

Autonics

DIGITAL PRESSURE SENSOR

PSA/PSB SERIES



Thank you very much for selecting Autonics products.  
For your safety, please read the following before using.

Caution for your safety

- Please keep these instructions and review them before using this unit.
- Please observe the cautions that follow;
- Warning** Serious injury may result if instructions are not followed.
- Caution** Product may be damaged, or injury may result if instructions are not followed.
- The following is an explanation of the symbols used in the operation manual.
- caution: Injury or danger may occur under special conditions.

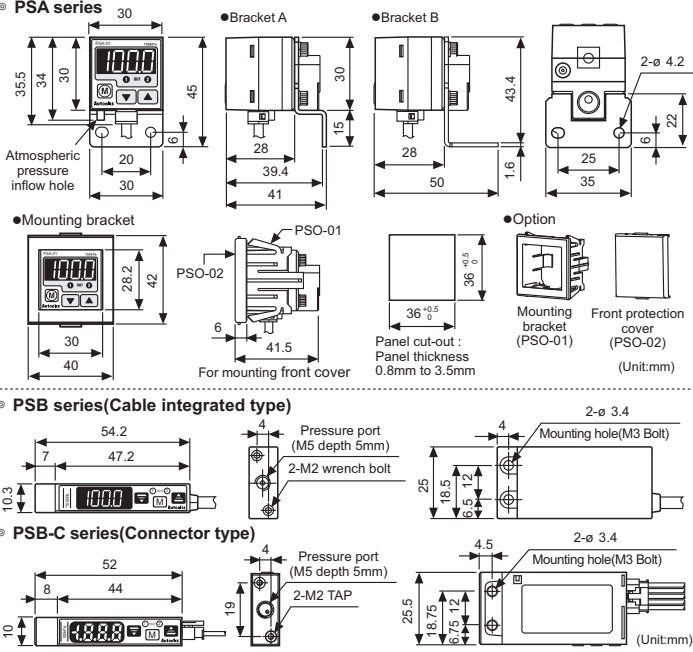
Warning

- In case of using this unit with machinery (Ex: nuclear power control, medical equipment, ship, vehicle, train, airplane, combustion apparatus, safety device, crime/disaster prevention equipment, etc.) which may cause damages to human life or property, it is required to install fail-safe device.
- Do not use it in flammable gas because it does not have an explosion proof construction. It may cause explosion.

Caution

- Do not apply the pressure beyond rated pressure. It may cause damage to this unit.
- Do not use it beyond power supply. It may cause damage to this unit.
- Do not make a short circuit for the load. It may cause damage to this unit.
- Do not wire incorrectly in power polarity etc. It may cause damage to this unit.
- Do not use corrosive gas or liquid as it is only for non-corrosive gas. It may cause damage to this unit.
- Do not give power to its case or twist its case strongly. It may cause damage to this unit.
- This unit shall not be used outdoors. It may shorten the life cycle of the product or give an electric shock. This unit is produced only for the indoor environment.

Dimensions



Functions

- Pressure display unit change function**  
PS□ -V01(C)(P) and PS□ -C01(C)(P) has 7 kinds of pressure unit, PS□ -01(C)(P) and PS□ -1(C)(P) has 4 kinds of pressure unit. Please select the proper unit for application.  
• PS□ -V01(C)(P), PS□ -C01(C)(P) : kPa, kgf/cm<sup>2</sup>, bar, psi, mmHg, inHg, mmH<sub>2</sub>O  
• PS□ -01(C)(P), PS□ -1(C)(P) : kPa, kgf/cm<sup>2</sup>, bar, psi  
※When using mmH<sub>2</sub>O unit, multiply display value by 100.
- Output operation mode change function**  
There are 6 kinds of control output mode in order to realize the various pressure sensing. Select a mode for your proper application.  
• Hysteresis mode(F - 1) : When needed to change hysteresis for sensing pressure.  
• Automatic sensitivity setting mode(F - 2) : When needed to set sensing sensitivity automatically at proper position.  
• Independent two output mode(F - 3, F - 4, F - 5) : When needed to detect pressure from two position with one unit.  
• Window comparison output mode(F - 5) : When needed to detect pressure in certain area.
- Response time change function(Chattering prevention)**  
It can prevent chattering of control output by changing response time. It is able to set 4kinds of response time(2.5ms, 5ms, 100ms, 500ms) and if the response time is getting longer, the sensing will be more stable by increasing the number of digital filter.
- Analog output scale setting function**  
It is not fixed the analog output(1-5VDC) scale as the rated pressure range but this is a function to change properly for user's application. If A1 position for 1VDC output and A5 position for 5VDC output are set, the pressure range of A1 to A5 is to 1-5VDC analog output.
- Key lock function**  
This unit has 2 kinds of key lock function in order to prevent wrong operation.  
• Loc : All keys are locked therefore it is impossible to change any parameter setting/ preset, zero point adjustment, peak hold and bottom hold check. (It is able to change the status of lock)  
• PRL : This is partial locked status, therefore it is impossible to change parameter setting(It is able to change the status of lock) only, the other functions can be changed.  
• UnL : All of the setting is available, all keys are unlocked.
- Zero point adjustment function**  
This function is to set the display value of pressure as zero point forcibly in case that of port is opened to atmospheric pressure. Zero point adjustment affects analog output voltage.
- Peak hold and bottom hold function**  
This function is to diagnosis malfunction of the system caused by parasitic pressure or to check through memorizing the max./min. pressure occurred from the system.

Output operation mode

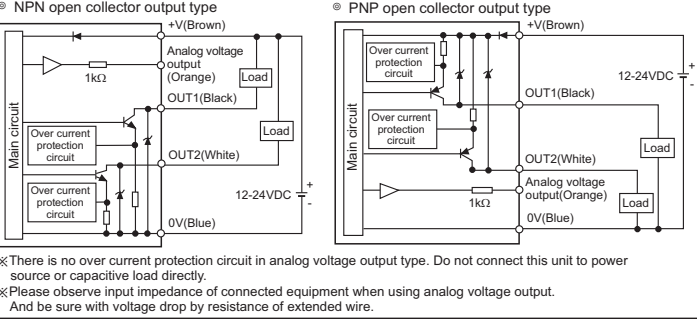
- PSA/PSB series has 6 kinds of output operation mode, please use proper output operation mode in accordance with sensing.
- Hysteresis mode(F - 1)**  
It is able to set certain value for pressure sensing level(5± 1) and hysteresis(5± 2).
- Independent two output mode(F - 3, F - 4, F - 5)**  
① It is able to set pressure sensing level from two positions(5± 1, 5± 2) in this mode, one is for control and the other is for alarm or additional control.  
② Hysteresis is fixed in 1digit. (2 digits for compound pressure or psi unit type)
- Automatic sensitivity setting mode(F - 2)**  
① This function is to set pressure sensing level to the proper position automatically. It is set by receiving pressure from two positions(5± 1, 5± 2).  
② Hysteresis is fixed in 1digit.(2 digits for compound pressure or psi unit type)  
③ The pressure sensing level is shown in the following calculation.  
$$Set = \frac{(5\pm 1 + 5\pm 2)}{2}$$
- Window comparison output mode(F - 5)**  
① It is able to set Low/High-limit value of pressure sensing level in this mode.  
② Hysteresis is fixed in 1digit.(2 digits for compound pressure or psi unit type)

Specifications

Pressure type		Gauge pressure	
		Vacuum pressure type	Positive pressure type
Model	NPN output	PSA-V01 PSB-V01 PSB-V01C	PSA-01 PSB-01 PSB-01C
	PNP output	PSA-V01P PSB-V01P PSB-V01CP	PSA-01P PSB-01P PSB-01CP
Rated pressure range		0.0 to -101.3kPa	0.0 to 100.0kPa
Display pressure range		5.0 to -101.3kPa	-5.0 to 110.0kPa
Max. pressure range		2 times of rated pressure	
Applicable fluid		Air, Non-corrosive gas	
Power supply		12V-24VDC ± 10%(Ripple P-P:Max. 10%)	
Current consumption		Max. 50mA	
Control output		●NPN open collector output ⇒ Sink current: Max. 100mA, Applied voltage: Max. 30VDC, Residual voltage: Max. 1V ●PNP open collector output ⇒ Source current: Max. 100mA, Residual voltage: Max. 2V	
Hysteresis <sup>※1</sup>		1digit fixed(2digits for psi unit)	2digit fixed
Repeat error		± 0.2% F.S. ± 1digit	± 0.2% F.S. ± 2digit
Response time		Selectable 2.5ms, 5ms, 100ms, 500ms	
Short circuit protection		Built-in	
Analog output		●Output voltage:1V-5VDC ± 2% F.S. ●Zero point:Within 1VDC ± 2% F.S. ●Resolution:Approx. 1/200 ●Linear:Within ± 2% F.S. ●Span:Within 4VDC ± 2% F.S. ●Output impedance:1kΩ	
Display method		3½ digit LED 7segment	
Min. display interval		1digit(psi unit: 2 digits are fixed)	2digits
Pressure unit		kPa, kgf/cm <sup>2</sup> , bar, psi, mmHg, mmH <sub>2</sub> O, inHg	kPa, kgf/cm <sup>2</sup> , bar, psi, mmHg, mmH <sub>2</sub> O, inHg
Characteristic of control output and display temp.		Max. ± 1% F.S. <sup>※2</sup>	
Characteristic of analog output		Max. ± 2% F.S. <sup>※2</sup>	
Vibration		1.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hours	
Environ		-10 to 50, Storage: -20 to 60°C	
-ment		Ambient humidity 35 to 85%RH, Storage: 35 to 85%RH	
Material		●PSA = Front case:PC, Rear case:PC(Insert glass), Pressure port:die-cast(Zn) ●PSB = Case, Pressure port:PA ●PSB-C = Case, Pressure port, Cover: IXEF	
Protection		IP40(IEC standard)	
Wire		Cable integrated type ø 4, 5P, Length: 2m, AWG 24, Insulation diameter: ø 1.0	
Connector type		5P, Length: 3m, AWG 24, Insulation diameter: ø 1.4	
Unit weight		PSA: Approx. 120g, PSB : Approx. 70g, PSB-C : Approx. 80g	

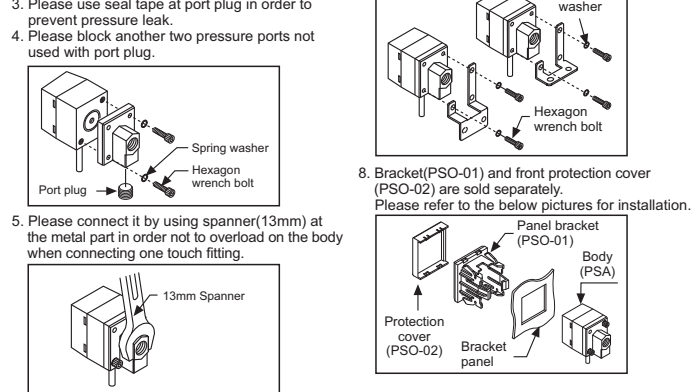
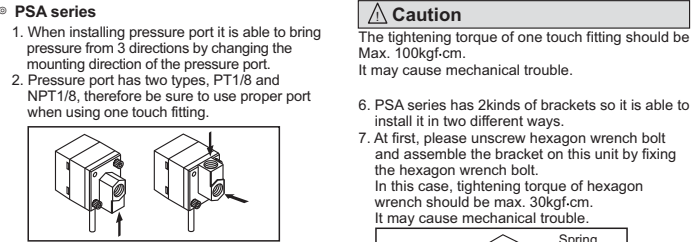
- ※1: In F I mode, hysteresis is variable.
- ※2: Display pressure at 25°C within 0 to 50°C
- ※F.S. is the rated pressure.
- ※The specification of pressure port is marked on the upper part of the case. Pressure ports are distinguished by the colors, silver(Rc[PT1/8] or black[NPT1/8]).
- ※Environment resistance is rated at no freezing or condensation.

Input/Output circuit and connection diagram



- There is no over current protection circuit in analog voltage output type. Do not connect this unit to power source or capacitive load directly.
- Observe input impedance of connected equipment when using analog voltage output. And be sure with voltage drop by resistance of extended wire.

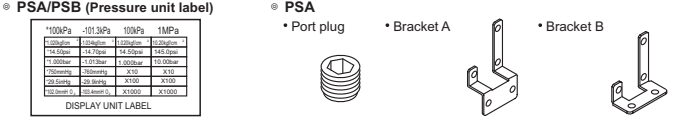
Front panel identification and function



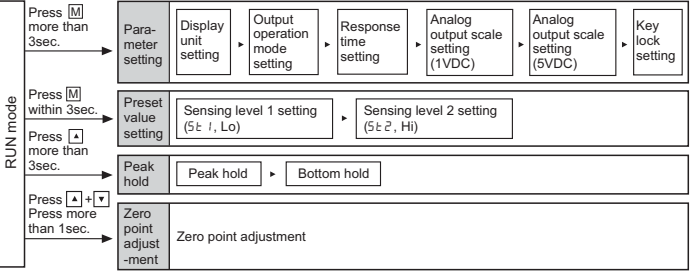
- Pressure port is M5. It is able to use general one touch fitting.
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Error display	Description	Countermeasures
Er 1	If external pressure applied, when adjusting Zero point	Please try again after external pressure removing
Er 2	When overloaded on control output	Remove overload
Er 3	When the setting value is not matched with setting condition	Set proper setting value after checking setting condition
HHH	When the applied pressure exceeds the upper display pressure range up	Apply pressure within display pressure range
LLL	When the applied pressure exceeds the lower display pressure range down	

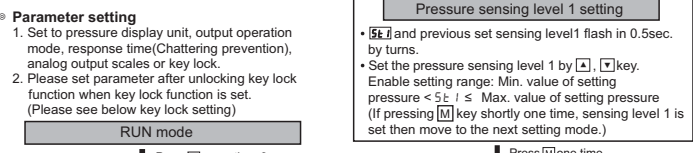
Accessory



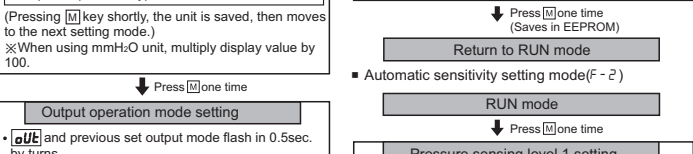
Setting



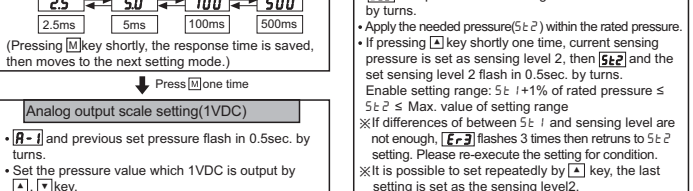
- Zero point adjustment**  
1. press [L] and [T] keys for over 1sec. at the same time putting an applied pressure in state of the atmospheric pressure.  
2. When the zero point adjustment is completed, it displays [0.0] and returns to RUN mode automatically.  
※If executing zero point adjustment on external pressure being at pressure port [Er 1] flashes 3times. Please execute it in the atmospheric pressure after removing external pressure.  
※Please execute zero point adjustment regularly.
- Preset value setting**  
1. Set the pressure sensing level.  
2. Please set preset value after unlocking key lock when key lock function is set.  
3. Be sure that the setting method is different by each output operation mode.  
When hysteresis mode(F - 1) and independent two output mode(F - 3, F - 4, F - 5)



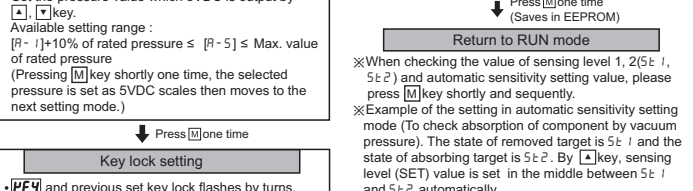
- Parameter setting  
1. Set to pressure display unit, output operation mode, response time(Chattering prevention), analog output scales or key lock.  
2. Please set parameter after unlocking key lock function when key lock function is set. (Please see below key lock setting)



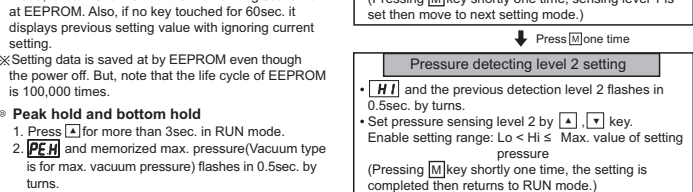
- Output operation mode setting  
1. [R-1] and previous set unit flash in 0.5sec. by turns.  
2. Select the unit by [L], [T] key.  
3. [F-1] → [F-2] → [F-3] → [F-4] → [F-5] → [F-6] (Pressing [M] key shortly, the output operation mode is saved, then moves to the next setting mode.)
- Response time setting  
1. [Sp2] and previous set response time flashes in 0.5sec. by turns.  
2. Select the response time by [L], [T] key.  
3. [2.5] → [5.0] → [100] → [500] (Pressing [M] key shortly, the response time is saved, then moves to the next setting mode.)



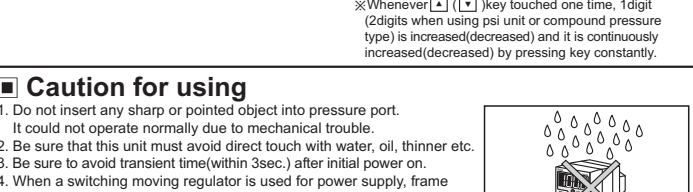
- Analog output scale setting(5VDC)  
1. [R-5] and previous set pressure will flashes in 0.5sec. by turns.  
2. Set the pressure value which 5VDC is output by [L], [T] key.  
3. Available setting range : [R - 1] × 10% of rated pressure ≤ [R - 5] ≤ Max. value of rated pressure  
(Pressing [M] key shortly one time, the selected pressure is set as 5VDC scales then moves to the next setting mode.)
- Return to RUN mode  
Press [M] one time (Saves in EEPROM)



- Pressure sensing level 2 setting  
1. [5±2] and previous set sensing level 1 flash in 0.5sec. by turns.  
2. Apply the needed pressure(5± 1) within the rated pressure.  
3. If pressing [L] key shortly one time, current sensing pressure is set sensing level 2, then [5±2] and the set sensing level 2 flash in 0.5sec. by turns.  
4. Enable setting range: 5± 1 + 1% of rated pressure ≤ 5± 2 ≤ Max. value of setting range  
※If differences of between 5± 1 and sensing level are not enough, [Er 2] flashes 3 times then returns to 5± 2 setting. Please re-execute the setting for condition.  
※It is possible to set repeatedly by [L] key, the last setting is set as the sensing level2.



- Automatic sensitivity setting and fine adjustment  
1. [5±2] and sensing level(Set) flash in 0.5sec. by turns.  
2. Set =  $\frac{(5\pm 1 + 5\pm 2)}{2}$   
3. Adjust sensing level(Set) by [L], [T] key, when fine adjustment of the sensing level(Set) is needed. (Enable adjustment range : -Between 5± 1 and 5± 2)
- Return to RUN mode  
Press [M] one time (Saves in EEPROM)



- Peak hold and bottom hold  
1. Press [L] for more than 3sec. in RUN mode.  
2. [PEH] and memorized max. pressure(Vacuum type is for max. vacuum pressure) flashes in 0.5sec. by turns.  
3. Press [L] key one time shortly, then it displays bottom hold value [LoH] and memorized min. pressure (Vacuum type is for max. vacuum pressure) flashes in 0.5sec. by turns.  
4. If pressing [L] key one time shortly, memorized peak hold and bottom hold value is removed then returns to RUN mode.  
※When the peak hold value is over than display pressure range, it displays [HHH]. Bottom hold value is below than display pressure range, it displays [LLL].

Caution for using

- Do not insert any sharp or pointed object into pressure port. It could not operate normally due to mechanical trouble.
- Be sure that this unit must avoid direct touch with water, oil, thinner etc.
- Be sure to avoid transient time(within 3sec.) after initial power on.
- When a switching moving regulator is used for power supply, frame ground(F.G.) terminal of its power supply part must be grounded.
- Avoid wiring with power line or high voltage line. It may cause malfunction by noise.
- When moving this unit from cold place to warm place, please remove the humidity on the cover then use it.
- Do not press the setting button with sharp or pointed object.
- Do not apply over 30N tensile strength on connection part or load.
- When using mmH<sub>2</sub>O unit, multiply display value by 100.
- Installation environment  
① It shall be used indoor  
② Pollution Degree 2  
③ Altitude Max. 2,000m  
④ Installation Category III  
※It may cause malfunction if above instructions are not followed.

Main products

- Proximity sensors
- Area sensors
- Door/Door side sensors
- Counters
- Rotary encoders
- Power controllers
- Panel meters
- Temperature controllers
- Tachometer/Pulse(Rate) meters
- Temperature/Humidity transducers
- Switching power supplies
- Stepping motors/drivers/motion controllers
- Field network devices
- Laser marking system(CO2, Nd:YAG)
- Laser welding/soldering system
- Photoelectric sensors
- Fiber optic sensors
- Pressure sensors
- Timers
- Display units
- Sensor controllers
- Graphic/Logic panels

Autonics Corporation

http://www.autonics.com

Satisfiable Partner For Factory Automation

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EP-KE-77-0001L