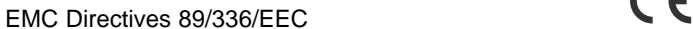




# Installation & Maintenance Manual

## Multi Channel Pressure Sensor Controller

### Series PSE200 / PSE201



EMC Directives 89/336/EEC  
EN61000-6-2:2001 Electromagnetic Compatibility (EMC). Generic standards - Immunity for industrial environments.  
EN55011+ A1:1998 Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical radio-frequency equipment and light industrial environments.

### Safety Instructions

The Pressure Sensor Controller and this manual contain essential information for the protection of users and others from possible injury and property damage and to ensure correct handling. Please check that you fully understand the definition of the following messages (signs) before going on to read the text, and always follow the instructions.

Please read the operation manuals of related apparatus and understand it before operating the controller.

IMPORTANT MESSAGES	
Read this manual and follow its instructions. Signal words such as WARNING and NOTE will be followed by important safety information that must be carefully reviewed.	
<b>WARNING</b>	Indicates a potentially hazardous situation that could result in death or serious injury if you do not follow instructions.
<b>NOTE</b>	Gives you helpful information.

### WARNING

**Do not disassemble, remodel (including change of printed circuit board) or repair.**

An injury or failure can result.

**Do not operate beyond specification range.**

Fire, malfunction or controller damage can result. Please use it after confirming the specification.

**Do not operate in atmosphere of an inflammable, an explosive and corrosive gas.**

Fire, an explosion and corrosion can result. This controller is not an explosion-proof type.

**Prepare the double interlock by another system (Mechanical interlock etc.) and check operating normally, when using this controller for an interlock circuit.**

An accident by a malfunction may potentially result.

**These instructions must be followed while in maintenance ; Turn off the power supply, stop the supplied air, exhaust the residual pressure and verify the release of air before performing maintenance.**

Otherwise it can cause injury.

### NOTE

Follow the instructions given below when handling your controller. Otherwise, the controller may be damaged or may fail, thereby resulting in malfunction.

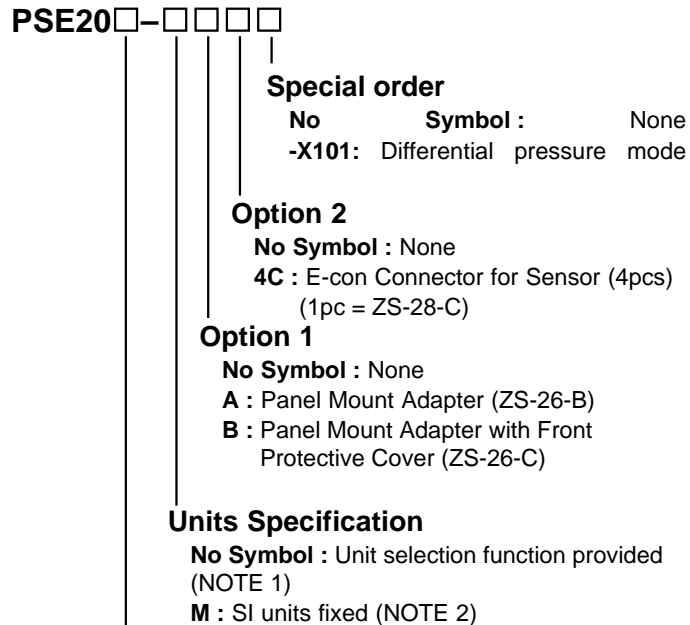
- Do not drop, bring into collision with other objects or apply excessive shock to the unit (980m/s<sup>2</sup> or more).
- Do not pull the lead wire with force or lift the controller by holding the lead wire. Pulling strength is as follows.

Power and output lead wire : less than 50N

Lead wire with connector for sensor : less than 25N

- Do not use in a place in which oil or chemical splashes may occur.
- Connect wires and cables correctly.
- Do not perform wiring while power is on.
- Do not use wire or cable with power cable or high-voltage cable in the same route.
- Connect Terminal FG to ground when using a switching regulator obtained on the commercial market.
- Insert a noise filter (line noise filter, ferrite element or other element) between the switching regulator and controller when analog output is used.
- Do not insert or remove the sensor (connector) with the power ON.
- Do not press the setting buttons with a sharp pointed object.
- For 3 seconds after power is turned ON the measurement output will be OFF. This includes after momentary disconnection of power, by reset, etc). Some initial drift occurs during 20 to 30 minutes after turning the power ON.

### Model Indication Method



### Input / Output Specification

- 0 : NPN open collector 5 outputs + Auto shift Input
- 1 : PNP open collector 5 outputs + Auto shift Input

NOTE 1 : The new Measurement Law prohibits use in Japan of the controller with a unit selection function.  
NOTE 2 : Fixed unit for compound, vacuum, low pressure is : kPa for positive pressure is : MPa

### Specification

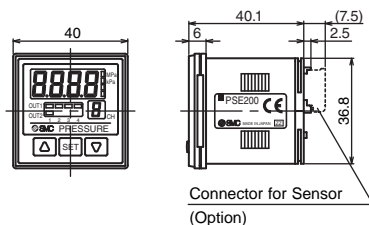
	PSE20※			
Set pressure range	-0.1 to 1MPa	10 to -101kPa	-10 to 101kPa	-101 to 101kPa
Pressure range *1	For positive	For vacuum	For low press.	For compound
Rated pressure range	0 to 1MPa	0 to -101kPa	0 to 101kPa	-101 to 101kPa
Power supply voltage	12 to 24VDC, ripple (p-p) 10% or less (Protected against inverse connection)			
Current consumption	55mA or less (current consumption of sensor not included)			
Power supply voltage for sensor	[Power supply voltage] -1.5V			
Power supply current for sensor	Max. 40mA or less (Max. total consumed current is 100mA for inputting 4 sensors.) *2			
Sensor input	Input signal	1 to 5VDC (Input impedance : Approx. 800k )		
	Number of input	4 inputs		
	Input protection	With over voltage protection (Max. 26.4V)		
	Auto identification	Provided *3		
Switch output	Hysteresis Mode : Variable Window Comparator Mode : fixed (3digits)			
	Output type	NPN or PNP open collector output		
	Number of output	5 outputs (2 points for sensor input CH1, and 1 point for each CH2 to CH4)		
	Max. load current	80mA		
	Max. applied voltage	30VDC (@ NPN output)		
Response time	Residual voltage	1V or less (@ 80mA load current)		
	Output protection	Short circuit protection is provided		
Anti-Chattering function	5ms or less			
	20ms, 160ms, 640ms selection			
Repeatability	±0.1%F.S. or less			

	PSE20※	
Indicator accuracy (Ambient Temp. 25PC)	±0.5% F.S. ±1digit or less	
LCD display	Display for measured value : 4 digits 7-segment (Orange) Display for channel : 1 digit 7-segment (Red) Sampling rate : 4 times/1sec.	
Operation display	Illuminates when output is ON (Red)	
Auto shift input	Non-Voltage input (reed/solid state), Input : 10ms or more, Channel independent ON/OFF is possible	
Environment	Enclosure	Front part : IP65 (Panel mounted), Others : IP40
	Operating temp. range	Operation : 0 to 50PC, Storage : -10 to 60PC (No condensation, no freezing)
	Operating humidity range	Operation/Storage : 35 to 85% RH (No condensation)
	Withstand voltage	1000VAC, 1 min. (between live parts and case)
	Insulation resistance	50MΩ or more (500VDC M) (between live parts and case)
	Vibration proof	10 to 500Hz smaller one 1.5mm or 98m/s <sup>2</sup> double amplitude, each in directions of X, Y and Z for 2 hours
Impact proof	980m/s <sup>2</sup> , 3 times each in directions of X, Y and Z respectively	
Temp. Characteristic	±0.5% F.S. or less (25PC)	
Connection	Power supply and output connection : 8P connector, Sensor connection : 4P e-con	
Lead wire	Oil proof cabtire cable with 8 cores (0.15mm <sup>2</sup> )	
Material	Body : PBT, Display : Transparent nylon, Rear Rubber cover : CR	
Mass (Weight)	113g (Power and output lead wire included) 55g (Power and output lead wire not included)	

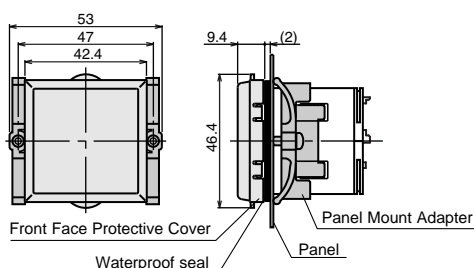
\*1 Select pressure range at the initialization.  
\*2 Over current on Vcc side and 0V side of sensor input connector results in breakage of internal parts of controller.  
\*3 Pressure sensor that auto identification can be applied is only "PSE530 series". Refer to "Auto identification function" section for details.

### Outline with Dimensions (in mm)

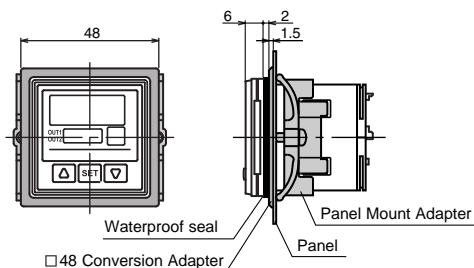
#### Dimensions of Main Unit



#### Front Face protective Cover + Panel Mount Type



#### 48 Conversion Adapter + Panel Mount Type



### Name and Functions of Individual Parts

#### Main Unit

Switch Output Lamp : Lit when OUT1(CH1 to CH4) and/or OUT2 (Red) (CH1 only) is ON.

LCD Display : Displays the current status of pressure, setting mode, (Orange) selected indication unit and error code.

△ Button : Selects the mode and increases a set ON/OFF value.

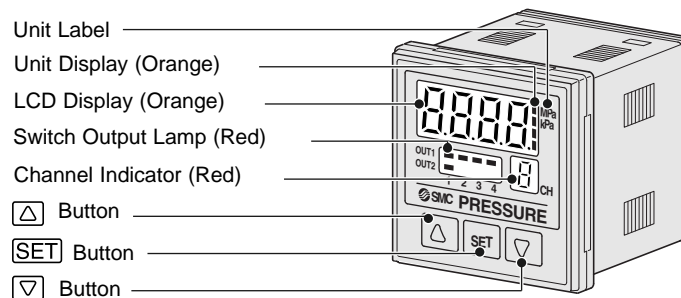
▽ Button : Selects the mode and decreases a set ON/OFF value.

SET Button : Changes the mode and sets a set value.

Unit Display : Lit ON to indicate the selected unit. For the controller (Orange) without unit selection function, the unit is fixed to SI (MPa or kPa).

Unit label : Attach the unit label (kgf/cm<sup>2</sup>, bar, PSI, inHg, mmHg) with a unit selection function.

Channel Indicator : Indicates the channel (1 to 4) that is selected. (Red)

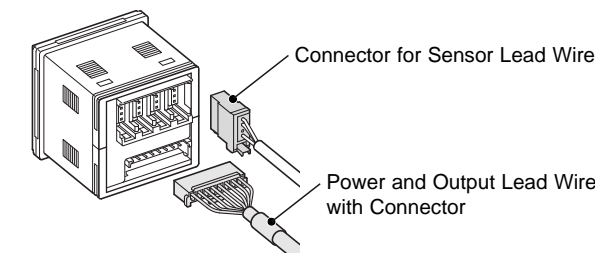


### Accessories

Power and Output Lead Wire with Connector (2m) : **ZS-26-A**

### Options

Connector for Sensor Lead Wire (1pc) : **ZS-28-C**

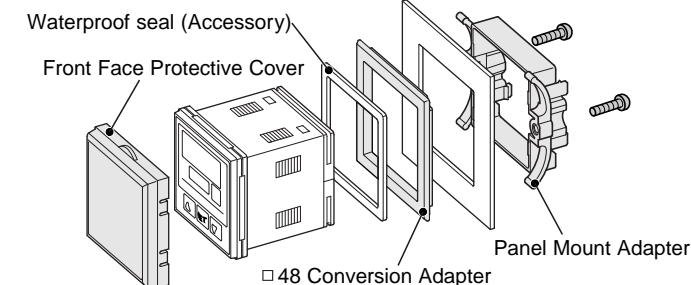


Panel Mount Adapter with set screws M3 ∞ 8L (2pcs) : **ZS-26-B**

Panel Mount Adapter with set screws M3 ∞ 8L (2pcs) + Front Face Protective Cover : **ZS-26-C**

Front Face Protective Cover with waterproof seal : **ZS-26-01**

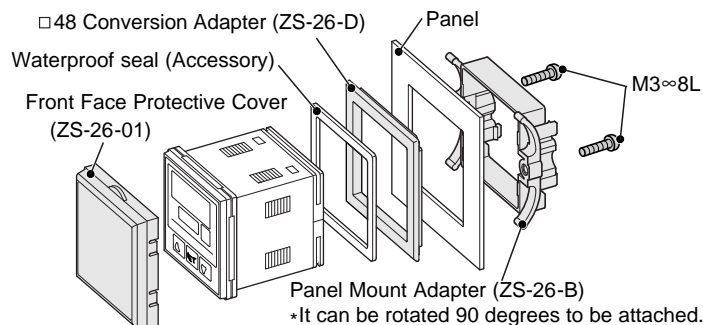
□48 Conversion Adapter : **ZS-26-D**  
(It is an adapter for attaching PSE200 series in the panel cut size of PSE100 series.)



## Installation

### Mounting by Panel mount adapter

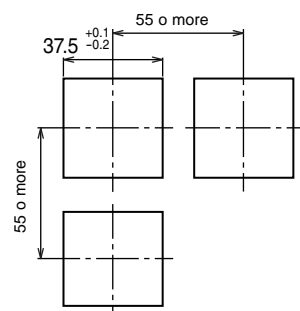
- Fix the panel mount adapter to the controller with the set screws M3 ∞ 8L (2pcs) as attached.



- \*Panel mounting of the controller meets IP65 (if □48 conversion adapter is used, it meets IP40). However, if the panel mount adapter is not installed securely or the instrument is not seated correctly, liquid might enter. Tighten the screws by 1/4 to 1/2 turn more after the heads make contact with the panel.

### Panel Cut Dimensions

Panel thickness : 0.5 to 8mm

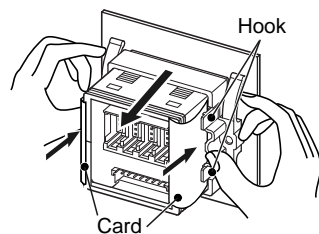


### Connection

- Make connection after turning the power off.
- Install the lead wire separately from the route for power cable or high-voltage cable. Otherwise, malfunction may potentially result due to noise.
- Be sure to ground Terminal FG when using a switching regulator obtained on the commercial market. If the analog output is connected to a switching regulator obtained on the market, switching noise will be superimposed and product specification can no longer be met. This can be prevented by inserting a noise filter, such as a line noise filter and a ferrite element, between the switching regulator and the controller, or by using a series power supply instead of a switching regulator.

### Notice when removing the controller

- The controller with panel mount adapter can be removed from panel after removing two screws as shown in the figure, by inserting a suitable thin card both sides to disconnect the hooks. Pull the panel mount adapter to the front, and remove the controller. If panel mount adapter is drawn forward with hook caught, the adapter and controller may be damaged.



## Installation (continue)

### Attaching connector to sensor lead wire

- Strip the sensor wire as shown in the right figure. Connector cover 20mm or more Insulation
- The core of the corresponding color shown in the following table is put into the pin of the number printed on the e-con connector, and pushed to the back.

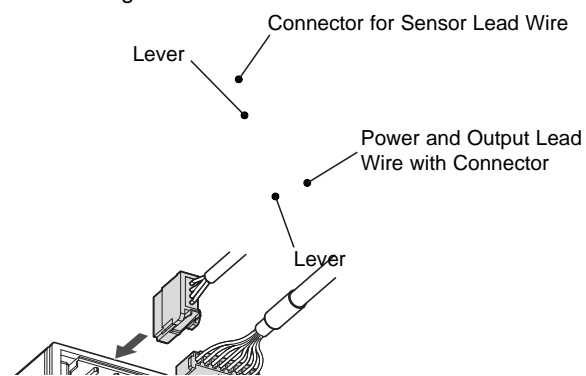
Pin No.	Wire Color
1	Brown (DC+)
2	NC
3	Blue (DC-)
4	Black (IN : 1 to 5VDC)

- Check that the above-mentioned preparation work has been performed correctly, then part A shown in the figure is pushed in by hand to make temporary connection.
- Part A center is pressed straight in using a tool, such as pliers.
- Re-use cannot be performed once the e-con connector has been completely crimped.
- In case of connection failure such as incorrect order of wires or incomplete insertion, please use a new e-con connector.

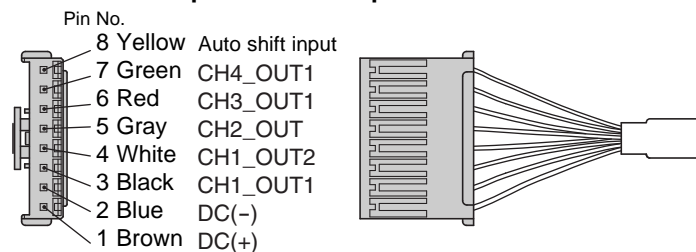
## Internal Circuit and Wiring

### Connector Connecting/Disconnecting

- When connecting the connector, insert it straight onto the pins and lock the connector into the square groove in the housing until connector clicks.
- When disconnecting the connector, press the connector lever to disengage the lever claw from the square groove. Then pull out the connector straight.



### Power and Output Connector pin numbers

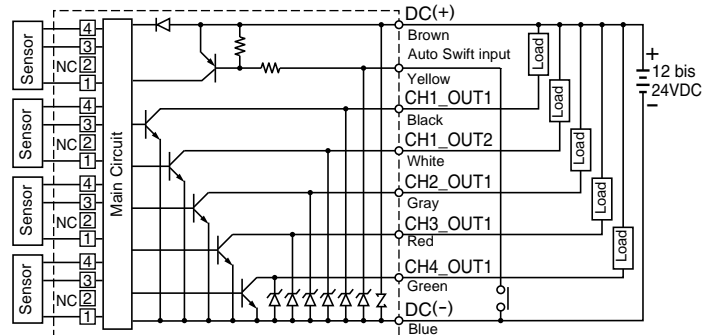


## Example of Internal Circuit and Wiring (continue)

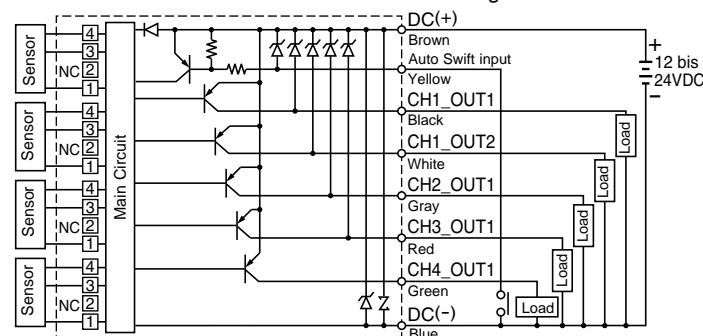
### Output Specification

When the SMC Power and Output Lead Wire (type ZS-26-A) is used, the colors of wire (Brown, Blue, Black, White, Gray, Red, Green, Yellow) will apply as shown on circuit diagram.

PSE200-(M) □ : NPN Open Collector Five outputs+Auto shift Input  
Max. 30V, 80mA Residual voltage 1V or less

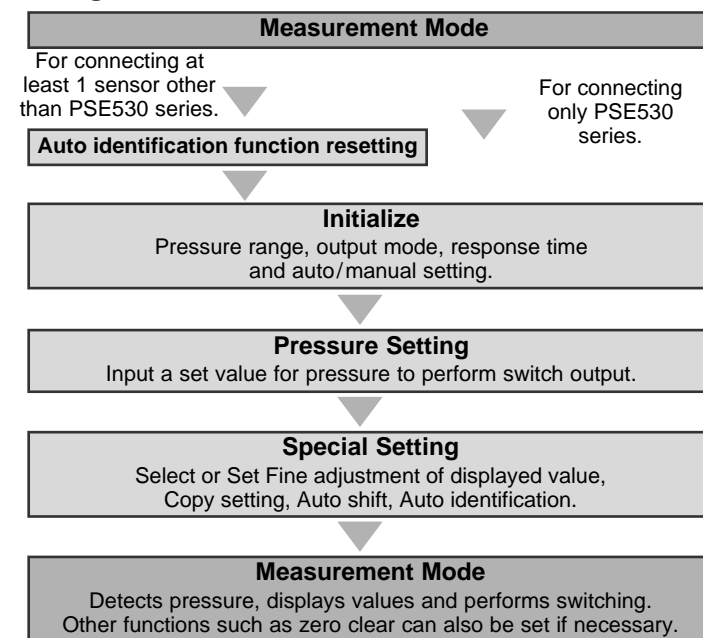


PSE201-(M) □ : PNP Open Collector Five outputs+Auto shift Input  
Max. 80mA Residual voltage 1V or less



## Setting

### Setting Procedures



### Auto identification function resetting

- Press the [▽] button and [SET] button simultaneously longer than two seconds to display [FSt].
- Press the [SET] button three times. ([FSt] displays in order the following: [CPy] [SH1] [Aon].)
- If [Aon] is displayed, press the [△] or [▽] button to display [AoF], and then press the [SET] button.

\* Setting for the Auto identification function is ON when units are shipped from the factory.

(Auto identification ON) Aon ⇔ AoF (Auto identification OFF)

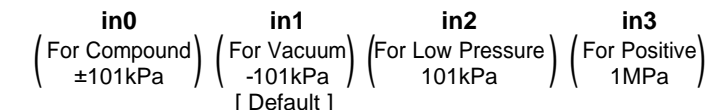
## Setting (continue)

### Initialize

Select the setting channel by pressing the [△] button, then press and hold the [SET] button longer than 2 seconds. Initialization can begin.

### 1. Pressure Range Setting

- Select the pressure range suitable for the sensor connected.
- Press the [△] or [▽] button and select the pressure range. Press the [SET] button to set.



Note) When automatic identification mode is set, controller is changed to pressure range of connected pressure sensor (Series PSE530) automatically when power is supplied. When range setting is changed, pressure set value changes. So conduct pressure setting again.

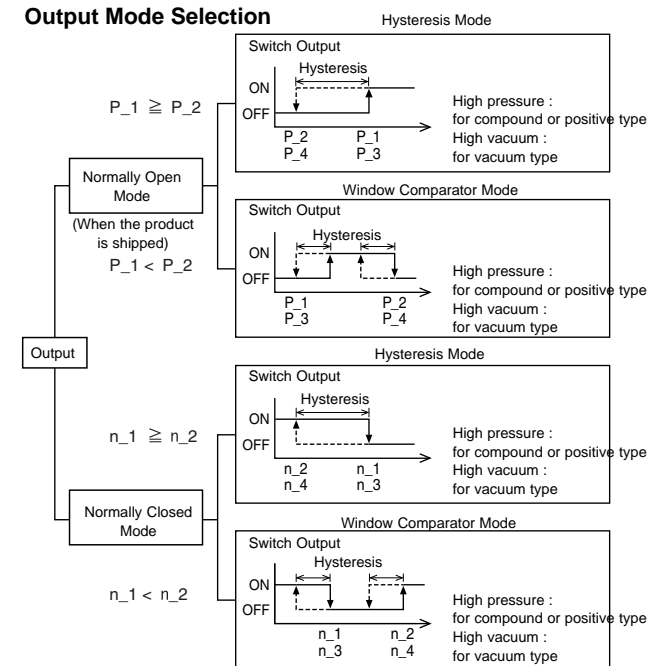
### 2. Selecting Display Unit

(Only when unit switch function is built in.)  
See table "Selecting Display Unit":next page.

### 3. Output Method Setting

- To set output style for OUT1.
  - Press the [△] or [▽] button and select the normally open or the normally closed. Next, press the [SET] button to set.
  - (Normally open) 1n0 ⇔ 1nC (Normally closed)
- To set operating mode and output style for OUT2.(CH1 only)
  - Press the [△] or [▽] button and the [SET] button to set, as in OUT1.
  - (Normally open) 2n0 ⇔ 2nC (Normally closed)

### Output Mode Selection



- The following is given using OUT1 as an example. The descriptions for OUT2 are the same as those for OUT1, under the conditions that [n\_1] and [n\_2] should be replaced by [n\_3] and [n\_4], [P\_1] and [P\_2] should be replaced by [P\_3] and [P\_4].
- If input pressure fluctuates around the set point when hysteresis is set at 2 digits or less in hysteresis mode, switch output may cause chattering.
- Hysteresis is fixed at 3 digits in window comparator mode. When the pressure is set, use 7 digits or more span between [n\_1] and [n\_2] or [P\_1] and [P\_2]. Less than 7 digits is not accepted by the controller.

**Setting (continue)**

**4.Response Time Setting**

- A response time for switch output can be set as user desires.
- Set the optimum response time to prevent the chattering of a switch. The response time currently set will be displayed. Select a desired response time by pressing the  $\Delta$  or  $\nabla$  button. Press the **SET** button to set.

Response time 5  $\leftrightarrow$  20  $\leftrightarrow$  160  $\leftrightarrow$  640

**5.Pressure setting**

- There are two methods for pressure set-up : manual and auto preset, either one of which can be selected. The auto preset is provided for an automatic optimum set-up by using a sample for a case in which switch output is used to check absorption.
- An operation mode currently selected is displayed. Press the  $\Delta$  or  $\nabla$  button to select the set-up method to be used. Press the **SET** button to set.

(Manual Setting)  $\bar{n}An \leftrightarrow AUt$  (Auto Preset)

- All the settings are now completed and the controller will return to Measurement mode.

**Pressure setting mode (continue)**

**3.Selection of OUT2 [P\_3, P\_4] setting mode** (CH1 only)

- Press  $\Delta$  button or  $\nabla$  button to select the required set value as in 1,2.
- Value increases by one digit per press of  $\Delta$  button. It continues to increase with button pressed and held.
- Value decreases by one digit per press of  $\nabla$  button. It continues to decrease with button pressed and held.
- Check the corrected value, then press the **SET** button.

**4.Auto shift compensation value setting**

- [C\_5]/[C\_3] (for CH2 to CH4) and Auto shift set value will display alternately. Without Auto shift input setting, set value displays Zero.
- Check the corrected value, then press the **SET** button.
- The pressure setting mode is now completed and the controller will return to the Measurement mode.

**Auto Preset Setting**

When auto preset is selected at initialization, this function stores in the memory a pressure setting value, which is calculated from a measurement pressure as a reference value. The set value of controller is automatically set to an optimum value by repeating absorption and non-absorption several times with a sample, which is to be set up.

**1.Selection of OUT1 auto preset mode**

- Press the  $\Delta$  button during the Measurement mode to select channel, and then, press the **SET** button to display [AP1].

**2.Preparation of unit for OUT1**

- Prepare a sensor unit for which pressure for OUT1 is to be set.

**3.Selection of auto preset value of OUT1 setting**

- Press the **SET** button to display [A1L].
- Operate system so that the measured pressure may change.
- Detection will be made and a set value will be stored in the memory automatically. (When OUT1 setting is not necessary, press  $\Delta$  button and  $\nabla$  button simultaneously for longer than one second to skip to [AP2].)

**4.Selection of OUT2 auto preset mode** (CH1 only)

- Press the **SET** button to display [AP2].

**5.Preparation of unit and setting for OUT2**

- Prepare a unit for which pressure for OUT2 is to be set.
- Press the **SET** button to display [A2L], detection will be made and a set value will be stored in the memory automatically. (When OUT2 setting is not necessary, press  $\Delta$  button and  $\nabla$  button simultaneously for longer than one second to skip to Measurement mode.)

**6.Set up of OUT2 auto preset value**

- Press the **SET** button to finish the auto preset mode. The controller will return to the Measurement mode.

A pressure setting value in auto preset is as follows.

$$ON=A-(A-B)/4 \quad A=\text{maximum pressure value}$$

$$OFF=B+(A-B)/4 \quad B=\text{minimum pressure value}$$

**Special Setting**

**Fine adjustment function of displayed value**

This removes irregularities between CH1 to CH4 output values, to allow the same displayed value. It is possible to make fine adjustment within  $\pm 5\%$ F.S. (For compound :  $\pm 2.5\%$ F.S.) of the measured data on the displayed value for each pressure sensor.

- Press  $\nabla$  button and **SET** button simultaneously longer than two seconds to display [FSt]. If fine adjustment is unnecessary, press **SET** button while [FSt] is displayed. The controller will move to copy function [CPy].
- Select channel by  $\Delta$  button or  $\nabla$  button.
- Press the **SET** button, and [FSt] and the current value will display alternately.
- Increase or reduce value by  $\Delta$  button or  $\nabla$  button. (The possible range of adjustment  $\pm 5\%$ R.D.)
- Check the value, then press the **SET** button. [FSC] and the adjusted value(%) will display alternately.
- Press the **SET** button to return display to [FSt]. Perform the setting of other channels like the above by  $\Delta$  button or  $\nabla$  button.
- After setting the other channels in [FSt], press the **SET** button. The controller will move to copy function [CPy].

Note) When Fine adjustment mode is conducted, pressure setting value is sometimes changed by  $\pm 1$ digit.

**Copy function**

1) 5 items can be copied, Pressure setting value, Range setting, Display unit, Output type and Response time.

2) If copied from CH1  $\rightarrow$  CH2, CH3, CH4, CH1 OUT1 information is copied. CH2, CH3, CH4 information is copied only into OUT1 of CH1 if copied from CH2, CH3, CH4  $\rightarrow$  CH1.

- When [CPy] is displayed.
- In case Copy mode setting is not necessary, press the **SET** button to skip to Auto shift mode [SH1].
- Select to display channel to be copied in channel indicator by  $\Delta$  button or  $\nabla$  button.
- Press the **SET** button so that the channel display of the copied material stops flashing.
- [CPy] and the channel to be pasted will display alternately. Select the channel to be pasted by  $\Delta$  button or  $\nabla$  button.

C\_1 (CH1)  $\leftrightarrow$  C\_2 (CH2)  $\leftrightarrow$  C\_3 (CH3)  $\leftrightarrow$  C\_4 (CH4)

- Press the **SET** button, to store and return to [CPy] display.
- $\Delta$  button or  $\nabla$  button can be pressed again to repeat the same operation to copy other channels.
- After copying is finished, press **SET** button to move to Auto shift mode. Note) When Copy mode is conducted, pressure setting value is sometimes changed by  $\pm 1$ digit.

**Auto shift function**

This function corrects the setting value of each switch output according to change of pressure source. Even if pressure source is changed, the controller can make a correction on switch output.

- Press the  $\Delta$  button or  $\nabla$  button in the state where [SH1] is displayed, and [CH1] and [on]/[oF] will display alternately. Pressing **SET** button with the indication of [SH1] will move to the auto identification mode.

(Auto shift ON) on oF (Auto shift OFF)

- Select Auto shift mode by  $\Delta$  button or  $\nabla$  button, and press the **SET** button.
- Similarly, [CH2], [CH3] and [CH4] press the  $\Delta$  button or  $\nabla$  button, and select Auto shift mode.
- After Auto shift mode setting of all channels is finished, if the **SET** button is pressed, the controller will move to Auto identification mode.

**Auto identification function**

This function identifies the pressure range of the sensor connected to the controller. When [Aon] is set at the Auto identification mode, and when power is re-applied at [Aon] status, this function activates. (Special pressure sensor (SMC PSE530 series) is applicable to this function. Other pressure sensors are not applicable.)

- Select Auto identification mode by  $\Delta$  button or  $\nabla$  button, and press the **SET** button.
- All the setting mode will be completed and return to the Measurement mode.

**Selecting Display Unit**

When unit switch function is included.

The indication unit can be selected freely. Pressing the  $\Delta$  or  $\nabla$  button will change the unit and will automatically convert set values. Press the **SET** button to set and to move to setting the output mode.

LCD Display	PA	GF	bAr	PSi	inH	$\bar{n}\bar{n}H$
$\downarrow$ For compound and vacuum	kPa	kgf/cm <sup>2</sup>	bar	psi	inHg	mmHg
$\downarrow U$ For low pressure	kPa	kgf/cm <sup>2</sup>	bar	psi		
$\downarrow \bar{n}$ For positive	MPa	kgf/cm <sup>2</sup>	bar	psi		

**Pressure setting mode**

**Manual Setting**

Manually select a set value of the controller. Pressure setting is made for respective channel.

**1.Selection of OUT1 [P\_1] setting mode**

- Press the  $\Delta$  button during the Measurement mode to select channel, and then, press the **SET** button to display set values.
- [P\_1] and the current set value will display alternately. (When the Normally Closed mode is selected in initialization, [n\_1] and the set value will display alternately.)
- Press  $\Delta$  button or  $\nabla$  button to select the required set value.  $\Delta$  button to increase the value,  $\nabla$  button to reduce. Value increases by one digit per press of  $\Delta$  button. It continues to increase with button pressed and held. Value decreases by one digit per press of  $\nabla$  button. It continues to decrease with button pressed and held.
- Check the corrected value, then press the **SET** button.

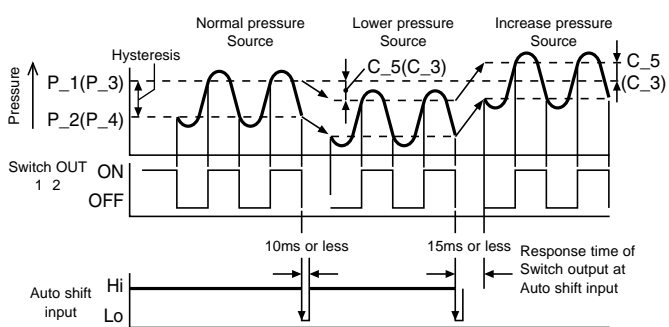
**2.Selection of OUT1 [P\_2] setting mode**

- [P\_2] and the current set value will display alternately. (When the Normally Closed mode is selected in initialization, [n\_2] and the set value will display alternately.)
- Press  $\Delta$  button or  $\nabla$  button to select the required set value.  $\Delta$  button to increase the value,  $\nabla$  button to reduce. Value increases by one digit per press of  $\Delta$  button. It continues to increase with button pressed and held. Value decreases by one digit per press of  $\nabla$  button. It continues to decrease with button pressed and held.
- Check the corrected value, then press the **SET** button.

**About Auto shift function**

This function corrects the setting value of each switch output according to change of pressure source. Even if pressure source is changed, this can make a correct decision on switch output.

**With Auto shift**



**Using with Auto shift input, accepted set range is like below.**

	Pressure range				
	-1MPa	-100kPa	0	100kPa	1MPa
For Compound		-101kPa	101kPa		
For Vacuum		-101kPa	10kPa		
For Low pressure		-10kPa	101kPa		
For Positive		-100kPa	1MPa		

Legend:  Set pressure range  Accepted set range

**Special Setting (continue)**

**Conditions and explanations for Auto shift function**

- Keep constant pressure for 10ms or more from the close signal of Auto shift input.
- At Auto shift input, display indicates [ooo] for approx. 1 sec. Then the pressure at that time is memorized to [C\_5] or [C\_3] as corrected value. The switch set to Auto shift mode at the time of initial setting operates with the corrected value [C\_5]/[C\_3] applied to the setting value.
  - CH1 will operate with Auto shift function. The operating value of OUT1, OUT2 applies corrected value [C\_5] to the set value [P\_1] to [P\_4] or [n\_1] to [n\_4].
  - CH2 to CH4 will operate with Auto shift function. The operating value of OUT1 applies corrected value [C\_3] to the set value [P\_1], [P\_2] or [n\_1], [n\_2].
- There will be a delay of 15ms max. before the switch output will respond to Auto shift input corrected values.
- When corrected set value exceeds the set pressure range with Auto shift input, the value is changed to be within the range of set pressure.
- When Auto shift function is turned off, corrected value becomes zero.
- When Auto shift function of all channels is turned off, even if Auto shift input is Lo (Non Voltage input) controller does not display [ooo].
- Correct value [C\_5] or [C\_3] after Auto shift input clears when the power is turned OFF.
- Correct value [C\_5] or [C\_3] when Auto shift input function is reset to zero (Initial value) when power is re-supplied.

Note) There is no EEPROM in the memory for corrected value.

**Other Functions(continue)**

**Zero Clear Function**

- For measured pressure in ambient pressure and within the range of  $\pm 5\%$ F.S. (For compound pressure only,  $\pm 2.5\%$ F.S.), displayed value can be adjusted to zero.
- Press and hold the and buttons simultaneously longer than one second to reset to "0" on the display. Please press button before button. In case of pressing button first, channel select function may operate.
  - The mode will return to the Measurement mode automatically.

**Channel Select Function**

- For each button press, channel selection can be made, like [1→ 2→ 3→ 4→ 1...]. Display shows pressure value, which is measured at the channel selected.

**Channel Scan Function**

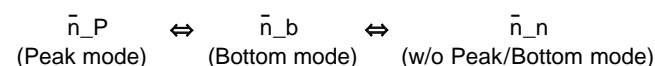
- Press and hold button for two seconds or more. The display indicates each channel measurement value for two seconds and then scans to the next channel.
- To reset this function, press button again for two seconds or more.

**Other Functions**

**Peak and Bottom Hold Display Function**

Maximum and minimum values are always detected and updated during measurement. Displayed values can be held.

- Press the button longer than 2 seconds.
- Select Peak/Bottom mode by button or button, and press the button.
- [n\_P] (Peak mode) : Indicates the maximum pressure value.
- [n\_b] (Bottom mode) : Indicates the minimum pressure value.
- [n\_n] (w/o Peak/Bottom mode) : Return to the Measurement mode.



- To reset holding, press the , , or button or select [n\_n].

**Key Lock Function**

This function prevents errors such as changing a set value by mistake. Set [LoC] (lock mode) in order not to accept button operation.

**Lock**

- Press and hold the button longer than four seconds. Release the button when [UnL] is displayed.
- Press the button or button to set the display to [LoC].
- Press the button to return to the Measurement mode.

**Unlock**

- Press and hold the button longer than four seconds. Release the button when [LoC] is displayed.
- Press the button or button to set the display to [UnL].
- Press the button to return to the Measurement mode.

**Error Display Function**

This function displays error location and nature when a problem or an error occurs.

Error name	Error display	Contents	Disposition
Over current error	OUT 1	Over 80mA load current of switch output flows.	Turn the power off, check the load and wiring of output to find cause of over current.
	OUT 2		
Residual pressure error		Performing zero reset, $\pm 5\%$ F.S. (For compound : $\pm 2.5\%$ F.S.) or more pressure applied to ambient pressure. *After 2 sec., measurement mode recovers automatically.	After changing an applied pressure into ambient pressure, re-perform zero reset.
Applied pressure error	---	Pressure over max. limit of set pressure range is applied.	Check connection and wiring of the sensor. Apply a correct pressure to within the set pressure range.
	----	The sensor has the possibility of disconnection /miswiring, or pressure below min. limit of set pressure range is applied.	
System error		Internal data error causes this display.	Turn the power off, re-input power.
		Internal data error causes this display.	
		Internal data error causes this display.	
		Internal data error causes this display.	

• If the above remedy does not recover the operation, the error needs to be investigated at SMC.

**For "-X101"**

**Differential pressure mode**

- In this mode, differential pressure between CH1 and CH2, and CH3 and CH4 can be set and indicated.
- When channel 1 is selected, differential pressure between CH1 and CH2 can be set and indicated.
- When channel 2 is selected, measured pressure of CH2 can be set and indicated.
- When channel 3 is selected, differential pressure between CH3 and CH4 can be set and indicated.
- When channel 4 is selected, measured pressure of CH4 can be set and indicated.

Selected channel	1	2	3	4
Normal operation mode	CH1	CH2	CH3	CH4
Differential pressure mode	CH1-CH2	CH2	CH3-CH4	CH4
Output	CH1-OUT1 CH1-OUT2	CH2-OUT1	CH3-OUT1	CH4-OUT1

**Note**

- When differential pressure mode is selected, the range of pressure sensor to be connected shall be same in CH1 and CH2, and CH3 and CH4. Also, pressure range setting (included into initial set mode) shall be same in the channels. Different pressure range setting results in malfunction.

**How to select differential pressure mode**

- Differential pressure mode can be selected in operation selecting mode included into special mode.

Indication	Operation mode
doF	Normal operation mode
don	Differential pressure mode



**Note**

- When shipped from factory, pressure sensor is set to "don" (differential pressure mode).
- If normal operation mode is required, set operation selecting mode to "doF" (normal operation mode).

**Connection polarity of pressure sensor in differential pressure mode.**

- In differential pressure mode, each channel of pressure sensor shall be connected as shown below.

Pressure range setting	CH1	CH2	CH3	CH4
in0 (Compound)	Hi/Lo	Lo/Hi	Hi/Lo	Lo/Hi
in1 (Vacuum)	Lo	Hi	Lo	Hi
in2 (Low)	Hi	Lo	Hi	Lo
in3 (High)	Hi	Lo	Hi	Lo

\*Hi:High pressure side Lo:Low pressure side

\*Connection mentioned above realize the operation within setting pressure range completely.

Zero clear mode(applicable to only CH1 and CH3)

- In this mode, indicated value can be adjusted to zero within measured differential pressure range of  $\pm 5\%$ F.S. (If compound pressure is selected, within  $\pm 2.5\%$ F.S.) Indicated value is reset to zero by keeping push of and button together over one second and when these button is released, zero clear is finished and measuring mode is returned.
- Zero clear in CH2 and CH4 is performed same as standard.

Peak and bottom mode (applied to only CH1 and CH3)

- In this mode, indicated max./min. differential pressure value can be maintained. By pushing other button, this mode is released.
- Peak and bottom mode of CH2 and CH4 is same as standard.

Auto preset mode(applied to only CH1 and CH3)

- In this mode, optimum differential pressure value can be set automatically.
- Auto preset mode of CH2 and CH4 is same as standard.

Auto shift function

- In differential pressure mode, auto shift function of all channels are turned "off" (invalid).

Indicated value fine adjusting function

- In some cases, dispersion of output voltage from individual pressure sensor prevents exact measurement of differential pressure. This function (included into special mode) can get rid of the dispersion and realize exact measurement of differential pressure. For further information, refer to operation manual for standard.

□ To enquire about the product, please contact the following.

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