

For your safety, please read the following before using.

- ① Do not drop, hit or allow excessive shock. Even if switch body appears undamaged, internal components may be broken and can cause malfunction.
- ② Turn power off before connecting wiring. Wrong wiring or short circuit will damage and / or cause malfunction.
- ③ Do not use in environment containing steam or oil vapor.
- ④ This product is not explosion-proof rated. Do not use in atmosphere containing flammable or explosive gases.
- ⑤ Wiring for pressure controller should avoid power source line and high voltage line. If use in the same circuit, noise may cause malfunction.

A. SPECIFICATIONS

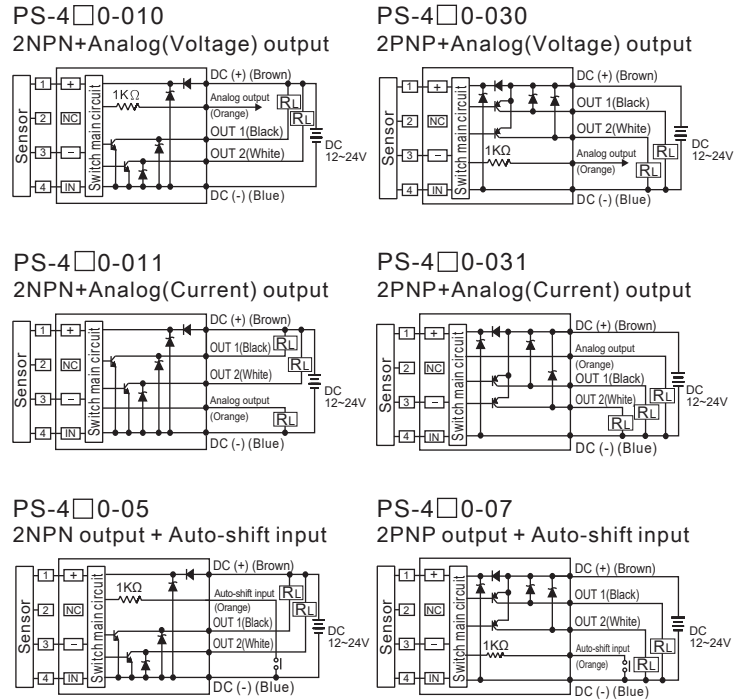
| MODEL                                        |                        | PS-400                                                                                                                                                                                              |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |
|----------------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|--------------------|------------------|------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|----------------------|------------------|-------------------|-------------------|
| SENSOR TYPE                                  |                        | S-0                                                                                                                                                                                                 | S-1                         | S-2                | S-3              | S-4              | S-5                | S-6                                                                                                                        | S-7                | S-8                | S-9                  | S-10             | S-11              | S-12              |
| Rated pressure range                         |                        | Self-Setting<br>(*1)                                                                                                                                                                                | 0<br>~<br>-101.3<br>kPa     | 0<br>100<br>kPa    | 0<br>2<br>kPa    | 0<br>5<br>kPa    | -100<br>100<br>kPa | -101<br>500<br>kPa                                                                                                         | 0<br>1<br>MPa      | 0<br>2<br>MPa      | 0<br>2.5<br>MPa      | 0<br>10<br>MPa   | 0<br>25<br>MPa    | 0<br>40<br>MPa    |
| Set pressure range                           |                        |                                                                                                                                                                                                     | 10<br>~<br>-101.3<br>kPa    | -10<br>100<br>kPa  | -0.2<br>2<br>kPa | -0.5<br>5<br>kPa | -100<br>100<br>kPa | -101<br>500<br>kPa                                                                                                         | -0.100<br>1<br>MPa | -0.100<br>2<br>MPa | -0.100<br>2.5<br>MPa | 0<br>10<br>MPa   | 0<br>25<br>MPa    | 0<br>40<br>MPa    |
| Setting pressure range<br>(Auto-shift input) |                        | —                                                                                                                                                                                                   | 101.3<br>~<br>-101.3<br>kPa | -100<br>100<br>kPa | -2<br>2<br>kPa   | -5<br>5<br>kPa   | -100<br>100<br>kPa | -500<br>500<br>kPa                                                                                                         | -1<br>1<br>MPa     | -2<br>2<br>MPa     | -2.5<br>2.5<br>MPa   | -10<br>10<br>MPa | -25<br>25<br>MPa  | -40<br>40<br>MPa  |
| Set pressure<br>resolution                   | kPa                    | Self-Setting                                                                                                                                                                                        | 0.1                         | 0.1                | 0.01             | 0.01             | 0.1                | 1                                                                                                                          | —                  | —                  | —                    | —                | —                 | —                 |
|                                              | MPa                    |                                                                                                                                                                                                     | —                           | —                  | —                | —                | —                  | —                                                                                                                          | 0.001              | 0.01               | 0.01                 | 0.01             | 0.1               | 0.1               |
|                                              | kgf/cm <sup>2</sup>    |                                                                                                                                                                                                     | 0.001                       | 0.001              | —                | —                | 0.001              | 0.01                                                                                                                       | 0.01               | 0.1                | 0.1                  | 0.1              | 1                 | 1                 |
|                                              | bar                    |                                                                                                                                                                                                     | 0.001                       | 0.001              | —                | —                | 0.001              | 0.01                                                                                                                       | 0.01               | 0.1                | 0.1                  | 0.1              | 1                 | 1                 |
|                                              | psi                    |                                                                                                                                                                                                     | 0.01                        | 0.01               | —                | —                | 0.01               | 0.1                                                                                                                        | 0.1                | 1                  | 1                    | 1                | 1 <sup>(*)2</sup> | 1 <sup>(*)2</sup> |
|                                              | inHg                   |                                                                                                                                                                                                     | 0.1                         | —                  | —                | —                | 0.1                | —                                                                                                                          | —                  | —                  | —                    | —                | —                 | —                 |
|                                              | mmHg                   |                                                                                                                                                                                                     | 1                           | —                  | 0.1              | 0.1              | 1                  | —                                                                                                                          | —                  | —                  | —                    | —                | —                 | —                 |
|                                              | ---                    |                                                                                                                                                                                                     | —                           | —                  | —                | —                | —                  | —                                                                                                                          | —                  | —                  | —                    | —                | —                 | —                 |
| Power supply voltage                         |                        | 12 ~ 24V DC ±10%, Ripple (P-P) ≤ 10%                                                                                                                                                                |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |
| Current consumption                          |                        | ≤ 40mA (With no load)                                                                                                                                                                               |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |
| Sensor input                                 |                        | 1~5V or 4~20mA                                                                                                                                                                                      |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |
| Switch output                                |                        | 2 NPN : open collector 2 outputs<br>Max. load current : 125mA<br>Max. supply voltage : 30V DC<br>Residual voltage : ≤ 1.5V                                                                          |                             |                    |                  |                  |                    | 2 PNP : open collector 2 outputs<br>Max. load current : 125mA<br>Max. supply voltage : 24V DC<br>Residual voltage : ≤ 1.5V |                    |                    |                      |                  |                   |                   |
| Repeatability                                |                        | ±0.1% F.S. ±1 digit                                                                                                                                                                                 |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |
| Hysteresis                                   | One point set mode     | Adjustable (*3)                                                                                                                                                                                     |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |
|                                              | Hysteresis mode        |                                                                                                                                                                                                     |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |
|                                              | Window comparator mode |                                                                                                                                                                                                     |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |
| Response time                                |                        | ≤ 2.5ms (chattering-proof function: 25ms, 100ms, 250ms, 500ms, 1000ms and 1500ms selectable)                                                                                                        |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |
| Output short circuit protection              |                        | Yes                                                                                                                                                                                                 |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |
| Display                                      |                        | 3 ½ digital, 7 segment LCD display ( Red / Green / Orange )<br>( Sampling rate : 5 times / sec. )                                                                                                   |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |
| Indicator accuracy                           |                        | ±1% F.S. ±1 digit ( ambient temperature: 25 ±3°C )                                                                                                                                                  |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |
| Switch on indicator                          |                        | Orange Indicator 1 : OUT1 & Orange Indicator 2 : OUT2                                                                                                                                               |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |
| Analog output<br>(Voltage Output)            |                        | Output Voltage: 1 ~ 5V ±2% F.S. (within rated pressure range)<br>Linearity: ±1% F.S.<br>Output impedance: about 1kΩ                                                                                 |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |
| Analog output<br>(Current Output)            |                        | Output Current: 4 ~ 20mA ±2% F.S.(within rated pressure range)<br>Linearity: ±1% F.S.<br>Max.Load Impedance: 300Ω at power supply of 12V,<br>600Ω at power supply of 24V<br>Min.Load impedance: 50Ω |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |
| Environment                                  | Enclosure              | IP40                                                                                                                                                                                                |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |
|                                              | Ambient temp. range    | Operation: 0 ~ 50°C, Storage:-10 ~ 60°C<br>( No condensation or freezing )                                                                                                                          |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |
|                                              | Ambient humidity range | Operation/Storage: 35 ~ 85% RH ( No condensation )                                                                                                                                                  |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |
|                                              | Withstand voltage      | 1000V AC in 1-min (between case and lead wire)                                                                                                                                                      |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |
|                                              | Insulation resistance  | ≥ 50 MΩ (at 500V DC, between case and lead wire)                                                                                                                                                    |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |
|                                              | Vibration              | Total amplitude 1.5mm or 10G,10Hz-55Hz-10Hz scan for 1 minute, 2 hours each direction of X, Y and Z                                                                                                 |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |
| Shock                                        |                        | 100m/s <sup>2</sup> (10G), 3 times each in direction of X, Y and Z                                                                                                                                  |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |
|                                              |                        |                                                                                                                                                                                                     |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |
| Temperature characteristic                   |                        | ±0.5% F.S. of detected pressure (25°C) at temp. (Range of 0~50°C)                                                                                                                                   |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |
| Lead wire                                    |                        | Ø4 PVC - 26 AWG ( 0.15 mm <sup>2</sup> ) - 5 cores                                                                                                                                                  |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |
| Weight                                       |                        | Approx. 67g (with 2 meter lead wire)                                                                                                                                                                |                             |                    |                  |                  |                    |                                                                                                                            |                    |                    |                      |                  |                   |                   |

\*1.S-0 : Set the sensor range ( 1999 ~ -1999 ) by self. The decimal place can be adjusted.

\*2.Actual value is 10 times display value while pressure unit is psi.

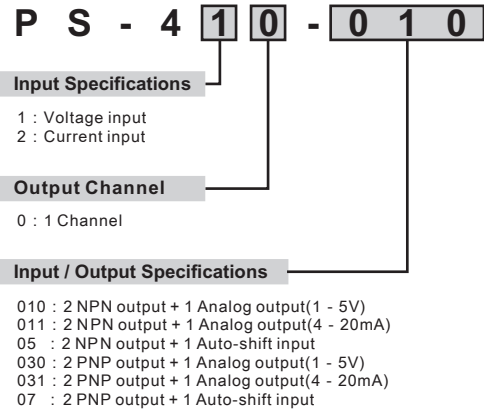
\*3.Hysteresis value is adjustable within 1 ~ 8 digits for one point set mode and window comparator mode.

B. OUTPUT CIRCUIT WIRING DIAGRAMS



\*Two wire current input only can be used "+" & "OUT" type.

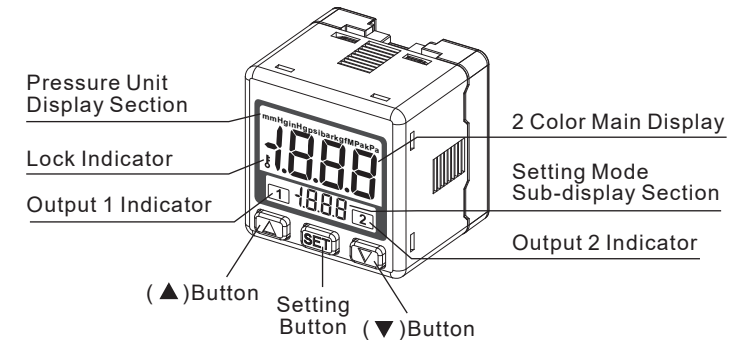
C. ORDERING INFORMATION



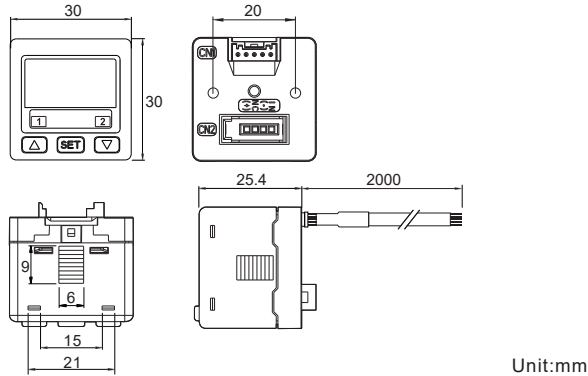
Optional Parts

BT-8 : Mounting bracket  
BT-9 : Mounting bracket  
PA-C : Panel adapter  
PA-D : Panel adapter + Front protective lid  
CN46A: Sensor connector Ø0.8 ~ Ø1.0 mm, 24~26AWG  
CN46B: Sensor connector Ø1.0 ~ Ø1.2 mm, 24~26AWG  
CN46C: Sensor connector Ø1.2 ~ Ø1.6 mm, 24~26AWG  
PS□ -05-01:Transducer

D. PANEL DESCRIPTION



E. DIMENSIONS



F. CONNECTOR

| PIN No. | Wire Color  |
|---------|-------------|
| 1       | Brown (DC+) |
| 2       | NC          |
| 3       | Blue (DC-)  |
| 4       | Black (IN)  |

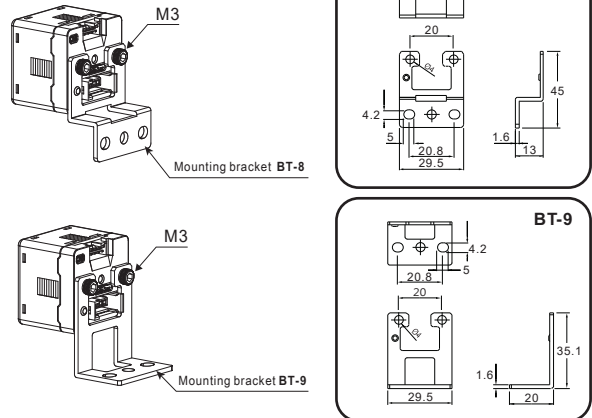
CN46: Sensor connector

Diameter: Ø0.8 ~ Ø1.0 mm

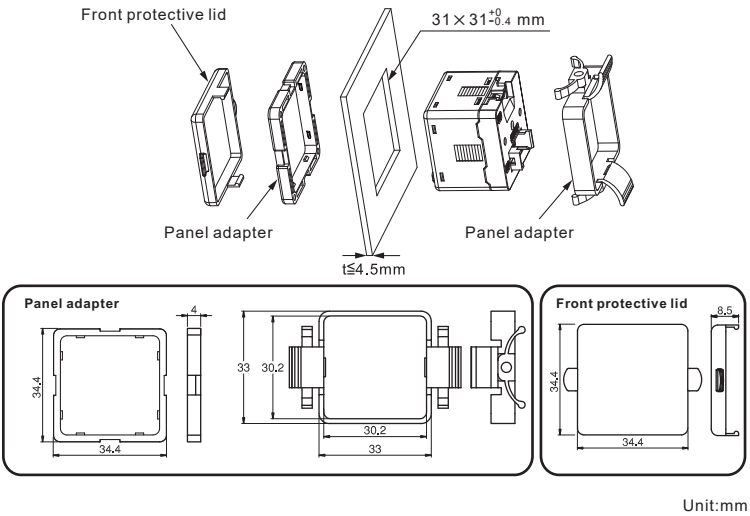
Power and output Lead wire with connector

G. OPTIONAL PARTS DIMENSIONS

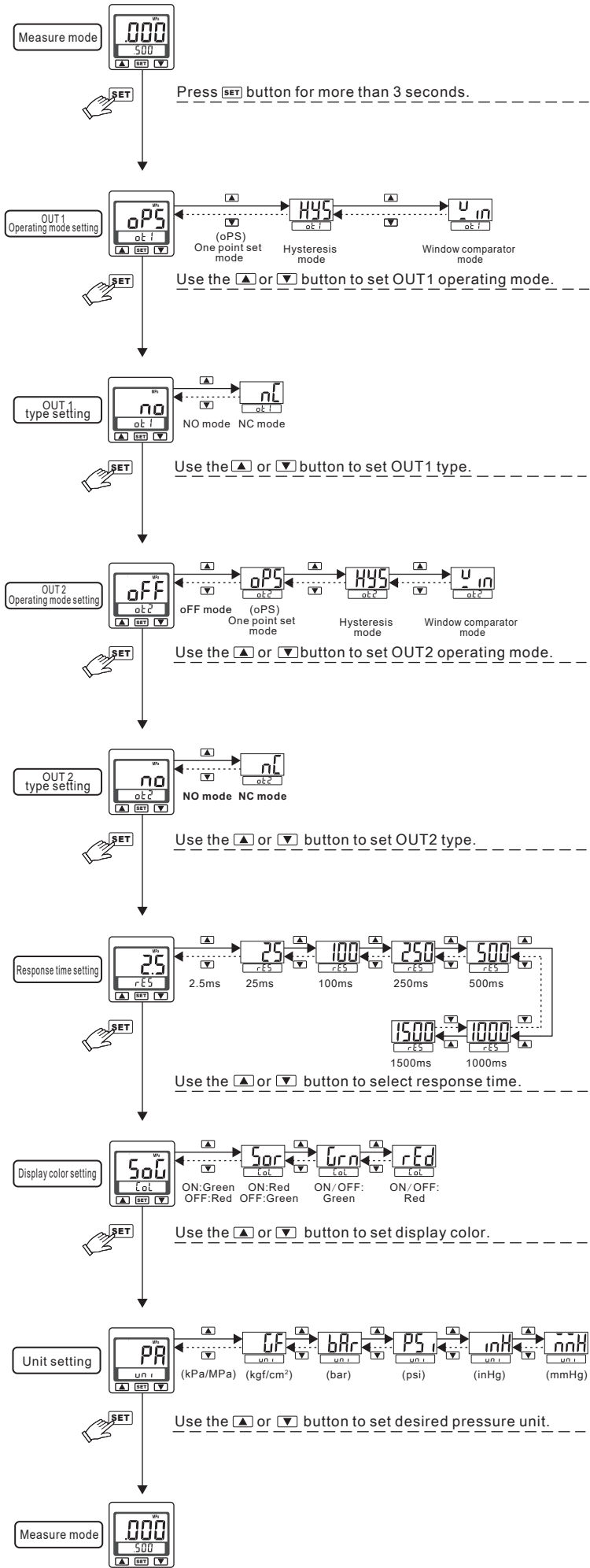
① Mounting bracket



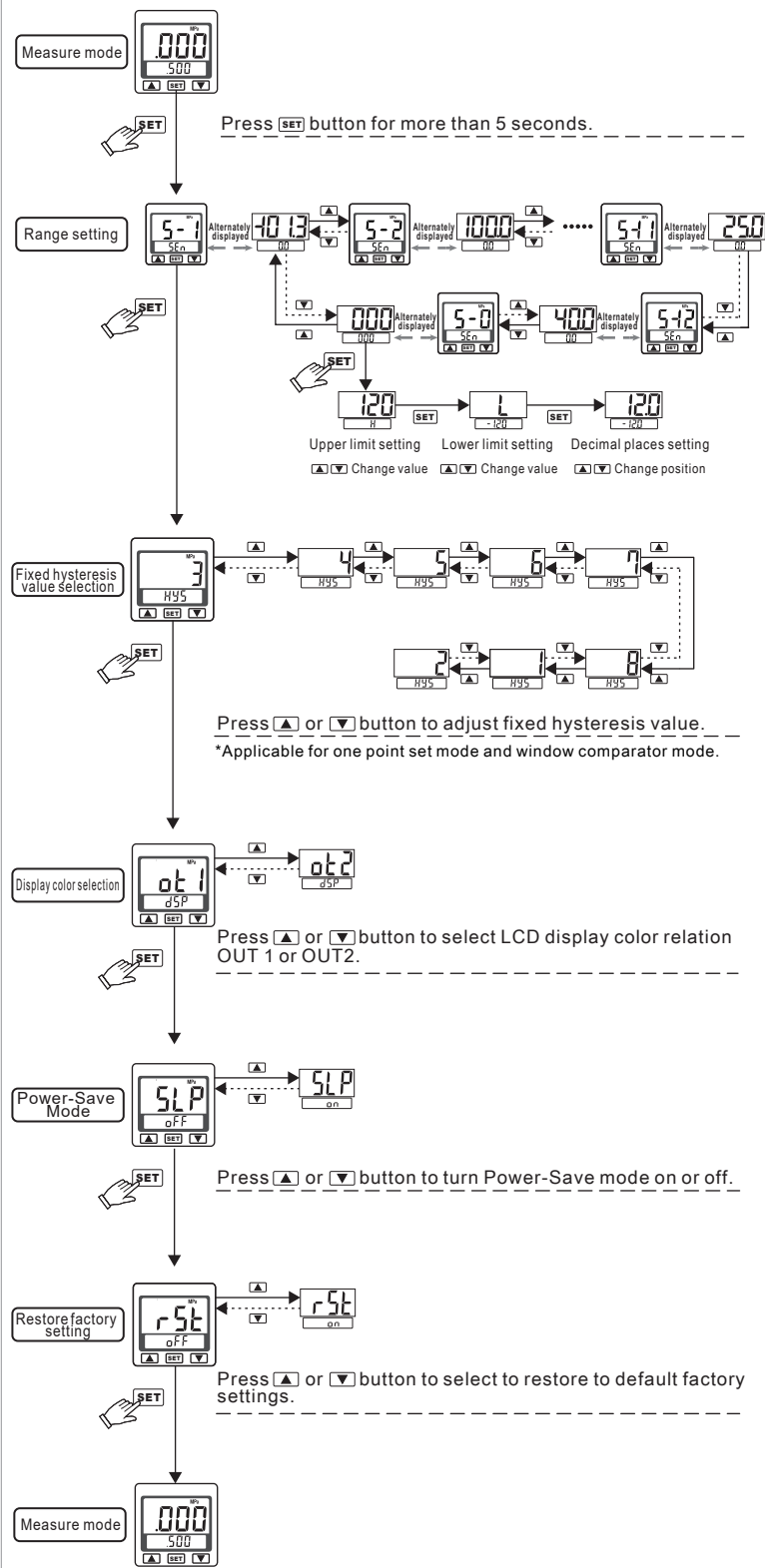
② Panel Mounting



H. INITIAL SETTING MODE

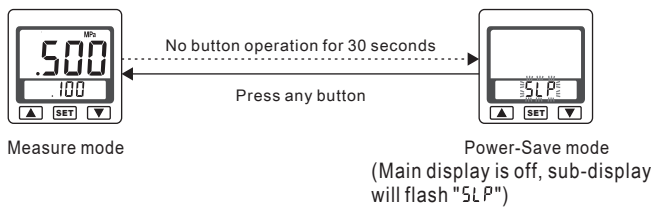


## I. ADVANCE SETTING MODE

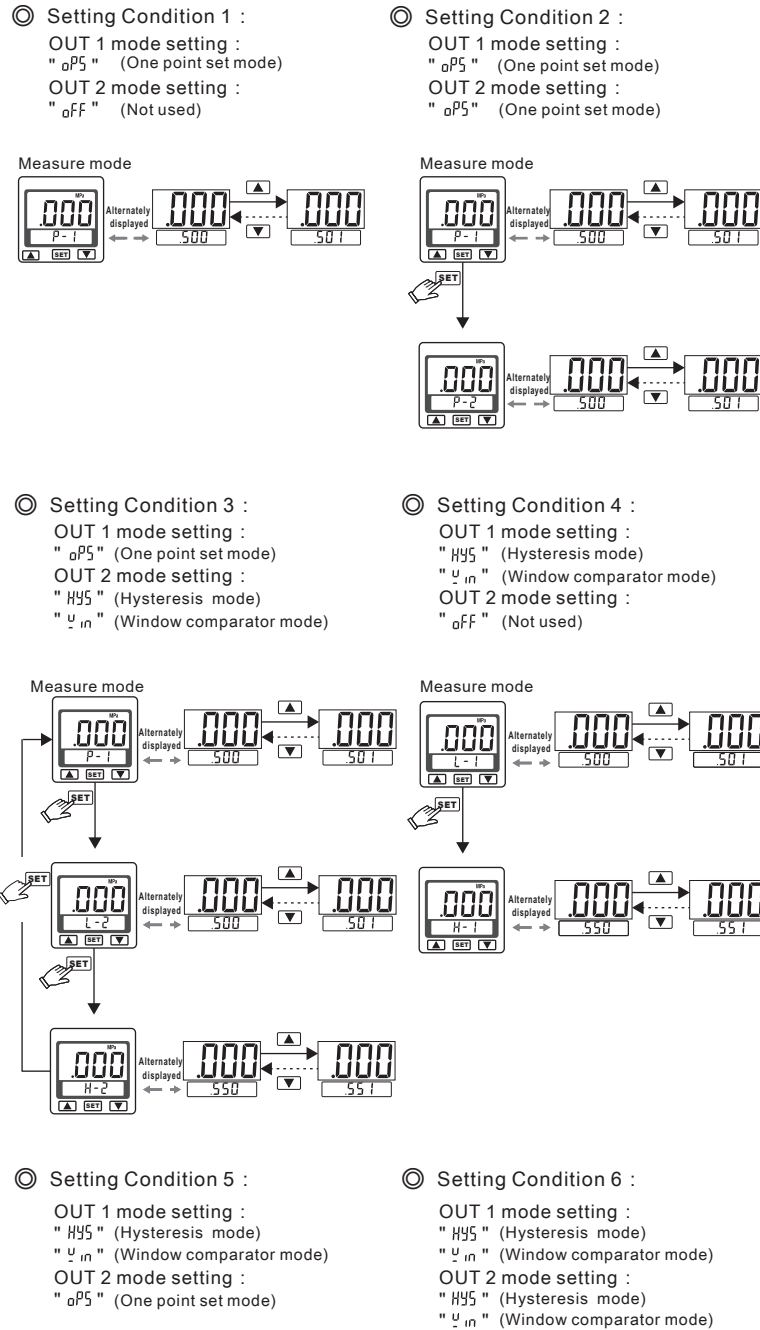


## J. POWER-SAVE MODE

- During Power-Save mode, the main display will turned off if no buttons are pressed after 30 seconds.
- During Power-Save mode, the output LCD's may not be synchronize with the output. It is normal and will not affect output operation.
- Press any button to turn-on main display temporarily.



## K. PRESSURE SETTING MODE

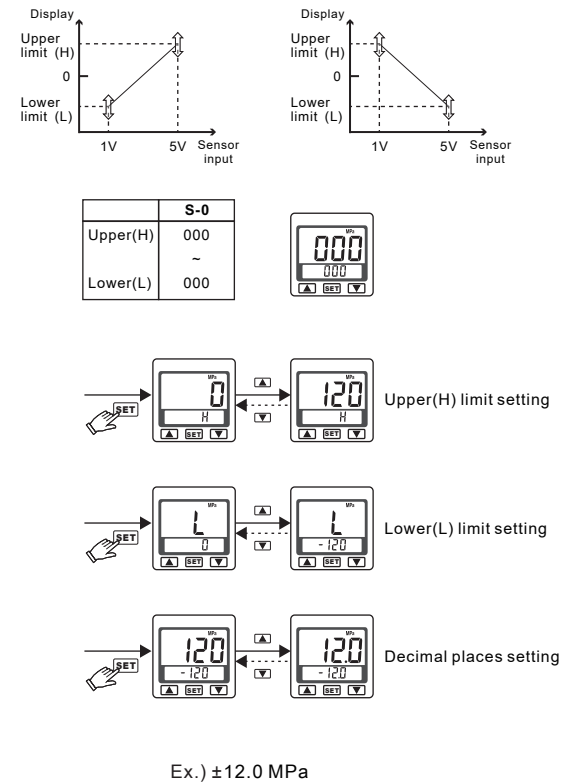


【 NOTE : 】  
Do not disconnect power when the sub-display and setting value is flashing alternately; otherwise the system cannot store the values.

## L. S-0 PRESSURE SETTING MODE

The pressure can be set to the value within the range of  $\pm 1999$ , and decimal place can be adjusted.

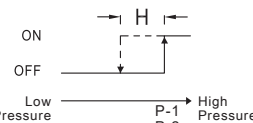
※NOTE : Upper limit (H) and lower limit (L) can't be set the same polarity.



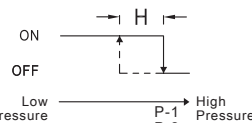
## M. OUTPUT TYPE

### (1) One point set mode:

#### Normal open mode

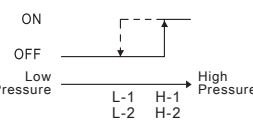


#### Normal close mode

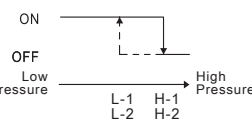


### (2) Hysteresis mode:

#### Normal open mode

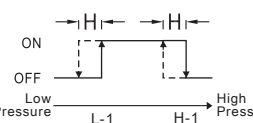


#### Normal close mode

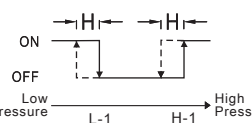


### (3) Window comparator mode:

#### Normal open mode



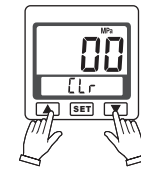
#### Normal close mode



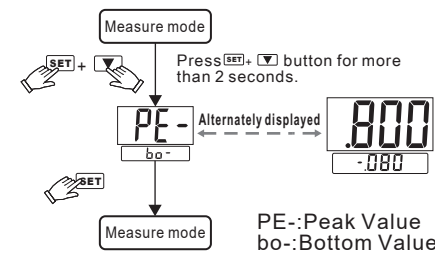
【 NOTE : 】  
\*1. In case hysteresis is set at less than or equal to 3 digits, switch output may chatter if input pressure fluctuates near the set point.  
\*2. When using window comparator mode, the difference between two set points must be greater than the fixed hysteresis, otherwise will cause the switch output to malfunction.

## N. ZERO POINT SETTING

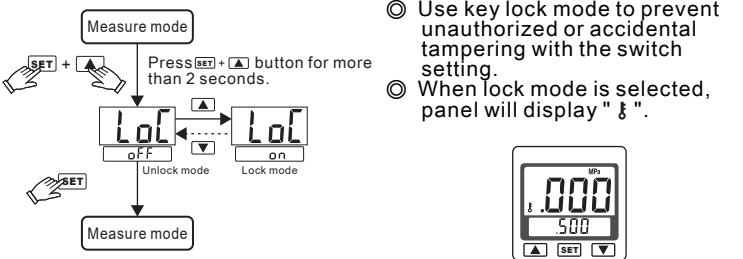
Press the **▲** + **▼** button at the same time until the "00" is shown.  
Release the button to end zero setting.



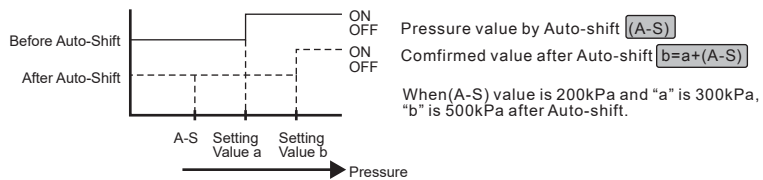
## O. PEAK/BOTTOM HOLD FUNCTION



## P. KEY LOCK/UNLOCK MODE



## Q. AUTO-SHIFT MODE



## R. APPENDED TABLE

| AWG   | Diameter (mm)  | Color of cover | Product No. | Sumitomo 3M Ltd. Product No. |
|-------|----------------|----------------|-------------|------------------------------|
| 24~26 | Ø0.8 ~ Ø1.0 mm | Red            | CN46A       | 37104-3101-000FL             |
|       | Ø1.0 ~ Ø1.2 mm | Yellow         | CN46B       | 37104-3122-000FL             |
|       | Ø1.2 ~ Ø1.6 mm | Orange         | CN46C       | 37104-3163-000FL             |

## S. ERROR CODE INSTRUCTION

| Error Type                | Error code                   | Error Condition                                                                                                                    | Troubleshooting                                                                                              |
|---------------------------|------------------------------|------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Excess load current error | out1<br>out2                 | Er 1 Output 1 load current is more than 125 mA<br>Er 2 Output 2 load current is more than 125 mA                                   | Turn power off and check the cause of overload current or lower the current load under 125 mA, then restart. |
| Residual pressure error   | Er 3                         | During zero reset, ambient pressure is over $\pm 3\%$ F.S. for S1~S12 or $\pm 2\%$ of setting range for S0.                        | Change input pressure to ambient pressure and perform zero reset again.                                      |
| Applied pressure error    | HHH<br>LLL                   | Supply pressure is exceeds the upper limit of pressure setting.<br>Supply pressure is exceeds the lower limit of pressure setting. | Adjust the pressure within operating pressure range.                                                         |
| System error              | Er 4<br>Er 5<br>Er 6<br>Er 7 | Internal system error<br>Internal system error<br>Internal data error<br>Internal data error                                       | Turn power off, and then restart. If error condition remains, please return to factory for inspection.       |

## T. PRESSURE UNIT CONVERSION TABLE

| From                  | To       | Pa       | kPa       | MPa         | kgf/cm <sup>2</sup> | mmHg        | psi       | bar       | inHg |
|-----------------------|----------|----------|-----------|-------------|---------------------|-------------|-----------|-----------|------|
| 1 Pa                  | 1        | 0.001    | 0.000001  | 0.000010197 | 0.00750062          | 0.000145038 | 0.00001   | 0.0002953 |      |
| 1 kPa                 | 1000.000 | 1        | 0.001000  | 0.010197    | 7.500616            | 0.145038    | 0.010000  | 0.2953    |      |
| 1 MPa                 | 1000000  | 1000     | 1         | 10.197      | 7500.616            | 145.038     | 10        | 295.2998  |      |
| 1 kgf/cm <sup>2</sup> | 98066.5  | 98.0665  | 0.0980665 | 1           | 735.559             | 14.2233     | 0.980665  | 28.95979  |      |
| 1 mmHg                | 133.32   | 0.13332  | 0.000133  | 0.0013595   | 1                   | 0.019336    | 0.0013332 | 0.039370  |      |
| 1 psi                 | 6895     | 6.895    | 0.006895  | 0.07031     | 51.7157             | 1           | 0.06895   | 2.036074  |      |
| 1 bar                 | 100000.0 | 100.0000 | 0.100000  | 1.01972     | 750.062             | 14.5038     | 1         | 29.52998  |      |
| 1 inHg                | 3386.388 | 3.386388 | 0.003386  | 0.034530    | 25.40000            | 0.491141    | 0.033863  | 1         |      |