PSAN Series INSTRUCTION MANUAL

TCD210185AE

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.
- Λ 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 present
- 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 source.
- 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.

Ρ	S	Α	Ν	-	0	0	ß	4	6	-	6	

Control output

V: Voltage output A: Current output

9/16-18UNF

No mark: NPN open collector output

Fluid

P: PNP open collector output

Option input / output

• Medium / Port fitting position No mark: Pneumatic type (gas) / Back D: Pneumatic type (gas) / Bottom

B: Fluid type (liquid, gas) / Back L: Fluid type (liquid, gas) / Bottom

Pressure type and Range

• • • • •					
	Pressure	Rated range	H: External input		
01	Ctatic	0.0 to 100.0 kPa	O Pressure po	rt	
1 Static		0 to 1,000 kPa	Medium	Deserves	
V01	Negative	0.0 to -101.3 kPa	Port	Pneuma	
C01	Compound	-101.3 to 100.0 kPa	R1/8	0	
			Rc1/8	0	
🔁 Wir	ing		NPT1/8	0	
No ma	rk: Cable type	7/16-20UNF	-		

C: Connector type

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)

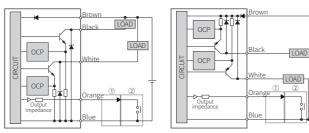
Unit Descriptions

3

Connections

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

NPN open collector output



(1): Option voltage / current output model. (2): Option external input model

OCP (over current protection circuit)

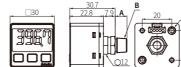
 There is no short circuit protection circuit. Do not connect directly to power or capacitive loads. • The control output is abnormal when the control output circuit is shorted or over current is supplied.

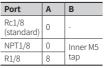
· Pay attention to the input impedance of the connected device when using analog voltage output. Be sure to the voltage drop due to the resistance of the wiring when extending the wiring

Dimensions

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

Pneumatic type, back port, connector type



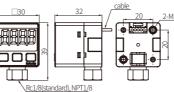


B

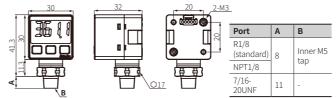
Inner M5

Pneumatic type, bottom port, connector type

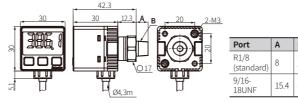
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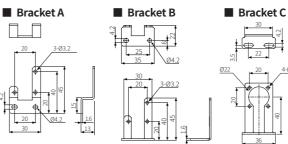


Fluid type, bottom port, connector type



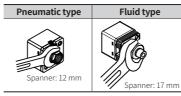






Installation

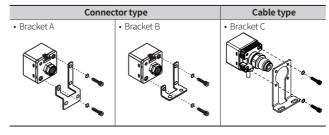
One-touch fitting



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.

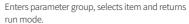


Wiring

• Do not pull the wiring with a force of more than 30 N.

1. Pressure range (sticker) 2. Display part (red) Run mode: Displays PV (present value), SV (setting value) Setting mode: Displays parameter and setting value 3. Output indicator (OUT1: red , OUT2: green) Turns ON when the corresponding control output is

ON 4. [M] key



5. [▼], [▲] key Sets preset of output operation mode, runs the

mode or changes parameter.

PNP open collector output

Specifications

Model	PSAN-	PSAN-	PSAN-□1□□□-□	PSAN-			
Pressure Type	Pneumatic type model: Gauge pressure Fluid type model: Gauge pressure ⁰¹⁾ or sealed gauge pressure ⁰²⁾						
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: ≤ ±1% F.S., 0 to 50 °C: ≤ ±0.5% F.S.						
Max. pressure	Rated pressure $\times 2$	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	Pneumatic type (air, non-corrosive gas)	Fluid type (non-corrosive gas and fluid that do not corrode stainless steel 316L)				
Connection type	Connector type	Cable type / connector type				
Cable	Ø 4 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.	AWG24 (0.08 mm, 40-core), insulator diameter: Ø 1 mm					
Material	Front case: PC Back case: (back port) PC / (bottom port) PBT+GF15% Pressure port: Brass-nickel plated	Front case: PC Back case: PA6 Pressure port: SUS304/SUS316L				
Protection structure	Connector type: IP40 (IEC standard)	Connector type: IP40 (IEC standard) Cable type: IP65 (IEC standard)				
Certification ⁰¹⁾	ation ⁰¹⁾ CE 방 태					
Unit weight (packaged)	Back port: $\approx 80 \text{ g}$ ($\approx 165 \text{ g}$) Bottom port: $\approx 85 \text{ g}$ ($\approx 170 \text{ g}$)	Connector type: $\approx 88 \text{ g} (\approx 173 \text{ g})$ Cable type: $\approx 90 \text{ g} (\approx 167 \text{ g})$				

ent may vary depending on the model. Check the certification on the Aut

Power supply	12 - 24 VDC== (ripple P-P: ≤ 10%)				
Allowable voltage range	90 to 110% of rated voltage				
Current consumption	\leq 50 mA $^{01)}$				
Control output	NPN open collector output / PNP open collector output model				
Load voltage	\leq 30 VDC==				
Load current	\leq 100 mA				
Residual voltage	NPN: ≤ 1 VDC=, PNP: ≤ 2 VDC=				
Hysteresis	According to output operation mode ⁰²⁾				
Repeat error	\pm 0.2% F.S. \pm min display interval				
Response time	2.5, 5, 100, 500, 1000 ms				
Protection circuit	Output short over-current protection circuit				
Insulation resistance	\geq 50 M Ω (500 VDC= megger)				
Dielectric strength	Between the charging part and the case: 1,000 VAC ~ 50 / 60 Hz for 1 min				
Vibration	1.5 mm amplitude at frequency of 10 to 55Hz in each X, Y, Z direction for 2 hours				
Ambient temperature	-10 to 50 °C, Storage: -20 to 60 °C (no freezing or condensation)				
Ambient humidity	30 to 80%RH, Storage: 30 to 80%RH (no freezing or condensation)				

01) Current output: \leq 75 mA

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

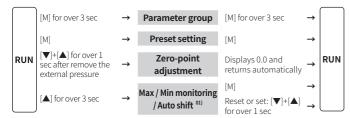
Analog output	Voltage (1 - 5 VDC== ±2% F.S)	Current (DC 4 - 20mA ±2% F.S)			
Output impedance	1 kΩ	-			
Linearity	\leq ±1% F.S	\leq ±1% F.S			
Zero-point	≤ 1 VDC= $\pm 2\%$ F.S.	\leq DC 4 mA \pm 2% F.S.			
Span	\leq 4 VDC== ±2% F.S.	\leq DC 16 mA \pm 2% F.S.			
Resolution	1/1000 or 1/2000 (different by pressure type and display unit)				
Response time	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 ²	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 ₂ O ⁰¹⁾	0.1	-					-	0.1

01) Multiply display value by 100

Mode Setting



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

Para	meter	Display	Default	Setting range			
P-1	Display unit	Unit	2 P A	[Negative / Compound pressure model] kPa, KGC: kgf/cm², bar, psi, mmHg, inHg, H2O: mmH ₂ O			
F-1	Display unit	0111 0	⊼PR	[Static pressure model] MPa, kPa, KGC: kgf/cm², bar, psi			
P-2	OUT operation mode	o U E.Ā	H 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	SPd	2.5	2.5, 5.0, 100, 500, 1,000 ms			
P-5	Voltage low limit scale	8-lu	0.0	[Option voltage output model] Min. rated pressure ≤ Low limit scale ≤ 90% of rated pressure			
P-6	Voltage high limit scale	R-5u	100.0	[Option voltage output model] Low limit scale setting value + 10% of rated pressure \leq High limit scale \leq Max. rated pressure			
P-7	Current low limit scale	я-оч	0.0	[Option current output model] Min. rated pressure \leq Low limit scale \leq 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]			
P-10	Auto shift output ⁰¹⁾	5H.oE	0 U E I	[Option external input model] OUT1, OUT2, ALL			
P-11	Lock	LoEY	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 $[{\rm M}]$ 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

Onerationmode		Durat		Catting youngo		
Operation mode		Preset		Setting range		
		Pressure detection level 1	5 E I	Min. display pressure $<$ ST1 \leq Max. display pressure		
historopia		Hysteresis level 1	H 4 5 I	Min. display pressure ≤ HYS1 < ST1		
Hysteresis	H Y 5.ñ	Pressure detection level 2	522	Min. display pressure $<$ ST2 \leq Max. displa pressure		
		Hysteresis level 2	Н У 5 2	Min. display pressure ≤ HYS2 < ST2		
		Pressure detection low limit 1	Lo-I	Min. display pressure \leq LO-1 \leq Max. display pressure -(3 \times Min display interval		
Window comparison		Pressure detection high limit 1	ні - І	LO-1 + (3 \times Min display interval) \leq HI-1 \leq Max. display pressure		
output ⁰¹⁾	Ϋ́ιο	Pressure detection low limit 2	Lo-2	Min. display pressure \leq LO-2 \leq Max. display pressure - (3 \times Min display interva		
		Pressure detection high limit 2	н:-2	LO-2 + (3 \times Min display interval) \leq HI-2 \leq Max. display pressure		
	HA - ñ	Pressure detection level 1	5 E I	Min. display pressure < ST1 ≤ Max. displa pressure		
Livetorooia		Hysteresis level 1	H 4 5 1	Min. display pressure ≤ HYS1 < ST1		
Hysteresis- Window comparison output ⁰²⁾		Pressure detection low limit	Loÿ	Min. display pressure \leq LOW \leq Max. display pressure - (3 \times Min display interva		
output		Pressure detection high limit	ні Сн	Low + (3 × Min display interval) ≤ HIGH ≤ Max. display pressure		
			Pressure level 1	5E I	Min. display pressure \leq ST1 \leq Max. displa pressure - 1% of rated pressure	
Auto sensitivity	A11⊦o	Pressure level 2 ⁰³⁾	552	ST1 + 1% of rated pressure \leq ST2 \leq Max. display pressure		
setting		Pressure detection level	SEE	Auto setting SET= $\frac{(ST1+ST2)}{2}$ • Manual setting is possible by [♥] or [▲] key.		
Forced output control ⁰⁴⁾	F.oUE	-	-	 Manual ON/OFF for OUT1/2 is possible b [▼] or [▲] key. 		

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.
- 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		Dreast	Negative	Static		Compound
Operation mo	ae	Preset	0.1 kPa	0.1 kPa	1 kPa	0.1 kPa
		5E I	-50.0	50.0	500	50.0
Lhustorosis		H	0.0	0.0	0	-50.0
Hysteresis	H Y 5.ñ	552	-50.0	50.0	500	50.0
		H H S S	0.0	0.0	0	-50.0
		Lo-I	0.0	0.0	0	-50.0
Window	Πļυ	HI - I	-50.0	50.0	500	50.0
comparison output		Lo-2	0.0	0.0	0	-50.0
		ні - 2	-50.0	50.0	500	50.0
Hysteresis-		5E I	-50.0	50.0	500	50.0
Window		H	0.0	0.0	0	-50.0
comparison	НЧ- <u></u>	Loy	0.0	0.0	500	-50.0
output		н: Сн	-50.0	50.0	0	50.0
Auto		5E I	0.0	0.0	0	-50.0
sensitivity	AUto	552	-50.0	50.0	500	50.0
setting		565	-25.0	25.0	250	0.0
Forced output control	F.oUE	-	·			·

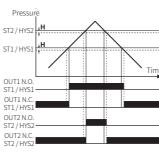
Output Operation Mode

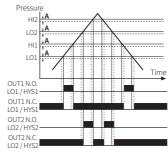
Change the output operation mode to change pressure detection method.

ON: OFF: H: Hysteresis A: Min display interval

Hysteresis

- directly. Setting: Pressure detection level (ST1,
- Window comparison output • Set the hysteresis for pressure detection • It detects pressure at the desired range. • Hysteresis is fixed as min. display interval.
- Setting: High limit (HI1, HI2), Low limit ST2), Hysteresis (HYS1, HYS2) (LO1, LO2)





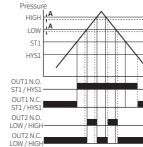
Auto sensitivity setting

• It is available both hysteresis mode and window comparison output mode operations.

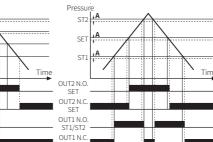
Hysteresis - Window

comparison output

 Setting: Pressure detection level (ST1), Hysteresis (HYS1), High limit (HIGH), Low • Hysteresis is fixed as min. display interval. limit (LOW)



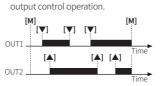




Forced output control

• 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



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 shift menu
- 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 $[\mathbf{\nabla}]$ + $[\mathbf{A}]$ 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			
			5 H.I N	D	Min. preset	setting $<$ SH.IN \leq	Max. preset setting	
		Auto-shift correction			Pressure	Setting range (after correction)	Setting range (preset range)	
Auto-	SHFE				Negavive	-101.3 to 5.0 kPa	-101.3 to 101.3 kPa	
shift	1 2 2				Static	-5.0 to 110.0 kPa	-110.0 to 110.0 kPa	
					Static	-50.0 to 1100 kPa	-1100 to 1100 kPa	
					Compound	-101.3 to 110.0 kPa	-101.3 to 110.0 kPa	

Precaution

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

Error	•			
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.		
Err∃	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 range.		
LLLL	When applied pressure exceeds low-limit of display pressure range.			
- HH -				
- L L -	Auto shift correction error.	Set the corrected setting value within setting pressure range.		
- HL -		Secting pressure range.		

