DRW171186AB

Autonics

Digital Pressure Sensor (fluid type)

PSAN Series

INSTRUCTION MANUAL

Connector type　　Cable type

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

■ Safety Considerations

※Please observe all safety considerations for safe and proper product operation to avoid hazards.
※⚠ symbol represents caution due to special circumstances in which hazards may occur.

⚠ **Warning** Failure to follow these instructions may result in serious injury or death.
⚠ **Caution** Failure to follow these instructions may result in personal injury or product damage.

⚠ Warning

1. **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, fire or economic loss.
2. **Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.**
   Failure to follow this instruction may result in explosion or fire.
3. **Install on a device panel or to a pressure port directly to use.**
   Failure to follow this instruction may result in fire.
4. **Do not connect, repair, or inspect the unit while connected to a power source.**
   Failure to follow this instruction may result in fire.
5. **Check 'Connections' before wiring.**
   Failure to follow this instruction may result in fire.
6. **Do not disassemble or modify the unit.**
   Failure to follow this instruction may result in fire.

⚠ Caution

1. **Use the unit within the rated specifications.**
   Failure to follow this instruction may result in fire or product damage.
2. **Use dry cloth to clean the unit, and do not use water or organic solvent.**
   Failure to follow this instruction may result in fire.
3. **This product is designed to detect the pressure of noncorrosive gas/liquid. Do not use for corrosive gas/liquid.**
   Failure to follow this instruction may result in product damage.
4. **Keep metal chip, dust, and wire residue from flowing into the unit.**
   Failure to follow this instruction may result in fire or product damage.

■ Dimensions

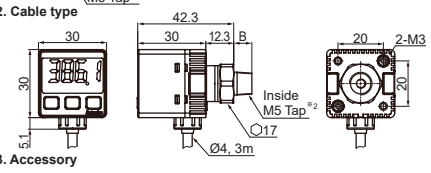
(unit: mm)

1. Connector type

※A	
R1/8 model (standard)	8
NPT1/8 model	8
7/16-20UNF model	11

※1: Only for R1/8 model, NPT1/8 model

2. Cable type

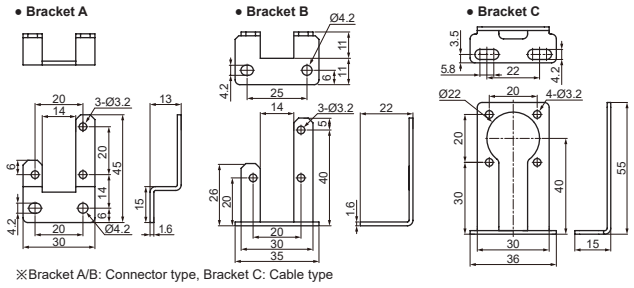


※B	
R1/8 model (standard)	8
9/16-18UNF model (metal gasket sealing method)	15.4

※2: Only for R1/8 model

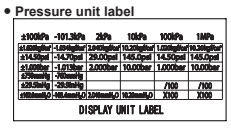
3. Accessory

● Bracket A　● Bracket B　● Bracket C

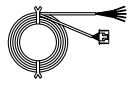


※Bracket A/B: Connector type, Bracket C: Cable type

● Pressure unit label



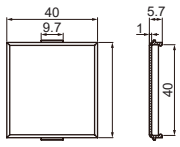
● Cable for Connector type(PSO-C01)



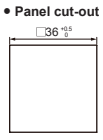
※Ø4mm, 5-wire, 2m (AWG24, core diameter: 0.08mm, number of cores: 40, insulator diameter: Ø1mm)

4. Sold separately

● Front cover(PSO-P01)

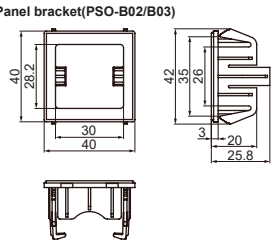


● Panel cut-out



(panel thickness: 0.8 to 3.5mm)

● Panel bracket(PSO-B02/B03)



※PSO-B02(white): Connector type
PSO-B03(black): Cable type

■ Functions

◎ **Pressure unit change**
PSAN-LV01C(P) and PSAN-LC01C(P) has 7 kinds of pressure unit, PSAN-L01C(P) and PSAN-L1C(P) has 5 kinds of pressure unit. Please select the proper unit for application.
- PSAN-LV01C(P), PSAN-LC01C(P) : kPa, kgf/cm², bar, psi, mmHg, inHg, mmH₂O
- PSAN-L01C(P), PSAN-L1C(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 [HYSn]: When needed to change hysteresis for detecting pressure.
- Window comparison output mode [Yin]: 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 [FoUt]: When needed to display pressure with remaining comparison output OFF regardless of set 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 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**
- 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: A function to hold PV and Control output while signal is input.
  - Auto Shift: A function to compensate the set 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**
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	Troubleshooting
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 set 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 set value within setting pressure range.

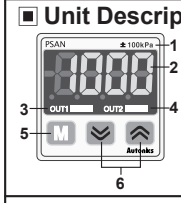
※The above specifications are subject to change and some models may be discontinued without notice.
※Be sure to follow cautions written in the instruction manual and the technical descriptions (catalog, homepage).

■ Specifications

Pressure type			Sealed gauge pressure※6(In case of 100.0kPa/Standard pressure is gauge pressure.)				
			Negative pressure	Standard pressure		Compound pressure	
Model※1	Voltage output	Connector	PSAN-LV01C(P)V-□	PSAN-L01C(P)V-□	PSAN-L1C(P)V-□	PSAN-LC01C(P)V-□	
		Cable	—	—	PSAN-B1(P)V-□	PSAN-BC01(P)V-□	
	Current output	Connector	PSAN-LV01C(P)A-□	PSAN-L01C(P)A-□	PSAN-L1C(P)A-□	PSAN-LC01C(P)A-□	
	Hold/Auto shift input	Connector	PSAN-LV01C(P)H-□	PSAN-L01C(P)H-□	PSAN-L1C(P)H-□	PSAN-LC01C(P)H-□	
		Cable	—	—	PSAN-B1(P)H-□	PSAN-BC01(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				
Applied fluid			Air, Non-corrosive gas and fluid that will not corrode SUS316L				
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. 1VDC⎓, PNP: Max. 2VDC				
	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			Over 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			Connector type: IP40(IEC standards), Cable type: IP65 (IEC standards)							
Material			Front case: PC, Rear case: PA6, Pressure port: SUS316L							
Cable			Connector cable (Ø4, 5-wire, Length: 2m) (AWG24, Core diameter : 0.08mm, Number of cores : 40, Insulator out diameter: Ø1mm)							
Approval			CE							
Weight※5			Connector type: Approx. 173g (approx. 88g), Cable type: Approx. 167g (approx. 90g)							

※1: (P) is PNP output type, □ of model name is as pressure port.
Standard: R1/8, option: NPT1/8, 9/16-18UNF(cable type), 7/16-20UNF(connector type).
※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 by pressure units.
※5: This weight is with packaging and the weight in parentheses is only unit weight.
※6: The unit is sealed structure. It is based on atmospheric pressure 101.3kPa.
※F.S.: Rated pressure.
※There may be ±1digit error in hysteresis by pressure unit calculation error.
※For using mmH₂O unit, multiply display value by 100.
※Environment resistance is rated at no freezing or condensation.

■ Unit Descriptions

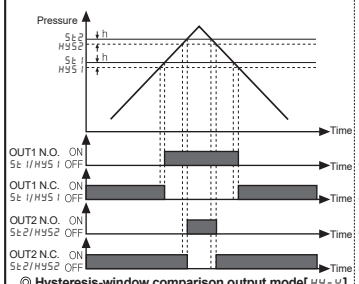


1. **Range of rated pressure:** It is possible to change the pressure unit in Pressure sensor. Please use different unit as label for your application.
2. **4digit LED display(Red):** Used to indicate measured pressure value, set value and error message.
3. **Output1 indicator(Red):** Output 1 is ON, 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.

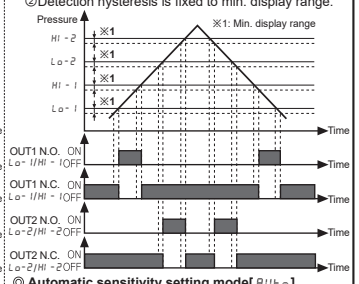
■ Output Operation Mode

※ **PSAN Series has 5 kinds of output operation mode. Use the proper output operation mode by the detection.**

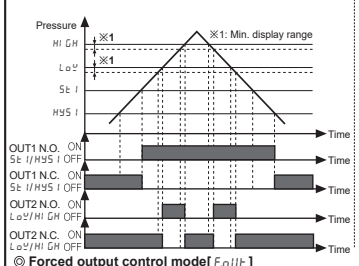
◎ **Hysteresis mode[HYSn]**
It is able to set certain value for pressure detection level [St 1, St2] and hysteresis [HYS 1, HYS2].



◎ **Window comparison output mode[Yin]**
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.

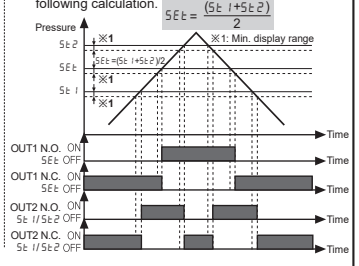


◎ **Hysteresis-window comparison output mode[HY-Y]**
①It is available to set hysteresis mode [St 1, HYS 1] and window comparison output mode when both hysteresis mode and window comparison output mode [LoY, HI GH] are necessary.
②Detection hysteresis is fixed to min. display range.

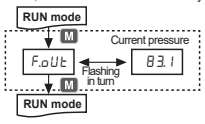


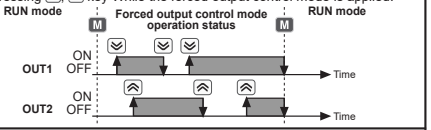
◎ **Automatic sensitivity setting mode[AUto]**
①This function is to set pressure detection level to the proper position automatically. It is set by applied pressure from two positions[St 1, St2].
②Detection hysteresis is fixed to min. display range.
③The pressure detection level(SEt) is shown in the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

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



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

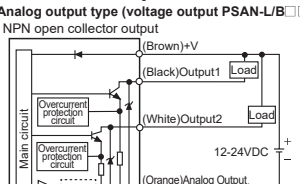




■ Control Output and Connection Diagram

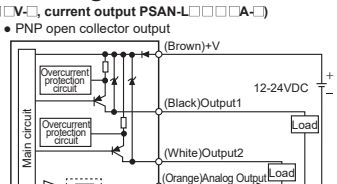
◎ **Analog output type (voltage output PSAN-L/B□□□□V-□, current output PSAN-L□□□□A-□)**

● NPN open collector output



※ ⋯⋯: Only for voltage output type.

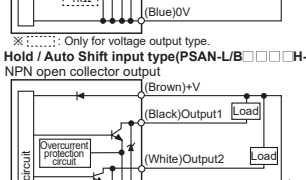
● PNP open collector output



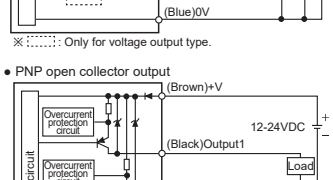
※ ⋯⋯: Only for voltage output type.

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

● NPN open collector output



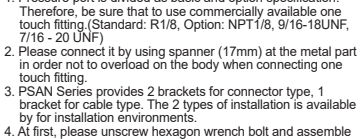
● PNP open collector output

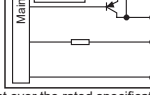


※If short-circuit the control output terminal or supply current over the rated specification, control signal is abnormal due to the current protection circuit

■ Installation

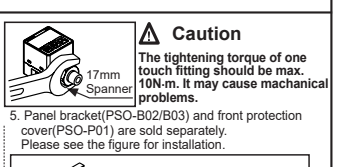
1. Pressure port is divided as basic and option specification. Therefore, be sure that to use commercially available one touch fitting.(Standard: R1/8, Option: NPT1/8, 9/16-18UNF, 7/16 - 20 UNF)
2. Please connect it by using spanner (17mm) at the metal part in order not to overload on the body when connecting one touch fitting.
3. PSAN Series provides 2 brackets for connector type, 1 bracket for cable type. The 2 types of installation is available by for installation environments.
4. At first, please unscrew hexagon wrench bolt and assemble the bracket on this unit by fixing hexagon the wrench bolt. **In this case, tightening torque of hexagon wrench should be max. 3N·m. It may cause mechanical problems.**





⚠ **Caution**
The tightening torque of one touch fitting should be max. 10N·m. It may cause machanical problems.

5. Panel bracket(PSO-B02/B03) and front protection cover(PSO-P01) are sold separately. Please see the figure for installation.



6. Do not pull the cable with a tensile strength of 30N or over.

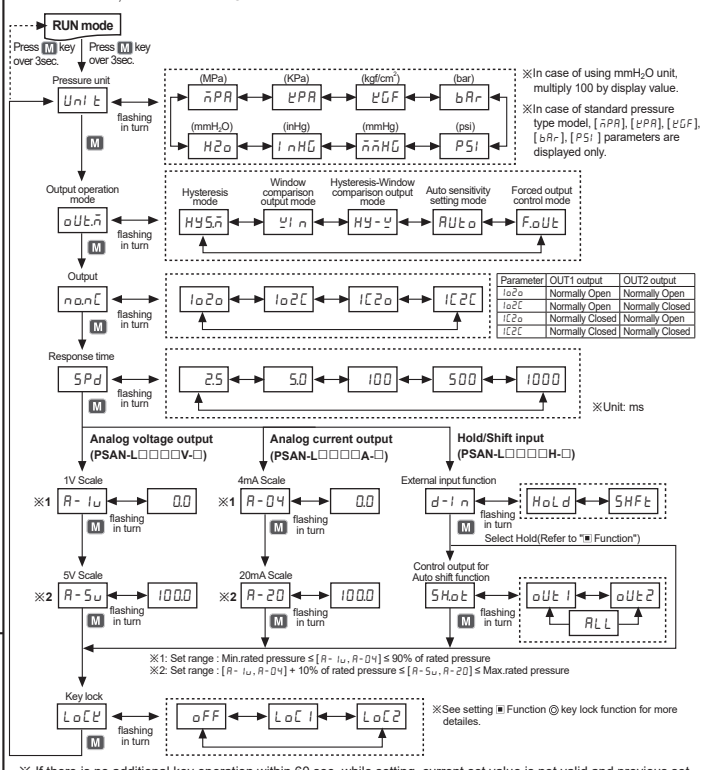
■ Setting

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)
	Forced output control mode setting	The forced output control mode is applied with pressign M key after selecting forced output control mode [FoUt] in output operation mode [oUtn] 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 set values.
※ Press M key to save set value in each parameter and move to next parameters.
※ When pressing M key for 3 sec in the middle of parameter setting, current set value will be saved and [rUn] will flash twice, then returned to RUN mode.

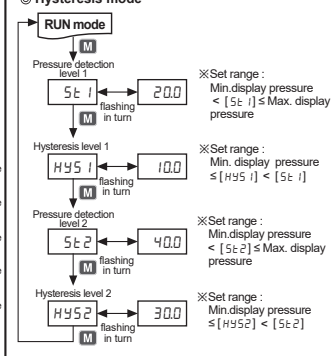


※ If there is no additional key operation within 60 sec. while setting, current set value is not valid and previous set value will be remained.

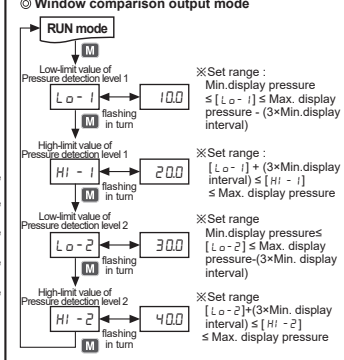
■ Preset Setting

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

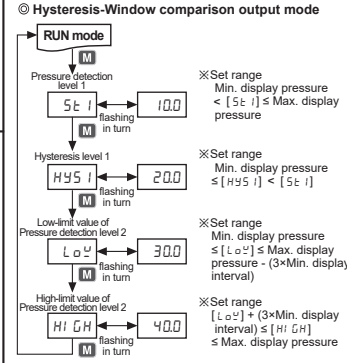
◎ **Hysteresis mode**



◎ **Window comparison output mode**



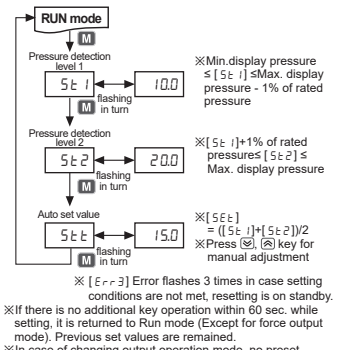
◎ **Hysteresis-Window comparison output mode**



◎ **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**



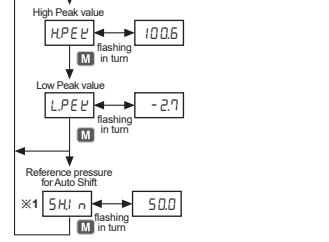
※ [Err 3] Error flashes 3 times in case setting conditions are not met, resetting is on standby.
※If there is no additional key operation within 60 sec. while setting, it is returned to Run mode (Except for force output mode). Previous set values are remained.
※In case of changing output operation mode, 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
HYSn	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
Yin	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-L□□□□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 set value
- High_Range = Max.display pressure - Max. preset set value

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

■ Cautions during Use

1. Follow instructions in 'Cautions during Use'. Otherwise, It may cause unexpected accidents.
2. 12-24VDC power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
3. Use the product, 3 sec after supplying power.
4. When using switching mode power supply, frame ground (F.G.) terminal of power supply should be grounded.
5. Wire as short as possible and keep away from high voltage lines or power lines, to prevent inductive noise.
6. This unit may be used in the following environments.
   ①Indoors (in the environment condition rated in 'Specifications')
   ②Altitude max. 2,000m
   ③Pollution degree 3
   ④Installation category II

■ 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, CO_2, 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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