**Display Type Pressure Sensors** 

# **PSAN Series**

INSTRUCTION MANUAL

TCD210185AD

**Autonics** 

Thank you for choosing our Autonics product.

Read and understand the instruction manual and manual thoroughly before using the product.

For your safety, read and follow the below safety considerations before using. For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.

Keep this instruction manual in a place where you can find easily.

The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

Follow Autonics website for the latest information.

### **Safety Considerations**

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
- ↑ symbol indicates caution due to special circumstances in which hazards may occur.

★ Warning Failure to follow instructions may result in serious injury or death.

- 01. Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.) Failure to follow this instruction may result in personal injury, economic loss or fire.
- 02. Do not use the unit in the place where flammable/explosive/corrosive gas, humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be

Failure to follow this instruction may result in explosion or fire.

- 03. Install on a device panel or to a pressure port directly to use. Failure to follow this instruction may result in fire.
- 04. Do not connect, repair, or inspect the unit while connected to a power

Failure to follow this instruction may result in fire.

- 05. Check 'Connections' before wiring.
- Failure to follow this instruction may result in fire.
- 06. Do not disassemble or modify the unit.
- Failure to follow this instruction may result in fire or electric shock.

▲ Caution Failure to follow instructions may result in injury or product damage.

- 01. Use the unit within the rated specifications.
- Failure to follow this instruction may result in fire or product damage.
- 02. Use a dry cloth to clean the unit, and do not use water or organic solvent. Failure to follow this instruction may result in fire.
- 03. This product is designed to detect the pressure of noncorrosive medium. Do not use for corrosive medium.

Failure to follow this instruction may result in product damage.

04. Keep the product away from metal chip, dust, and wire residue which flow into the unit.

Failure to follow this instruction may result in fire or product damage.

### **Cautions during Use**

- Follow instructions in 'Cautions during Use'.
- Otherwise, it may cause unexpected accidents.
- Power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- Use the product, 3 sec after supplying power.
- When using switching mode power supply, frame ground (F.G.) terminal of power supply should be grounded.
- Wire as short as possible and keep away from high voltage lines or power lines, to prevent inductive noise.
- This unit may be used in the following environments.
- Indoors (in the environment condition rated in 'Specifications')
- Altitude max 2.000 m
- Pollution degree 3
- Installation category II

### **Ordering Information**

This is only for reference, the actual product does not support all combinations For selecting the specified model, follow the Autonics website.

# P S A N - 0 2 3 4 5 - 6

# • Medium / Port fitting position



P: PNP open collector output

### L: Fluid type (liquid, gas) / Bottom 2 Pressure type and Range

	Pressure		Rated range				
	01	Static	0.0 to 100.0 kPa				
	1	Static	0 to 1,000 kPa				
	V01	Negative	0.0 to -101.3 kPa				
ĺ	C01	Compound	-101.3 to 100.0 kPa				

No mark: Pneumatic type (gas) / Back

D: Pneumatic type (gas) / Bottom

B: Fluid type (liquid, gas) / Back

### Wiring

No mark: Cable type (fluid type) C: Connector type

No mark: NPN open collector output

### **6** Option input / output

V: Voltage output A: Current output H: External input

### O Pressure port

Medium	Pneumatic	Fluid
R1/8	0	0
Rc1/8	0	-
NPT1/8	0	0
7/16-20UNF	-	0
9/16-18UNF	-	0

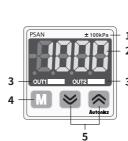
### **Product Components**

- Product
- Instruction manual
- Unit sticker
- Connector type: Bracket A / B, Connector wiring (PSO-C01)
- Cable type: Bracket C

### **Sold Separately**

- Front cover (PSO-P01), Panel bracket (PSO-B02 / B03)
- Pneumatic type: M5 gender (PSO-Z01)

### **Unit Descriptions**



### 1. Pressure range (sticker)

- 2. Display part (red)
- Run mode: Displays PV (present value), SV (setting
- Setting mode: Displays parameter and setting value 3. Output indicator (OUT1: red , OUT2: green)
- Turns ON when the corresponding control output
- 4. [M] key

Enters parameter group, selects item and returns run mode

### 5. [▼], [▲] key

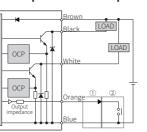
Sets preset of output operation mode, runs the mode or changes parameter.

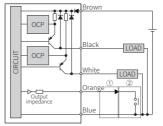
### Connections

Color	Function
Brown	+V
Blue	0 V
Black	OUT 1
White	OUT 2
Orange	Option input / output

### ■ NPN open collector output

# ■ PNP open collector output



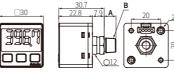


- (1): Option voltage / current output model. (2): Option external input model
- OCP (over current protection circuit)
- There is no short circuit protection circuit. Do not connect directly to power or capacitive loads.
- The control output is abnormal when the control output circuit is shorted or over current is
- · Pay attention to the input impedance of the connected device when using analog voltage output. Be sure to the voltage drop due to the resistance of the wiring when extending the

### Dimensions

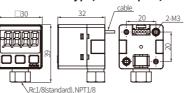
• Unit: mm, For the detailed drawings, follow the Autonics website.

### ■ Pneumatic type, back port, connector type

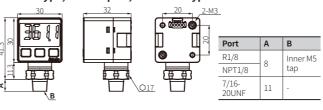


Port	Α	В
Rc1/8	0	-
NPT1/8	0	Inner M5
R1/8	8	tap

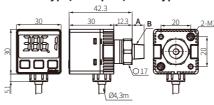
### ■ Pneumatic type, bottom port, connector type



### ■ Fluid type, bottom port, connector type

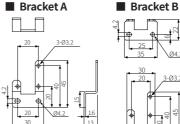


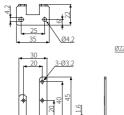
### ■ Fluid type, back port, cable type

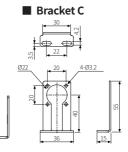


Port	Α	В
R1/8	8	Inner M5 tap
9/16- 18UNF	15.4	-

■ Bracket A







# Installation

### One-touch fitting

Pneumatic type  Fluid type  Spanner: 12 mm  Spanner: 1		
Spanner: 12 mm	Pneumatic type	Fluid type
	Spanner: 12 mm	Spanner: 1

Connect the metal part with a spanner so that no large force is applied to the unit body. (tightening torque: ≤ 10 N m, it may cause malfunction.)

### Bracket

Use spring washers and hexagon wrench bolts (tightening torque:  $\leq$  3 N m) to select and install a bracket suitable for your environment.

Conne	Cable type	
• Bracket A	• Bracket B	• Bracket C

### Wiring

 $\bullet$  Do not pull the wiring with a force of more than 30 N.

### **Specifications**

Model	PSAN- V01C	PSAN- 01C - PSAN-1 - PSAN-1		PSAN-	
Pressure Type	Pneumatic type Fluid type mode	ssure <sup>02)</sup>			
Pressure	Negative	Static		Compound	
Min display unit	0.1 kPa	0.1 kPa	1 kPa	0.1 kPa	
Rated pressure range	0.0 to -101.3 kPa	0.0 to 100.0 kPa	0 to 1,000 kPa	-101.3 to 100.0 kPa	
Display & setting pressure range	5.0 to -101.3 kPa	-5.0 to 110.0 kPa	-101.3 to 1,100 kPa	-101.3 to 110.0 kPa	
Display type	7 Segment LED, 4 ½ digit				
Display accuracy	-10 to 0 °C: $\leq \pm$	1% F.S., 0 to 50 °	$C: \le \pm 0.5\% \text{ F.S.}$		
Max. pressure	Rated pressure ×2	Rated pressure ×2	• Pneumatic type: Rated pressure ×1.5 • Fluid type: Rated pressure ×2	Rated pressure ×2	

01) Only for static pressure, rated pressure range 100.0 kPa model

02) The unit is sealed structure. It is based on atmospheric pressure 101.3 kPa.

Applicable medium		umatic type non-corrosive gas)	Fluid type (non-corrosive gas and fluid that do not corrode stainless steel 316L)			
Connection type	Con	nector type	Cable type / connector type			
Cable	Ø4ı	mm, 5-core, 2 m	Connector type: Ø 4 mm, 5-core, 2 m Cable type: Ø 4 mm, 5-core, 3 m			
Wire spec.	AWG	624 (0.08 mm, 40-core), insulator	diameter: Ø 1 mm			
Material	Back	t case: PC c case: (back port) PC / (bottom port) PBT+GF15% sure port: Brass-nickel plated	Front case: PC Back case: PA6 Pressure port: SUS304/SUS316L			
Protection structure	Con	nector type: IP40 (IEC standard)	Connector type: IP40 (IEC standard) Cable type: IP65 (IEC standard)			
(packaged) Botto  Power supply  Allowable voltage		# EHC				
		<pre>c port: ≈ 80 g (≈ 165 g) om port: ≈ 85 g (≈ 170 g)</pre>	Connector type: $\approx 88  \mathrm{g}  (\approx 173  \mathrm{g})$ Cable type: $\approx 90  \mathrm{g}  (\approx 167  \mathrm{g})$			
		12 - 24 VDC== (ripple P-P: ≤ 10%)				
		90 to 110% of rated voltage				

CE	€ £\$ HIL			
	12 - 24 VDC= (ripple P-P: $\leq$ 10°	%)		
	90 to 110% of rated voltage ≤ 50 mA (1)			
ion				
	NPN open collector output / PN	NP open collector output model		
	≤ 30 VDC==			
	≤ 100 mA			
	NPN: ≤ 1 VDC==, PNP: ≤ 2 VDC==			
	According to output operation mode <sup>02)</sup>			
	±0.2% F.S. ±min display interval			
	2.5, 5, 100, 500, 1000 ms			
	Output short over-current protection circuit			
ice	≥ 50 MΩ (500 VDC= megger)			
1	Between the charging part and the case: 1,000 VAC $\sim$ 50 / 60 Hz for 1 min			
	$1.5\mathrm{mm}$ amplitude at frequency of 10 to 55Hz in each X, Y, Z direction for 2 hours			
ure	-10 to 50 °C, Storage: -20 to 60 °C (no freezing or condensation)			
	30 to 80%RH, Storage: 30 to 80%RH (no freezing or condensation)			
mA.				
	ion ion	Back port: $\approx 80$ g ( $\approx 165$ g) Bottom port: $\approx 85$ g ( $\approx 170$ g)  12 - 24 VDC= (ripple P-P: $\le 10^{\circ}$ 90 to 110% of rated voltage  ion $\le 50$ mA $^{\circ 1}$ NPN open collector output / Pt $\le 30$ VDC= $\le 100$ mA  NPN: $\le 1$ VDC=, PNP: $\le 2$ VDC  According to output operation $\pm 0.2\%$ F.S. $\pm$ min display inter 2.5, 5, 100, 500, 1000 ms  Output short over-current protice $\ge 50$ M $\Omega$ (500 VDC= megger) Between the charging part and the short over short over the charging part and the short over short over short over the charging part and the short over short		

02) Refer to 'Output operation mode'. ±1digit error may occur due to pressure unit operation.

Analog output	Voltage (1 - 5 VDC== ±2% F.S)	Current (DC 4 - 20mA ±2% F.S)				
Output impedance	1kΩ	-				
Linearity	≤ ±1% F.S	≤±1% F.S				
Zero-point	$\leq$ 1 VDC= $\pm$ 2% F.S.	$\leq$ DC 4 mA $\pm$ 2% F.S.				
Span	$\leq$ 4 VDC== $\pm$ 2% F.S.	$\leq$ DC 16 mA $\pm$ 2% F.S.				
Resolution	1/1000 or 1/2000 (different by press	ure type and display unit)				
Posponso timo	50 ms	70 ms				

### Minimum Display Interval

Pressure	Negative		Static				Compound	
Min display interval	0.1 kPa		0.1 kPa		1 kPa		0.1 kPa	
Resolution Display unit	1/1000	1/2000	1/1000	1/2000	1/1000	1/2000	1/1000	1/2000
MPa	-	-	0.001	-	0.001	-	-	-
kPa	0.1	-	0.1	-	1	-	-	0.1
kgf/cm <sup>2</sup>	0.001	-	0.001	-	0.01	-	-	0.001
bar	0.001	-	0.001	-	0.01	-	-	0.001
psi	-	0.01	-	0.01	-	0.1	-	0.02
mmHg	-	0.4		_			-	0.8
inHg	-	0.02					-	0.03
mmH <sub>2</sub> O <sup>01)</sup>	0.1	-			_		-	0.1

01) Multiply display value by 100

### **Mode Setting**

	[M] for over 3 sec	$\rightarrow$	Parameter group	[M] for over 3 sec	$\rightarrow$	
	[M]	$\rightarrow$	Preset setting	[M]	$\rightarrow$	
RUN	[▼]+[▲] for over 1 sec after remove the external pressure	$\rightarrow$	Zero-point adjustment	Displays 0.0 and returns automatically	$\rightarrow$	RUN
	[▲] for over 3 sec	→	Max / Min monitoring / Auto shift <sup>01)</sup>	[M] Reset or set: [▼]+[▲] for over 1 sec	<b>→</b>	

01) Max. / Min. pressure value is available to check by monitoring. [Option external input model] Auto shift judgment level checking / setting is available when P-9 External input terminal is set as SHFT. (no input displays 0)

# **Parameter Setting**

- Some parameter are activated / deactivated depending on other parameters. Refer to the description.
- The setting item name and setting value are cross-displayed on the display part.
- It returns to RUN mode when there is no additional key input for 60 sec in each parameter group.
- Guaranteed write life: 100,000 times
- [M] key: Saves setting value and moves to next parameter

	[▼], [▲] key: Selects setting value								
Parameter		Display	Default	Setting range					
P-1	Display unit	Unit	Lbu	[Negative / Compound pressure model] kPa, KGC: kgf/cm², bar, psi, mmHg, inHg, H2O: mmH <sub>2</sub> O					
1-1	Display unit	01117 C	ñРЯ	[Static pressure model] MPa, kPa, KGC: kgf/cm², bar, psi					
P-2	OUT operation mode	o U E.ñ	H Y 5.ñ	HYS.M: Hysteresis WIN: Window comparison output HY-W: Hysteresis-Window comparison output AUTO: Auto sensitivity setting F.OUT: Forced output control					
P-3	Output type	n a.n [	1020	OUT1 OUT2  1020 Normally open Normally open  102C Normally closed Normally open  1C2O Normally closed Normally open  1C2C Normally closed Normally closed					
P-4	Response time	5Pd	2.5	2.5, 5.0, 100, 500, 1,000 ms					
P-5	Voltage low limit scale	A-10	0.0	[Option voltage output model] Min. rated pressure ≤ Low limit scale ≤ 90% of rated pressure					
P-6	Voltage high limit scale	A-Su	100.0	[Option voltage output model] Low limit scale setting value + 10% of rated pressure ≤ High limit scale ≤ Max. rated pressure					
P-7	Current low limit scale	Я-04	0.0	[Option current output model] Min. rated pressure ≤ Low limit scale ≤ 90% of rated pressure					
P-8	Current high limit scale	A-50	100.0	[Option current output model] Low limit scale setting value +10% of rated pressure ≤ High limit scale ≤ Max. rated pressure					
P-9	External input terminal	d-In	Hold	[Option external input model] HOLD: Hold SHFT: Auto shift					
P-10	Auto shift output <sup>01)</sup>	5H.oE	oUt 1	[Option external input model] OUT1, OUT2, ALL					
P-11	Lock	Lo[Y	oFF	LOC1: Parameter, preset, zero-point adjustment setting lock / Monitoring value reset lock LOC2: Parameter lock (available to check setting value) OFF					

01) Condition: P-9. External input terminal SHFT setting

### **Preset Setting**

### Setting method

- Setting name and value are cross-displayed in SV display part.
- 1. Set the operation mode in P-2 OUT operation mode.
- 2. Enter the preset setting mode by pressing [M] key from RUN mode.
- 3. Select the setting item by [M] key and change the preset by  $[\mathbf{V}]$  or  $[\mathbf{A}]$  key.
- 4. Press [M] key to save setting or no key input over 60 sec not to save setting and return to RUN mode. (except forced output control mode)

### Preset setting by operation mode

Operation mode		Preset		Setting range	
		Pressure detection level 1	5 E I	Min. display pressure < ST1 ≤ Max. display pressure	
Lhustavasia	H 9 5.ñ	Hysteresis level 1	H951	Min. display pressure ≤ HYS1 < ST1	
Hysteresis		Pressure detection level 2	5 £ 2	Min. display pressure < ST2 ≤ Max. display pressure	
		Hysteresis level 2	H425	Min. display pressure ≤ HYS2 < ST2	
	ם ר	Pressure detection low limit 1	Lo-I	Min. display pressure $\leq$ LO-1 $\leq$ Max. display pressure -(3 $\times$ Min display interval)	
Window		Pressure detection high limit 1	ні - і	LO-1+(3 × Min display interval) ≤ HI-1 ≤ Max. display pressure	
comparison output <sup>01)</sup>		Pressure detection low limit 2	Lo-2	Min. display pressure ≤ LO-2 ≤ Max. display pressure - (3 × Min display interval)	
		Pressure detection high limit 2	H1 - 5	LO-2 + (3 $\times$ Min display interval) $\leq$ HI-2 $\leq$ Max. display pressure	
		Pressure detection level 1	5 E I	Min. display pressure < ST1 ≤ Max. display pressure	
Hysteresis-		Hysteresis level 1	H951	Min. display pressure ≤ HYS1 < ST1	
Window comparison output <sup>(02)</sup>	HA-ñ	Pressure detection low limit	۲oñ	Min. display pressure $\leq$ LOW $\leq$ Max. display pressure - (3 $\times$ Min display interval)	
острас		Pressure detection high limit	ні Сн		
		Pressure level 1	5 Ł I	Min. display pressure $\leq$ ST1 $\leq$ Max. display pressure - 1% of rated pressure	
Auto sensitivity	RIIFo	Pressure level 2 <sup>03)</sup>	5 £ 2	$ST1 + 1\%$ of rated pressure $\leq ST2 \leq Max$ . display pressure	
setting	,,,,,,	Pressure detection level	SEŁ	Auto setting SET= (ST1+ST2)/2  • Manual setting is possible by [▼] or [▲] key.	
Forced output control <sup>04)</sup>	F.oUt	-	-	<ul> <li>Manual ON/OFF for OUT1/2 is possible by</li> <li>[▼] or [▲] key.</li> </ul>	

- 01) Hysteresis: 1 (min display interval, fixed)
- 02) ST1 = HYS1, actual hysteresis is 1 (min, display interval)
- 03) When error appears, check setting conditions and set proper setting values. 04) [Option external input model] Forced output does not support external input terminal

### Precaution

• The preset value (default) of the changed operation mode is set when changing P-2 OUT operation mode setting.

Negative Static

Compound

- Preset value is converted as the changed unit automatically when changing P-1 Display unit setting.
- Preset is reset when changing P-9 External input terminal setting.

# ■ Default setting value

Operation mode		Preset	ivegative	Static	Static	
Operation mo	ue	Preset	0.1 kPa	0.1 kPa	1 kPa	0.1 kPa
	НУ5.ñ	5E I	-50.0	50.0	500	50.0
I bushawa da		H 9 5 1	0.0	0.0	0	-50.0
Hysteresis		5£2	-50.0	50.0	500	50.0
		H952	0.0	0.0	0	-50.0
	ñlu	Lo-1	0.0	0.0	0	-50.0
Window		HI - I	-50.0	50.0	500	50.0
comparison output		Lo-2	0.0	0.0	0	-50.0
2242		H1 - 2	-50.0	50.0	500	50.0
Hysteresis-	HA-ñ	5E I	-50.0	50.0	500	50.0
Window		H 9 5 1	0.0	0.0	0	-50.0
comparison		Lou	0.0	0.0	500	-50.0
output		ні Сн	-50.0	50.0	0	50.0
Auto		5 E I	0.0	0.0	0	-50.0
sensitivity	AUEo	5£2	-50.0	50.0	500	50.0
setting		SEE	-25.0	25.0	250	0.0
Forced output control	F.oUt	-				

### **Output Operation Mode**

Change the output operation mode to change pressure detection method.

ON: H: Hysteresis A: Min display interval

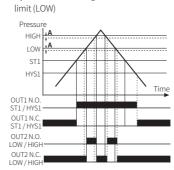
### Hysteresis

- Set the hysteresis for pressure detection It detects pressure at the desired range.
- Setting: Pressure detection level (ST1, ST2), Hysteresis (HYS1, HYS2)

# OUT2 N.O.

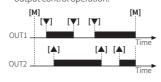
### ■ Hysteresis - Window comparison output

- It is available both hysteresis mode and window comparison output mode operations.
- Setting: Pressure detection level (ST1), Hysteresis (HYS1), High limit (HIGH), Low

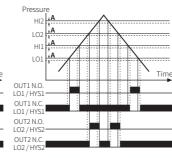


### ■ Forced output control

- It displays the present pressure with forcibly holding comparing output OFF regardless of setting value.
- Manual ON/OFF for OUT1/2 is possible by [M], [▼] or [▲] key during forced output control operation.

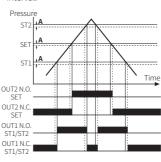


- **■** Window comparison output
- Hysteresis is fixed as min. display interval.
- Setting: High limit (HI1, HI2), Low limit (LO1, LO2)



### Auto sensitivity setting

- This function is to set the proper position (SET) automatically by applied pressure from two positions (ST1, ST2). SET= (ST1+ST2)
- Hysteresis is fixed as min. display interval.



### **Auto shift Preset Setting**

### Setting method

### [Parameter setting]

- 1. Select P-9 External input terminall: SHFT.
- 2. Press the  $[\blacktriangle]$  key for over 3 sec. in RUN mode to enter Max / Min monitoring / Auto
- 3. Press the [M] key to entering Auto shift setting and press the [▼] or [▲] key to change preset.
- 4. When reset the set correctiong value, press the  $[\mathbf{V}]$  +  $[\mathbf{A}]$  keys for over 1 sec.

### [External input setting]

- 1. At the desired preset value pressure, maintain low level for over 1 ms of Auto shift input (orange).
- 2. The pressure at this time is measured and applied after 7.5 ms and is stored in the auto shift correction value.

Operation mode		Preset		Default	Setting range			
Auto- shift	SHFŁ	Auto-shift	5 H.I N	0	Min. preset setting < SH.IN ≤ Max. preset setting			
					Pressure	Setting range (after correction)	Setting range (preset range)	
					Negavive	-101.3 to 5.0 kPa	-101.3 to 101.3 kPa	
					Static	-5.0 to 110.0 kPa	-110.0 to 110.0 kPa	
						-50.0 to 1100 kPa	-1100 to 1100 kPa	
					Compound	-101.3 to 110.0 kPa	-101.3 to 110.0 kPa	

### Precaution

- $\bullet$  Auto shift correction is reset as 0 when changing P-2 OUT operation mode and preset
- Preset setting range is wider than the rated pressure with the source pressure
- In case of forced output control mode or PV HHHH/LLLL, Auto shift function does not

Erro	•	
Display	Cause	Troubleshooting
_ , ,	When external pressure is input while	Try again after removing exte

Display	Cause	Troubleshooting		
Errl	When external pressure is input while adjusting zero point.	Try again after removing external pressure.		
Err2	When overload is applied on control output	Remove overload.		
Err3	When 'ST1', 'ST2' setting range is not met in auto sensitivity setting mode.	Check setting conditions and set proper setting values.		
нннн	When applied pressure exceeds high-limit of display pressure range.	Apply pressure within display pressure		
LLLL	When applied pressure exceeds low-limit of display pressure range.	range.		
- HH -				
-LL-	Auto shift correction error.	Set the corrected setting value within setting pressure range.		
-HL-				



**Autonics**