

# Autonics DIGITAL PRESSURE SENSOR PSAN SERIES

M A N U A L

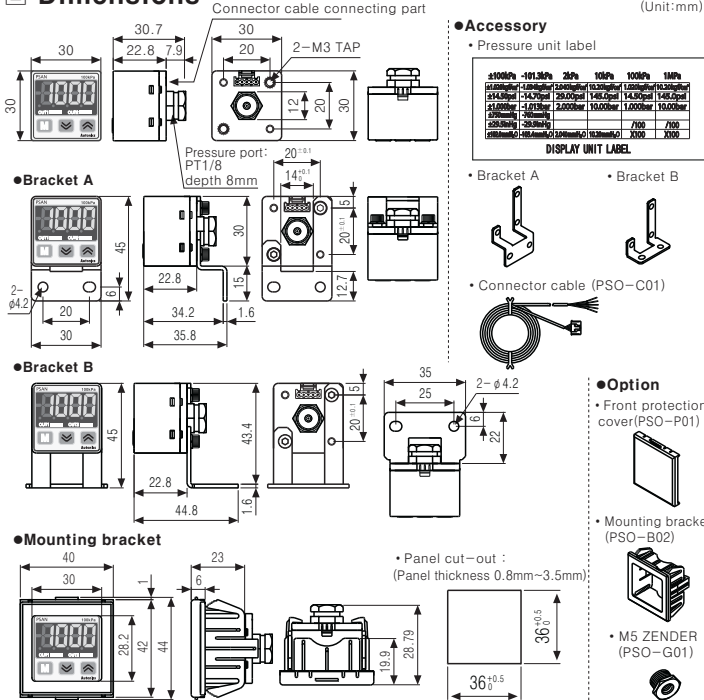


Thank you very much for selecting Autonics products.  
For your safety, please read the following before using.

## 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.
  - Caution**: Injury or danger may occur under special conditions.
- Warning**
  - Please use it with double safety devices when it is used at the equipments which may cause damages to human life or assets. (Ex: Nuclear power, Medical equipment, Vehicle, Train, Air plane, Combustion apparatus, Entertainment or Safety device etc.) It may cause a fire, human life or assets.
  - Do not use it in flammable gas because it does not have an explosion proof construction. It may cause explosion.

## Dimensions



## Front panel identification and function

- Range of rating pressure: It is possible to change the pressure unit in Pressure sensor. Please use different unit as label for your application.
- 4 digit LED display (Red): Used to indicate measured pressure value, setting value and error message
- Output indicator (Red): Output 1 is ON, LED will be ON
- Output indicator (Green): Output 2 is ON, LED will be ON
- M key: Used to enter into Preset/Parameter setting mode and to save Setting mode
- Key: Used to set the setting value to upper steps in preset mode and to display pressure unit, resolution, output mode, control output type, response time, analog output, Hold/Auto Shift, Key lock setting and High/Low Peak value in parameter setting mode
- Key: Used to set the setting value to lower steps in preset mode and to display pressure unit, resolution, output mode, control output type, response time, analog output, Hold/Auto Shift and Key lock setting in parameter setting mode

## Functions

- Pressure unit change Function**  
PSAN-V01C(P) and PSAN-C01C(P) has 7 kinds of pressure unit, PSAN-01C(P) and PSAN-1C(P) has 4 kinds of pressure unit. Please select the proper unit for application.
  - PSAN-V01C(P), PSAN-C01C(P): kPa, kgf/cm<sup>2</sup>, bar, psi, mmHg, inHg, mmH<sub>2</sub>O
  - PSAN-01C(P), PSAN-1C(P): kPa, kgf/cm<sup>2</sup>, bar, psi
- Display resolution change function**  
A function to select display resolution for measured pressure - 1/1,000 or 1/2,000  
Used when minimum display range is changed depending on pressure unit
- Output mode change Function**  
There are 5 kinds of control output mode in order to realize the various pressure detection.
  - Hysteresis mode(HY5): When needed to change hysteresis for detecting pressure.
  - Window comparison output mode(Ln): When needed to detect pressure in certain area.
  - Hysteresis - Window comparison output mode(HY-Ln): When both hysteresis mode and window comparison output mode are required
  - Automatic sensitivity setting mode(RuLo): When needed to set detection sensitivity automatically at proper position.
  - Forced output control mode(FoLo): When needed to display pressure with remaining comparison output OFF regardless of setting value
- Control output change function**  
Type of control output for Out1 and Out2 can be able to set Normal Open and Normal Close.
  - Note that Normal Open and Normal Close provide opposite output.
- Response time change function (Chattering prevention)**  
It can prevent chattering of control output by changing response time. It is able to set 5 kinds of response time(2.5ms, 5ms, 100ms, 500ms, 1000ms) and if the response time is getting longer, the detection will be more stable by increasing the number of digital filter.
- Analog output scale setting and Hold/Auto Shift setting function**
  - Analog voltage output scale setting: The scale function for analog output voltage (1-5VDC) is not fixed to the rated pressure range. It can be changed for User's application.
  - Analog current output scale setting: The scale for analog output Current (4-20mA) is not fixed to the rated pressure range. It can be changed for User's application.
  - Hold/Auto Shift input setting (Refer to Autonics Catalog for further information.)
  - Hold function: A function to hold PV and Control output while signal is input.
  - Auto Shift function: A function to compensate the setting value for changed value of reference pressure as threshold level if reference pressure of the device changes.
- Key lock function**  
The key lock function prevents key operations so that conditions set in each mode. [preset/parameter mode] are not inadvertently changed. There are 2 kinds of key lock functions available.
  - LoC1: All keys are locked; therefore it is not available to change parameter settings, preset value, zero adjustment, High/Low peak check and SHJ data initialization. (Lock setting change is available)
  - LoC2: Partially locked status; therefore it is not available to change parameter settings only (Lock setting change is available). Other settings are still available.
- Zero point adjustment function**  
The zero-point adjustment function forcibly sets the pressure value to "Zero" when the pressure port is opened to atmospheric pressure. When the zero adjustment is applied, analog output [Voltage or Current] is changed by this function.
- High Peak / Low Peak 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.

## Error

Error display	Description	Countermeasures
Err 1	When external pressure is input while adjusting zero point	Try again after removing external pressure
Err 2	When overload is applied on control output	Remove overload
Err 3	When setting condition is not met in Auto sensitivity setting mode	Check setting conditions and set proper setting values
LLLL	When applied pressure exceeds Low-limit of display pressure range	Apply pressure within display pressure range
HHHH	When applied pressure exceeds High-limit of display pressure range.	Apply pressure within display pressure range.
-H-		Set the corrected setting value within setting pressure range.
-HL-		

\* The above specifications are subject to change without notice.

## Specifications

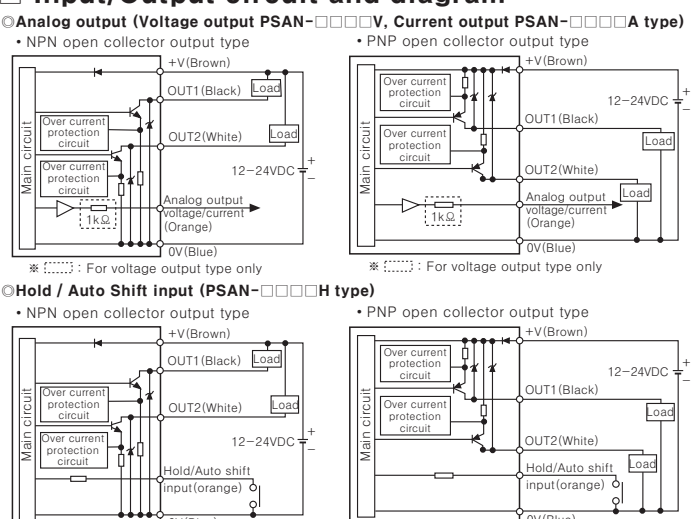
Pressure type	Gauge pressure					
	Negative pressure type	Standard pressure type	Compound pressure type	Compound pressure type		
Model (★1)	PSAN-V01C(P/V) PSAN-V01C(P/A) PSAN-V01C(P/H)	PSAN-01C(P/V) PSAN-01C(P/A) PSAN-01C(P/H)	PSAN-1C(P/V) PSAN-1C(P/A) PSAN-1C(P/H)	PSAN-C01C(P/V) PSAN-C01C(P/A) PSAN-C01C(P/H)		
Rated pressure range	0.0 ~ -101.3kPa	0.0 ~ 100.0kPa	0 ~ 1,000kPa	-101.3kPa ~ 100.0kPa		
Display pressure range	5.0 ~ -101.3kPa	-5.0 ~ 110.0kPa	-50 ~ 1,100kPa	-101.3kPa ~ 110.0kPa		
Min. display unit (internal resolution)	0.1kPa(1/2,000)	0.1kPa(1/2,000)	1kPa(1/2,000)	0.1kPa(1/2,000)		
Max. pressure range	2 times of rating pressure					
Applicable fluid	Air, Non-corrosive gas					
Power supply	12V~24VDC ±10% (Ripple P-P: Max. 10%)					
Current consumption	Max. 50mA (Analog Current Output type Max 75mA)					
Control output	<ul style="list-style-type: none"> <li>NPN open collector output: Max. sink current: Max. 100mA, Applied voltage: Max. 30VDC, Residual voltage: Max. 1V</li> <li>PNP open collector output: Max. source current: Max. 100mA, Residual voltage: Max. 2V</li> </ul>					
Hysteresis (★2)	Min. display range					
Repeat error	±0.2% F.S. ± Min. display range					
Response time	Selectable 2.5ms, 5ms, 100ms, 500ms, 1000ms					
Short circuit protection	Built-in					
Analog output (★3)	Voltage output	<ul style="list-style-type: none"> <li>Output voltage: 1-5VDC ±2% F.S. • Linear: Within ±1% F.S.</li> <li>Output impedance: 1kΩ • Zero point: Within 1VDC ±2% F.S. • Span: Within 4VDC ±2% F.S.</li> <li>Resolution: 1/2,000 (equal to display resolution) • Response Time: 50ms</li> </ul>				
	Current output	<ul style="list-style-type: none"> <li>Output current: 4-20mA ±2% F.S. • Linear: Within ±1% F.S.</li> <li>Zero point: Within 4mA ±2% F.S. • Span: Within 16mA ±2% F.S.</li> <li>Resolution: 1/2,000 (equal to display resolution) • Response Time: 70ms</li> </ul>				
Display method	4 digit LED 7segment					
pressure unit	1000	2000	1000	2000	1000	2000
	kPa	0.1	0.1	0.1	0.1	0.1
	kgf/cm <sup>2</sup>	0.001	0.001	0.001	0.01	0.01
	bar	0.001	0.001	0.001	0.01	0.01
	psi	0.02	0.01	0.02	0.1	0.2
	mmHg	1	0.4			1
inHg	0.1	0.02			0.1	
mmH <sub>2</sub> O	0.1	0.1			0.2	
Characteristic of control output and display temp.	Max. ±0.5% F.S. of display pressure at 25°C within 0°C to 50°C *Max. ±1% F.S. of display pressure at 25°C under -10°C					
Analog output temp. characteristic	Max. ±2% F.S. of display pressure at 25°C within 0°C to 50°C					
Dielectric strength	1000VAC 50/60Hz for 1 minute					
Insulation resistance	Min. 50MΩ (at 500VDC mega)					
Ambient temperature	-10°C to +50°C (at non-dew status)					
Storage temperature	-20°C to +60°C (at non-freezing status)					
Ambient humidity	30~80%RH					
Storage humidity	30~80%RH					
Vibration	1.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hours					
Protection	IP40 (IEC specification)					
Material	Front case: PC, Rear case: PC, Pressure port: Nickel Plated Brass					
Wire	φ 4, 5P, Length: 2m					
Weight	Approx. 80g					
*F.S. : Rated pressure.	*(★1) (P) represents PNP output type models.					
* (★2) : In hysteresis output mode, detection difference is variable.	*(★3) It is allowed to select one analog output type only.					

## Output operation mode

PSAN series has 5 kinds of output operation mode, please use proper output operation mode in accordance with detection.

- Hysteresis mode (HY5)**
  - It is able to set certain value for pressure detection level (St1, St2) and hysteresis (HY51, HY52).
  - Pressure vs. Time graph showing hysteresis.
- Window comparison output mode (Ln)**
  - It is able to set the range for high (Hi-1, Hi-2)/low (Lo-1, Lo-2) limit of pressure detection level when it is required to detect pressure at a certain range.
  - Detection hysteresis is fixed to min. display range.
  - Pressure vs. Time graph showing window comparison.
- Hysteresis-window comparison output mode (HY-Ln)**
  - It is available to set hysteresis mode (St1, HY51) and window comparison output mode when both hysteresis mode and window comparison output mode (Lo-1, Hi-1) are necessary.
  - Detection hysteresis is fixed to min. display range.
  - Pressure vs. Time graph showing combined hysteresis and window comparison.
- Automatic sensitivity setting mode (RuLo)**
  - This function is to set pressure detection level to the proper position automatically.
  - It is set by applied pressure from two positions (St1, St2).
  - Detection hysteresis is fixed to min. display range.
  - The pressure detection level is shown in the following calculation:  $SET = \frac{St1 + St2}{2}$
  - Pressure vs. Time graph showing automatic sensitivity setting.
- Forced output control mode (FoLo)**
  - Used to display pressure with forcibly holding comparing output OFF regardless of setting value.
  - Output 1, 2 can be ON/OFF manually by pressing (H) key while the forced output control mode is applied.
  - Pressure vs. Time graph showing forced output control.

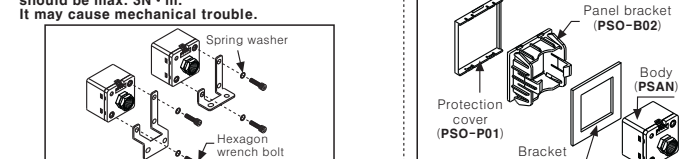
## Input/Output circuit and diagram



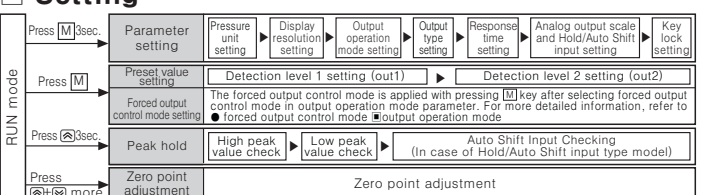
## Installation

- Pressure port has two types, PT1/8 and NPT1/8, therefore be sure to use proper part when using one touch fitting. (NPT 1/8 is option)
- Please connect it by using spanner (12mm) at the metal part in order not to overload on the body when connecting one touch fitting.
- Two different fixing brackets are provided for PSAN model. Select proper one with considering your application environments.
- At first, please unscrew hexagon wrench bolt and assemble the bracket on this unit by fixing hexagon of the wrenchbolt. In this case, tightening torque of hexagon wrench should be max. 3N·m. It may cause mechanical trouble.

**Caution**  
The tightening torque of one touch fitting should be Max. 10N·m. It may cause mechanical trouble.



## Setting



## Parameter setting

- If interkey lock is set (lock1 or lock2), unlock the key lock before setting parameters.
- Press (M) key to save setting value in each parameter and move to next parameters.
- Press (H) key to change setting values.
- When pressing (M) key for 3 sec in the middle of parameter setting, current setting value will be saved in EEPROM and (H) will be flickering twice, then returned to RUN mode.

**Parameter setting flow:**

- Pressure unit setting: kPa, kgf/cm<sup>2</sup>, bar, psi, mmHg, inHg, mmH<sub>2</sub>O
- Display resolution setting: 1000, 2000, 1000, 2000, 1000, 2000
- Output operation mode setting: HY5, Ln, HY-Ln, RuLo, FoLo
- Output setting: LoLo, LoLo, LoLo, LoLo
- Response time setting: 2.5, 5.0, 100, 500, 1000
- Analog output scale setting: R-Ln, R-D4, R-5u, R-20
- Hold/Auto Shift input setting: d-1, SHaC
- Key lock setting: LoC1, LoC2

## Preset Setting

- [L-U] will be flickering twice when returning to RUN mode.
- Press (H) key to change setting values.

**Hysteresis mode:**

- Pressure detection level 1 setting: St1, HY51
- Hysteresis level 1 setting: HY51
- Pressure detection level 2 setting: St2, HY52
- Hysteresis level 2 setting: HY52

**Window comparison output mode:**

- Low-limit value of Pressure detection level 1 setting: Lo-1
- High-limit value of Pressure detection level 1 setting: Hi-1
- Low-limit value of Pressure detection level 2 setting: Lo-2
- High-limit value of Pressure detection level 2 setting: Hi-2

**Automatic sensitivity setting mode:**

- Pressure detection level 1 setting: St1
- Pressure detection level 2 setting: St2

**Forced output control mode:**

- Low-limit value of Pressure detection level 1 setting: FoLo-1
- High-limit value of Pressure detection level 1 setting: FoHi-1
- Low-limit value of Pressure detection level 2 setting: FoLo-2
- High-limit value of Pressure detection level 2 setting: FoHi-2

## Peak Hold / Auto Shift/Change

**Pressure Unit Setting:** kPa, kgf/cm<sup>2</sup>, bar, psi, mmHg, inHg, mmH<sub>2</sub>O

**Display Resolution Setting:** 1000, 2000, 1000, 2000

**Output Operation Mode Setting:** HY5, Ln, HY-Ln, RuLo, FoLo

**Output Setting:** LoLo, LoLo, LoLo, LoLo

**Response Time Setting:** 2.5, 5.0, 100, 500, 1000

**Analog Output Scale Setting:** R-Ln, R-D4, R-5u, R-20

**Hold/Auto Shift Input Setting:** d-1, SHaC

**Key Lock Setting:** LoC1, LoC2

**Pressure Unit Setting:** kPa, kgf/cm<sup>2</sup>, bar, psi, mmHg, inHg, mmH<sub>2</sub>O

**Display Resolution Setting:** 1000, 2000, 1000, 2000

**Output Operation Mode Setting:** HY5, Ln, HY-Ln, RuLo, FoLo

**Output Setting:** LoLo, LoLo, LoLo, LoLo

**Response Time Setting:** 2.5, 5.0, 100, 500, 1000

**Analog Output Scale Setting:** R-Ln, R-D4, R-5u, R-20

**Hold/Auto Shift Input Setting:** d-1, SHaC

**Key Lock Setting:** LoC1, LoC2

## Caution for using

- Do not insert any sharp or pointed object into pressure port. It may cause mechanical trouble due to sensor damage.
- 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.
- It may cause malfunction by noise, if wiring with power line or high voltage line.
- When moving this unit from warm place to cold place, please remove the humidity on the cover then use it.
- Do not press the setting button with sharp or pointed object.
- Do not put over 30N tensile strength on connection part or load.
- When using mmH<sub>2</sub>O unit, please multiply display value by 100.

## Major products

- Proximity sensors
- Fiber optic sensors
- Counters
- Display units
- Panel meters
- Temperature controllers
- Tachometer/Pulse (Rate) meters
- Temperature/Humidity transducers
- Stepping motors/drivers/motion controllers
- Laser marking system (CO<sub>2</sub>, Nd:YAG)
- Laser welding/soldering system
- Photoelectric sensors
- Door/Door state sensors
- Power controllers
- Graphic/Logic panels
- Area sensors
- Pressure sensors
- Rotary encoders
- Sensor controllers

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