

Autonics

DIGITAL PRESSURE SENSOR

PSA/PSB SERIES

M A N U A L



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.
 - Warning**: Injury or danger may occur under special conditions.

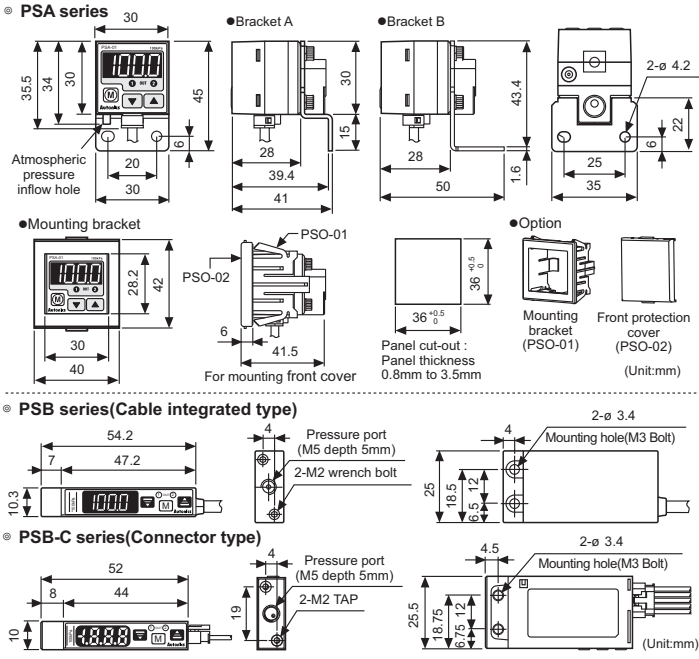
Warning

- 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. It may cause a fire, human injury or damage to property.
- 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.

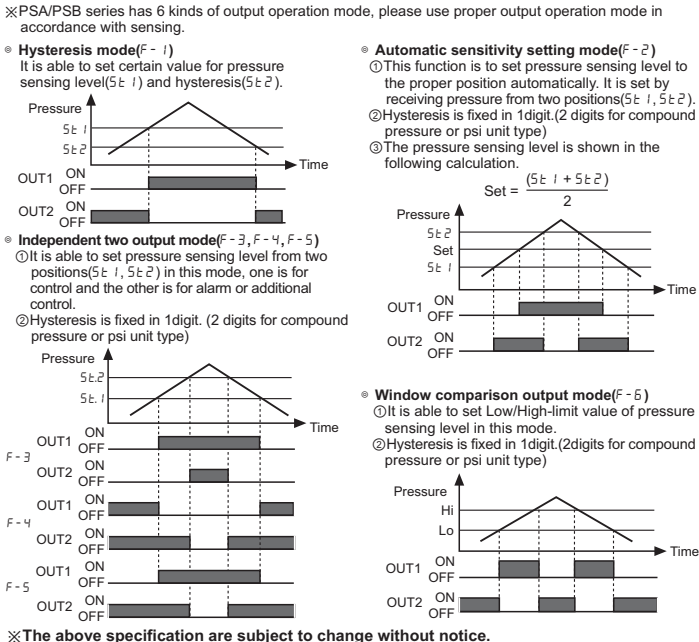
Dimensions



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/cm², bar, psi, mmHg, inHg, mmH₂O
 - PS□ - 01(C)(P), PS□ - 1(C)(P): kPa, kgf/cm², bar, psi
- 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 4 kinds 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 property 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)
 - PR.L: 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 at 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



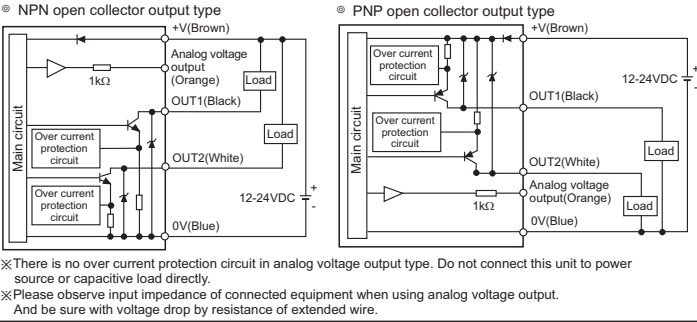
*The above specification are subject to change without notice.

Specifications

Pressure type	Vacuum pressure type		Positive pressure type		Compound pressure type
	NPN output	PSA-V01 PSB-V01 PSB-V01C	PSA-01 PSB-01 PSB-01C	PSA-1 PSB-1 PSB-1C	
Model	PNP output	PSA-V01P PSB-V01P PSB-V01CP	PSA-01P PSB-01P PSB-01CP	PSA-1P PSB-1P PSB-1CP	PSA-C01P PSB-C01P PSB-C01CP
Rated pressure range	0.0 to -101.3kPa	0.0 to 100.0kPa	0 to 1,000kPa	-100.0 to 100.0kPa	
Display pressure range	5.0 to -101.3kPa	-5.0 to 110.0kPa	-50 to 1,100kPa	-101.2 to 110.0kPa	
Max. pressure range	2 times of rated pressure		1.5 times of rated pressure	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	<ul style="list-style-type: none"> ●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 ^{※1}	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	<ul style="list-style-type: none"> ●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	3 1/2 digit LED 7segment		2digits		
Min. display interval	1digit(psi unit: 2 digits are fixed)		2digits		
Pressure unit	kPa, kgf/cm ² , bar, psi, mmHg, mmH ₂ O, inHg		kPa, kgf/cm ² , bar, psi		kPa, kgf/cm ² , bar, psi, mmHg, mmH ₂ O, inHg
Characteristic of control output and display temp.	Max. ± 1% F.S. ^{※2}		Max. ± 2% F.S. ^{※2}		
Characteristic of analog output	Max. ± 2% F.S. ^{※2}				
Vibration	1.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hours				
Environ-ment	<ul style="list-style-type: none"> Ambient temperature: -10 to 50, Storage: -20 to 60°C Ambient humidity: 35 to 85%RH, Storage: 35 to 85%RH 				
Material	<ul style="list-style-type: none"> ●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)				
Cable integrated type	φ 4.5P, Length: 2m, AWG 24, Insulation diameter: φ 1.0				
Wire	5P, Length: 3m, AWG 24, Insulation diameter: φ 1.4				
Unit weight	PSA: Approx. 120g, PSB: Approx. 70g, PSB-C: Approx. 80g				

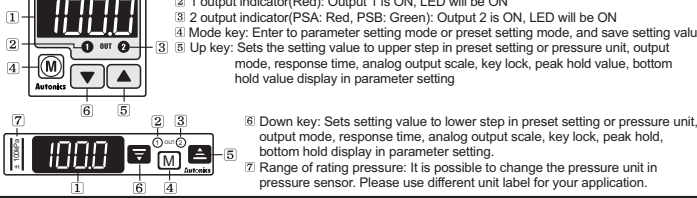
※1: In F I mode, hysteresis is variable. ※2: Display pressure at 25°C within 0 to 50°C
※F.S. is the rated pressure.
※The specification of pressure port is marked on the upper part of the case. Pressure ports are distinguished by the colors, silver(Rc:PT1/8) or black(NPT1/8).
※Environment resistance is 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.
※Please 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



Installation

- PSA series**
 - When installing pressure port it is able to bring pressure from 3 directions by changing the mounting direction of the pressure port.
 - Pressure port has two types, PT1/8 and NPT1/8, therefore be sure to use proper port when using one touch fitting.
 - Please use seal tape at port plug in order to prevent pressure leak.
 - Please block another two pressure ports not used with port plug.
 - Please connect it by using spanner(13mm) at the metal part in order not to overload on the body when connecting one touch fitting.
- PSB series**
 - Pressure port is M5. It is able to use general one touch fitting.
 - It is able to use it without the pressure port according to environment. In this case O-Ring between pressure port and its body should not be taken out in order to prevent pressure leak.
 - Please connect it by using spanner(10mm) at pressure port in order not to overload on the body when connecting one touch fitting.

Caution

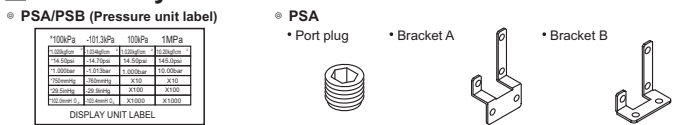
The tightening torque of one touch fitting and hexagon wrench should be Max. 50kgf-cm and 20kgf-cm. It may cause mechanical trouble. Please do not use spanner to install as it may cause mechanical trouble.



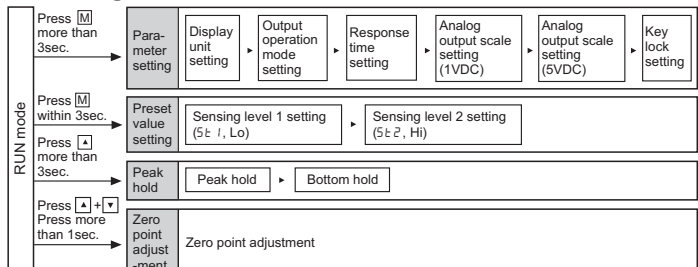
Error

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	Apply pressure within display pressure range

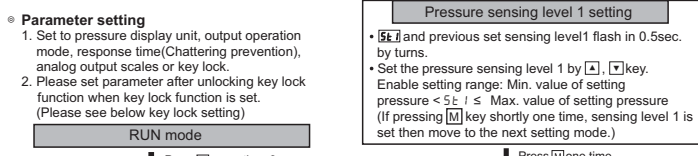
Accessory



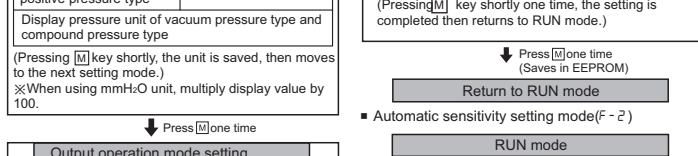
Setting



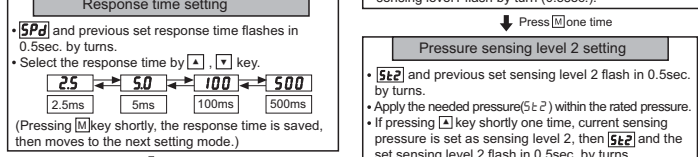
- Zero point adjustment**
 - press [] and [] keys for over 1sec. at the same time putting an applied pressure in state of the atmospheric pressure.
 - When the zero point adjustment is completed, it displays [] and returns to RUN mode automatically.
- Preset value setting**
 - Set the pressure sensing level.
 - Please set preset value after unlocking key lock when key lock function is set. (Please see key lock setting)
 - Be sure that the setting method is different by each output operation mode.



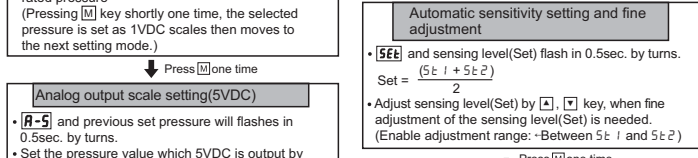
- ※If executing zero point adjustment on external pressure being at pressure port [] flashes 3times. Please execute it in the atmospheric pressure after removing external pressure.
※Please execute zero point adjustment regularly.
- Parameter setting**
 - Set to pressure display unit, output operation mode, response time(Chattering prevention), analog output scales or key lock.
 - Please set parameter after unlocking key lock function when key lock function is set. (Please see below key lock setting)



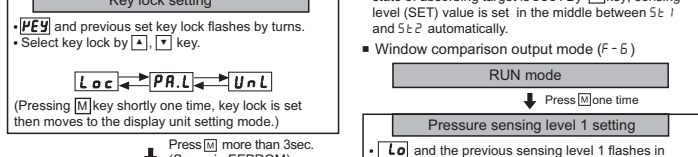
- [] and previous set unit flash in 0.5sec. by turns. • Select the unit by [] key.
- [] and previous set output mode flash in 0.5sec. by turns. • Select the output operation mode by [] key. (Pressing [] key shortly, the output operation mode is saved, then moves to the next setting mode.)
- [] key shortly, the unit is saved, then moves to the next setting mode.)
- When using mmH₂O unit, multiply display value by 100.



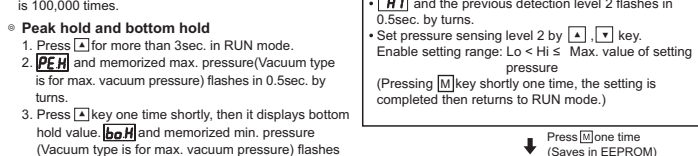
- [] and previous set response time flashes in 0.5sec. by turns. • Select the response time by [] key.
- [] key shortly, the response time is saved, then moves to the next setting mode.)
- [] and previous set pressure flash in 0.5sec. by turns. • Set the pressure value which 1VDC is output by [] key. Available setting range: Min. value of rated pressure ≤ [] ≤ 90% of rated pressure (Pressing [] key shortly one time, the selected pressure is set as 1VDC scales then moves to the next setting mode.)



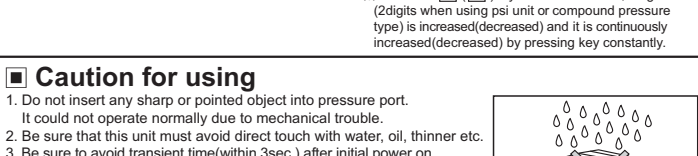
- [] and previous set pressure flash in 0.5sec. by turns. • Set the pressure value which 5VDC is output by [] key. Available setting range: [] + 10% of rated pressure ≤ [] ≤ Max. value of rated pressure (Pressing [] key shortly one time, the selected pressure is set as 5VDC scales then moves to the next setting mode.)



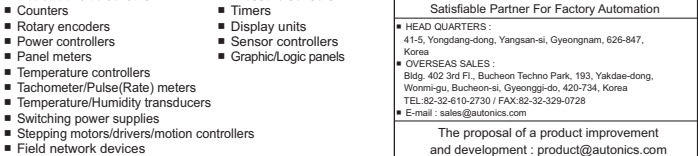
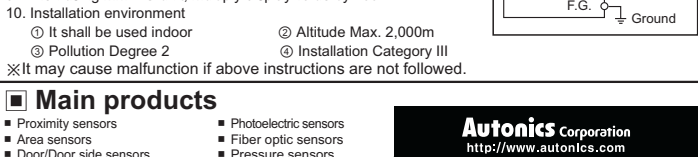
- [] and previous set key lock flashes by turns. • Select key lock by [] key. (Pressing [] key shortly one time, key lock is set then moves to the display unit setting mode.)
- Press [M] more than 3sec. (Saves in EEPROM) → Return to RUN mode
- When pressing [] key for over 3sec. in any setting mode, it returns to RUN mode memorizing set value at EEPROM. Also, if no key touched for 60sec, it displays previous setting value with ignoring current setting.
- Setting data is saved at EEPROM even though the power off. But, note that the life cycle of EEPROM is 100,000 times.



- Press [] for more than 3sec. in RUN mode. • [] and memorized max. pressure(Vacuum type is for max. vacuum pressure) flashes in 0.5sec. by turns.
- Press [] key one time shortly, then it displays bottom hold value [] and memorized min. pressure (Vacuum type is for max. vacuum pressure) flashes in 0.5sec. by turns.
- If pressing [] 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 [] Bottom hold value is below than display pressure range, it displays []



- [] and the previous sensing level 1 flashes in 0.5sec. by turns. • Set pressure sensing level 1 by [] key. Enable setting range: Min. setting pressure ≤ Lo < Max. value of setting pressure (Pressing [] key shortly one time, sensing level 1 is set then move to the next setting mode.)
- Press [M] one time (Saves in EEPROM) → Return to RUN mode
- [] and the previous detection level 2 flashes in 0.5sec. by turns. • Set pressure sensing level 2 by [] key. Enable setting range: Lo < Hi ≤ Max. value of setting pressure (Pressing [] key shortly one time, the setting is completed then returns to RUN mode.)
- Please check the preset value again when output operation mode is changed.
- When the display unit is changed, preset value is calculated according to the display unit.
- If no key touched for 60sec, it returns to RUN mode (Except for automatic sensitivity setting mode(F-2))
- Whenever [] key touched one time, 1digit (2digits when using psi unit or compound pressure type) is increased(decreased) and it is continuously increased(decreased) by pressing key constantly.



※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

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EP-KE-77-0001L