

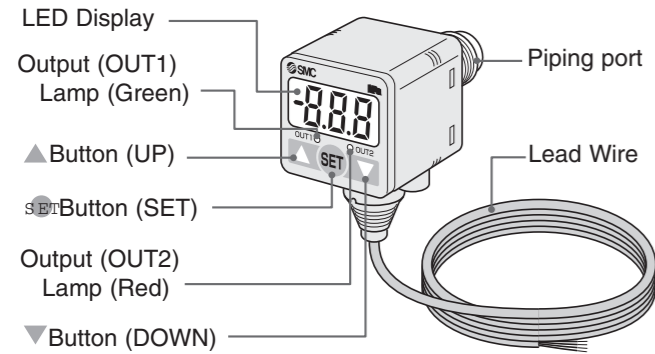


## Names and Functions of Individual Parts

### Pressure switch

Output (OUT1) Lamp (Green): Lit when OUT1 is ON.  
 Output (OUT2) Lamp (Red): Lit when OUT2 is ON.  
 LED Display: Displays a flow rate, set mode status, and error code.

- ▲ Button (UP) : Selects the mode and increases a set ON/OFF value.
- ▼ Button (DOWN) : Selects the mode and decreases a set ON/OFF value.
- SET Button (SET) : Changes the mode and sets a set value.



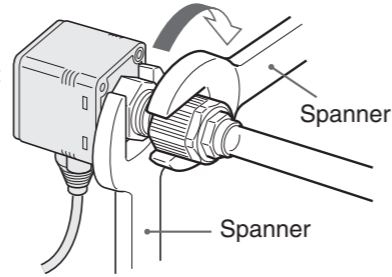
### Options

- Bracket A : ZS-24-A with set screws M3 · 5L (2pcs)
- Bracket D : ZS-24-D with set screws M3 · 5L (2pcs)
- Panel mount adapter : ZS-24-E
- Panel mount adapter : ZS-24-F (with front face protective cover)

## Installation

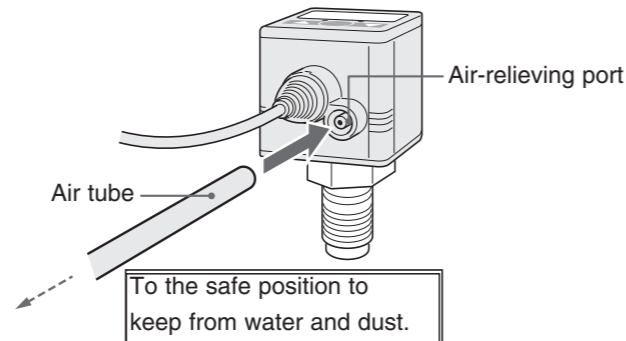
### Piping

- Use Hexagon socket head plug or fitting for connection to piping.
- In order to connect hexagon socket head plug or fitting on pressure port, apply spanner at pressure port hexagon part. Apply a tightening torque of 13.6N·m or less.



### Air tube attachment

- When the pressure switch is used in a place where water and dust splashes may occur, insert tube in the air-relieving port, and provide piping to a safe position to protect the air relieving port from water and dust. "See the figure below."



- Concerning the tube, insert it in the air-relieving port at the root.
- SMC TU0425 (polyurethane, O.Dø4, I.Dø2.5) suits to this product.

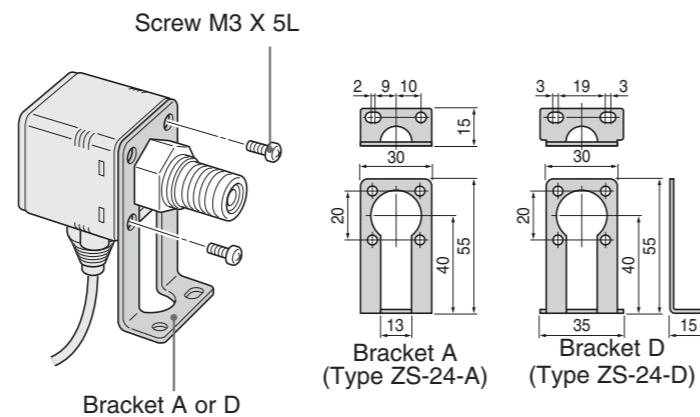
### Mounting

Before you mount a flow switch, read "SAFETY" and "Installation" described in this chapter carefully to obtain safe and correct measurement.

- Mount the optional bracket and panel mount adapter to the Pressure switch.
- When the Pressure switch is to be placed at a location where it is exposed to water and dust, insert an optional air tube (O.D ø4, I.D ø2.5) to the air-relieving port of Pressure switch. (Refer to the air tube attaching above)

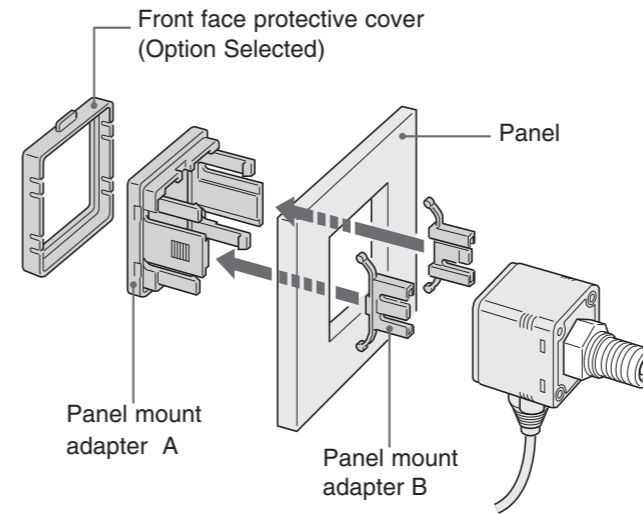
### Mounting with bracket

- Fix the bracket to the Pressure switch with the set screws M3 · 5L (2pcs) as attached.
- The tightening torque of the set screws must be less than 0.98N·m.

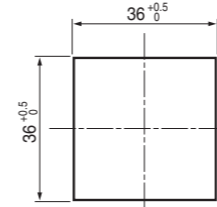


## Installation (continued)

### Mounting with Panel mount adapter



Panel cutout dimension



Panel Thickness  
1 to 3.2mm

### Options

- Panel mount adapter: ZS-24-E (Panel mount adapter A and B included)
- Panel mount adapter: ZS-24-F (with front face protective cover)

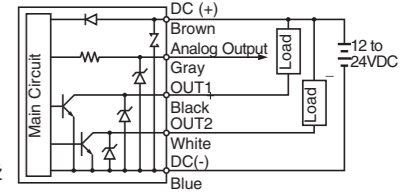
### Connection

- 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 pressure switch, or by using a series power supply instead of a switching regulator.

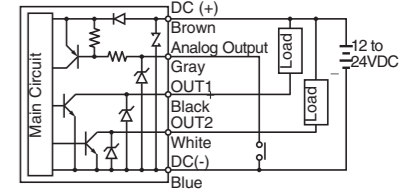
## Internal Circuit and Wiring

### Output Specification

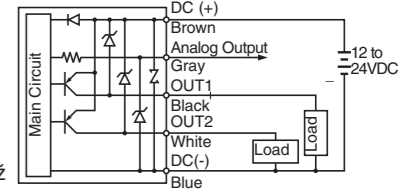
-22  
NPN Open Collector Output  
2 Outputs  
Max. 30V, 80mA  
Residual voltage 1V or less  
Analog Output 1 to 5V  
Output Impedance : Approx.1kΩ



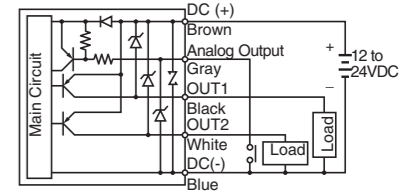
-30  
AUTO SHIFT Input  
Voltage Free Contact.  
NPN Open Collector Output  
2 Outputs  
Max. 30V, 80mA  
Residual voltage 1V or less



-62  
PNP Open Collector Output  
2 Outputs  
Max. 80mA  
Residual voltage 1V or less  
Analog Output 1 to 5V  
Output Impedance : Approx.1kΩ

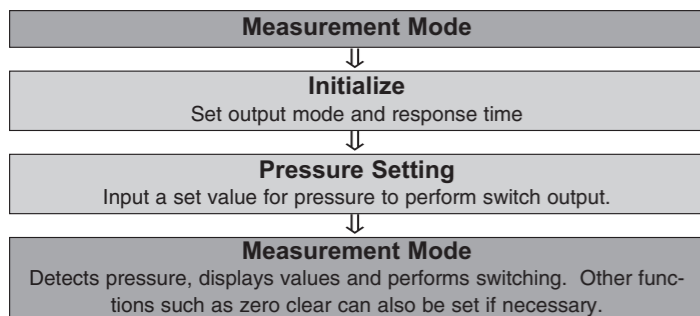


-70  
AUTO SHIFT Input  
Voltage Free Contact.  
PNP Open Collector Output  
2 Outputs  
Max. 80mA  
Residual voltage 1V or less



## Setting

### Setting Procedure



### Initialize

Press and hold the **SET** button longer than two seconds. Release the **SET** button when [1no] is displayed and initialization can begin. When the units specification of model indication is M, the SI units will be fixed. If no symbol is supplied, unit is displayed [PA]. Refer to "Selecting Indication Unit." for details.

### 1. Output Mode Setting

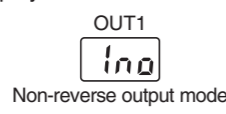
Two output modes are available, namely, the Reverse Output mode and Non-Reverse Output mode.

The desired output mode can be set for switch output.

The output mode currently selected will be displayed.

1) First, the output mode for OUT1 is set.

- Press **▲** button or **▼** button to select non-reverse output mode or reverse output mode.



- Set a mode with the **SET** button. [1no] means non-reverse output mode and [1nc] means reverse output mode.

2) Then, select non-reverse output mode or reverse output mode for OUT2 by **▲** button or **▼** button similarly to OUT1.

- Set a mode with the **SET** button. [2no] means non-reverse output mode and [2nc] reverse output mode.

Press the **SET** button to move on to setting a desired response time.

### 2. Response Time Setting

- The response time for switch output can be set.
- Setting of the response time prevents chattering of the output. The response time currently set will be displayed. Select the desired response time by pressing the **▲** or **▼** button.

[2.5] [24] [192] [768]



Press the **SET** button to set and to move to setting of Pressure setting mode.

### 3. 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 when the pressure switch is used to check absorption.

The operation mode currently selected is displayed. Press **▲** button or **▼** button to select the set-up method to be used.

[nAn] (manual set-up)    [AUT] (auto preset)



By pressing the **SET** button, the control returns to measuring mode.

## Pressure setting mode

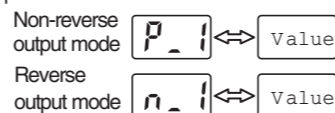
### Manual

Manually set a set value of the pressure switch.

The output method is also set in accordance with the value set manually. Set the output method while referring to the output method described below.

#### 1. Selection of OUT1 setting mode

Press the **SET** button during the Measurement mode. [P\_1] and the current set value will display alternately. (When the Reverse Output mode is selected in initialization, [n\_1] and the set value will display alternately.)



#### 2. Selection of set value of [P\_1]

Press the **▲** button to increase the set value or the **▼** button to decrease the set value.

#### 3. Set up of [P\_1] and move to [P\_2] setting mode

Press the **SET** button to set the set value and to move to the setting mode for [P\_2] ([n\_2] in the Reverse Output mode). [P\_2] and the set value will display alternately. (When the Reverse Output mode is selected in initialization, [n\_2] and the set value will be displayed alternately.)

#### 4. Selection of set value of [P\_2]

Press the **▲** button to increase the set value or the **▼** button to decrease the set value.

#### 5. Set up of [P\_2] and move to OUT2 setting mode

Press the **SET** button to set the set value and to move to the setting mode for OUT2. Set the set value as in OUT1. [P\_3] or [P\_4] and the set value will be displayed alternately. (When the Reverse Output mode is selected in initialization, [n\_3] or [n\_4] and the set value will be displayed alternately.)

#### 6. Completion of a set up

Completing settings for [P\_1] to [P\_4] ([n\_1] to [n\_4] in the Reverse Output mode) will finish pressure setting and return to the Measurement mode. \*For the Model with Auto shift function, the mode will move to display mode of compensation value. Refer to the section of Auto shift function.

### Auto Preset Setting

When auto preset is selected in Initialize, this function stores in the memory a measurement pressure as a reference value. The set value of switch 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 **SET** button to set pressure setting for OUT1 to auto preset. Display will switch to [AP1]. (When OUT1 setting is not necessary, press **▲** button and **▼** button simultaneously.)



#### 2. Preparation of unit for OUT1

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

#### 3. Selection of [A1L] and pressure setting

When the **SET** button is pressed, [A1L] will flash. Operate the system so that the pressure changes.



#### 4. Set up of OUT1 auto preset value and move to OUT2 auto preset mode

When the **SET** button is pressed, the pressure is automatically read and set for [P\_1],[P\_2] ([n\_1],[n\_2] in Reverse mode). Display will switch to [AP2]. (When OUT2 setting is not necessary, press **▲** button and **▼** button simultaneously.)

#### 5. Preparation of unit for OUT2 and pressure setting

Prepare a unit for which pressure for OUT2 is to be set. Set the set value of OUT2 as in OUT1. [A2L] will flash.

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

Press the **SET** button to set the set value of [P\_3],[P\_4] ([n\_3],[n\_4] in Reverse mode), and auto preset mode is finished. The mode will return to the Measurement mode.

A pressure setting value in auto preset is as follows in non-reverse output mode with OUT1. (P\_1,2 is n\_1,2 in reverse output mode with OUT1.)  
 $P_1 = A - (A - B) / 4$     A=maximum pressure value  
 $P_2 = B + (A - B) / 4$     B=minimum pressure value  
 For OUT2 set-up, above P\_1,2 and n\_1,2 become P\_3,4 and n\_3,4 respectively.

## Output Method

- Four output methods can be selected by selecting an output mode and by combining large and small set values of OUT1 and OUT2. One of these four output methods can be selected for each output.
- OUT1 and OUT2 can be set independently.
- One-digit flow rate conversion will be a minimum set unit. See the specification for the minimum set units.
- When setting in the Auto Presetting mode, the Hysteresis mode will be set automatically.
- In the Window Comparator mode, leave between [P\_1] and [P\_2] or between [n\_1] and [n\_2] a span of more than seven digits. Hysteresis in this case will be three digits fixed.
- 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] and [P\_1] and [P\_2] should be replaced by [P\_3] and [P\_4].

### Selecting Indication Unit

If the unit specification of the model indication is without "M" [PA]

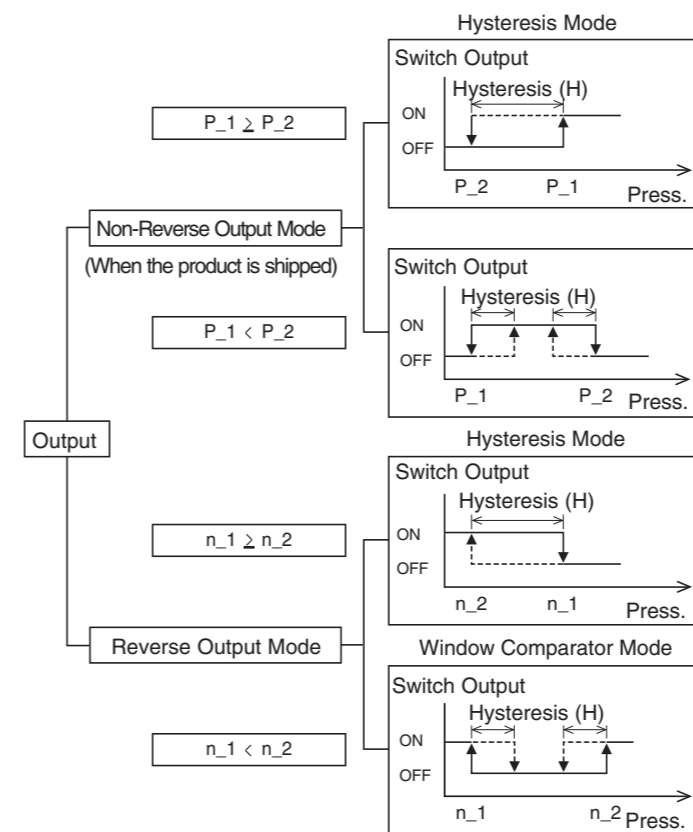
The indication unit can be selected freely. Pressing the **▲** or **▼** button will change the unit and will automatically convert set values.

The units will change in the following order :  
 PA GF bAr PSi inH mmH

For Compound Pressure

For Positive Pressure

Press the **SET** button to set and to move on to Output mode setting.



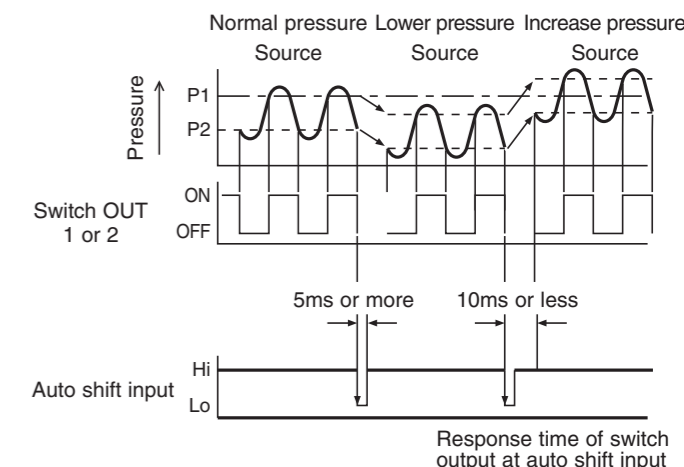
## Other Functions

### Auto shift function

When the source pressure fluctuates too much, the pressure switch may not be able to operate normally. Auto shift is provided to compensate for the fluctuation of the source pressure. While measured pressure becomes the standard pressure value when auto shift input is received, this function corrects the set value [P\_1] or [n\_1] and [P\_2] or [n\_2] of switch OUT 1, and the set value [P\_3] or [n\_3] and [P\_4] or [n\_4] of switch OUT 2.

#### With Auto Shift

Set auto shift input as Lo at the time the pressure source changes, in order to memorize the pressure change and to correct the pressure set value, so that a correct decision emerges.



### Conditions and explanations for auto shift function

- Keep constant pressure for 5ms or more from the close signal of auto shift input.
- At auto shift input, display indicates [ooo] for approx. 1sec. Pressure value at that time is memorized as corrected value [C\_5].
- With corrected value which is memorized, set value [P\_1] to [P\_4] or [n\_1] to [n\_4] are compensated.
- The span is 10ms or less until the switch output operates after auto shift input.
- When the corrected set value exceeds the accepted set range with auto shift input, the corrected value is not memorized. When exceeding the high limit the display indicates [UUU], and when exceeding the low limit the display indicates [LLL].
- When completing the pressure setting of OUT2, the corrected value and [C\_5] will be displayed alternately. Press the **SET** button to set and return to Measurement mode.
- The Corrected value [C\_5] after auto shift input setting, will be lost if the power is dis-connected, and is reset to zero (Initial value) when the power is re-supplied.

Note: There is No EEprom in the memory for the corrected value.

#### Using with auto shift input, accepted set range is as follows:-

	Set pressure range	Accepted set range
<b>For compound</b>	-100.0 to 100.0 kPa	-100.0 to 100.0 kPa
<b>For positive</b>	-0.1 to 1.000 MPa	-1.000 to 1.000 MPa

**Other Functions (continue)****Peak and Bottom Hold Display Function**

Maximum and minimum values are always detected and updated during measurement. Displayed values can be held. For peak hold, Press and hold the ▲ button for longer than one second to hold the maximum pressure value. The display will flash.

To reset holding, press and hold the ▲ button for more than one second. The display will return to measurement mode. For bottom hold, Press and hold the ▼ button for longer than one second to hold the minimum pressure value. The display will flash. To reset holding, press and hold the ▼ button for more than one second. The display will return to measurement mode.

**Key Lock Function**

This function prevents errors such as changing a set value by mistake.

**Lock**

UnL

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

**Unlock**

LoC

- Press and hold the SET button longer than four seconds. Release the button when [LoC] is displayed.
- Press the ▲ button to change the display to [unL]
- Press the SET button to return to the Measurement mode.

**Zero Clear Function**

The displayed value can be adjusted to zero when pressure to be measured is within – 70digits of the atmospheric pressure.

This function is useful because it enables the detection of pressure fluctuations larger than a certain value without being influenced by fluctuations of source pressure. Press and hold the ▲ and ▼ buttons simultaneously to reset to “0” on the display, and return to Measurement mode automatically.

**Error Display Function**

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

Error name	Display of error	Contents	Disposition
Over current error	OUT1	Over 80mA load current is flowing to the switch output.	Turn the power off and remove the cause of the over-current, Then turn the power on.
	OUT2		
Residual pressure error	[Er3]	Performing zero reset, the following pressure applied to ambient pressure. [ ISE50/60: Over – 0.071MPa ] *After 3 sec., measurement mode	After changing the applied pressure into ambient pressure, re-perform zero reset.
Applied pressure error	---	Pressure outside of high limit of set pressure range is applied.	Reset applied pressure into within set pressure range.
	----	Pressure outside of low limit of set pressure range is applied.	
Auto shift error	UUU	Corrected set value exceeds high limit of the accepted set range. *After 1 sec., measurement mode recovers automatically.	Re-set up the pressure set value so that the corrected set value which added the measurement pressure value with auto shift signal to the pressure set value does not exceed the accepted set range.
	LLL	Corrected set value exceeds low limit of the accepted set range. *After 1 sec., measurement mode recovers automatically.	
System error	[Er4]	Internal data error causes this display.	Turn off the power, and turn on again. If resetting fails, an investigation by SMC is required.
	[Er6]	Internal data error causes this display.	
	[Er7]	Internal data error causes this display.	
	[Er8]	Internal data error causes this display.	

**Contact**

AUSTRIA	(43) 2262 62280	NETHERLANDS	(31) 20 531 8888
BELGIUM	(32) 3 355 1464	NORWAY	(47) 67 12 90 20
CZECH REP.	(420) 541 424 611	POLAND	(48) 22 211 9600
DENMARK	(45) 7025 2900	PORTUGAL	(351) 21 471 1880
FINLAND	(358) 207 513513	SLOVAKIA	(421) 2 444 56725
FRANCE	(33) 1 6476 1000	SLOVENIA	(386) 73 885 412
GERMANY	(49) 6103 4020	SPAIN	(34) 945 184 100
GREECE	(30) 210 271 7265	SWEDEN	(46) 8 603 1200
HUNGARY	(36) 23 511 390	SWITZERLAND	(41) 52 396 3131
IRELAND	(353) 1 403 9000	UNITED KINGDOM	(44) 1908 563888
ITALY	(39) 02 92711		

**SMC Corporation**

URL <http://www.smcworld.com> (Global) <http://www.smceu.com> (Europe)

Specifications are subject to change without prior notice from the manufacturer. The descriptions of products in this document may be used by other companies. © SMC Corporation All Rights Reserved.