#### Autonics

**DIGITAL PRESSURE SENSOR (Pneumatic type) PSQ SERIES** 

#### INSTRUCTION MANUAL





Thank you for choosing our Autonics product Please read the following safety considerations before use.

#### ■ Safety Considerations

XPlease observe all safety considerations for safe and proper product operation to avoid hazards. XSafety considerations are categorized as follows.

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

The symbols used on the product and instruction manual represent the following. ⚠ symbol represents caution due to special circumstances in which hazards may occur.

#### **⚠** Warning

- A Warning

  1. Fall-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 fire, personal injury, or economic loss.

  2. Install on a device panel or to a pressure port directly to use.

  Failure to follow this instruction may result in fire.

  3. Do not connect, repair, or inspect the unit while connected to a power source.

  Failure to follow this instruction may result in fire.

  4. Check 'Connections' before wiring.

  Failure to follow this instruction may result in fire.

  5. Do not disassemble or modify the unit.

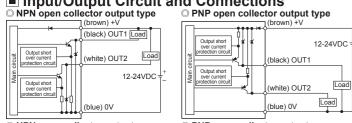
  Failure to follow this instruction may result in fire.

- ailure to follow this instruction may result in fire.

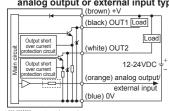
#### **⚠** Caution

- 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. Do not use for corrosive gas Failure to follow this instruction may result in product damage.
  4. 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 fire or explosion.
  5. Keep metal chip, dust, and wire residue from flowing into the unit.
  Failure to follow this instruction may result in fire or product damage.

### Input/Output Circuit and Connections



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



	The open conector output				
е		analog output o	or external input type		
	┌╴		(brown) +V		
		Output short over current protection circuit	12-24VDC T		
	Main circuit	Output short over current protection circuit	Load (white) OUT2		
	Ž		(orange) analog output/ external input Load		
	ᆫ		\$\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		
		:::::::: output impedar			
shi c	HIERO	ant over the rated on	ocification normal control		

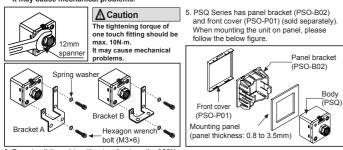
※::...:: output impedance
※If short-circuit the control output terminal or supply of signal is not output due to the output short over current protection circuit

#### Installation

- be pressure port is divided to standard and optional specification, be cautious when using commercial touch fitting. (Standard: Rc1/8, Option: R1/8, NPT1/8) a spanner (12mm) at the metal part of the unit in order not to overload on the body when connecting
- one touch fitting.

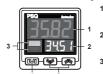
  Two different fixing brackets are provided for PSQ Series. Select proper one according to your application
- environments.

  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.



Display	Cause	Troubleshooting	
ERRI	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 5 $\pm$ 1, 5 $\pm$ 2 is set incorrectly.	Check the setting range and set 5£ 1,5£2.	
ERRY	When connection between master and slave is wrong during copying parameters.	Check the cables between sensors and the connection of the same models.	
ERRS	When entering invalid password.	Enter valid password.	
нннн	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.		
-нн-	When the correction value of auto shift, remote zero exceeds the high-limit of the setting range.		
-LL-	When the correction value of auto shift, remote zero exceeds the low-limit of the setting range.	Set the correction value of auto shift, remove zero within the setting range.	
-HL-	When [HH], [LL] occur both.		

#### Unit Descriptions

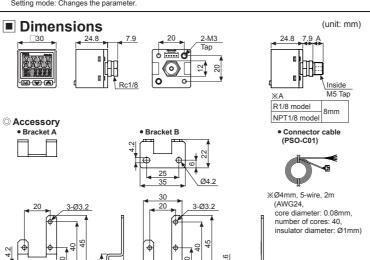


- Present value (PV) display part (green, red, orange by setting/status RUN mode: Displays PV. Setting mode: Displays parameter.
- 2. Setting value (SV) display part (green)
- Setting mode: Displays SV.

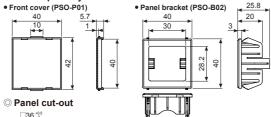
  3. Output indicator (OUT1, OUT2) (orange)

  Colorinate 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.
  Parameter setting mode: Press the M key to select the setting items.
  Press the M key to select the setting items.
  Press the M key for over 2 sec to return RUN mode: Press the M key for over 2 sec to return RUN mode: Press the M key to set preset value of output operation mode.
  Press the M keys to set key lock/unlock.
  Press the M keys to adjust zero point.
  Press the M keys to set peak hold.
  Preset value setting mode: Press the A key to increase/decrease setting value.
  Setting mode: Changes the parameter.



Sold separately



M5 gender (PSO-Z01)

# □36 <sup>+0.5</sup> (panel thickness 0.8 to 3.5mm)

## Specifications

]  - 	Туре	е	NPN or PNP open collector output type		NPN or PNP open collector output +analog output or external input type		
		Model <sup>×1</sup>		PSQ-C01C-	PSQ-C1C-	PSQ-C01CU-	PSQ-C1CU-
	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		2 times of rated pressure	1.5 times of rated pressure	2 times of rated pressure	1.5 times of rated pressure
		Applied fluid		Air, non-corrosive gas			
		Power supply		12-24VDC (ripple P-P: max. 10%)			
		Allov	vable voltage range	90 to 110% of rated voltage			
_		Curr	ent consumption	Max. 50mA (current output: max. 70r		output: max. 70mA)	
al g on		Con	trol output	NPN or PNP open collector output -Load voltage: max. 30VDC			
		Hysteresis*2 Repeat error Response time Protection circuit		Min. display interval			
				±0.2% F.S. ± min. display interval			
				Select one; 2.5ms, 5ms, 10ms, 25ms, 50ms, 100ms, 250ms, 500ms, 1,000ms, 5,000ms			
				Output short over current protection circuit			
ie			Voltage			Output voltage: 1-5\ Linear: max. ±1% F. Possilution: 1/2 000	

10	tootion on our	Output short over our	icht proteotion ondat			
Analog	Voltage output	_		Output voltage: 1-5VDC= ±2.5% F.S. - Linear: max. ±1% F.S. - Resolution: 1/2,000 - Output impedance: approx. 240Ω - Response time: 50ms		
output**	Current	_		Output current: DC4-20mA ±2.5% F.S. Linear: max. ±1% F.S. Resolution: 1/2,000 Output impedance: approx. 100kΩ Response time: 50ms		
External input*3 (Auto shift/ Remote zero/ Hold)		_		ON voltage: Max. 0.4VDC OFF voltage: 5-Vin or open Resolution: 1/2,000 Output impedance: approx. 100kΩ		
Display		Present value (PV) indicator, setting value (SV) indicator: 4-digit				
Display		12 segment LCD method				
	MPa	0.001	0.001	0.001	0.001	
	kPa	0.1	1	0.1	1	
Min.	kgf/cm <sup>2</sup>	0.001	0.01	0.001	0.01	
display	bar	0.001	0.01	0.001	0.01	
interval	psi	0.02	0.2	0.02	0.2	
iiiitoi vai	mmHg	1	_	1		
	inHg	0.1	_	0.1		
	mmH <sub>2</sub> O	0.1	_	0.1	_	
Display	accuracy	0 to 50°C: max. ±0.5% F.S., -10 to 0°C: max. ±1% F.S.				
Insulation resistance						
Dielectric strength		1,000VAC 50/60Hz for 1 min				
Vibration		1.5mm amplitude at frequency of 10 to 55Hz (for 1 min) in each of X, Y, Z direction for 2 hours				
Environ-		-10 to 50°C, storage: -20 to 60°C				
ment	Ambient humi.	30 to 80%RH, storage: 30 to 80%RH				
Protection structure		IP40 (IEC standard)				
Material		Front case: polycarbonate, rear case: polycarbonate, pressure port: brass-nickel plated				
		44				

X1: ☐ in model represents the type of pressure port. Standard: Rc1/8, option: R1/8, NPT1/8

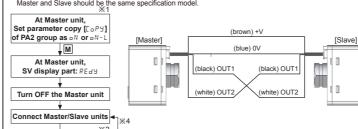
\*2: in hysteresis output floue, it is variable.
 \*3: Select one between analog output (voltage or current) and external input.
 \*4: The weight includes packaging. The weight in parenthesis is for unit only.
 \*For using mmH<sub>2</sub>O unit, multiply display value by 100.
 \*Environment resistance is rated at no freezing or condensation.

X2: In hysteresis output mode, it is variable.

■ Functions

PV display: arbitrary value

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



Turn ON the Master/Slave nits with pressing the M key nN-L: Copies SVs and locks front keys of Slave unit.

##E: Other SVs aim docts from Reys of Slave unit.

#2: When connecting Master unit and Slave unit incorrectly, the PV display of Master unit displays ERP4.

Turn OFF the Master unit power and turn ON it. It displays REdY at SV SV display: EoPY
[Slave unit]
PV display: arbitrary value
SV display: oK 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.

3: Connect other Slave units to copy parameters.

Turn OFF the Master/Salve units and disconnect Master/Slave units

(only for NPN or PNP open collector output+analog output Set output voltage, output current to the current display value at 1-5VDC voltage output [R-V], DC4-20mA [R-E] current output. 1-5VDC Voltage output [H-V], D.C4-ZUMA [H-L] current output Set pressure value for 1VDC output [R-V] and pressure value for 5VDC output [R-SV]. [R-V] setting range: 0% F.S.≤ [R-V] ≤ [R-V]-10% F.S. or [R-V] setting range: 10% F.S.≤ [R-SV] ≤ [R-V]-100% F.S. or [R-V] +10% F.S.≤ [R-SV] ≤ [R-SV] ≤ [R-SV] ≤ [R-SV] ≤ [R-V] +10% F.S. or [R-V] +10% F.S.≤ [R-SV] ≤ [R-V] +10% F.S. ∈ [R-V] ≤ [R-V] +10% F.S. ∈ [R-V] ≤ [R-V] +10% F.S. ∈ [R-V

• Set pressure value for 4mA output [₱-04] and pressure value for 20mA output [₱-20]. [₱-04] setting range: 0% F.S.≤ [₱-04]≤100% F.S. [₱-20] setting range: 0% F.S.≤ [₱-20]≤ [₱-04]-10% F.S. or [₱-04]+10% F.S.≤ [₱-20]≤100% F.S.

1VDC 0.6VDC 0.6VDC 10% 1-51/ R-11/ R-51/ PV

# Auto Shift/Remote Zero/Hold input (only for NPN or PNP open collector output+analog output or external input type) -Auto Shift [SHFE], Remote Zero [ZERo] : 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

If case of femole zero, it is the same function as and smit out femole zero makes the measured pressure as 0 forcibly.

When changing analog output and external input setting, auto shift correction value [∑EJ H], remote zero correction value [∑EJ H] are also reset as 0.

-Setting correction value

: Press the ☑ A key to set SV manually or apply 0VDC to orange cable over 1ms.

When selecting analog output/external input [□ / o] of PA1 group as [SHFE] or [ZERo], press the ☒ key to select control output at [SHoE], [ZEoE] to be with correction value.

-Deleting correction value: Press the ☒Hゑ keys for over 1 sec to delete set auto shift correction.

• Hold [Hat d]: The function to hold PV and control output while signal is input

# 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, 1000ms, 5000ms, if the response time is getting longer, the detection will be more stable by increasing the number of

#### 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 [blb 1], [blb2], or [RLL].

5 - □N Red in normal status. When the set color linked output turns ON, it displays green.

GREN Green is fixed. SV display part

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

There are 3 types; displaying SV [5±d], displaying unit [UNI ±], none [aFF]

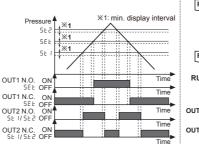
■ THIS function is to diagnose malfunction of the system caused by parasitic pressure through memorizing input the max./min. pressure occurred from the system. Press the M+⊗ key more than 1 sec in RUN mode and se

#### Output Operation Mode

PSQ Series has 4 output operation mode. Use the proper oper desired application of detection.

Hysteresis mode [HY5M] ○ Window comparison output mode [₩ N] • It detects pressure at the desired range.
• Set high-limit value of pressure detection level [HI HI 2], and low-limit value of pressure detection level [Lo I, Lo 2].
• Hysteresis is fixed as min. display interval. Set the hysteresis of pressure detection. Set the pressure detection level [5£ 1, 5£2] and hysteresis [495 1, 4952]. SE2 4h OUT1 N.O. ON OUT1 N.C. ON OUT1 N.C. ON OUT2 N.O. ON OUT2 N.C. ON SEZ/HYSS OFF ○ Auto sensitivity setting mode [AULo] ○ Forced output control mode [F.a U b ]

Regardless of setting value, it maintains con output OFF and displays present pressure.

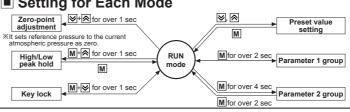


output OFF and displays present pressure.

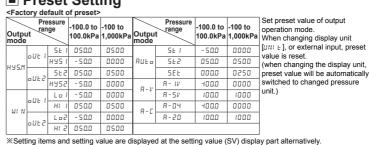
Set OUT1 operation mode [olb +] of parameter 1
group as Fallb and return to RUN mode. The PV
display part displays the measured pressure and
the SV display part displays [Fallb].

• During forced output control mode, press the ☑ or
key to turn ON/OFF OUT1, 2 manually. RUN mode OUT1 ON S S OUT2 ON A A

Setting for Each Mode



#### Preset Setting

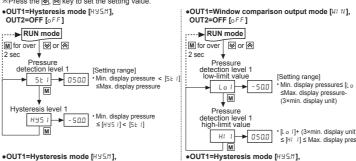


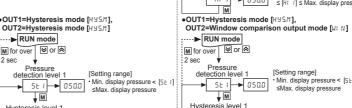
Setting items and setting value are displayed at the setting value (SV) display part alternatively.

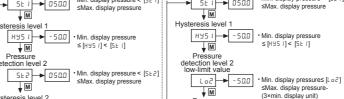
If there is no additional key input for over 2 sec during setting, the setting value is automatically set and it returns to RUN mode. (except forced output control mode)

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







RUN mode

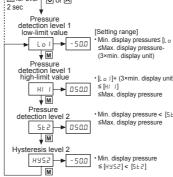
M for over ⊌ or ⋈

ysteresis level 2

H452

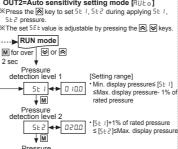
-500

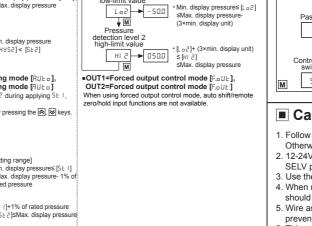
Min. display pressu
≤ [4452] < [5£2] OUT2=Hysteresis mode [H95n]



RUN mode

Press the key to set 5t 1.5t2 during app



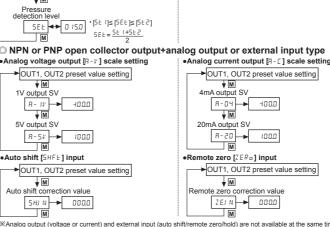


Pressure detection level 1 | Setting range | Setting range | • Min. display pressure≤ [L o 1] • Min. display pressure≤ [L o 1] • Min. display unit) | Pressure

gn-limit value

| H | | → □5□□ | • [t o 1] + (3×min. display unit)

| Fressure | S | H | 1] | ≤ Max. display pressure



■ Parameter Setting

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

\*\*Press the ☑ A key to set the setting value.

\*\*After entering parameter 1/2 group, press the ☑ key for over 2 sec to return to RUN mode.

\*\*When pressing the ☑ key once returning RUN mode from parameter 1 group, 2 group within 2 sec, it enters the previous parameter group.

Parameter 1 group …► RUN mode

> OUT1 opera H95M WIN RUEO FOUE

##95# ₩95# ₩ ## WAppears when OUT1 operation mode is set as #95#, #! N.

Analog output/ External input \*Only for NPN or PNP open collector output+analog output or 

\*When OUT1 operation mode is set as Folli- or applied

ZEot → OUL I ← OUL Z ← → RLL OUES: OFF NO NE

OUT1 output OUT2 output Normal Open OFF

NC Normal Closed OFF lo2o Normal Open Normal Open 
 Io2E
 Normal Open
 Normal Closed

 IE2o
 Normal Closed
 Normal Open

 IE2E
 Normal Closed
 Normal Closed
 2.5 ← 5 ← 10 ← 25 ← 50

5000 - 1000 - 500 - 250 - 100 R-oN FED FEN

KPA ← MPA ← KGF ← ► LAR

※For using mmH₂O unit, multiply display value by 100. Department Parameter 2 Parameter 3 Paramet …► RUN mode

playing SV) (Displaying unit) (None) SV display part **►** 5Ub M

# Cautions during Use

1. Follow instructions in 'Cautions during Use'.

Otherwise, it may cause unexpected accidents. 12-24VDC power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
 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.

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.

②Altitude max. 2,000m ③Pollution degree 3 (4) Installation category II

■ Major Products

Photoelectric Sensors

Fiber Optic Sensors

Temperature Controllers

Temperature/Humidity Transducers

■ Laser Marking System (Fiber, CO₂, Nd: YAG)
■ Laser Welding/Cutting System

Autonics Corporation