

**For your safety, please read the following before using.**

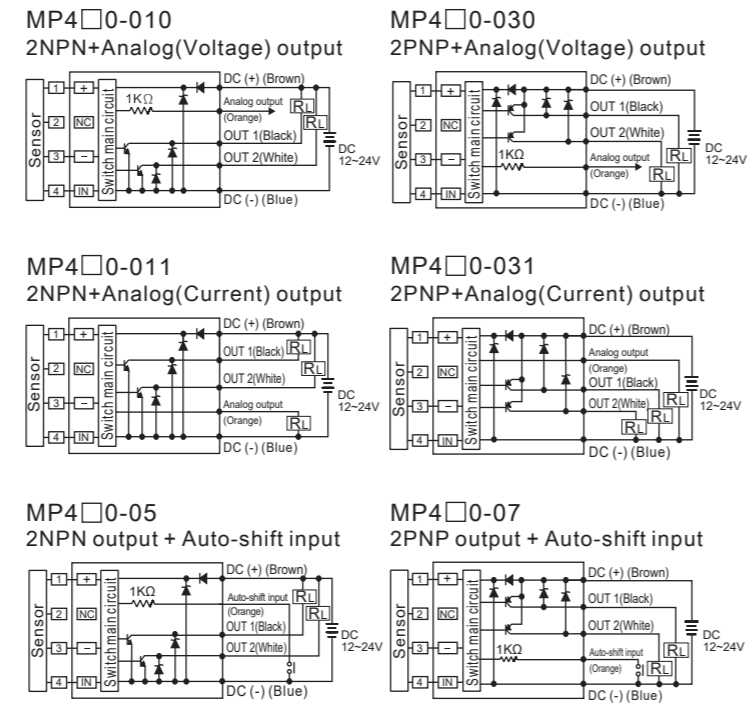
- Do not drop, hit or allow excessive shock. Even if switch body appears undamaged, internal components may be broken and can cause malfunction.
- Turn power off before connecting wiring. Wrong wiring or short circuit will damage and / or cause malfunction.
- Do not use in environment containing steam or oil vapor.
- This product is not explosion-proof rated. Do not use in atmosphere containing flammable or explosive gases.
- 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	MP400												
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	0 -101.3 kPa	0 100 kPa	0 2 kPa	0 5 kPa	-100 100 kPa	-101 500 MPa	0 1 MPa	0 2 MPa	0 2.5 MPa	0 10 MPa	0 25 MPa	0 40 MPa	0 40 MPa
Setting pressure range	10 -101.3 kPa	-10 100 kPa	-0.2 2 kPa	-0.5 5 kPa	-100 100 kPa	-101 500 MPa	-0.100 1 MPa	-0.100 2 MPa	-0.100 2.5 MPa	0 10 MPa	0 25 MPa	0 40 MPa	0 40 MPa
Setting pressure range (Auto-shift input)	-	101.3 -101.3 kPa	-100 100 kPa	-2 2 kPa	-5 5 kPa	-100 500 MPa	-1 1 MPa	-2 2 MPa	-2.5 2.5 MPa	-10 10 MPa	-25 25 MPa	-40 40 MPa	-40 40 MPa
Set pressure resolution	kPa	0.1	0.1	0.01	0.01	0.1	1	-	-	-	-	-	-
	MPa	-	-	-	-	-	0.001	0.01	0.01	0.01	0.1	0.1	0.1
	kgf/cm <sup>2</sup>	0.001	0.001	-	-	0.001	0.01	0.1	0.1	0.1	1	1	1
	bar	0.001	0.001	-	-	0.001	0.01	0.1	0.1	0.1	1	1	1
	psi	0.01	0.01	-	-	0.01	0.1	1	1	1	1	1 <sup>5</sup>	1 <sup>5</sup>
	inHg	0.1	-	-	-	0.1	-	-	-	-	-	-	-
mmHg	1	-	0.1	0.1	1	-	-	-	-	-	-	-	-
---	-	-	-	-	-	-	-	-	-	-	-	-	-
Power supply voltage	12 to 24V DC ±10%, Ripple (P-P) 10% or less												
Current consumption	≤ 40mA (With no load)												
Sensor input	1-5V or 4-20mA												
Switch output	NPN: open collector 2 outputs Max. load current: 125mA Max. supply voltage: 30V DC Residual voltage: ≤ 1.5V						PNP: open collector 2 outputs Max. load current: 125mA Max. supply voltage: 24V DC Residual voltage: ≤ 1.5V						
Repeatability (Switch output)	±0.1% F.S. ±1 digit												
Hysteresis	One point set mode	Adjustable(*2)											
	Window comparator mode	Adjustable(*2)											
Response time	≤ 2.5ms (chattering-proof function: 25ms, 100ms, 250ms, 500ms, 1000ms and 1500ms selections)												
Output short circuit protection	Yes												
Display	3 ½ digital, 7 segment LCD display (Red / Green / Orange) (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 (Voltage Output) *3	Output Voltage: 1 to 5V ±2% F.S. (within rated pressure range) Linearity: ±1% F.S. Output impedance: about 1kΩ												
Analog output (Current Output) *4	Output Current: 4 to 20mA ±2% F.S. (within rated pressure range) Linearity: ±1% F.S. Max. Load Impedance: 300Ω at power supply of 12V, 600Ω at power supply of 24V Min. Load impedance: 50Ω												
Enclosure	IP 40												
Ambient temp. range	Operation: 0 ~ 50°C, Storage: -10 ~ 60°C (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	50Mohm min. (at 500V DC, between case and lead wire)												
Vibration	Total amplitude 1.5mm or 10G, 10Hz-55Hz-10Hz scan for 1 minute, two 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 Oil-resistance cable (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. Hysteresis value is adjustable within 1 ~ 8 digits for one point set mode and window comparator mode.  
 \*3. If analog voltage output is selected, the analog current output cannot be selected at the same time.  
 \*4. If analog current output is selected, the analog voltage output cannot be selected at the same time.  
 \*5. If set pressure unit is psi, the value requires to ten multiply by display value.

**B. OUTPUT CIRCUIT WIRING DIAGRAMS**



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

**C. ORDERING INFORMATION**

**MP410-010**

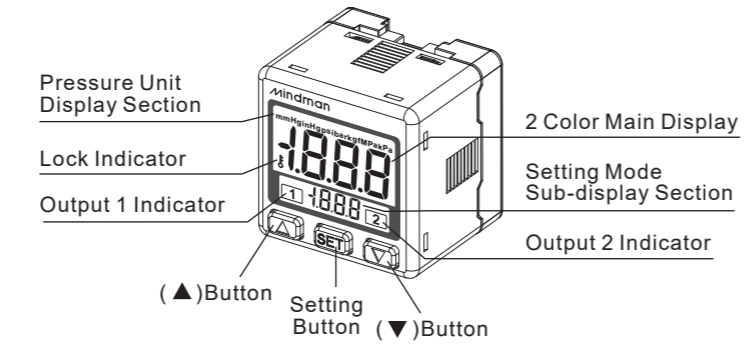
**Input Specifications**  
 1 : Voltage input  
 2 : Current input

**Output Channel**  
 0 : 1 Channel

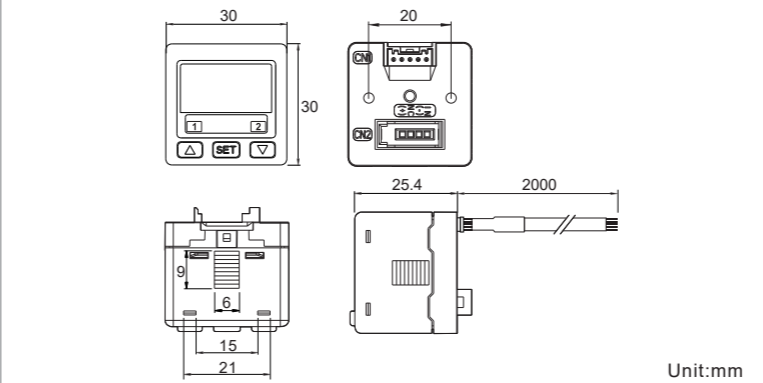
**Input / Output Specifications**  
 010 : 2 NPN output + 1 Analog output(1 - 5V)  
 011 : 2 NPN output + 1 Analog output(4 - 20mA)  
 05 : 2 NPN output + 1 Auto-shift input  
 030 : 2 PNP output + 1 Analog output(1 - 5V)  
 031 : 2 PNP output + 1 Analog output(4 - 20mA)  
 07 : 2 PNP output + 1 Auto-shift input

**Optional Parts**  
 MP-A8 : Mounting bracket  
 MP-A9 : Mounting bracket  
 MP-B2 : Panel adapter  
 MP-C2 : Panel adapter + Front protective lid  
 MP-FA: Sensor connector Ø0.8 ~ Ø1.0 mm, 24~26AWG  
 MP-FB: Sensor connector Ø1.0 ~ Ø1.2 mm, 24~26AWG  
 MP-FC: Sensor connector Ø1.2 ~ Ø1.6 mm, 24~26AWG  
 MP10□-01: Transducer

**D. PANEL DESCRIPTION**



**E. DIMENSIONS**



**F. CONNECTOR**

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

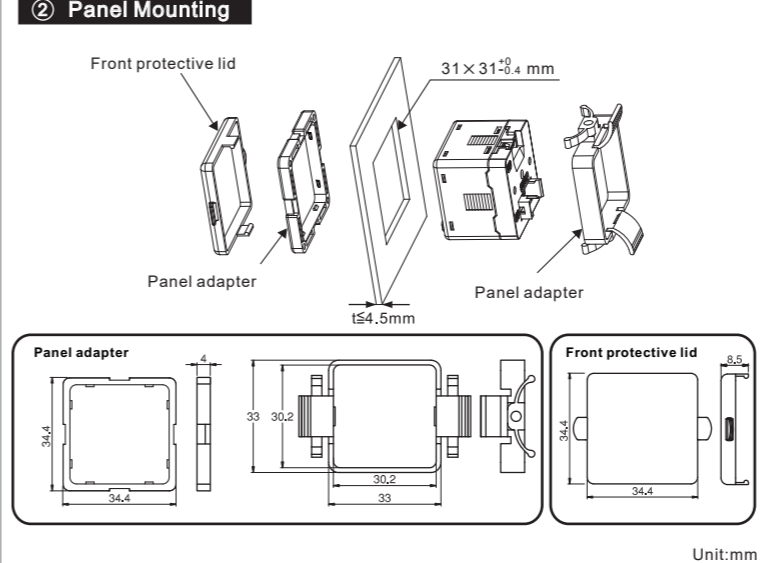
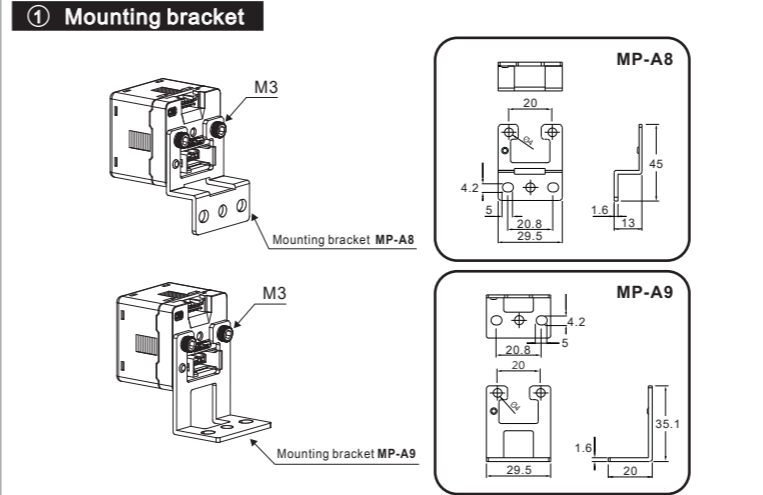
  

PIN No.	Wire Color
1	Brown (DC+)
2	Orange (Analog or Auto Shift)
3	White (OUT2)
4	Black (OUT1)
5	Blue (DC-)

MP-FA: Sensor connector  
 MP-FB: Sensor connector  
 MP-FC: Sensor connector

Diameter: Ø0.8 ~ Ø1.0 mm  
 Power and output Lead wire with connector

**G. OPTIONAL PARTS DIMENSIONS**



**H. INITIAL SETTING MODE**

Press **SET** button for more than 3 seconds.

Use the **▲** or **▼** button to set OUT1 operating mode.

Use the **▲** or **▼** button to set OUT1 type.

Use the **▲** or **▼** button to set OUT2 operating mode.

Use the **▲** or **▼** button to set OUT2 type.

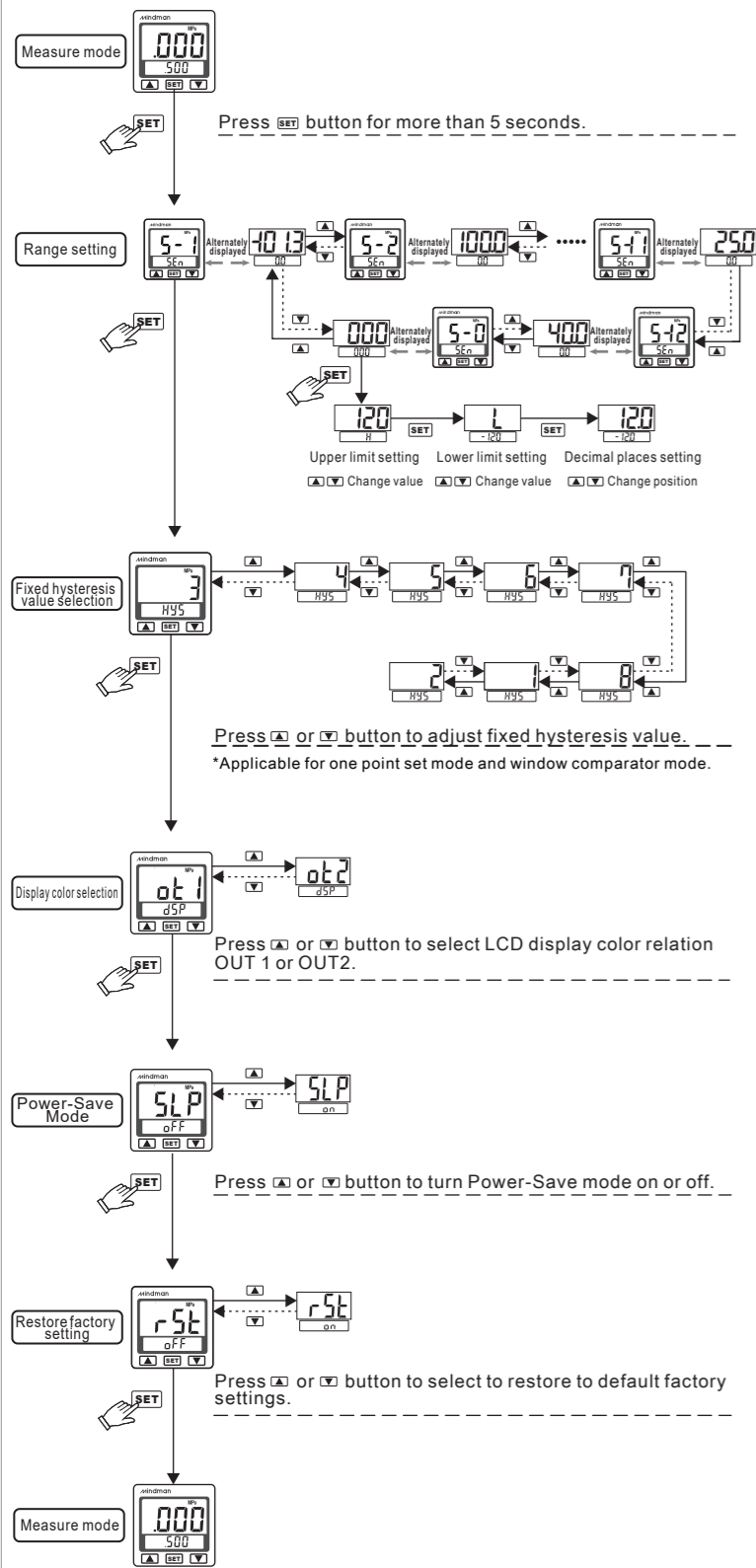
Use the **▲** or **▼** button to select response time.

Use the **▲** or **▼** button to set display color.

Use the **▲** or **▼** button to set desired pressure unit.

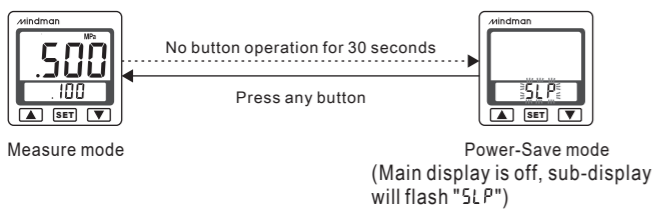
**[NOTE:]**  
 ※1. kPa applies to S0 ~ S6.  
 ※2. inHg applies to S-0, S-1 and S-5.  
 ※3. mmHg applies to S-0, S-1, S-3, S-4 and S-5.  
 ※4. MPa applies to S-0 and S-7~S-12.  
 ※5. Only for sensor type S0.

## I. ADVANCE SETTING MODE

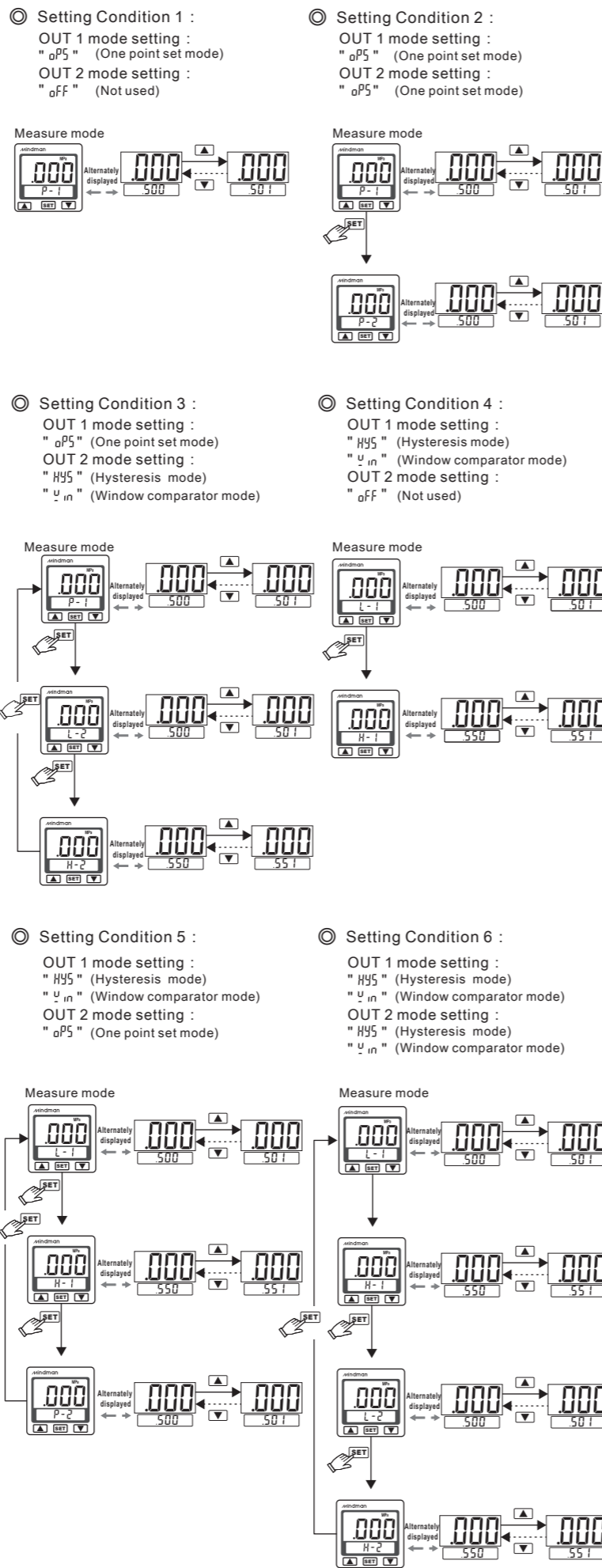


## J. POWER-SAVE MODE

- During Power-Save mode, the main display will be turned off if no buttons are pressed after 30 seconds.
- During Power-Save mode, the output LCD's may not be synchronized 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

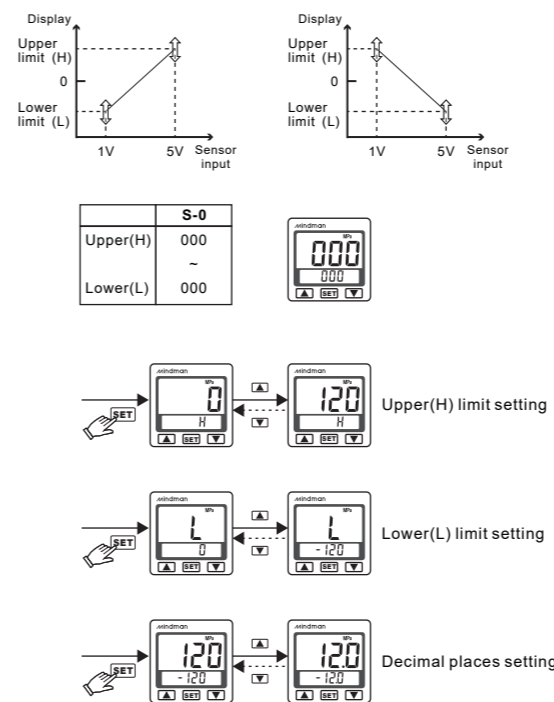


[ NOTE : ]  
Do not disconnect power when the sub-display and setting value is flashing alternately; otherwise the system cannot store the values.

## 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.

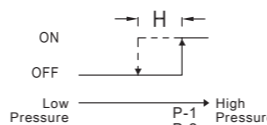
※NOTE : Upper limit (H) and lower limit (L) can't be set the same polarity.



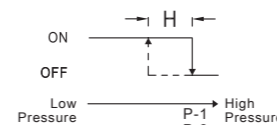
## M. OUTPUT TYPE

### (1) One point set mode:

#### Normal open mode

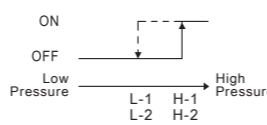


#### Normal close mode

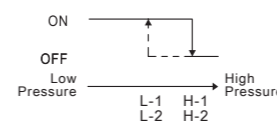


### (2) Hysteresis mode:

#### Normal open mode

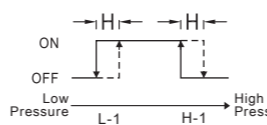


#### Normal close mode

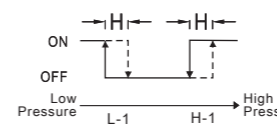


### (3) Window comparator mode:

#### Normal open mode



#### Normal close mode

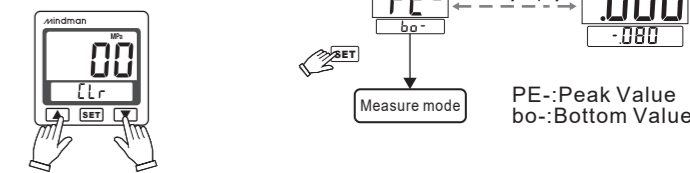


[ NOTE : ]

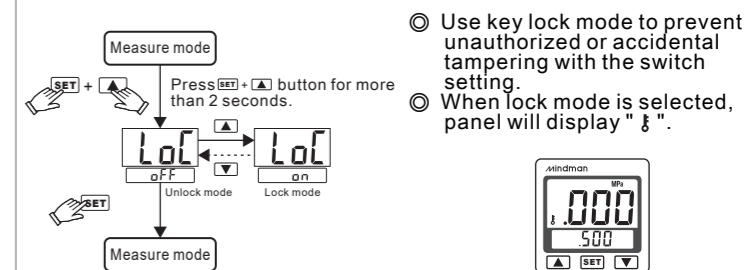
- In case hysteresis is set at less than or equal to 3 digits, switch output may chatter if input pressure fluctuates near the set point.
- When using window comparator mode, the difference between two set points must be greater than the fixed hysteresis, otherwise will cause the switch output to malfunction.

## N. ZERO POINT SETTING

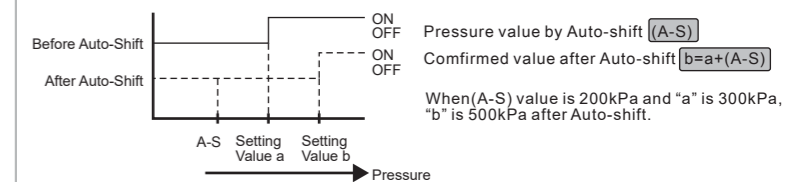
Press the **▲** + **▼** button at the same time until the "00" is shown.  
Release the button to end zero setting.



## P. KEY LOCK/UNLOCK MODE



## Q. AUTO-SHIFT MODE



## R. APPENDED TABLE

AWG	Diameter (mm)	Color of cover	Mindman Product No.	Sumitomo 3M Ltd. Product No.
24~26	Ø0.8 ~ Ø1.0 mm	Red	MP-FA	37104-3101-000FL
	Ø1.0 ~ Ø1.2 mm	Yellow	MP-FB	37104-3122-000FL
	Ø1.2 ~ Ø1.6 mm	Orange	MP-FC	37104-3163-000FL

## S. ERROR CODE INSTRUCTION

Error Type	Error code	Error Condition	Troubleshooting
Excess load current error	out1	Output 1 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.
	out2	Output 2 load current is more than 125 mA	
Residual pressure error	Er3	During zero reset, ambient pressure is over $\pm 3\%$ F.S.	Change input pressure to ambient pressure and perform zero reset again.
Applied pressure error	HHH	Supply pressure is exceeds the upper limit of pressure setting.	Adjust the pressure within operating pressure range.
	LLL	Supply pressure is exceeds the lower limit of pressure setting.	
System error	Er4	Internal system error	Turn power off, and then restart. If error condition remains, please return to factory for inspection.
	Er5	Internal system error	
	Er6	Internal data error	
	Er7	Internal data error	

## 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	0.001333	0.0013595		1	0.019336	0.0013332	0.039370
1 psi	6895	6.895	0.006895	0.007031	51.7157		1	0.06895	2.036074
1 bar	100000.0	100.0000	0.100000	0.101972	750.062		14.5038	1	29.52998
1 inHg	3386.388	3.386388	0.003386	0.034530	25.40000		0.491141	0.033863	1