Autonics

DIGITAL PRESSURE SENSOR(Pneumatic type)

PSAN SERIES

M A N U A L

CE

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

1. **In case of using this unit with machinery(Ex: nuclear power control, medical equpment, 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.
2. **Do not use it in flammable gas because it does not have an explosion proof construction.**
   It may cause explosion.

⚠ Caution

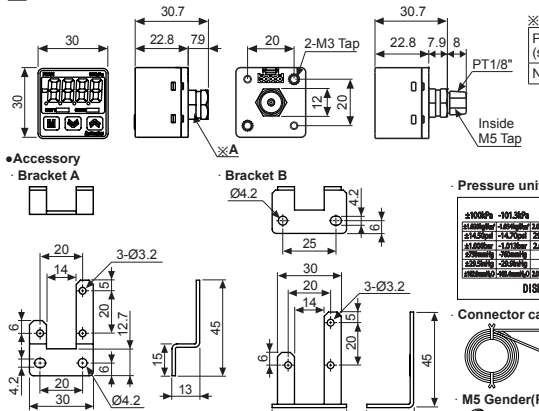
1. **This unit shall not be usde outdoors.**
   It might shorten the life cycle of the product or cause electric shock. This unit is proper indoor environmnet.
2. **Do not apply the pressure beyond rated pressure.**
   It may cause damage to this unit.
3. **Do not use it beyond power supply.**
   It may cause damage to this unit.
4. **Do not make a short circuit for the load.**
   It may cause damage to this unit.
5. **Do not wire incorrectly in power polarity etc.**
   It may cause damage to this unit.
6. **Do not use corrosive gas or liquid as it is only for non-corrosive gas.**
   It may cause damage to this unit.
7. **Do not supply power to its case or twist its case strongly.**
   It may cause damage to this unit.

■ Dimensions

(unit:mm)

※A

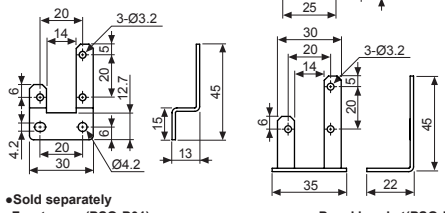
PT1/8"model (standard)	8
NPT1/8"model	



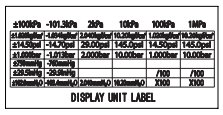
●Accessory

· Bracket A

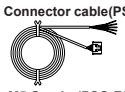
· Bracket B



· Pressure unit label



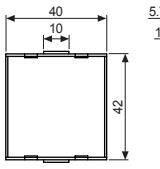
· Connector cable(PSO-C01, 2m)



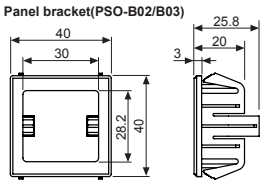
· M5 Gender(PSO-Z01)

●Sold separately

· Front cover(PSO-P01)



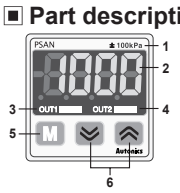
· Panel bracket(PSO-B02/B03)



● Panel cut-out

(panel thickness: 0.8 to 3.5mm)

■ Part descriptions



1. **Range of rating pressure:** It is possible to change the pressure unit in Pressure sensor. Please use different unit as label for your application.
2. **4digit LED display(Red):** Used to indicate measured pressure value, setting value and error message.
3. **Output1 indicator(Red):** Output 1 is ON, LED will be ON.
4. **Output2 indicator(Green):** Output 2 is ON, LED will be ON.
5. **M key:** Used to enter into Preset/Parameter setting mode and to save Setting mode.
6. **, key:** Used to set parameter and preset, peak value check mode, function setting or output operation mode.
   + key: Used for zero point adjustment function by pressing + keys over 1 sec. simultaneously in RUN mode.

■ Functions

◎ **Pressure unit change**
PSAN-V01C(P) and PSAN-C01C(P) has 7 kinds of pressure unit, PSAN-01C(P) and PSAN-1C(P) has 5 kinds of pressure unit. Please select the proper unit for application.
- PSAN-V01C(P), PSAN-C01C(P) : kPa, kgf/cm², bar, psi, mmHg, inHg, mmH₂O
- PSAN-01C(P), PSAN-1C(P) : MPa, kPa, kgf/cm², bar, psi

※ When using mmH₂O unit, please multiply display value by 100.

◎ **Output mode change**
There are 5 kinds of control output mode in order to realize the various pressure detection.
- Hysteresis mode [HYS.ñ] : When needed to change hysteresis for detecting pressure.
- Window comparison output mode [Ył n] : When needed to detect pressure in certain area.
- Hysteresis - Window comparison output mode [HY-Y] : When both hysteresis mode and window comparison output mode are required.
- Automatic sensitivity setting mode [AUto] : When needed to set detection sensitivity automatically at proper position.
- Forced output control mode [F.oUt] : When needed to display pressure with remaining comparison output OFF regardless of setting value.

◎ **Control output change**
Type of control output for Out1 and Out2 can be able to set Normally Open and Normally Closed.
※ Note that Normally Open and Normally Closed provide opposite output.

◎ **Response time change(chattering prevention)**
It can prevent chattering of control output by changing response time.
It is able to set 5kinds 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**
- 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 output is 1-5VDC within the pressure range from the pressure point[A-1u] for 1VDC to the pressure point [A-5u] for 5VDC.
- Analog current output scale setting: The scale for analog output Current (DC4-20mA) is not fixed to the rated pressure range. It can be changed for User's application. Analog output is 4-20mA within the pressure range from the pressure point [A-04] for 4mA to the pressure point [A-20] for 20mA.
- Hold/Auto Shift input setting
  - 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**
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.
- LoC 1: All keys are locked; therefore it is not available to change parameter settings, preset value, zero adjustment, High/Low peak check and SHI n 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.
- oFF: All of the setting is available, all keys are unlocked.

◎ **Zero point adjustment**
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.(Press + keys over 1 sec. in RUN mode.)

◎ **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

Display	Description	Countermeasures
Err 1	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 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.	
-HH-, -LL-, -HL-	Auto shift correction error.	Set the corrected setting value within setting pressure range.

※The above specifications are subject to change and some models may be discontinued without notice.

■ Specifications

Pressure type		Gauge pressure			
		Negative pressure	Standard pressure		Compound pressure
Model※1	Voltage output	PSAN-V01C(P)V-□	PSAN-01C(P)V-□	PSAN-1C(P)V-□	PSAN-C01C(P)V-□
	Current output	PSAN-V01C(P)A-□	PSAN-01C(P)A-□	PSAN-1C(P)A-□	PSAN-C01C(P)A-□
	Hold/Auto shift input	PSAN-V01C(P)H-□	PSAN-01C(P)H-□	PSAN-1C(P)H-□	PSAN-C01C(P)H-□
Rated pressure range		0.0 to -101.3kPa	0.0 to 100.0kPa	0 to 1,000kPa	-101.3kPa to 100.0kPa
Display pressure range		5.0 to -101.3kPa	-5.0 to 110.0kPa	-101.3 to 1,100kPa	-101.3kPa to 110.0kPa
Min.display unit		0.1kPa	0.1kPa	1kPa	0.1kPa
Max. pressure range		2 times of rated pressure	2 times of rated pressure	1.5 times of rated pressure	2 times of rated pressure
Applied 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		NPN or PNP open collector output • Load voltage: Max. 30VDC • Load current: Max. 100mA • Residual voltage - NPN: Max. 1V, PNP: Max. 2V			
	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	• Output voltage: 1-5VDC ±2% F.S. • Linear: Max. ±1% F.S. • Output impedance: 1kΩ • Zero point: Max. 1VDC ±2% F.S. • Span: Max. 4VDC ±2% F.S. • Response time: 50ms • Resolution: Automatically changed to 1/1000 or 1/2000 by pressure unit			
	Current output	• Output current: DC4-20mA ±2% • Linear: Max. ±1% F.S. • Zero-point: Max. DC4mA ±2% F.S. • Span: Max. DC16mA ±2% F.S. • Response time:70ms • Resolution: Automatically changed to 1/1000 or 1/2000 by pressure unit			
Display method		7segment LED Display			

Min. Display interval※4 (Pressure unit \ Resolution)	1000	2000	1000	2000	1000	2000	1000	2000
MPa	–	–	0.001	–	0.001	–	–	–
kPa	0.1	–	0.1	–	1	–	–	0.1
kgf/cm²	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
mmH₂O	0.1	–					–	0.1

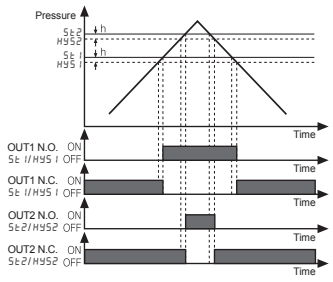
Display accuracy		0°C to 50°C : Max. ±0.5% F.S., -10 to 0°C : Max. ±1% F.S.			
Dielectric strength		1000VAC 50/60Hz for 1 minute			
Insulation resistance		Min. 50MΩ(at 500VDC megger)			
Vibration		1.5mm amplitude at frequency of 10 to 55Hz(for 1 min.) in each of X, Y, Z direction for 2 hours			
Environment	Ambient temp.	-10 to 50°C, storage : -20 to 60°C			
	Ambient humi.	30 to 80%RH, storage :30 to 80%RH			
Protection		IP40(IEC specification)			
Material		Front case: PC, Rear case: PC, Pressure port: Nickel Plated Brass			
Cable		Connector cable (Ø4mm, 5-wire, Length: 2m) (AWG24, Core diameter : 0.08mm, Number of cores : 40, Insulator out diameter: Ø1mm)			
Approval		CE			
Weight※5		Approx. 165g(approx. 80g)			

※1: (P) is PNP output type, □ of model name is as pressure port. Rc1/8: PT1/8"model(standard), NPT1/8: NPT1/8"model(option), R1/8: PT1/8"model(Option)
※2: In hysteresis output mode, detection difference is variable.
※3: It is allowed to select one analog output type only.
※4: Resolution(1000/2000) of min. Display interval is automatically selected depend on pressure units.
※5: This weight is with packaging and the weight in parentheses is only unit weight.
※F.S.: Rated pressure.
※There may be ±1digit error in hysteresis by pressure unit calculation error.
※Environment resistance is rated at no freezing or condensation.

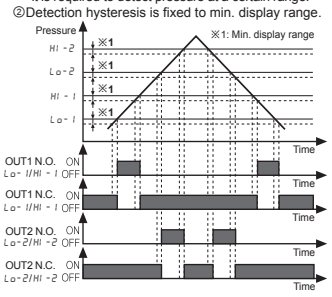
■ Output operation mode

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

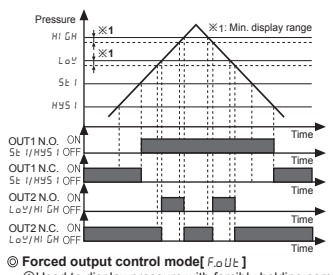
◎ **Hysteresis mode[HYS.ñ]**
It is able to set certain value for pressure detection level[St 1, St2] and hysteresis[HYS 1, HYS2].



◎ **Window comparison output mode[Ył n]**
①It 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.
②Detection hysteresis is fixed to min. display range.

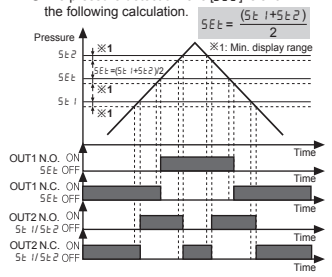


◎ **Hysteresis-window comparison output mode[HY-Y]**
①It is available to set hysteresis mode[St 1, HYS 1] and window comparison output mode when both hysteresis mode and window comparison output mode[LoY, HI GH] are necessary.
②Detection hysteresis is fixed to min. display range.

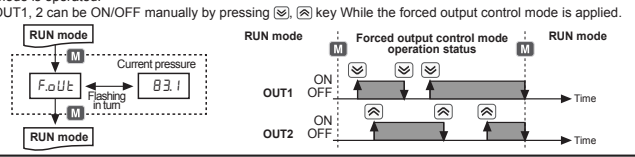


◎ **Automatic sensitivity setting mode[AUto]**
①This function is to set pressure detection level to the proper position automatically. It is set by applied pressure from two positions[St 1, St2].
②Detection hysteresis is fixed to min. display range.
③The pressure detection level[SEt] is shown in the following calculation.

$$SEt = \frac{(St\,1 + St2)}{2}$$



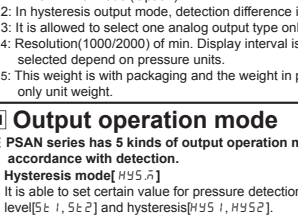
◎ **Forced output control mode[F.oUt]**
①Used to display pressure with forcibly holding comparing output OFF regardless of setting value.
②In parameter setting, if output operation mode setting[oUtP] is changed to [F.oUt] , forced output control mode is operated.
③OUT1, 2 can be ON/OFF manually by pressing , key While the forced output control mode is applied.



■ Input/Output circuit and diagram

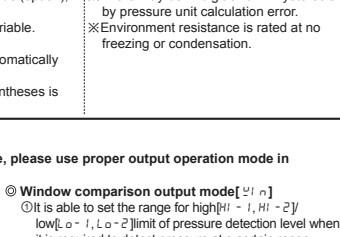
◎ **Analog output type (Voltage output PSAN-□□□□V-□, Current output PSAN-□□□□A-□)**

● NPN open collector output type



※ : For voltage output type only.

● PNP open collector output type



※ : For voltage output type only.

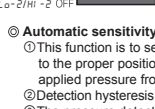
◎ **Hold / Auto Shift input type (PSAN-□□□□H-□)**

● NPN open collector output type

● PNP open collector output type

■ Installation

1.Pressure port is divided as basic and option specification. Therefore, be sure that to use commercially available one touch fitting. (Standard: Rc1/8", Option: NPT1/8", R1/8")
2.Please connect it by using spanner(12mm) at the metal part in order not to overload on the body when connecting one touch fitting.
3.Two different fixing brackets are provided for PSAN model. Select proper one with considering your application environments.
4.At first, please unscrew hexagon wrench bolt and assemble the bracket on this unit by fixing hexagon the wrenchbolt. In this case, tightening torque of hexagon wrench should be max. 30kgf·cm. It may cause mechanical problems.



⚠Caution
The tightening torque of one touch fitting should be max. 100kgf·cm. It may cause machanical problems.

5.Panel bracket(PSO-B02) and front protection cover(PSO-P01) are optional to sell.
Please see the figure for installation.

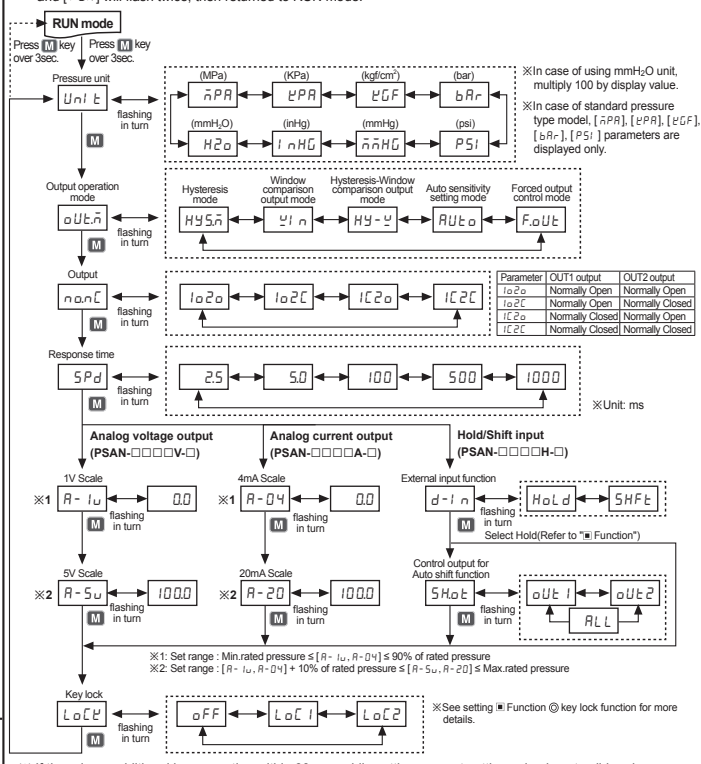
■ Setting

RUN mode

- Press M key over 3sec. → **Parameter setting**: Pressure unit setting ▸ Output operation mode setting ▸ Output type setting ▸ Response time setting ▸ Analog output scale and Hold/Auto Shift input setting ▸ Key lock setting
- Press M key → **Preset value setting**: Detection level 1 setting (out1) ▸ Detection level 2 setting (out2)
- Press M key → **Forced output control mode setting**: The forced output control mode is applied with pressign M key after selecting forced output control mode[F.oUt] in output operation mode[oUtP] parameter. For more detailed information, refer to "• Forced output control mode" / "■ Output operation mode"
- Press M key over 3sec. → **Peak hold**: High peak value check ▸ Low peak value check ▸ Auto shift input setting (In case of Hold/Auto shift input type model)
- Press +keys over 1sec. → **Zero-point adjustment**: Zero-point adjustment

■ Parameter setting

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

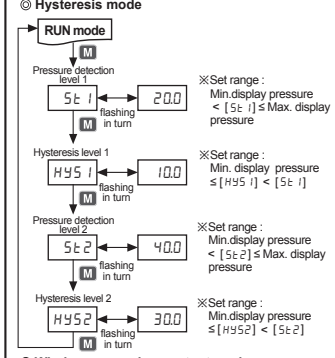


※ If there is no additional key operation within 60 sec. while setting, current setting value is not valid and previous setting value will be remained.

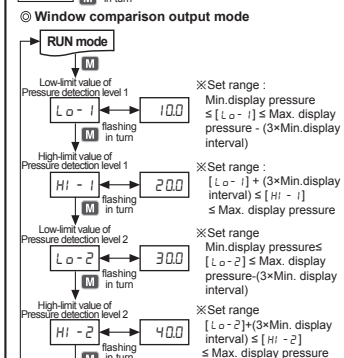
■ Preset Setting

※ [rUn] flashes twice when returning to RUN mode.
※ Press , key to change setting values.
※ Press M key to save setting value in each parameter and move to next parameters.

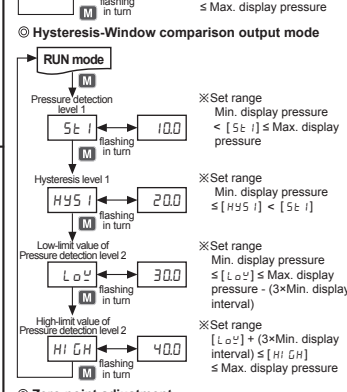
◎ **Hysteresis mode**



◎ **Window comparison output mode**

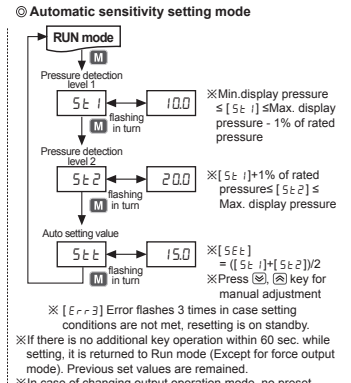


◎ **Hysteresis-Window comparison output mode**



◎ **Zero point adjustment**
1.Please press + 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 will display 0.0 and return to RUN mode automatically.
※If executing zero point adjustment on external pressure being at pressure port [Err 1] flashes 5 times. Please execute it in the atmospheric pressure after removing external pressure.
※Please execute zero point adjustment regularly.

◎ **Automatic sensitivity setting mode**



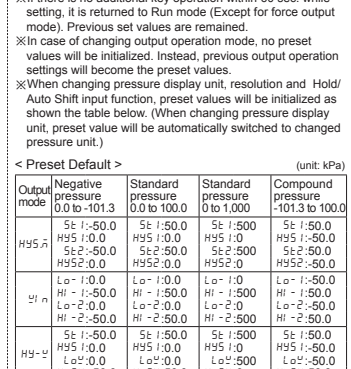
※ [Err3] Error flashes 3 times in case setting conditions are not met, resetting is on standby.
※If there is no additional key operation within 60 sec. while setting, it is returned to Run mode (Except for force output mode). Previous set values are remained.
※In case of changing output operation mode, no preset values will be initialized. Instead, previous output operation settings will become the preset values.
※When changing pressure display unit, resolution and Hold/Auto Shift input function, preset values will be initialized as shown the table below. (When changing pressure display unit, preset value will be automatically switched to changed pressure unit.)

< Preset Default > (unit: kPa)

Output mode	Negative pressure 0.0 to -101.3	Standard pressure 0.0 to 100.0	Standard pressure 0 to 1,000	Compound pressure -101.3 to 100.0
HYS.ñ	St 1:-50.0 HYS 1:0.0 St2:-50.0 HYS2:0.0	St 1:50.0 HYS 1:0.0 St2:50.0 HYS2:0.0	St 1:500 HYS 1:0 St2:500 HYS2:0	St 1:50.0 HYS 1:-50.0 St2:50.0 HYS2:-50.0
Ył n	Lo- 1:0.0 HI - 1:-50.0 Lo-2:0.0 HI -2:-50.0	Lo- 1:0.0 HI - 1:50.0 Lo-2:0.0 HI -2:50.0	Lo- 1:0 HI - 1:500 Lo-2:0 HI -2:500	Lo- 1:-50.0 HI - 1:50.0 Lo-2:-50.0 HI -2:50.0
HY-Y	St 1:-50.0 HYS 1:0.0 LoY:0.0 HI GH:-50.0	St 1:50.0 HYS 1:0.0 LoY:0.0 HI GH:50.0	St 1:500 HYS 1:0 LoY:500 HI GH:0	St 1:50.0 HYS 1:-50.0 LoY:-50.0 HI GH:50.0
AUto	St 1:0.0 St2:-50.0 SEt:-25.0	St 1:0.0 St2:50.0 SEt:25.0	St 1:0 St2:500 SEt:250	St 1:-50.0 St2:50.0 SEt:0.0

※When using the forced output function, Hold/Auto shift function is not available to use in Hold/Auto shift mode.

◎ **Peak Hold / Auto Shift Check/Change**

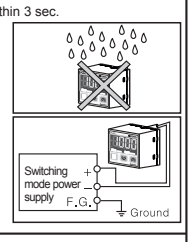


※1: PSAN-□□□□H-□ Displayed only when d-In is set to SHFt. Auto shift reference pressure can be set within display error range.
(Low_Range ≤ SHI n ≤ High_Range)
- Low_Range = Min.display pressure - Min. preset setting value
- High_Range = Max.display pressure - Max. preset setting value

※If pressing + keys for over 1sec. in case of High peak / Low peak/ Auto shift reference pressure value, setting value will be erase and return to next operation.
※ [rUn] flashes twice, then return to RUN mode.

■ Caution for using

1. Do not insert any sharp or pointed object into pressure port. It may cause malfunction and damage the sensor.
2. Be sure that this unit must avoid direct touch with water, oil, thinner etc.
3. It is ready to operate 3 sec. after it is turned ON. Be sure not to use the product within 3 sec.
4. When using switching mode power supply, frame ground (F.G.) terminal of power supply should be grounded.
5. To avoid inductive noise, keep the wiring away from power line, high voltage line. It may cause malfunction.
6. When moving this unit from warm place to cold place, please remove the humidity on the cover then use it.
7. Do not press the setting button with sharp or pointed object.
8. Do not apply a tensile strength in excess of 30N to the cables or connector.
9. When using mmH₂O unit, please multiply display value by 100.
10. Installation environment
    ① It shall be used indoor. ② Altitude Max. 2,000m
    ③ Pollution Degree 2 ④ Installation Category II



※It may cause malfunction if above instructions are not followed.

■ Major products

■ Photoelectric Sensors
■ Fiber Optic Sensors
■ Door Sensors
■ Door Side Sensors
■ Area Sensors
■ Proximity Sensors
■ Pressure Sensors
■ Rotary Encoders
■ Connector/Sockets
■ Graphic/Logic Panels
■ Field Network Devices
■ Control Switches/Lamps/Buzzers
■ Switching Mode Power Supplies
■ Laser Marking System(Fiber, CO₂, Nd:YAG)
■ Laser Welding/Cutting System
■ Temperature Controllers
■ Temperature/Humidity Transducers
■ SSR/Power Controllers
■ Counters
■ Timers
■ Panel Meters
■ Tachometer/Pulse(Rate) Meters
■ Display Units
■ Sensor Controllers
■ I/O Terminal Blocks & Cables
■ Stepper Motors/Drivers/Motion Controllers

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