

Display Type Pressure Sensors

PSAN Series

INSTRUCTION MANUAL

TCD210185AB

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.)

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.
- 12 - 24 VDC≐ 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 - ① ② ③ ④ ⑤ - ⑥

① 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

④ Control output

No mark: NPN open collector output
P: PNP open collector output

⑤ Option input / output

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

② Pressure type and Range

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

③ Wiring

No mark: Cable type (fluid type)

C: Connector type

③ Pressure port

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

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)

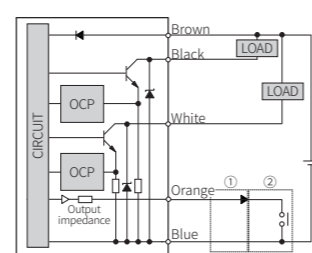
Unit Descriptions

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

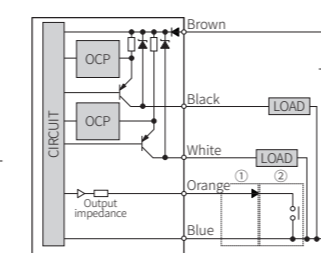
Connections

Color	Function
Brown	+V
Blue	0V
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 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

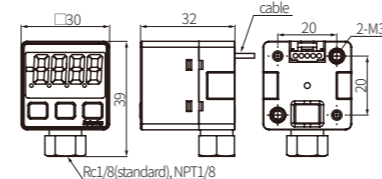
• Unit: mm, For the detailed drawings, follow the Autonics website.

■ Pneumatic type, back port, connector type

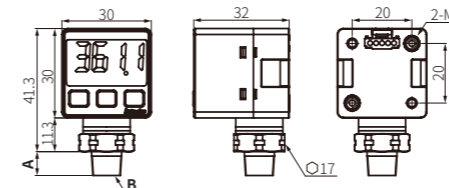


Port	A	B
Rc1/8 (standard)	0	-
NPT1/8	0	Inner M5 tap
R1/8	8	-

■ Pneumatic type, bottom port, connector type

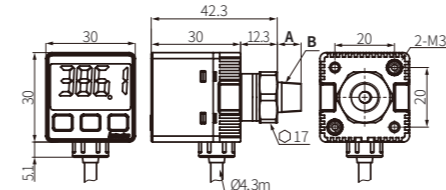


■ Fluid type, bottom port, connector type



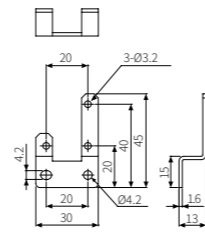
Port	A	B
R1/8 (standard)	8	Inner M5 tap
NPT1/8	11	-
7/16-20UNF	11	-

■ Fluid type, back port, cable type

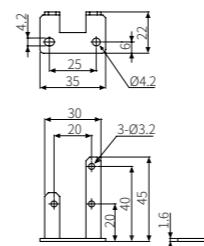


Port	A	B
R1/8 (standard)	8	Inner M5 tap
9/16-18UNF	15.4	-

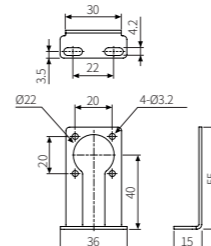
■ Bracket A



■ Bracket B

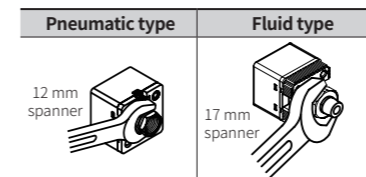


■ Bracket C



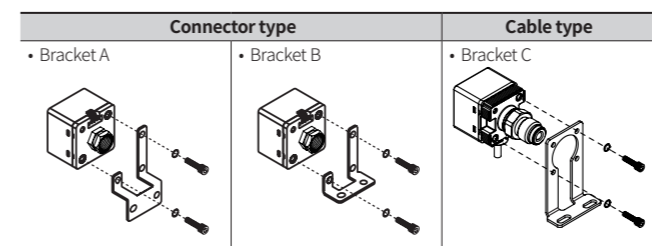
Installation

■ One-touch fitting



■ Bracket

Use spring washers and hexagon wrench bolts (tightening torque: ≤ 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.

Specifications

Model	PSAN-□V01C□□□□□	PSAN-□01C□□□□□	PSAN-□1□□□□□□□	PSAN-□C01□□□□□
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 ×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)
Approval	CE [EHL]	
Unit weight (packaged)	Back port: ≈ 80 g (≈ 165 g) Bottom port: ≈ 85 g (≈ 170 g)	Connector type: ≈ 88 g (≈ 173 g) Cable type: ≈ 90 g (≈ 167 g)

Power supply	12 - 24 VDC≐ (ripple P-P: ≤ 10%)
Allowable voltage range	90 to 110% of rated voltage
Current consumption	≤ 50 mA ⁰¹⁾
Control output	NPN open collector output / PNP open collector output model
Load voltage	≤ 30 VDC≐
Load current	≤ 100 mA
Residual voltage	NPN: ≤ 1 VDC≐, PNP: ≤ 2 VDC≐
Hysteresis	According to output operation mode ⁰²⁾
Repeat error	±0.2% F.S. ± min display interval
Response time	2.5, 5, 100, 500, 1000 ms
Protection circuit	Output short over-current protection circuit
Insulation resistance	≥ 50 MΩ (500 VDC≐ megger)
Dielectric strength	1,000 VAC~ 50 / 60 Hz for 1 min
Vibration	1.5 mm amplitude at frequency of 10 to 55Hz (for 1 min) 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: ≤ 75 mA

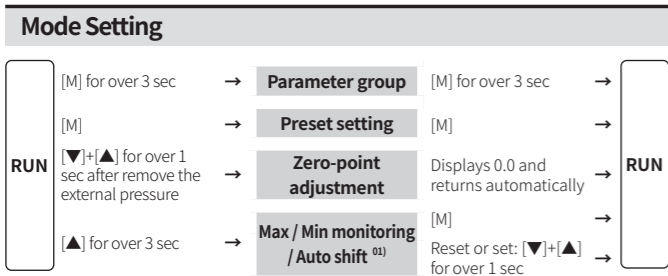
02) Refer to 'Output operation mode'. ±1digit error may occur due to pressure unit operation.

Analog output	Voltage (1 - 5 VDC≐ ±2% F.S)	Current (DC 4 - 20mA ±2% F.S)
Output impedance	1 kΩ	-
Linearity	≤ ±1% F.S	≤ ±1% F.S
Zero-point	≤ 1 VDC≐ ±2% F.S.	≤ DC 4 mA ±2% F.S.
Span	≤ 4 VDC≐ ±2% F.S.	≤ DC 16 mA ±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			
Resolution Display unit	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.



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	MPa	[Negative / Compound pressure model] kPa, KG/C: kgf/cm ² , bar, psi, mmHg, inHg, H ₂ O: mmH ₂ O [Static pressure model] MPa, kPa, KG/C: kgf/cm ² , bar, psi															
P-2	OUT operation mode	OFF	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	IO20	<table border="1"> <thead> <tr> <th></th> <th>OUT1</th> <th>OUT2</th> </tr> </thead> <tbody> <tr> <td>IO20</td> <td>Normally open</td> <td>Normally open</td> </tr> <tr> <td>IO2C</td> <td>Normally closed</td> <td>Normally open</td> </tr> <tr> <td>IC20</td> <td>Normally closed</td> <td>Normally open</td> </tr> <tr> <td>IC2C</td> <td>Normally closed</td> <td>Normally closed</td> </tr> </tbody> </table>		OUT1	OUT2	IO20	Normally open	Normally open	IO2C	Normally closed	Normally open	IC20	Normally closed	Normally open	IC2C	Normally closed	Normally closed
	OUT1	OUT2																
IO20	Normally open	Normally open																
IO2C	Normally closed	Normally open																
IC20	Normally closed	Normally open																
IC2C	Normally closed	Normally closed																
P-4	Response time	2.5	2.5, 5.0, 100, 500, 1,000 ms															
P-5	Voltage low limit scale	0.0	[Option voltage output model] Min. rated pressure ≤ Low limit scale ≤ 90% of rated pressure															
P-6	Voltage high limit scale	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	0.0	[Option current output model] Min. rated pressure ≤ Low limit scale ≤ 90% of rated pressure															
P-8	Current high limit scale	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	HOLD	[Option external input model] HOLD: Hold SHFT: Auto shift															
P-10	Auto shift output ⁰¹⁾	OFF	[Option external input model] OUT1, OUT2, ALL															
P-11	Lock	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 [▼] or [▲] 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
Hysteresis	Pressure detection level 1	ST1 Min. display pressure < ST1 ≤ Max. display pressure
	Hysteresis level 1	HYS1 Min. display pressure ≤ HYS1 < ST1
	Pressure detection level 2	ST2 Min. display pressure < ST2 ≤ Max. display pressure
	Hysteresis level 2	HYS2 Min. display pressure ≤ HYS2 < ST2
Window comparison output ⁰¹⁾	Pressure detection low limit 1	LO-1 Min. display pressure ≤ LO-1 ≤ Max. display pressure - (3 × Min display interval)
	Pressure detection high limit 1	HI-1 LO-1 + (3 × Min display interval) ≤ HI-1 ≤ Max. display pressure
	Pressure detection low limit 2	LO-2 Min. display pressure ≤ LO-2 ≤ Max. display pressure - (3 × Min display interval)
	Pressure detection high limit 2	HI-2 LO-2 + (3 × Min display interval) ≤ HI-2 ≤ Max. display pressure
Hysteresis-Window comparison output ⁰²⁾	Pressure detection level 1	ST1 Min. display pressure < ST1 ≤ Max. display pressure
	Hysteresis level 1	HYS1 Min. display pressure ≤ HYS1 < ST1
	Pressure detection low limit	LO Min. display pressure ≤ LO ≤ Max. display pressure - (3 × Min display interval)
	Pressure detection high limit	HI LO + (3 × Min display interval) ≤ HI ≤ Max. display pressure
Auto sensitivity setting	Pressure level 1	ST1 Min. display pressure ≤ ST1 ≤ Max. display pressure - 1% of rated pressure
	Pressure level 2 ⁰³⁾	ST2 ST1 + 1% of rated pressure ≤ ST2 ≤ Max. display pressure
	Pressure detection level	Auto setting SET = (ST1+ST2)/2 • Manual setting is possible by [▼] or [▲] key.
Forced output control ⁰⁴⁾	F.O	-

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	Preset	Negative	Static	Compound	
		0.1 kPa	0.1 kPa	1 kPa	0.1 kPa
Hysteresis	ST1	-50.0	50.0	500	50.0
	HYS1	0.0	0.0	0	-50.0
	ST2	-50.0	50.0	500	50.0
	HYS2	0.0	0.0	0	-50.0
Window comparison output	LO-1	0.0	0.0	0	-50.0
	HI-1	-50.0	50.0	500	50.0
	LO-2	0.0	0.0	0	-50.0
	HI-2	-50.0	50.0	500	50.0
Hysteresis-Window comparison output	ST1	-50.0	50.0	500	50.0
	HYS1	0.0	0.0	0	-50.0
	LO	0.0	0.0	500	-50.0
	HI	-50.0	50.0	0	50.0
Auto sensitivity setting	ST1	0.0	0.0	0	-50.0
	ST2	-50.0	50.0	500	50.0
	SET	-25.0	25.0	250	0.0
Forced output control	F.O	-	-	-	-

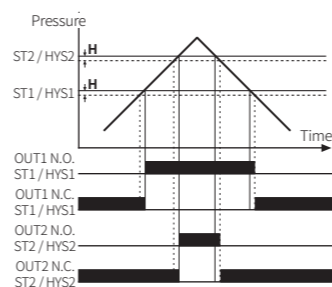
Output Operation Mode

Change the output operation mode to change pressure detection method.

ON: [M] OFF: [M] H: Hysteresis A: Min display interval

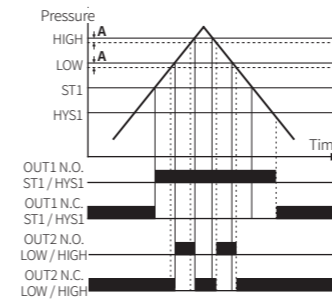
■ **Hysteresis**

- Set the hysteresis for pressure detection directly.
- Setting: Pressure detection level (ST1, ST2), Hysteresis (HYS1, HYS2)



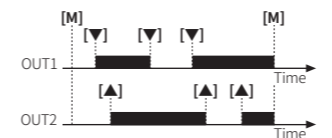
■ **Hysteresis - Window comparison output**

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



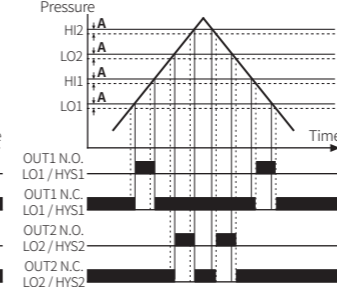
■ **Forced output control**

- 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 output control operation.



■ **Window comparison output**

- It detects pressure at the desired range.
- 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)/2
- Hysteresis is fixed as min. display interval.

Auto shift Preset Setting

■ **Setting method**

- [Parameter setting]
1. Select P-9 External input terminal: SHFT.
 2. Press the [▲] 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 correcting value, press the [▼] + [▲] 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	SHFT	Auto-shift correction	Min. preset setting < SH.IN ≤ Max. preset setting		
			Pressure	Setting range (after correction)	Setting range (preset range)
			Negative	-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
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
Err 1	When external pressure is input while adjusting zero point.	Try again after removing external pressure.
Err 2	When overload is applied on control output	Remove overload.
Err 3	When 'ST1', 'ST2' setting range is not met in auto sensitivity setting mode.	Check setting conditions and set proper setting values.
HHHH	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-	Auto shift correction error.	Set the corrected setting value within setting pressure range.
-LL-		
-HL-		