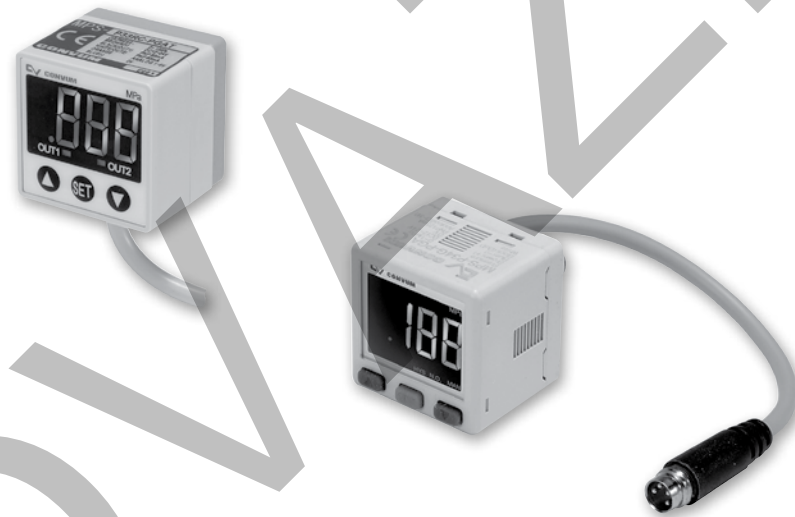




Pressure Sensors

Section C

www.parker.com/pneu/sensors



Cautions

Pressure sensors are designed to monitor pressure and are not a safety measure to prevent accidents.

The compatibility of the sensor is the responsibility of the designer of the system and specifications.

Operating environment

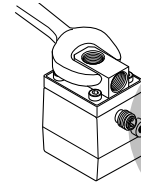
- Parker sensors have not been investigated for explosion-proof construction in hazardous environments.
- Do not use with flammable gases, liquids, or in hazardous environments.
- Avoid installing the sensor in locations where excessive voltage surges could damage or affect the performance of the sensor.



Operations

- Dedicate a power supply of 10.8 to 26.4VDC to the sensor and set the ripple to Vp-p10% or less. Avoid excessive voltage. Avoid voltage surges.
- A small amount of internal voltage drop is possible. Ensure the power supply minus any internal voltage drop exceeds the operating load.
- Verify the operating media is compatible with the specified sensor. Check the chemical make-up, operating temperatures, and maximum pressure ranges of the system before installing.
- Installation of air dryer system is recommended to remove moisture.

Installation

- Never insert an object into the pressure port other than an appropriate fluid connector.
- Avoid short-circuiting the sensor. Connect the brown lead to V+ and blue lead to 0V.
- Do not connect the output lead wires (black / white) to the power supply.
- Outputs not being used should be trimmed and insulated.
- Install as shown using the metal mounting bracket.



	Pressure range	Output type	Media	Maximum IP rating	Hysteresis output mode adjustment	Display	Page number
Technical data							C4
MPS-33							
	0 to -1 bar 0 to 10 bar -1 to 5 bar	(2) NPN / PNP with 1-5VDC Analog	Air, Non-corrosive gas	65	Variable, 100% F.S.	LED display (Red)	C5 - C9
MPS-34							
	0 to -1 bar 0 to 10 bar	(1) PNP / NPN with 4 to 20ma Analog	Air, Non-corrosive gas	40	Variable, 100% F.S.	LED display (Red / Green)	C10 - C15
Accessories	Cables						C23
Glossary							C24 - C26

Programming options

Options	MPS 33	MPS 34
Outputs change N.O. / N.C.	✓	✓
Units of measure change	✓	✓
Hysteresis mode	✓	✓
Window comparator mode	✓	✓
Auto teach mode	✓	✓
Output response time	✓	✓
Lockout option	✓	✓
Password lockout	—	—
Max. value display	✓	✓
Min. value display	✓	✓
Zero reset	✓	✓
Red / Green LED display options	—	✓
Error output mode	✓	✓
Setting of decimal point	—	—

Selecting the proper pressure sensor

Selecting a Parker Pressure Sensor for an application is more than just selecting the correct operating range of the sensor. Electromechanical pressure sensors convert the applied pressure to an electrical signal. When pressure is applied, the diaphragm is deflected causing the diffused resistors to change resistance (piezoelectric effect), which yields an electrical signal proportional to the pressure change. Applications for pressure switches are numerous and important in today's high-tech manufacturing environment. Parker Pressure Sensors are solid state sensors and not mechanical switches. The outputs are either analog (1 -5vc, 4-20ma or 0-20ma) or PNP/NPN

Open Collector Transistor Type Outputs. The application will determine if the Open Collector Output is used in a Hysteresis or Window Comparator Function. The output mode of the sensor, as well as whether the sensor is normally open (non-passing) or normally closed (passing), can be programmed by you to fit your application. In addition to electrical outputs, most of these sensors have additional programming options that can be integrated into the system logic for additional benefits. These programming options are listed at the bottom of the page and are detailed on the next pages. Choose the best Pressure Sensor for the application based on Pressure Range, Output Type and additional programming options.

Programming options:

Outputs change N.O. / N.C.

The status of the Output at 0 bar is either Normally Open (Non-Passing) or Normally Closed (Passing) and can be set through programming.

Units of measure

The units of measure on the display can be changed to suit the application. Some choices are PSI, inHg, Bar, Kpa, Mpa or mmHg and are dependent on the pressure range of the sensor.

Hysteresis mode

This output mode provides one switch point and a reversing point. When the switch point pressure is achieved, the output (NPN / PNP) changes state and will not change back until the reversing point pressure is achieved.

Window comparator mode

This output mode provides two switch points. These two points create a window that the sensor output holds its state (NO or NC). This mode is also referred to as High/Low Setting. Anytime the pressure is higher or lower than the "window" the output changes state.

Auto setting mode

Programming feature that automatically sets switch point and reversing points for the outputs of the sensor based upon the minimum and maximum pressure readings of the sensor over time.

Output response time

Output response time is the time it takes for the output signal to change state after the pressure switch point is achieved. Sensor response time is typically less than 2.0 milliseconds and can be made slower by programming the response time in multiples of the standard sensor response time.

Lockout option

All sensor programming is locked out. Programming or LED Display cannot be changed when the sensor is locked out.

Password lockout

Lockouts the sensor from any programming changes. To unlock the sensor a user programmed 4 digit code must be entered into the sensor.

Max. valve display

Sensor will only display the maximum applied pressure reading until reset to measuring mode. A helpful tool in system set up.

Min valve display

Sensor will only display the minimum applied pressure reading until reset to measuring mode. A helpful tool in system set up.

Zero reset

Just like a pressure gauge, a pressure sensor measures the system pressure in relation to the atmospheric pressure. Pressure Sensors can be calibrated to the current atmospheric pressure by using the Zero Reset Function.

Red / Green LED display options

Display LED's change from Red to Green, or Green to Red when the output changes state. This can be a great visual indicator on a plant floor.

Error output

Error Message is displayed if the pressures, inputs, or outputs exceed the parameters of the sensor

Setting of decimal point

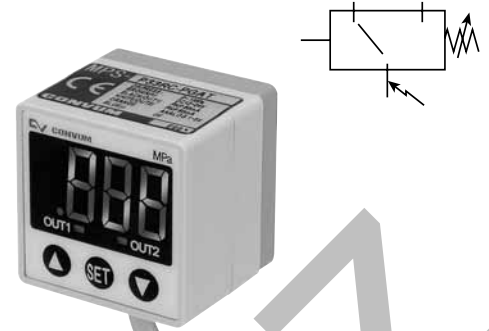
Depending on the units of measure, the decimal point can be adjusted up to three decimal points. (SCPSD only)

Features

- Sensor output:
 2 NPN or PNP open collector
 Transistor output, 30VDC, 125mA with
 Analog output, 1 to 5VDC
- Output response time less than 2.0 milliseconds
- RoHS
- Air and non-corrosive gase

Programming options

Outputs change N.O. / N.C.	✓
Units of measure change	✓
Hysteresis mode	✓
Window comparator mode	✓
Auto teach mode	✓
Output response time	✓
Lockout option	✓
Password lockout	—
Max. value display	✓
Min. value display	✓
Zero reset	✓
Red / Green LED display options	—
Error output mode	✓



MPS-33 Sensor only ordering numbers

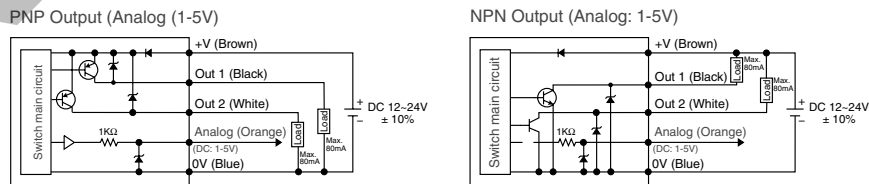
Pressure range	Electrical output	Electrical connection	Part number 1/8 BSPP Female	Part number 1/8 NPSF Female
0 to -1 bar	(2) PNP with (1) 1-5VDC	2 m 5 Wire Lead Wire	MPS-V33G-PGAT	MPS-V33N-PGAT
0 to -1 bar	(2) NPN with (1) 1-5VDC	2 m 5 Wire Lead Wire	MPS-V33G-NGAT	MPS-V33N-NGAT
-1 to 5 bar	(2) PNP with (1) 1-5VDC	2 m 5 Wire Lead Wire	MPS-R33G-PGAT	MPS-R33N-PGAT
-1 to 5 bar	(2) NPN with (1) 1-5VDC	2 m 5 Wire Lead Wire	MPS-R33G-NGAT	MPS-R33N-NGAT
0 to 10 bar	(2) PNP with (1) 1-5VDC	2 m 5 Wire Lead Wire	MPS-P33G-PGAT	MPS-P33N-PGAT
0 to 10 bar	(2) NPN with (1) 1-5VDC	2 m 5 Wire Lead Wire	MPS-P33G-NGAT	MPS-P33N-NGAT

MPS-33 Accessories

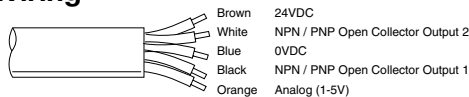
Description	Part Number
Panel mounting bracket Note : Add "H" in suffix of Sensor Only Part Number to include with sensor	MPS-ACCH8
Surface mounting bracket Note : Add "K" in suffix of Sensor Only Part Number to include with sensor	MPS-ACCK8

Example: MPS-P33N-PGATK, includes sensor MPS-P33N-PGA with bracket MPS-ACCK8

Internal circuit for open collector and analog output wiring



Lead Wiring

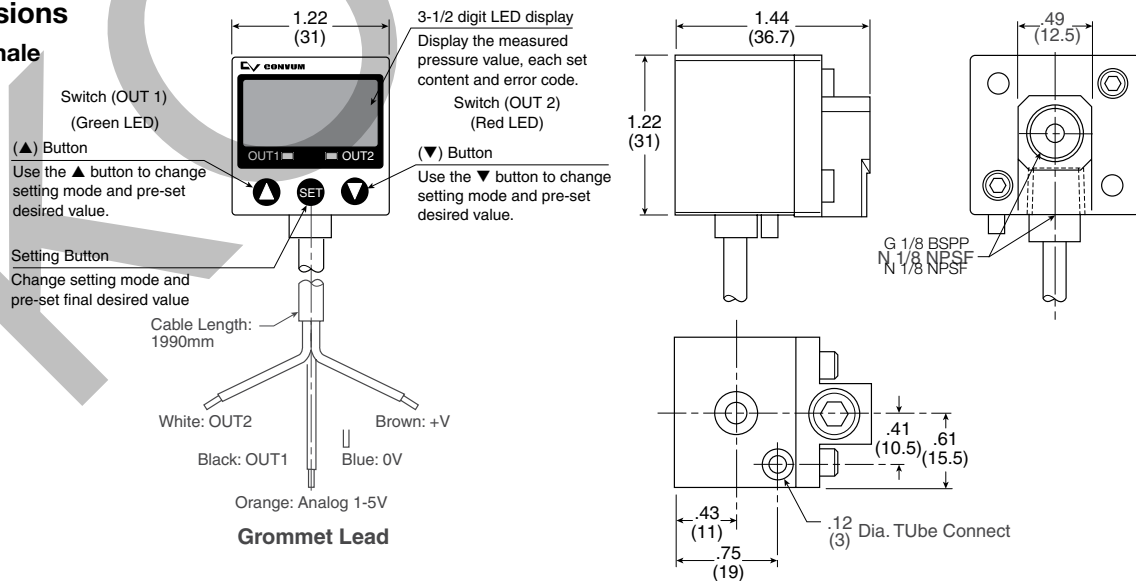


Specifications

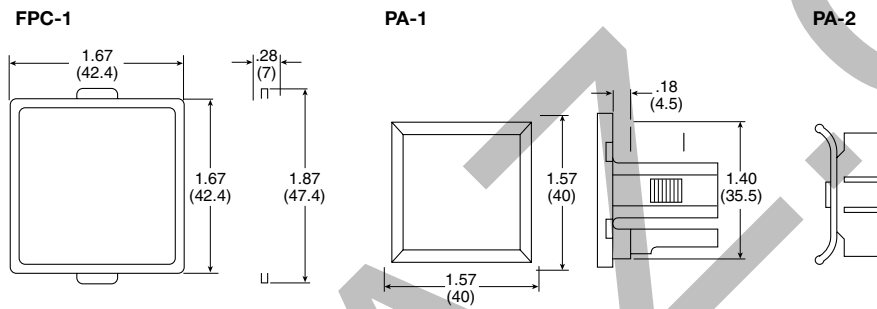
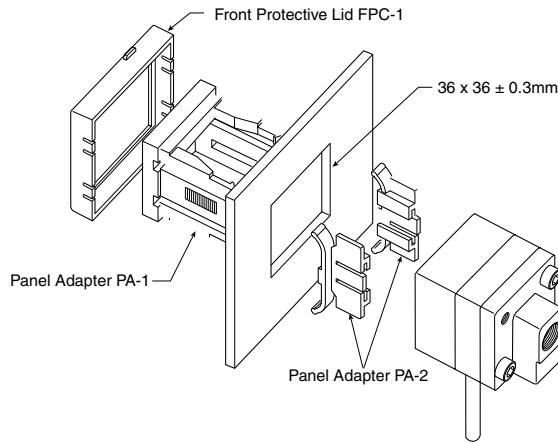
	Vacuum (V)	Compound (R)	Positive (P)
Pressure range	-1 to 0 bar (-14.5 to 0 PSI)	-1 to 5 bar (-14.5 to 72 PSI)	0 to 10 bar (0 to 145 PSI)
Proof pressure	3 bar (44 PSI)	8 bar (116 PSI)	15 bar (218 PSI)
Display resolution, Units of measure	0.1, kPa	1, kPa	0.001, Mpa
	0.001, kgf/cm ²	0.01, kgf/cm ²	0.01, kgf/cm ²
	0.001, bar	0.01, bar	0.01, bar
	0.01, PSI	0.1, PSI	0.1, PSI
	0.1, inHg	—	—
	1, mmHg	—	—
	0.1, mmH ₂ O	—	—
Media	Air & non-corrosive gases, incombustible gases		
Pressure port	(G) 1/8" BSPP female, (N) 1/8" NPSF		
Operating temperature	0°C to 50°C		
Storage temperature	-20°C to 60°C		
Humidity	40 - 85% RH (no condensation)		
Electrical connection	(G) Grommet open lead, 5 wire (0.15mm ²)		
Power supply	12 to 24VDC ±10% or less, Ripple (Vp-p) 10% or less		
Display	3 + 1/2 digit, 1 color, 7-segment RED LED		
Display refresh	.1 to 3.0 Seconds, Variable (factory set at 0.1)		
Control output	NPN (Sinking), PNP (Sourcing), Open collector, max 80mA, 2 output		
Analog output	1 to 5VDC ± ±2.5% F.S. Linearity ≤1% of F.S.;		
Switch output	Output signal, NPN or PNP, Normally open or closed, LED indicator		
Output indicator	Green LED (OUT1), Red LED (OUT2)		
Output modes	Hysteresis or Window Comparator		
Response time	≤ 2.5ms (chattering-proof function: 24ms, 192ms, 786m selections)		
Repeatability	± 0.2% of F.S. ± 1 digit or less		
Thermal error	≤ ± 2% of F.S. or less at range of 0°C to 50°C		
General protection	IP65, CE marked, EMC-EN61000-6-2: 2001, with dust tube connection		
Current consumption	<55mA		
Vibration resistance	10 to 150Hz, Double amplitude 1.5mm, XYZ, 2 hrs.		
Shock resistance	980 m/s ² (about 10G), 3 times/each directions X, Y, Z		
Noise resistance	Vp-p400V, 10 ms, 0.5µs noise simulator		
Material	Housing: ABS (gray) , Pressure port: Zinc die-cast, Diaphragm: Silicone		
Mass	105g (including cable)		

Dimensions

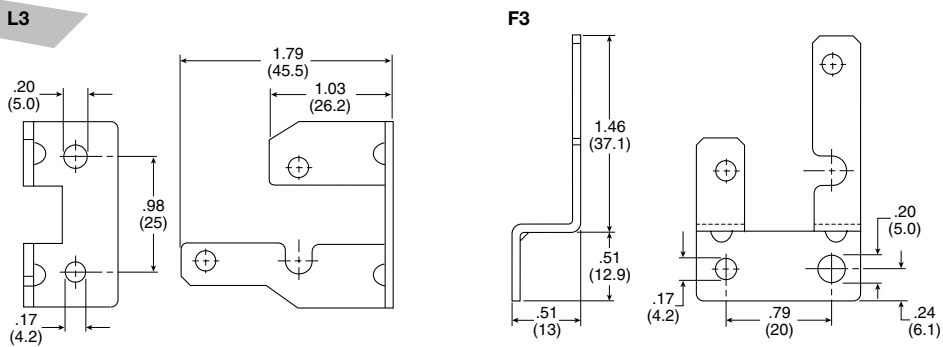
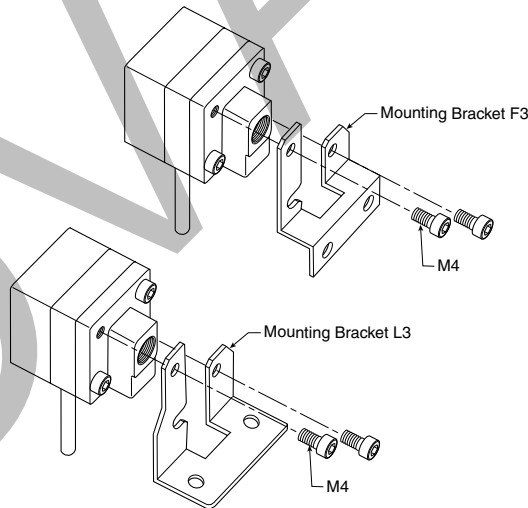
1/8" Female



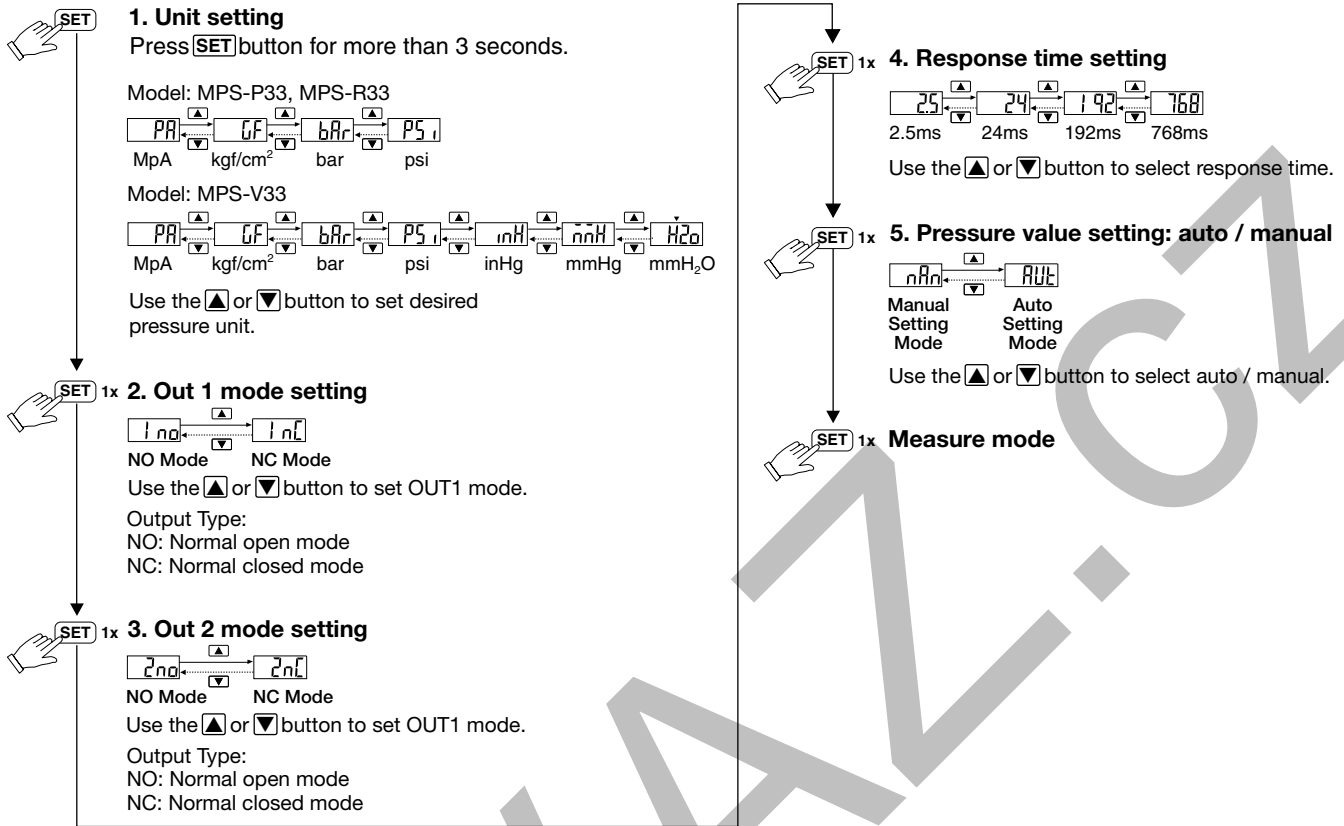
MPS-ACCH8
Panel mounting
bracket



MPS-ACCK8
L3 & F3 mounting
brackets and
screws included



Initial setting mode



Zero point setting / the max. & min. display mode

Zero setting:

- press the ▼▲ button at the same time until the "00" is shown. Release the button to end zero setting.

The max. value display mode:

- Press ▲ button 2 seconds to enter the max. value mode, pressure sensor will detect the max. value and keep max. value displayed.
- Press ▲ button 2 seconds to return to measure mode display.

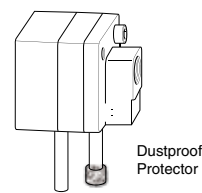
The min. value display mode:

- Press ▼ button 2 seconds to enter the min. value mode, pressure sensor will detect the min. value and keep min. value displayed.
- Press ▼ button 2 seconds to return to measure mode display.



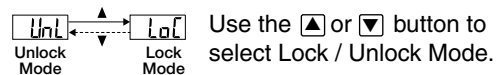
Dustproof protector

Note: Required for IP65 rating protection and is included with sensor.



Key lock / unlock mode

Key lock / unlock mode
 Press **SET** button for less than 5 seconds.



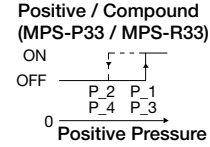
Measure mode

- Key lock mode can prevent operation mistakes.

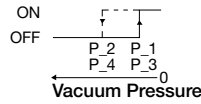
Output type

Hysteresis Mode P1 (n1) > P2 (n2)
P3 (n3) > P4 (n4)
Output Hysteresis value can be preset.

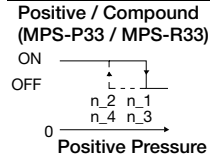
Normal open mode



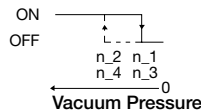
Vacuum (MPS-V33)



Normal close mode



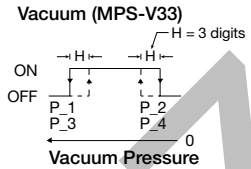
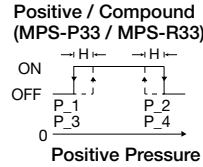
Vacuum (MPS-V33)



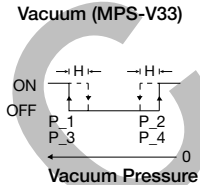
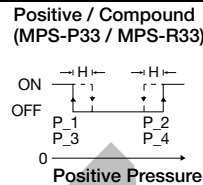
(Note)
When hysteresis mode setting is within 2 digits, if the input and pre-set pressure is quite near, pressure sensor output might cause chattering.

Window comparator Mode P1 (n1) < P2 (n2)
P3 (n3) < P4 (n4)
Within pressure setting range, pressure sensor output can be ON or OFF.

Normal open mode

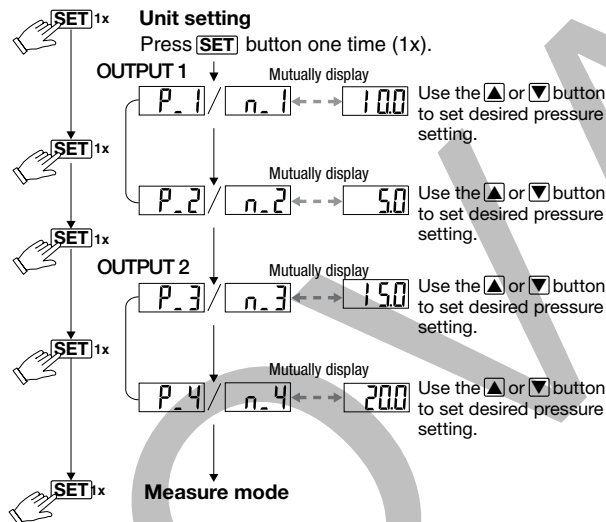


Normal close mode



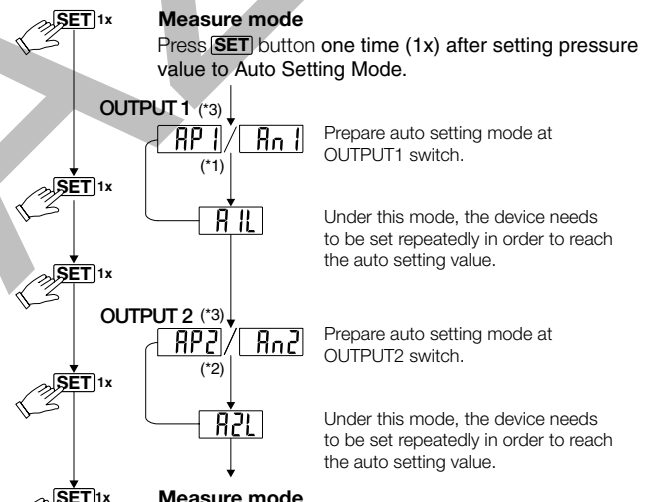
Manual setting mode

The LED shows: (P_* at normal open mode and (n_*) at normal close mode. Pressure setting value is shown normally and will not lead to pressure sensor pause or stop working.



Auto setting mode

- *1. In case of without need of OUT1 pressure value setting, press ▼+▲ at the same time to enter (AP2) / (An2).
- *2. In case of without need of OUT2 pressure value setting, press ▼+▲ at the same time to enter measure mode.
- *3. The LED shows (AP*) at normal open mode and (An*) at normal closed mode.



Calculation of setting value

A = The max. pressure value under auto setting mode.
B = The min. pressure value under auto setting mode.

$$P1 (n1) = \frac{A - B}{4}$$

$$P3 (n3) = \frac{A - B}{4}$$

$$P2 (n2) = \frac{B - A - B}{4}$$

$$P4 (n4) = \frac{B - A - B}{4}$$

Error messages

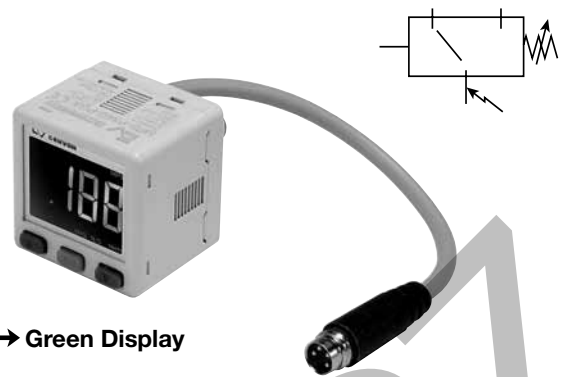
Error name	Display	Description	Solutions
Excess load current error	OUT1 Er1	Excess load current of 80 mA	Turn off power and check the cause of overload current or lower the current load under 80 mA, then restart
	OUT2 Er2		
Residual pressure error	Er3	During zero reset, ambient pressure is over ±3% F.S.	Change input pressure to ambient pressure and perform zero reset again
Applied pressure error	---	The applied pressure is excess the upper limit of pressure setting	Adjust the pressure within applied pressure range
	----	The applied pressure is excess the lower limit of pressure setting	
System error	Er4	Internal data error	Turn power off and then restart. If error condition remains, please return to factory for inspection
	Er6	Internal system error	
	Er7	Internal data error	

Features

- Sensor output:
 - 1 NPN or PNP Open collector Transistor output, 30VDC, 125mA with Analog output, 4 to 20mA
- Output response time less than 2.0 milliseconds
- RoHS
- Air and non-corrosive gases
- Sensor face includes icons to show sensor programming status

Programming options

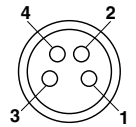
Outputs change N.O. / N.C.	✓
Units of measure change	✓
Hysteresis mode	✓
Window comparator mode	✓
Auto teach mode	✓
Output response time	✓
Lockout option	✓
Password lockout	—
Max. value display	✓
Min. value display	✓
Zero reset	✓
Red / Green LED display options	✓
Error output mode	✓



Red ↔ Green Display

Sensor pin out with analog output

- Pin #
- 1 Brown: 24VDC
 - 2 White: 4 to 20mA
 - 3 Blue: 0VDC
 - 4 Black: PNP Open Collector Output 1



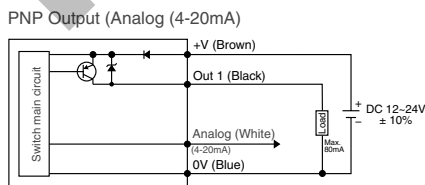
MPS-34 Sensor only ordering numbers

Pressure range	Electrical output	Electrical connection	Part number	Part number
			1/8 BSPP male	1/8 NPSF male
0 to -1 bar	(1) PNP with (1) 4-20ma	M8, 4 Pin	MPS-V34G-PCI	MPS-V34N-PCI
0 to 10 bar	(1) PNP with (1) 4-20ma	M8, 4 Pin	MPS-P34G-PCI	MPS-P34N-PCI

MPS-34 Accessories

Description	Part number
Panel mounting bracket Note : Add "H" in suffix of Sensor Only Part Number to include with sensor	MPS-ACCH9
Surface mounting bracket Note : Add "K" in suffix of Sensor Only Part Number to include with sensor	MPS-ACCK10
Example: MPS-P34N-PCIK, includes sensor MPS-P34N-PCI with bracket MPS-ACCK10	
M8, 4-Pin, 2 meter cable	CB-M8-4P-2M-PUR
M8, 4-Pin, 5 meter cable	CB-M8-4P-5M-PUR

Internal circuit for open collector and analog output wiring

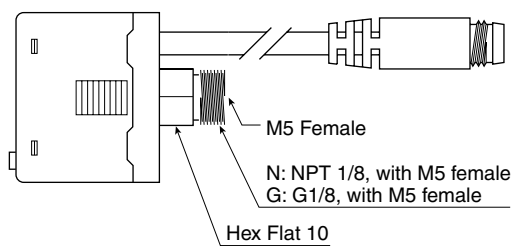
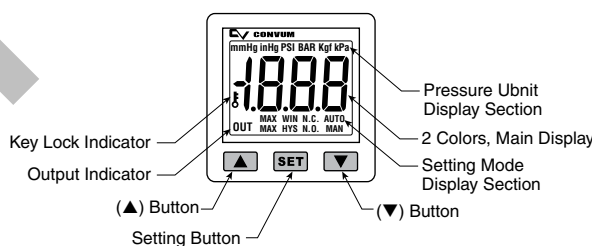
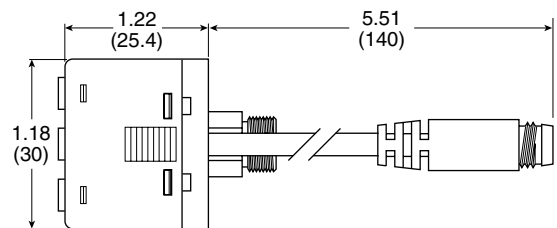


Specifications

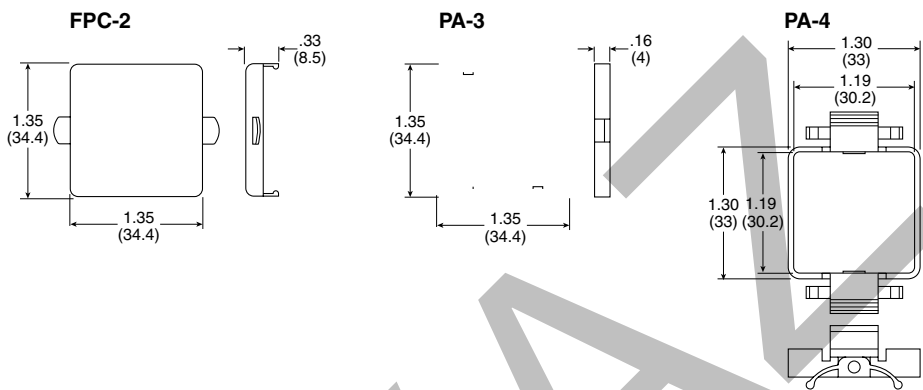
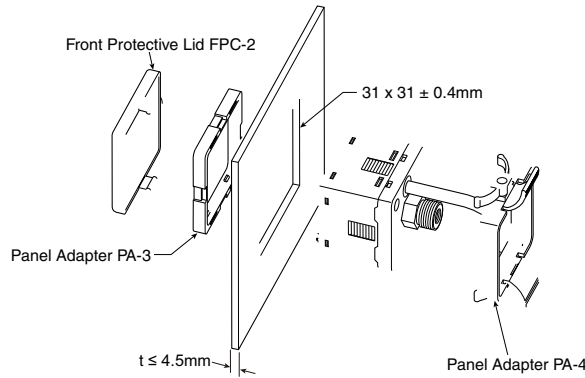
	Vacuum (V)	Positive (P)
Pressure range	-1 to 0 bar (-14.5 to 0 PSI)	0 to 10 bar (0 to 145 PSI)
Proof pressure	3 bar (44PSI)	15 bar (218 PSI)
Display resolution , Units of measure	0.1, kPa	1, kPa
	0.001, kgf/cm ²	0.01, kgf/cm ²
	0.001, bar	0.01, bar
	0.01, PSI	0.1, PSI
	0.01, inHg	-
	1, mmHg	-
Media	Air & non-corrosive gases	
Pressure port	(G) 1/8 BSPP male, (N) 1/8" NPT male both with M5 female port	
Operating temperature	0°C to 50°C	
Storage temperature	-20°C to 60°C	
Humidity	35 to 85% RH (no condensation)	
Electrical connection	(C) 4-pin, M8 connector on 150mm lead wire	
Power supply	12 to 24VDC ±10%, Ripple (P-P) 10% or less	
Display	3 + 1/2 digit, 2 color, 7-segment RED / GREEN LED	
Display refresh	Timing update : 0.1 ~ 3 sec. (Factory Set Unit: 0.1 sec.)	
Switch output	Output signal, PNP, Normally open or closed, LED indicator, 125 mA max. output load	
Output modes	Hysteresis or Window Comparator	
Response time	≤ 2.5ms (chattering-proof function: 24ms, 250ms, 500ms, 1000ms and 1500ms selections)	
Repeatability	± 0.2% of F.S. ± 1 digit	
Output current	Output current 4 to 20mA; Linearity ±1.0% of F.S.; Maximum load impedance 300Ω at power supply of 12V; 600Ω at power supply of 12V; Minimum load impedance 50Ω	
Thermal error	0°C to 50°C 25°C (77°C) + 2% of F.S. or less at range of 0°C to 50°C	
General protection	IP40, CE marked, EMC-EN61000-6-2: 2001	
Current consumption	45mA (with no load)	
Vibration resistance	10 to 150Hz, Double amplitude 1.5mm, XYZ, 2 hrs.	
Shock resistance	980 m/s ² (about 10G), 3 times/each directions X, Y, Z	
Noise Resistance	Vp-p400V, 10 ms, 0.5µs noise simulator	
Material	Housing: ABS (gray) , Pressure port: Zinc die-cast, Diaphragm: Silicone	
Mass	45g with M8 connector	

Dimensions

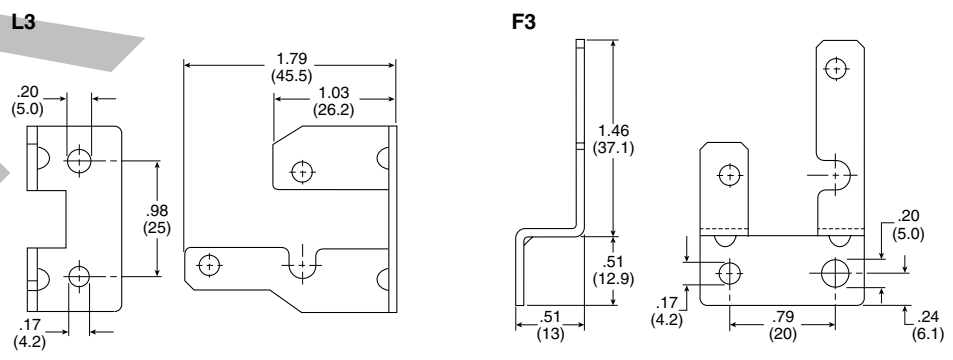
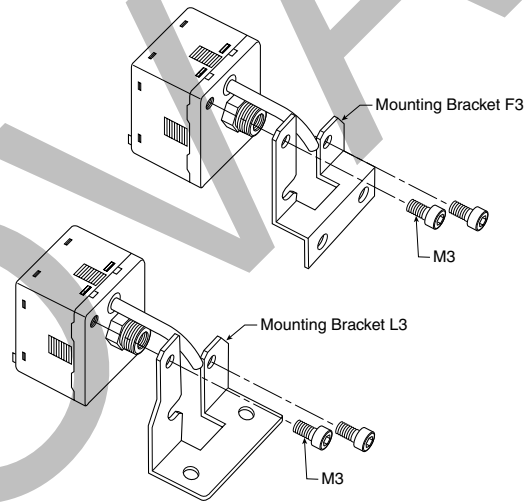
1/8" Male



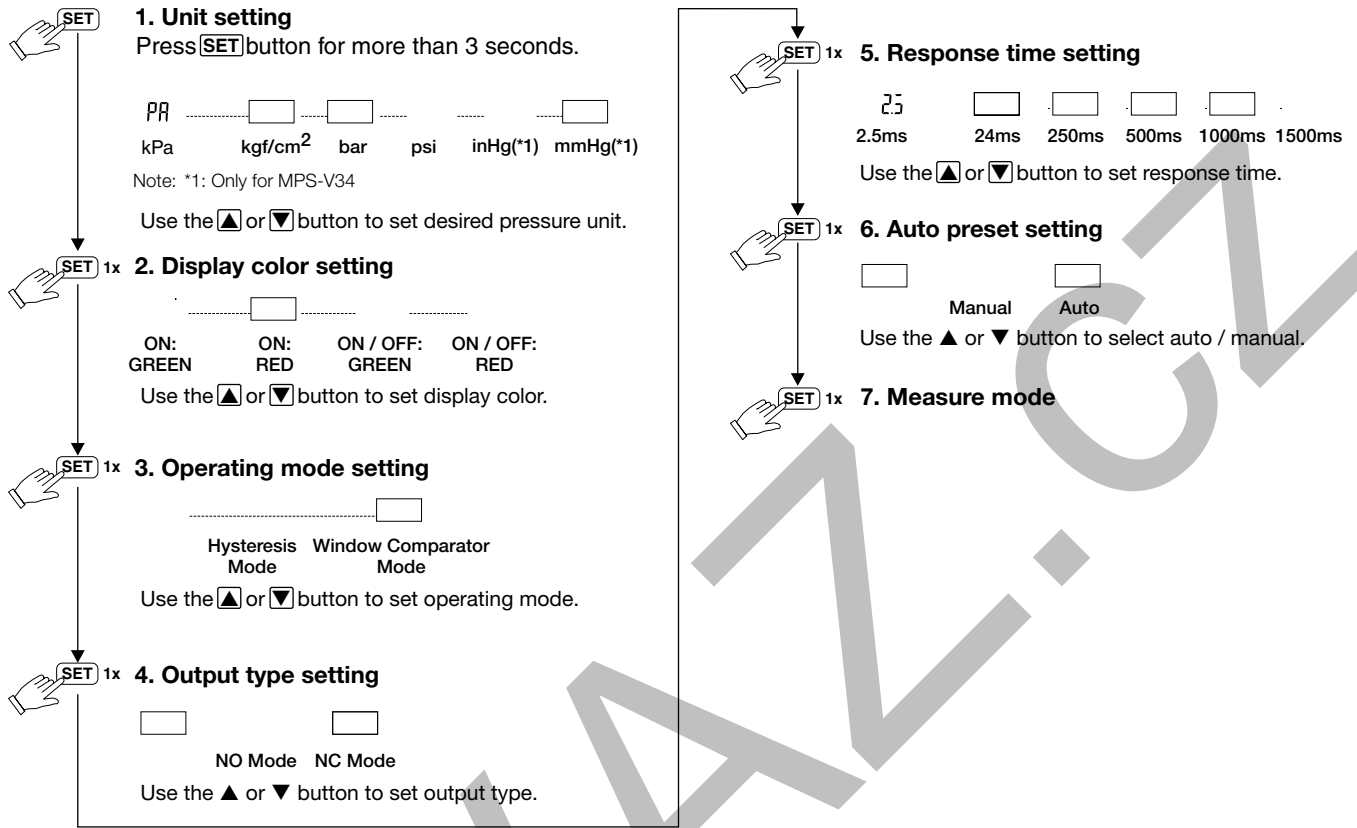
MPS-ACCH9
Panel mounting
bracket



MPS-ACCK10
L3 & F3 mounting
brackets and
screws included



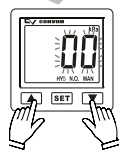
Initial setting mode



Zero point setting / the max. & min. display mode

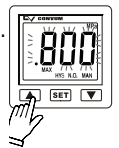
Zero setting:

- press the ▼▲ button at the same time until the "00" is shown. Release the button to end zero setting.



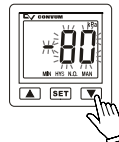
The max. value display mode:

- Press ▲ button 2 seconds to enter the max. value mode, pressure sensor will detect the max. value and keep max. value displayed.
- Press ▲ button 2 seconds to return to measure mode display.

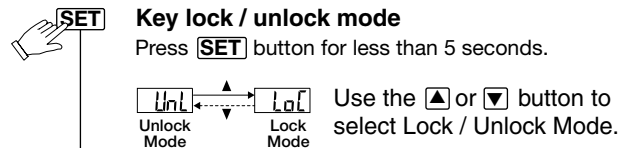


The min. value display mode:

- Press ▼ button 2 seconds to enter the min. value mode, pressure sensor will detect the min. value and keep min. value displayed.
- Press ▼ button 2 seconds to return to measure mode display.



Key lock / unlock mode



- Key lock mode can prevent operation mistakes.



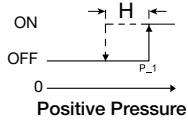
Pressure setting mode

Hysteresis Mode

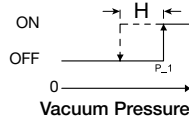
Output Hysteresis value can be preset.

Normal open mode

Positive (MPS-P34)

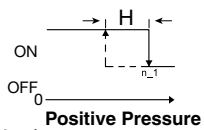


Vacuum (MPS-V34)

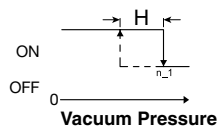


Normal close mode

Positive (MPS-P34)



Vacuum (MPS-V34)



(Note)

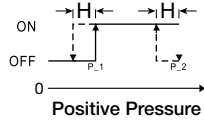
In case hysteresis is set at less than or equal to 2 digits, switch output may chatter if input pressure fluctuates near the set point.

Window comparator Mode

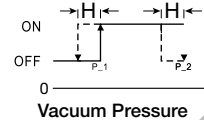
Within pressure setting range, pressure sensor output can be ON or OFF.

Normal open mode

Positive (MPS-P34)

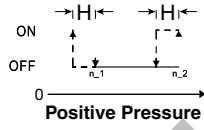


Vacuum (MPS-V34)

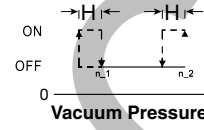


Normal close mode

Positive (MPS-P34)

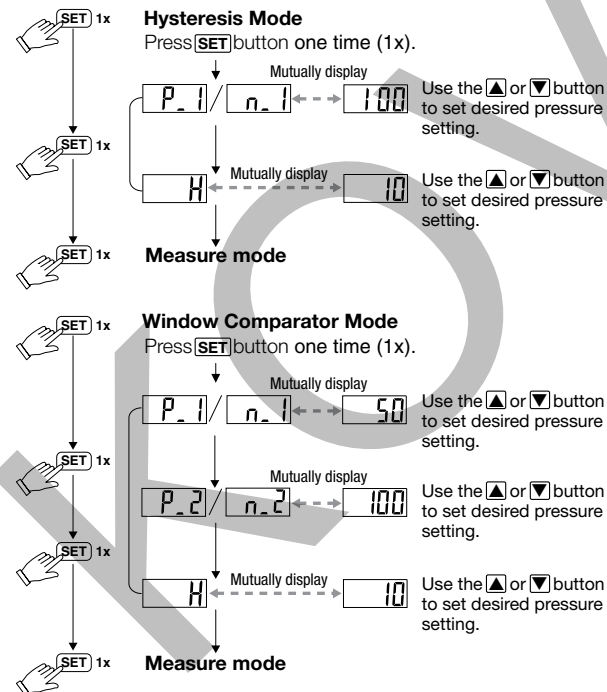


Vacuum (MPS-V34)



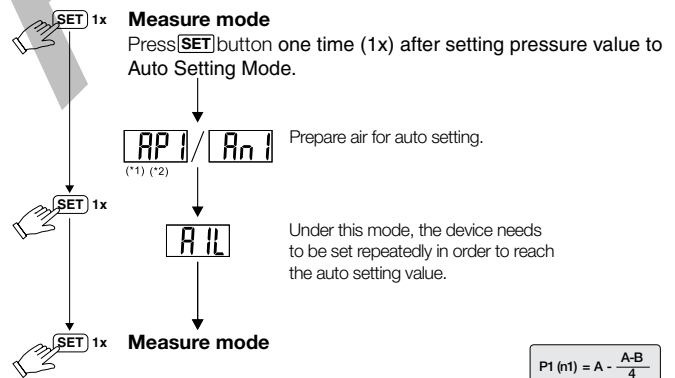
Manual setting mode

The LED shows: (P_* at normal open mode and (n_*) at normal close mode. Pressure setting value is shown normally and will not lead to pressure sensor pause or stop working.



Auto setting mode

1. The LED shows: (AP1) at normal open mode and (An1) at normal close mode.
2. In case of without need of auto pressure value setting, press ▼+▲ at the same time to enter measure mode.



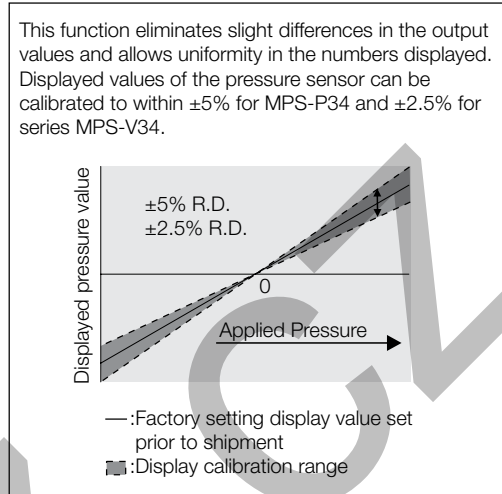
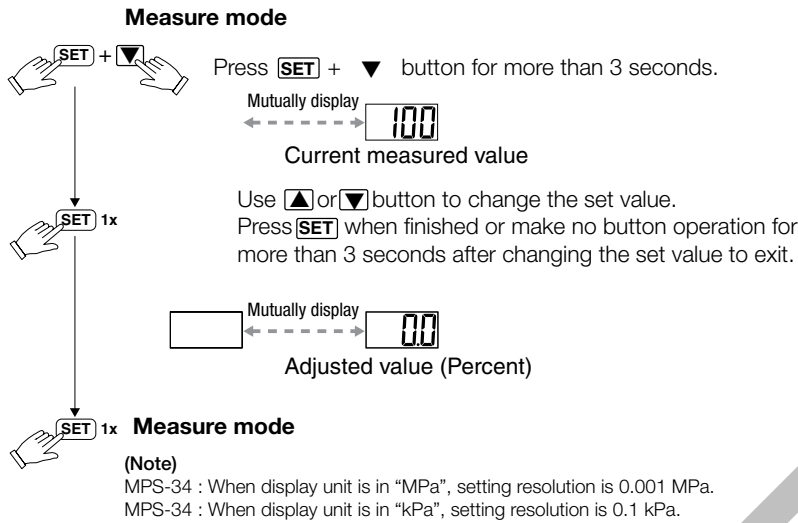
Calculation of setting Value

A = The max. pressure value under auto setting mode.
B = The min. pressure value under auto setting mode.

$$P1 (n1) = A - \frac{A-B}{4}$$

$$H = B + \frac{A-B}{4}$$

Fine adjustment mode



Error messages

Error name	Display	Description	Solutions
Excess load current error	oCP	Output load current of 125 mA	Turn off power and check the cause of overload current or lower the current load under 125 mA, then restart
Residual pressure error	oUr	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	The applied pressure is excess the upper limit of pressure setting	Adjust the pressure within applied pressure range
	LLL	The applied pressure is excess the lower limit of pressure setting	
System Error	Er4	Internal data error	Turn power off and then restart. If error condition remains, please return to factory for inspection
	Er6	Internal system error	
	Er7	Internal data error	
	Er8	Internal system error	

