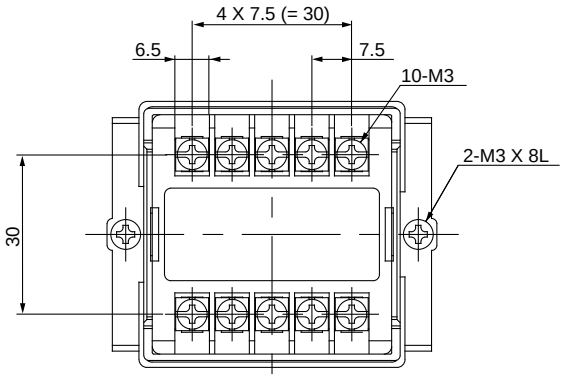
1. Time delay for power on reset of controller is 0.5 seconds. Be aware that the output circuit is not active immediately after the power is connected.

Dimensions

A: Panel mount

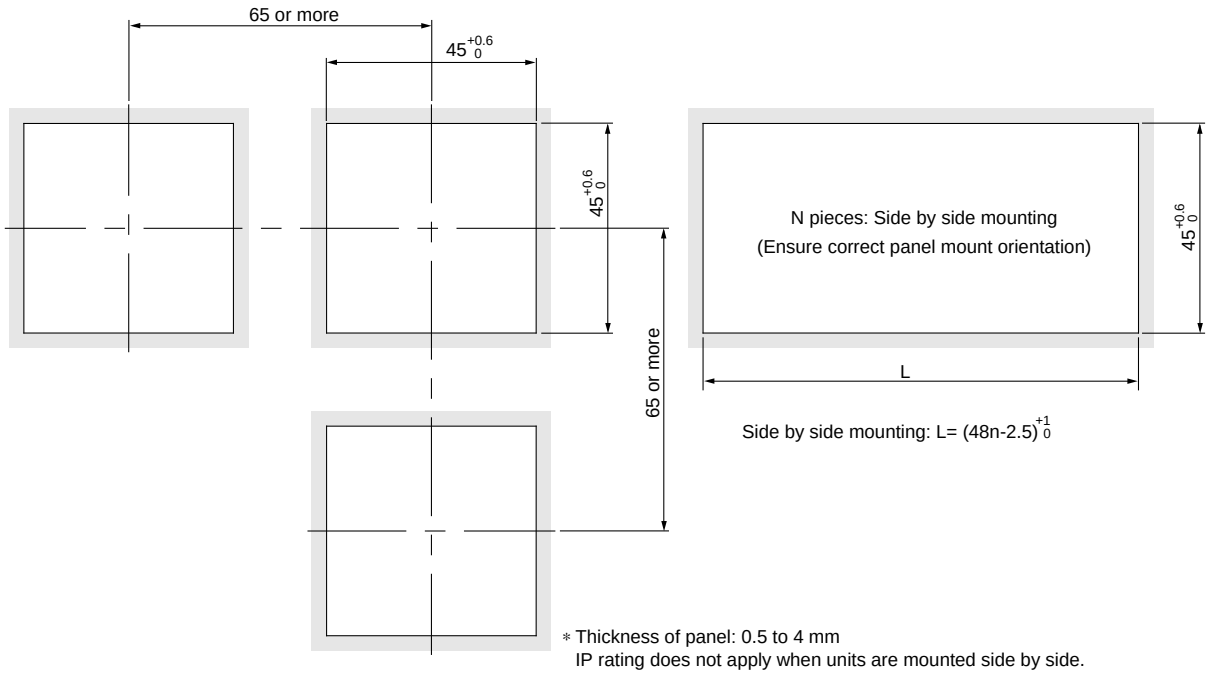






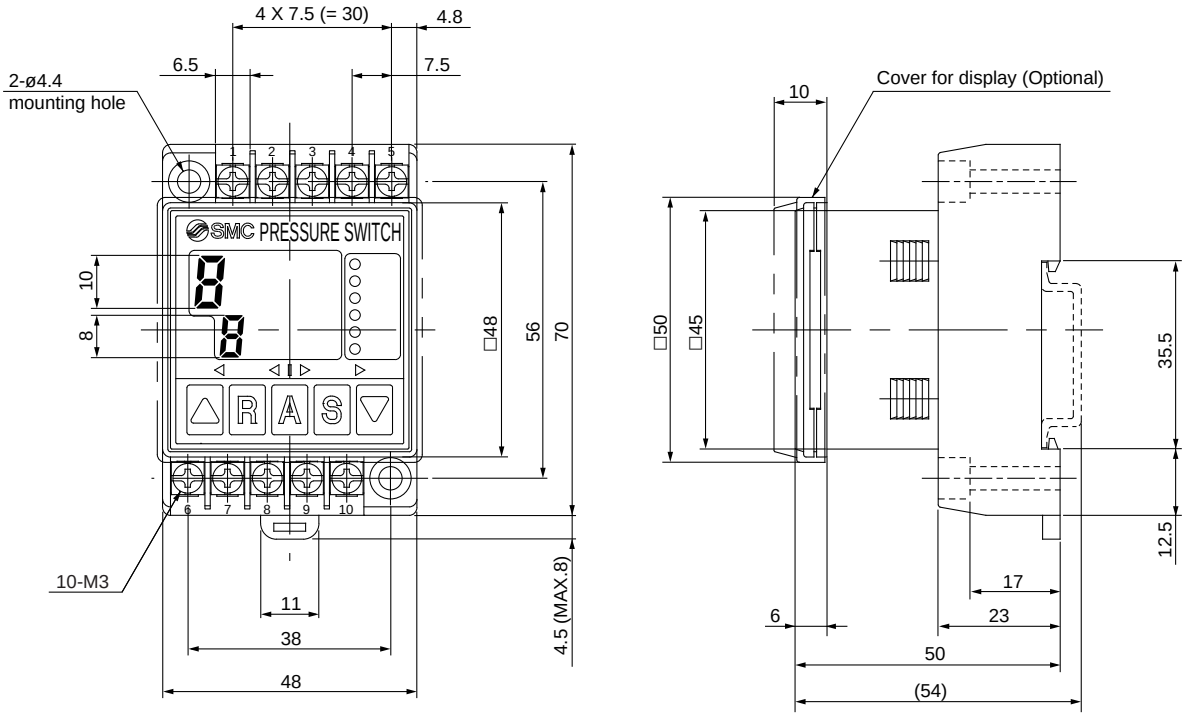
View A

Cutout dimensions for panel mount

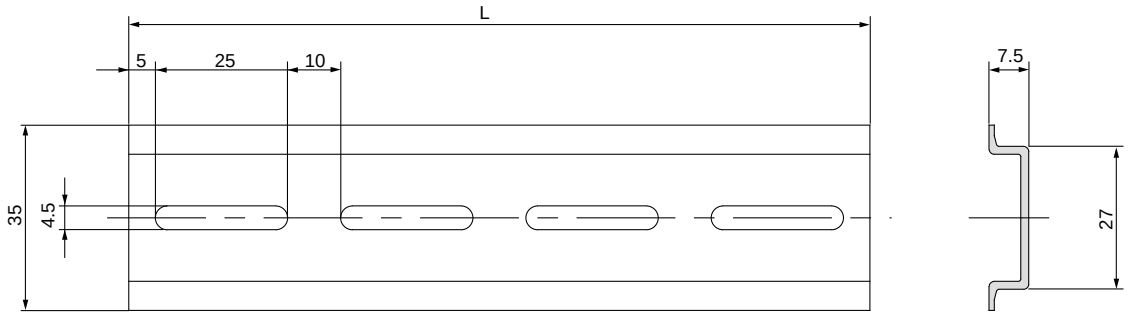


∗ Thickness of panel: 0.5 to 4 mm
IP rating does not apply when units are mounted side by side.

B: Wall mount, DIN rail



DIN rail



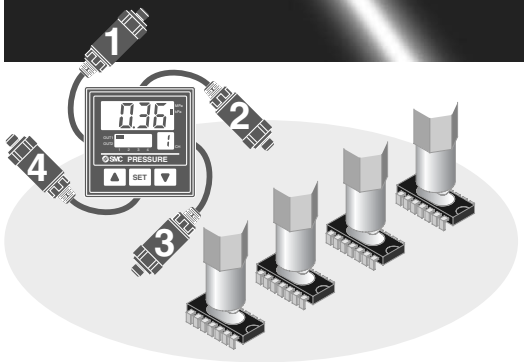
Material: Aluminum

Part number of DIN rail

Part number	L
ISA-2-1	105
ISA-2-2	140
ISA-2-3	175
ISA-2-4	210
ISA-2-5	245
ISA-2-6	280
ISA-2-7	315

High Precision, Remote Type Digital Pressure Sensor

Series PSE530/200



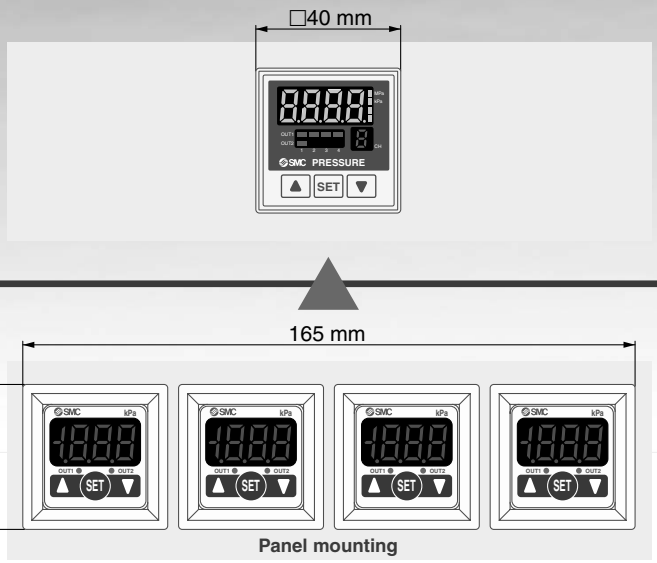
A single controller monitors up to 4 pressure sensors.

A single controller monitors

Pressure Sensor
Series PSE530

Multi-channel Controller
Series PSE200

1 Space saving

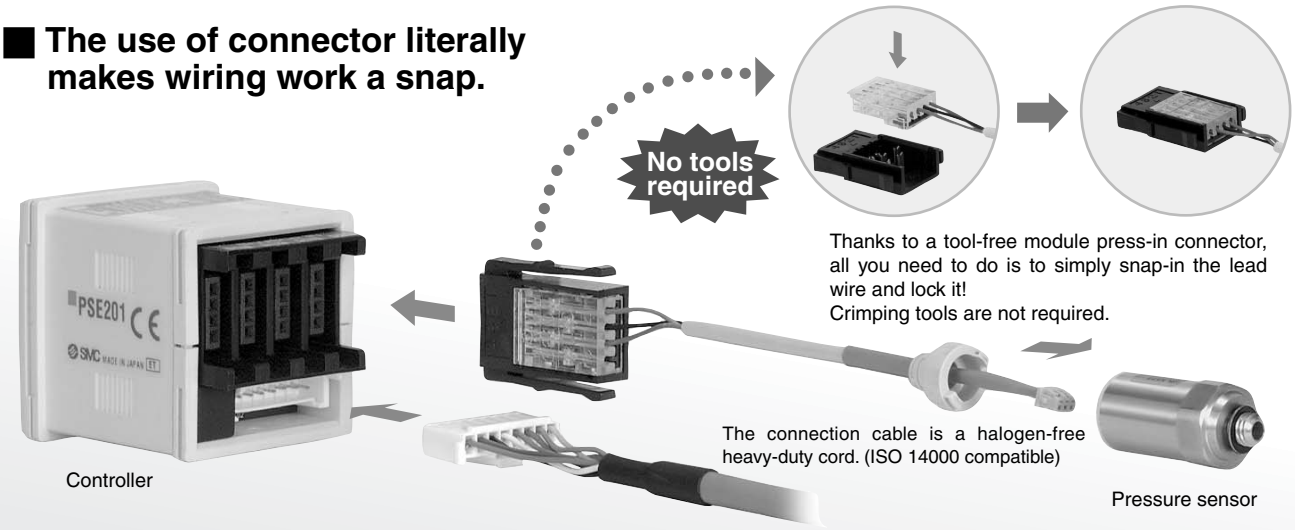


76% reduction in installation space
(Compared to the panel mounted ZSE40/ISE40.)

Less panel mounting work

2 Simplified application

■ The use of connector literally makes wiring work a snap.



Low power consumption: 55 mA or less (Controller)

The new controller provides energy savings without compromising display brightness quality thanks to the use of transparent (negative) LCD and a backlight.

up to 4 pressure sensors.

3 Multifunction

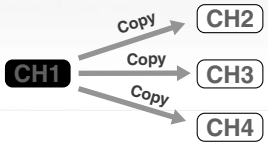
■ Auto shift function (P. 16-3-17)
Allows stable switch output even when supply pressure changes.

■ Auto preset (P. 16-3-14)
Automatically sets the pressure value.

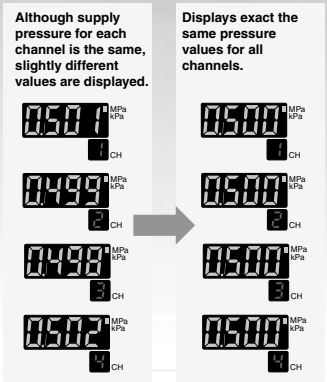
■ Auto identification function (P. 16-3-17)
Can automatically identify the pressure range of a connected SMC sensor.

■ Copy function (P. 16-3-17)
Each channel's information can be copied to another channel.

CH1 setting can be copied to CH2, CH3, and CH4.

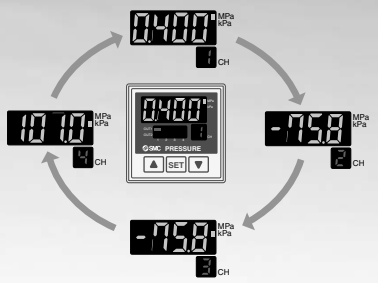


■ Display calibration (P. 16-3-17)
Each channel has an adjustable display function.



■ Anti-chattering function (P. 16-3-12)
Prevents malfunction due to sudden pressure changes.

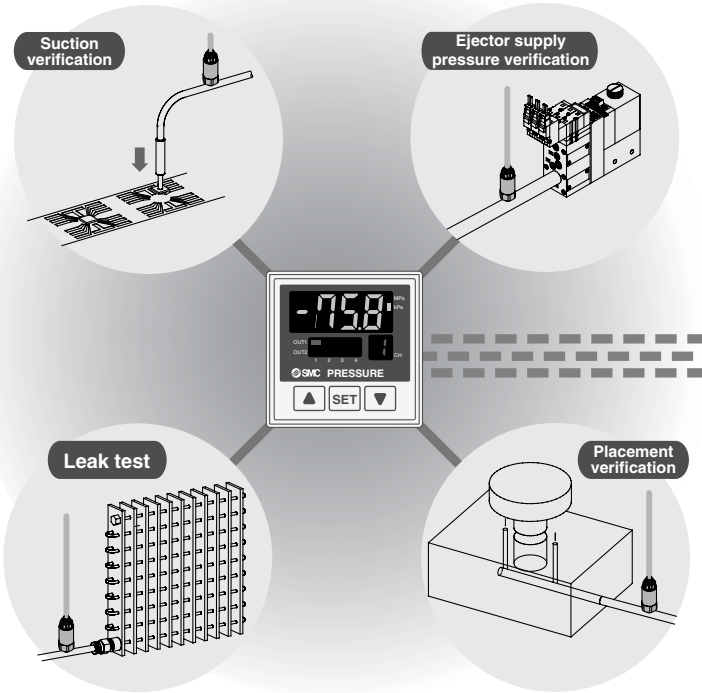
■ Channel scan function (P. 16-3-18)
Allows constant monitoring of the displayed pressure value for each channel.



- **Reset function**
- **Key lock function**
- **Displays peak & bottom pressure values**

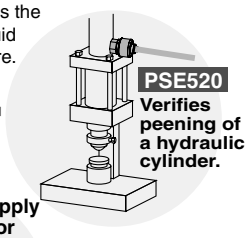
4 Application

■ A single controller monitors various applications.



■ Connectable to SMC's other series (Series PSE510 & PSE52□)

Connecting to general purpose pressure sensor PSE52□ allows the sensor to verify hydraulic or liquid pressure rather than air pressure.



PSE520
Verifies peening of a hydraulic cylinder.

PSE520
Verifies supply pressure for line cleaning and washing operations.

PSE521
Suctioning of wet work-pieces can be verified.

Note) Connector types vary depending on the core wire size of the sensor cable and the outside diameter of insulation. Refer to "Connecting to other series" on page 16-3-21.

Pressure Sensor
Series PSE530

How to Order

PSE53 0 — M5 —

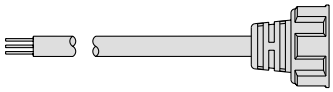
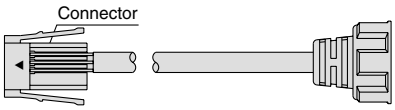
Pressure sensing range

0	High pressure [0 to 1 MPa]
1	Vacuum [0 to –101 kPa]
2	Low pressure [0 to 101 kPa]
3	Compound pressure [–101 to 101 kPa]

Port size

M5	M5 x 0.8

Option

Nil	Without cable
L	Sensor cable (3 m) 
CL	Sensor cable (3 m) + Connector (1 pc.) 

Note) At the factory, the connector is not connected to the cable, but packed together with it for shipment.

Option

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

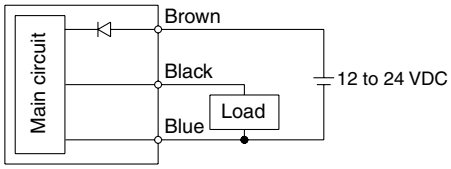
Description	Part no.	Note
Connector	ZS-26-E	4 pcs. per set
Sensor cable	ZS-26-F	Cable length: 3 m
Connector + Sensor cable	ZS-26-G	Cable length: 3 m The connector is not connected to the cable at the time of shipment.

Specifications

Model		PSE530-M5	PSE531-M5	PSE532-M5	PSE533-M5
Rated pressure range		0 to 1 MPa	0 to –101 kPa	0 to 101 kPa	–101 to 101 kPa
Proof pressure		1.5 MPa	500kPa		
Fluid		Air/Non-corrosive gas			
Power supply voltage		12 to 24 VDC (Ripple ±10% or less)			
Current consumption		15 mA or less			
Output specification		Analog output (1 to 5 V, Output impedance: Approx. 1 kΩ)			
Accuracy		±2% F.S. or less (Within rated pressure range, Ambient temperature 25° ±3°C)			
Linearity		±1% F.S. or less			
Repeatability		±1% F.S. or less			
Power supply voltage effect		±1% F.S. or less based on the analog output at 18 V ranging from 12 to 24 VDC			
Resistance	Enclosure	IP40			
	Temperature range	0° to 50°C; Stored: –10° to 70°C (No freezing or condensation)			
	Withstand voltage	1000 VAC, 50/60Hz for 1 minute between external terminals and case			
	Insulation resistance	5 MΩ between external terminals and case (at 50 VDC)			
	Vibration resistance	10 to 500 Hz at whichever is smaller of 1.5 mm amplitude or 98 m/s^2 acceleration, in X, Y, Z directions, for 2 hours each (De-energized)			
	Impact resistance	980 m/s^2 in X, Y, Z directions, 3 times each (De-energized)			
Temperature characteristics (Based on 25°C)		±2% F.S. or less based on the analog output value at 25°C from a range of 0° to 50°C			
Port size		M5 x 0.8			
Material		Body: Stainless steel Grade 303, Internal enclosure: PPE; Pressure sensor: Silicon; O-ring: NBR			
Sensor cable/Option		Halogen-free heavy-duty cord, ø2.7, 0.15 mm^2, 3 cores, 3 m			

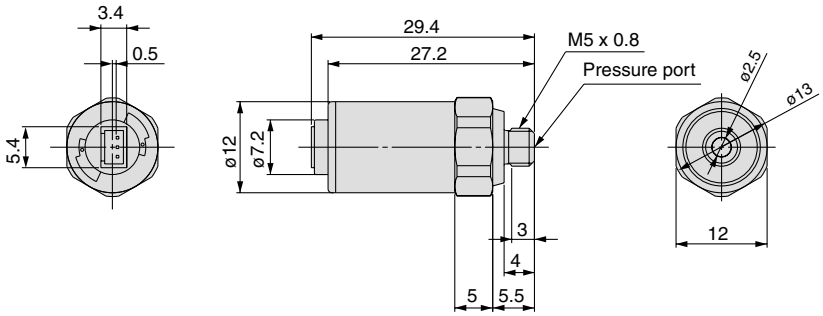
Internal Circuit

	Sensor cable color
DC (+) Power supply	Brown
DC (–) GND	Blue
Analog output (1 to 5 V)	Black

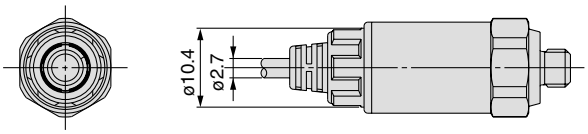


Dimensions

PSE53□-M5



With sensor cable



Multi-channel Controller
Series PSE200

How to Order

PSE20 0 — M □ □

Input/Output specifications

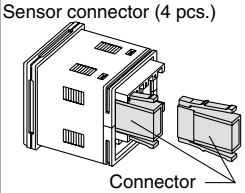
0	NPN 5 outputs + Auto shift input
1	PNP 5 outputs + Auto shift input

Unit specifications

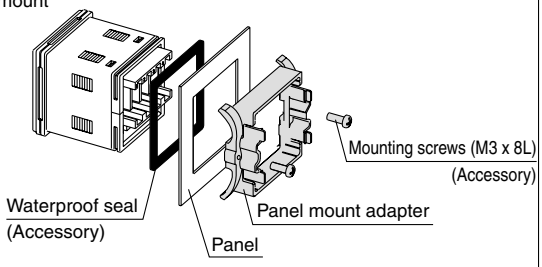
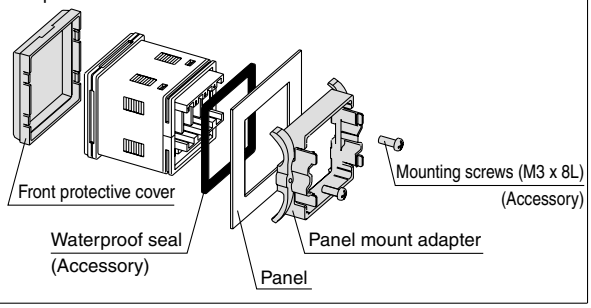
Nil	With unit display switching function
M	Fixed SI unit Note)

Note) Fixed unit
For vacuum low pressure & compound pressure: kPa
For high pressure: MPa

Option 2

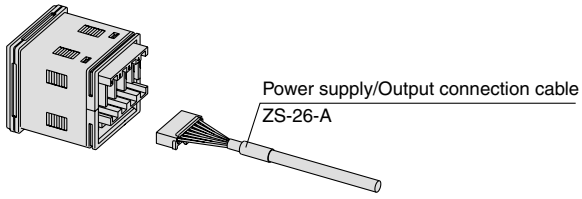
Nil	Without connector
4C	Sensor connector (4 pcs.) 

Option 1

Nil	Without panel mount/protective cover
A	Panel mount 
B	Front protective cover + Panel mount 

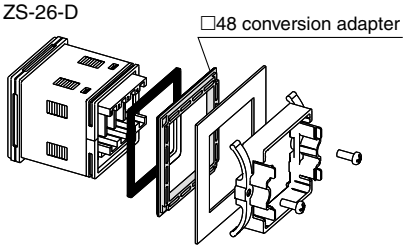
Accessory: Power supply/Output connection cable (2 m)

Included with the controller.



Option

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

Description	Part no.	Note
Panel mount adapter	ZS-26-B	Waterproof seal, screws included
Front protective cover	ZS-26-01	
Front protective cover + Panel mount adapter	ZS-26-C	Waterproof seal, screws included
□48 conversion adapter This adapter is used to mount Series PSE200 on the panel fitting of Series PS100.	ZS-26-D  Order panel mount adapter separately.	
Connector	ZS-26-E (4 pcs. per set)	

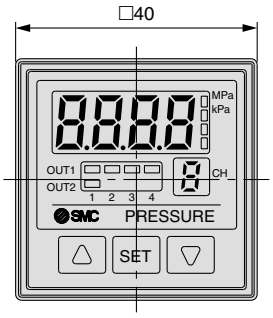
Specifications

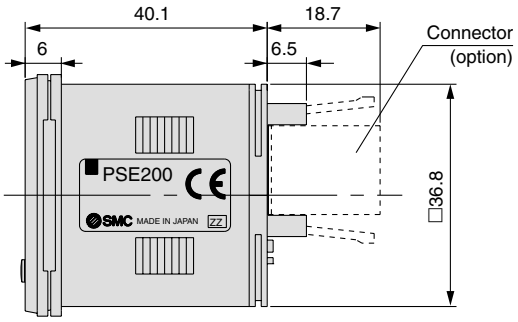
Model		PSE200	PSE201		
Output specification		NPN open collector	PNP open collector		
Power supply voltage		12 to 24 VDC ±10%, Ripple (p-p) 10% or less (With power supply polarity protection)			
Current consumption		55 mA or less (Current consumption for sensor is not included.)			
Power supply voltage for sensor		[Power supply voltage] –1.5 V			
Power supply current for sensor Note 1)		40 mA maximum (100 mA maximum for the total power supply current when 4 sensors are input.)			
Sensor input		1 to 5 VDC (Input impedance: Approx. 800 kΩ)			
	No. of inputs	4 inputs			
	Input protection	With excess voltage protection (Up to 26.4 V)			
Hysteresis	Hysteresis mode	Variable			
	Window comparator mode	3-digit fixed			
Switch output	No. of outputs	5 outputs (CH1: 2 outputs, CH2 to 4: 1 output)			
	Maximum load current	80 mA			
	Maximum load voltage	30 VDC (With NPN)			
	Residual voltage	1 V or less (With load current of 80 mA)			
	Output protection	With short circuit protection			
Response time		5 ms or less			
	Anti-chattering function	With anti-chattering function, Response time selection: 20 ms, 160 ms, 640 ms			
Repeatability		±0.1% F.S. or less			
Setting/Display accuracy		±0.5% F.S. ±1 digit or less (at ambient temperature of 25° ±3°C)			
Display		For measured value display: 4-digit, 7-segment indicator, Display color: Yellow For channel display: 1-digit, 7-segment indicator, Display color: Red			
Indication light		Red (Lights up when output is ON.)			
Auto shift input		Non-voltage input (Reed or Solid state), Input 10 ms or more, Independently controllable auto shift function ON/OFF			
Auto identification function Note 2)		With auto identification function			
Resistance	Enclosure	Front face: IP65, Other: IP40			
	Ambient temperature range	Operating: 0° to 50°C, Stored: –10° to 60°C (No freezing or condensation)			
	Ambient humidity range	Operating/Stored: 35 to 85% RH (No condensation)			
	Vibration resistance	10 to 500 Hz at whichever is smaller of 1.5 mm amplitude or 98 m/s² acceleration, in X, Y, Z directions for 2 hrs. each (De-energized)			
	Impact resistance	980 m/s² 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: 4P connector			
Material		Enclosure: PBT; Display: Transparent nylon; Back rubber cover: CR			
Weight		Approx. 60 g (Power supply/output connecting cable not included)			
Applicable pressure sensor		**PSE530** (For high pressure)	**PSE531** (For vacuum)	**PSE532** (For low pressure)	**PSE533** (For compound pressure)
Regulating pressure range		–0.1 to 1 MPa	10 to –101 kPa	–10 to 101 kPa	–101 to 101 kPa
Set pressure resolution Note 3)	kPa	—	0.1	0.1	0.1
	MPa	0.001	—	—	—
	kgf/cm²	0.01	0.001	0.001	0.001
	bar	0.01	0.001	0.001	0.001
	psi	0.1	0.01	0.01	0.02
	mmHg	—	1	—	1
	InHg	—	0.1	—	0.1

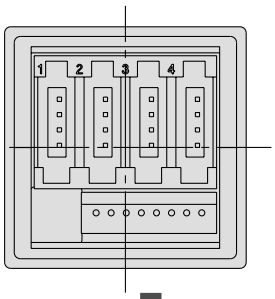
Note 1) If the Vcc and 0 V side of the sensor input connector are short circuited, the inside of the controller will be damaged.
Note 2) Auto identification function comes with "Series PSE53□" pressure sensor only. Other SMC series (PSE510 and PSE520) are not equipped with this function.
Note 3) For controllers with unit display switching function. (Either of SI units, [kPa] or [MPa], will be the set unit for those controllers without unit switching function.)

Dimensions

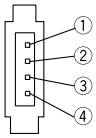
PSE200 & PSE201





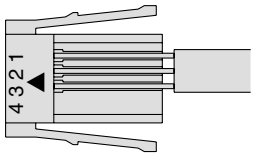


Sensor connector (4P x 4)

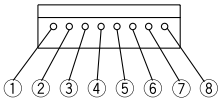


PIN no.	Terminal
①	DC (+)
②	IN (1 to 5 V)
③	DC (–)
④	N.C.

Connector (Option)

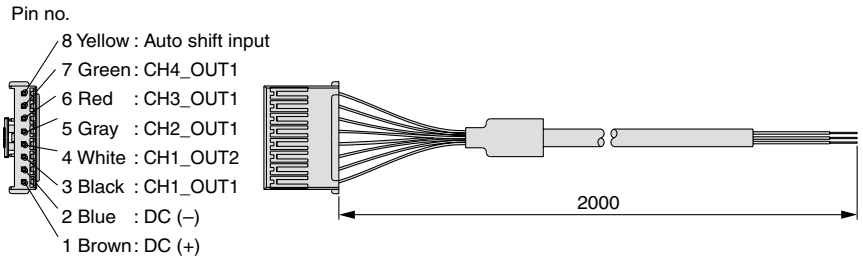


Power supply/Output connector (8P)



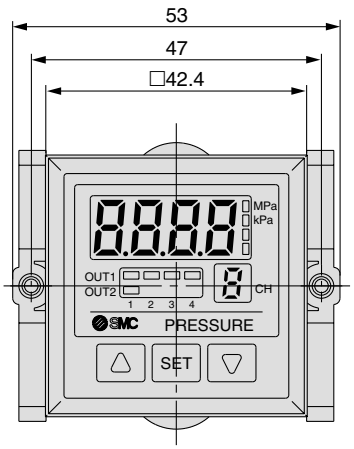
PIN no.	Terminal
①	DC (+)
②	DC (–)
③	CH1_OUT1
④	CH1_OUT2
⑤	CH2_OUT1
⑥	CH3_OUT1
⑦	CH4_OUT1
⑧	Auto shift input

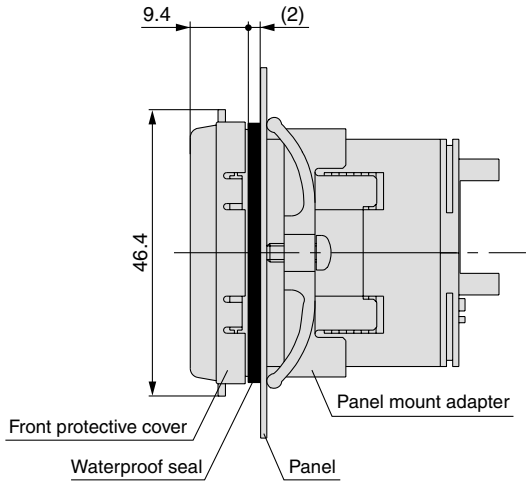
Power supply/Output connection cable (Included)



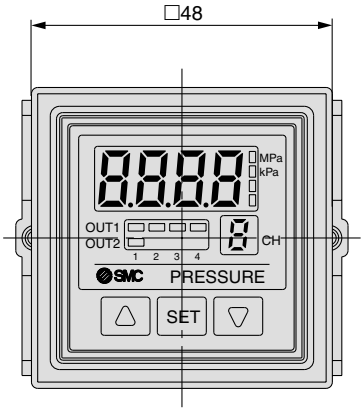
Dimensions

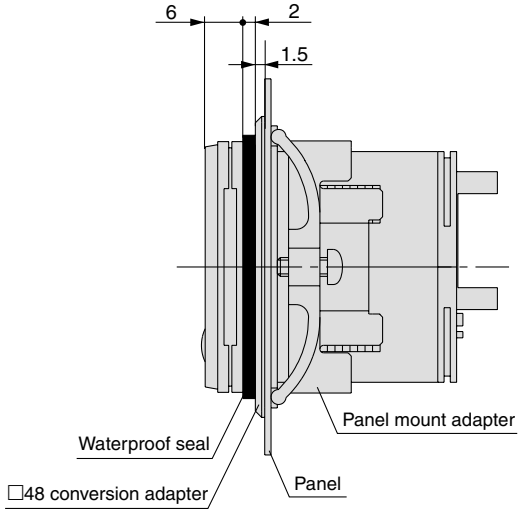
Front protective cover + Panel mount

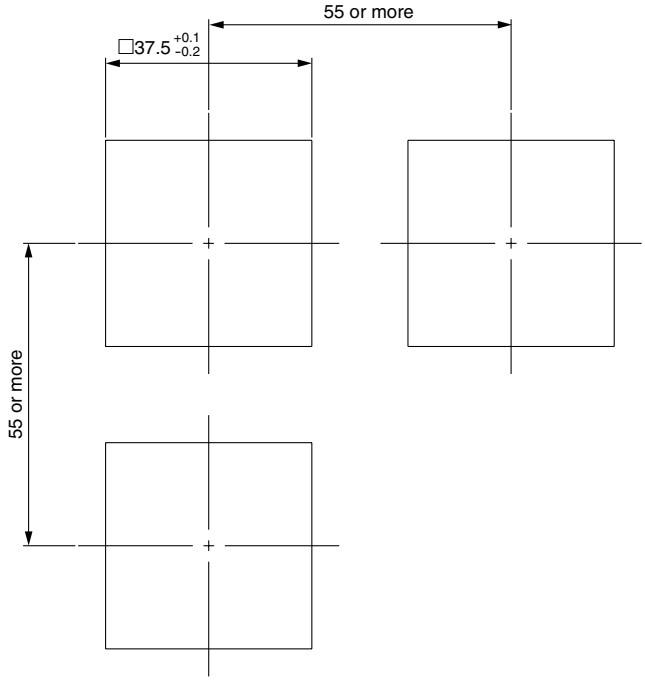




□48 conversion adapter + Panel mount

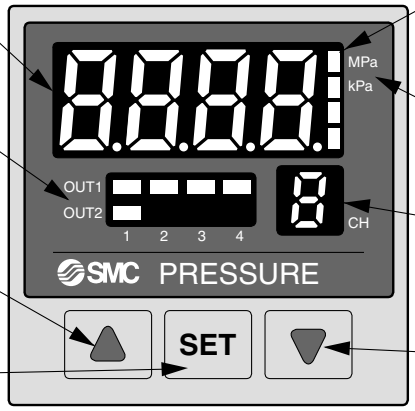






Panel fitting dimension
Applicable panel thickness: 0.5 to 8 mm

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), 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.

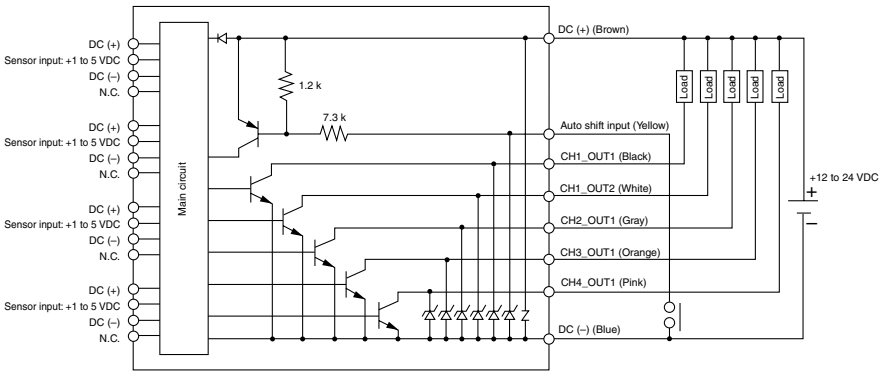
Error Code & Solution

LED display	Contents	Solution
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.	
Er 3	Pressure is applied to a pressure sensor during the reset operation (a zero point adjustment) 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.
---	Supply pressure exceeds the maximum regulating pressure.	Reduce/Increase supply pressure to within the regulating pressure range.
----	Supply pressure is below the minimum regulating pressure.	
Er 5	Internal data error.	Please contact SMC.
Er 6	Internal data error.	Shut off the power supply and turn it back on. Please contact SMC if it does not recover.
Er 7	Internal data error.	
Er 8	Internal data error.	

Internal Circuit and Connection

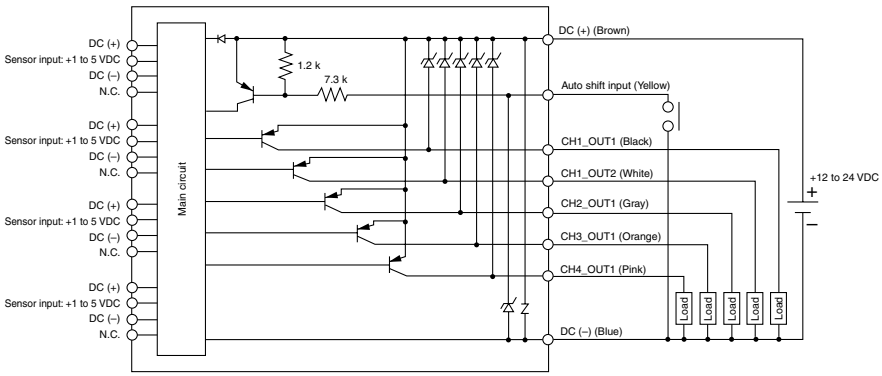
PSE200-(M)□

• NPN open collector 5 outputs + Auto shift 1 input specification



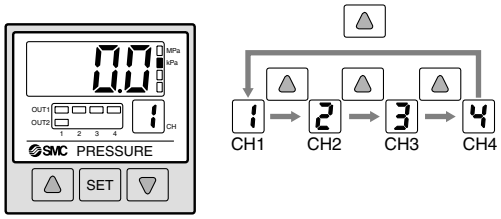
PSE201-(M)□

• PNP open collector 5 outputs + Auto shift 1 input specification



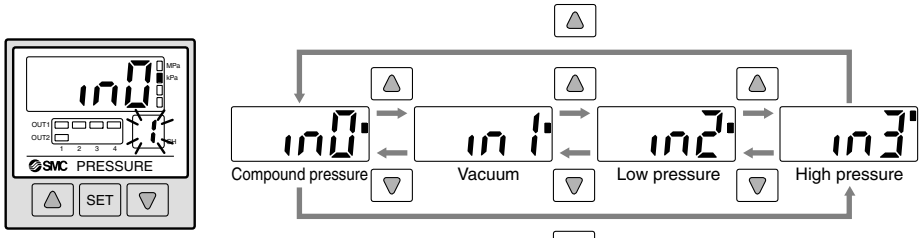
Operation 1: Initial Setting

1 Channel selection



Press SET button and hold for 2 seconds or longer.

2 Range setting



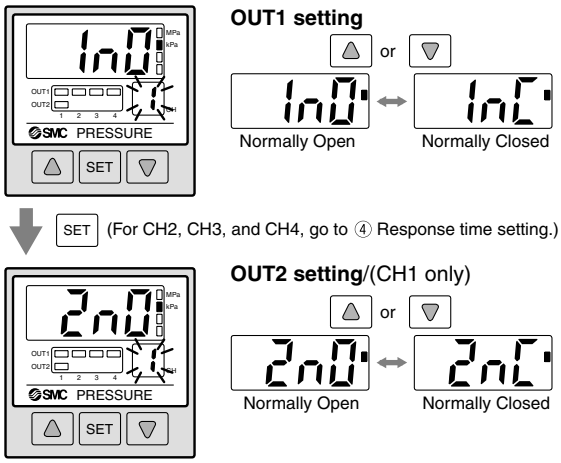
Note) Sensor range varies depending on the type of pressure sensor.

Pressure Sensor/Sensor Range

Sensor supply pressure	in0 (Compound pressure)	in1 (Vacuum)	in2 (Low pressure)	in3 (High pressure)
Regulating pressure range	–101 to 101 kPa	10 to –101 kPa	–10 to 101 kPa	–0.1 to 1 MPa
Applicable pressure sensor	PSE533	PSE531	PSE532	PSE530

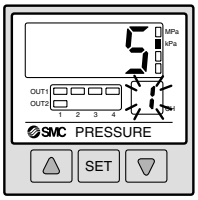
SET → If the controller is equipped with a unit switching function, unit setting can be changed.
(Refer to page 16-3-17 for details.)

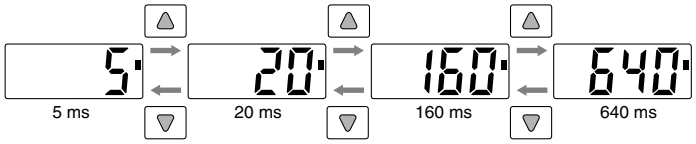
3 Output mode setting



Operation 1: Initial Setting

4 Response time setting



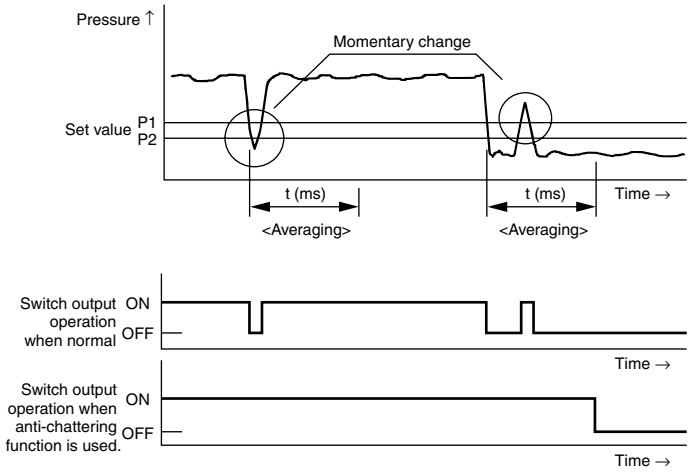


Press SET button.

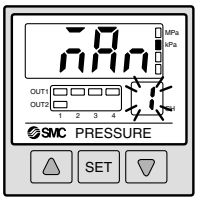
Anti-chattering function

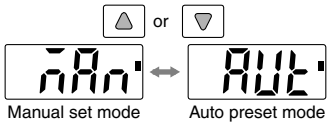
Devices such as large bore cylinders and high-flow vacuum ejectors consume a large volume of air when they operate, and this may cause a momentary drop in the supply pressure. This function prevents such momentary drops from being detected as abnormal pressures by changing the response time setting.

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



5 Manual setting/Auto preset



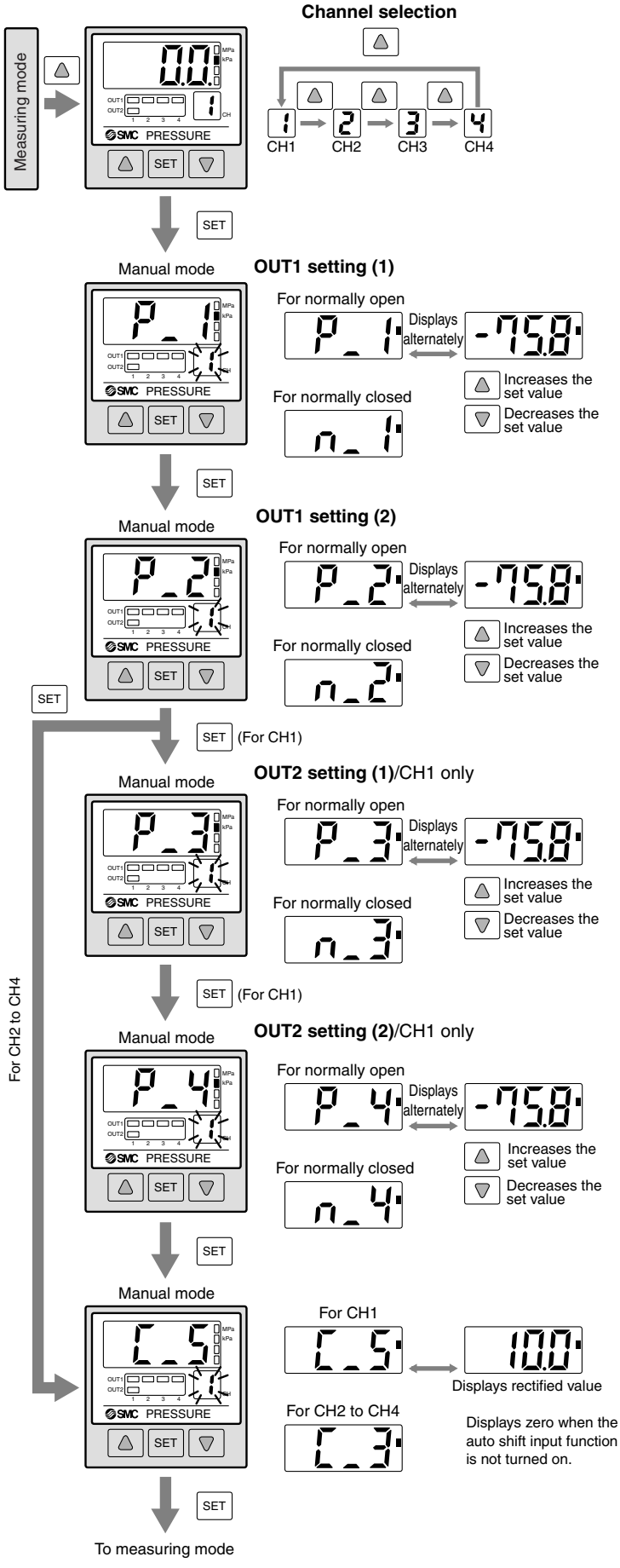


Press SET button.

CH1 setting is completed when the channel display changes from blinking to lights on.
Repeat the same setting steps for CH2 to CH4.

Operation 2: Pressure Setting

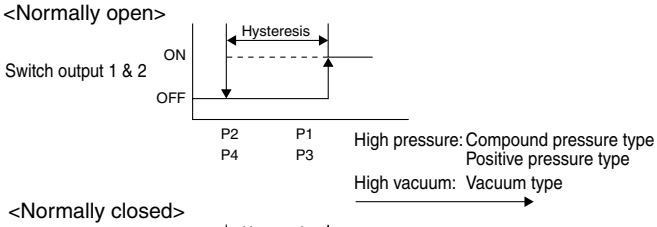
Manual setting



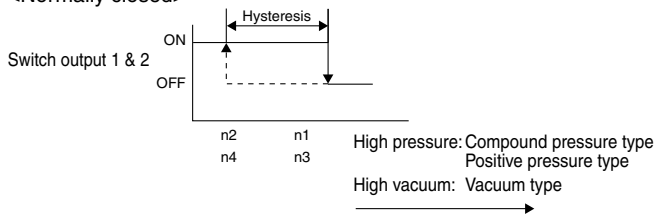
Output mode

Hysteresis mode: Hysteresis of the switch output can be set arbitrarily.

<Normally open>



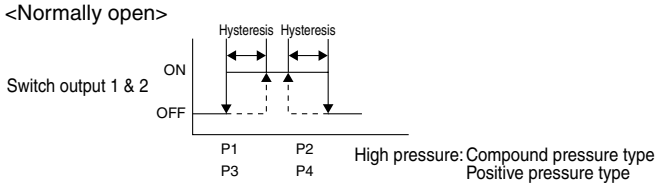
<Normally closed>



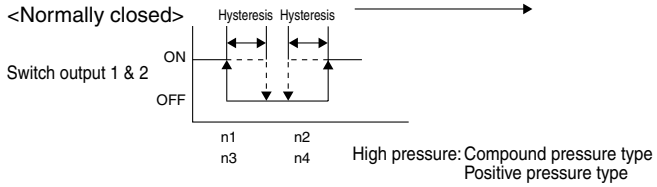
Note) If the hysteresis is set for less than 2 digits, the switch output may possibly chatter when the input pressure changes around the set value.

Window comparator mode: Allows the switch output to be turned ON or OFF within any set pressure range.

<Normally open>



<Normally closed>



Note) The hysteresis is set to 3 digits. When setting the pressure, allow 7 digits or more.

Regulating pressure range	Main application	Display	Hysteresis mode Note 1)	Window comparator mode Note 2)
–101.0 to 101.0 kPa	Adsorption and vacuum release verification	in0	P2(n2) ≤ P1(n1)	P2(n1) > P1(n2)
10.0 to –101.0 kPa	Adsorption verification	in1	P2(n2) ≥ P1(n1)	P2(n1) < P1(n2)
–10.0 to 101.0 kPa	Supply pressure verification Leak test	in2	P2(n2) ≤ P1(n1)	P2(n1) > P1(n2)
–0.1 to 1000.0 MPa		in3	P2(n2) ≤ P1(n1)	P2(n1) > P1(n2)

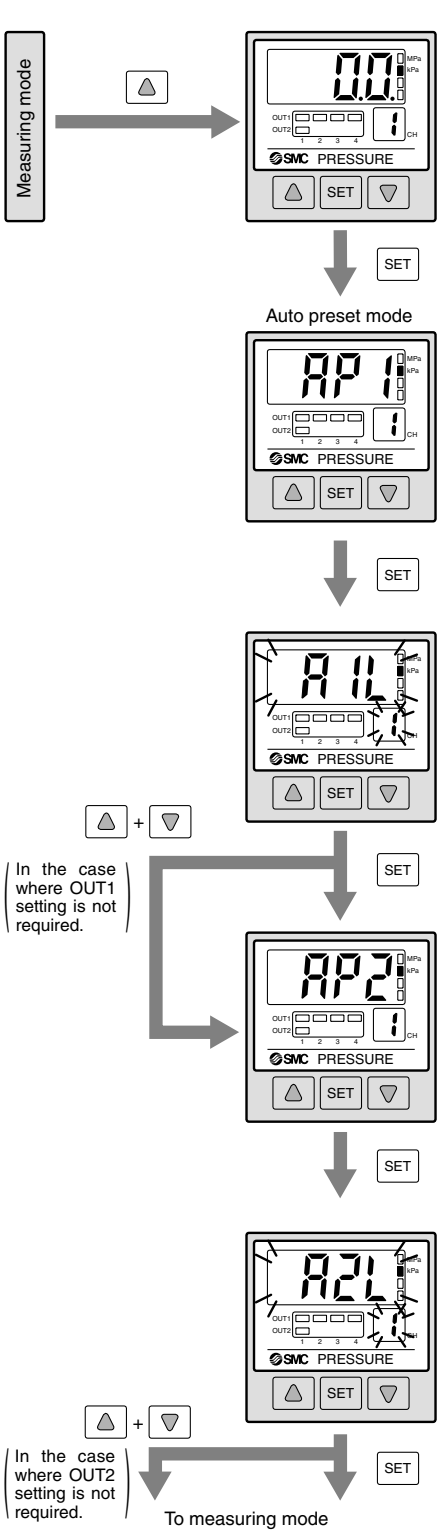
∗ P3(n3) and P4(n4) are the same as P1(n1) and P2(n2).

Note 1) If the hysteresis is set too small, the switch output may possibly chatter when the input pressure changes around the set value.

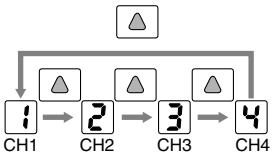
Note 2) The hysteresis is set to 3 digits. When setting the pressure in the window comparator mode, allow 7 digits or more. If the allowance is less than 7 digits, the controller will not operate.

Operation 2: Pressure Setting

Auto preset



Channel selection



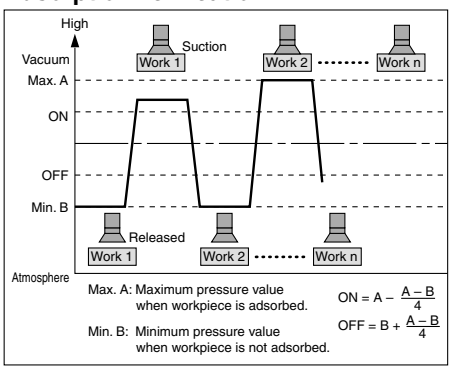
OUT1 auto preset preparation
Prepare the equipment to be set in this mode.

OUT1 auto preset
For adsorption verification:
In this mode, repeat the adsorption and release of the workpiece for a few times.
The optimum values will be set automatically.
For supply pressure verification:
The optimum values will be set automatically.

OUT2 auto preset preparation (CH1 only)
For adsorption verification:
Change the conditions of the workpiece such as the (suction) nozzle with vacuum pad attachment and supply vacuum pressure.
For supply pressure verification:
Prepare the equipment for the OUT2 setting in this mode.

OUT2 auto preset (CH1 only)
For adsorption verification:
In this mode, repeat the adsorption and release of the workpiece for a few times.
The optimum values will be set automatically.
For supply pressure verification:
The optimum values will be set automatically.

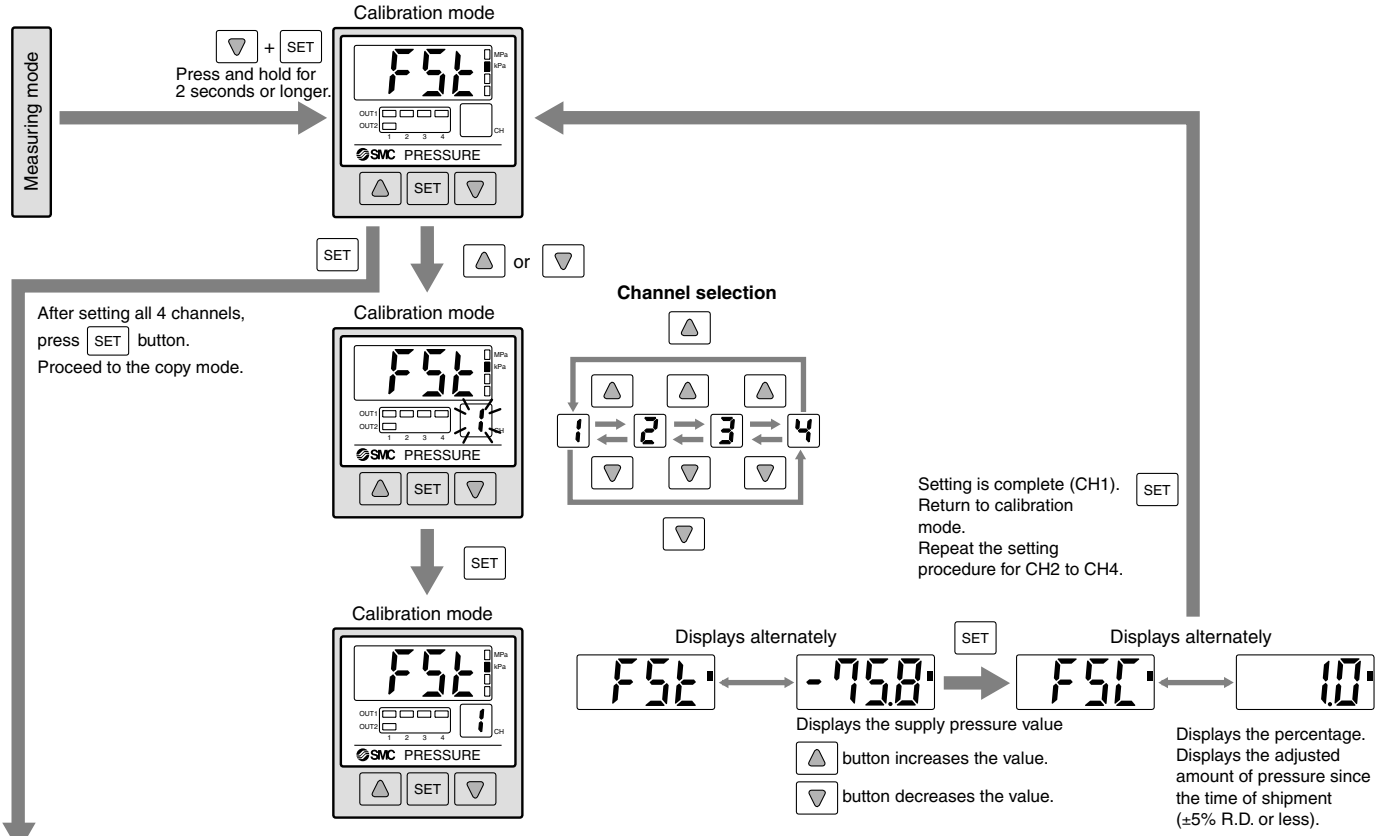
Adsorption Verification



Operation 3: Special Setting

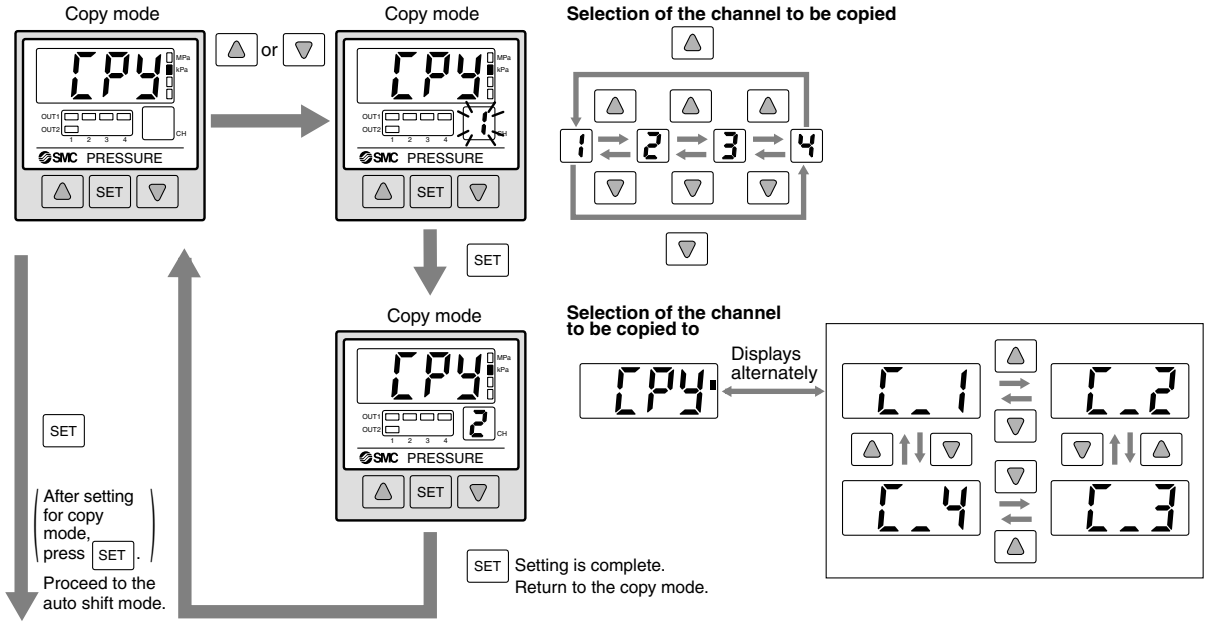
1 Precision indicator setting

Refer to **A** Display calibration function on page 16-3-17 for details.



2 Copy setting

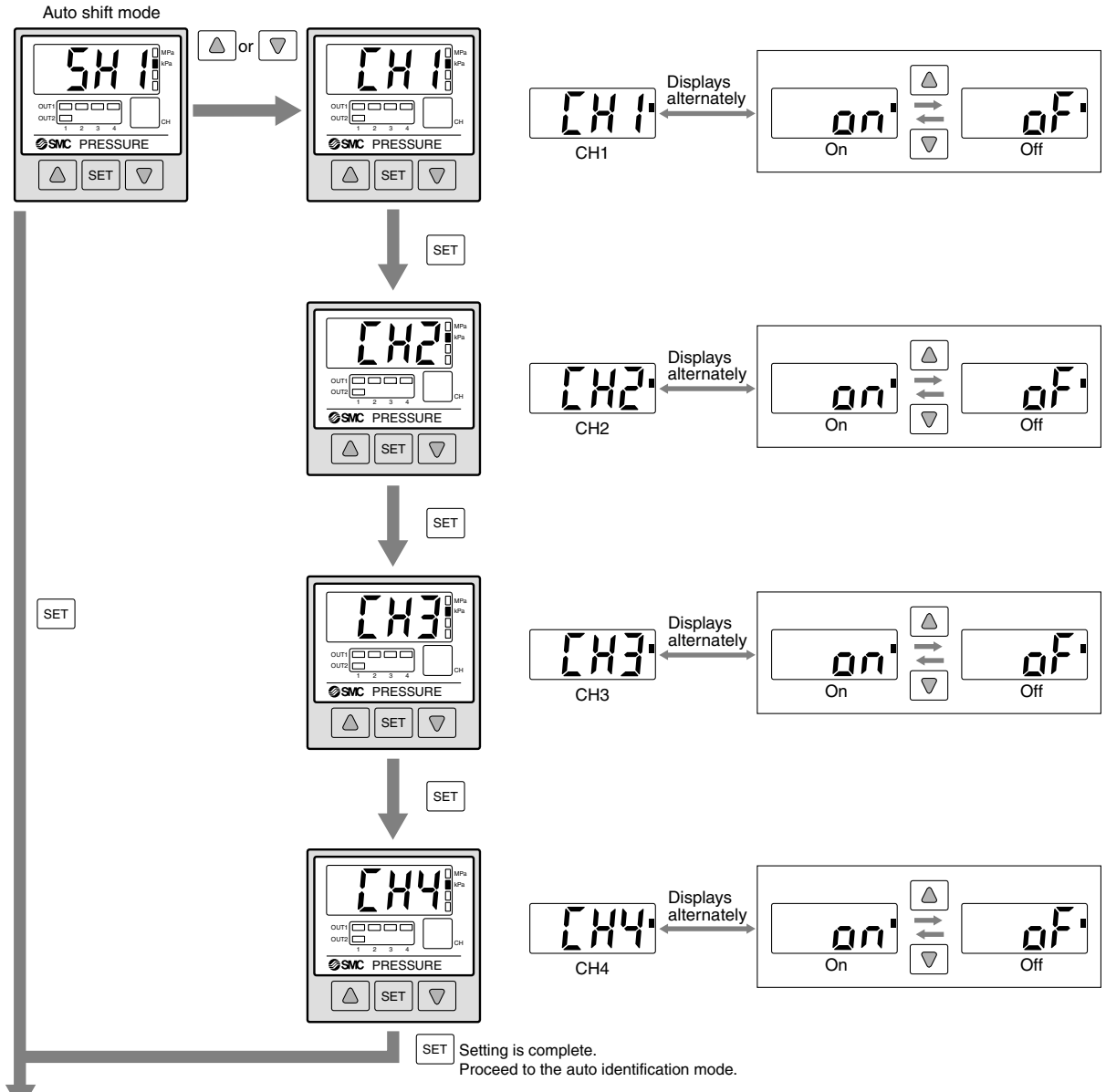
Refer to **B** Copy setting function on page 16-3-17 for details.



Operation 3: Special Setting

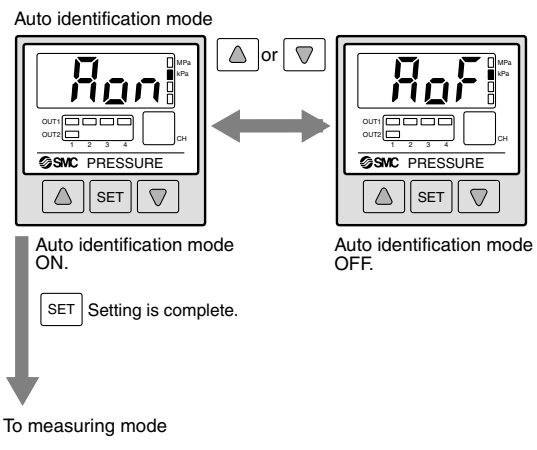
3 Auto shift

Refer to C Auto shift function on page 16-3-17 for details.



4 Auto identification

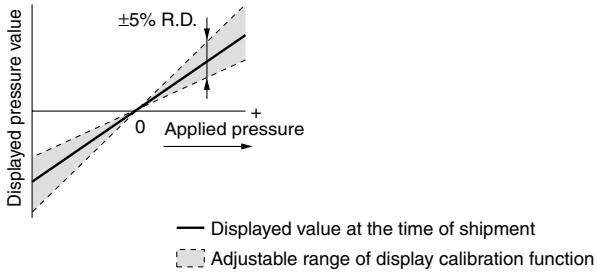
Refer to D Auto identification function on page 16-3-17 for details.



Function Details

A Display calibration function

This function eliminates slight differences in the output values of all 4 channels and allows uniformity in the numbers displayed. Displayed values of the pressure sensors can be adjusted to within ±5%.



Note) When the display calibration function is used, the regulating pressure value may change ±1 digit.

C Auto shift function

If there is a fluctuation in the supply pressure, erroneous operation may occur (e.g., in the case of adsorption verification, the switch does not turn ON even though the workpiece is being adsorbed, or does not turn OFF even though the workpiece is no longer being adsorbed.)
The auto shift function rectifies pressure changes to ensure proper ON/OFF switch response during such fluctuations.

<Principle>
At the point when the supply pressure fluctuates, the set pressure value is rectified by setting the auto shift input (external input) to Lo (no-voltage input), using the pressure measured at that point as a standard.

- This function is good only for those channels whose function selection is turned "on" during the auto shift mode setting.
- Maintain the constant pressure for 10 ms or more after a drop in the auto shift input.
- When the auto shift is input, "ooo" will be displayed for approximately 1 second, and the pressure value at that point will be saved as a rectified value "C_5" (for CH1) or "C_3" (for CH2 and CH3). Based on the saved rectified values, the set value "P_1" to "P_4" or "n_1" to "n_4" will likewise be rectified.
- The time from the moment the auto shift is input, to the moment the switch output actually operates is 15 ms or less.
- If the set value rectified by the auto shift input exceeds the regulating pressure range, it will be rectified once more to within the values of the regulating pressure range.
- When the auto shift function is turned "off", the shift value will be zero.
- When all of the auto shift functions are turned "off", "ooo" will not be displayed even if the auto shift input is set to Lo (no-voltage input).
- Values "C_5" and "C_3", rectified after the auto shift is input, will be lost once the power is turned off.
- Values "C_5" and "C_3", rectified after the auto shift function is used, will be reset to zero (initial value) when the power is turned back on again.

Note) Rectified values are not saved in EEPROM.

D Auto identification function

This function automatically identifies the pressure range of the pressure sensor that is connected to the multi-channel pressure sensor controller, 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 setting the range. Turning the power back on while in the "Aon" setting can cause a malfunction.

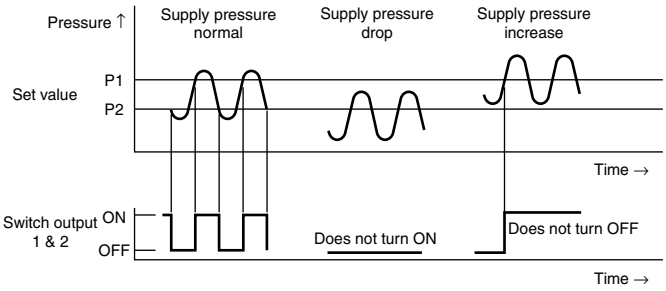
B Copy function

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

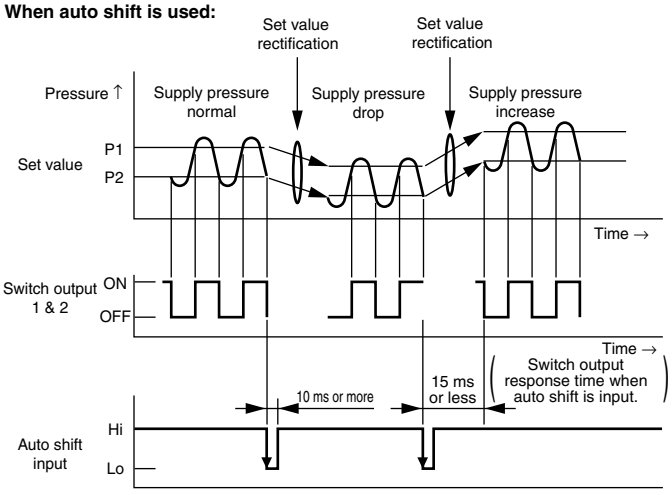
- When CH1 is copied to CH2, CH3, and CH4, information of OUT1 in CH1 will be copied.
- When CH2, CH3, or CH4 is copied to CH1, information of OUT1 in CH2, CH3, or CH4 will be copied only to OUT1 in CH1.

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

When auto shift is NOT used:
When the supply pressure fluctuates, a correct sensing is no longer possible.



When auto shift is used:



E Unit display switching function

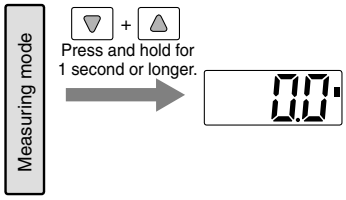
Display units can be switched with this function.
Units that can be displayed vary depending on the range of the pressure sensors connected to the controller.
Display units can be selected using either ◁ or ▷.

Unit Display and Resolution

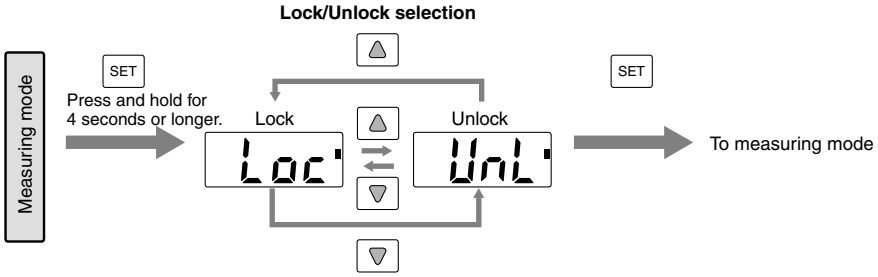
Applicable pressure sensor		PSE530	PSE531	PSE532	PSE533
Regulating pressure range		–0.1 to 1 MPa	10 to –101 kPa	–10 to 101 kPa	–101 to 101 kPa
PA	kPa	—	0.1	0.1	0.1
	MPa	0.001	—	—	—
GF	kgf/cm²	0.01	0.001	0.001	0.001
bAr	bar	0.01	0.001	0.001	0.001
PSI	psi	0.1	0.01	0.01	0.02
mmH	mmHg	—	1	—	1
inH	inHg	—	0.1	—	0.1

Operation 4: Other Functions

Reset

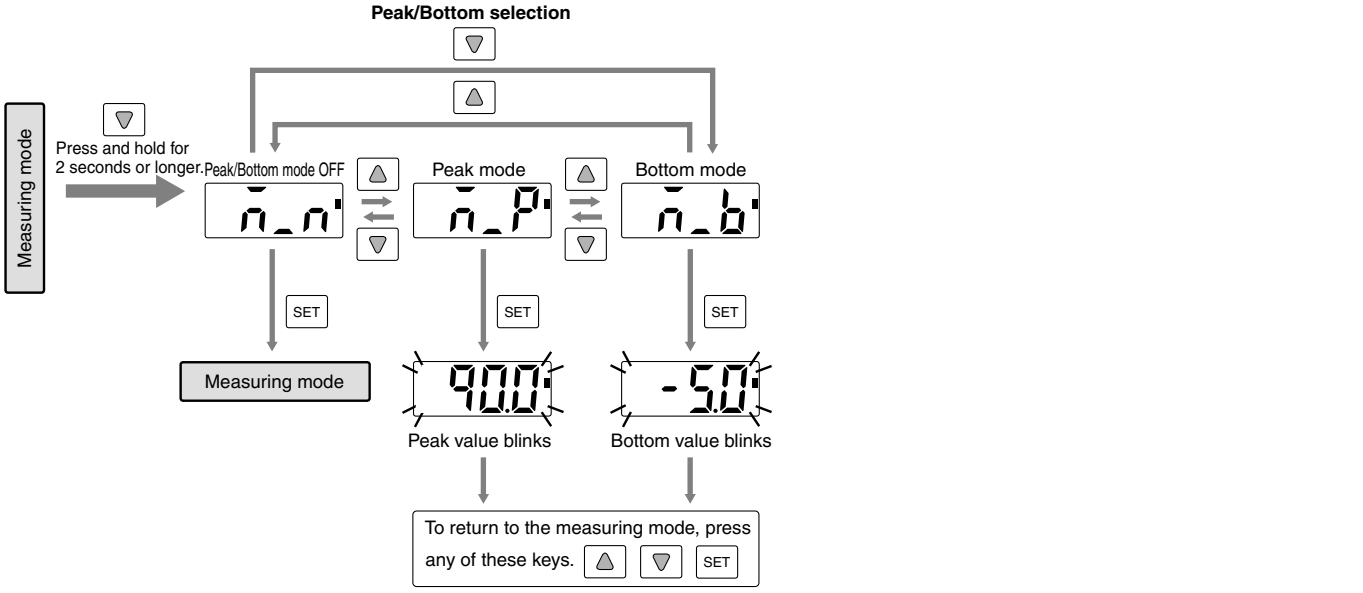


Key lock



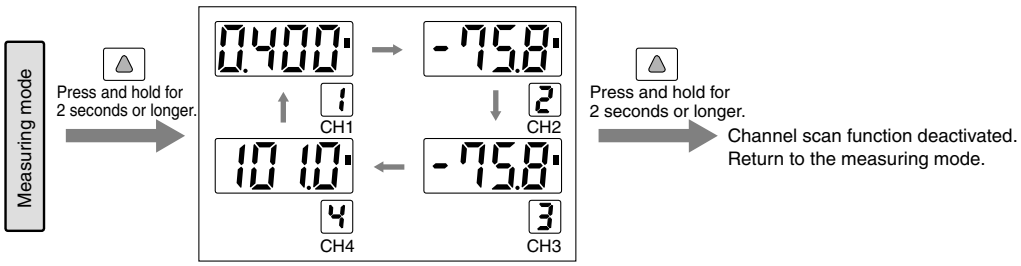
Note) Channel selection and channel scan operation will not be locked even if the key lock function is on.

Peak/Bottom display



∗ If any buttons other than above are pressed during the peak/bottom mode, the peak/bottom mode will be deactivated.

Channel scan



∗ Pressure value for each channel are displayed at 2 second intervals.

Specific Product Precautions 1

Be sure to read before handling.

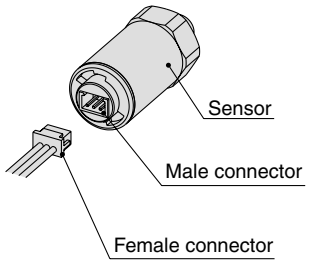
■ Pressure Sensor

Handling

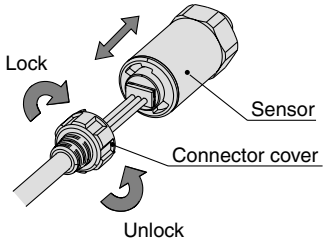
⚠Warning

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 inside of the sensor could be damaged and lead to a malfunction.**
2. **The tensile strength of the cord is 23 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 3.5 N·m when installing piping. Exceeding this value may cause malfunctioning of the sensor.**
4. **Do not use pressure sensors with corrosive and/or inflammable gases or liquids.**
5. **Connecting the sensor cable (Option)**

   Hold the female connector of the sensor cable with your fingers and carefully insert it into the connector.



A connector cover is provided as part of the cable assembly (see the figure below). It is designed to keep the female connector from slipping out of the sensor. To lock the connector cover in place, first make sure it is facing in the right direction as you slip it over the female connector, then lock it to the sensor body by turning it clockwise. To remove the cover, first unlock it by turning it counterclockwise, then pull back on it. To remove the female connector, grab it with your fingers and pull back on it. Do not pull on the cable.



Operating Environment

⚠Warning

1. **The pressure sensors 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. **The pressure sensors do not have an explosion proof rating. Never use pressure sensors in the presence of inflammable or explosive gases.**

■ Controller

Handling

⚠Warning

1. **Do not drop, bump, or apply excessive impacts (1000 m/s^2) while handling. Although the body of the controller case may not be damaged, the inside of the controller could be damaged and cause a malfunction.**
2. **The tensile strength of the power supply/output connection cable is 50 N; that of the pressure sensor lead wire with connector is 25 N. Applying a greater pulling force than the applicable specified tensile strength to either of these components can lead to a malfunction. When handling, hold the body of the controller—do not dangle it from the cord.**

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. 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.**

Operating Environment

⚠Warning

1. **Our multi-channel pressure sensor controllers 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 multi-channel pressure sensor controllers do not have an explosion proof rating. Never use pressure sensors in the presence of inflammable or explosive gases.**
3. **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.**

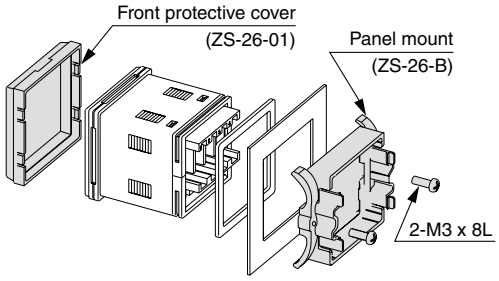
Series PSE
Specific Product Precautions 2
Be sure to read before handling.

Mounting

⚠Caution

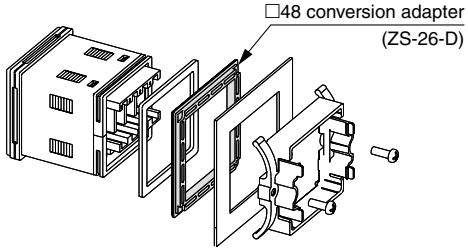
The front face of the panel mount conforms to IP65 (IP40 when using the □48 conversion adapter); however, there is a possibility of liquid filtration if the panel mount adapter is not installed securely and properly. Securely fix the adaptor with screws as shown below.

Standard



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

When using □48 conversion adapter



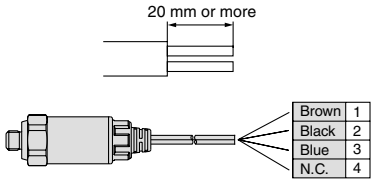
Wiring

⚠Caution

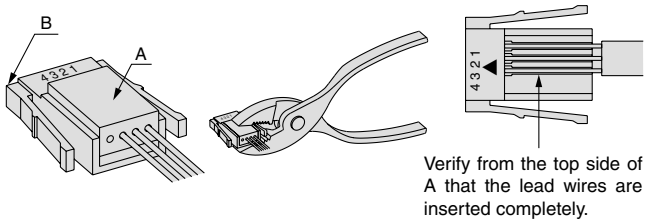
1. Connecting sensor cable and connector (ZS-26-E)

- Cut the sensor cable as shown below.
- Insert each lead wire into the corresponding connector number by following the chart provided below.

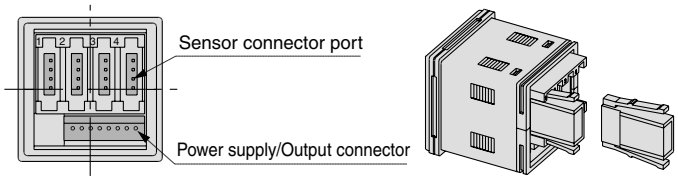
Connector no.	Core wire color of sensor cable
1	Brown (DC+)
2	Black (Analog output)
3	Blue (DC–)
4	N.C.



- Make sure that the number of connector and the core wire color match. After verifying that the wires are inserted all the way, temporarily hold the connector down manually.
- Using pliers, snap A into B as shown below so that there is no gap between A and B, and secure the connector.
- The A and B portion of the sensor connector are already tacked down temporarily at the time of shipment. Do not snap the A portion in place before inserting the cable. Note that the connector cannot be taken apart to be reused once it is crimped. Use a new sensor connector in case wiring or the snapping of A into B are done incorrectly.

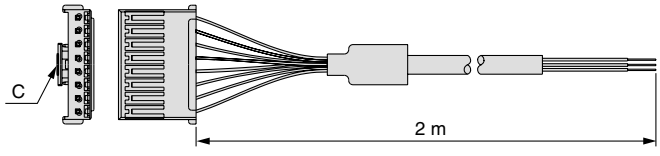


- To connect the connector to the multi-channel pressure sensor, push the connector with its A portion facing toward you into the socket until it clicks as shown below.
- To remove the connector, pull it straight out while applying pressure to the fingers on both sides.



2. Connecting power supply/output connection cable

- To connect the power supply/output connection cable to the controller, insert the cable connector with the C part facing down until it clicks.



Specific Product Precautions 3

Be sure to read before handling.

Wiring

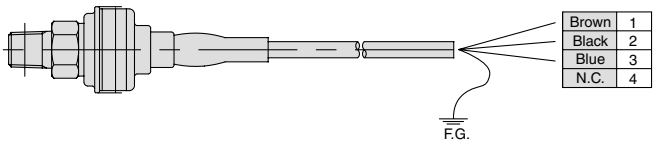
⚠Caution

3. Connecting to other series

- Any pressure sensor (SW) can be connected as long as it generates analog output (1 to 5 V) signal. However, the pressure range must match.
- SMC pressure sensors, Series PSE510 & PSE520, are also connectable.
- When connecting to pressure sensors other than the Series PSE530, connector types will vary depending on the wire core size of the cable and the outside diameter of the insulation cover. Refer to the table provided below.

Connector part no.	Wire core size	Insulation cover O.D.	Sensor part no.
ZS-26-E	AWG24-26 (0.14 to 0.2 mm²)	ø1.0 to 1.4	PSE510, PSE530
ZS-26-E-1	AWG24-26 (0.14 to 0.2 mm²)	ø1.4 to 2.0	
ZS-26-E-2	AWG20-22 (0.3 to 0.5 mm²)	ø1.0 to 1.4	PSE521
ZS-26-E-3	AWG20-22 (0.3 to 0.5 mm²)	ø1.4 to 2.0	PSE520

- Refer to the following diagram for connecting Series PSE520 to the connector.



Connect the shielding wire to the frame ground (F.G.) or F.G. terminal.

(There is no shielding wire for Series PSE510 & PSE530.)

Regulating Pressure Range & Rated Pressure Range

⚠Caution

1. Regulating pressure range: Refers to allowable pressure range in a pressure setting mode.

- Setting range is between P_1(n_1) to P_4(n_4).
- For Series PSE200, the regulating pressure range and the setting pressure range that can be displayed are the same.

2. Rated pressure range: Refers to the pressure range that satisfies the product specifications.

- Pressure range that satisfies the product specifications (accuracy and linearity) for PSE530.

High Precision, Remote Type, 2-color Display Digital Pressure Sensor

Series PSE540/560

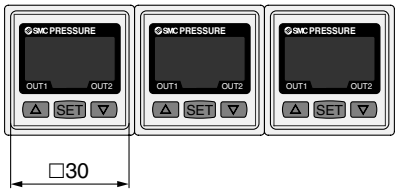
Pressure Sensor Controller

Series PSE300

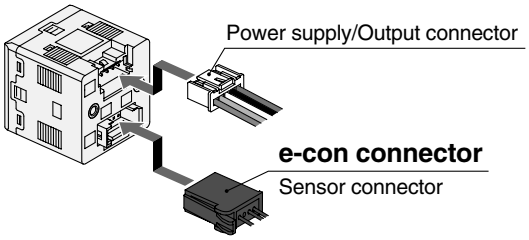
Response Time **1 ms**

Set Pressure Resolution **1/1000**

Can be mounted in close proximity with each other either horizontally or vertically.



Connection



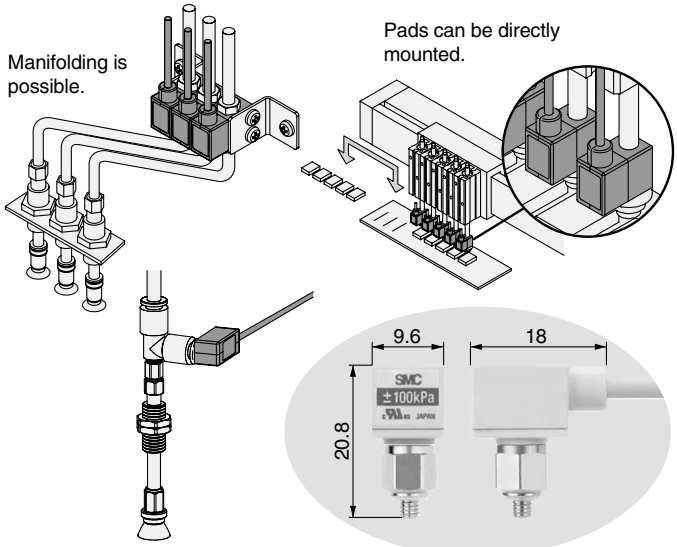
2 outputs + Analog output or auto shift input

Compact Pressure Sensor for Pneumatics

Series PSE540

Weight **2.9 g**

Dimension **9.6 x 20.8 x 18 mm**



Pressure Sensor for General Purpose Fluids

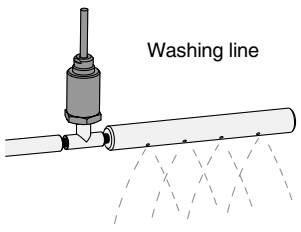
Series PSE560

IP65

Wetted Material

Stainless steel 316L

• Copper-free • Oil-free (Single diaphragm)



Variations

Compact Pressure Sensor for Pneumatics — *Series PSE540* — P. 16-3-25

Male thread type

M3 x 0.5
M5 x 0.8

R 1/8 (With M5 female thread)
NPT 1/8 (With M5 female thread)

Plug-in reducer type

ø4 plug-in reducer
ø6 plug-in reducer

M5 female thread, through type

M5 x 0.8

M5 x 0.8 (With mounting hole)

Pressure Sensor for General Purpose Fluid — *Series PSE560* — P. 16-3-27

Male thread type

R 1/8, 1/4 (With M5 female thread)
NPT 1/8, 1/4 (With M5 female thread)
URJ 1/4, TSJ 1/4

Female thread type

Rc 1/8

Applicable fluid example

Argon	Nitrogen
Air containing drainage	Hydraulic fluid
Ammonia	Silicon oil
Freon	Lubricating oil
Carbon dioxide	Fluorocarbon

Controller — *Series PSE300* — P. 16-3-36

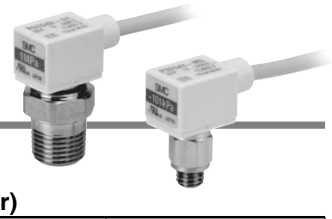
Functions

- **Auto shift function**
- **Auto preset function**
- **Precision indicator setting**
- **Peak and bottom display function**
- **Key lock function**
- **Reset function**
- **Error indication function**
- **Unit display switching function**
- **Anti-chattering function**

Series		Rated pressure range		
For pneumatics	**PSE541**	0 to –101 kPa	Vacuum	–101 kPa ~ 0
	PSE543	–100 to 100 kPa	Compound pressure	–100 kPa ~ 100 kPa
For general purpose fluids	**PSE560**	0 to 1 MPa	Positive pressure	0 ~ 1 MPa
	PSE561	0 to –101 kPa	Low pressure	–101 kPa ~ 0
	PSE563	–100 to 100 kPa	Compound pressure	–100 kPa ~ 100 kPa
	PSE564	0 to 500 kPa	Positive pressure	0 ~ 500 kPa

Compact Pressure Sensor For General Air

Series PSE540



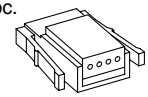
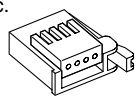
How to Order

Pressure sensing range

1	Vacuum (0 to –101 kPa)
3	Compound pressure (–100 to 100 kPa)

PSE54 1 – M3 – ☐

Option (Connector)

Nil	C1	C2
Without	Connector for PSE200 multiple channel pressure controller 1 pc. 	Connector for PSE300 multiple channel pressure controller 1 pc. 

Note) At the factory, the connector is not connected to the cable, but packed together with it for shipment.

Port size

M3	M3 x 0.5	
M5	M5 x 0.8	
01	R 1/8 (With M5 female thread)	
N01	NPT1 /8 (With M5 female thread)	
R04	ø4 plug-in reducer	
R06	ø6 plug-in reducer	

IM5	M5 female thread, through type	
IM5H	M5 female thread, through type (With mounting hole)	

Option/Part No.

Description	Part no.	Note
Connector for PSE200	ZS-26-E-4	1 pc.
Connector for PSE300	ZS-28-C	1 pc.

Specifications

Conforms to CE marking and UL (CSA) standards.

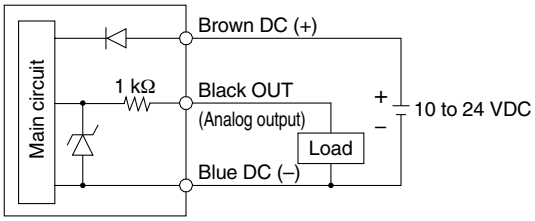
Model		PSE541	PSE543
Rated pressure range		0 to –101 kPa	–100 to 100 kPa
Proof pressure		500 kPa	
Fluid		Air, No-corrosive gas, Non-flammable gas	
Power supply voltage		12 to 24 VDC ±10%, Ripple (p-p) 10% or less (With power supply polarity protection)	
Current consumption		15 mA or less	
Output specification		Analog output 1 to 5 V (Within rated pressure range), Output impedance: Approx. 1 kΩ	
Accuracy (Ambient temperature of 25°C)		±2% F.S. or less	
Linearity		±0.4% F.S. or less	
Repeatability		±0.2% F.S. or less	
Power supply voltage effect		±0.8% F.S. or less	
Resistance	Enclosure	IP40	
	Operating temperature range	Operating: 0 to 50°C, Stored: –20 to 70°C (No condensation or freezing)	
	Operating humidity range	Operating/Stored: 35 to 85% RH (No condensation)	
	Withstand voltage	1000 VAC, 50/60 Hz for 1 minute between live parts and case	
	Insulation resistance	50 MΩ between live parts and case (at 500 VDC)	
	Vibration resistance	10 to 500 Hz at whichever is smaller of 1.5 mm amplitude or 98 m/s^2 acceleration, in X, Y, Z directions, for 2 hours each (De-energized)	
	Impact resistance	980 m/s^2 in X, Y, Z directions, 3 times each (de-energized)	
Temperature characteristics		±2% F.S. or less (based on 25°C)	

Piping Specifications

Model		M3	M5	01	N01	R04	R06	IM5	IM5H
Port size		M3 x 0.5	M5 x 0.8	R1/8 M5 x 0.8	NPT1/8 M5 x 0.8	ø4 plug-in reducer	ø6 plug-in reducer	M5 female thread, through type	M5 female thread, through type (with mounting hole)
Material	Case	Resin case: PBT Fitting: Stainless steel 303		Resin case: PBT Fitting: C3604BD		PBT		Resin case: PBT Fitting: A6063S-T5	
	Pressure sensing section	Pressure sensor: Silicon, O-ring: NBR							
Sensor cable		3-wire oval cable (0.15 mm^2)							
Weight	With sensor cable	42.4 g	42.7 g	49.3 g		41.4 g	41.6 g	43.3 g	44.1 g
	Without sensor cable	2.9 g	3.2 g	9.8 g		1.9 g	2.1 g	3.8 g	4.6 g

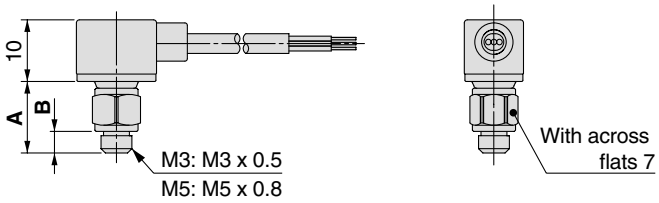
Internal Circuit

PSE54□
Voltage output type
1 to 5 V
Output impedance
Approx. 1 kΩ



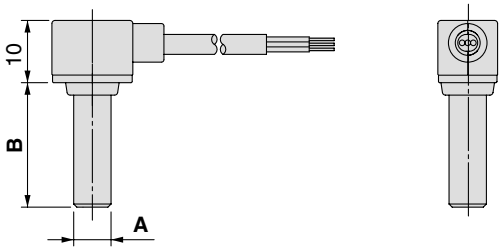
Dimensions

PSE54□- M3 / M5



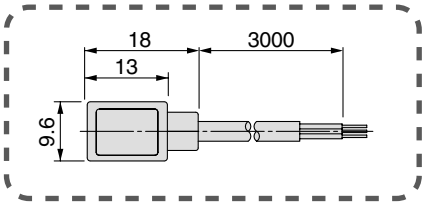
	PSE54□-M3	PSE54□-M5
A	10.8	11.5
B	3	3.5

PSE5□- R04 / R06

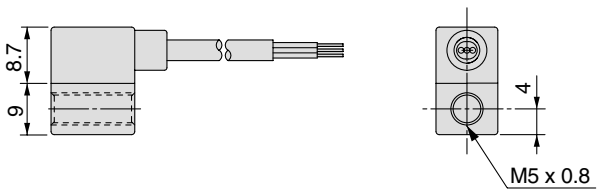


	PSE54□-R04	PSE54□-R06
A	ø4	ø6
B	18	20

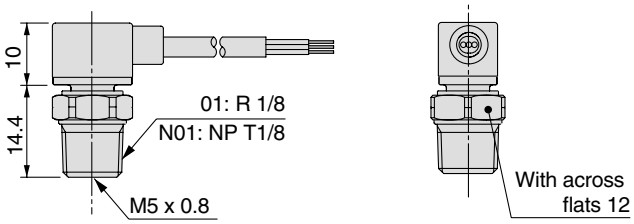
Common dimensions



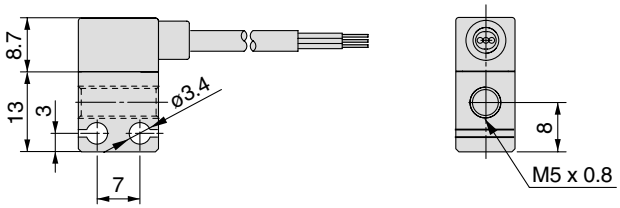
PSE54□-IM5



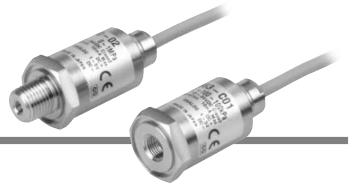
PSE54□- 01 / N01



PSE54□-IM5H



Pressure Sensor
For General Fluids
Series PSE560



How to Order

Pressure sensing range

0	Positive pressure (0 to 1 MPa)
1	Vacuum (0 to –101 kPa)
3	Compound pressure (–100 to 100 kPa)
4	Positive pressure (0 to 500 kPa)

PSE56 0 — 01 — □ — □

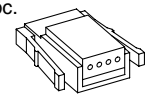
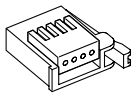
Port size

01	R 1/8 (With M5 female thread)
02	R 1/4 (With M5 female thread)
C01	Rc 1/8
N01	NPT 1/8 (With M5 female thread)
N02	NPT 1/4 (With M5 female thread)
A2	URJ 1/4
B2	TSJ 1/4

Output specifications

Nil	Voltage output type 1 to 5 V
28	Current output type 4 to 20 mA

Option (Connector)

Nil	**C1**	**C2**
Without	Connector for PSE200 multiple channel pressure controller 1 pc. 	Connector for PSE300 multiple channel pressure controller 1 pc. 

Note 1) Current output type cannot be connected to PSE20□ and PSE30□.
Note 2) The connector is not connected to the cable and is supplied loose at the time of shipment.

Option/Part No.

Description	Part no.	Note
Connector for PSE200	ZS-26-E-4	1 pc.
Connector for PSE300	ZS-28-C	1 pc.

Specifications

Conforms to CE marking and UL (CSA) standards.

Model	PSE560	PSE561	PSE563	PSE564
Rated pressure range	0 to 1 MPa	0 to –101 kPa	–100 to 100 kPa	0 to 500 kPa
Proof pressure	1.5 MPa	500 kPa	500 kPa	750 kPa

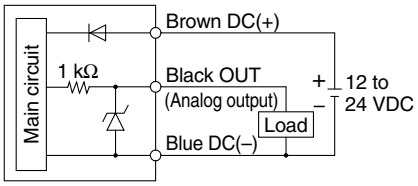
Model		PSE56□-□	PSE56□-□-28
Fluid		Fluid, including gas, that will not corrode Stainlesss steel 316L	
Power supply voltage		12 to 24 VDC ±10%, Ripple (p-p) 10% or less (With power supply polarity protection)	
Current consumption		10 mA or less	—
Output specification		Analog output 1 to 5 V (Within rated pressure range) Output impedance: Approx. 1 kΩ	Analog output 4 to 20 mA (Within rated pressure range) Allowable load impedance: 500 Ω or less (at 24 VDC) 100 Ω or less (at 12 VDC)
Accuracy (Ambient temperature of 25°C)		±1% F.S. or less	
Linearity		±0.5% F.S. or less	
Repeatability		±0.2% F.S. or less	
Power supply voltage effect		±0.3% F.S. or less	
Resistance	Enclosure	IP65	
	Operating temperature range	Operating: –10 to 60°C, Stored: –20 to 70°C (No condensation or freezing)	
	Operating humidity range	Operating/Stored: 35 to 85% RH (No condensation)	
	Withstand voltage	250 VAC for 1 minute between live parts and case	
	Insulation resistance	50 MΩ between live parts and case (at 50 VDC)	
	Vibration resistance	10 to 150 Hz at whichever is smaller of 1.5 mm amplitude or 20 m/s² acceleration, in X, Y, Z directions, for 2 hours each (De-energized)	
	Impact resistance	500 m/s² in X, Y, Z directions, 3 times each (De-energized)	
Temperature characteristics		±2% F.S. or less (0 to 50°C, based on 25°C), ±3% F.S. or less (–10 to 60°C, based on 25°C)	

Piping Specifications

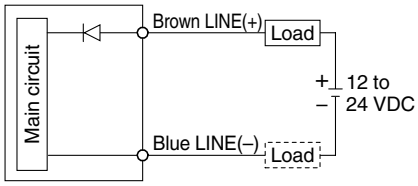
Model		01	02	N01	N02	C01	A2	B2
Port size		R 1/8 M5 x 0.8	R 1/4 M5 x 0.8	NPT 1/8 M5 x 0.8	NPT 1/4 M5 x 0.8	Rc 1/8	URJ 1/4	TSJ 1/4
Material		Case: C3604 + nickel plated, Piping port/pressure sensor: Stainless steel 316L						
Sensor cable		PSE56□-□: Oil proof 3-wire heavy-duty vinyl cable with air tube (0.2 mm²) PSE56□-□-28: Oil proof 2-wire heavy-duty vinyl cable with air tube (0.2 mm²)						
Weight	With sensor cable	193 g	200 g	194 g	201 g	187 g	203 g	193 g
	Without sensor cable	101 g	108 g	102 g	109 g	95 g	111 g	101 g

Internal Circuit

PSE56□-□
Voltage output type
1 to 5 V
Output impedance
Approx. 1 kΩ



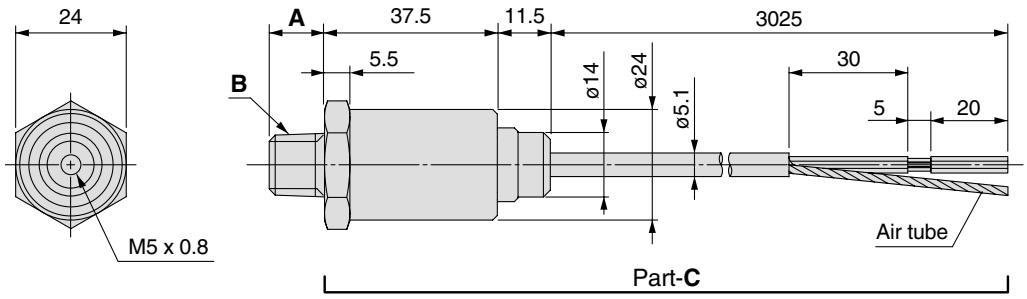
PSE56□-□-28
Current output type
4 to 20 mA
Allowable load impedance
500 Ω or less (at 24 VDC)
100 Ω or less (at 12 VDC)



∗ Install the load either on the LINE (+) or LINE (–) side.

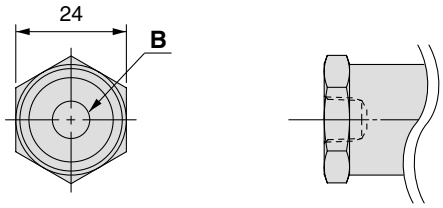
Dimensions

PSE56□-$^{01}_{02}$ / PSE56□-$^{N01}_{N02}$

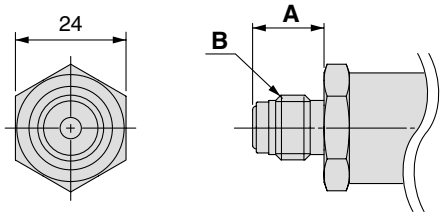


∗ The dimensions of Part C are common to all PSE56□ models.

PSE56□-C01

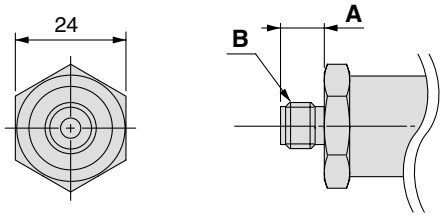


PSE56□-A2



Model	A	B
PSE56□-01	8.2	R 1/8
PSE56□-02	12	R 1/4
PSE56□-N01	9.2	NPT 1/8
PSE56□-N02	12.2	NPT 1/4
PSE56□-C01	—	Rc 1/8
PSE56□-A2	15.5	URJ 1/4
PSE56□-B2	9.5	TSJ 1/4

PSE56□-B2



Series PSE
Specific Product Precautions 1
Be sure to read before handling.

■ Pressure Sensor

Handling

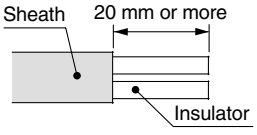
⚠ Warning

1. Do not drop, bump, or apply excessive impact (PSE540: 980 m/s², PSE560: 500 m/s²) while handling. Although the body of the sensor may not be damaged, the inside of the sensor could be damaged and lead to malfunction.

2. The tensile strength of the cord is 50 N. Applying a greater pulling force to it can cause malfunction. When handling, hold the body of the sensor—do not dangle it from the cord.

3. Do not use pressure sensors with corrosive and/or flammable gases or liquids.

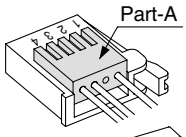
4. Connection of sensor connector



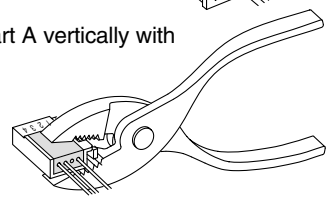
- Cut the sensor cable as illustrated to the right.
- Referring to the table below, insert each lead wire of the cable at the position marked with a number corresponding to the color of the lead wire.

Connector no.	Wire core color	
	For PSE200 (ZS-26-E)	For PSE300 (ZS-28-C)
1	Brown (DC (+))	Brown (DC (+))
2	Black (OUT: 1 to 5 V)	Not connected
3	Blue (DC (–))	Blue (DC (–))
4	Not connected	Black (OUT: 1 to 5 V)

- Confirm that the numbers on the connector match the colors of the wires and that the wires are inserted to the bottom. Press Part A by hand for temporary fixing.



- Press in the central part of Part A vertically with a tool such as pliers.
- A sensor connector cannot be taken apart for reuse once it is crimped. If the wire arrangement is incorrect or if the wire insertion fails, use a new sensor connector.



- For connection to SMC Series PSE300 pressure switches, use sensor connectors (ZS-28-C) or e-con connectors listed below.

Manufacturer	Part no.
Sumitomo 3M	37104-3101-000FL
Tyco Electronics AMP	1-1473562-4

- For detailed information about e-con connectors, please consult the manufacturers of the respective connectors.

Operating Environment

⚠ Warning

1. The pressure sensors 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. The pressure sensors do not have an explosion proof rating. Never use pressure sensors in the presence of flammable or explosive gases.

Air Supply

⚠ Warning

1. Use of toxic, corrosive or flammable gases

Since the switch uses stainless steel 316L as the material of the pressure sensor and fittings, do not use **toxic** or **corrosive** gases.

2. Fluid compatibility

Since the switch uses stainless steel 316L as the wetted material (for the pressure sensor and fittings), use fluids that will not corrode this material.

(For the corrosiveness of the fluids, please consult with the manufacturers of the respective fluids.)

Helium leakage test

Helium leakage test is conducted on the welded parts. Use ferrules by Crawford Fittings (Swagelok® fittings) as TSJ fittings, seals and glands by Cajon (VCR® fittings) as URJ fittings. If ferrules, seals, or glands of other brands are to be used, be sure to conduct helium leakage test before using those products.

■ Controller

Handling

⚠ Warning

1. Do not drop, bump, or apply excessive impact (100 m/s²) while handling. Although the body of the controller case may not be damaged, the inside of the controller could be damaged and cause malfunction.

2. The tensile strength of the power supply/output connection cable is 50 N; that of the pressure sensor lead wire with connector is 25 N. Applying a greater pulling force than the applicable specified tensile strength to either of these components can lead to malfunction. When handling, hold the body of the controller—do not dangle it from the cord.

Connection

⚠ Warning

1. Incorrect wiring can damage the switch and cause 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.

Specific Product Precautions 2

Be sure to read before handling.

■ Controller

Operating Environment

⚠ Warning

1. Our pressure sensor controllers 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 sensor controllers do not have an explosion proof rating. Never use pressure sensors in the presence of flammable or explosive gases.

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

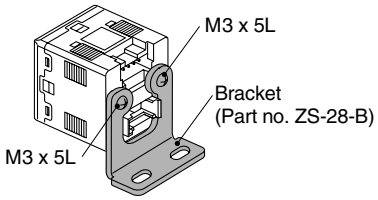
Mounting

⚠ Caution

1. Mounting with bracket

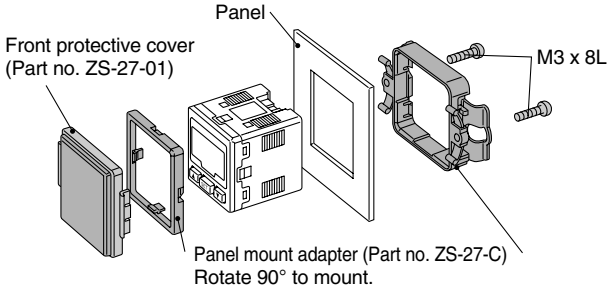
Mount the bracket on the body with two M3 x 5L mounting screws.

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.



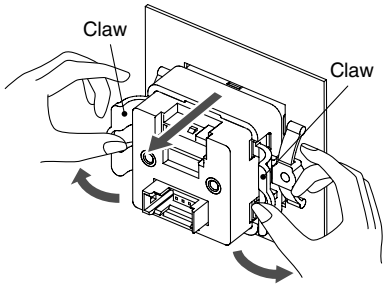
Mounting

⚠ Caution

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 controller while pushing the claws outward.

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

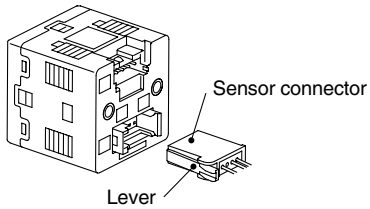


Wiring

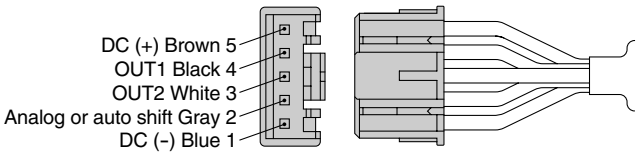
⚠ Caution

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 one finger.



2. Connector pin numbers for power supply/output cable



Specific Product Precautions 3

Be sure to read before handling.

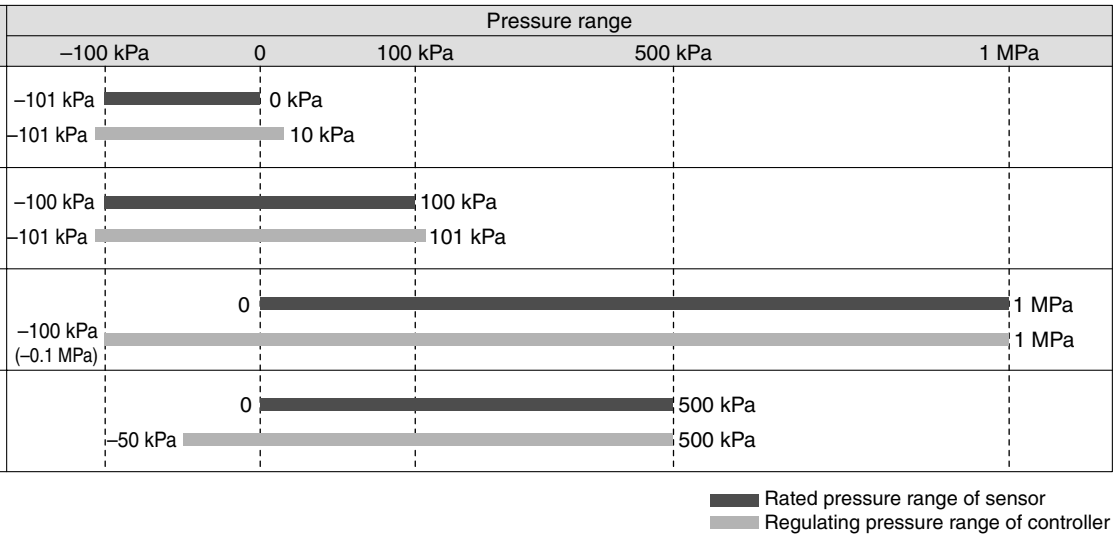
Regulating Pressure Range and Rated Pressure Range

⚠ Caution

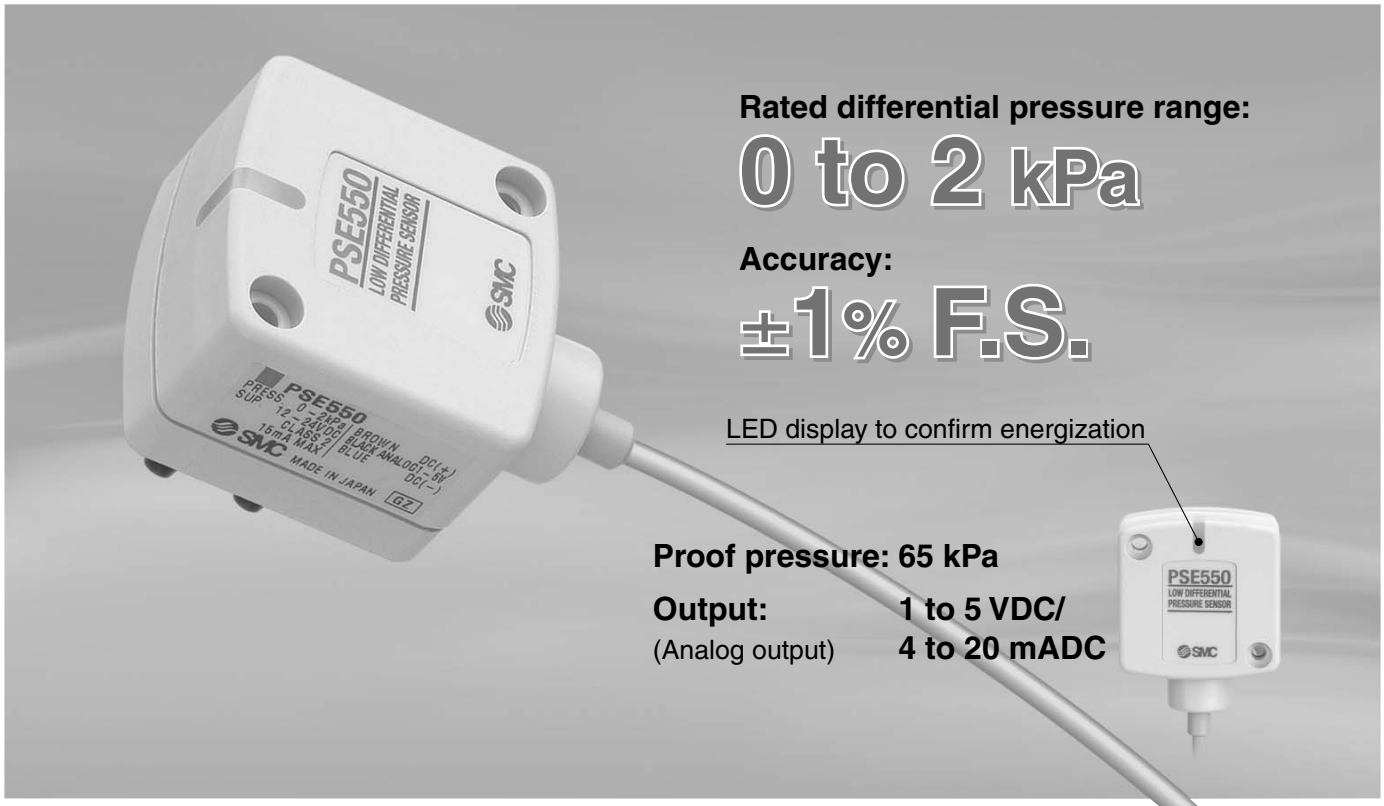
Set the pressure within the rated pressure range.

The regulating pressure range is the range of pressure that can be set on the controller.
The rated pressure range is the range of pressure that satisfies the specifications (accuracy, linearity, etc.) of 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.

Sensor		Pressure range
For vacuum	**PSE541** **PSE561**	–101 kPa to 0 kPa –101 kPa to 10 kPa
For compound pressure	**PSE543** **PSE563**	–100 kPa to 100 kPa –101 kPa to 101 kPa
For positive pressure	**PSE560**	0 to 1 MPa –100 kPa (–0.1 MPa) to 1 MPa
	PSE564	0 to 500 kPa –50 kPa to 500 kPa



Low Differential Pressure Sensor
Series PSE550/300



Rated differential pressure range:
0 to 2 kPa

Accuracy:
±1% F.S.

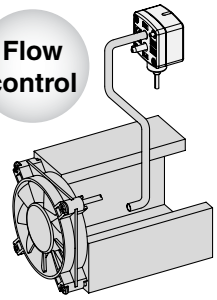
LED display to confirm energization

Proof pressure: 65 kPa

Output: **1 to 5 VDC/**
(Analog output) **4 to 20 mADC**

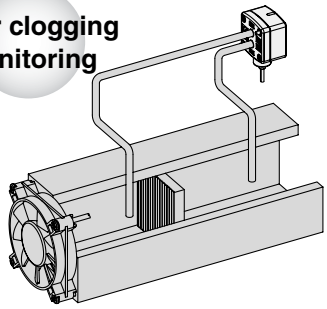
Applications

Flow control



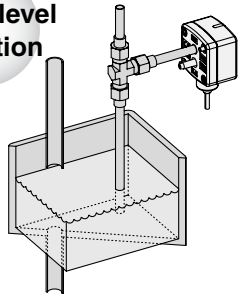
Can control air flow by monitoring the flow rate inside the duct.

Filter clogging monitoring



Can control filtration and replacement periods by monitoring the clogging of the filter.

Liquid level detection

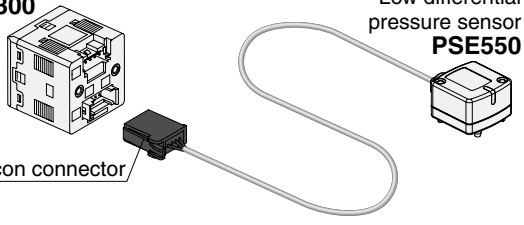


Can detect the liquid level through changes in the purge pressure.

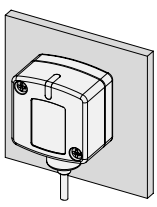
Plug connection

Controller
PSE300

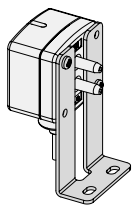
Low differential pressure sensor
PSE550



Two mounting methods



Direct mounting



Bracket mounting

Low Differential Pressure Sensor
Series PSE550

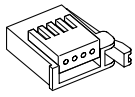
How to Order

PSE550 □ □ □

Output specifications

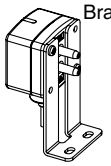
Nil	Voltage output type 1 to 5 V
28	Current output type 4 to 20 mA

Option 2 (Connector)

Nil	None
C2	Connector for PSE300 multiple channel pressure controller 1 pc. 

Note 1) Current output type cannot be connected to the Series PSE300.
Note 2) The connector is unassembled in the factory but is included with the shipment.

Option 1 (Bracket)

Nil	None
A	Bracket 

Note) The bracket is unassembled in the factory, but is included with the shipment.

Option/Part No.

Description	Part no.	Note
Bracket	ZS-30-A	With M3 x 5L (2 pcs.)
Connector for PSE300	ZS-28-C	1 pc.

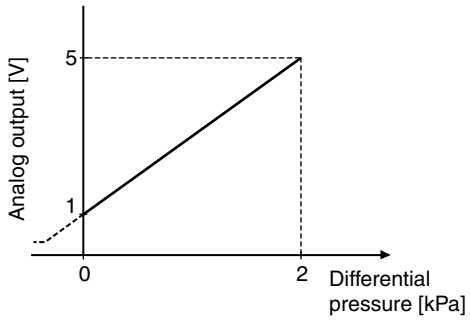
Specifications

Model		PSE550	PSE550-28
Rated differential pressure range		0 to 2 kPa	
Operating pressure range		–50 to 50 kPa Note)	
Proof pressure		65 kPa	
Applicable fluid		Air/Non-corrosive gas/Non-inflammable gas	
Power supply voltage		12 to 24 VDC ±10%, Ripple (p-p) 10% or less (With power supply polarity protection)	
Current consumption		15 mA or less	—
Output specification		Analog output 1 to 5 VDC (Within rated differential pressure range) Output impedance: Approx. 1 kΩ	Analog output 4 to 20 mADC (Within rated differential pressure range) Allowable load impedance: 500 Ω or less (at 24 VDC) 100 Ω or less (at 12 VDC)
Accuracy (Ambient temperature of 25°C)		±1% F.S. or less	
Linearity		±0.5% F.S. or less	
Repeatability		±0.3% F.S. or less	
Indication light		Orange light is on (When energized)	
Environmental resistance	Enclosure	IP40	
	Operating temperature range	Operating: 0 to 50°C, Stored: –20 to 70°C (No freezing or condensation)	
	Operating humidity range	Operating/Stored: 35 to 85% RH (No condensation)	
	Withstand voltage	1000 VAC or more, 50/60 Hz for 1 minute between live parts and case	
	Insulation resistance	50 MΩ or more between live parts and case (at 500 VDC)	
	Vibration resistance	10 to 150 Hz at whichever is smaller of 1.5 mm amplitude or 100 m/s^2 acceleration, in X, Y, Z directions, for 2 hours each (De-energized)	
	Impact resistance	300 m/s^2 in X, Y, Z directions, 3 times each (De-energized)	
Temperature characteristics		±3% F.S. or less (Based on 25°C)	
Port size		ø4.8 (ø4.4 in the end) resin piping (Applicable to I.D. ø4 air tubing)	
Material of wetted parts		Resin pipe: Nylon, Piston area of sensor: Silicon	
Sensor cable		3-wire oval cable (0.15 mm^2)	2-wire oval cable (0.15 mm^2)
Weight	With sensor cable	75 g	
	Without sensor cable	35 g	

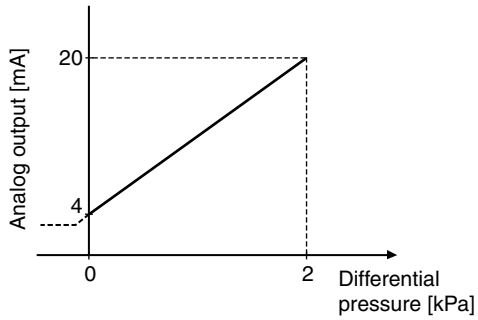
Note) Can detect differential pressure from 0 to 2 kPa within the range of –50 to 50 kPa.

Analog Output

1 to 5 VDC

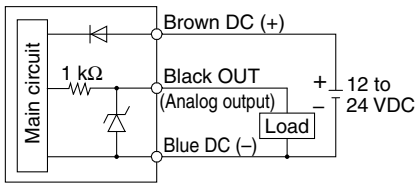


4 to 20 mADC

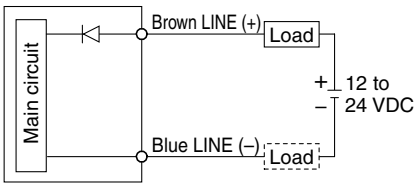


Internal Circuit

PSE550
Voltage output type
1 to 5 V
Output impedance
Approx. 1 kΩ

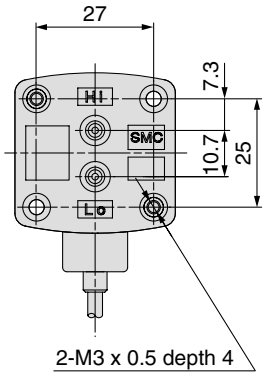


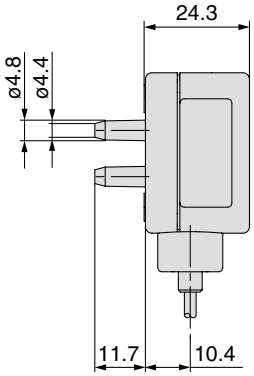
PSE550-28
Current output type
4 to 20 mA
Allowable load impedance
500 Ω or less (at 24 VDC)
100 Ω or less (at 12 VDC)

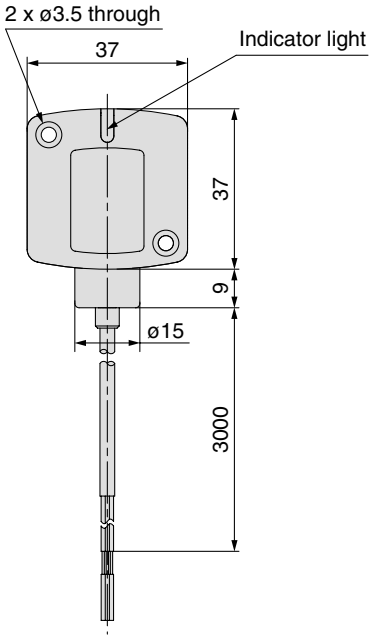


∗ Install the load either on the LINE (+) or LINE (–) side.

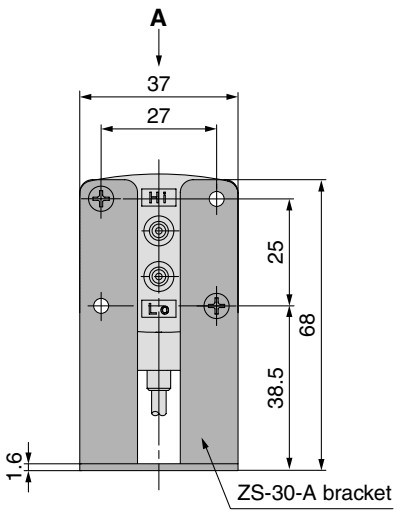
Dimensions

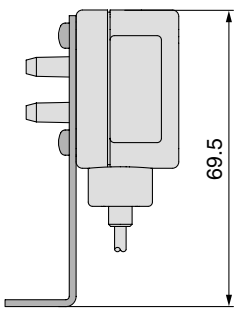


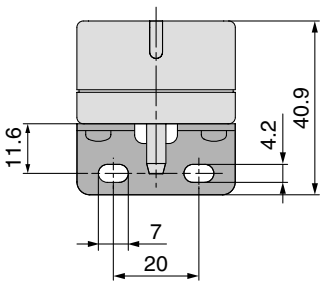




With bracket







A View

Controller
Series PSE300

How to Order

Input/Output specifications

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

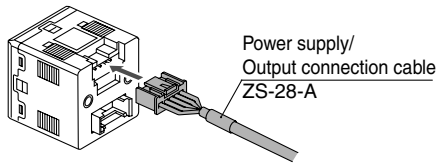
Unit specifications

Nil	With unit display switching function
M	Fixed SI unit Note 1)

Note 1) Fixed unit
For vacuum & low pressure & low differential pressure & compound pressure: kPa
Positive pressure: MPa (For 1 MPa)
kPa (For 500 kPa)

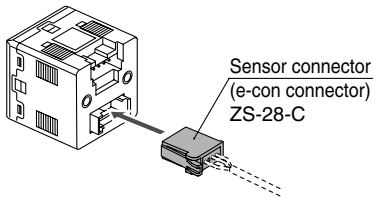
PSE30 0 — M □ □ □

Option 1

Nil	Without cable
L	Power supply/Output connection cable 

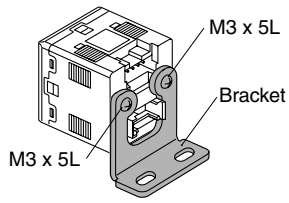
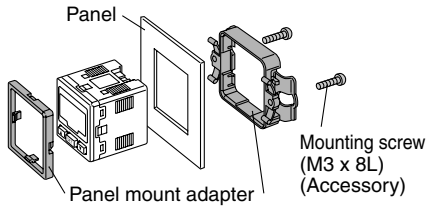
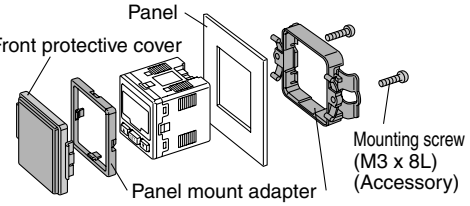
Note) The cable is unassembled in the factory, but is included with the shipment.

Option 3

Nil	Without connector
C	Sensor connector 

Note) The connector is unassembled in the factory, but is included with the shipment.

Option 2

Nil	Without bracket/panel mount adapter/front protective cover
A	Bracket 
B	Panel mount adapter 
D	Panel mount adapter + Front protective cover 

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	ZS-28-A	
Bracket	ZS-28-B	With M3 x 5L (2 pcs.)
Sensor connector	ZS-28-C	1 pc.
Panel mount adapter	ZS-27-C	With M3 x 8L (2 pcs.)
Panel mount adapter + Front protective cover	ZS-27-D	With M3 x 8L (2 pcs.)

Specifications

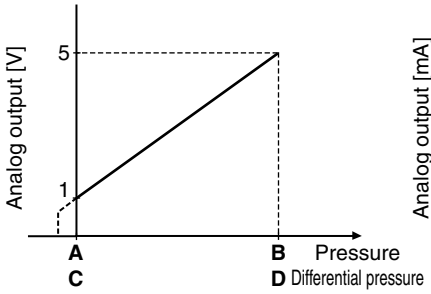
Conforms to CE marking and UL (CSA) standards.

Model		PSE30□					
Set (differential) pressure range		–101 to 101 kPa	10 to –101 kPa	–10 to 100 kPa	–0.1 to 1 MPa	–50 to 500 kPa	–0.2 to 2 kPa
Pressure range Note 1)		For compound pressure	For vacuum	For low pressure	For positive pressure		For low difference pressure
Rated (differential) pressure range		–100 to 100 kPa	0 to –101 kPa	0 to 100 kPa	0 to 1 MPa	0 to 500 kPa	0 to 2 kPa
Power supply voltage		12 to 24 VDC, Ripple (p-p) 10% or less (With power supply polarity protection)					
Current consumption		50 mA or less (Current consumption for sensor is not included.)					
Sensor input		1 to 5 VDC (Input impedance: 1 MΩ)					
	No. of inputs	1 input					
	Input protection	With excess voltage protection (Up to 26.4 V)					
Hysteresis		Hysterisis mode: Variable, Window comparator mode: Variable					
Switch output		NPN or PNP open collector output: 2 outputs					
	Maximum load current	80 mA					
	Maximum load voltage	30 VDC (at NPN output)					
	Residual voltage	1 V or less (With load current of 80 mA)					
	Output protection	With short circuit protection					
Response time		1 ms or less					
	Anti-chattering function	Response time settings for anti-chattering function: 20 ms, 160 ms, 640 ms, 1280 ms					
Repeatability		±0.1% F.S. or less					
Analog output	Voltage output Note 2)	Output voltage: 1 to 5 V (Within rated pressure range (Differential pressure)), Output impedance: Approx. 1 kΩ Linearity: ±0.2% F.S. (Not including sensor accuracy), Response speed: 150 ms 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 20 mA (Within rated pressure range) Maximum load impedance: 300 Ω (at 12 VDC), 600 Ω (at 24 VDC), Minimum load impedance: 50 Ω Linearity: ±0.2% F.S. (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 of 25°C)		±0.5% F.S. ±2 digits or less	±0.5% F.S. ±1 digit or less				
Display		3 + 1/2 digit, 7 segment indicator, 2-color display (Red/Green), Sampling frequency: 5 times/sec					
Indicator light		OUT1: Lights up when ON (Green), OUT2: Lights up when ON (Red)					
Auto shift input Note 2)		Non-voltage input (Reed or Solid state), Low level input: 5 ms or more, Low level: 0.4 V or less					
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 98 m/s² acceleration, 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)					
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/output connection cable	85 g					
	Without power supply/output connection cable	30 g					

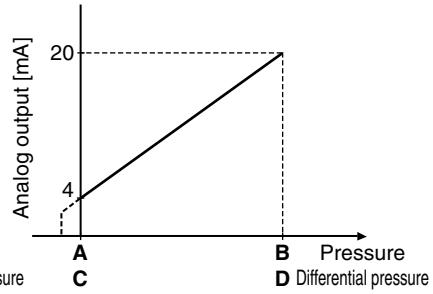
Note 1) Pressure range can be selected during initial setting.
Note 2) Auto shift function is not available when analog output option is selected.
Also, analog output option is not available when auto shift function is selected.
Note 3) The following units can be selected with unit conversion function:
For vacuum & compound pressure: kPa·kgf/cm²·bar·psi·mmHg·inHg
For positive pressure & low pressure: MPa·kPa·kgf/cm²·bar·psi
For low differential pressure: kPa·mmH₂O

Analog Output

1 to 5VDC



4 to 20 mADC

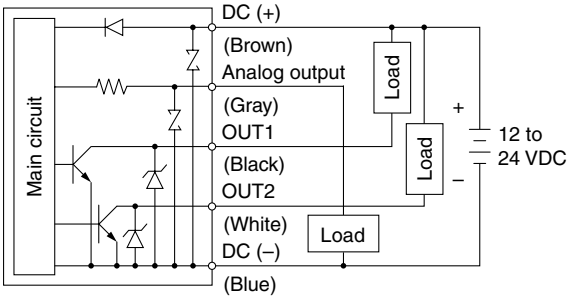


Range	Rated pressure range	A	B
For vacuum	0 to –101 kPa	0	–101 kPa
For compound pressure	–100kPa to 100 kPa	–100 kPa	100 kPa
For positive pressure	0 to 1 MPa	0	1 MPa
	0 to 500 kPa	0	500 kPa

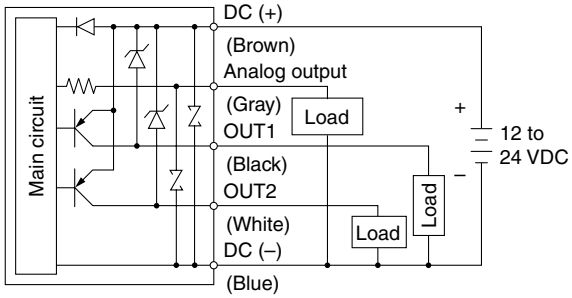
Range	Rated differential pressure range	C	D
For low differential pressure	0 to 2 kPa	0	2 kPa

Internal Circuit

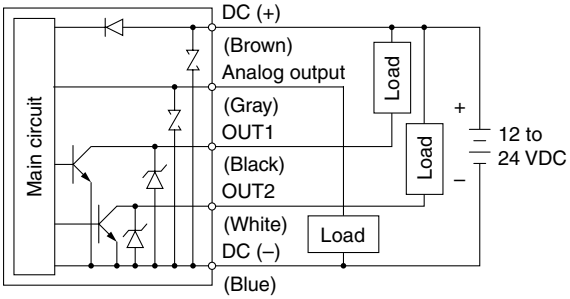
PSE300
NPN open collector output (2 outputs), Max. 30 V or 80 mA, residual voltage 1 V or less
Analog output: 1 to 5 V
Output impedance: Approx. 1 kΩ



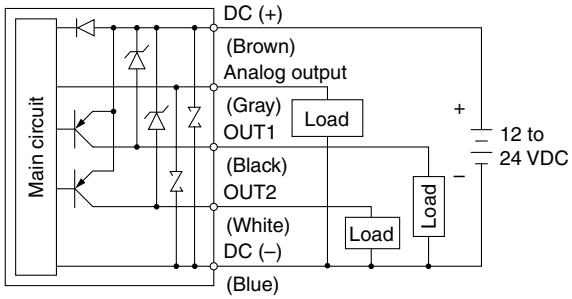
PSE303
PNP open collector output (2 outputs), Max. 80 mA, residual voltage 1 V or less
Analog output: 1 to 5 V
Output impedance: Approx. 1 kΩ



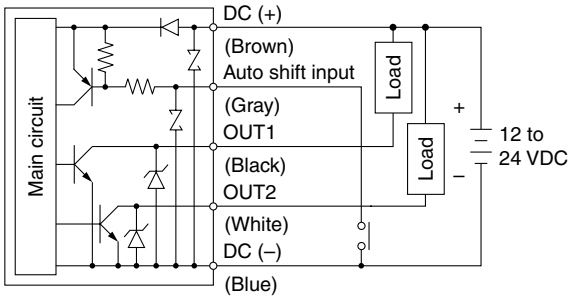
PSE301
NPN open collector output (2 outputs), Max. 30 V or 80 mA, residual voltage 1 V or less
Analog output: 4 to 20 mA
Maximum load impedance: 300 Ω (12 VDC), 600 Ω (24 VDC)
Minimum load impedance: 50 Ω



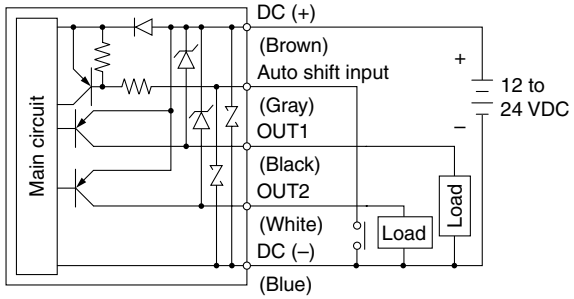
PSE304
PNP open collector output (2 outputs), Max. 80 mA, residual voltage 1 V or less
Analog output: 4 to 20 mA
Maximum load impedance: 300 Ω (12 VDC), 600 Ω (24 VDC)
Minimum load impedance: 50 Ω



PSE302
NPN open collector output with auto shift input (2 outputs),
Max. 30 V, 80 mA, residual voltage 1 V or less



PSE305
PNP open collector output with auto shift input (2 outputs),
Max. 80 mA, residual voltage 1 V or less



Descriptions

LCD
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.

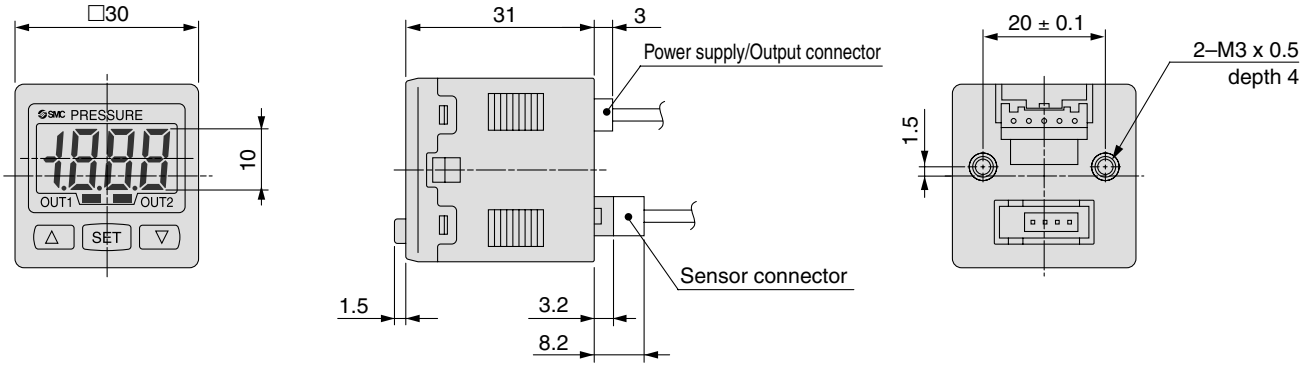
Up button
Use this button to select the mode or increase the ON/OFF set value.
It is also used for switching to the peak display mode.

Output (OUT2) display (Red)
Lights up when OUT2 is ON.

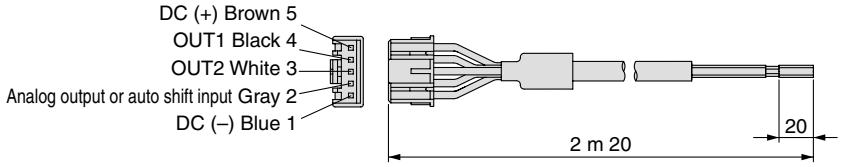
SET button
Use this button to change the mode or confirm the set value.

Down 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

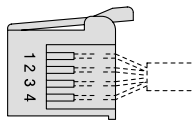


Power supply/Output connection cable (ZS-28-A)

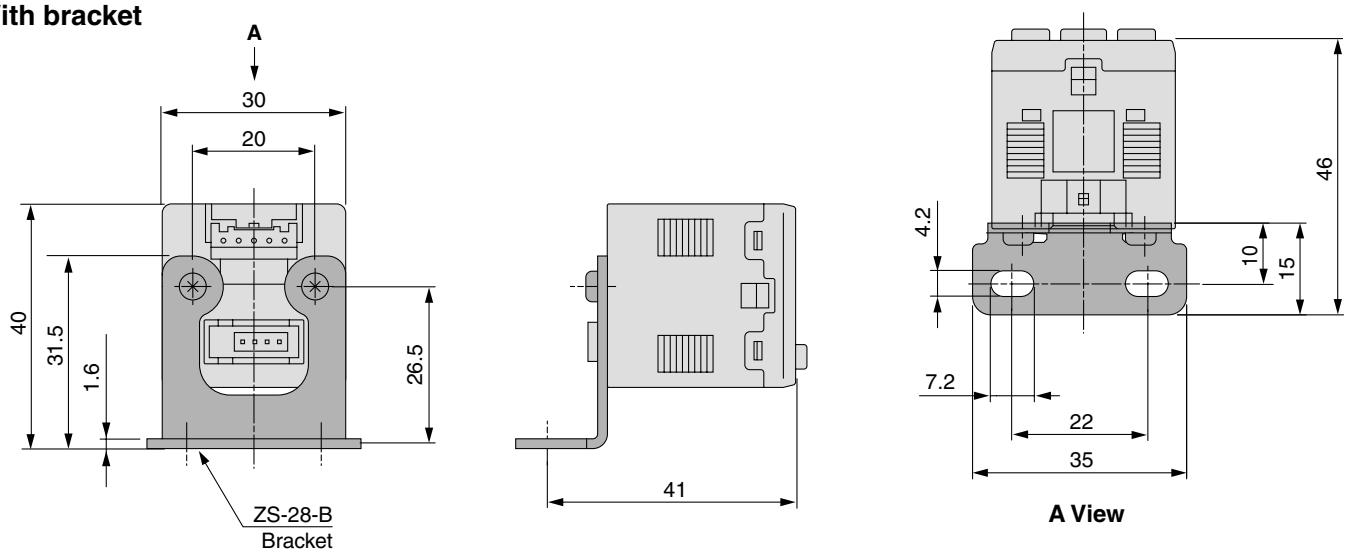


Sensor connector

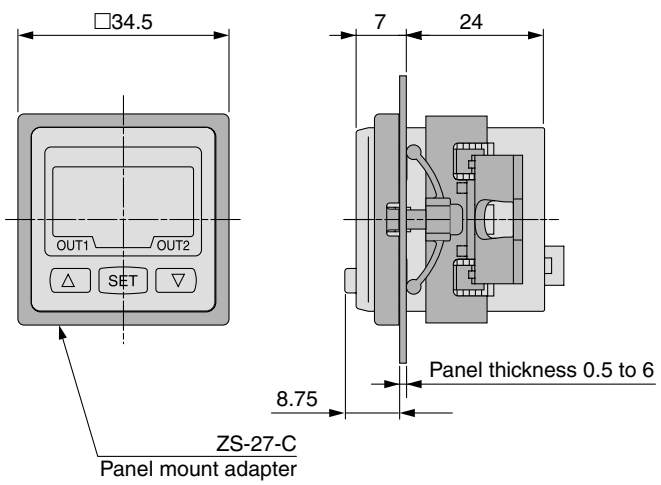
PIN no.	Terminal
1	DC (+)
2	N.C.
3	DC (–)
4	IN (1 to 5 V)



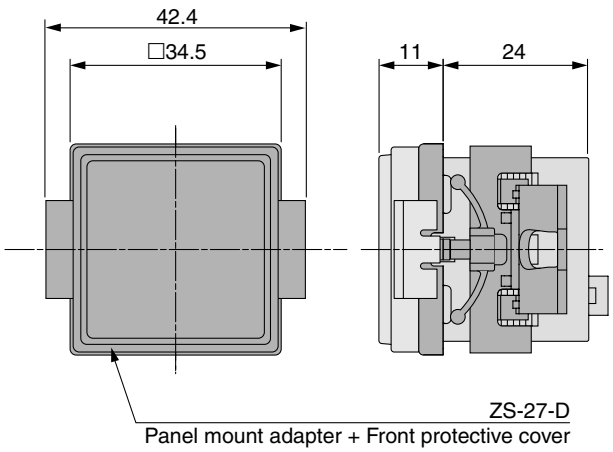
With bracket



With panel mount adapter



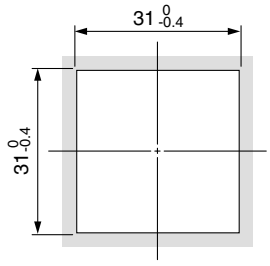
With panel mount adapter + Front protective cover



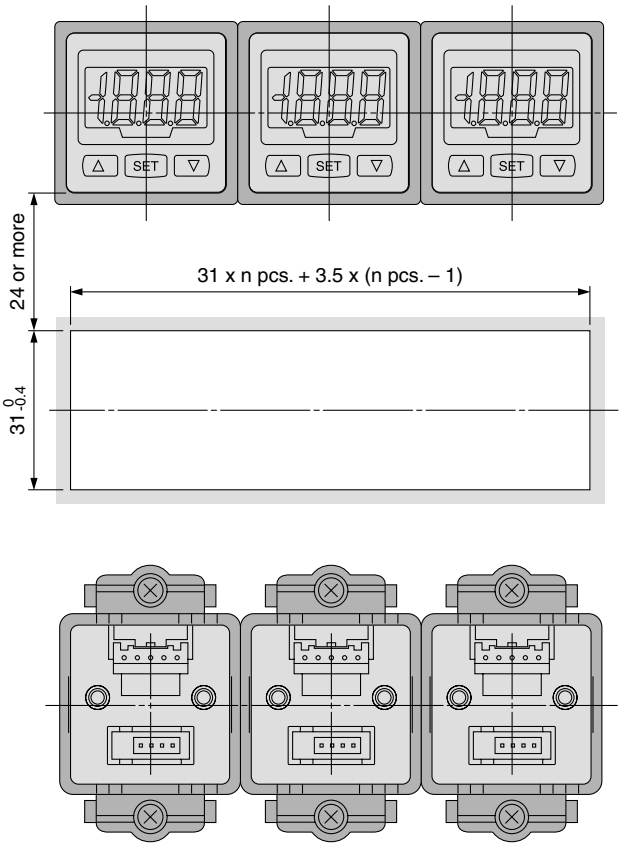
Dimensions

Panel cutout dimensions

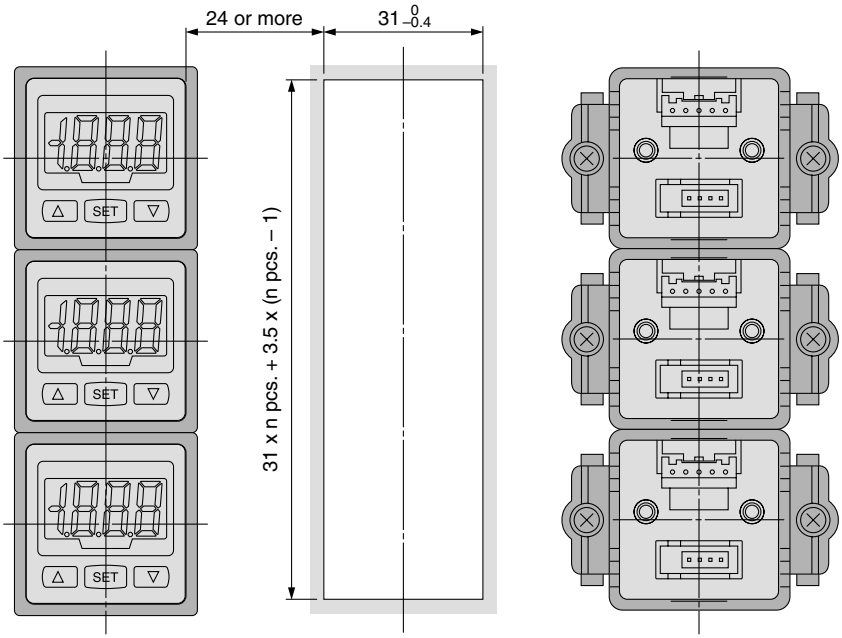
Mount of single unit



Horizontal stacking mount of multiple units (n pcs.)



Vertical stacking mount of multiple units (n pcs.)

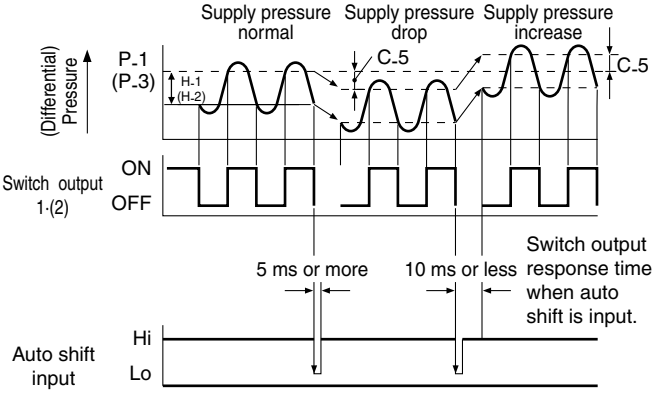


Functions

A Auto shift function

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



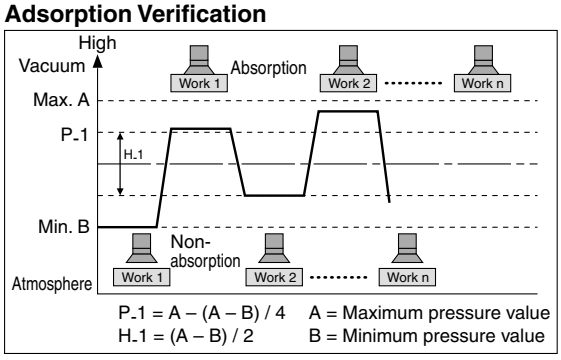
Possible Set Range For Auto Shift Input

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

B Auto preset function

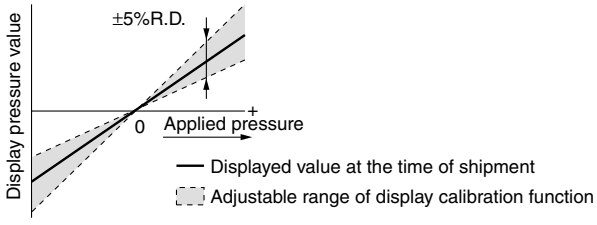
Auto preset function, when selected in the initial setting, calculates and stores the set value from the measured (differential) pressure.
The optimum set value is determined automatically by repeating vacuum and break with the target workpiece several times.

Adsorption Verification



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 ±5%.



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

D Peak and bottom display function

This function constantly detects and updates the maximum and minimum values and allows to hold 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 within ±7% F.S. of the factory adjusted value.

G Error indication function

Error name		Error code	Description
Overcurrent error	OUT1	Er 1	Load current of switch output exceeds 80 mA.
	OUT2	Er2	
Residual pressure error		Er3	Pressure applied during the zero reset operation exceeds ±7% F.S. ∗ 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 be unconnected or mis-wired. 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 one second, the switch returns to the measuring mode.
System error		Er4	Internal data error
		Er6	Internal data error
		Er7	Internal data error
		Er8	Internal data error

H Unit display switching function

Display units can be switched with this function.
Units that can be displayed vary depending on the range of the pressure sensors connected to the controller.

Pressure range		For compound pressure	For vacuum	For low pressure	For positive pressure		For low differential pressure
Applicable pressure sensor		**PSE533∗ PSE543 PSE563**	**PSE531∗ PSE541 PSE561**	**PSE532∗**	**PSE530∗ PSE560**	**PSE564**	**PSE550**
Set (differential) pressure range		–101 to 101 kPa	10 to –101 kPa	–10 to 100 kPa	–0.1 to 1 MPa	–50 to 500 kPa	–0.2 to 2.00 kPa
PA	kPa	0.2	0.1	0.1	—	1	0.01
	MPa	—	—	—	0.001	—	—
GF	kgf/cm²	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	—
inH	inHg	0.1	0.1	—	—	—	—
mmH	mmHg	2	1	—	—	—	1 mmH₂O

∗ Series PSE530 pressure sensors are also applicable. Please contact SMC for more information.

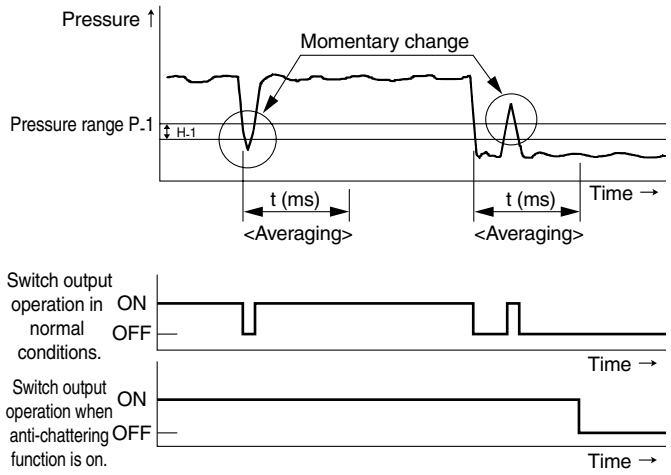
Functions

Anti-chattering function

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.

Response time settings: 20 ms, 160 ms, 640 ms, 1280 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.



Specific Product Precautions 1

Be sure to read before handling.

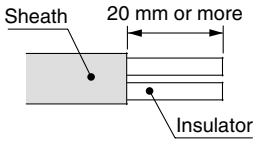
Pressure Sensor

Handling

⚠ Warning

1. **Do not drop, bump, or apply excessive impact while handling. Although the body of the sensor may not be damaged, the inside of the sensor could be damaged and lead to malfunction.**
2. **The tensile strength of the cord is 50 N or less. Applying a greater pulling force to it can cause malfunction. When handling, hold the body of the sensor—do not dangle it from the cord.**
3. **Care should be taken when stripping the outer cable covering as the insulator may be accidentally torn or damaged if incorrectly stripped, as shown on the right.**

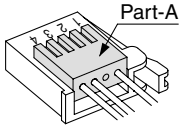
4. **Do not use pressure sensors with corrosive and/or flammable gases or liquids.**
5. **Connection of sensor connector**
   - Cut the sensor cable as illustrated to the right.



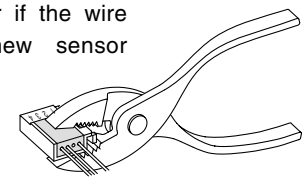
   - Referring to the table below, insert each lead wire of the cable at the position marked with a number corresponding to the color of the lead wire.

Connector no.	Wire core color
	For PSE300 (ZS-28-C)
1	Brown (DC (+))
2	Not connected
3	Blue (DC (—))
4	Black (OUT: 1 to 5 V)

   - Confirm that the numbers on the connector match the colors of the wires and that the wires are inserted to the bottom. Press Part A by hand for temporary fixing.



   - Press in the central part of Part A vertically with a tool such as pliers.
   - A sensor connector cannot be taken apart for reuse once it is crimped. If the wire arrangement is incorrect or if the wire insertion fails, use a new sensor connector.



   - For connection to SMC Series PSE300 pressure switches, use sensor connectors (ZS-28-C) or e-con connectors listed below.

Manufacturer	Part no.
Sumitomo 3M	37104-3101-000FL
Tyco Electronics AMP	1-1473562-4
OMRON Corporation	XN2A-1430

   - For detailed information about e-con connectors, please consult the manufacturers of the respective connectors.
   - When piping, increase the length of the air tubing to allow for any possible warping, increased tension or moment load or increased tension, etc.
   - In cases where SMC air tubing is not used, make sure the product has similar I.D. accuracy within ø4 ± 0.3 mm.

Handling

- Make sure that the air tubing is firmly inserted to avoid possible disconnection. (Tensile strength is approx. 25 N when being inserted 8 mm.)
- Please consult with SMC if you intend to use with fluids other than air, non-corrosive gas and non-inflammable gas.

Operating Environment

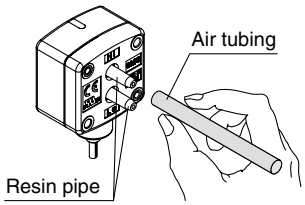
⚠ Warning

1. **The pressure sensors are CE marked; however, they are not equipped with surge protection against lightening. Lightning surge countermeasures should be applied directly to system components as necessary.**
2. **The pressure sensors do not have an explosion proof rating. Never use pressure sensors in the presence of flammable or explosive gases.**

Piping Connection

⚠ Caution

- Cut the air tubing vertically.
- Carefully hold the air tubing and slowly push it into the resin pipe, ensuring that it is inserted by more than 8 mm. For your information, the tensile strength is approx. 25 N when inserted by more than 8 mm.



- Insert the low pressure tubing into “Lo” pipe, and the high-pressure tubing into “Hi” pipe.

Controller

Handling

⚠ Warning

1. **Do not drop, bump, or apply excessive impact (100 m/s²) while handling. Although the body of the controller case may not be damaged, the inside of the controller could be damaged and cause malfunction.**
2. **The tensile strength of the power supply/output connection cable is 50 N; that of the pressure sensor lead wire with connector is 25 N. Applying a greater pulling force than the applicable specified tensile strength to either of these components can lead to malfunction. When handling, hold the body of the controller.**

Specific Product Precautions 2

Be sure to read before handling.

■ Controller

Connection

⚠ Warning

1. **Incorrect wiring can damage the switch and cause 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.**

Operating Environment

⚠ Warning

1. **Our pressure sensor controllers 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 sensor controllers do not have an explosion proof rating. Never use pressure sensors in the presence of flammable or explosive gases.**

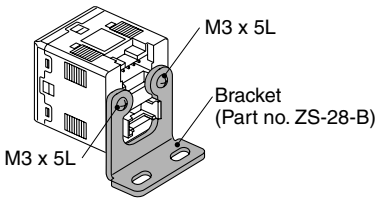
Mounting

⚠ Caution

1. Mounting with bracket

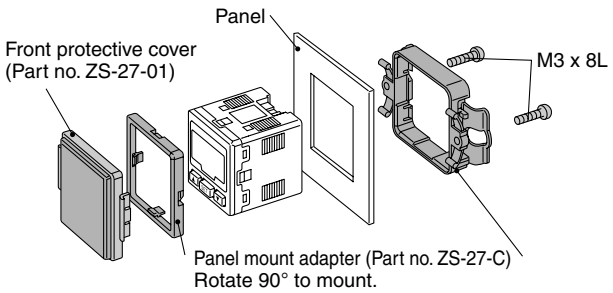
Mount the bracket on the body with two M3 x 5L mounting screws.

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.

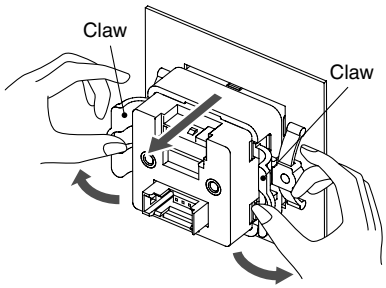


Mounting

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 controller while pushing the claws outward.

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

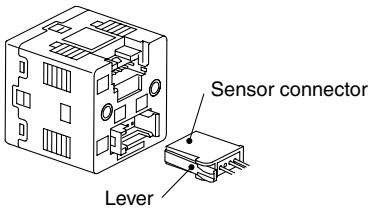


Wiring

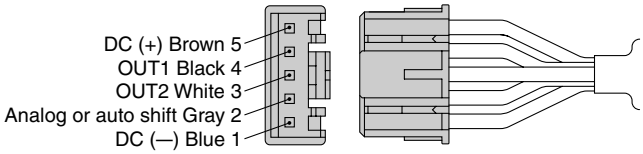
⚠ Caution

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 one finger.



2. Connector pin numbers for power supply/output



Specific Product Precautions 3

Be sure to read before handling.

Set Differential Pressure Range & Rated Differential Pressure Range

⚠ Caution

Set the pressure within the rated differential pressure range.

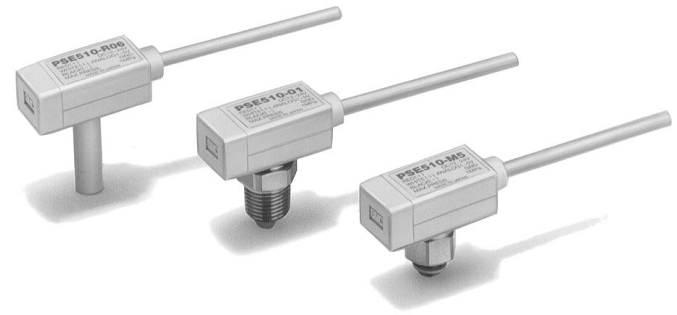
The set differential pressure range is the range of differential pressure that can be set on the controller. The rated differential pressure range is the range of differential pressure that satisfies the specifications (accuracy, linearity, etc.) of the sensor.

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

Sensor		Pressure range
		–2 kPa 0 2 kPa 5 kPa 10 kPa
For low differential pressure	**PSE550**	0 2 kPa –0.2 kPa 2 kPa

Rated differential pressure range of sensor
Set differential pressure range of controller

Pressure Sensor
For General Pneumatic Applications
Series PSE 510



How to Order

PSE51 □ — □

Operating pressure

0	High pressure (0 to 1 MPa)
1	Vacuum (–101 to 0 kPa)
2	Low pressure (0 to 100 kPa)

Porting

R06	ø6 reducer
M5	M5 X 0.8
01	R(PT) 1/8, M5 X 0.8
T01	NPTF 1/8, M5 X 0.8

Sensor Specifications/General Pneumatic Applications

Model		**PSE510-□**	**PSE511-□**	**PSE512-□**
Operating pressure range		0 to 1 MPa	–101 to 0kPa	0 to 100kPa
Max. pressure		1MPa	200kPa	
Fluid		Air, Non corrosive gases		
Output specification		Analog (1 to 5V, Load impedance: 10kΩ or more)		
Supply voltage		12 to 24V DC (Ripple ± 10% or less)		
Current consumption		10mA or less		
Operating temperature range		0 to 50°C (No condensation)		
Temperature characteristics (25°C standard)	**25 ± 10°C**	± 1%F.S. or less		
	0 to 50°C	± 1.5% F.S. or less		
Repeatability		± 0.3% F.S. or less		
Voltage resistance		Between external terminal and housing 1000V AC, 50/60Hz for 1 min.		
Insulation resistance		Between external terminal and housing 2MΩ (500V DC by megameter)		
Vibration resistance		10 to 500Hz Pulse width: 1.5mm or acceleration 98 m/s^2 (at the smaller vibration) to X, Y, Z direction (2 hours)		
Shock resistance		980 m/s^2 to X, Y, Z direction (3 times for each direction)		
Protective construction		IP40		

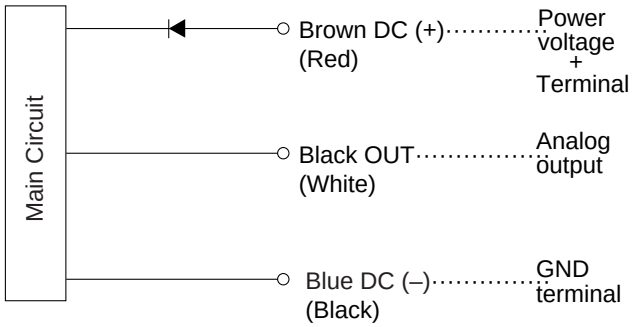
Note) When pressure sensor PSE510 series is connected to controller PSE100 series, display range is as series PSE100.

Process Connection

Model		**R06**	**M5**	**01**	**T01**
Material	**Housing**	Resin housing: PBT	Resin housing: PBT Fitting: Stainless steel (SUS303)	Resin housing: PBT Fitting: C3604BD (Electroless nickel plated)	Resin housing: PBT Fitting: C3604BD (Electroless nickel plated)
	Pressure sensor area	Pressure sensor: Silicon, O ring: NBR			
Lead wire		Oil proof vinyl insulation ø2.55, 0.15mm^2 X 3 wire (Brown, Blue, Black) 3000mm			
Port size		ø6 reducer	M5 X 0.8	R(PT) 1/8, M5 X 0.8	NPTF1/8, M5 X 0.8
Weight (Excluding lead wire)		Approx. 7g	Approx. 10g	Approx. 12g	

Internal Circuit

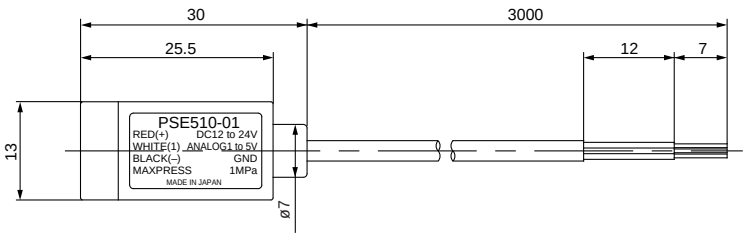
Lead wire colors inside ( ) are those prior to conformity with IEC standards.



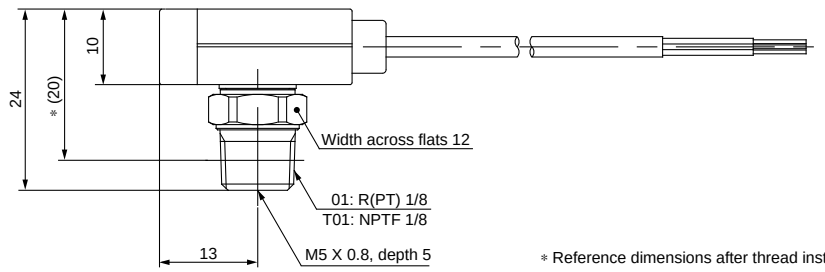
⚠Caution

Be sure to read before handling. Refer to p.0-26 and 0-27 for Safety Instructions and common precautions on the products mentioned in this catalog, and refer to p.3.0-7 to 3.0-9 for precautions on every series.

Dimensions

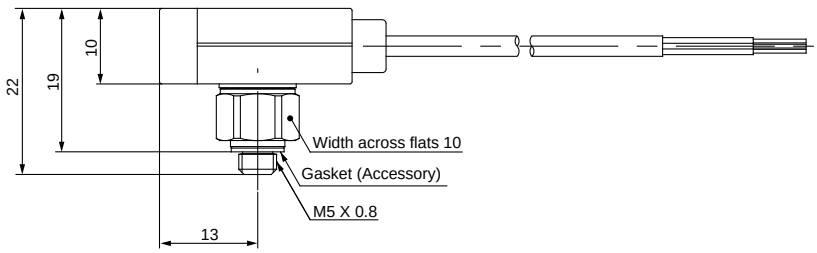


01, T01

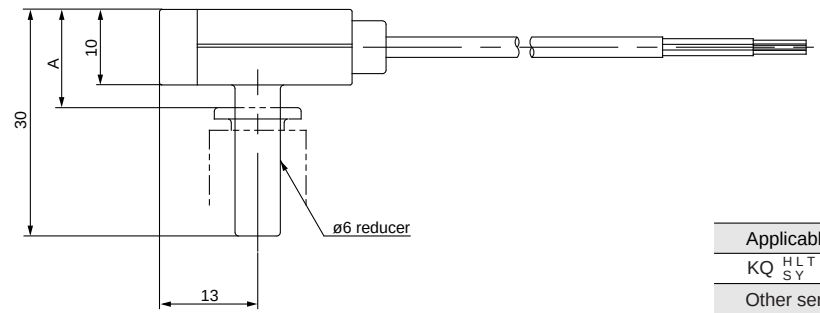


∗ Reference dimensions after thread installation

M5

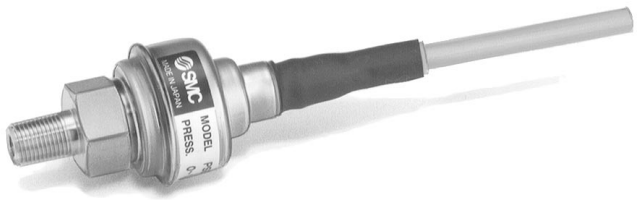


R06



Applicable fitting	A
KQ H L T S Y 06-M5	16
Other series KQ, KS	13
KJ Series	14.5
KJ (-X20) Series	16

Pressure Sensor
For General Purpose Fluid Applications
Series PSE520



How to Order

PSE52 0 – ☐

Operating pressure

0	High pressure (0 to 1 MPa)

Porting

01	R(PT) 1/8, M5 X 0.8
02	R(PT) 1/4, M5 X 0.8
T01	NPTF 1/8, M5 X 0.8
T02	NPTF 1/4, M5 X 0.8

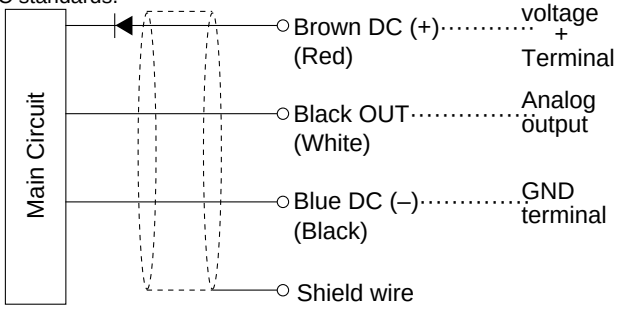
Sensor Specifications/General Purpose Fluid Applications

Model		PSE520-01	PSE520-02	PSE520-T01	PSE520-T02
Operating pressure range		0 to 1 MPa			
Max. pressure		2MPa			
Fluid		Fluid non corrosive to SUS304, SUS630			
Output specification		Analog (1 to 5V, Load impedance: 10kΩ or more)			
Supply voltage		12 to 24 V DC (Ripple ± 10% or less)			
Current consumption		15mA or less			
Operating temperature range		–10 to 70°C (No condensation or frost formation)			
Temperature characteristics (25°C standard)	25 ± 10°C	± 1% F.S. or less			
	–10 to 70°C	± 3% F.S. or less			
Repeatability		± 0.3% F.S. or less			
Voltage resistance		Between GND terminal and housing 250V AC for 1 min.			
Insulation resistance		Between external terminal and housing 100MΩ (50V DC by megameter)			
Vibration resistance		10 to 55Hz Pulse width: 1.5mm to X, Y, Z direction (2 hours)			
Shock resistance		294 m/s^2 (11ms or less) to X, Y, Z direction (3 times for each direction)			
Protective construction		IP65			
Material	Housing	Housing: Stainless steel (SUS304), Fitting: Stainless steel (SUS304)			
	Pressure sensor area	Diaphragm: Stainless steel (SUS630)			
Lead wire		Special elastic polyvinyl chloride ø6, 0.34mm^2, 3 wire, 3000mm			
Port size		R(PT)1/8, M5 X 0.8	R(PT)1/4, M5 X 0.8	NPTF1/8, M5 X 0.8	NPTF1/4, M5 X 0.8
Weight		Approx. 220g			

Note) When pressure sensor PSE 520 series is connected to controller PSE100 series, display range is as PSE100 series.

Internal Circuit

Lead wire colors inside ( ) are those prior to conformity with IEC standards.

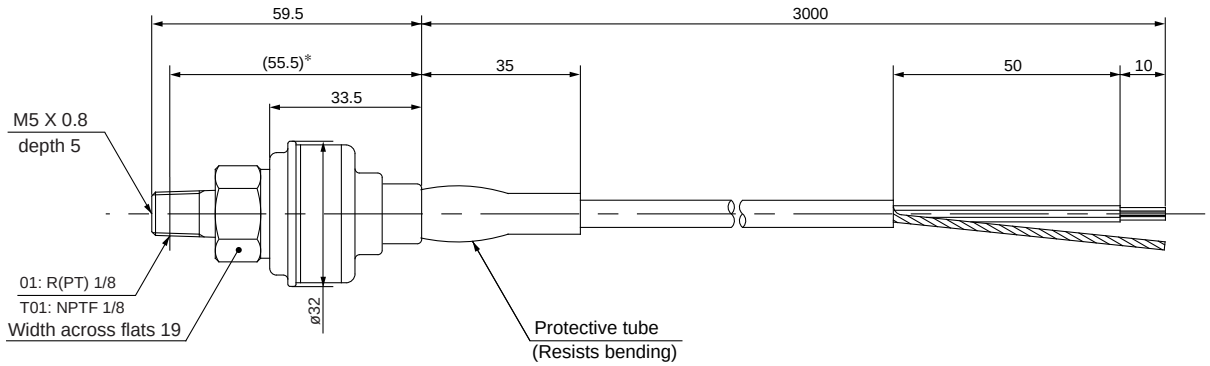


⚠Caution

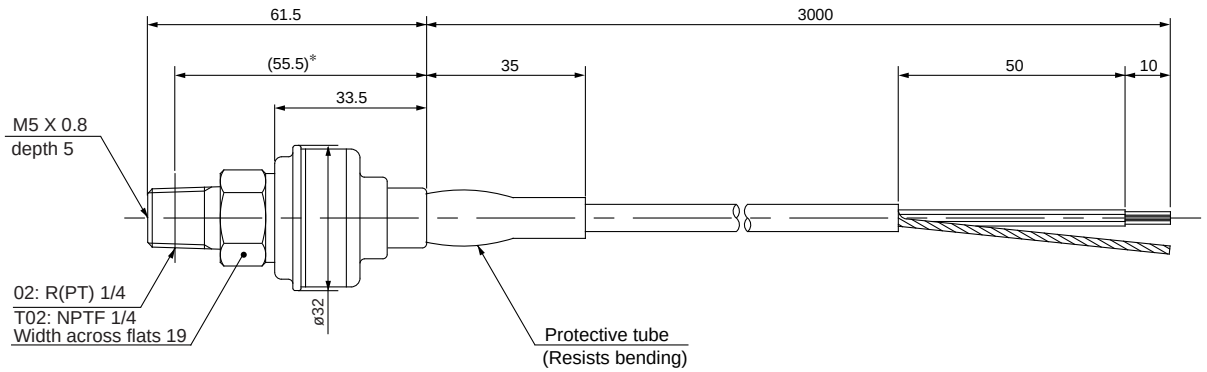
Be sure to read before handling. Refer to p.0-26 and 0-27 for Safety Instructions and common precautions on the products mentioned in this catalog, and refer to p.3.0-7 to 3.0-9 for precautions on every series.

Dimensions

PSE520-01, T01



PSE520-02, T02



∗ Reference dimensions after thread installation

Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazard by labels of **"Caution", "Warning"** or **"Danger"**. To ensure safety, be sure to observe ISO 4414 Note 1), JIS B 8370 Note 2) and other safety practices.

⚠ **Caution :** Operator error could result in injury or equipment damage.

⚠ **Warning :** Operator error could result in serious injury or loss of life.

⚠ **Danger :** In extreme conditions, there is a possible result of serious injury or loss of life.

Note 1) ISO 4414: Pneumatic fluid power--General rules relating to systems.
Note 2) JIS B 8370: General Rules for Pneumatic Equipment

⚠ Warning

1. The compatibility of pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.

Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements. The expected performance and safety assurance will be the responsibility of the person who has determined the compatibility of the system. This person should continuously review the suitability of all items specified, referring to the latest catalog information with a view to giving due consideration to any possibility of equipment failure when configuring a system.

2. Only trained personnel should operate pneumatically operated machinery and equipment.

Compressed air can be dangerous if an operator is unfamiliar with it. Assembly, handling or repair of pneumatic systems should be performed by trained and experienced operators.

3. Do not service machinery/equipment or attempt to remove components until safety is confirmed.

1. Inspection and maintenance of machinery/equipment should only be performed once measures to prevent falling or runaway of the driver objects have been confirmed.
2. When equipment is to be removed, confirm the safety process as mentioned above. Cut the supply pressure for this equipment and exhaust all residual compressed air in the system.
3. Before machinery/equipment is restarted, take measures to prevent shooting-out of cylinder piston rod, etc.

4. Contact SMC if the product is to be used in any of the following conditions:

1. Conditions and environments beyond the given specifications, or if product is used outdoors.
2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, clutch and brake circuits in press applications, or safety equipment.
3. An application which has the possibility of having negative effects on people, property, or animals, requiring special safety analysis.

Common Precautions

Be sure to read before handling.
For detailed precautions on every series, refer to main text.

Selection

⚠ Warning

1. Confirm the specifications.

Products represented in this catalog are designed for use in compressed air appllications only (including vacuum), unless otherwise indicated.
Do not use the product outside their design parameters.
Please contact SMC when using the products in applications other than compressed air (including vacuum).

Mounting

⚠ Warning

1. Instruction manual

Install the products and operate them only after reading the instruction manual carefully and understanding its contents. Also keep the manual where it can be referred to as necessary.

2. Securing the space for maintenance

When installing the products, please allow access for maintenance.

3. Tightening torque

When installing the products, please follow the listed torque specifications.

Piping

⚠ Caution

1. Before piping

Make sure that all debris, cutting oil, dust, etc, are removed from the piping.

2. Wrapping of pipe tape

When screwing piping or fittings into ports, ensure that chips from the pipe threads or sealing material do not get inside the piping. Also, when the pipe tape is used, leave 1.5 to 2 thread ridges exposed at the end of the threads.

Air Supply

⚠ Warning

1. Operating fluid

Please consult with SMC when using the product in applications other than compressed air (including vacuum).
Regarding products for general fluid, please ask SMC about applicable fluids.

2. Install an air dryer, aftercooler, etc.

Excessive condensate in a compressed air system may cause valves and other pneumatic equipment to malfunction.
Installation of an air dryer, after cooler etc. is recommended.

3. Drain flushing

If condensate in the drain bowl is not emptied on a regular basis, the bowl will over flow and allow the condensate to enter the compressed air lines.
If the drain bowl is difficult to check and remove, it is recommended that a drain bowl with the auto-drain option be installed.
For compressed air quality, refer to “Air Preparation Equipment” catalog.

4. Use clean air

If the compressed air supply is contaminated with chemicals, cynthetic materials, corrosive gas, etc., it may lead to break down or malfunction.

Operating Environment

⚠ Warning

1. Do not use in environments where the product is directly exposed to corrosive gases, chemicals, salt water, water or steam.

2. Do not expose the product to direct sunlight for an extended period of time.

3. Do not use in a place subject to heavy vibrations and/or shocks.

4. Do not mount the product in locations where it is exposed to radiant heat.

Maintenance

⚠ Warning

1. Maintenance procedures are outlined in the operation manual.

Not following proper procedures could cause the product to malfunction and could lead to damage to the equipment or machine.

2. Maintenance work

If handled improperly, compressed air can be dangerous.
Assembly, handling and repair of pneumatic systems should be performed by qualified personnel only.

3. Drain flushing

Remove drainage from air filters regularly. (Refer to the specifications.)

4. Shut-down before maintenance

Before attempting any kind of maintenance make sure the supply pressure is shut of and all residual air pressure is released from the system to be worked on.

5. Start-up after maintenance and inspection

Apply operating pressure and power to the equipment and check for proper operation and possible air leaks. If operation is abnormal, please verify product set-up parameters.

6. Do not make any modifications to be product.

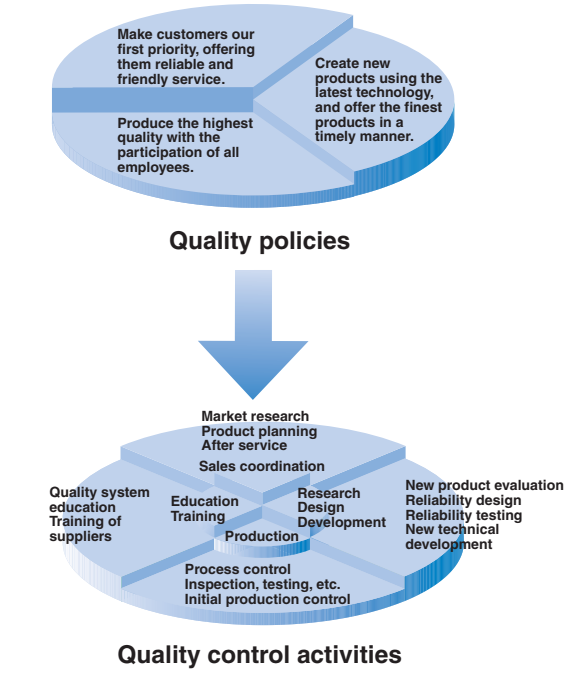
Do not take the product apart.

Quality Assurance Information (ISO 9001, ISO 14001)

Reliable quality of products in the global market

To enable our customers throughout the world to use our products with even greater confidence, SMC has obtained certification for international standards “ISO 9001” and “ISO 14001”, and created a complete structure for quality assurance and environmental controls. SMC products pursue to meet its customers’ expectations while also considering company’s contribution in society.

SMC’s quality control system



Quality management system

ISO 9001

This is an international standard for quality control and quality assurance. SMC has obtained a large number of certifications in Japan and overseas, providing assurance to our customers throughout the world.



Environmental management system

ISO 14001

This is an international standard related to environmental management systems and environmental inspections. While promoting environmentally friendly automation technology, SMC is also making diligent efforts to preserve the environment.



SMC Product Conforming to Inter

SMC products complying with EN/ISO, CSA/UL standards are supporting

CE Mark

The CE mark indicates that machines and components meet essential requirements of all the EC Directives applied.
It has been obligatory to apply CE marks indicating conformity with EC Directives when machines and components are exported to the member Nations of the EU.
Once “A manufacturer himself” declares a product to be safe by means of CE marking (declaration of conformity by manufacturer), free distribution inside the member Nations of the EU is permissible.

■ CE Mark

SMC provides CE marking to products to which EMC and Low Voltage Directives have been applied, in accordance with CETOP (European hydraulics and pneumatics committee) guide lines.

■ As of February 1998, the following 18 countries will be obliged to conform to CE mark legislation

Iceland, Ireland, United Kingdom, Italy, Austria, Netherlands, Greece, Liechtenstein, Sweden, Spain, Denmark, Germany, Norway, Finland, France, Belgium, Portugal, Luxembourg

■ EC Directives and Pneumatic Components

• Machinery Directive

The Machinery Directive contains essential health and safety requirements for machinery, as applied to industrial machines e.g. machine tools, injection molding machines and automatic machines. Pneumatic equipment is not specified in Machinery Directive. However, the use of SMC products that are certified as conforming to EN Standards, allows customers to simplify preparation work of the Technical Construction File required for a Declaration of Conformity.

• Electromagnetic Compatibility (EMC) Directive

The EMC Directive specifies electromagnetic compatibility. Equipment which may generate electromagnetic interference or whose function may be compromised by electromagnetic interference is required to be immune to electromagnetic affects (EMS/immunity) without emitting excessive electromagnetic affects (EMI/emission).

• Low Voltage Directive

This directive is applied to products, which operate above 50 VAC to 1000 VAC and 75 VDC to 1500 VDC operating voltage, and require electrical safety measures to be introduced.

• Simple Pressure Vessels Directive

This directive is applied to welded vessels whose maximum operating pressure (PS) and volume of vessel (V) exceed 50 bar/L. Such vessels require EC type examination and then CE marking.

national Standards

you to comply with EC directives and CSA/UL standards.

Mark of compliance for CSA/UL

Mark of compliance for CSA

NRTL /C

■ CSA Standards & UL Standards

UL and CSA standards have been applied in North America (U.S.A. and Canada) symbolizing safety of electric products, and are defined to mainly prevent danger from electric shock or fire, resulting from trouble with electric products. Both UL and CSA standards are acknowledged in North America as the first class certifying body. They have a long experience and ability for issuing product safety certificate. Products approved by CSA or UL standards are accepted in most states and governments beyond question.
Since CSA is a test certifying body as the National Recognized Testing Laboratory (NRTL) within the jurisdiction of Occupational Safety and Health Administration (OSHA), SMC was tested for compliance with CSA Standards and UL Standards at the same time and was approved for compliance with the two Standards. The above CSA NRTL/C logo is described on a product label in order to indicate that the product is approved by CSA and UL Standards.

■ TSSA (MCCR) Registration Products

TSSA is the regulation in Ontario State, Canada. The products that the operating pressure is more than 5 psi (0.03 MPa) and the piping size is bigger than 1 inch. fall into the scope of TSSA regulation.

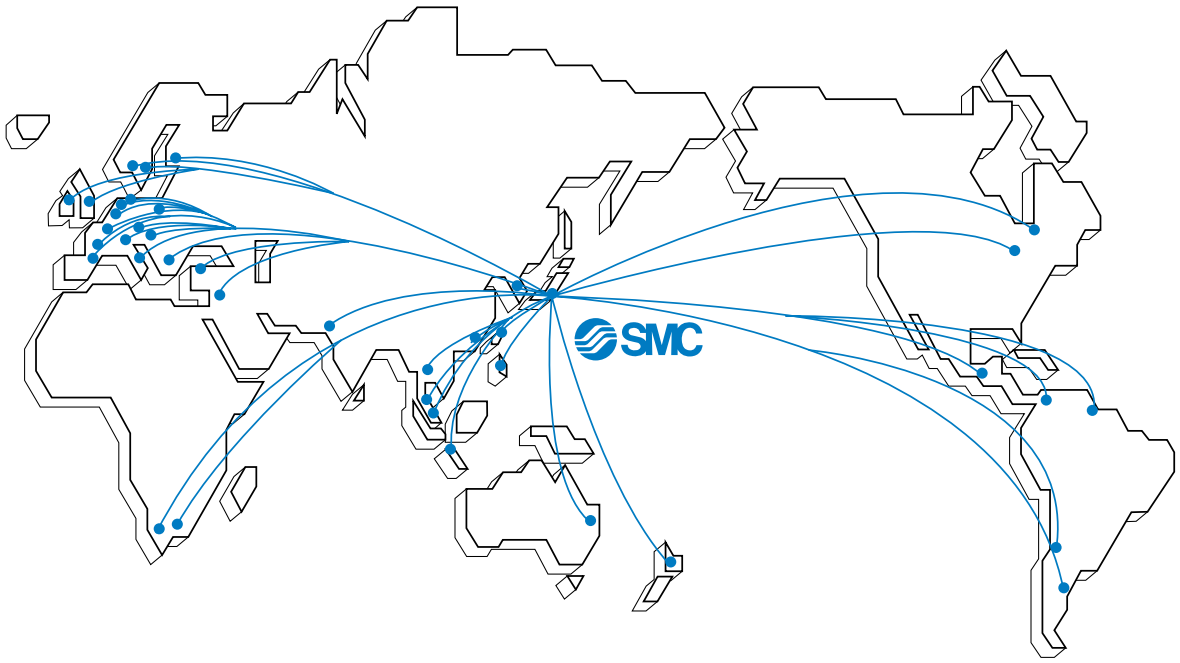
Products conforming to CE Standard

With CE symbol for simple visual recognition

In this catalog each accredited product series is indicated with a CE mark symbol. However, in some cases, every available models may not meet CE compliance. Please visit our web site for the latest selection of available models with CE mark.

http://www.smcworld.com

SMC's Global Service Network



America

U.S.A. **SMC Corporation of America**
3011 North Franklin Road Indianapolis, IN 46226, U.S.A.
TEL: 317-899-4440 FAX: 317-899-3102

CANADA **SMC Pneumatics (Canada) Ltd.**
6768 Financial Drive Mississauga, Ontario, L5N 7J6 Canada
TEL: 905-812-0400 FAX: 905-812-8686

MEXICO **SMC Corporation (Mexico), S.A. DE C.V.**
Carr. Silao-Trejo K.M. 2.5 S/N, Predio San Jose del Duranzo
C.P. 36100, Silao, Gto., Mexico
TEL: 472-72-2-55-00 FAX: 472-72-2-59-44/2-59-46

CHILE **SMC Pneumatics (Chile) S.A.**
Av. La Montaña 1,115 km. 16,5 P. Norte Parque
Industrial Valle Grande, Lampa Santiago, Chile
TEL: 02-270-8600 FAX: 02-270-8601

ARGENTINA **SMC Argentina S.A.**
Teodoro Garcia 3860 (1427) Buenos Aires, Argentina
TEL: 011-4555-5762 FAX: 011-4555-5762

BOLIVIA **SMC Pneumatics Bolivia S.R.L.**
Avenida Beni Numero 4665
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Vincent Avenue, Crownhill, Milton Keynes, MK8 0AN, Backinghamshire, U.K.
TEL: 01908-563888 FAX: 01908-561185

GERMANY **SMC Pneumatik GmbH**
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TEL: 06103-4020 FAX: 06103-402139

ITALY **SMC Italia S.p.A.**
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TEL: 02-9271365 FAX: 02-9271365

FRANCE **SMC Pneumatique S.A.**
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Marne La Vallee Cedex 3 France
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SWEDEN **SMC Pneumatics Sweden AB**
Ekhagsvägen 29-31, S-141 05 Huddinge, Sweden
TEL: 08-603-07-00 FAX: 08-603-07-10

SWITZERLAND **SMC Pneumatik AG**
Dorfstrasse 7, Postfach 117, CH-8484 Weisslingen, Switzerland
TEL: 052-396-3131 FAX: 052-396-3191

AUSTRIA **SMC Pneumatik GmbH (Austria)**
Girakstrasse 8, A-2100 Korneuburg, Austria
TEL: 0-2262-6228-0 FAX: 0-2262-62285

SPAIN **SMC España, S.A.**
Zuazobidea 14 Pol. Ind. Júndiz 01015 Vitoria, Spain
TEL: 945-184-100 FAX: 945-184-510

IRELAND **SMC Pneumatics (Ireland) Ltd.**
2002 Citywest Business Campus, Naas Road, Saggart, Co. Dublin, Ireland
TEL: 01-403-9000 FAX: 01-466-0385

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TEL: 70252900 FAX: 70252901

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FINLAND **SMC Pneumatics Finland OY**
PL72, Tiistinniityntie 4, SF-02231 ESP00, Finland
TEL: 09-8595-80 FAX: 09-8595-8595

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TEL: 67-12-90-20 FAX: 67-12-90-21

BELGIUM (Distributor) **SMC Pneumatics N.V./S.A.**
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TEL: 03-355-1464 FAX: 03-355-1466

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TEL: 0212-221-1512 FAX: 0212-221-1519

RUSSIA **SMC Pneumatik LLC.**
36/40 Sredny prospect V.O. St. Petersburg 199004, Russia
TEL: 812-118-5445 FAX: 812-118-5449

CZECH **SMC Industrial Automation CZ s.r.o.**
Hudcova 78a, CZ-61200 Brno, Czech Republic
TEL: 05-4121-8034 FAX: 05-4121-8034

HUNGARY **SMC Hungary Ipari Automatizálási kft.**
Budafoki ut 107-113 1117 Budapest
TEL: 01-371-1343 FAX: 01-371-1344

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TEL: 01-3205111 FAX: 01-3261489

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Nova 3, SK-83103 Bratislava
TEL: 02-4445-6725 FAX: 02-4445-6028

SLOVENIA **SMC Industrijska Avtomatilca d.o.o.**
Grajski trg 15, SLO- 8360 Zuzemberk, Slovenia
TEL: 07388-5240 FAX: 07388-5249

LATVIA **SMC Pneumatics Latvia SIA**
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TEL: 777 94 74 FAX: 777 94 75

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14-18 Hudson Avenue Castle Hill NSW 2154, Australia
TEL: 02-9354-8222 FAX: 02-9894-5719

NEW ZEALAND **SMC Pneumatics (New Zealand) Ltd.**
8C Sylvia Park Road Mt.Wellington Auckland, New Zealand
TEL: 09-573-7007 FAX: 09-573-7002

TAIWAN **SMC Pneumatics (Taiwan) Co.,Ltd.**
17, Lane 205, Nansan Rd., Sec.2, Luzhu-Hsiang, Taoyuan-Hsien, TAIWAN
TEL: 03-322-3443 FAX: 03-322-3387

HONG KONG **SMC Pneumatics (Hong Kong) Ltd.**
29/F, Clifford Centre, 778-784 Cheung, Sha Wan Road, Lai Chi Kok, Kowloon, Hong Kong
TEL: 2744-0121 FAX: 2785-1314

SINGAPORE **SMC Pneumatics (S.E.A.) Pte. Ltd.**
89 Tuas Avenue 1, Jurong Singapore 639520
TEL: 6861-0888 FAX: 6861-1889

PHILIPPINES **SHOKETSU SMC Corporation**
Unit 201 Common Goal Tower, Madrigal Business Park,
Ayala Alabang Muntinlupa, Philippines
TEL: 02-8090565 FAX: 02-8090586

MALAYSIA **SMC Pneumatics (S.E.A.) Sdn. Bhd.**
Lot 36 Jalan Delima1/1, Subang Hi-Tech Industrial Park, Batu 3 40000 Shah Alam Selangor, Malaysia
TEL: 03-56350590 FAX: 03-56350602

SOUTH KOREA **SMC Pneumatics Korea Co., Ltd.**
Woolim e-BIZ Center (Room 1008), 170-5, Guro-Dong, Guro-Gu,
Seoul, 152-050, South Korea
TEL: 02-3219-0700 FAX: 02-3219-0702

CHINA **SMC (China) Co., Ltd.**
7 Wan Yuan St. Beijing Economic & Technological Development Zone 100176, China
TEL: 010-67882111 FAX: 010-67881837

THAILAND **SMC Thailand Ltd.**
134/6 Moo 5, Tiwanon Road, Bangkadi, Amphur Muang, Patumthani 12000, Thailand
TEL: 02-963-7099 FAX: 02-501-2937

INDIA **SMC Pneumatics (India) Pvt. Ltd.**
D-107 to 112, Phase-2, Extension, Noida, Dist. Gautaim Budh Nagar,
U.P. 201 305, India
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