Autonics

DIGITAL PRESSURE SENSOR (Fluid type) PSQ SERIES

INSTRUCTION MANUAL

(€ c¶us



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. ★ ★ symbol represents caution due to special circumstances in which hazards may occur.

▲ Warning 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 dam

⚠ Warning

- I. 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.

 2. 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.

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

 Failure to follow this instruction may result in fire.

- Failure to follow this instruction may result in fire.

 4. Do not connect, repair, or inspect the unit while connected to a power source. Failure to follow this instruction may result in fire.

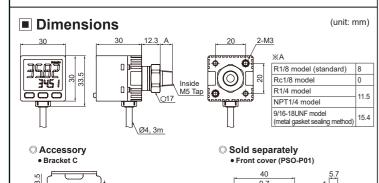
 5. Check 'Connections' before wiring.
 Failure to follow this instruction may result in fire.

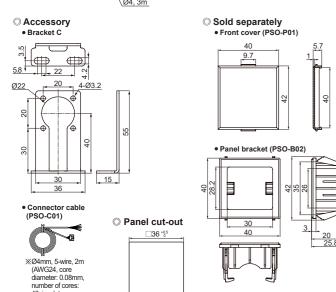
 6. Do not disassemble or modify the unit.
 Failure to follow this instruction may result in fire.

- **⚠** Caution

- Use the unit within the rated specifications.
 Failure to follow this instruction may result in fire or product damage.
 Use dry cloth to clean the unit, and do not use water or organic solvent.
 Failure to follow this instruction may result in fire.

Failure to follow his instruction may result in lire. 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. Keep metal chip, dust, and wire residue from flowing into the unit. Failure to follow this instruction may result in fire or product damage.





Installation

Since pressure port is divided to standard and optional specification, be cautious when using commercial one touch fitting. (Standard: R1/8, Option: R1/4, NPT1/4, 9/16-18UNF, Rc1/8)
Use a spanner (17mm) at the metal part of the unit in order not to overload on the body when connecting

(panel thickness 0.8 to 3.5mm)

- 2. Use a spanner (1/mm) 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.

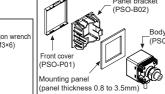
 4. At first, please unscrew hexagon wrench bolt and assemble the bracket on this unit by fixing hexagon the wrench bolt. In this case, tightening torque of hexagon wrench should be max. 3N-m. It may cause mechanical problems.

 5. PSQ Series has panel bracket (PSO-B02) and front cover (PSO-P01) (sold separately).

 When mounting the unit on panel, please follow the below figure.

∧ Caution





*The above specifications are subject to change and some models may be discontinued without notice
*Be sure to follow cautions written in the instruction manual and the technical descriptions

■ Input/Output Circuit and Connections

NPN open collector output type ○ PNP open collector output type nite) OUT2 12-24VDC

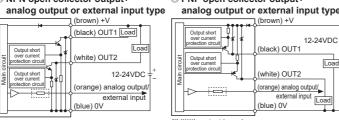
olack) OUT1 hite) OUT2 (blue) 0V O PNP open collector output+

(white) OUT2

blue) 0V

(orange) analog output/

○ NPN open collector output+



Pressure type		type	Sealed gauge pressure ^{×1}					
Туре			NPN or PNP open collector output type		NPN or PNP open co +analog output or ex			
Mod	del ^{×2}		PSQ-BC01-	PSQ-BC1-	PSQ-BC01U-	PSQ-BC1U-		
Rate	ed pre	ssure range	-100.0 to 100.0kPa	-100 to 1,000kPa	-100.0 to 100.0kPa	-100 to 1,000kPa		
		Setting range	-101.3 to 110.0kPa	-101 to 1,100kPa	-101.3 to 110.0kPa	-101 to 1,100kPa		
Min.	. displ	ay unit	0.1kPa	1kPa	0.1kPa	1kPa		
Max	c. pres	sure range	3 times of rated pres	sure				
App	lied fl	uid	Air, non-corrosive ga	s and fluid that do no	t corrode stainless stee	l 316L		
Pow	ver su	pply	12-24VDC (ripple P-P: max. 10%)					
Allowable voltage range		oltage range	90 to 110% of rated voltage					
Current consumption		onsumption	Max. 50mA (analog output: n			output: max. 70mA)		
Con	itrol o	utput	NPN or PNP open collector output ·Load voltage: max. 30VDC≕ ·Load current: max. 100mA ·Residual voltage: max. 2VDC=					
	Hyste	eresis ^{**3}	Min. display interval					
	Repe	eat error	±0.2% F.S. ±min. dis	play interval				
	Resp	onse time	Select one; 2.5ms, 5ms, 10ms, 25ms, 50ms, 100ms, 250ms, 500ms, 1,000ms, 5,000ms					
	Prote	ection circuit	Output short over current protection circuit					
Analog output ^{**4}		Voltage output	_		Output voltage: 1-5 Linear: max. ±1% F Resolution: 1/2,000 Output impedance: Response time: 50r	.S. approx. 240Ω		
		Current output	_		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 ^{*4} (Auto shift/			_		ON voltage: max. 0 OFF voltage: 5-Vin Resolution: 1/2.000	.4VDC or open		

	Current output	_		Linear: max. ±1% F. Resolution: 1/2,000 Output impedance: Response time: 50m	approx. 100kΩ	
External input ^{*4} (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 o	digits	Present value (PV) in	dicator, setting value ((SV) indicator: 4-digit		
Display i	method	12 segment LCD met	thod			
	MPa	0.001	0.001	0.001	0.001	
	kPa	0.1	1	0.1	1	
	kgf/cm ²	0.001	0.01	0.001	0.01	
Min.	bar	0.001	0.01	0.001	0.01	
display interval	psi	0.02	0.2	0.02	0.2	
	mmHg	1	_	1	_	
	inHg	0.1	_	0.1	_	
	mmH ₂ O	0.1	_	0.1	_	
Display a	accuracy	0 to 50°C: max. ±0.5% F.S., -10 to 0°C: max. ±1% F.S.				
Insulatio	n resistance	Over 50MΩ (at 500VDC megger)				
Dielectri	c strength	1,000VAC 50/60Hz for 1 min				
Vibration	1	1.5mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 2 hours				
Environ-	Ambient temp.	-10 to 50°C, storage: -20 to 60°C				
ment	Ambient humi.	30 to 80%RH, storage: 30 to 80%RH				
Cable		Ø4mm, 5-wire, 3m, (AWG24, core diameter: 0.08mm, number of cores: 40, insulator out diameter: Ø1mm)				
Protection	n structure	IP65 (IEC standard)				
Material		Front case: polycarbonate, rear case: polyamide 6, pressure port: stainless steel 316L				
Approva	I	(€. ε %) us				
\Moight ^{%5}		Approx 210g (approx 125g)				

- Approx. 210g (approx. 125g) **X1: The unit is sealed structure. It is based on atmospheric pressure 101.3kPa.

 **X2: □ in model represents the type of pressure port. Standard: R1/8, option: Rc1/8, R1/4, NPT1/4, 9/16-18UNF.

 **X3: In hysteresis output mode, it is variable.

 **X4: Select one between analog output (voltage or current) and external input.

 **5: The weight includes packaging. The weight in parenthesis is for unit only.

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

 **Environment resistance is rated at no freezing or condensation.

Unit Descriptions



- 1. Present value (PV) display part (green, red, orange by setting/status
- 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)
 : Turn ON while the control output turns ON.
- : Turn UN write are considered.

 4. M key

 RUN mode: Press the M key for over 2 sec to enter parameter 1 group.

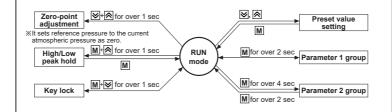
 Press the M key for over 4 sec to enter parameter 2 group.

 Parameter setting mode: Press the M key to select the setting items.

 Press the M key for over 2 sec to return RUN mode.

Parameter setting mode: Press the M key to select the New York over 2 RUN mode: Press the W Askey to set preset value of output operation mode. Press the M Yey keys to set key lock/unlock. Press the Yey Askeys to adjust zero point. Press the M Yey Keys to set peak hold. Presset value setting mode: Press the New Yey Askeys to increase/decrease setting value.

Setting for Each Mode



Preset Setting

O Setting guide

- Setting garder

 To enter the preset setting mode, press the ☑ ⋒ key in RUN mode.

 Press the ☑ ⋒ key to change preset value, the 웹 key to move to the next mode.

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

Analog output/External input

Setting example
 Analog current output scale

OUT1, OUT2 Preset setting

NPN or PNP open collector output(OUT1/2)

- Analog output/External input

 1. Select OUT1/2 operation mode [□ UE 1/2] to use in parameter 1 group.

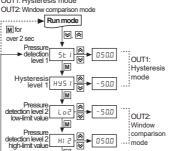
 (OUT1/2 operation mode: easy, hysteresis, window comparison, auto sensitivity setting, forced output control). Enter the preset setting mode from RUN mode. (set items are displayed in the order of OUT1 OUT2). Setting example.

 1. Select analog output/External input are log output/external input use in parameter 1 group.

 (Analog output/External input are log output/external input use in parameter 1 group.

 (Analog output/External input use in parameter

Setting example OUT1: Hysteresis mode



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

Operation mode (easy, hysteresis, window comparison, auto sensitivity setting) that can be set separately per each output (OUT1/OUT2) display parameter name with identification number.([5£]: [5£1]/[5£2])

When changing pressure unit or analog output/extenal input, the preset value is initialized corresponding to changed item. When changing operation mode, the preset value is reset for the changed mode.

Outpu	ıt				Factory default		
operation mode		Preset		Setting range	-100.0 to 100.0kPa	-100 to 1,000kPa	
ERSY	Easy	Р	Pressure detection level	Min. display pressure < [P] ≤ Max. display pressure	050.0	0500	
нч5м	Hysteresis	SE	Pressure detection level	Min. display pressure < [5₺] ≤ Max. display pressure	050.0	0500	
		H95	Hysteresis level	Min. display pressure ≤ [HH5] < [5 E]	-50.0	0000	
WI N	Window	Lo	Pressure detection level low-limit	Min. display pressure ≤ [Ł □] ≤ Max. display pressure - (3 × min. display unit)	- 50.0	0000	
MIN	compari- son	н	Pressure detection level high-limit	[L □] + (3 × min. display unit) ≤ [H/] ≤ Max. display pressure	050.0	0500	
		SE I	Pressure detection level 1	Min. display pressure ≤ [5 ₺ 1] ≤ Max. display pressure - 1% of rated pressure	- 50.0	0000	
AUEn	Auto sensitivity	512	Pressure detection level 2	[5	050.0	0500	
	setting	SEŁ	Pressure detection level	$SEE = \frac{(5E \ 1+5E2)}{2}$, $[5E \ 1] \le [5EE] \le [5E2]$ Pressure detection level $[5EE]$ can be selectable by pressing the $\boxed{\mathbb{A}}$ key.	000.0	0250	
F.oUt	Forced output control	_	_	_	_	_	
	Analog	A- 11'	1V output SV	0% F.S. ≤ [A - 11/] ≤ 100% F.S.	400.0	0000	
A-1	voltage output	A-5⊬	5V output SV	$[R - iV] + 10\% F.S. \le [R - 5V] \le 100\% F.S.$ or $0\% F.S. \le [R - 5V] \le [R - iV] - 10\% F.S.$	100.0	1000	
	Analog	A-04	4mA output SV	0% F.S. ≤ [A - 04] ≤ 100% F.S.	400.0	0000	
A-C	current output	A-50	20mA output SV	[R-04] + 10% F.S. ≤ [R-20] ≤ 100% F.S. or 0% F.S. ≤ [R-20] ≤ [R-04] - 10% F.S.	100.0	1000	

Prese	t setting l	y exte	rnal input mode		
Extern mode	al input	Prese	t	Setting range	Factory default
SHFE	Auto shift	SHI N	Auto shift correction value*	Min. preset setting value < [5HJ №] < Max. preset setting value	000.0
ZERo	Remote zero	ZEJ N	Remote zero correction value*	Min. preset setting value < [7 E3 N] < Max. preset setting value	000.0
HoLd	Hold		_	_	_

Analog output[®]

O Supported operation mode list

OUT1		OUT2	
		oFF	OFF
	F	ERSY	Easy
ERSY	Easy	H95.M	Hysteresis
		ши	Window compariso
	5.n Hysteresis	oFF	OFF
		ERSY	Easy
הבכה		H95.M	Hysteresis
		MIN	Window compariso
		oFF	OFF
HI N	Window comparison	ERSY	Easy
HIN		H95.M	Hysteresis
		ши	Window compariso
AUto	Auto sensitivity se	tting	
F.oUt	Forced output contr	rol	

	11 - 1	Allalog voltage output
	A-C	Analog current output
	Extern	al input [*]
son	SHFE	Auto shift
-	ZERo	Remote zero
	HoLd	Hold
son		g output (voltage or current) and external input shift/remote zero/hold) are not available at the time.

Parameter Setting

- ※After entering parameter 1/2 group, if there is value and it returns to RUN mode.
 ※Press the ☑, ☒ key to set the setting value.

Description

- **Press the 💌 🙈 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 MM key once returning RUN mode from parameter 1 group, 2 group within 2 sec, it enters the previous parameter group.

 **Some parameters are activated/deactivated according to the setting of other parameters. Refer to the description of each parameter.
- O Parameter Group

	•
Parameter 1 group	
Parameter name	Setting range

oUE I	OUT1 operation mode	RUEo	Hysteresis Window comparis	etting	Select OUT1 operation mode. \mathbb{X} When setting OUT1 operation mode as auto sensitivity setting mode \mathbb{R} \mathbb{H} \mathbb{L} \mathbb{H} or forced output control mode \mathbb{H} \mathbb{H} \mathbb{H} \mathbb{H} out \mathbb{H} operation mode is set automatically same as the setting value of OUT1 operation mode.		ERSY	
oUt2	OUT2 operation mode	BFF ERSY HYSM WIN	Easy Hysteresis	son	Select OUT2 operation mode.		oFF	
1/o ^{×1}	Analog output/ External input	SHFE	Analog current of Auto shift Remote zero		Remote zer Hold: The control *When Capplied pressur	log output/external input operation mode. When reference pressure of the pressure sensor changes, it corrects present pressure to reference pressure and by moving detection level as much as fluctuation level, ro: It is the same function as auto shift but remote zero makes the measured pressure as 0 forcibly, function to hold present value (PV) and rol output while signal is input. DUT1 operation mode is set as [F_BUE] or pressure is higher/lower than the display e range, auto shift [SHFE], remote zero functions are not available.	Я-г	
5Ho E ^{**1}	Auto shift applied terminal	oUE2	OUT1 OUT2 OUT1 & OUT2	OUT2		oUE I		
7 E.o.t ^{Ж1}	Remote zero applied terminal		OUT1 OUT2 OUT1 & OUT2		Select remote zero applied terminal. **Appears when analog output/external input is [IERO].		oUt I	
			OUT1	OUT	2			
			Normally Open			XAppears when OUT2 operation		
NoNE	Output		Normally Closed	-		mode is [aFF].		
NONL	type		Normally Open			XAppears when OUT1 operation	No	
			Normally Closed			mode is [AUE], or OUT2 operation		
			Normally Closed Normally Closed		nally Open	mode is [HY5,M], [WI N].		
5Pd	Response time	2.5 , !	5,10,25,50,11 500,1000,50	00,	lt can prevent control output from chattering by changing response time. Xif the response time is getting longer, the detection will be more stable but present value (PV) might be different from the real pressure value.		2.5	
ELoR	PV display color	REA	Normal: Green / Outp Normal: Red / Output: Fixed red Fixed green		·		R-0N	
di SP	Color linked output	ALL	OUT2 OUT1 & OUT2		※Appears	color linked output. s when OUT2 operation mode is not $[{}_{\square}FF]$ display color is set as $[{}_{\square}{}^{-}{}_{\square}{}^{N}]$ and $[{}_{\square}{}^{-}{}_{\square}{}^{N}]$.	oUE I	
		K P R M P R	kPa MPa					

- 1		MMHS	mmHg			
		I NH5				
		H20	mmH ₂ O			
			-			
Paramet	ter 2 group					
Parameter name Setting range		Description		Factory default		
ЅИЬ	SV display part	UNI E	Standard Unit OFF	mode. Standard [5±d]: Displ Unit [UNI E]: Display pre pressing [8 (SV) for 5: None [oFF]: It does no When pre value (SV) XIf select unit [UNI E]:	at the SV display part in RUN lay setting value (SV) always. assure unit normally. When g. [A]	Std
СоРУ	Parameter copy	oFF oN oN-L	OFF ON ON with key lock	This function is for copying parameter settings of Master to Slave 1:1. ※For the details, refer to ■ Paprameter C opy.		oFF
INIE	Parameter reset	oFF oN	OFF Reset parameter setting	Reset the parameter	settings.	oFF
PWd	Password	0000 to 9999	-	Set the 4-digit passwo [0000]: Disable pass [000 1]: Only checking	word	0000
5.oUt	Control output switching		NPN PNP	Select type of control	output.	NPN
	Hysteresis for easy mode	to	Bar type (Min: 1ea , Max: 8ea)	-100.0 to 100.0kPa -100.0 to 1,000kPa *Appears when OUT is easy mode. *Although the displa	easy mode. Hysteresis per 1 Bar 0.1kPa 1tkPa 1to r OUT2 operation mode y unit is changed, standard or easy mode is not changed.	111

■ Frror and Troubleshooting

Display	Cause	Troubleshooting
ERR I	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£ 1, 5£2 is set incorrectly.	Check the setting range and set 5£ 1,5£2.
ERRA	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
LLLL	When applied pressure exceeds the low-limit of display pressure range.	range.
- HH -	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.	

High/Low Peak Hold

- Setting method

 1. Press the Mi+⊠ key for over 1 sec in RUN mode and set the peak hold.

 2. High peak is displayed on present value (PV) display, and low peak is displayed on setting value (SV) display.

 3. Press the ☑+⊠ key for over 1 sec, initialize high/low peak value.

Output Operation Mode

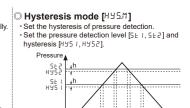
XIt is possible to set the hysteresis value in hysteresis for easy mode of parameter 2 group.

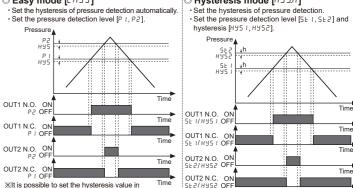
Easy mode [ER54]

OUT1 N.O. ON

OUT2 N.O. ON

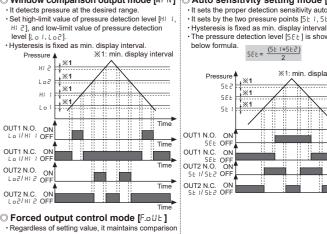
OUT2 N.O.

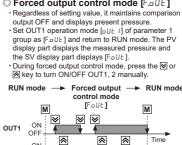




♥ Window comparison output mode [糾 N]

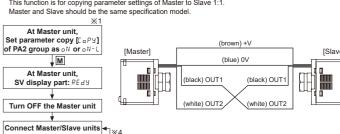
Auto sensitivity setting mode [위비논 a] • It sets the proper detection sensitivity automatic lt sets by the two pressure points [5£ 1,5£2]. Hysteresis is fixed as min. display interval. The pressure detection level [5EE] is shown in the

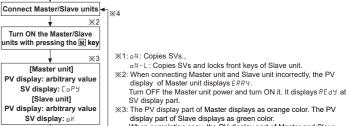




OUT2 ON OFF ■ Parameter Copy

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





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: 4: Connect other Slave units to copy parameters. Turn OFF the Master/Salve units and disconnect Master/Slave units

Cautions during Use

1. Follow instructions in 'Cautions during Use'.

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

 3. 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.
- 6. This unit may be used in the following environments

①Indoors (in the environment condition rated in 'Specifications') ②Altitude max. 2,000m ③Pollution degree 3 4 Installation category II

■ Major Products

- Photoelectric Sensors Fiber Optic Sensors

- (I/O Terminal Blocks & Cables Stepper Motors/Drivers/Motio Graphic/Logic Panels Field Network Devices
- Laser Marking System (Fiber, CO₂, Nd: YAG)
 Laser Welding/Cutting System

Autonics Corporation