



*Pressure Switch*



**MP45**  
*series*

**IP65** / Digital **LCD** display / Copy setting

## High-Precision Digital Pressure Switch

### MP45 series

- IP65
- Copy setting.
- 2 NPN / PNP open collector + analog output (1~5V or 4~20mA).
- 2-color digital LCD display.
- Repeatability  $\pm 0.2\%$  F.S.  $\pm 1$  digit.

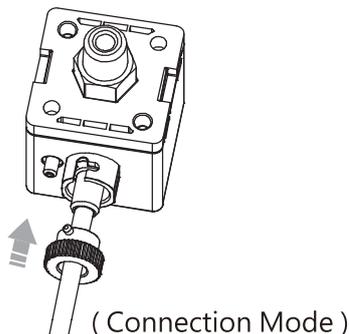


### 1 Quick Installation



- Save Installation Time
- Easy Removal

Data cable can be conveniently installed after the unit is attached to the equipment, increase installation speed!



( Connection Terminals )



( Finished Connection )



## 2 Copy Setting



Master



( Original Parameter )

COPY



Slave



( Copied )

- Reduce setting errors
- Reduce setting time

Can copy the setting value from master to slave sensor.

## 3 Unit Easy Indication

- Conversion unit is on display and easy to read.

inHg | psi | bar | kgf / cm<sup>2</sup> | MPa | kPa



## 4 2 Color Main Display

- Display different setting conditions. Can change the setting value and color mode.



	5.00	5.00	6.00	7.00
ON	Green	Red	Green	Red
OFF	Red	Green	Green	Red

## 5 IP65

- Can withstand low pressure water spout from all directions, and prevent product from damaging.



## 6 Environmental Protection Design

- RoHS Compliance / Without Harmful Substance

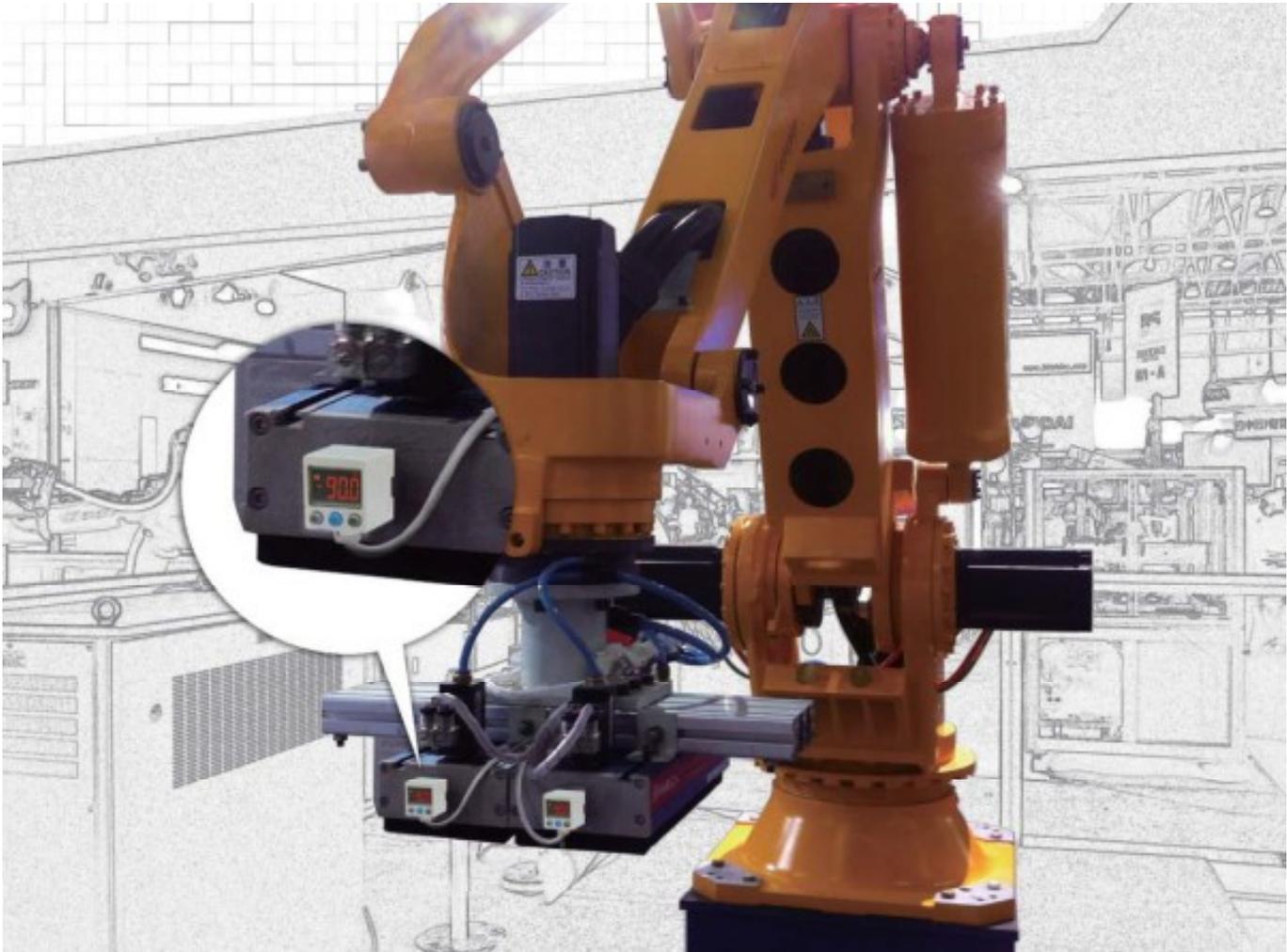


At "Restriction of the use of Hazardous Substance Directive" request, when processing the products, cannot use the exempted substance :  
Lead(Pb) / Mercury (Hg) / Cadmium (Cd) / Hexavalent Chromium (Cr<sup>IV</sup>) / Polybrominated Biphenyls (PBB) / Polybrominated Diphenyl Ethers (PBDE):

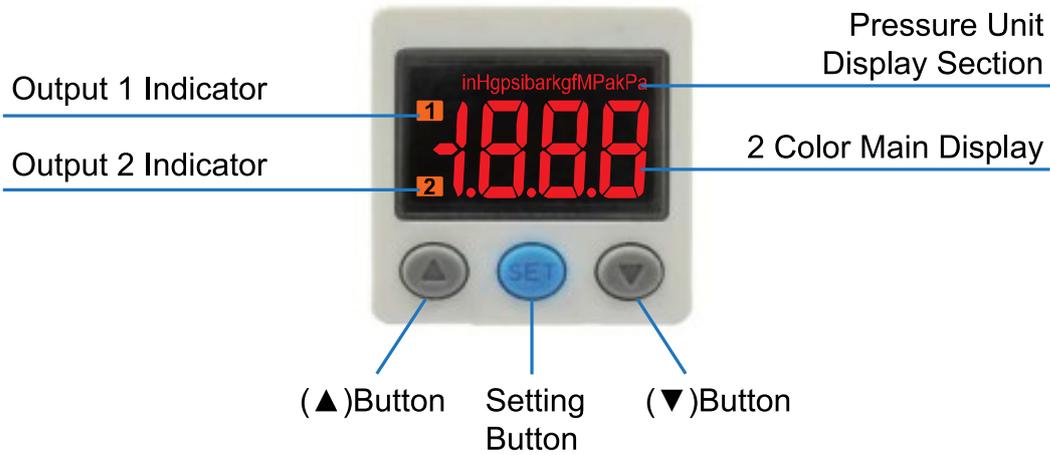


PRODUCT APPLICATION

Vacuum pressure detection on the robotic arm



PANEL DESCRIPTION



SPECIFICATIONS

Type	MP45P (Positive)	MP45V (Vacuum)	MP45C (Compound)
Rated pressure range	0.0~1.000MPa	-101.3~0.0kPa	-100.0~100.0kPa
Set pressure resolution	1.000MPa 0 -0.100MPa	10.0kPa 0 -101.3kPa	101.0kPa 0 -101.0kPa
Withstand pressure	1.5MPa	300kPa	300kPa
Set pressure resolution	0.001MPa	0.1kPa	0.1kPa
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
Port size	F1 : R1/8", M5 ; F2 : NPT1/8", #10-32UNF ; F3 : G1/8", M5		

## FUNCTION SETTING

### ■ COPY FUNCTION SETTING

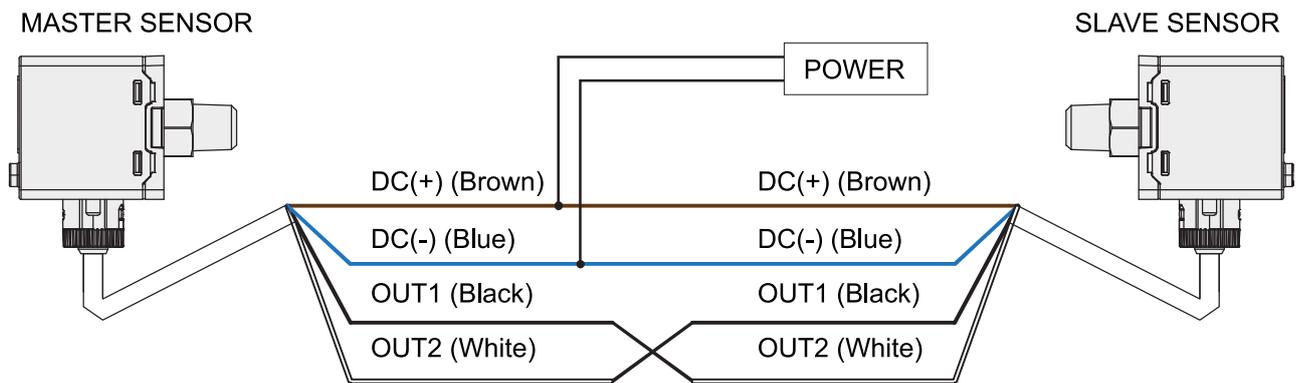
- Copy function setting can use the master sensor to copy the parameter to the slave sensors.
- Before copying, please confirm the model of pressure sensor. This function cannot be used with different model.
- The copy function only can be one-to-one.
- SETTING STEP:

① Please set the copy function to **on** or **onL** on the master sensor.

Slave sensor set to **SLu** .

② Turn off power to both master and slave sensor.

③ Refer to connection diagram below with the master and slave sensor :



④ Turn on power at the same time to the master and slave sensor.(\* 1)

⑤ Wait 5 sec., when finishing to convey the data,

the master sensor displays (alternating display) **CPY** ↔ **God** .

the slave sensor displays (alternating display) **SLu** ↔ **God** .

⑥ When data convey is failed,

(Master) sensor displays **CPY** ↔ **God** . (Slave) sensor displays **ErB** (\* 2)

⑦ Turn off power and remove the wire connection. Remove wire connection while power is still on may cause permanent damage to the sensor.

⑧ If another copy is required, set the slave sensor to **SLu** , then repeat step ③ to ⑤.

⑨ How to cancel the copy mode by master sensor :

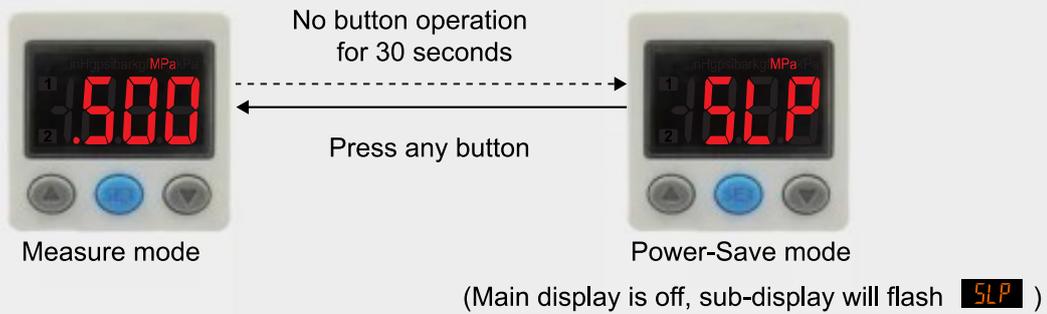
When the master sensor displays **CPY** ↔ **God** , press **▼** button to leave the copy mode.

【NOTE】 \* 1.If power on process is not synchronized, the data cannot be copied.

\* 2.When data convey is failed, please reset (slave) sensor to **SLu** and recheck wire connection, then repeat step ③ to ⑤.

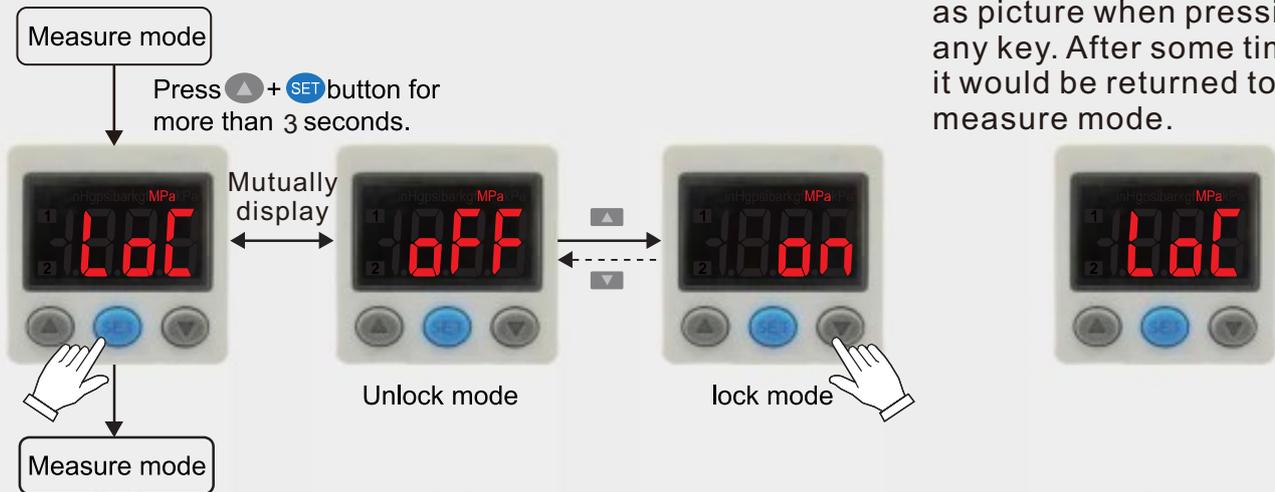
### POWER-SAVE MODE

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



### KEY LOCK / UNLOCK MODE

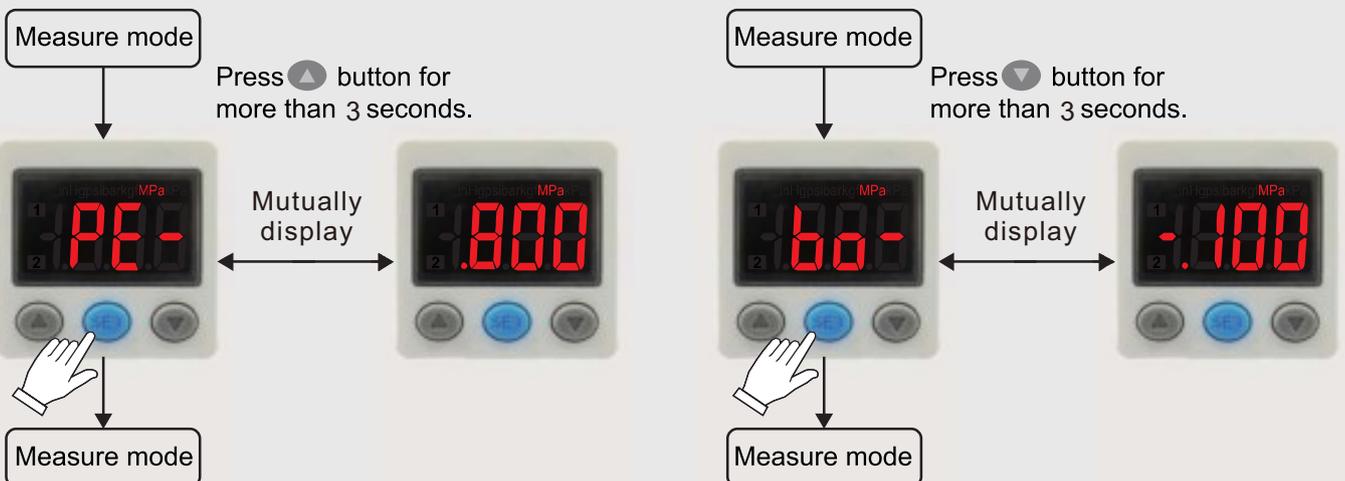
- Key lock mode, it displays as picture when pressing any key. After some time, it would be returned to measure mode.



### THE MAX. & MIN DISPLAY MODE

**PE-** : Peak value

**bo-** : Bottom value



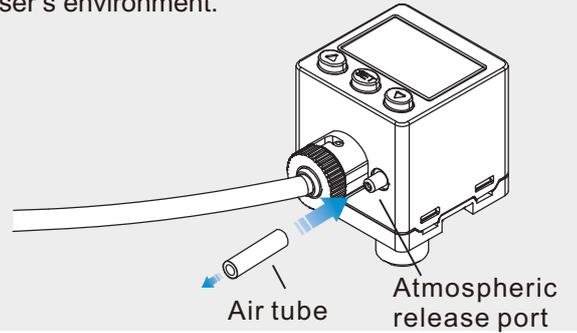
### ■ ZERO POINT SETTING

- Press the ▲ ▼ button at the same time until the "00" is shown. Release the button to exit.



### ■ DUST AND SPLASH ENVIRONMENT

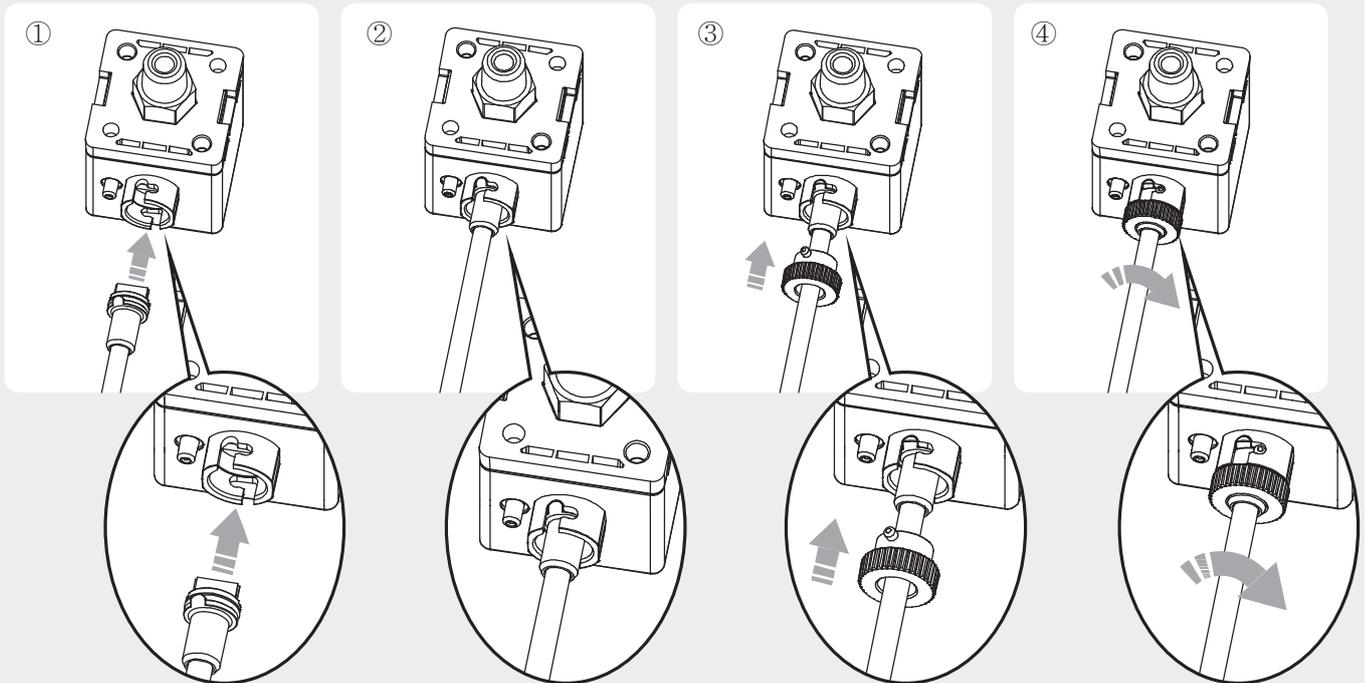
- To maintain IP65, please insert an air tube (O.D.: 4mm) into atmospheric release port and pipe the other end away from dust / spattering liquid environment.
- Use proper air tube dimension of O.D.: 4mm, I.D.:2.5mm, and the length is depending on the user's environment.



### ■ WIRE INSTALLATION INSTRUCTION

Please install the wire as the following step.

- Turn upward the salient point by terminal. (See figure ①)
- Install to the terminal to the groove by pressure sensor. (See figure ②)
- Terminal cover install to the products. (See figure ③)
- Turn the terminal cover to lock. (See figure ④)



## SPECIFICATIONS

TYPE		MP45P (Positive)	MP45V (Vacuum)	MP45C (Compound)
Rated pressure range		0.0~1.000MPa	-101.3~0.0kPa	-100.0~100.0kPa
Set pressure range		-0.100~1.000MPa	-101.3~10.0kPa	-101.0~101.0kPa
Withstand pressure		1.5MPa	300kPa	
Fluid		Air, Non-corrosive / Non-flammable gas		
Set pressure resolution	kPa	-	0.1	
	MPa	0.001	-	
	kgf/cm <sup>2</sup>	0.01	0.001	
	bar	0.01	0.001	
	psi	0.1	0.01	
	inHg	-	0.1	
Power supply voltage		12 to 24V DC $\pm 10\%$ , Ripple (P-P) 10% or less		
Current consumption		$\leq 40\text{mA}$ (With no load)		
Switch output		NPN: open collector 2 outputs Max. load current: 125mA Max. supply voltage: 30V DC Residual voltage: $\leq 1.5\text{V}$	PNP: open collector 2 outputs Max. load current: 125mA Max. supply voltage: 24V DC Residual voltage: $\leq 1.5\text{V}$	
Repeatability(Switch output)		$\pm 0.2\%$ F.S. $\pm 1$ digit		
Hysteresis	One point set mode	Adjustable( *1)		
	Hysteresis mode			
	Window comparator mode			
Response time		$\leq 2.5\text{ms}$ (chattering-proof function: 25ms, 100ms, 250ms, 500ms, 1000ms and 1500ms selections)		
Output short circuit protection		Yes		
LCD display		3 1/2 digit, 7 segment (red/green)		
Indicator accuracy		$\pm 2\%$ F.S. $\pm 1$ digit (ambient temperature: 25 $\pm 3^\circ\text{C}$ )		
Switch ON Indicator		Orange (1&2 Indicator) OUT1 OUT2		
Analog output (Voltage Output) (*2)		Output Voltage: 1 to 5V $\pm 2.5\%$ F.S. Linearity: $\pm 1\%$ F.S.                      Output impedance: about 1k $\Omega$		
Analog output (Current Output) (*3)		Output Current: 4 to 20mA $\pm 2.5\%$ F.S. Linearity: $\pm 1\%$ F.S. Max.Load Impedance: 250 $\Omega$ at power supply of 12V, 600 $\Omega$ at power supply of 24V Min.Load impedance: 50 $\Omega$		
Environment	Environment	IP65		
	Ambient temp. range	Operation: 0 ~ 50 $^\circ\text{C}$ , Storage:-10 ~ 60 $^\circ\text{C}$ ( 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	50M $\Omega$ 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		$\pm 2.5\%$ F.S. of detected pressure (25 $^\circ\text{C}$ ) at temp. Range of 0~50 $^\circ\text{C}$		
Port size		F1 : R1/8", M5 ; F2 :NPT1/8", #10-32UNF ; F3 : G1/8", M5		
Lead wire		Oil-resistance cable(0.15mm <sup>2</sup> )		
Weight		Approx.86g (with 2 meter lead wire)		

**[ NOTE ]** \*1 : Hysteresis value is adjustable within 1 ~ 8 digits for one point set mode and window comparator mode.  
\*2 : If analog voltage output is selected, the analog current output cannot be selected at the same time.  
\*3 : If analog current output is selected, the analog voltage output cannot be selected at the same time.

ORDERING INFORMATION

M P 4 5 C - 010 - F 1

Pressure Range

C : Compound (-101.0 ~ 101.0 kPa)  
 V : Vacuum (10.0 ~ -101.3 kPa)  
 P : Positive (-0.100 ~ 1.000 MPa)

Pressure Port

F1 : R1/8", M5  
 F2 : NPT1/8", #10-32UNF  
 F3 : G1/8", M5

Output Specifications

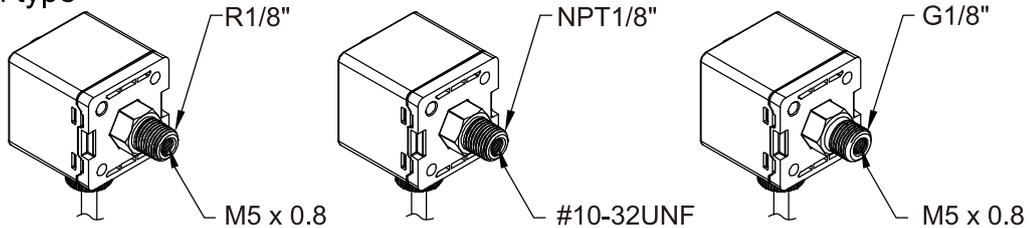
010 : 2 NPN+Analog (Voltage) output (1 ~ 5V)  
 011 : 2 NPN+Analog (Current) output (4 ~ 20mA)  
 030 : 2 PNP+Analog (Voltage) output (1 ~ 5V)  
 031 : 2 PNP+Analog (Current) output (4 ~ 20mA)

Optional Parts

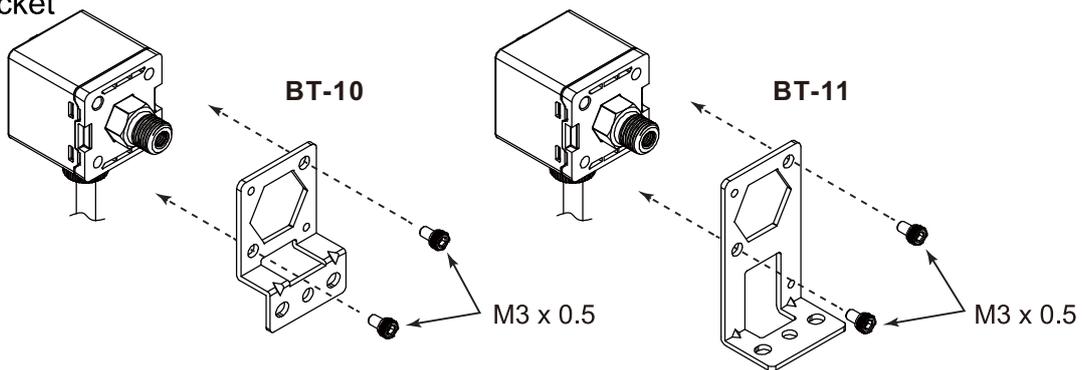
MP-A10: Mounting bracket (BT-10)  
 MP-A11: Mounting bracket (BT-11)  
 MP-B3: Panel adapter (PA-E)  
 MP-C3: Panel adapter+Front protective lid (PA-F)

INSTALLATION

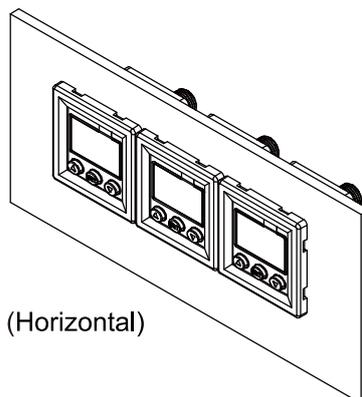
■ Connection type



■ Mounting bracket



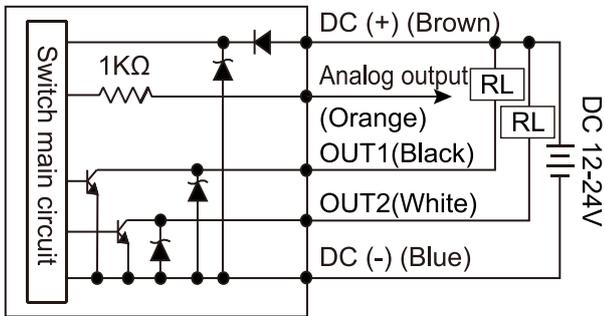
■ Panel Mounting



OUTPUT CIRCUIT WIRING DIAGRAMS

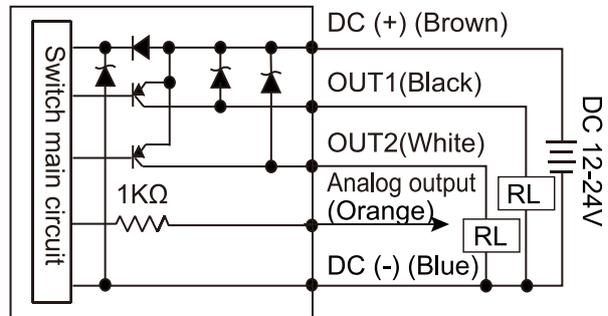
■ MP45□-010-□

2 NPN+Analog Voltage output(1 ~ 5V)



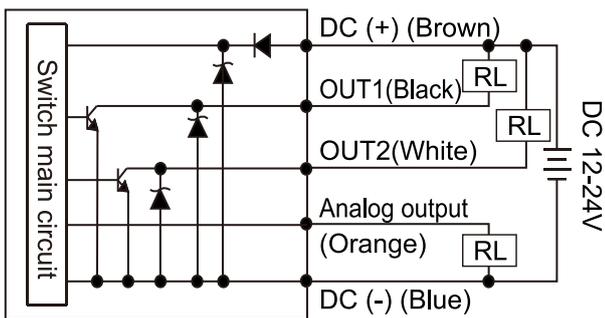
■ MP45□-030-□

2 PNP+Analog Voltage output(1 ~ 5V)



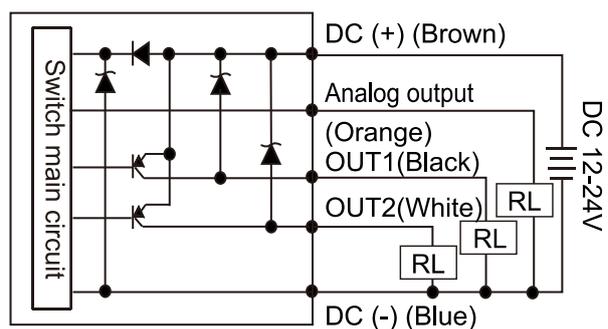
■ MP45□-011-□

2 NPN+Analog Current output(4 ~ 20mA)

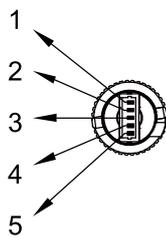


■ MP45□-031-□

2 PNP+Analog Current output(4 ~ 20mA)



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

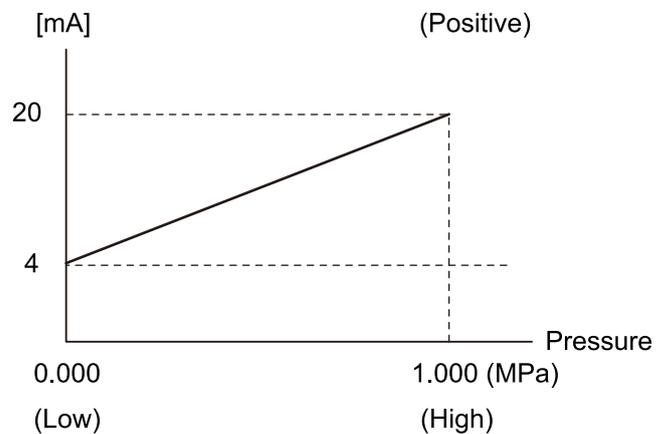
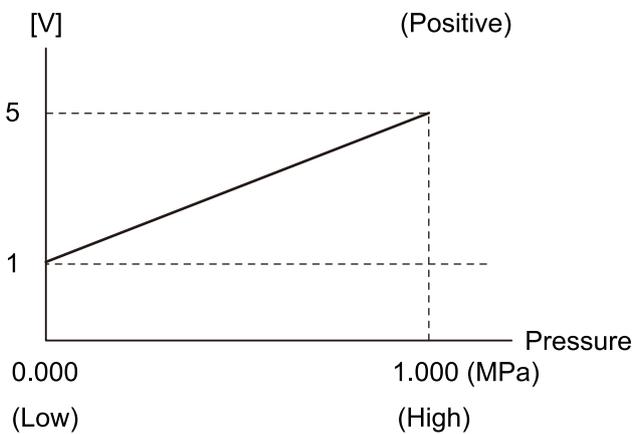
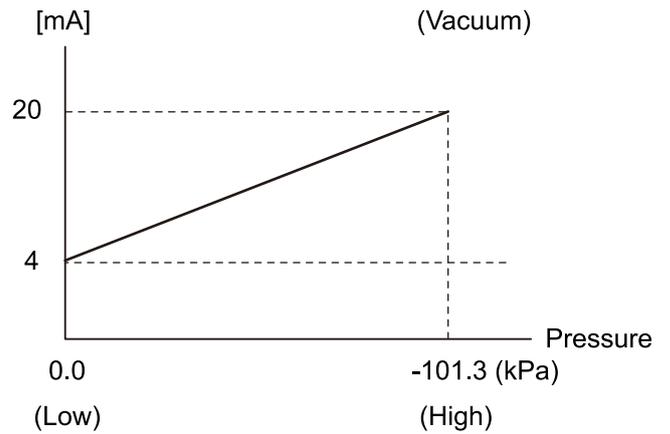
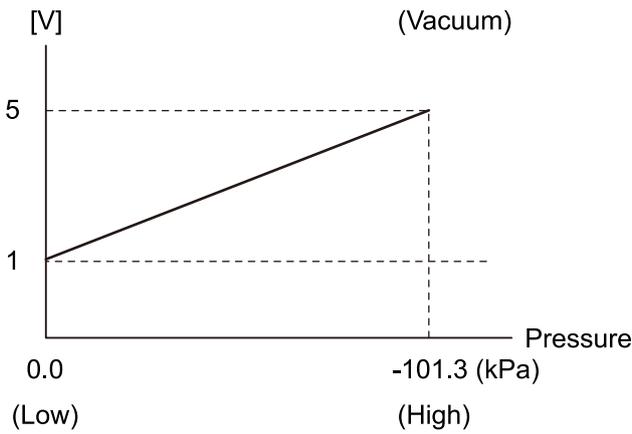
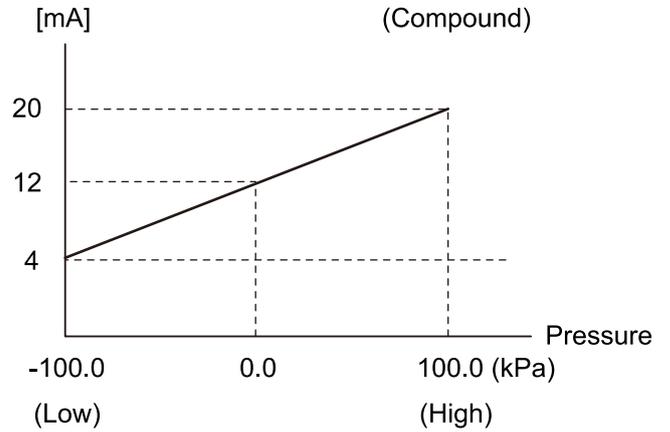
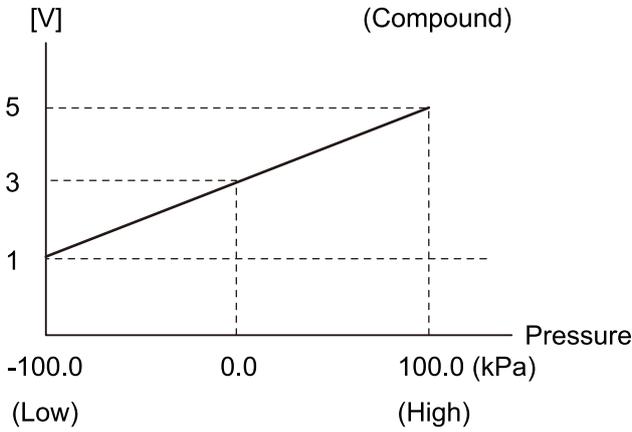


ANALOG OUTPUT DESCRIPTION

■ Analog output is proportional to the rated pressure range.

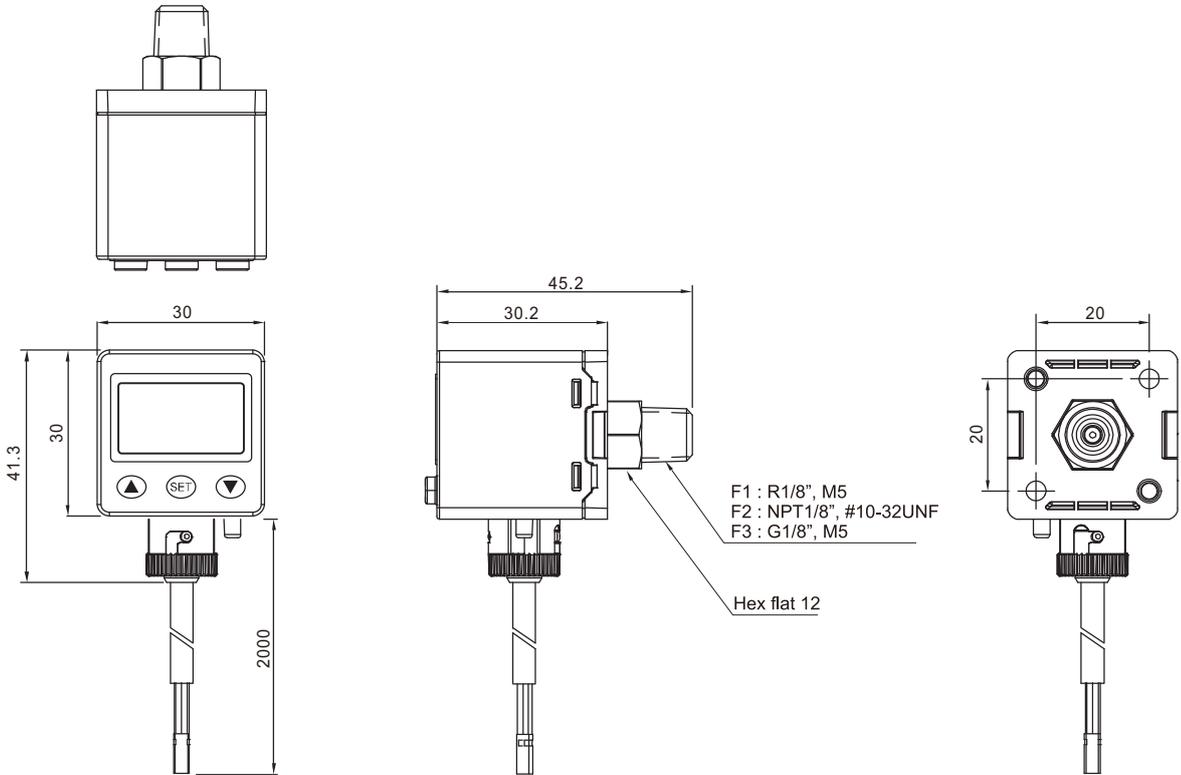
● Voltage type

● Current type

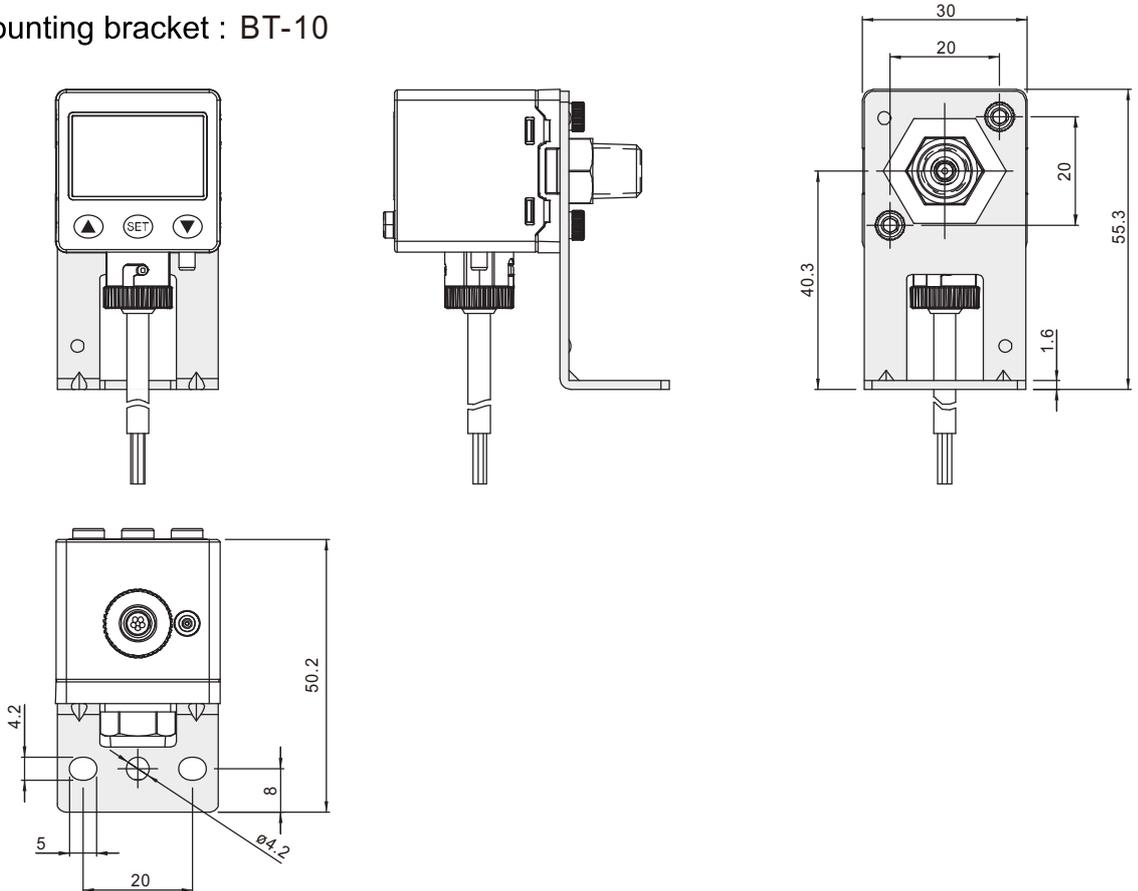


OPTIONAL PARTS DIMENSIONS

■ Dimensions



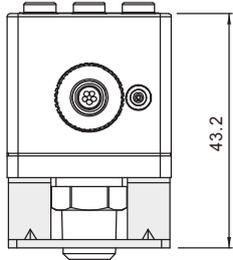
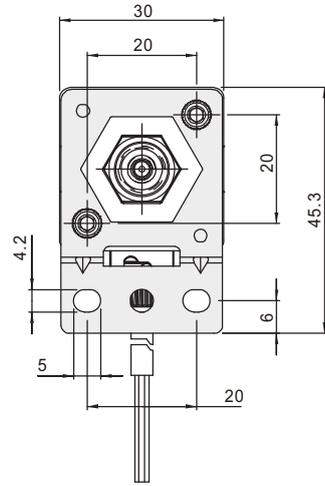
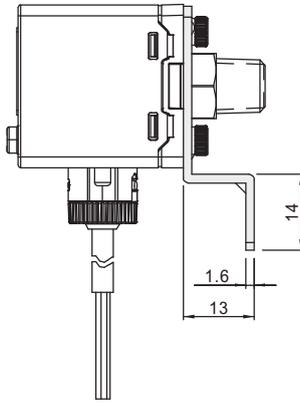
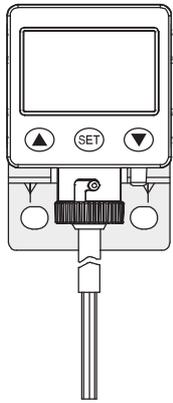
■ Mounting bracket : BT-10



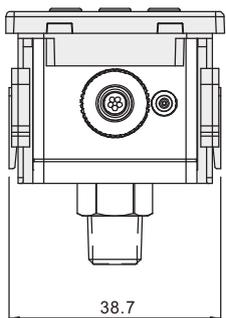
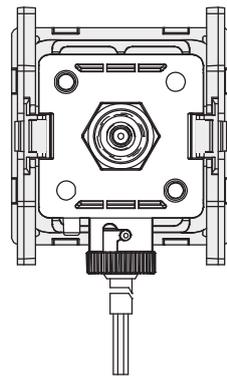
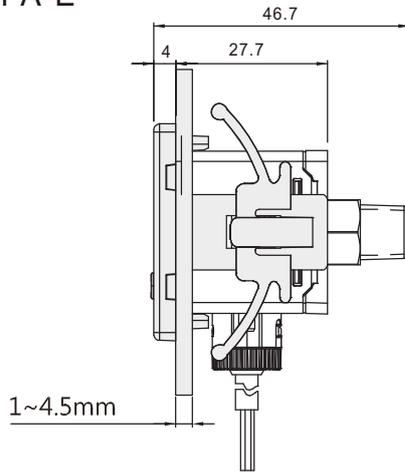
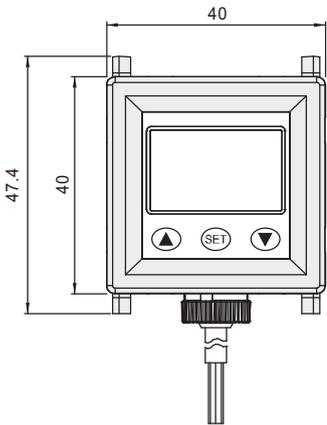
Unit:mm

OPTIONAL PARTS DIMENSIONS

■ Mounting bracket : BT-11

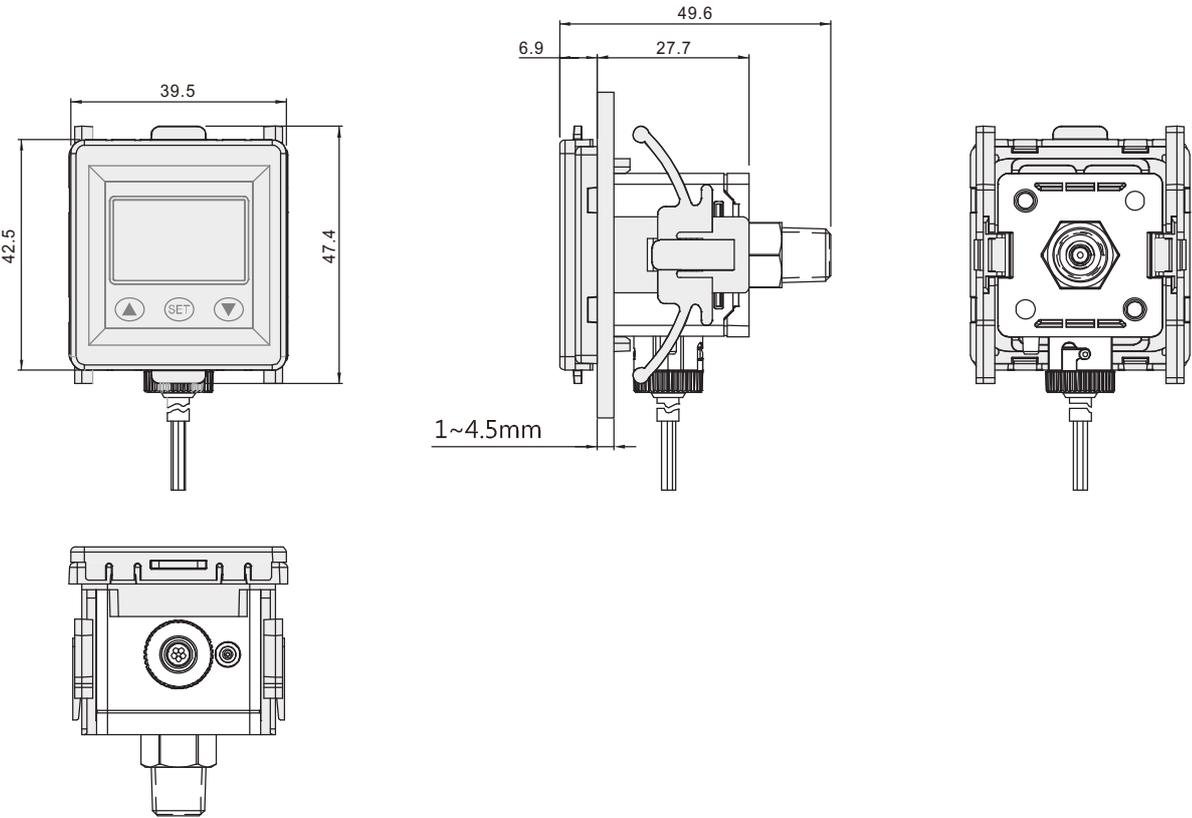


■ Panel adapter : PA-E

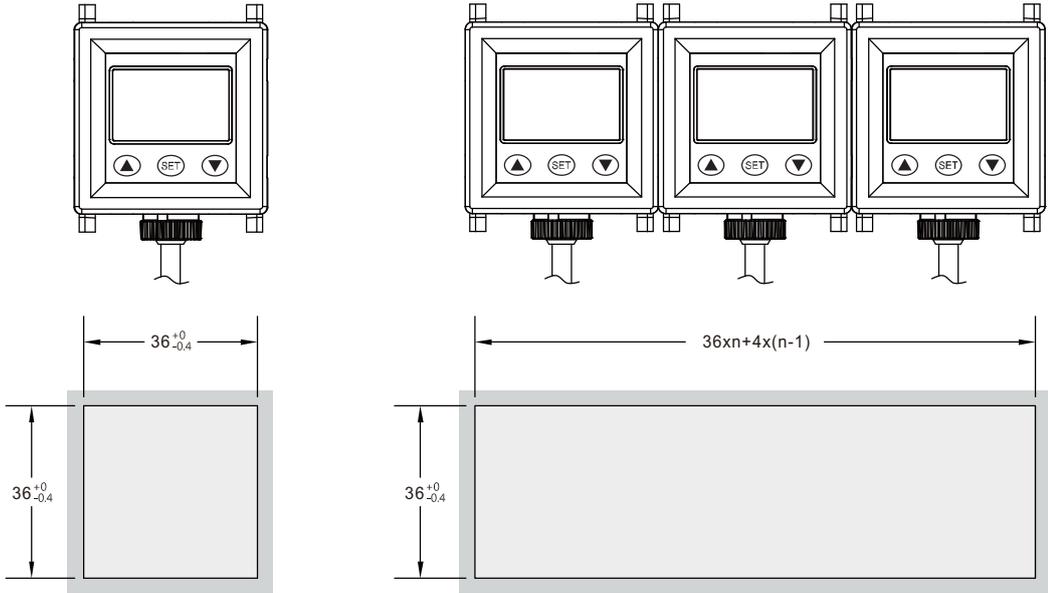


Unit:mm

■ Panel adapter + Front protective lid : PA-F



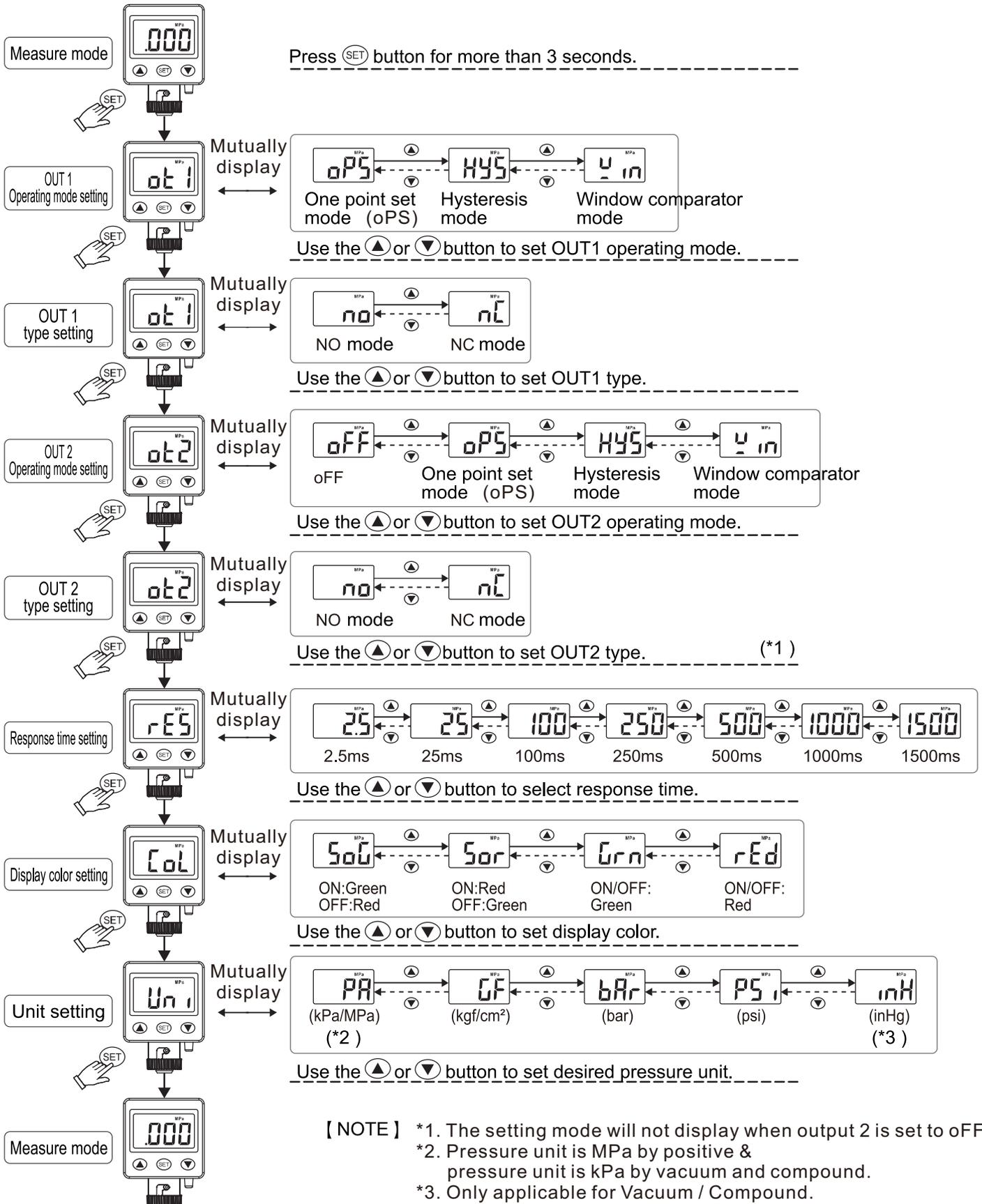
■ Panel cutout dimensions



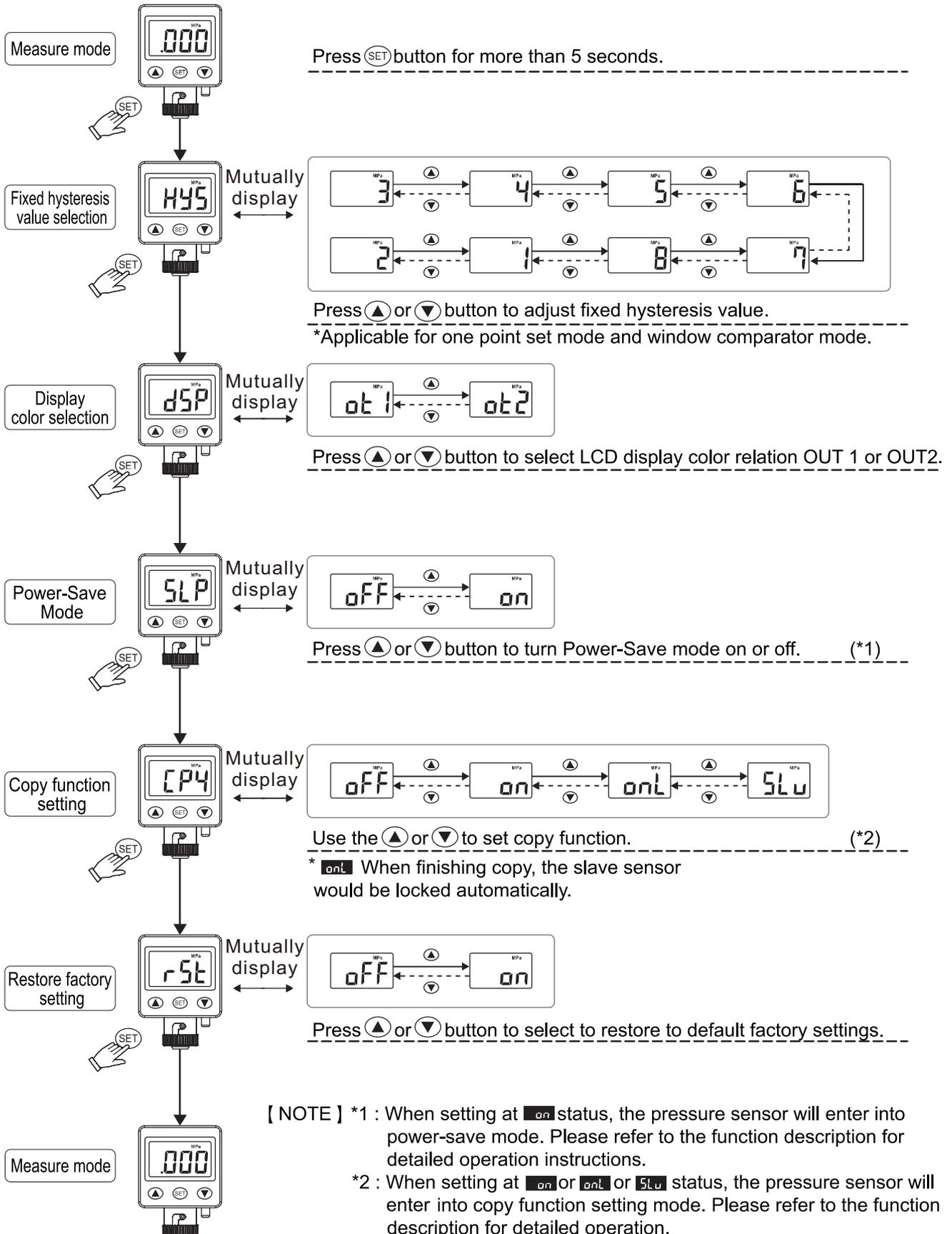
Unit:mm

OPERATION STEPS

Initial setting mode



■ Advance setting mode



## ERROR CODE INSTRUCTION / PRESSURE UNIT CONVERSION TABLE

### ERROR CODE INSTRUCTION

Error Type	Error code	Error Condition	Troubleshooting
Excess load current error	OUT1	Er1	Output 1 load current is more than 125 mA
	OUT2	Er2	
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 exceeds the upper limit of pressure setting.	Adjust the pressure within operating pressure range.
	LLL	Supply pressure 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	
Data copy error	Er8	Data copy error	Please recheck the model no. and wire connection, then set the salve sensor to "SLV". Turn the power on again, if error condition remains, please return to factory for inspection.

### 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

# NOTE

