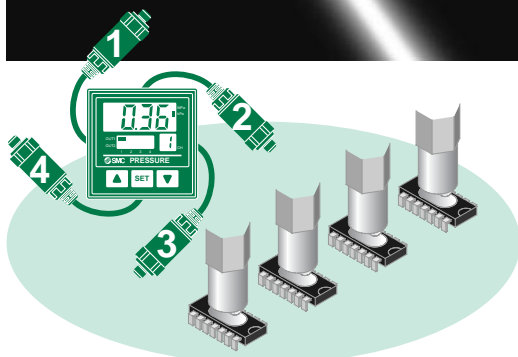


Multi-Channel Controller **Series PSE200**  
Pressure Sensor **Series PSE530**



A single controller monitors up to  
4 pressure sensors.



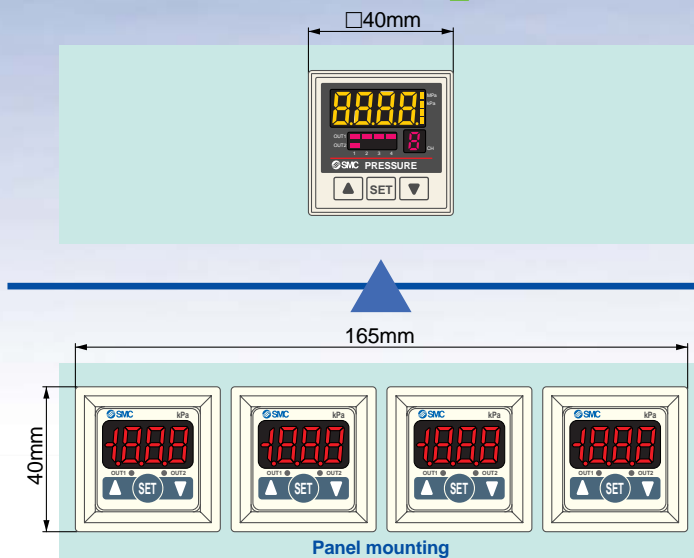
# A single controller monitors

Pressure Sensor  
**Series PSE530**

Multi-Channel Controller  
**Series PSE200**



## Space saving



=

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

**Less panel  
mounting work**



## Simplified application

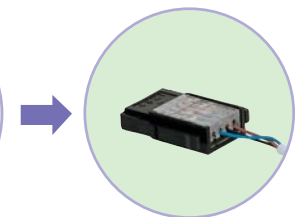
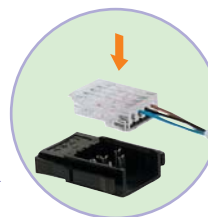
- The use of connector literally makes wiring work a snap.



Controller



**No tools  
required**



Thanks to a tool-free module press-in connector, all you need to do is to simply snap-in the lead wire and lock it! Crimping tools are not required.

The connection cable is a halogen-free heavy-duty cord. (ISO14000 compatible)



Pressure sensor

## Low power consumption: 55mA 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 (page 14)

Allows stable switch output even when supply pressure changes.

### Auto preset (page 11)

Automatically sets the pressure value.

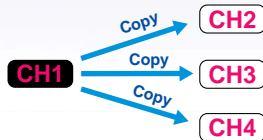
### Auto identification function (page 14)

Can automatically identify the pressure range of a connected SMC sensor.

### Copy function (page 14)

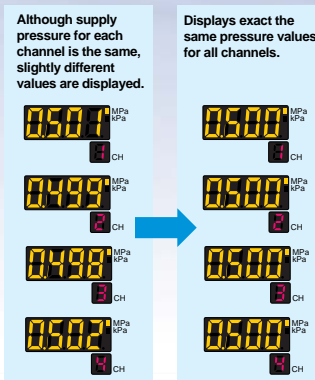
Each channel's information can be copied to another channel.

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



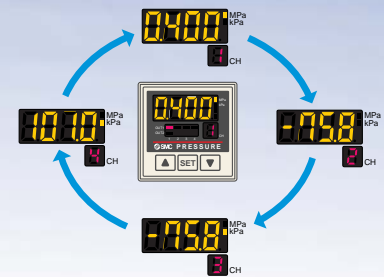
### Display calibration (page 14)

Each channel has an adjustable display function.



### Channel scan function (page 15)

Allows constant monitoring of the displayed pressure value for each channel.



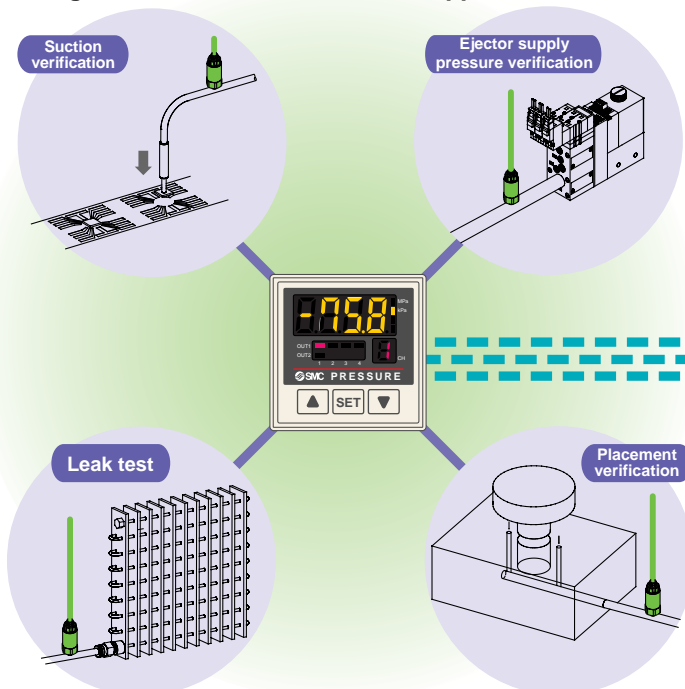
- Reset function
- Key lock function
- Displays peak & bottom pressure values

### Anti-chattering function (page 9)

Prevents malfunction due to sudden pressure changes.

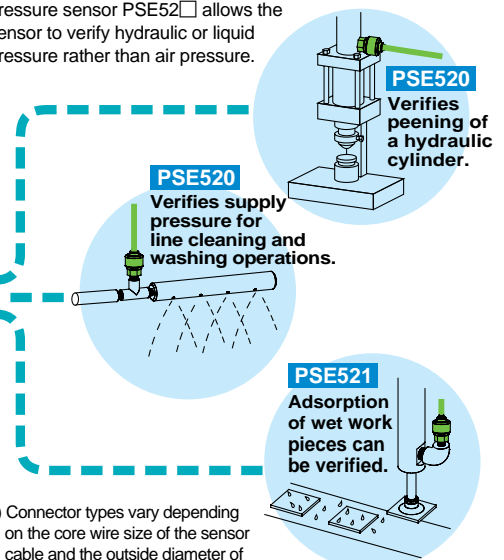
## 4 Application

### 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.



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 22.

# Pressure Sensor

## Series *PSE530*

### How to Order

PSE53 **0** – **M5** –  


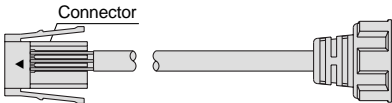
#### Pressure sensing range

<b>0</b>	High pressure [0 to 1MPa]
<b>1</b>	Vacuum [0 to -101kPa]
<b>2</b>	Low pressure [0 to 101kPa]
<b>3</b>	Compound pressure [-101 to 101kPa]

#### Port size

<b>M5</b>	M5
-----------	----

#### Option

<b>Nil</b>	Without cable
<b>L</b>	Sensor cable (3m) 
<b>CL</b>	Sensor cable (3m) + Connector (1 pc.) 

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

### Options

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

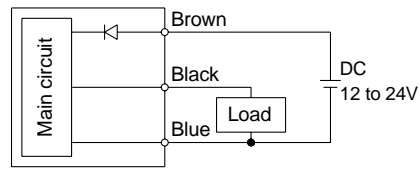
Description	Part no.	Note
Connector	ZS-26-E	4 pcs. per set
Sensor cable	ZS-26-F	Cable length: 3m
Connector + Sensor cable	ZS-26-G	Cable length: 3m The connector is not connected to the cable at the time of shipment.

### Specifications

Model		PSE530-M5	PSE531-M5	PSE532-M5	PSE533-M5
Rated pressure range		0 to 1MPa	0 to −101kPa	0 to 101kPa	−101 to 101kPa
Proof pressure		1.5MPa	500kPa		
Fluid		Air, Non-corrosive gas			
Power supply voltage		12 to 24VDC (Ripple ±10% or less)			
Current consumption		15mA or less			
Output specification		Analogue output (1 to 5V, Output impedance: Approx. 1kΩ)			
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 18V ranging from 12 to 24VDC			
Resistance	Enclosure	IP40			
	Temperature range	0° to 50°C; Stored: −10° to 70°C (with no condensation and no freezing)			
	Withstand voltage	1000VAC, 50/60Hz for 1 minute between external terminals and case			
	Insulation resistance	5MΩ between external terminals and case (at 50VDC)			
	Vibration resistance	10 to 500Hz at whichever is smaller of 1.5mm amplitude or 98m/s² acceleration, in X, Y, Z directions, for 2 hours each (de-energized)			
	Impact resistance	980m/s² 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			
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, 0.15mm², 3 cores, 3m			

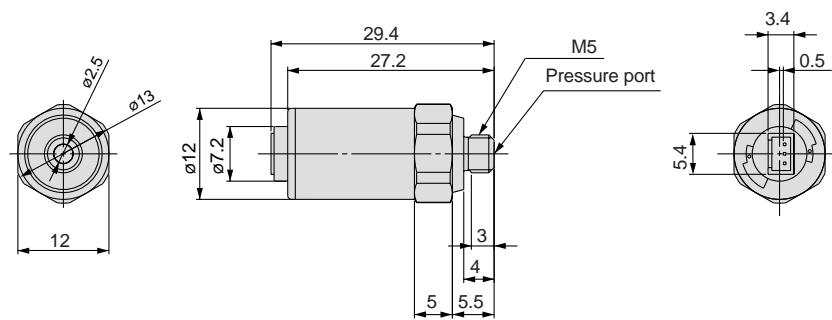
## Internal Circuit

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

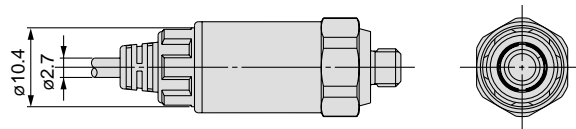


## Dimensions

### PSE53□-M5



#### With sensor cable



# Multi-channel Controller

## Series *PSE200*

### How to Order

PSE20 **0** — **M**    

#### Input/Output specifications

<b>0</b>	NPN 5 outputs + Auto shift input
<b>1</b>	PNP 5 outputs + Auto shift input

#### Unit specifications

<b>Nil</b>	With unit display switching function
<b>M</b>	Fixed SI unit <small>Note)</small>

Note) Fixed units

For vacuum low pressure & compound pressure: kPa

For high pressure: MPa



#### Option 2

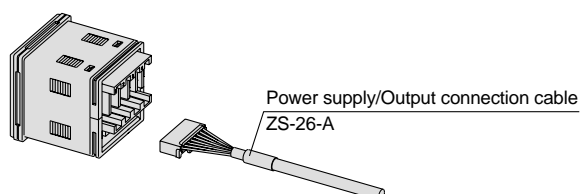
<b>Nil</b>	Without connector
<b>4C</b>	Sensor connector (4 pcs.)

#### Option 1

<b>Nil</b>	Without panel mount/protective cover
<b>A</b>	<b>Panel mount</b> <p>Waterproof seal (accessory)</p> <p>Panel mount adapter</p> <p>Panel</p> <p>Mounting screws (M3 x 8L) (accessory)</p>
<b>B</b>	<b>Front protective cover + Panel mount</b> <p>Front protective cover</p> <p>Waterproof seal (accessory)</p> <p>Panel mount adapter</p> <p>Panel</p> <p>Mounting screws (M3 x 8L) (accessory)</p>

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

Included with the controller.



### Options

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
<input type="checkbox"/> 48 conversion adapter This adapter is used to mount Series PSE200 on the panel fitting of Series PS100.	ZS-26-D  <input type="checkbox"/> 48 conversion adapter 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 24VDC $\pm 10\%$ , Ripple (p-p) 10% or less (with power supply polarity protection)	
Current consumption		55mA or less (Current consumption for sensor is not included.)	
Power supply voltage for sensor		[Power supply voltage] $-1.5V$	
Power supply current for sensor <sup>Note 1)</sup>		40mA maximum (100mA maximum for the total power supply current when 4 sensors are input.)	
Sensor input	No. of inputs	1 to 5VDC (Input impedance: Approx. 800k $\Omega$ )	
	Input protection	With excess voltage protection (up to 26.4V)	
	Hysteresis mode	Variable	
Hysteresis	Window comparator mode	3-digit fixed	
	No. of outputs	5 outputs (CH1: 2 outputs, CH2 to 4: 1 output)	
Switch output	Maximum load current	80mA	
	Maximum load voltage	30VDC (with NPN)	
	Residual voltage	1V or less (with load current of 80mA)	
	Output protection	With short circuit protection	
Response time		5ms or less	
Anti-chattering function		With anti-chattering function, Response time selection: 20ms, 160ms, 640ms	
Repeatability		$\pm 0.1\%$ F.S. or less	
Setting/Display accuracy		$\pm 0.5\%$ F.S. $\pm 1$ digit or less (at ambient temperature of $25^\circ \pm 3^\circ C$ )	
Display		For measured value display: 4-digit, 7-segment indicator, Display colour: Yellow For channel display: 1-digit, 7-segment indicator, Display colour: Red	
Indication light		Red (Lights up when output is ON.)	
Auto shift input		Non-voltage input (reed or solid state), Input 10ms or more, Independently controllable auto shift function ON/OFF	
Auto identification function <sup>Note 2)</sup>		With auto identification function	
Resistance	Enclosure	Front face: IP65, Other: IP40	
	Ambient temperature range	Operating: $0^\circ$ to $50^\circ C$ , Stored: $-10^\circ$ to $60^\circ C$ (with no condensation or freezing)	
	Ambient humidity range	Operating/Stored: 35 to 85% RH (with no condensation)	
	Vibration resistance	10 to 500Hz at whichever is smaller of 1.5mm amplitude or 98m/s <sup>2</sup> acceleration, in X, Y, Z directions for 2 hrs. each (de-energized)	
	Impact resistance	980m/s <sup>2</sup> in X, Y, Z directions, 3 times each (de-energized)	
Temperature characteristics		$\pm 0.5\%$ F.S. or less based on $25^\circ C$	
Connection		Power supply/Output connection: 8P connector, Sensor connection: 4P connector	
Material		Enclosure: PBT; Display: Transparent nylon; Back rubber cover: CR	
Weight		Approx. 60g (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 1MPa	10 to -101kPa	-10 to 101kPa	-101 to 101kPa
Set pressure resolution <sup>Note 3)</sup>	kPa	—	0.1	0.1	0.1
	MPa	0.001	—	—	—
	kgf/cm <sup>2</sup>	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 0V side of the sensor input connector are short circuited, the inside of the controller will be damaged.

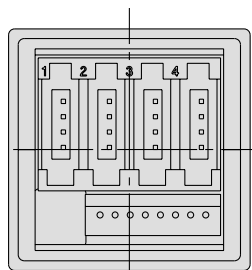
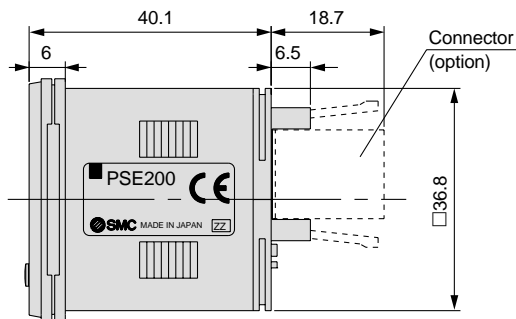
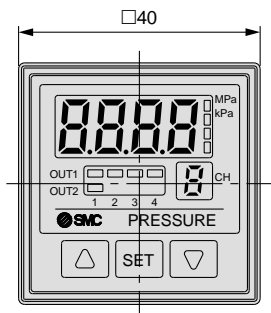
Note 2) Auto identification function comes with "Series PSE53□" pressure sensor only. Other SMC series (PSE510 and PSE520) are not equipped with this function.

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.)

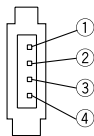
# Series PSE200

## Dimensions

### PSE200 & PSE201

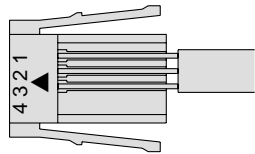


Sensor connector (4P x 4)

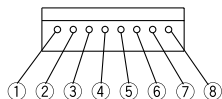


PIN no.	Terminal
①	DC(+)
②	IN (1 to 5V)
③	DC(-)
④	N.C.

Connector (optional)

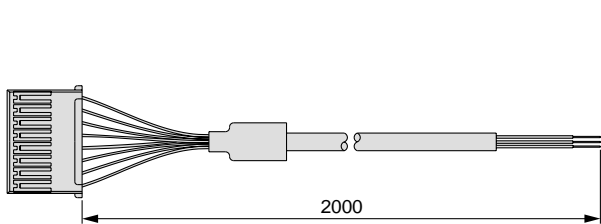


Power supply/Output connector (8P)



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)

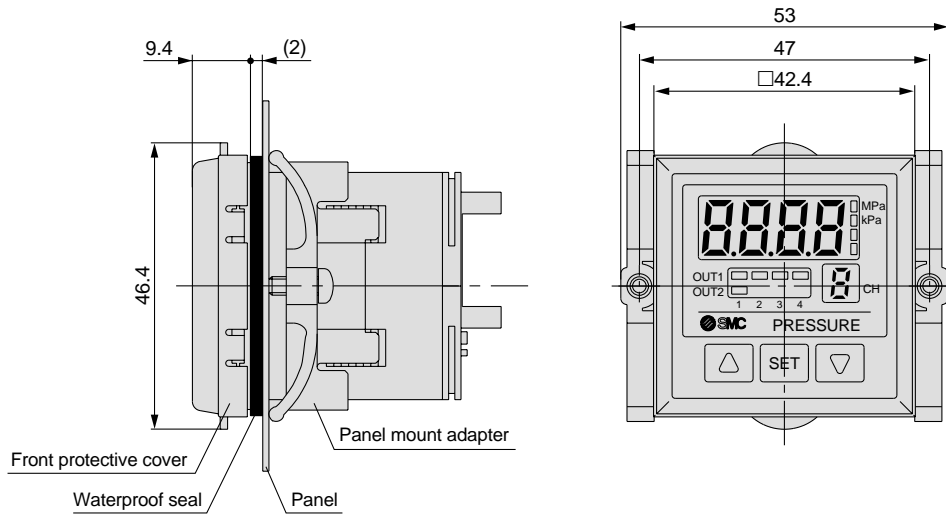


Pin no.	Terminal
8 Yellow	Auto shift input
7 Green	CH4_OUT1
6 Red	CH3_OUT1
5 Gray	CH2_OUT1
4 White	CH1_OUT2
3 Black	CH1_OUT1
2 Blue	DC(-)
1 Brown	DC(+)

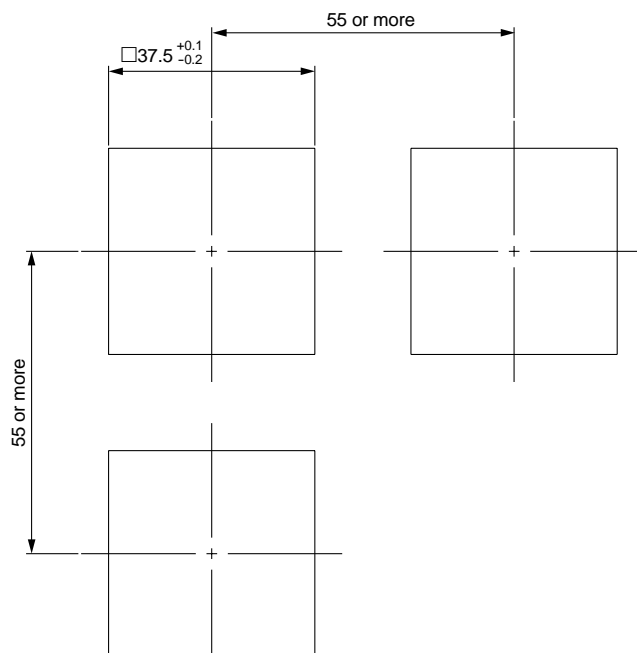
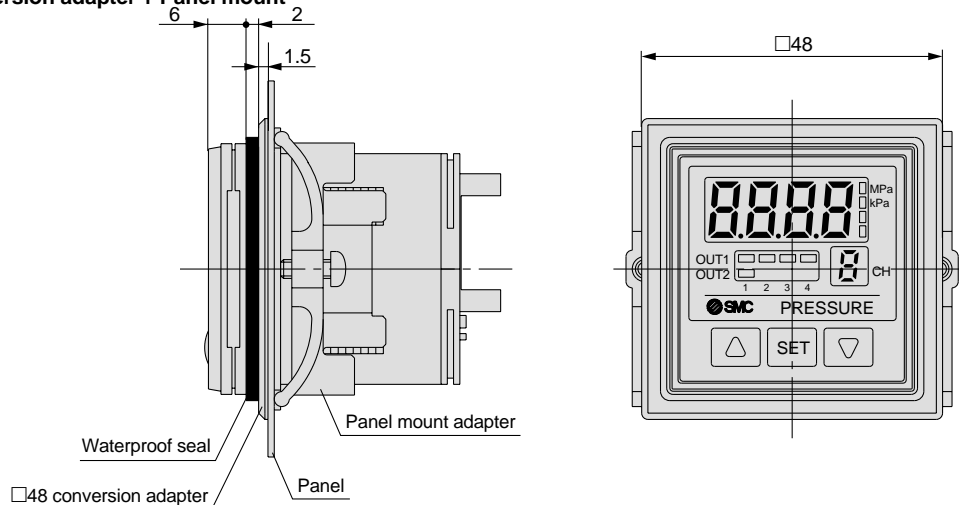


## Dimensions

### Front protective cover + Panel mount



### $\square 48$ conversion adapter + Panel mount



**Panel fitting dimension**  
Applicable panel thickness: 0.5 to 8mm

## Descriptions

### 4-digit display

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

### Switch output display

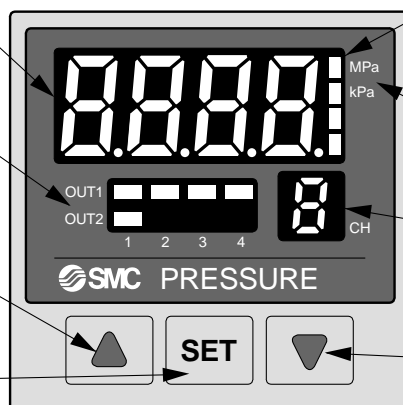
Displays the output status of OUT1 (CH1 to CH4), OUT2 (CH1 only). Lights up when it is ON.

### 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/cm<sup>2</sup> bar PSI inHg mmHg

### Channel display

Displays the selected channel.

### DOWN button

Use this button to change the mode or set value.

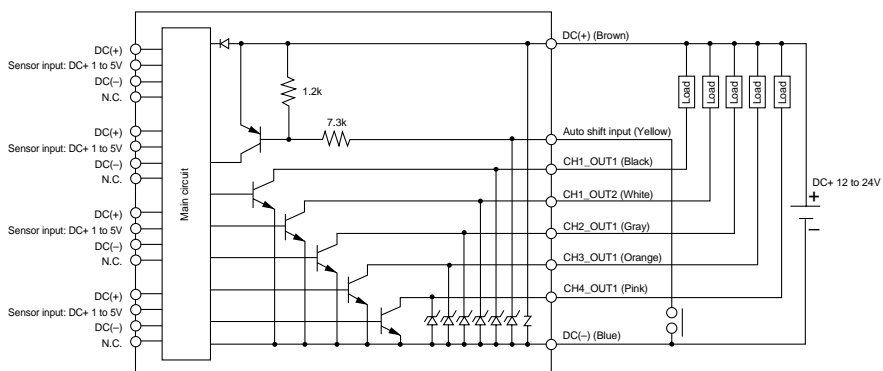
## Error Code & Solution

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: $\pm 2.5\%$ F.S. or more. When pressure other than compound pressure is used: $\pm 5\%$ 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.	Contact SMC.
Er 6	Internal data error.	Shut off the power supply and turn it back on. Contact SMC if it does not recover.
Er 7	Internal data error.	
Er 8	Internal data error.	

## Internal Circuits and Connections

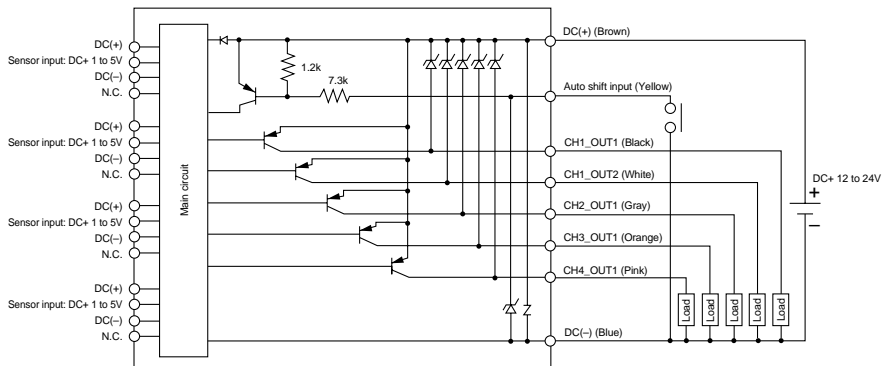
### PSE200-(M)□

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



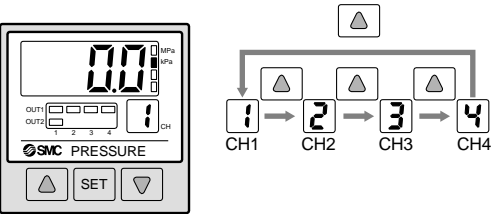
### PSE201-(M)□

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



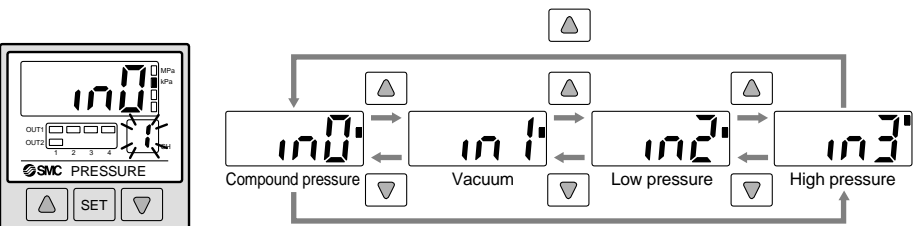
Operation 1 : Initial Setting

1 Channel selection



Press **SET** button and hold for 2 seconds or longer.

2 Range setting



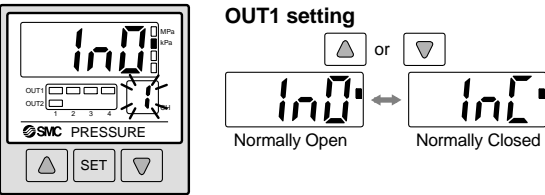
Note) Sensor range varies depending on the type of pressure sensor.

Pressure sensor/Sensor range

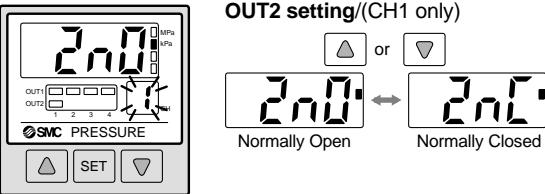
Sensor supply pressure	in0 (Compound pressure)	in1 (Vacuum)	in2 (Low pressure)	in3 (High pressure)
Regulating pressure range	-101 to 101kPa	10 to -101kPa	-10 to 101kPa	-0.1 to 1MPa
Applicable pressure sensor	PSE533	PSE531	PSE532	PSE530

If the controller is equipped with a unit switching function, unit setting can be changed.  
(Refer to page 14 for details.)

3 Output mode setting



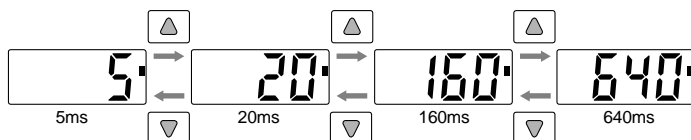
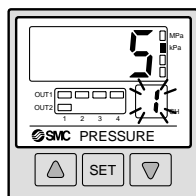
**SET** (For CH2, CH3, and CH4, go to ④ Response time setting.)



**SET**

## Operation 1: Initial Setting

### 4 Response time setting



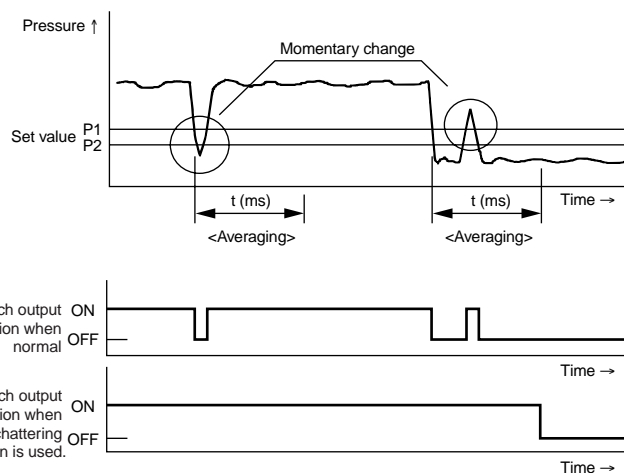
Press **SET** button.

#### Anti-chattering function

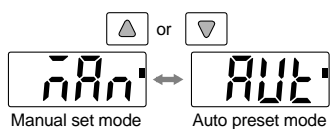
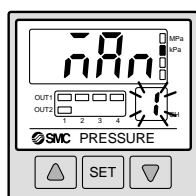
Devices such as large bore cylinders and high-flow vacuum ejectors consume a large volume of air when they operate, and this may cause a momentary drop in the supply pressure. This function prevents such momentary drops from being detected as abnormal pressures by changing the response time setting.

#### <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

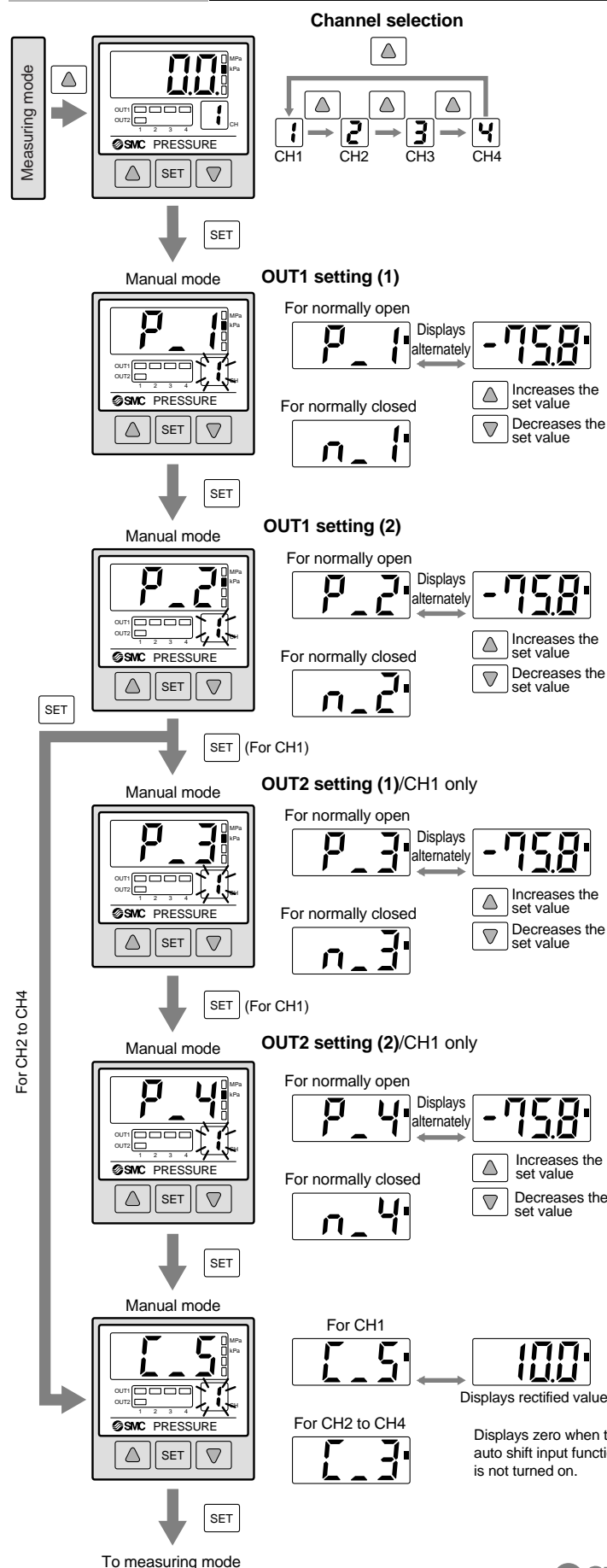


Press **SET** button.

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

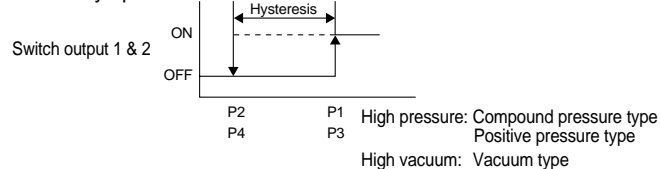
### Manual setting



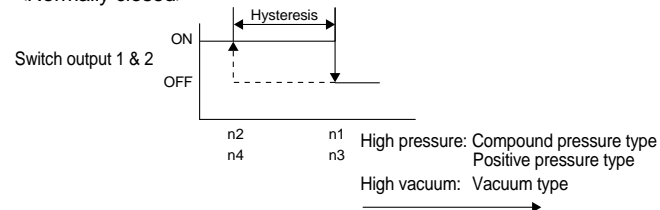
### Output mode

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

<Normally open>



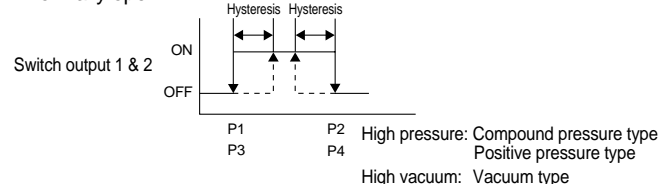
<Normally closed>



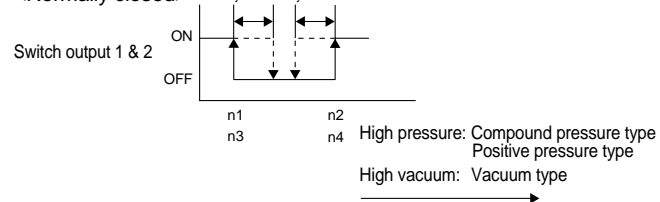
Note) If the hysteresis is set for less than 2 digits, the switch output may possibly chatter when the input pressure changes around the set value.

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	Note 1) Hysteresis mode	Note 2) Window comparator mode
-101.0 to 101.0kPa	Adsorption and vacuum release verification	$in0$	$P2(n2) \leq P1(n1)$	$P2(n1) > P1(n2)$
10.0 to -101.0kPa	Adsorption verification	$in1$	$P2(n2) \geq P1(n1)$	$P2(n1) < P1(n2)$
-10.0 to 101.0kPa	Supply pressure verification	$in2$	$P2(n2) \leq P1(n1)$	$P2(n1) > P1(n2)$
-0.1 to 1000.0MPa	Leak test	$in3$	$P2(n2) \leq P1(n1)$	$P2(n1) > P1(n2)$

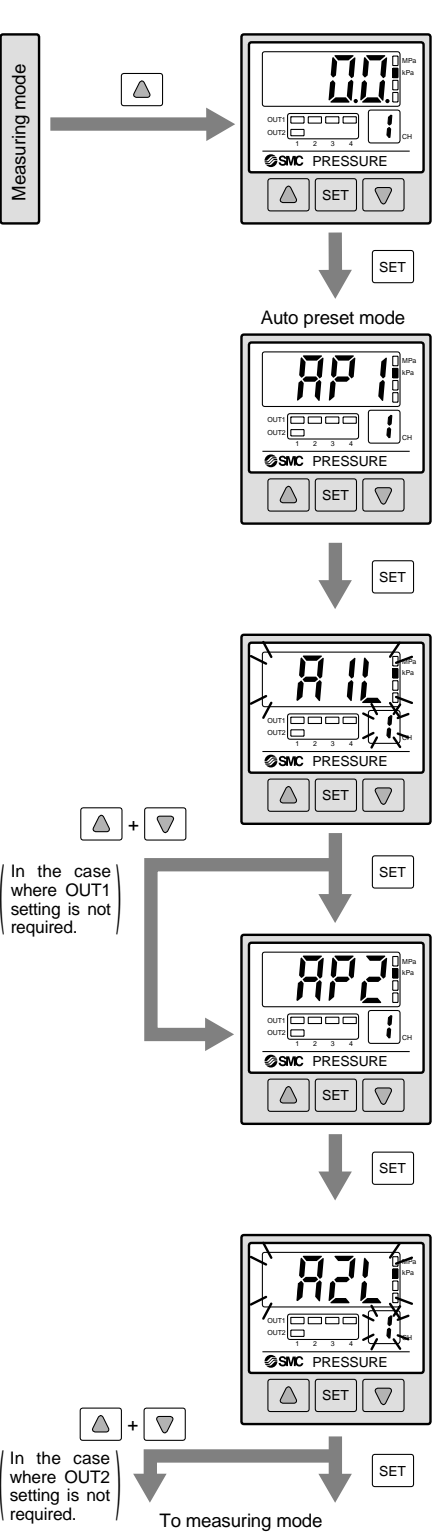
\* P3(n3) and P4(n4) are the same as P1(n1) and P2(n2).

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

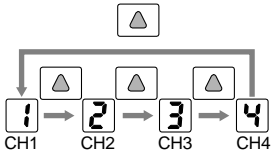
Note 2) The hysteresis is set to 3 digits. When setting the pressure in the window comparator mode, allow 7 digits or more. If the allowance is less than 7 digits, the controller will not operate.

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 work piece 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 work piece such as the (suction) nozzle with vacuum pad attachment and supply vacuum pressure.

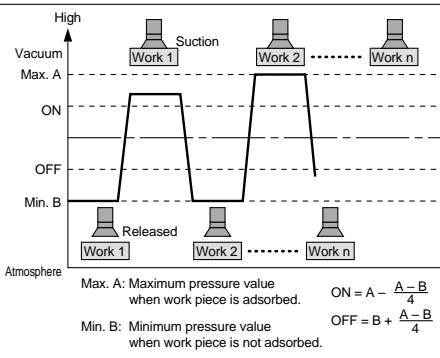
**For supply pressure verification:**  
Prepare the equipment for the OUT2 setting in this mode.

**OUT2 auto preset (CH1 only)**

**For adsorption verification:**  
In this mode, repeat the adsorption and release of the work piece for a few times.  
The optimum values will be set automatically.

**For supply pressure verification:**  
The optimum values will be set automatically.

Adsorption verification

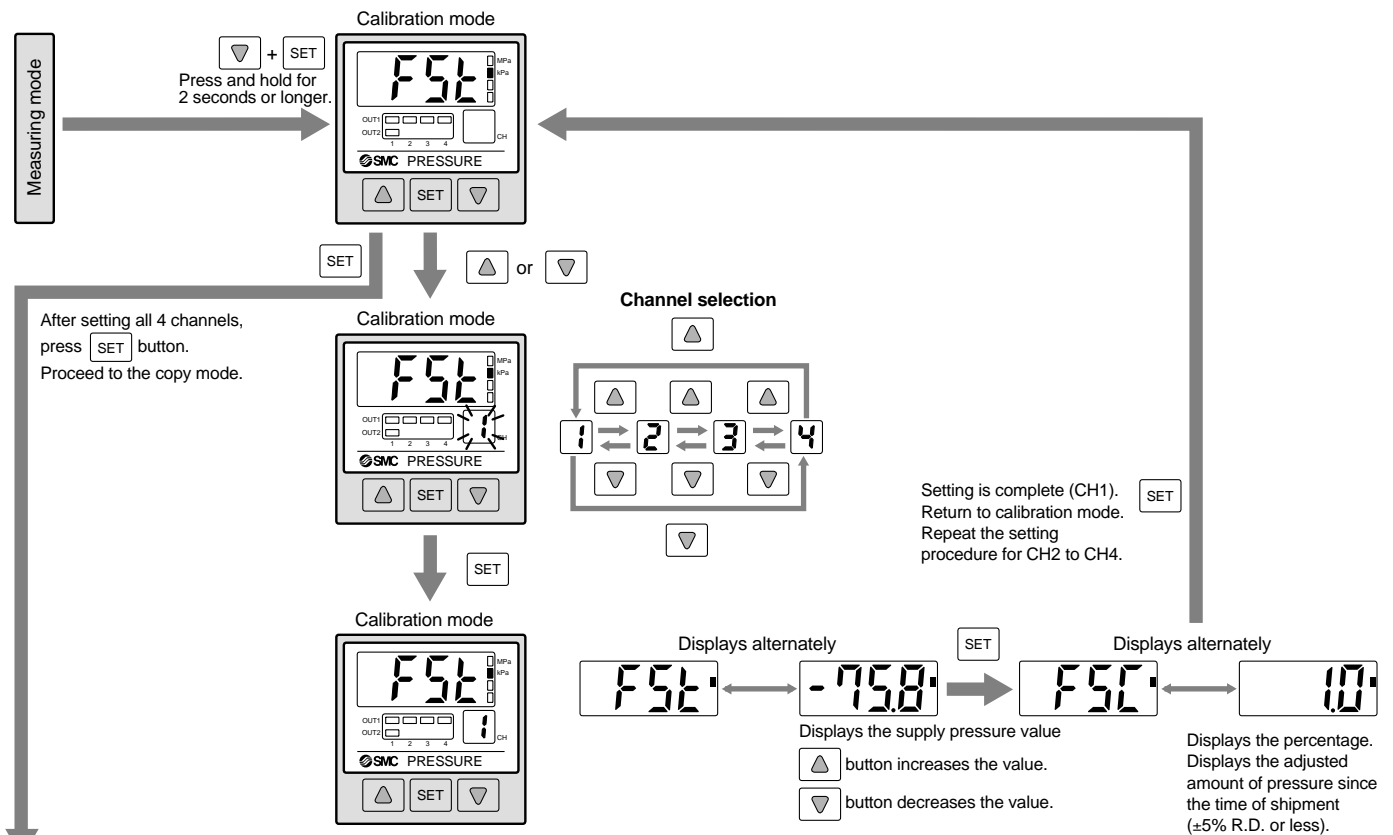




## Operation 3 : Special Setting

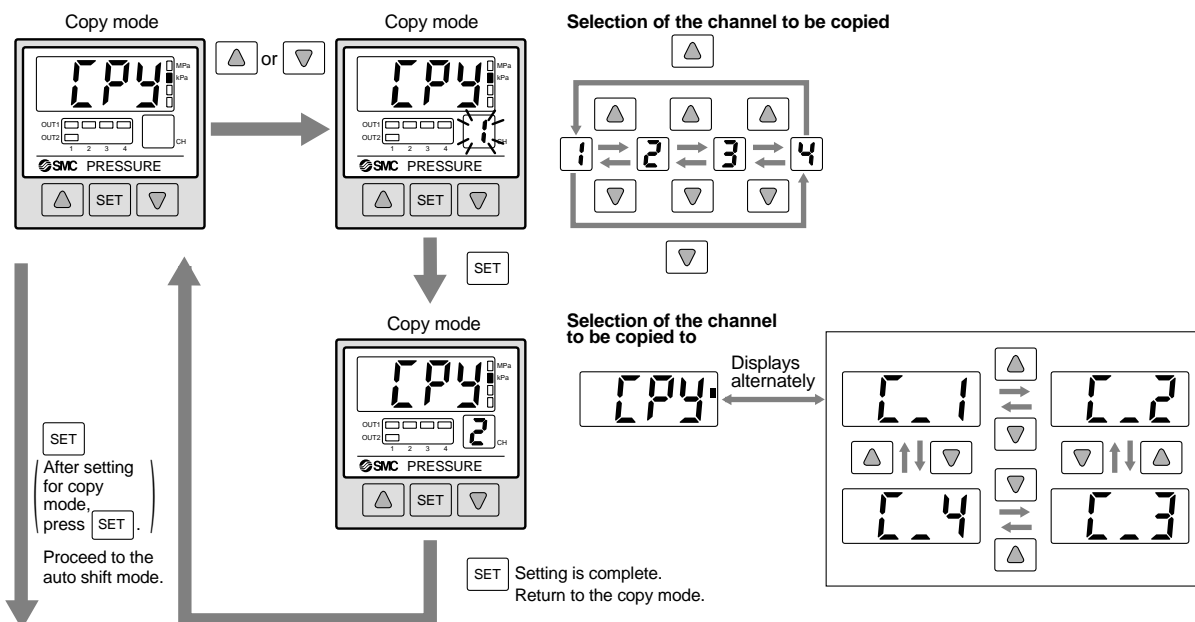
### 1 Precision indicator setting

Refer to **A** Display calibration function on page 14 for details.



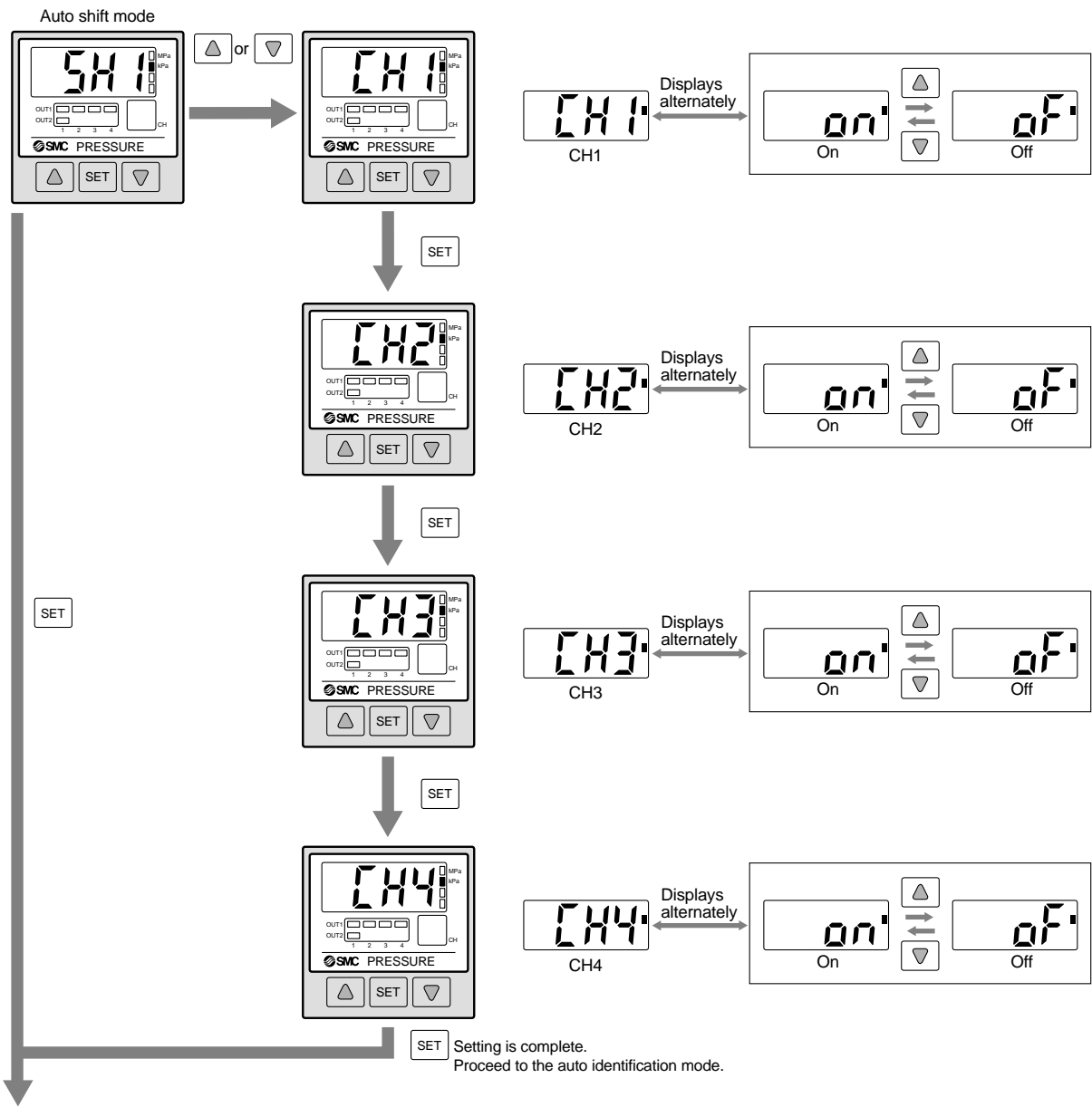
### 2 Copy setting

Refer to **B** Copy setting function on page 14 for details.

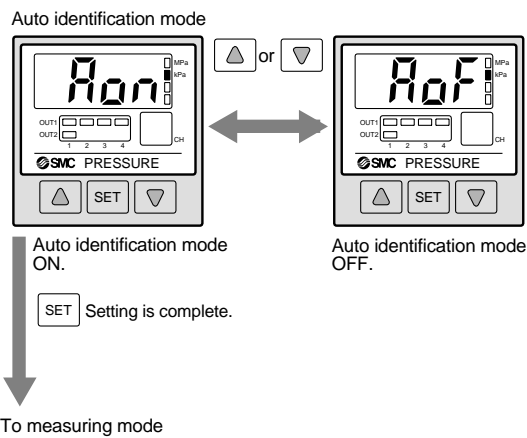


Operation **3**: Special Setting

**3 Auto shift** Refer to **G** Auto shift function on page 14 for details.



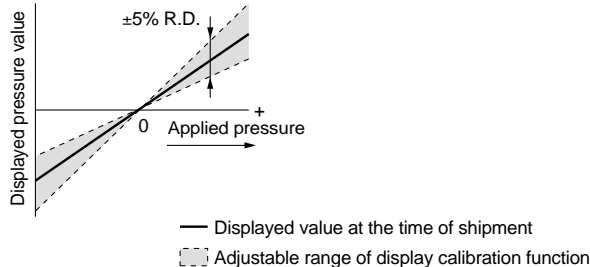
**4 Auto identification** Refer to **D** Auto identification function on page 14 for details.



## 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  $\pm 5\%$ .



Note) When the display calibration function is used, the regulating pressure value may change  $\pm 1$  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 work piece is being adsorbed, or does not turn OFF even though the work piece 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 10ms 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 15ms 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

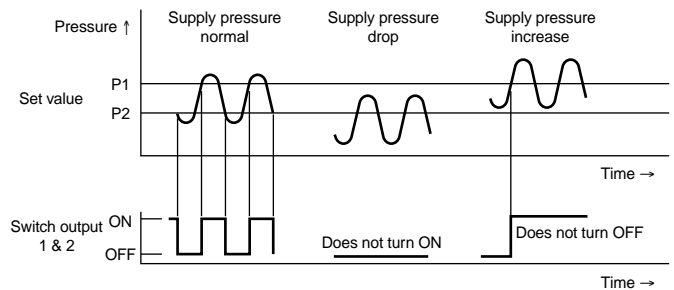
Information that can be copied includes the following: ① Pressure set values Range settings ③ Display Units ④ Output modes ⑤ Response times.

- 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.

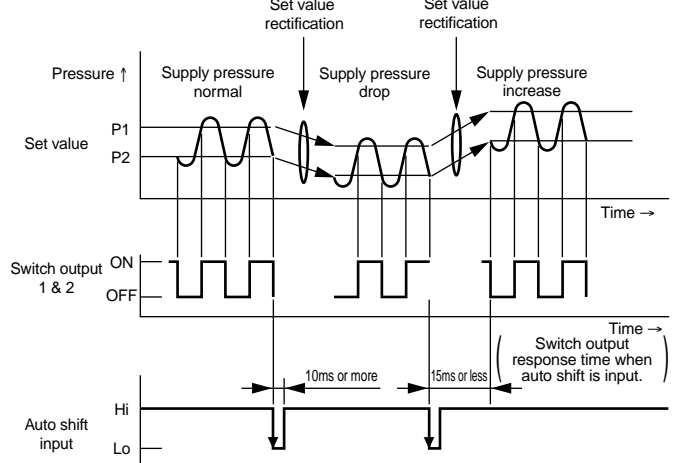
Note) When the copy function is used, the regulating pressure value of the copied channel may change  $\pm 1$  digit.

#### 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.

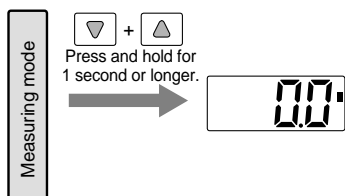
Display units can be selected using either ◀ or ▶.

#### Unit display and resolution

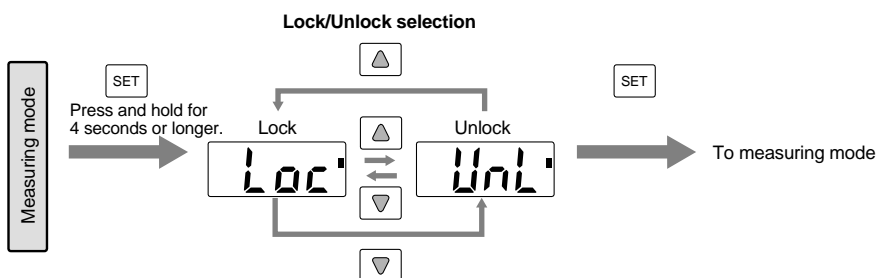
Applicable pressure sensor	PSE530	PSE531	PSE532	PSE533
Regulating pressure range	-0.1 to 1MPa	10 to -101kPa	-10 to 101kPa	-101 to 101kPa
PR	kPa	—	0.1	0.1
	MPa	0.001	—	—
GF	kgf/cm <sup>2</sup>	0.01	0.001	0.001
bar	bar	0.01	0.001	0.001
PSI	psi	0.1	0.01	0.02
mmHg	mmHg	—	1	1
inHg	inHg	—	0.1	0.1

## Operation 4: Other Functions

### Reset

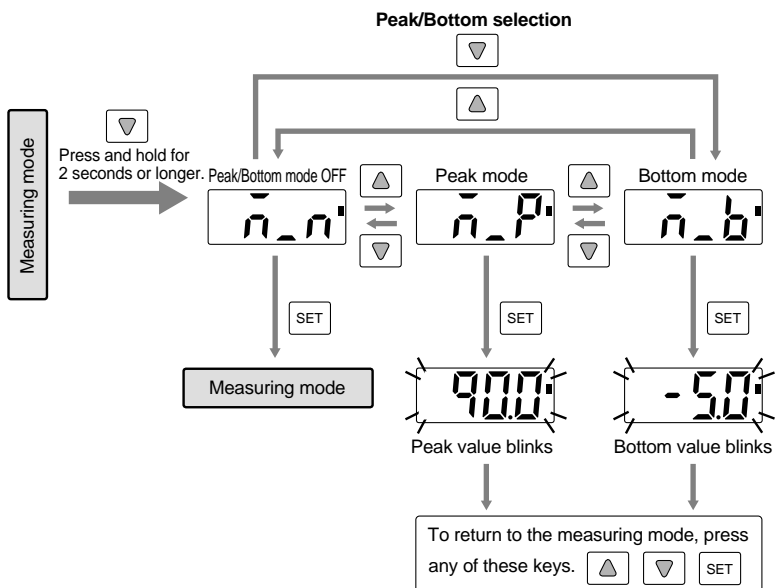


### Key Lock



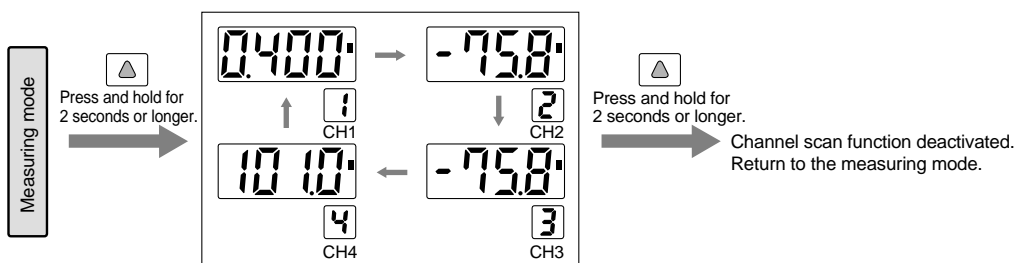
Note) Channel selection and channel scan operation will not be locked even if the key lock function is on.

### 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.





*Series PSE*

# 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 a label 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 – Recommendations for the application of equipment to transmission and control 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 with the specific pneumatic system must be based on specifications or after analysis and/or tests to meet your specific requirements.

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

Compressed air can be dangerous if handled incorrectly. Assembly, handling or maintenance 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 after confirmation of safe locked-out control positions.
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. (Bleed air into the system gradually to create back pressure.)

**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, press applications, or safety equipment.
3. An application which has the possibility of having negative effects on people, property, or animals, and therefore requires special safety analysis.





## Series PSE Pressure Switch Precautions

Be sure to read before handling. Refer to pages 17 through 19 for general safety instructions and common precautions, and to pages 20 through 22 for specific product precautions.

### Design & Selection

#### Warning

##### 1. Operate the switch only within the specified voltage.

Use of the switch outside the range of the specified voltage can cause not only malfunction and damage of the switch but also electrocution and fire.

##### 2. Do not exceed the maximum allowable load specification.

A load exceeding the maximum load specification can cause damage to the switch or shorten its operating life span.

##### 3. Do not use a load that generates surge voltage.

Although surge protection is installed in the circuit at the output side of the switch, damage may still occur if a surge is applied repeatedly. When a surge generating a load such as a relay or solenoid is directly driven, use a type of switch with a built-in surge absorbing element.

##### 4. Since the type of fluid varies depending on the product, be sure to verify the specifications.

The switches do not have an explosion proof rating. To prevent a possible fire hazard, do not use with flammable gases or fluids.

##### 5. Operate the switch within the regulating pressure range and maximum operating pressure.

Malfunction can occur if the pressure sensor is used outside the specified pressure range, and the sensor may be permanently damaged if used at a pressure that is above the maximum operating pressure.

### Mounting

#### Warning

##### 1. If the equipment is not operating properly, do not continue to use it.

Connect air and power after installation, repairs, or modifications, and verify proper installation. The switch should be checked for proper operation and possible leaks.

##### 2. Mount switches using the proper tightening torque.

When a switch is tightened beyond the specified tightening torque, the mounting screws, mounting bracket, or switch may be damaged. On the other hand, tightening below the specified tightening torque may cause the installation screws to come loose during operation.

Connection thread: M5

Nominal thread size	Tightening torque (N·m)
M5	1/6 rotation after tightening by hand

##### 3. Apply wrench only to that is integrated with the piping when installing the pressure switch onto the system piping.

Do not apply a wrench to the resin part as this may damage the switch.

### Wiring

#### Warning

##### 1. Verify the colour and terminal number when wiring.

Incorrect wiring can cause the switch to be damaged and malfunction. Verify the color and the terminal number in the instruction manual when wiring.

##### 2. Avoid repeatedly bending or stretching the lead wire.

Repeatedly applying bending stress or stretching force to the lead wire will cause it to break. If you believe the lead wire is damaged and likely to cause malfunctions, replace it.

##### 3. Confirm proper insulation of wiring.

Make sure that there is no faulty wiring insulation (contact with other circuits, ground fault, improper insulation between terminals, etc.). Damage may occur due to excess current flow into a switch.

### Operating Environment

#### Warning

##### 1. Never use in an atmosphere of explosive gases.

The switches do not have an explosion proof rating. Never use in the presence of an explosive gas as this may cause a serious explosion.

### Maintenance

#### Warning

##### 1. Perform a periodical inspections for proper operation of the switch.

Unexpected malfunctions may cause possible danger.

##### 2. Take precautions when using the switch for an interlock circuit.

When a pressure switch is used for an interlock circuit, devise a multiple interlock system to avoid trouble. Verify the operation of the switch and interlock function on a regular basis.



## Series PSE

# Digital Pressure Switch Precautions

Be sure to read before handling. Refer to pages 17 through 19 for general safety instructions and common precautions, and to pages 20 through 22 for specific product precautions.

### Selection

#### ⚠ Warning

##### 1. Monitor the internal voltage drop of the switch.

When operating below a specified voltage, it is possible that the load may be ineffective even though the pressure switch function is normal. Therefore, the formula below should be satisfied after confirming the minimum operating voltage of the load.

$$\text{Supply voltage} - \text{Internal voltage drop of switch} > \text{Minimum operating voltage of load}$$

#### ⚠ Caution

##### 1. Data of the multi-channel controller will be stored even after the power is turned off.

Input data (set pressure, etc.) will be stored in EEPROM so that the data will not be lost after the pressure switch is turned off. (Data will be stored for up to 100,000 hours after the power is turned off.)

### Mounting

#### ⚠ Warning

##### 1. Operation

Refer to the instruction manual for the operation of the digital pressure switch.

##### 2. Do not touch the LCD indicator.

Do not touch the LCD indicator face of the pressure switch during operation. Static electricity can change the readout.

##### 3. Pressure port

Do not introduce wire, needles, or similar objects to the pressure port as this may damage the pressure sensor and cause malfunctions.

### Wiring

#### ⚠ Warning

##### 1. Do not wire in conjunction with power lines or high voltage lines.

Wire separately from power lines and high voltage lines, avoiding wiring in the same conduit with these lines. Control circuits including switches may malfunction due to noise from these other lines.

##### 2. Do not allow loads to short circuit.

(3-wire type)

Although digital pressure switches indicate excess current error if loads are short circuited, all incorrect wiring connections cannot be protected. Take precautions to avoid incorrect wiring.

As for other pressure switches, the switches will be instantly damaged if loads are short circuited. Take special care to avoid reverse wiring between the brown power supply line and the black output line on 3-wire type switches.

##### 3. Connect a DC(–) wire (blue) as close as possible to the DC power supply GND terminal.

Connecting the power supply away from the GND terminal can cause malfunctions due to noise from devices that are connected to the GND terminal.

### Air supply

#### ⚠ Warning

##### 1. Use the switch within the specified fluid and ambient temperature range.

Ambient and fluid temperature operation is as follows:

Digital pressure switches: 0° to 50°C

Other pressure switches: 0° to 60°C

Take measures to prevent freezing moisture in circuits when below 5°C, since this may cause damage to the O-ring and lead to a malfunction. The installation of an air dryer is recommended for eliminating condensate and moisture. Never use the switch in an environment where there are drastic temperature changes even when these temperatures are within the specified temperature range.

##### 2. Vacuum switch

An instant pressure pulse of up to 0.5MPa (at the time of vacuum release) will not affect the performance of the switch. However, a constant pressure of 0.2MPa or more should be avoided.

### Operating Environment

#### ⚠ Warning

##### 1. Do not use in an area where surges are generated.

When there are units that generate a large amount of surge in the area around pressure switches, (e.g., solenoid type lifters, high frequency induction furnaces, motors) this may cause deterioration or damage to the switch's internal circuitry. Avoid sources of surge generation and crossed lines.

##### 2. Operating environment

In general, the digital pressure switches featured here are not dust or splash proof. Avoid using in an environment where the likelihood of splashing or spraying of liquids exists. If used in such an environment, use a dustproof and splash proof type switch.

### Maintenance

#### ⚠ Caution

##### 1. Cleaning of the switch body

Wipe off dirt with a soft cloth. If dirt does not come off easily, use a neutral detergent diluted with water to dampen a soft cloth. Wipe the switch only after squeezing the excess water out of the dampened cloth. Then finish off by wiping with a dry cloth afterwards.



## Series PSE Specific Product Precautions 1

Be sure to read before handling. Refer to pages 17 through 19 for general safety instructions and common precautions, and to pages 20 through 22 for specific product precautions.

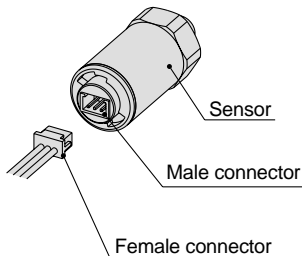
### ■ Pressure Sensor

#### Handling

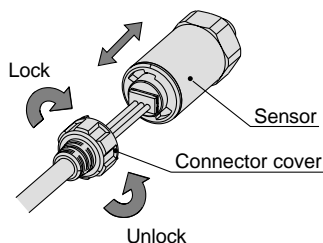
#### ⚠ Warning

1. Do not drop, bump, or apply excessive impacts ( $980\text{m/s}^2$ ) 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 23N. 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 3.5N·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 (optional)

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 ( $1000\text{m/s}^2$ ) 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 50N; that of the pressure sensor lead wire with connector is 25N. 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

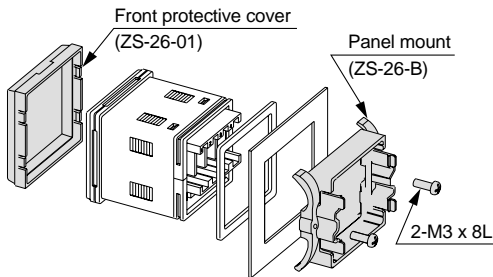
Be sure to read before handling. Refer to pages 17 through 19 for general safety instructions and common precautions, and to pages 20 through 22 for specific product precautions.

## Mounting

### ⚠ Caution

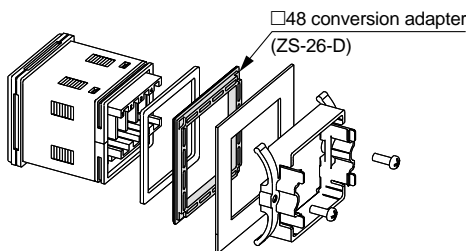
The front face of the panel mount conforms to IP65 (IP40 when using the □48 conversion adapter); however, there is a possibility of liquid filtration if the panel mount adapter is not installed securely and properly. Securely fix the adaptor with screws as shown below.

#### Standard



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

#### When using □48 conversion adapter



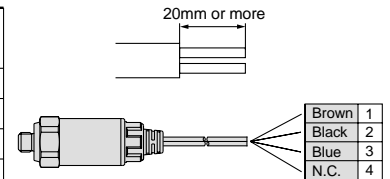
## Wiring

### ⚠ Caution

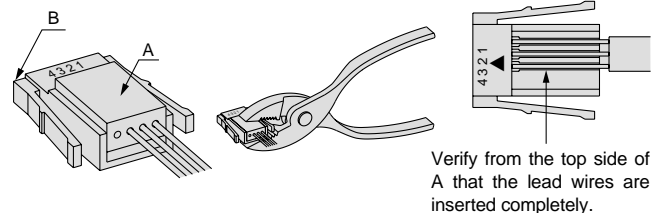
#### 1. Connecting sensor cable and connector (ZS-26-E)

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

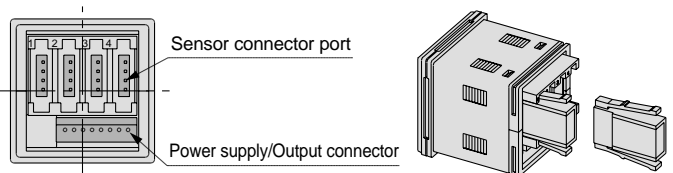
Connector no.	Core wire color of sensor cable
1	Brown (DC+)
2	Black (analog output)
3	Blue (DC-)
4	N.C.



- Make sure that the number of connector and the core wire colour 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.

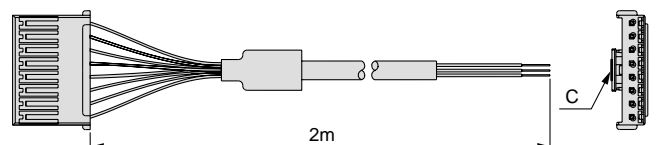


- To connect the connector to the multi-channel pressure sensor, push the connector with its A portion facing toward you into the socket until it clicks as shown below.
- To remove the connector, pull it straight out while applying pressure to the fingers on both sides.



#### 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.





# Series PSE Specific Product Precautions 3

Be sure to read before handling. Refer to pages 17 through 19 for general Safety instructions and common precautions, and to pages 20 through 22 for specific product precautions.

## Wiring

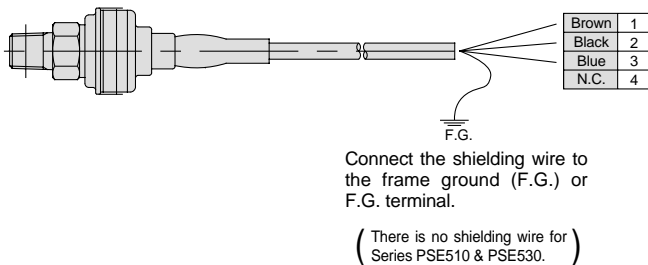
### ⚠ Caution

#### 3. Connecting to other series

- Any pressure sensor (SW) can be connected as long as it generates analogue output (1 to 5V) 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 0.2mm <sup>2</sup> )	ø1.0 to 1.4	PSE510, PSE530
ZS-26-E-1	AWG24-26 (0.14 to 0.2mm <sup>2</sup> )	ø1.4 to 2.0	
ZS-26-E-2	AWG20-22 (0.3 to 0.5mm <sup>2</sup> )	ø1.0 to 1.4	PSE521
ZS-26-E-3	AWG20-22 (0.3 to 0.5mm <sup>2</sup> )	ø1.4 to 2.0	PSE520

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



## 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.







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