

Pressure Sensor

Specifications

Pressure type	Gauge pressure (In case of fluid type, standard pressure are sealed gauge pressure ^{※1})			
Type	NPN or PNP open collector output type		NPN or PNP open collector output+ analog output or external input type	
Model	PSQ-□C01□-□	PSQ-□C1□-□	PSQ-□C01□U-□	PSQ-□C1□U-□
Rated pressure range	-100.0 to 100.0kPa	-100 to 1,000kPa	-100.0 to 100.0kPa	-100 to 1,000kPa
Display&Setting pressure range	-101.3 to 110.0kPa	-101 to 1,100kPa	-101.3 to 110.0kPa	-101 to 1,100kPa
Min. display unit	0.1kPa	1kPa	0.1kPa	1kPa
Max. pressure range	Pneumatic type	2 times of rated pressure	1.5 times of rated pressure	2 times of rated pressure
	Fluid type	3 times of rated pressure		
Applied fluid	<ul style="list-style-type: none"> • Pneumatic type: Air, Non-corrosive gas • Fluid type: Air, Non-corrosive gas and fluid that do not corrode Stainless steel 316L 			
Power supply	12-24VDC \equiv (ripple P-P: max. 10%)			
Allowable voltage range	90 to 110% of rated voltage			
Current consumption	Max. 50mA		Max. 50mA (current output: max. 70mA)	
Control output	NPN or PNP open collector output			
	• Load voltage: Max. 30VDC \equiv • Load current: Max. 100mA • Residual voltage: Max. 2VDC \equiv			
	Hysteresis ^{※2}	Min. display interval		
	Repeat error	$\pm 0.2\%$ F.S. \pm Min. display interval		
Response time	Select one; 2.5ms, 5ms, 10ms, 25ms, 50ms, 100ms, 250ms, 500ms, 1,000ms, 5,000ms			
Protection circuit	Output short over current protection circuit			
Analog output ^{※3}	Voltage output	—	<ul style="list-style-type: none"> • Output voltage: 1-5VDC\equiv $\pm 2.5\%$ F.S. • Linear: Max. $\pm 1\%$ F.S. • Resolution: 1/2,000 • Output impedance: Approx. 240Ω • Response time: 50ms 	
	Current output	—	<ul style="list-style-type: none"> • Output current: DC4-20mA $\pm 2.5\%$ F.S. • Linear: Max. $\pm 1\%$ F.S. • Resolution: 1/2,000 • Output impedance: Approx. 100kΩ • Response time: 50ms 	
External input ^{※3} (Auto shift/Remote zero/Hold)	—	<ul style="list-style-type: none"> • ON voltage: Max. 0.4VDC\equiv • OFF voltage: 5-Vin or open • Resolution: 1/2,000 • Output impedance: Approx. 100kΩ 		
Display digits	Present value (PV) display part, Setting value (SV) display part: 4-digit			
Display method	12-segment LCD method			
Min. display interval	MPa	0.001	0.001	0.001
	kPa	0.1	1	1
	kgf/cm ²	0.001	0.01	0.001
	bar	0.001	0.01	0.001
	psi	0.02	0.2	0.02
	mmHg	1	—	1
	inHg	0.1	—	0.1
	mmH ₂ O	0.1	—	0.1
Display accuracy	0 to 50°C: Max. $\pm 0.5\%$ F.S., -10 to 0°C: Max. $\pm 1\%$ F.S.			
Insulation resistance	Over 50M Ω (at 500VDC megger)			
Dielectric strength	1,000VAC 50/60Hz for 1min			
Vibration	1.5mm amplitude at frequency of 10 to 55Hz (for 1min) in each X, Y, Z direction for 2 hours			
Environment	Ambient temperature	-10 to 50°C, storage: -20 to 60°C		
	Ambient Humidity	30 to 80%RH, storage: 30 to 80%RH		
Cable (fluid type)	$\varnothing 4$ mm, 5-wire, 3m (AWG24, core diameter: 0.08mm, number of cores: 40, insulator out diameter: $\varnothing 1$ mm)			
Protection structure	• Pneumatic type: IP40 (IEC standard)		• Fluid type: IP65 (IEC standard)	
Material	<ul style="list-style-type: none"> • Pneumatic type - Front case: Polycarbonate, Rear case: Polycarbonate, Pressure port: Brass-nickel plated • Fluid type - Front case: Polycarbonate, Rear case: Polyamide 6, Pressure port: Stainless steel 316L 			
Approval	CE			
Weight ^{※4}	• Pneumatic type: Approx. 165g (approx. 80g)		• Fluid type: Approx. 210g (approx. 125g)	

※1: The unit is sealed structure. It is based on atmospheric pressure 101.3kPa.

※2: In hysteresis output mode, it is variable.

※3: Select one between analog output (voltage or current) and external input.

※4: The weight includes packaging. The weight in parenthesis is for unit only.

※Environment resistance is rated at no freezing or condensation.

(A) Photoelectric Sensors

(B) Fiber Optic Sensors

(C) Door/Area Sensors

(D) Proximity Sensors

(E) Pressure Sensors

(F) Rotary Encoders

(G) Connectors/ Connector Cables/ Sensor Distribution Boxes/Sockets

(H) Temperature Controllers

(I) SSRs / Power Controllers

(J) Counters

(K) Timers

(L) Panel Meters

(M) Tacho / Speed / Pulse Meters

(N) Display Units

(O) Sensor Controllers

(P) Switching Mode Power Supplies

(Q) Stepper Motors & Drivers & Controllers

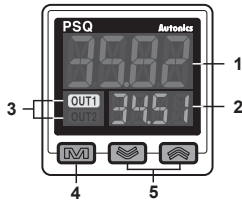
(R) Graphic/ Logic Panels

(S) Field Network Devices

(T) Software

PSQ Series

Unit Description

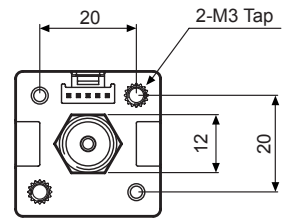
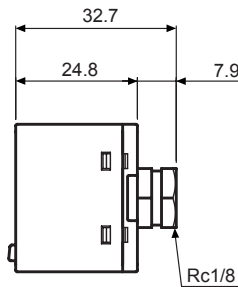
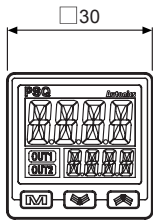


1. **Present value (PV) display part (green, red, orange by setting/status)**
 RUN mode: Displays PV.
 Setting mode: Displays parameter.
2. **Setting value (SV) display part (green)**
 RUN mode: Displays setting value, unit, etc.
 Setting mode: Displays SV.
3. **Output indicator (OUT1, OUT2) (orange):** Turns ON while the control output turns ON.
4. **M key**
 RUN mode: Press the M key for over 2 sec to enter parameter 1 group.
 Press the M key for over 4 sec to enter parameter 2 group.
 Setting mode: Press the M key to select the setting items.
 Press the M key for over 2 sec to return RUN mode.
5. **☑, ↗ key**
 RUN mode: Press the ☑, ↗ key to set preset value of output operation mode.
 Press the M+☑ keys to set key lock/unlock.
 Press the ☑+↗ keys to adjust zero point.
 Press the M+↗ keys to set peak hold.
 Preset value setting mode: Press the ☑, ↗ key to increase/decrease setting value.
 Setting mode: Changes the parameter.

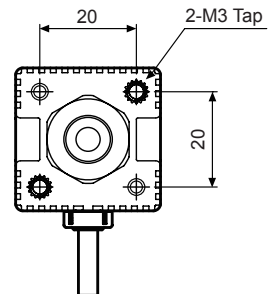
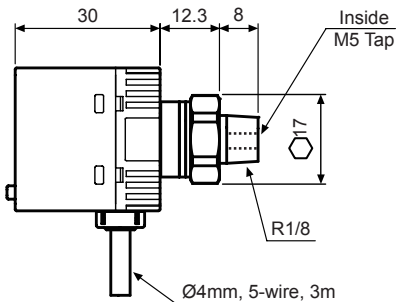
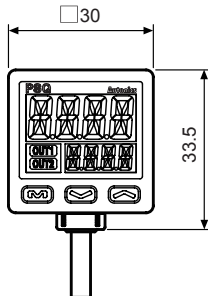
Dimensions

(unit: mm)

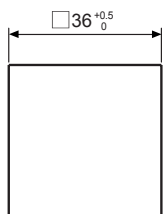
☉ Pneumatic type



☉ Fluid type



☉ Panel cut-out



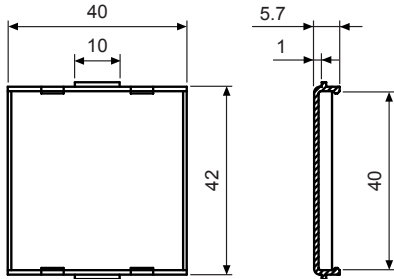
(panel thickness 0.8 to 3.5mm)

Pressure Sensor

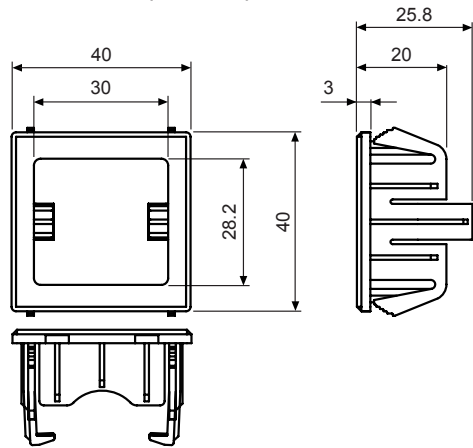
■ Dimensions

◎ Sold separately

● Front cover (PSO-P01)



● Panel bracket (PSO-B02)



(unit: mm)

● M5 gender (PSO-Z01)

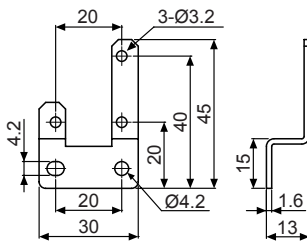
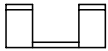


※M5 gender (PSO-Z01) is only for pneumatic type.

◎ Accessory

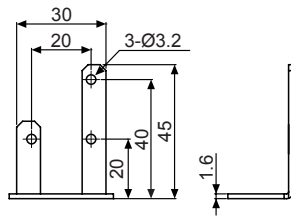
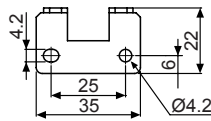
(unit: mm)

● Bracket A

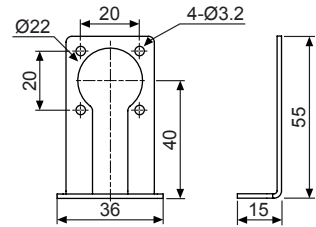
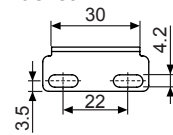


※Bracket A, B: Pneumatic type
Bracket C: Fluid type

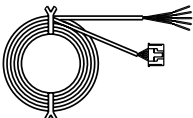
● Bracket B



● Bracket C



● Connector cable (PSO-C01)

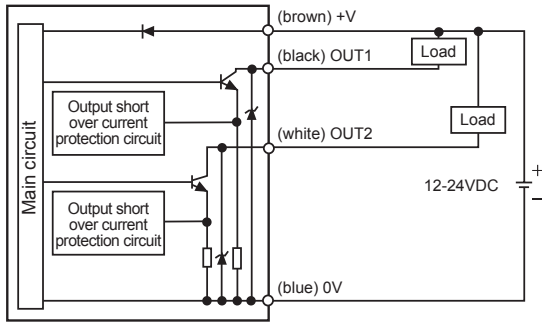


※Ø4mm, 5-wire, 2m
(AWG24, core diameter: 0.08mm, number of cores: 40, insulator diameter: Ø1mm)

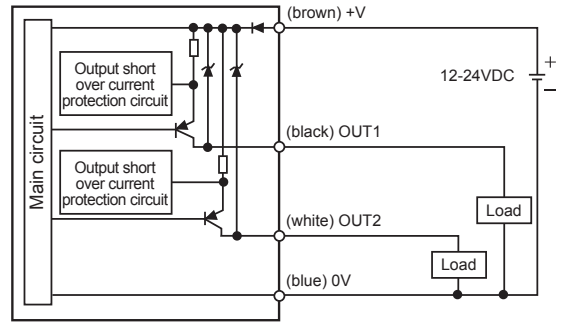
(A)	Photoelectric Sensors
(B)	Fiber Optic Sensors
(C)	Door/Area Sensors
(D)	Proximity Sensors
(E)	Pressure Sensors
(F)	Rotary Encoders
(G)	Connectors/ Connector Cables/ Sensor Distribution Boxes/Sockets
(H)	Temperature Controllers
(I)	SSRs / Power Controllers
(J)	Counters
(K)	Timers
(L)	Panel Meters
(M)	Tacho / Speed / Pulse Meters
(N)	Display Units
(O)	Sensor Controllers
(P)	Switching Mode Power Supplies
(Q)	Stepper Motors & Drivers & Controllers
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(S)	Field Network Devices
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Input/Output Circuit and Connections

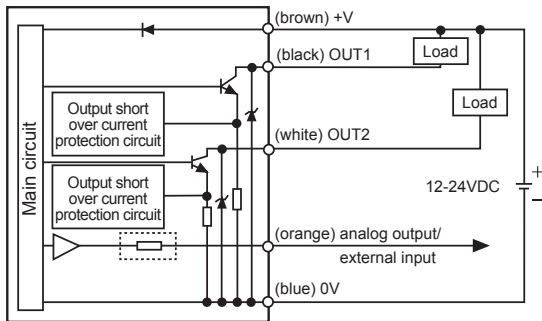
⊙ NPN open collector output type



⊙ PNP open collector output type

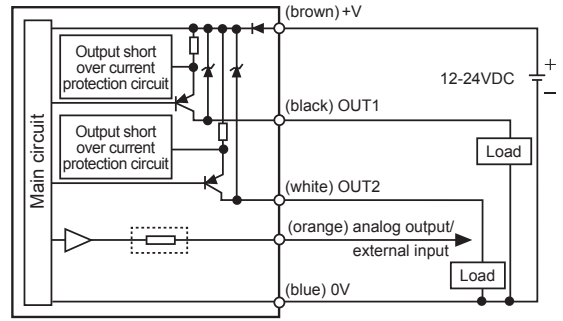


⊙ NPN open collector output+ analog output or external input type



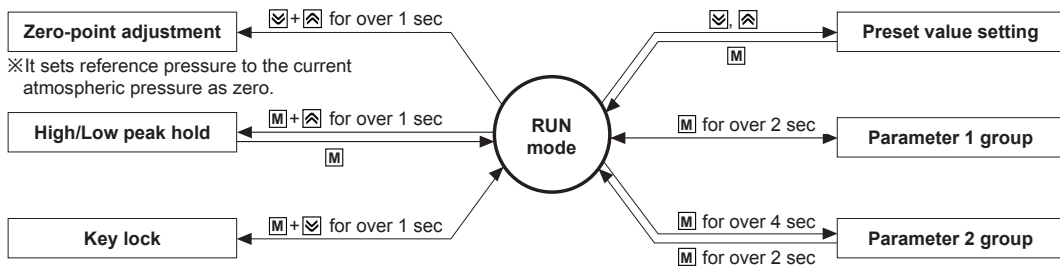
※ : output impedance

⊙ PNP open collector output+ analog output or external input type

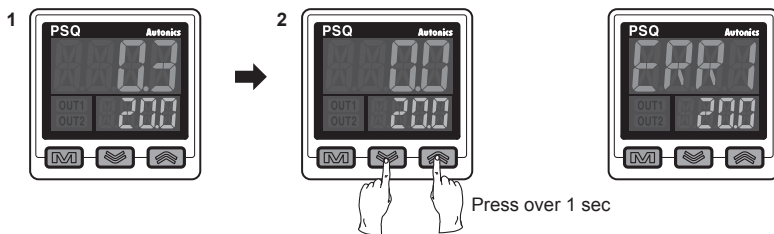


※ : output impedance

Setting for Each Mode



Zero-point Adjustment



※ If executing zero-point adjustment when external pressure over $\pm 5\%$ of rated pressure is applied, *ERR 1* flashes five times during pressing the keys. Remove external pressure and execute zero point again.

- To set zero atmospheric pressure forcibly, press the + keys over 1 sec in RUN mode with the opened pressure port.
- Zero point adjustment is completed, the PV display part displays 0.0 .

※ Please execute zero-point adjustment regularly.

Parameter Setting

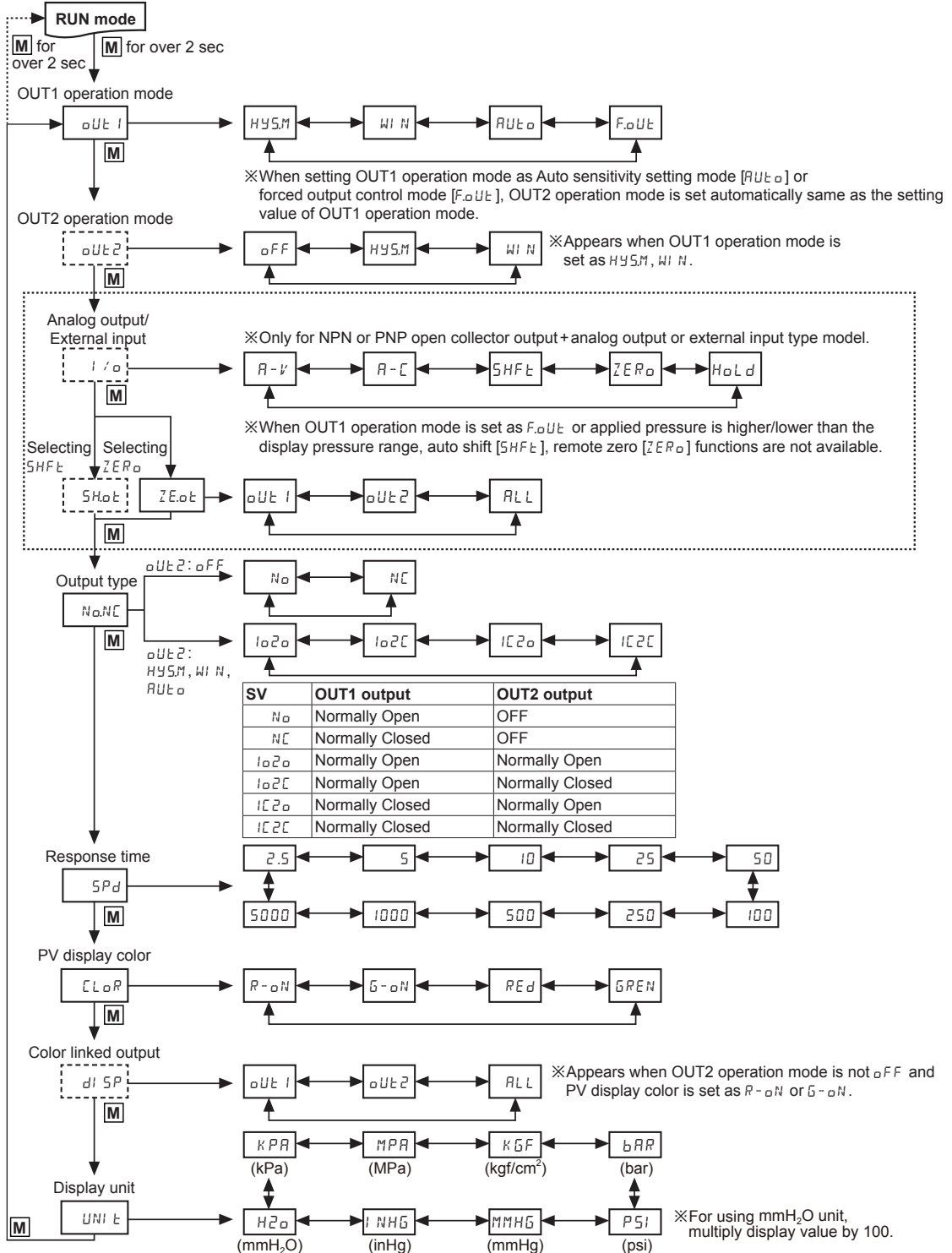
※After entering parameter 1/2 group, if there is no additional key input during 60 sec, it maintains previous setting value and it returns to RUN mode.

※Press the **[M]** key to set the setting value.

※After entering parameter 1/2 group, press the **[M]** key for over 2 sec to return to RUN mode.

※When pressing the **[M]** key once returning RUN mode from parameter 1/2 group within 2 sec, it enters the previous parameter group.

Parameter 1 group



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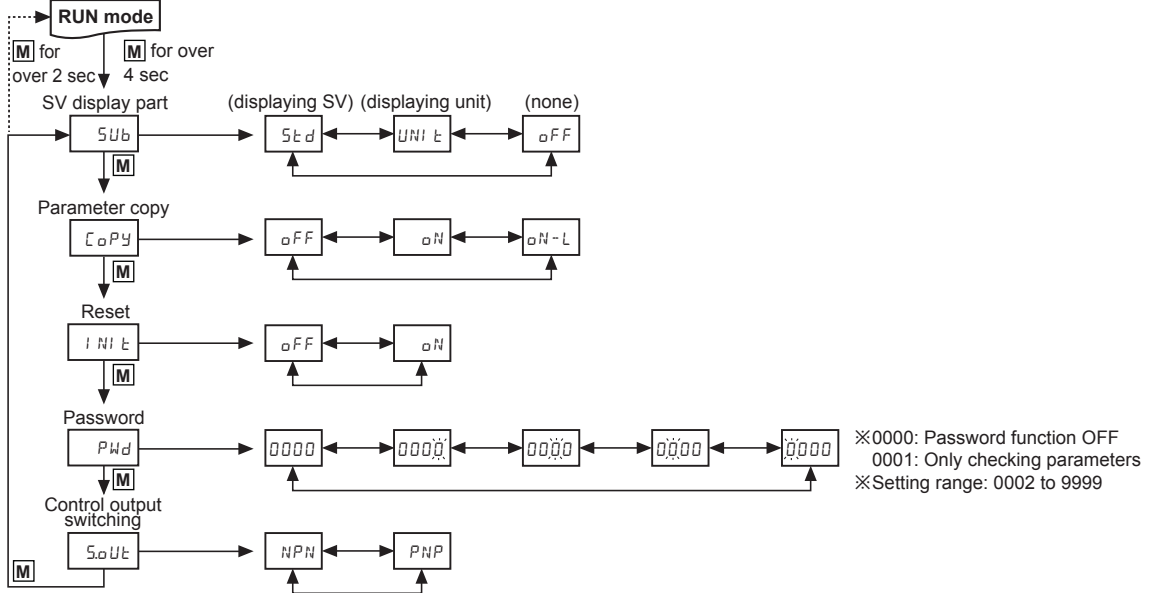
(R) Graphic/ Logic Panels

(S) Field Network Devices

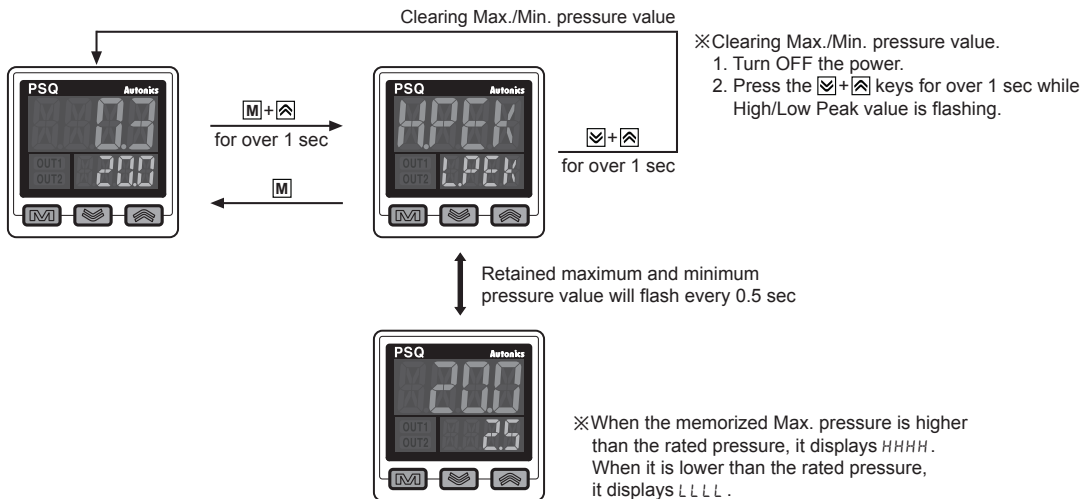
(T) Software

Parameter Setting

Parameter 2 group

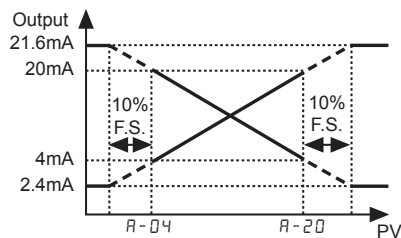
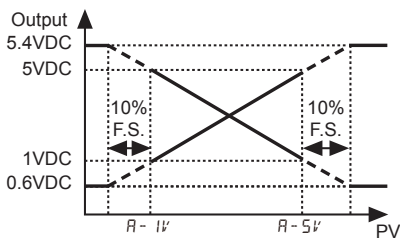


High/Low Peak Hold



Analog Output Scale Adjustment

• only for NPN or PNP open collector output+analog output or external input type model



■ Preset Setting

<Factory default of preset>

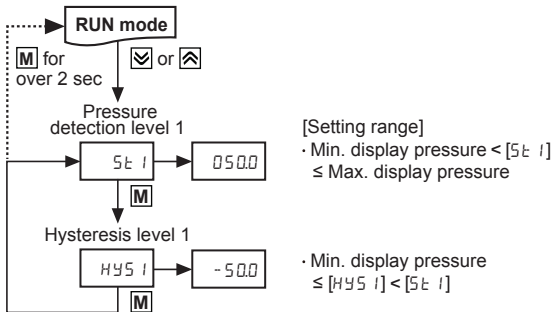
Output mode		Pressure range		Pressure range		Output mode		Pressure range		Pressure range		
		-100.0 to 100.0kPa	-100 to 1,000kPa	-100.0 to 100.0kPa	-100 to 1,000kPa			-100.0 to 100.0kPa	-100 to 1,000kPa			
HYSM	oUt 1	St 1	0500	0500	RUCO	St 1	-500	0000	St 2	-500	0500	
		HY 1	-500	0000		St 2	0500	0500				
	oUt 2	St 2	0500	0500		St	0000	0250	R-V	R-1V	-1000	0000
		HY 2	-500	0000		R-5V	1000	1000				
WIN	oUt 1	Lo 1	-500	0000	R-C	R-04	-1000	0000	R-20	1000	1000	
		HI 1	0500	0500		R-04	-1000	0000				
	oUt 2	Lo 2	-500	0000		R-20	1000	1000				
		HI 2	0500	0500								

- ※Set preset value of output operation mode. When changing display unit [UNIT], or external input, preset value is reset. (when changing the display unit, preset value will be automatically switched to changed pressure unit.)
- ※Setting items and setting value are displayed at the setting value (SV) display part alternatively.
- ※If there is no additional key input for over 2 sec during setting, the setting value is automatically set and it returns to RUN mode. (except forced output control mode)
- ※When changing output operation mode, the preset value is reset for the changed output operation mode. However, if the changed output operation mode has the previous preset value, the previous value is set.

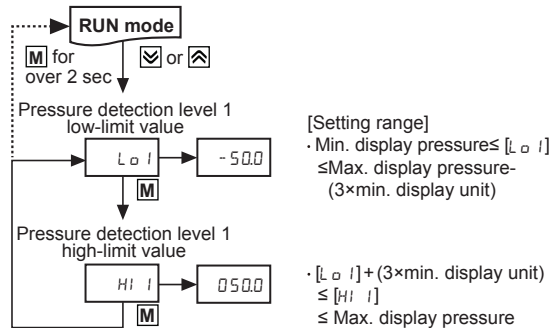
◎ NPN or PNP open collector output type

※Press the + key to set the setting value.

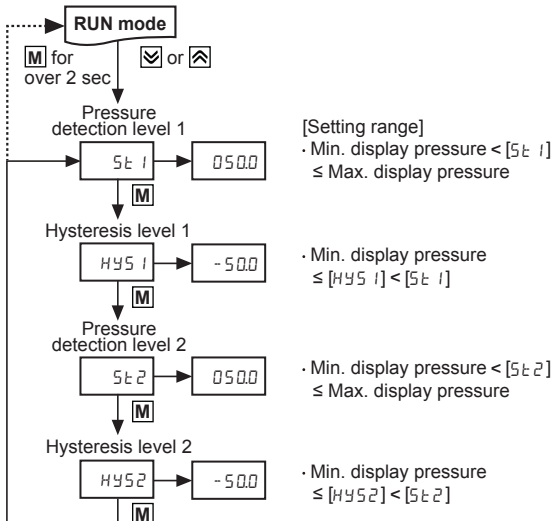
● OUT1=Hysteresis mode [HYSM], OUT2=OFF [OFF]



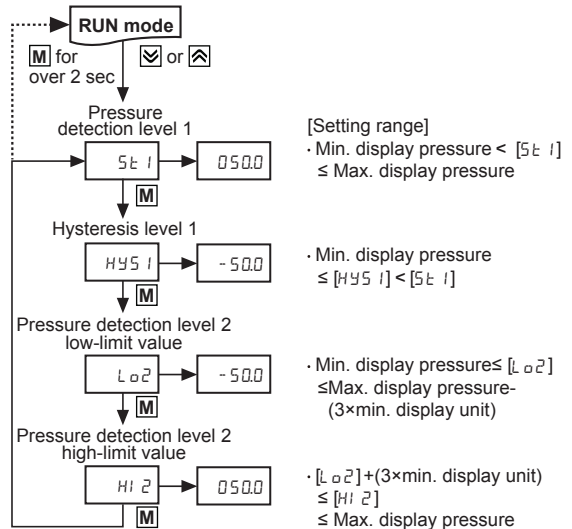
● OUT1=Window comparison output mode [WIN], OUT2=OFF [OFF]



● OUT1=Hysteresis mode [HYSM], OUT2=Hysteresis mode [HYSM]



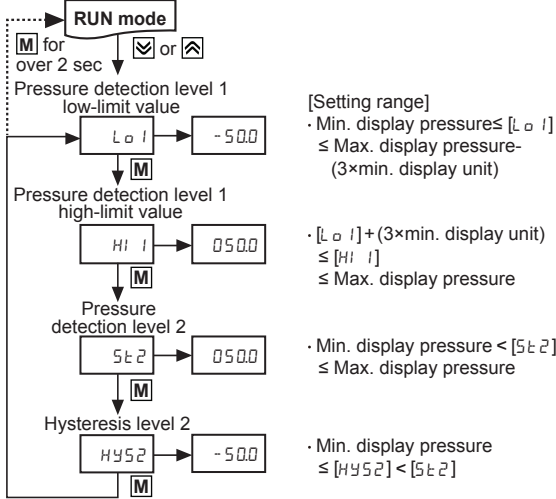
● OUT1=Hysteresis mode [HYSM], OUT2=Window comparison output mode [WIN]



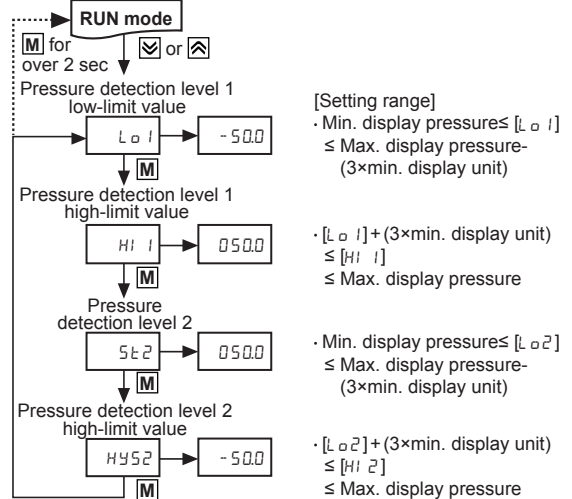
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■ Preset Setting

- OUT1=Window comparison output mode [HI N], OUT2=Hysteresis mode [HYSM]

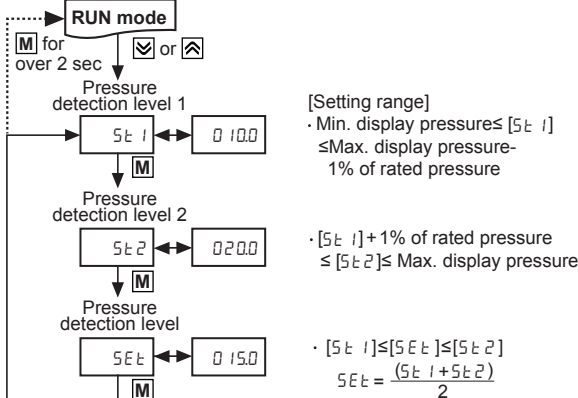


- OUT1=Window comparison output mode [HI N], OUT2=Window comparison output mode [HI N]



- OUT1=Auto sensitivity setting mode [AUT0], OUT2=Auto sensitivity setting mode [AUT0]

※ Press the M key to set $St1$, $St2$ during applying $St1$, $St2$ pressure.
 ※ The set SEt value is adjustable by pressing the M , M keys.

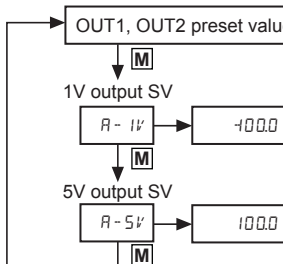


- OUT1=Forced output control mode [FOUT], OUT2=Forced output control mode [FOUT]

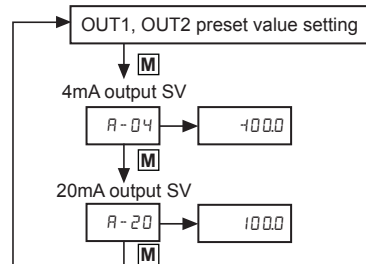
When using forced output control mode, auto shift/remote zero/ Hold input functions are not available.

© NPN or PNP open collector output+analog output or external input type

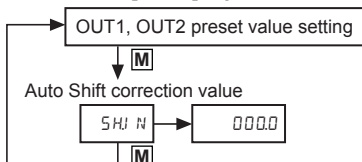
- Analog voltage output [A-V] scale setting



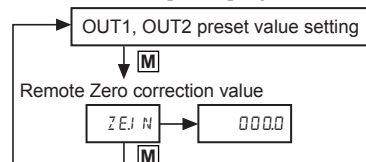
- Analog current output [A-I] scale setting



- Auto Shift [SHFt] input



- Remote Zero [ZER0] input



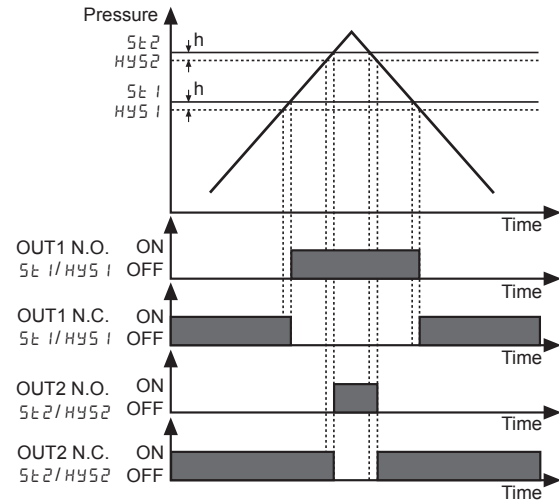
※ Analog output (voltage or current) and external input (auto shift/remote zero/hold) are not available at the same time.

■ Output Operation Mode

※PSQ Series has 4 output operation mode. Use the proper operation mode in accordance with the desired application of detection.

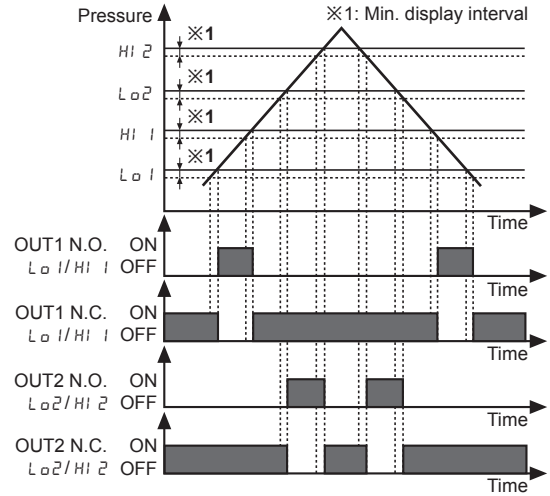
◎ Hysteresis mode [HYS.M]

- Set the hysteresis of pressure detection.
- Set the pressure detection level [SE1, SE2] and hysteresis [HYS1, HYS2].



◎ Window comparison output mode [WIN]

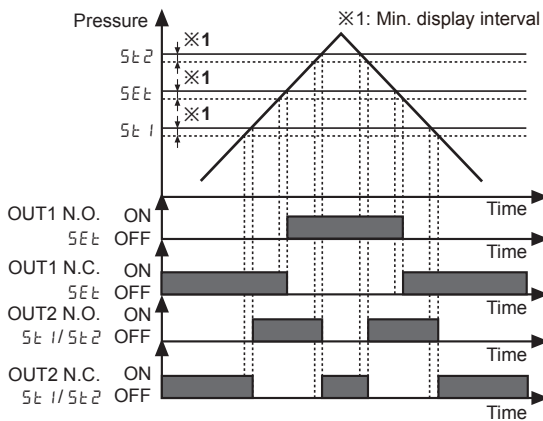
- It detects pressure at the desired range.
- Set high-limit value of pressure detection level [HI1, HI2], and low-limit value of pressure detection level [LO1, LO2].
- Hysteresis is fixed as Min. display interval.



◎ Auto sensitivity setting mode [AUTO]

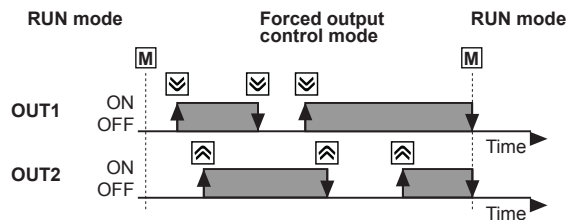
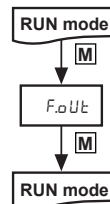
- It sets the proper detection sensitivity automatically.
- It sets by the two pressure points [SE1, SE2].
- Hysteresis is fixed as Min. display interval.
- The pressure detection level [SEt] is shown in the below formula.

$$SEt = \frac{(SE1 + SE2)}{2}$$



◎ Forced output control mode [FOULT]

- Regardless of setting value, it maintains comparison output OFF and displays present pressure.
- Set OUT1 operation mode [OUT1] of parameter 1 group as [FOULT] and return to RUN mode. The PV display part displays [FOULT].
- During forced output control mode, press the or key to turn ON/OFF OUT1, 2 manually.



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(B) Fiber Optic Sensors

(C) Door/Area Sensors

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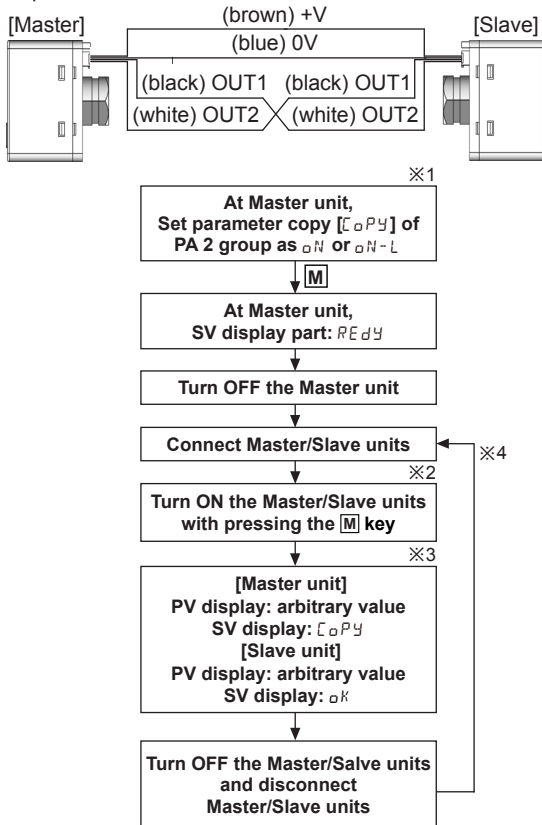
(S) Field Network Devices

(T) Software

■ Functions

◎ Parameter copy

※ This function is for copying parameter settings of Master to Slave 1:1. Master and Slave should be the same specification model.



- ※1: ON: Copies SVs.,
ON-L: Copies SVs and locks front keys of Slave unit.
- ※2: When connecting Master unit and Slave unit incorrectly, the PV display of Master unit displays *ERR4*. Turn OFF the Master unit power and turn ON it. It displays *REDY* at SV display part.
- ※3: The PV display part of Master displays as orange color. The PV display part of Slave displays as green color. When completing copy, the PV display part of Master and Slave displays the same arbitrary value.
- ※4: Connect other Slave units to copy parameters.

◎ Analog output scale adjustment

※ only for NPN or PNP open collector output+ analog output or external input type

Set output voltage, output current to the current display value at 1-5VDC voltage output [A-V], DC4-20mA [A- \bar{C}] current output.

- Set pressure value for 1VDC output [A-1V] and pressure value for 5VDC output [A-5V].
[A-1V] setting range: 0% F.S. \leq [A-1V] \leq 100% F.S.
[A-5V] setting range: 0% F.S. \leq [A-5V] \leq [A-1V]-10% F.S. or [A-1V]+10% F.S. \leq [A-5V] \leq 100% F.S.
- Set pressure value for 4mA output [A-04] and pressure value for 20mA output [A-20].
[A-04] setting range: 0% F.S. \leq [A-04] \leq 100% F.S.
[A-20] setting range: 0% F.S. \leq [A-20] \leq [A-04]-10% F.S. or [A-04]+10% F.S. \leq [A-20] \leq 100% F.S.

◎ Auto Shift/Remote Zero/Hold input

※ only for NPN or PNP open collector output+ analog output or external input type

● Auto Shift [SHFT], Remote Zero [ZER0]

When reference pressure of the pressure sensor changes, apply auto shift or remote zero digital input. It corrects present pressure to reference pressure and by moving detection level as much as fluctuation level. In case of remote zero, it is the same function as auto shift but remote zero makes the measured pressure as 0 forcibly. When changing analog output and external input setting, auto shift correction value [SHIN], remote zero correction value [ZERIN] are also reset as 0.

- Setting correction value
: Press the \boxtimes , \boxtimes key to set SV manually or apply 0VDC to orange cable over 1ms.
When selecting analog output/external input [i/o] of parameter 1 group as [SHFT] or [ZER0], press the [M] key to select control output at [SHOK], [ZEROK] to be with correction value.
- Deleting correction value
: Press the \boxtimes + \boxtimes keys for over 1 sec to delete set auto shift correction.

● Hold [HOLD]

The function to hold PV and control output while signal is input.

◎ Output mode change

● OUT1 operation mode

There are 4 kinds of control output mode in order to realize the various pressure detection.

- Hysteresis mode [HYSM]
: When needed to change hysteresis for detecting pressure.
- Window comparison output mode [WIN]
: When needed to detect pressure in certain area.
- Automatic sensitivity setting mode [AUT0]
: 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 setting value.

● OUT2 operation mode

Select control output mode between two types or OFF.

In case of OUT1 operation mode, select automatic sensitivity setting mode [AUT0] or forced output control mode [FOUT]. OUT2 operation mode setting is inactive.

- Hysteresis mode [HYSM]
: When needed to change hysteresis for detecting pressure.
- Window comparison output mode [WIN]
: When needed to detect pressure in certain area.
- OFF [OFF]

◎ Control output change

Type of control output for OUT1 and OUT2 can be able to set Normally Open or Normally Closed.

※Note that Normally Open and Normally Closed provide opposite output.

SV	OUT1 output	OUT2 output
N _O	Normally Open	OFF
N _C	Normally Closed	OFF
I _O Z _O	Normally Open	Normally Open
I _O Z _C	Normally Open	Normally Closed
I _C Z _O	Normally Closed	Normally Open
I _C Z _C	Normally Closed	Normally Closed

◎ Response time (chattering prevention)

It can prevent control output from chattering by changing response time.

There are 10 types of response time; 2.5ms, 5ms, 10ms, 25ms, 50ms, 100ms, 250ms, 500ms, 1,000ms, 5,000ms. If the response time is getting longer, the detection will be more stable by increasing the number of digital filter.

◎ PV display color and color linked output

You can select PV display color to the linked output status. There are 4 types as below.

Select color linked output among [O_UL 1], [O_UL 2], or [R_LL].

SV	PV display color
R-O _N	Green in normal status. When the set color linked output turns ON, it displays red.
G-O _N	Red in normal status. When the set color linked output turns ON, it displays green.
RE _d	Red is fixed.
GR _E N	Green is fixed.

◎ Pressure unit change

PSQ series has 8 kinds of pressure unit.

Please select the proper unit for application.

• kPa, Mpa, kgf/cm², bar, psi, mmHg, inHg, mmH₂O

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

◎ SV display part

Select the display type at the SV display part in RUN mode.

There are 3 types; displaying SV [5_Ld], displaying unit

[UN_I L], none [O_FF]

◎ RESET

This function is to reset all parameters as factory default except control output SV to prevent wrong settings or difficult operation.

◎ Password

This function is to limit parameter settings, to check the parameter or to change the parameter settings only for entering the set password.

- 0000: Password function OFF
- 0001: Only checking parameters
- Setting range: 0002 to 9999

◎ Control output change

Select between NPN open collector output or PNP open collector output.

◎ Key lock

The key lock function prevents key operations so that conditions set in each mode.

- Press the [M]+[X] key over 1 sec in RUN mode to lock keys. The PV display part displays [L_OC_K], and the SV display part displays [O_N] for 1 sec and it returns in RUN mode.
- Press the [M]+[X] key over 1 sec in RUN mode to unlock keys. The PV display part displays [L_OC_K], and the SV display part displays [O_FF] for 1 sec and it returns in RUN mode.

◎ 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.

To set zero atmospheric pressure forcibly, press the [X]+[R] keys over 1 sec in RUN mode with the opened pressure port.

◎ High/Low Peak Hold

This function is to diagnose malfunction of the system caused by parasitic pressure through memorizing input the max./min. pressure occurred from the system.

Press the [M]+[R] key more than 1 sec in RUN mode and set the Peak Hold.

◎ Error and troubleshooting

Display	Cause	Troubleshooting
ERR1	When adjusting zero point while external pressure is input.	Try again after removing external pressure.
ERR2	When over current is applied on control output	Remove the over current conditions by adjusting load resistance.
ERR3	When the range of Auto sensitivity setting mode ST1, ST2 is set incorrectly.	Check the setting range and set 5 _L 1, 5 _L 2.
ERR4	When connection between master and slave is wrong during copying parameters.	Check the cables between sensors and the connection of the same models.
ERR5	When entering invalid password.	Enter valid password.
HHHH	When applied pressure exceeds the high-limit of display pressure range.	Apply pressure within the display pressure range.
LLLL	When applied pressure exceeds the low-limit of display pressure range.	
-HH-	When the correction value of auto shift, remote zero exceeds the high-limit of the setting range.	Set the correction value of auto shift, remove zero within the setting range.
-LL-	When the correction value of auto shift, remote zero exceeds the low-limit of the setting range.	
-HL-	When [HH], [LL] occur both.	

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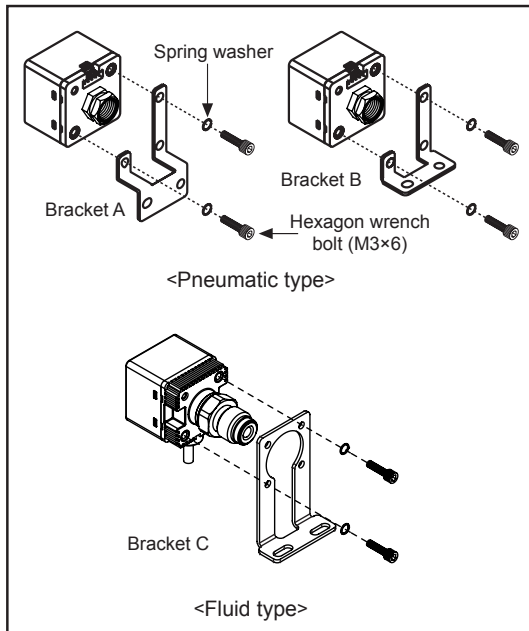
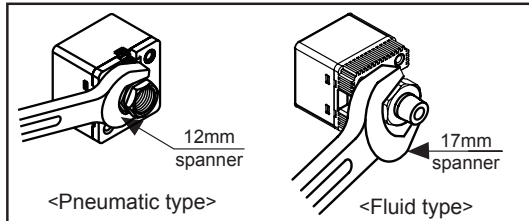
PSQ Series

■ Installation

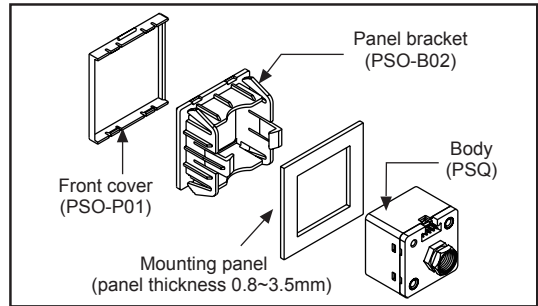
- Pressure port is divided as applicable fluid specification.
Pneumatic type: Rc1/8
Fluid type: R1/8
Therefore, make sure use commercially available one touch fitting.
- Use a spanner (pneumatic type: 12mm, fluid type: 17mm) at the metal part of the unit in order not to overload on the body when connecting one touch fitting.
- Two different brackets are provided for pneumatic type and one different brackets are provided for fluid type. Select proper one with considering your application environments.
- 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 mechanical problems.



- PSQ Series' has panel bracket (PSO-B02), front cover (PSO-P01) are sold separately. When mounting the unit on panel, please follow the below figure.

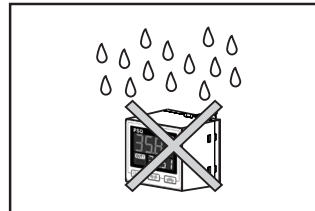


■ Proper Usage

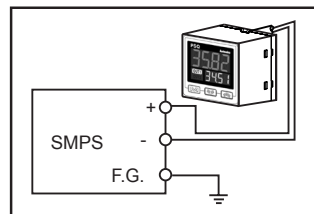
⚠ Caution

PSQ Series is for sensing of non corrosive gas. Do not use this product at corrosive gas or flammable gas, etc.

- In case of 12-24VDC model, power supply should be insulated and limited voltage/current or Class 2 SELV power supply device.
- Do not insert any sharp or pointed object into pressure port. Failure to follow these instructions may result in malfunction and damage to the sensor.
- Be sure that this unit must avoid direct touch with water, oil, thinner, etc.



- Do not use the product in preparation time (within 3 sec.) for operation after power-on.
- When using switching mode power supply, frame ground (F.G.) terminal of power supply should be grounded.



- Avoid wiring with power line or high voltage line. It may cause malfunction by noise.
- When moving this unit from cold place to warm place, please remove the humidity on the cover.
- Do not press the setting button with sharp or pointed object.
- Do not apply a tensile strength in excess of 30N to the cables or connector.
- This unit may be used in the following environment.
 - Indoors
 - Altitude max. 2,000m
 - Pollution degree 3
 - Installation category II