Pressure Sensor Indicators

PSM Series

PRODUCT MANUAL

For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.
The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

Features

- Display 8 (PSM8) or 4 (PSM4) channels of pressure value from pressure sensors
- Input range: 1 - 5 VDC⎓, DC 4 - 20 mA (by model)
- Pressure sensor model auto recognition (Autonics PSS Series pressure sensors)
- Set PV display color by control output type (red/green)
- Individual output indicators for each channel
- RS485 (Modbus RTU) communication support
- Refrigeration pressure control mode
- Easy wiring and connection with sensor connectors (CNE)
- Power supply: 12 - 24 VDC⎓ ±10%

Safety Considerations

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

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

01. Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)
Failure to follow this instruction may result in personal injury, economic loss or fire.

02. Do not use the unit in the place where flammable/explosive/corrosive gas, high 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. 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.
- Use twisted pair wire for communication line.
- 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	M	❶	-	❷	❸	❹

❶ No. of channels
4: 4 channels
8: 8 channels

❷ Sensor input
V: 1 - 5 VDC⎓
A: DC 4 - 20 mA

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

❹ Option input / output
D: Digital input
R: RS485 communication

Product Components

- Product
- Bracket
- Instruction manual

Sold Separately

- Sensor connector plug: CNE-P04-☐
- Pressure sensor: PSS Series
- Connector socket[01]: HIF3BA-20D-2.54R
- Communication converter: SCM-US
- I / O cable: CO20-HP☐-☐

01) Contact the manufacturer (Hirose Electric).

Manual

For proper use of the product, refer to the manuals and be sure to follow the safety considerations in the manuals.
Download the manuals from the Autonics website.

Software

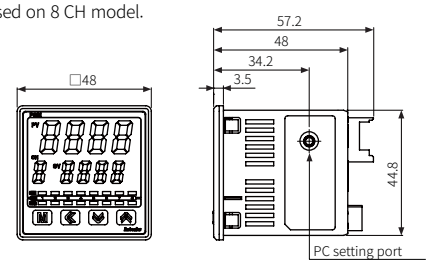
Download the installation file and the manuals from the Autonics website.

■ DAQMaster

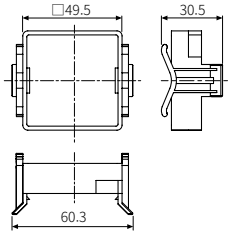
It is the comprehensive device management program for Autonics' products, providing parameter setting, monitoring and data management.

Dimensions

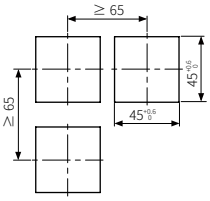
- Unit: mm, For the detailed drawings, follow the Autonics website.
- Below is based on 8 CH model.



■ Bracket

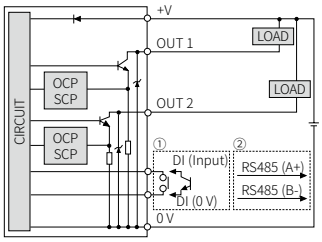


■ Panel cut-out

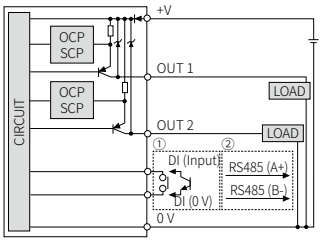


Inner Circuit

■ NPN open collector output

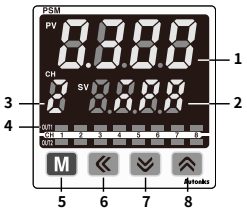


■ PNP open collector output



- Support OUT 1/2 per 1 channel
- ①: Digital input model, ②: RS485 Communication model
- OCP (over current protection circuit), SCP (short circuit protection circuit)
- The control output is abnormal when the control output circuit is shorted or over current is supplied.

Unit Descriptions

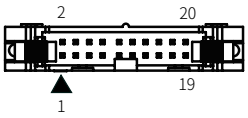


1. PV display part (green, red)
Run mode: Displays PV (present value)
Setting mode: Displays parameter
2. SV display part (green)
Run mode: Displays pressure unit
Setting mode: Displays parameter setting value
3. Channel display part (red)
Run mode: Displays channel
Setting mode: Displays parameter setting channel
4. Output (OUT1: red, OUT2: green) indicator
Turns ON when the corresponding control output is ON.
5. [M] key
Enters parameter group, selects item and returns run mode
6. [◀] key
Run mode: Changes channels
Setting mode: Changes parameter setting channel or digit
7. [▼], [▲] key
Sets preset of output operation mode, runs the mode or changes parameter

Cautions during Wiring

- Contact the manufacture for the socket and cable.

	Model
Hirose connector	HIF3BA-20PA-2.54DS
Hirose connector socket	HIF3BA-20D-2.54R



Connections

■ Input (Sensor connector per channel)

Pin		Voltage input	Current input	
			2-wire	3-wire
	4	INPUT	0 V	INPUT
	3	0 V	N.C	0 V
	2	TYPE [01]		
	1	+ V		

01) This pin is for automatically recognition of pressure sensor PSS model. Wire it only when connecting Autonics Pressure sensor PSS Series.

- Do not short +V and 0 V of sensor connector. It may cause break inner circuit.

■ Output (HIF3FB-20PA-2.54DSA, 20-pin)

Support functions are different for each model.

Pin	2 [01]	4	6	8	10	12	14	16	18	20 [02]
Func.	0 V	4 CH_ OUT2	4 CH_ OUT1	3 CH_ OUT2	3 CH_ OUT1	2 CH_ OUT2	2 CH_ OUT1	1 CH_ OUT2	1 CH_ OUT1	DI (0 V)/ RS485 (B-)
Pin	1 [01]	3	5	7	9	11	13	15	17	19 [02]
Func.	12-24 VDC⎓	8 CH_ OUT2	8 CH_ OUT1	7 CH_ OUT2	7 CH_ OUT1	6 CH_ OUT2	6 CH_ OUT1	5 CH_ OUT2	5 CH_ OUT1	DI (Input)/ RS485 (A+)

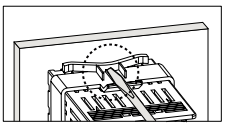
01) Pins 1 and 2 are power input terminals.
02) It varies depending on the option input / output specifications for each model.

Rated Pressure and Max. Pressure Display Range

Unit	Negative		Static		Compound	
	Decimal point	Rated range (max. range)	Decimal point	Rated range (max. range)	Decimal point	Rated range (max. range)
MPa	-		0.001	0.000 to 1.000 (-0.050 to 1.100)	-	
kPa	0.1	0.0 to -101.3 (5.0 to -101.3)	0.1	0.0 to 100.0 (-5.0 to 110.0)	0.1	-101.3 to 100.0 (-101.3 to 110.0)
			1	0 to 1000 (-50 to 1100)		
kgf/cm²	0.001	0.000 to -1.033 (0.051 to -1.033)	0.001	0.000 to 1.020 (-0.051 to 1.122)	0.001	-1.034 to 1.020 (-1.034 to 1.122)
			0.01	0.00 to 10.20 (-0.51 to 11.22)		
bar	0.001	0.000 to -1.013 (0.050 to -1.013)	0.001	0.000 to 1.000 (-0.050 to 1.100)	0.001	-1.013 to 1.000 (-1.013 to 1.100)
			0.01	0.00 to 10.00 (-0.50 to 11.00)		
psi	0.01	0.00 to -14.70 (0.74 to -14.70)	0.01	0.00 to 14.50 (-0.72 to 15.96)	0.02	-14.70 to 14.50 (-14.70 to 15.96)
			0.1	0.0 to 145.0 (-7.2 to 159.6)		
mmHg	1	0 to -760 (38.0 to -760.0)	-		1	-760 to 750 (-760.0 to 824.0)
inHg	0.1	0.0 to -29.9 (1.50 to -29.90)	-		0.1	-29.9 to 29.5 (-29.88 to 32.58)
mmH_2O [01]	0.1	0.0 to -103.3 (5.1 to -103.3)	-		0.1	-103.4 to 102.0 (-103.4 to 112.2)

01) Display value × 100

Installation



Insert this unit into a panel, fasten bracket by pushing with tools.

Specifications

Model	PSM4-□□□	PSM8-□□□
Display pressure range	Refer to 'Rated Pressure and Max. Pressure Display Range'.	
Max. inputs	4	8
Sensor input	• 1 - 5 VDC⎓ (Input impedance: ≈ 300 kΩ) • DC 4 - 20 mA model (Input impedance: ≈ 100 Ω)	
Sensor supply power	12 - 24 VDC⎓, 40 mA per channel (1 - 4 ch max. current: ≤ 100 mA, 5 - 8 ch max. current: ≤ 100 mA)	
Display type	7 Segment LED 4 digit	
Display accuracy	±0.1% F.S. ±2 digit (at 23 ±5 °C)	
Control output and display temp. characteristic	-10 to 0 °C: ±0.3% F.S. ± 2 digit 0 to 50 °C: ±0.2% F.S. ± 2 digit (at 25 °C)	
Option input	Digital input 1	
Contact input	[L]: ≤ 0.2 V	
Solid state input	Residual voltage ≤ 1.0 V, Leakage current ≤ 0.1 mA	
Protection structure	Front: IP65, the others: IP30 (IEC standard)	
Certification	CE UK EAC	
Unit weight (packaged)	≈ 65 g (≈ 108 g)	

Power supply	12 - 24 VDC⎓ (ripple P-P: ≤ 10%)
Permissible voltage range	90 to 110 % of rated voltage
Power consumption	≤ 3 W
Current consumption	≤ 100 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	Different by output operation mode [02]
Repeat error	±0.1% F.S. ±Min display interval
Response time	• 4 CH model: 2.5, 100, 500, 1000 ms • 8 CH model: 5, 100, 500, 1000 ms
RS485 comm.	Modbus RTU
Protection circuit	Output short over-current protection circuit, power supply reverse connection protection circuit
Insulation resistance	≥ 100 MΩ (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 55 Hz in each X, Y, Z direction for 2 hours
Ambient temperature	-10 to 50 °C, storage: -20 to 60 °C (rated at no freezing or condensation)
Ambient humidity	30 to 85%RH, storage: 30 to 85%RH (rated at no freezing or condensation)

01) Except sensor consumption current.
All output indicators ON: ≤ 120 mA / RS485 communication connection: 120 mA
02) Refer to output operation mode.

Communication Interface

■ RS485

Comm. protocol	Modbus RTU
Application standard	Compliance with EIA RS485
Max. connection	31-unit (address: 1 to 127)
Comm. synchronous method	Asynchronous
Comm. method	2-wire half duplex
Comm. distance	< 800 m
Comm. speed	2,400 / 4,800 / 9,600 (default) / 19,200 / 38,400 bps
Comm. response time	5 to 99 ms (default: 20 ms)
Start bit	1-bit (fixed)
Data bit	8-bit (fixed)
Parity bit	None (default), Even, Odd
Stop bit	1-bit, 2-bit (default)

- Do not change parameter by front keys of the product during communication connection. It may cause malfunction.
- Do not set duplicated address on the same communication line.
- When setting the parameter using SCM-US, match the communication speed to the PSM. Setable communication speed: 2400 ~ 19200 bps (recommendation: 9600 bps)
- SCM-US is for setting parameter, unsuitable for monitoring.
- The communication via RS485 and the SCM-US can not be used simultaneously because when the SCM-US is connected, communication through the power / communication connection terminal is blocked.

Mode Setting

RUN

[◀] or Auto [01]	→	**Change channels**	Auto	
[M] 2 sec	→	**Parameter 1 group**	[M] over 3 sec	→
[M] 4 sec	→	**Parameter 2 group**	[M] over 3 sec	
[M]	→	**Preset setting**	[M]	→
[▼]+[▲] for over 4 sec after remove the external pressure	→	**Zero-point adjustment**	Displays 0.0 and returns automatically	→
[▲] over 2 sec	→	**Max / Min monitoring / Auto shift [02]**	Mode switching: [M] Reset: [▼]+[▲] over 1 sec	→
[◀]+[▼]+[▲]	→	**Manual return for freezer control output [03]**	[M]	→
[◀]+[▼]+[▲] over 5 sec	→	**Parameter reset**	Auto	→

RUN

01) Depends on P2-7 Channel auto change cycle setting.
02) Digital option input model, Auto shift judgment level checking /setting is available when P2-3 Digital input terminal function is set as SHFT. (no input displays 0)
03) Available when P1-8 OUT operation mode is set freezer pressure control at over 1 channel and P2-3 Digital input terminal function is set manual return for freezer control output.

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 30 sec in each parameter group.
- [M] key: Saves setting value and moves to next parameter
  [▲], [▼] key: Selects setting value

■ Parameter 1 group

- Setting for each channel is possible. During setting, press the [◀] key to change the channel.

Parameter		Display	Default	Setting range	Condition
P1-1	PSS model auto recognition	AT.SC	oFF	OFF, ON • This function is available when connecting Autonics Pressure sensor PSS Series to recognize pressure type and range automatically. • Auto recognition method: P1-1 PSS model auto recognition ON → PSM power OFF [01] → PSS connection → PSM power ON	-
P1-2	Input display	diSP	Stnd	STND: standard, SCAL: Scale	-
P1-3	Pressure type [02]	in-t	Pos.H	POS.H: Static (standard) POS.L: Static (Rated Pressure and Max. Pressure Display Range: use low decimal point) VACU: Negative COMP: Compound	P1-2 Input display: STND
P1-4	Display unit	Unit	kPA	Pressure / Unit Static: KPA: kPa, KGF: kgf/cm², BAR: bar, PSI: psi, MPA*: MPa Negative: KPA: kPa, KGF: kgf/cm², BAR: bar, PSI: psi, MMHG: mmHg, INHG: inHg, H2O: mmH_2O Compound: KPA: kPa, KGF: kgf/cm², BAR: bar, PSI: psi, MMHG: mmHg, INHG: inHg, H2O: mmH_2O	* 1-3 Pressure type: POS.H
P1-5	Scale decimal point	dot	0000	0000, 000.0, 00.00, 0.000	P1-2 Input display: SCAL
P1-6	Low limit input scale	L-SC	0000	-1999 to 9999 • Varies according to P1-5 Scale decimal point	P1-2 Input display: SCAL
P1-7	High limit input scale	H-SC	1000	-1999 to 9999 H-SC ≥ L-SC ± (3 × Min. display unit) • Varies according to P1-5 Scale decimal point	
P1-8	OUT operation mode	oUt.A	HYS.A	HYS.M: Hysteresis WIN: Window comparison output HY-W: Hysteresis - Window comparison output AUTO: Auto sensitivity setting FRZE: Freezer pressure control F.OUT: Forced output control	-
P1-9	Output type	noAC	1o2o	1O.2O: OUT1 Normally open, OUT2 Normally open 1O.2C: OUT1 Normally open, OUT2 Normally closed 1C.2O: OUT1 Normally closed, OUT2 Normally open 1C.2C: OUT1 Normally closed, OUT2 Normally closed	-
P1-10	Auto shift range	SHot	oUt1	OUT1: OUT 1 of corresponding CH OUT2: OUT 2 of corresponding CH OUT.A: OUT 1+2 of corresponding CH ALL: OUT1+2 of all channels	P2-3 Digital input terminal function: SHFT

01) Must turn OFF the unit and connect PSS. Otherwise it may cause malfunction.
02) Below parameters are initialized when the setting value is changed.
P1-4 Display unit, P1-5 Scale decimal point, P1-6 Low limit input scale, P1-7 High limit input scale, Preset value, Auto shift judgment level

■ Parameter 2 group

• For all channels.

Parameter		Display	Default	Setting range			Condition
				□--■	□: Origial CH	■: Target CH	
P2-1	Channel copy	CoPY	I--A	4 CH	1 to 4	1 to 4, A: ALL	-
				8 CH	1 to 8	1 to 8, A: ALL	
				• Copy item[01]: Preset value, Parameter 1 group (except P1-10 Auto shift range)			
P2-2	Response time	SPd	2.5	[4 channel model] 2.5, 100, 500, 1000 ms			-
			5	[8 channel model] 5, 100, 500, 1000 ms			-
P2-3	Digital input terminal function	d-In	SHFt	[Digital option input model] SHFT: Auto shift, HOLD, REST: Manual return for freezer control output			-
P2-4	Digital input channel	d-CH	dI.CH	[Digital option input model] DI.CH: Corresponding channel DI.AL: All channels			-
P2-5	Zero-point adjustment channel	ZE.rS	rS.CH	RS.CH: Corresponding channel RS.AL: All channels			-
P2-6	Peak reset channel	PE.rS	rS.CH	RS.CH: Corresponding channel RS.AL: All channels			-
P2-7	Channel auto change cycle	At.CH	oFF	OFF, 2, 5 sec			-
P2-8	Power save	SAvE	oFF	OFF, ON • No operation for over 1 min in RUN mode: Turn OFF front part (except output indicator)			-
P2-9	Present value display part color	CLor	r--G	R--G: Red / Green, R--R: Red / Red, G--R: Green / Red, G--G: Green / Green • Display: Standard / Output			-
P2-10	Comm. address	AdrS	001	[RS485 option output model] 001 to 127			-
P2-11	Baud rate	bPS	96	[RS485 option output model] 24, 48, 96, 192, 384 (×100 bps)			-
P2-12	Parity bit	PrtY	nonE	[RS485 option output model] NONE, EVEN, ODD			-
P2-13	Stop bit	StP	2	[RS485 option output model] 1, 2 bit			-
P2-14	Response time	rSYt	20	[RS485 option output model] 5 to 99 ms			-
P2-15	Comm. write	Con.Y	EnA	[RS485 option output model] ENA: Enable, DISA: Disable			-
P2-16	Parameter reset	InIt	no	NO, YES			-
P2-17	Lock	LoCK	oFF	OFF LOC1: All setting lock LOC2: Parameter setting lock / Preset, Zero-point adjustment setting and monitoring reset are available			-

01) Resets auto shift judgment level and zero-point adjustment.

Auto shift Preset Setting

■ Setting method

[Parameter setting]

1. Select P2-3 Digital input terminal function as SHFT.
2. Press the [▲] key for over 2 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. The measured pressure when auto shift input is applied to the digital input terminal is set as the reference pressure. The measured values are stored in SH.IN.

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

■ Precaution

- Auto shift correction is reset as 0 when changing P1-8 OUT operation mode and preset value or zero-point adjustment.
- 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.
- When the auto shift digital input is applied for over 5 sec., the source pressure of OUT1 and OUT2 of all channels is changed at once regardless of the setting range.

Preset Setting

■ Setting method

- The setting item name and setting value are cross-displayed on the display part.

1. Set the operation mode in P1-8 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. (except forced output control mode)

■ Preset setting by operation mode

Operation mode		Preset		Setting range
Hysteresis	HYS.n	Pressure detection level 1	St 1	Min. display pressure < ST1 ≤ Max. display pressure
		Hysteresis level 1	HYS 1	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]	WIn	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[01]	HY-W	Pressure detection level 1	St 1	Min. display pressure < ST1 ≤ Max. display pressure
		Hysteresis level 1	HYS 1	Min. display pressure ≤ HYS1 < ST1
		Pressure detection low limit	LoW	Min. display pressure ≤ LOW ≤ Max. display pressure - (3 × Min display interval)
		Pressure detection high limit	HIGH	Low + (3 × Min display interval) ≤ HIGH ≤ Max. display pressure
Auto sensitivity setting	AUto	Pressure level 1	St 1	Min. display pressure ≤ ST1 ≤ Max. display pressure-1% of rated pressure
		Pressure level 2[02]	St2	ST1+1% of rated pressure ≤ ST2 ≤ Max. display pressure
		Pressure detection level	SEt	Auto setting SET= $\frac{(ST1+ST2)}{2}$ • Manual setting is possible by [▼] or [▲] key.
Freezer Pressure control	FrZE	Pressure detection level 1	St 1	Min. display pressure < ST1 ≤ Max. display pressure
		Hysteresis level 1	HYS 1	0 to 10% of display pressure range (F.S.) digit
		Output OFF delay time	tIME	0 to 3,600 sec
		Pressure detection level 2	St2	Min. display pressure < ST2 ≤ Max. display pressure
		Hysteresis level 2	HYS2	10% of 0 to Display Pressure range (F.S.) digit
		Manual/Auto reset	r.A-n	AUTO: Auto return, MAN: Manual return
Forced output control[03]	F.oUt	-	-	• Manual ON/OFF for OUT1/2 is possible by [▼] or [▲] key.

01) Hysteresis: 1 (Min display interval, fixed)
02) When error appears, check setting conditions and set proper setting values.
03) Hold / Auto shift function does not operate. .

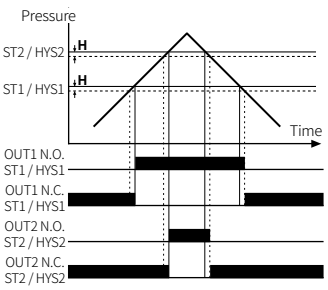
Output Operation Mode

Change the output operation mode to change pressure detection method.

ON: ■■■■ **OFF:** ——— **H:** Hysteresis **A:** Min display interval

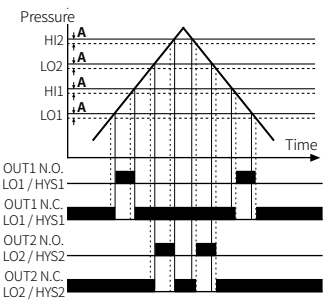
■ Hysteresis

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



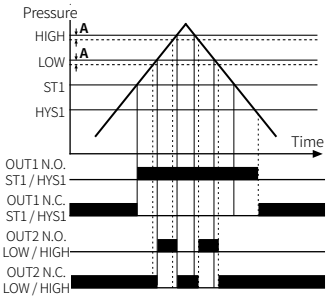
■ Window comparison output

- It detects pressure at the desired range.
- Hysteresis is fixed as min. display interval.
- Setting: High limit (HI1, HI2), Low limit (LO1, LO2)



■ 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)

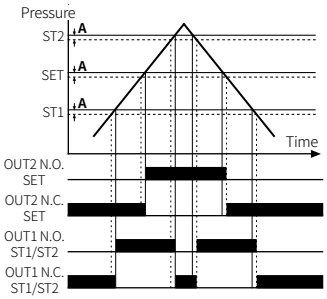


■ Auto sensitivity setting

- This function is to set the proper position (SET) automatically by applied pressure from two positions (ST1, ST2).

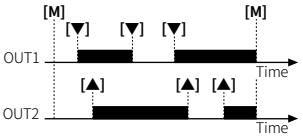
$$SET = \frac{(ST1+ST2)}{2}$$

- Hysteresis is fixed as min. display interval.



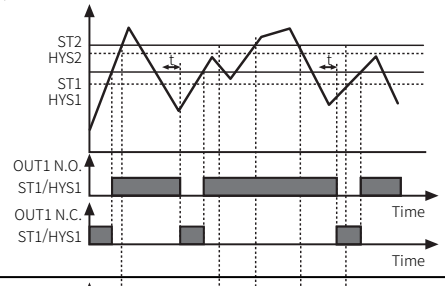
■ Forced output control Mode

- 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.

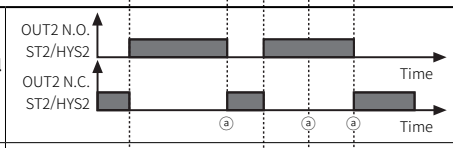
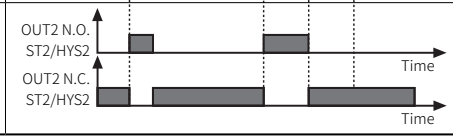


■ Freezer pressure control

- Pressure control for freezer system.
- OUT1 is for main output control. Output OFF delay time prevent from repeat ON/OFF.
- OUT2 is for alarm of abnormal high pressure.
- OUT1 setting: Pressure detection level (ST1), Hysteresis (HYS1), Output OFF delay time (TIME)
- OUT2 setting: Pressure detection level (ST2), Hysteresis (HYS2), Manual / Auto reset (R.A-M)



t: Output OFF delay time

Manual reset		ⓐ after hysteresis 2: Maintains ON until reset signal (digital input or [◀]+[▼]+[▲] key)
Auto reset		Output OFF after Hysteresis 2

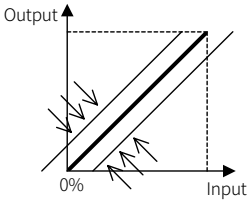
Error

Display	Cause	Troubleshooting
Err1	When external pressure (≥ ±5% of rated pressure) is input while adjusting zero point.	Try again after removing external pressure.
Err2	When over-current is applied on control output.	Remove the over current conditions such as adjusting load resistance.
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.

Zero-point Adjustment

With the pressure port open, the current pressure value on display is set to zero forcibly by removing deviations from opening the pressure port. Zero-point adjustment affects analog output.

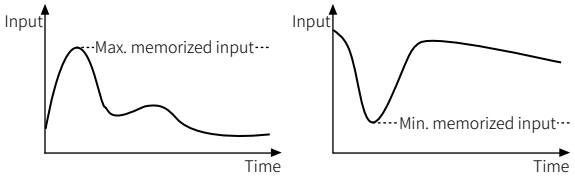
- For precise measurement, execute zero-point adjustment periodically.



Maximum / Minimum Value Monitoring

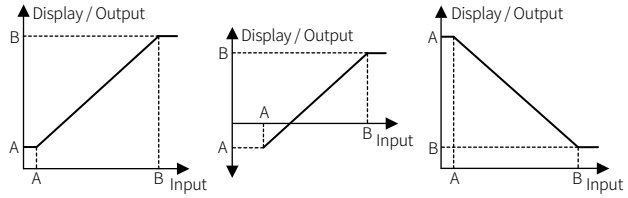
In order to identify abnormal conditions of the system that are not easily identified or to diagnose the max. / min. input that has occurred, save the value and notify it.

- When the memorized max. / min. pressure is higher / lower than the rated pressure, it displays 'HHHH' / 'LLLL'.



Display / Output Scale

Customizes the scale of display / output value from rated output range. If the measured input is a, b, and the arbitrary values to be displayed are A, B, the display / output value are outputted for input a and b linearly (a = A, b = B).

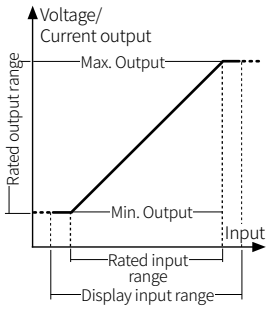


Response Time

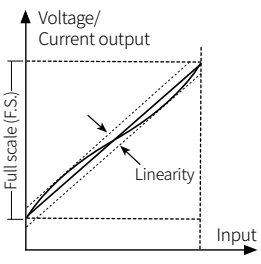
Prevents chattering of the output by changing the response time of the control output and pressure display value. When the response time is longer, the number of digital filter increase, so stable measurement is possible, but the measured value may differ from the actual input value.

Analog Output Characteristic

■ Input - Output



■ Linearity



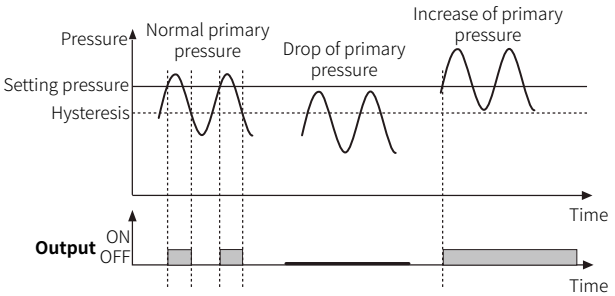
External Input

■ Auto shift

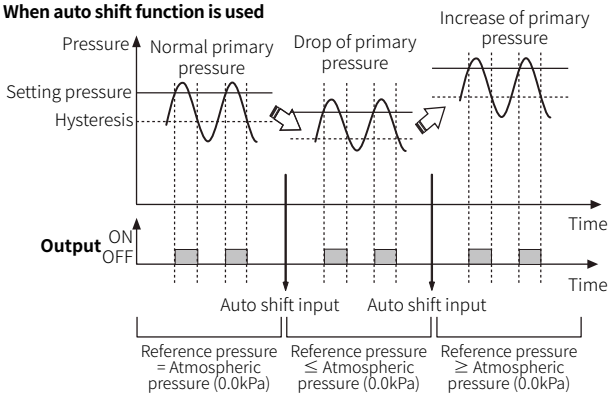
The judgment level is corrected by applying the standard pressure which is set when external input signal is applied.

- Correction set value ST1 = ST1 + SH.IN
  Correction set value HYS1 = HYS1 + SH.IN
  SH.IN is the reference pressure set by Auto shift input.

• When auto shift is not used



• When auto shift function is used

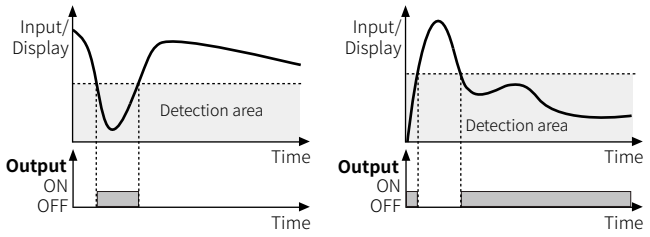


■ Hold

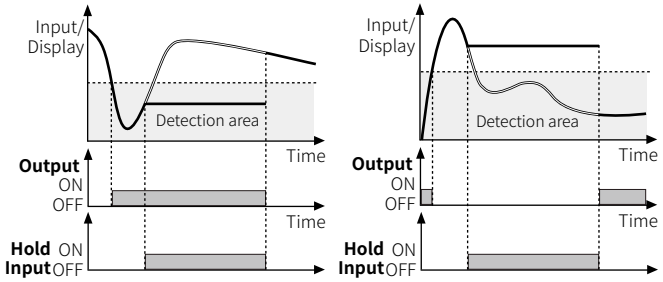
Holds current display value and control output when external input signal is applied.

Input: ═══ Display: ━━━

• When hold function is not used



• When hold function is used



Pressure Conversion Table

	Pa	kgf/cm²	mmHg	mmH_2O	psi	bar	inHg
Pa	1	0.000010197	0.007501	0.101972	0.00014504	0.00001	0.0002953
kgf/cm²	98066.5	1	735.5592	10000.0005	14.223393	0.980665	28.959025
mmHg	133.3224	0.001359	1	13.595099	0.019337	0.001333	0.039370
mmH_2O	9.80665	0.000099	0.073556	1	0.00142	0.000098	0.002896
psi	6894.733	0.070307	51.71475	703.016716	1	0.068947	2.036014
bar	100000.0	1.019716	750.062	10197.1626	14.503824	1	29.529988
inHg	3386.388	0.034532	25.40022	345.315507	0.491156	0.033864	1

• 1,000,000 Pa = 1,000 kPa = 1 MPa

Segment Table

The segments displayed on the product indicate the following meanings. It may differ depending on the product.

7 segment			
0	0	I	I
1	1	J	J
2	2	K	K
3	3	L	L
4	4	M	M
5	5	N	N
6	6	O	O
7	7	P	P
8	8	Q	Q
9	9	R	R
A	A	S	S
b	B	T	T
C	C	U	U
d	D	V	V
E	E	W	W
F	F	X	X
G	G	Y	Y
H	H	Z	Z

11 segment			
0	0	I	I
1	1	J	J
2	2	K	K
3	3	L	L
4	4	M	M
5	5	N	N
6	6	O	O
7	7	P	P
8	8	Q	Q
9	9	R	R
A	A	S	S
b	B	T	T
C	C	U	U
d	D	V	V
E	E	W	W
F	F	X	X
G	G	Y	Y
H	H	Z	Z

12 segment			
0	0	I	I
1	1	J	J
2	2	K	K
3	3	L	L
4	4	M	M
5	5	N	N
6	6	O	O
7	7	P	P
8	8	Q	Q
9	9	R	R
A	A	S	S
b	B	T	T
C	C	U	U
d	D	V	V
E	E	W	W
F	F	X	X
G	G	Y	Y
H	H	Z	Z

16 segment			
0	0	I	I
1	1	J	J
2	2	K	K
3	3	L	L
4	4	M	M
5	5	N	N
6	6	O	O
7	7	P	P
8	8	Q	Q
9	9	R	R
A	A	S	S
b	B	T	T
C	C	U	U
d	D	V	V
E	E	W	W
F	F	X	X
G	G	Y	Y
H	H	Z	Z

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