Autonics

DIGITAL PRESSURE SENSOR (Fluid type) PSQ SERIES

INSTRUCTION MANUAL





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

■ Safety Considerations

**Please observe all safety considerations for safe and proper product operation to avoid hazards.

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

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

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

 Failure to follow this instruction may result in personal injury, fire, or economic loss.

 Do not use it in flammable gas because it does not have an explosion proof construction.

 Failure to follow this instruction may result in explosion.

⚠ Caution

- 1. Do not use the unit outdoors.
 Failure to follow this instruction may result in shortening the life cycle of the unit. The unit is proper indoor environment.

 2. Do not apply the pressure beyond rated pressure.
 Failure to follow this instruction may result in product damage.

 3. Do not use the unit beyond power supply.
 Failure to follow this instruction may result in product damage by fire.

 4. Do not short the circuit for load.

- 1. Do not short the circuit for load.
- Failure to follow this instruction may result in product damage by fire.

- Failure to follow this instruction may result in product damage by me.

 5. Check the polarity of the power before wiring the unit for correct connection.

 Failure to follow this instruction may result in product damage by fire.

 6. Do not use corrosive gas or liquid to the unit as the unit is only for non-corrosive gas.

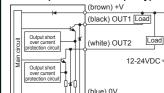
 Failure to follow this instruction may result in product damage.

 7. Do not supply excessive power to the unit case or twist the unit case strongly.

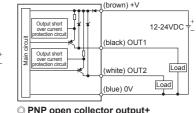
 Failure to follow this instruction may result in product damage.

Input/Output Circuit and Connections

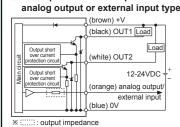
NPN open collector output type



O PNP open collector output type



NPN open collector output+



analog output or external input type (black) OUT1

(white) OUT2 (orange) analog output/ external input Loa (blue) 0V

Installation

- Pressure port is R1/8. Therefore, make sure use commercially available one touch fitting.
 Use a spanner (17mm) at the metal part of the unit in order not to overload on the body when connecting
- one touch fitting.

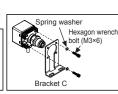
 3. Fixing bracket is provided for PSQ Series.

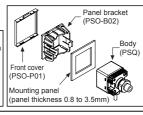
 4. At first, please unscrew hexagon wrench bolt and assemble the bracket on this unit by fixing hexagon the wrench bolt. In this case, tightening torque of hexagon wrench should be max. 3N-m. It may cause mechanical problems.

 5. 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.

▲ Caution The tightening torque of one touch fitting should be max. 10N·m. It may cause mechanical







Error and Troubleshooting

When oc	curring error, follow the below troubleshooting.	3	
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 5Ł 1, 5Ł 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.	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.		
- H! -	When [HH] [H] accur both		

__HL_- | When [HH], [LL] occur both.

**The above specifications are subject to change and some models may be discontinued without notice.

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)

The CN while the control output turns ON.

Full 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 for over 2 sec to return RUN mode.

Press the M key for over 2

S. \(\subseteq \) key

RUN mode: Press the \(\subseteq \) key to set preset value of output operation mode.

Press the \(\subseteq \) keys to set key lock/unlock.

Press the \(\subseteq \) keys to adjust zero point.

Press the \(\subseteq \) key to set peak hold.

Preset value setting mode: Press the \(\supseteq \) key to increase/decrease setting value. Setting mode: Changes the parameter.

Dimensions 30 12.3 8 Inside M5 Tap 20 2-M3 Tap R1/8

Ø4mm, 5-wire, 3m Accessory O Sold separately

|< 20 ►|

36 O Panel cut-out □36 +0.5

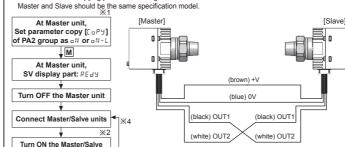


Specifications

	e type	Sealed gauge pressu	ıre	NDN DOO		
Туре		NPN or PNP open collector output type		NPN or PNP open collector output +analog output or external input type		
Model		PSQ-BC01-R1/8	PSQ-BC1-R1/8	PSQ-BC01U-R1/8	PSQ-BC1U-R1/8	
Rated pr	essure 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		3 times of rated pres	sure			
Applied fluid		Air, Non-corrosive gas and fluid that do not corrode stainless steel 316L				
Power supply		12-24VDC== (ripple P-P: max. 10%)				
Allowable voltage range		90 to 110% of rated voltage				
Current consumption		Max. 50mA (current output: max. 70mA)				
Control output Hysteresis ^{*2}		NPN or PNP open collector output Load voltage: Max. 30VDC: Residual voltage: Max. 2VDC:				
		Min. display interval				
	peat error	±0.2% F.S. ±Min. display interval				
	sponse time					
Pro	tection circuit	Output short over current protection circuit				
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 ^{*3}	Current output	Output current: DC4-20mA ±2.5' Linear: Max. ±1% F.S. Resolution: 1/2,000 Output impedance: Approx. 100i Response time: 50ms		.S. Approx. 100kΩ		
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 digits		Present value (PV) ir	ndicator, Setting value	(SV) indicator: 4-digit		
Display i	method	12 segment LCD me	thod			
	MPa	0.001	0.001	0.001	0.001	
	kPa	0.1	1	0.1	1	
				-		
Min	kgf/cm ²	0.001	0.01	0.001	0.01	
Min. display	bar	0.001	0.01	0.001 0.001	0.01	
	bar psi	0.001 0.02	0.01	0.001 0.001 0.02	0.01 0.01 0.2	
display	bar psi mmHg	0.001 0.02 1	0.01	0.001 0.001 0.02	0.01	
display	bar psi mmHg inHg	0.001 0.02 1 0.1	0.01	0.001 0.001 0.02 1 0.1	0.01 0.01 0.2	
display interval	bar psi mmHg inHg mmH ₂ O	0.001 0.02 1 0.1 0.1	0.01 0.2 — —	0.001 0.001 0.02 1 0.1 0.1	0.01 0.01 0.2	
display interval Display	bar psi mmHg inHg mmH ₂ O accuracy	0.001 0.02 1 0.1 0.1 0 to 50°C: Max. ±0.5'	0.01 0.2 ———————————————————————————————————	0.001 0.001 0.02 1 0.1 0.1	0.01 0.01 0.2	
display interval Display	bar psi mmHg inHg mmH ₂ O accuracy on resistance	0.001 0.02 1 0.1 0.1 0 to 50°C: Max. ±0.5' Over 50MΩ (at 500V	0.01 0.2 — — — % F.S., -10 to 0°C: Ma DC megger)	0.001 0.001 0.02 1 0.1 0.1	0.01 0.01 0.2	
Display a Insulatio	psi mmHg inHg mmH ₂ O accuracy on resistance c strength	0.001 0.02 1 0.1 0.1 0 to 50°C: Max. ±0.5' Over 50MΩ (at 500V 1,000VAC 50/60Hz fr	0.01 0.2 — — % F.S., -10 to 0°C: Ma DC megger) or 1 min	0.001 0.001 0.02 1 0.1 0.1 x. ±1% F.S.	0.01 0.01 0.2 —	
Display a Insulation Dielectric Vibration	psi mmHg inHg mmH ₂ O accuracy on resistance c strength	0.001 0.02 1 0.1 0.1 0.1 0 to 50°C: Max. ±0.5′ Over 50MΩ (at 500V 1,000VAC 50/60Hz ft 1.5mm amplitude at fi	0.01 0.2	0.001 0.001 0.02 1 0.1 0.1	0.01 0.01 0.2 —	
Display a Insulation Dielectric Vibration Environ-	bar psi mmHg inHg inHg mmH ₂ O accuracy or resistance c strength	0.001 0.02 1 0.1 0.1 0 to 50°C: Max. ±0.5 0ver 50MΩ (at 500V 1,000VAC 50/60Hz ft 1.5mm amplitude at ft -10 to 50°C, storage:	0.01 0.2	0.001 0.001 0.02 1 0.1 0.1 x. ±1% F.S.	0.01 0.01 0.2 —	
Display a Insulation Dielectric Vibration	bar psi mmHg inHg inHg mmH ₂ O accuracy or resistance c strength	0.001 0.02 1 0.1 0.1 0 to 50°C: Max. ±0.5 0ver 50MΩ (at 500°V 1,000VAC 50/60H2 ft 1.5mm amplitude at fir -10 to 50°C, storage: 30 to 80%RH, storag	0.01 0.2	0.001 0.001 0.02 1 0.1 0.1 x. ±1% F.S.	0.01 0.01 0.2 —	
Display interval Display in Insulatio Dielectric Vibratior Environment Cable	bar psi mmHg inHg mmH ₂ O accuracy or resistance c strength n Ambient temp.	0.001 0.02 1 0.1 0.1 0 to 50°C: Max. ±0.5' Over 50MΩ (at 500V 1,000VAC 50/60Hz ft 1.5mm amplitude at fi -10 to 50°C, storage: 30 to 80%RH, storag Ø4mm, 5-wire, 3m, (AWG24, core diame	0.01 0.2	0.001 0.001 0.02 1 0.1 0.1 x. ±1% F.S.	0.01 0.01 0.2 — — /, Z direction for 2 he	
Display interval Display in Insulatio Dielectric Vibratior Environment Cable	bar psi mmHg inHg mmH ₂ O accuracy or resistance c strength Ambient temp. Ambient humi.	0.001 0.02 1 0.1 0.1 0.1 0.1 0 to 50°C: Max. ±0.5′ Over 50MΩ (at 500V 1,000VAC 50/60Hz ft 1.5mm amplitude at ft -10 to 50°C, storage: 30 to 80%RH, storag 24mm, 5-wire, 3m, (AWG24, core diame IP65 (IEC standard)	0.01 0.2	0.001 0.001 0.02 1 0.1 0.1 0.1 x. ±1% F.S.	0.01 0.01 0.2	

■ Functions

○ Parameter copy This function is for copying parameter settings of Master to Slave 1:1.



nits with pressing the M key X1: □N: Copies SVs.

PV display: arbitrary value SV display: EoPY
[Slave unit]
display: arbitrary value
SV display: oK

nN-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 £RP4.

Turn OFF the Master unit power and turn ON it. It displays ££d4 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.

3: Connect other Slave units to copy parameters.

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

Analog output scale adjustment (only for NPN or PNP open collector output+analog output of Set output voltage, output current to the current display value at 1-5VDC voltage output (□-V), DC4-20mA [□-C] current output.

1-5VDC Voltage output [H-V], D.C4-20mA [H-L] current output

Set pressure value for 1VDC output [R-V], and pressure value for 5VDC output [R-SV].

[R-IV] setting range: 0% F.S.≤ [R-IV]≤100% F.S. [R-IV]+10% F.S. or

[R-SV] setting range: 0% F.S.≤ [R-SV]≤ [R-IV]+10% F.S. or

• Set pressure value for 4mA output [$R-0^4$] and pressure value for 20mA output [$R-0^4$] setting range: 0% F.S.= [$R-0^4$]=100% F.S. [$R-0^4$]=101% F.S. or [$R-0^4$]=100% F.S.= [$R-0^4$]=10% F.S.= [$R-0^4$]=100% F.S.

1VDC 0.6VDC 0.6VDC 1/1 R-1// R-5// PV

Auto Shift/Remote Zero/Hold input (only for NPN or PNP open collector output+a

(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

When changing analog output and external input setting, auto shift correction value [5H/N], remote zero correction value [ZEJN] are also reset as 0.

Setting correction value

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

When selecting analog output/external input [+ / -] of PA1 group as [SHFE] or [ZER-], press the M key to select control output at [SHAE], [ZEAE] to be with correction value.

-Deleting correction value: Press the ☑+☑ keys for over 1 sec to delete set auto shift correction.

+ Hold [HaEd]: The function to hold PV and control output while signal is input.

Response time (chattering prevention)

It can prevent control output from chattering output 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 the control of the

DPV display color and color linked output

I V U	ispiay color and color iniked output	
You can	select PV display color to the linked output status.	
There a	re 4 types as below. Select color linked output among [allE 1], [allE2], or [RLL].	
SV	PV display color	
R-0N	Green in normal status. When the set color linked output turns ON, it displays as red.	
5-oN	Red in normal status. When the set color linked output turns ON, it displays as green.	
REd	Red is fixed.	
GREN	Green is fixed.	

SV dispaly 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 [pFF]

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+C key more than 1 sec in RUN mode to set the peak hold.

Output Operation Mode

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

O Hysteresis mode [서명5세]
Window comparison output mode [서명 기계]

○ Window comparison output mode [糾 N] Set the hysteresis of pressure detection.
Set the pressure detection level [5£ 1, 5£2] and hysteresis [H95 1, H952]. 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 1, Lo2].

Hysteresis is fixed as min. display interval. Pressure A ×1 OUT1 N.O. ON OUT1 N.O. ON OUT1 N.C. ON La I/HI I OFF OUT2 N.O. ON OUT2 N.C. ON SE2/HYS2 OFF OUT2 N.C. ON Lo2/HI 2 OFF

○ Auto sensitivity setting mode [AUto] It sets by the two pressure points [5£ 1, 5£2]. Hysteresis is fixed as min. display interval. The pressure detection level [5EE] is shown in the

below formula. $5EE = \frac{(5E + 1 + 5E2)}{2}$

○ Forced output control mode [F.o UE] Regardless of setting value, it maintains comoutput OFF and displays present pressure. *Set OUT1 operation mode [all Ell] of parameter 1 group as Fall Eand return to RUN mode. The PV display part displays the measured pressure and the SV display part displays [F⊿UŁ].

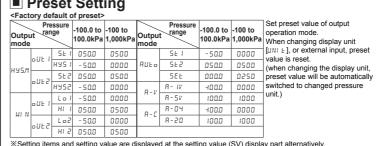
During forced output control mode, press the ☑ or ☑ key to turn ON/OFF OUT1, 2 manually.

RUN mode

RUN mode OUT1 ON OFF M OUT2 ON Time

Setting For Each Mode Zero-point adjustment \searrow , \triangle High/Low peak hold — My for over 1 sec M for over 2 sec Parameter 1 group M for over 4 sec Parameter 2 group M for over 2 sec

Preset Setting

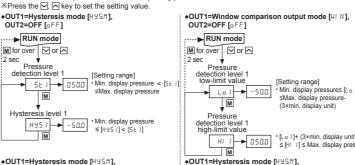


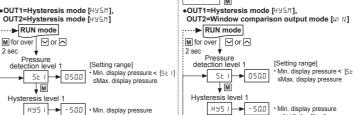
Setting items and setting value are displayed at the setting value (SV) display part alternatively.

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



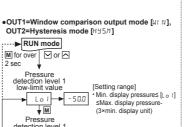


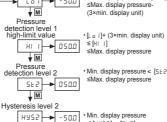
H45 1 → -500 • Min. display pressu ≤ [H45 1] < [5Ł 1] H45 1 → - 500 • Min. display pressure ≤ [H45 1] < [5E 1] SE2 → ØSQ.0 • Min. display pre ≤Max. display p Hysteresis level 2

Hys2

→ -500

Min. display pressu
≤ [Hys2] < [5£2]





Press the kev to set 5t 1.5t2 during app 5 £ 2 pressure.

The set 5 £ £ value is adjustable by pressing the ☑, ☒ key. ... RUN mode

Analog voltage output [A-1] scale setting

OUT1, OUT2 preset value setting

→ OUT1, OUT2 preset value setting

1V output SV

5V output SV

R-5V

1000

5HJ N → 000.0

•Auto shift [SHFE] input

M for over or

H425 → - 200 • Min. display pressure ≤ [H425] < [5E2] NPN or PNP open collector output+analog output or external input type

tetection level 1 [Setting range]

Min. display pressure < [SE |

Max. display pressure •OUT1=Window comparison output mode [¾1 ¾] ... RUN mode M for over ☑ or △ HI I D S D D ... (L o I)+ (3×min. display unit ≤ [HI I] ≤ [HI I] ≤ Max. display pressure • Min. display pressure

• Min. display pressure

• Max. display pressure

(3×min. display unit) | [. o 2]+ (3×min. display u ≤ [H 2] | ≤ [H 2] | ≤ [Max. display pressure •OUT1=Forced output control mode [F.a UE],
OUT2=Forced output control mode [F.a UE]

•Analog current output [Я - [] scale se

OUT1, OUT2 preset value setting

→OUT1, OUT2 preset value setting

4mA output SV

R-04

ImA output SV

20mA output SV

| R-20 | 100.0

•Remote zero [₹ E R □] input

₩

Cautions During Use

Parameter 2 group

…► RUN mode

SV display part

► 5Ub ₩ M

■ Parameter Setting

O Parameter 1 group

··▶ RUN mode

Analog output/ External input

OUT1

Xafter 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.

Xafter entering parameter 1/2 group, press the M key for over 2 sec to return to RUN mode.

Xafter entering parameter 1/2 group, press the M key for over 2 sec to return to RUN mode.

Xafter entering parameter 1/2 group, press the M key for over 2 sec to return to RUN mode.

Xafter entering parameter 1/2 group, press the M key for over 2 sec to return to RUN mode.

Xafter entering parameter 1/2 group, press the M key for over 2 sec to return to RUN mode.

Xafter entering parameter 1/2 group, press the M key for over 2 sec to return to RUN mode.

Xafter entering parameter 1/2 group, press the M key for over 2 sec to return to RUN mode.

H95M WIN RUED FOUE

MYSM WIN MAPPEARS when OUT1 operation mode is set as HYSM, HIN.

XOnly for NPN or PNP open collector output+analog output or

external input type mouel.

R-V SHFE SHFE ZERO HOLD

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

OUT1 output OUT2 output

2.5 ← 5 ← 10 ← 25 ← 50

5000 - 1000 - 500 - 250 - 100

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

R-oN FED FEEN

KPA → MPA → KGF → ЬAR

5Ed ■ UNI E ■ oFF

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

→ 000<u>0</u> ← 00<u>0</u> 0000 ← 0<u>0</u> 0000

0001: Only checking parame *Setting range: 0002 to 9999

ZE.ot → OUL I → OUL 2 → RLL

OUES: OFF NO NE

I. In case of 12-24VDC model, power supply should be insulated and limited voltage/current or Class 2 SELV power supply device.

2. Do not insert any sharp or pointed object into pressure port. Failure to follow these instructions may resu

in malfunction and damage to the sensor.

3. Be sure that this unit must avoid direct touch with water, oil, thinner, etc.

4. Do not use the product in preparation time (within 3 sec) for operating after pow

5. When using switching mode power supply, frame ground (F.G.) terminal of power supply

frame ground (F.G.) terminal or power suppry should be grounded.

6. Avoid wiring with power line or high voltage line. It may cause malfunction by noise.

7. When moving this unit from cold place to warm place, please remove the humidity on the cover.

8. Do not press the setting button with sharp or pointed object.

9. Do not apply a tensile strength in excess of 30N to the cables or connector.

10. This unit may be used in the following environment.

© Indoor.

② Altitude max. 2,000m Indoor.
 Pollution degree 3

Failure to follow these instructions may result in product damage

■ Major Products

hic/Logic Panels

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

DRW161200AA