## **Autonics** DIGITAL PRESSURE SENSOR **PSA/PSB SERIES**



Thank you very much for selecting Autonics products. For your safety, please read the following before using.

#### Caution for your safety

※Please keep these instructions and review them before using this unit. XPlease observe the cautions that follow;

**△ Warning** Serious injury may result if instructions are not followed.

△ Caution Product may be damaged, or injury may result if instructions are not followed

※The following is an explanation of the symbols used in the operation manual.

Δcaution:Injury or danger may occur under special conditions.

I. In case of using this unit with machinery (Ex: nuclear power control, medical equipment, ship, vehicle, train, airplane, combustion apparatus, safety device, crime/disaster prevention equipment, etc) which may cause damages to human life or property, it is required to install fail-safe device. It may cause a fire, human injury or damage to property.

2. Do not use it in flammable gas because it does not have an explosion proof construction. It may cause explosion.

- Do not apply the pressure beyond rated pressure. It may cause damage to this unit.
   Do not use it beyond power supply. It may cause damage to this unit.
   Do not make a short circuit for the load.

- It may cause damage to this unit.

  4. Do not wire incorrectly in power polarity etc.
- 1. Do not wire introversely in power points.

  1. It may cause damage to this unit.

  2. Do not use corrosive gas or liquid as it is only for non-corrosive gas.

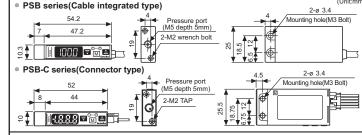
  1. It may cause damage to this unit.

  2. Do not give power to its case or twist its case strongly.

  1. It may cause damage to this unit.

  2. This unit shall not be used outdoors.
- It may shorten the life cycle of the product or cause electric shock. This unit is produced only for the indoor environment.

#### Dimensions PSA series (Unit:mm 9 77 6-25 20 39.4 pressure inflow hole 30 41 Mounting bracket 36 \*0.5 Front protection



## Functions

- Pressure display unit change function
  PS□ -V01(C)(P) and PS□ -C01(C)(P) has 7 kinds of pressure unit, PS□ -01(C)(P) and PS□ -1(C)(P) has
  4 kinds of pressure unit. Please select the proper unit for application.
  -PS□ -V01(C)(P), PS□ -C01(C)(P). kPa, kg/fcm² , bar, psi, mmHg, inHg, mmH₂O
  -PS□ -01(C)(P), PS□ -1(C)(P): kPa, kg/fcm² , bar, psi

  When using mmH₂O unit, multiply display value by 100.

- Output operation mode change function

  There are 6 kinds of control output mode in order to realize the various pressure sensing.
- Select a mode for your proper application.

  + Hysteresis mode(F I): When needed to change hysteresis for sensing pressure.

   Automatic sensitivity setting mode(F 2): When needed to set sensing sensitivity automatically at
- \*Automatic sensitivity searing mode(F 3, F 4, F 5): When needed to detect pressure from two position with one unit.

  \*Window comparison output mode(F 5): When needed to detect pressure in certain area.
- Response time change function(Chattering prevention)
  It can prevent chattering of control output by changing response time. It is able to set 4kinds of response time(2.5ms, 5ms, 100ms, 500ms) and if the response time is getting longer, the sensing will be more stable by increasing the number of digital filter.
- Analog output scale setting function
  It is not fixed the analog output(1-5VDC) scale as the rated pressure range but this is a function to change properly for user's application. When the position(R-1) for 1VDC output and the position(R of 5VDC output)
- are set, the pressure range of R-1 to R-5 is to 1-5VDC analog output.
- Key lock function
- This unit has 2 kinds of key lock function in order to prevent wrong operation LoC: All keys are locked therefore it is impossible to change any parameter setting/ preset, zero point
  adjustment, peak hold and bottom hold check. (It is able to change the status of lock)
- PR.L: This is partial locked status, therefore it is impossible to change parameter setting(It is able to change the status of lock) only, the other functions can be changed.

  • UnL: All of the setting is available, all keys are unlocked.
- Zero point adjustment function
  This function is to set the display value of pressure as zero point forcibly in case that of port is opened to atmospheric pressure. Zero point adjustment affects analog output voltage.
- Peak hold and bottom hold function
- This function is to diagnosis malfunction of the system caused by parasitic pressure or to check through memorizing the max./min. pressure occurred from the system

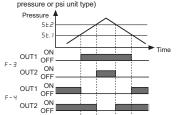
## Output operation mode

×PSA/PSB series has 6 kinds of output operation mode, please use proper output operation mode in accordance with sensing

# Hysteresis mode(F - 1) It is able to set certain value for pressure sensing level(5£ 1) and hysteresis(5£2). 5±2 OUT1 ON OFF OUT2 ON OFF

Independent two output mode(F-3,F-4,F-5)
①It is able to set pressure sensing level from two
positions(5£ 1,5£2) in this mode, one is for
control and the other is for alarm or additional

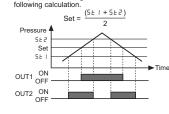
control.
②Hysteresis is fixed in 1digit. (2 digits for compound pressure or psi unit type)



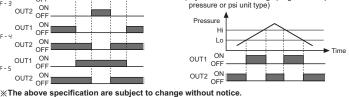
OUT1

OUT2 ON OFF

Automatic sensitivity setting mode(F - 2) This function is to set pressure sensing level to the proper position automatically. It is set by receiving pressure from two positions(5£ 1,5£2) ②Hysteresis is fixed in 1digit.(2 digits for compound pressure or psi unit type)
3 The pressure sensing level is shown in the



 Window comparison output mode(F - 5)
 ①It is able to set Low/High-limit value of pressure sensing level in this mode.
OHysteresis is fixed in 1digit.(2digits for compound



Specifications

Pressure type		Gauge pressure				
		Vacuum pressure type Positive pressure type		Compound pressure type		
Mode	NPN output	PSA-V01-□ PSB-V01-□ PSB-V01C-□	PSA-01-□ PSB-01-□ PSB-01C-□	PSA-1-□ PSB-1-□ PSB-1C-□	PSA-C01-□ PSB-C01-□ PSB-C01C-□	
*1	PNP output	PSA-V01P-□ PSB-V01P-□ PSB-V01CP-□	PSA-01P-□ PSB-01P-□ PSB-01CP-□	PSA-1P-□ PSB-1P-□ PSB-1CP-□	PSA-C01P-□ PSB-C01P-□ PSB-C01CP-□	
Rated pressure range		0.0 to -101.3kPa	0.0 to 100.0kPa	0 to 1,000kPa	-100.0 to 100.0kPa	
Displa	ay pressure range	5.0 to -101.3kPa	-5.0 to 110.0kPa	-50 to 1,100kPa	-101.2 to 110.0kPa	
Max.	pressure range	2 times of rated pres	ssure	1.5 times of rated pressure	2 times of rated pressure	
Appli	cable fluid	Air, Non-corrosive gas				
Powe	er supply	12V-24VDC ± 10%(Ripple P-P:Max. 10%)				
Curre	ent consumption	Max. 50mA				
Contr	rol output	NPN or PNP open collector output  ■ Load voltage: Max. 30VDC  ■ Load current: Max. 100mA  ■ Residual voltage -NPN: Max. 1V, PNP: Max. 2V				
Hysteresis ×2		1digit fixed(2digits for psi unit) 2digit fixed				
Repeat error		± 0.2% F.S. ± 1digit ± 0.2% F.S. ± 2digit				
R	Response time	Selectable 2.5ms, 5ms, 100ms, 500ms				
s	Short circuit protection	Built-in				
Analo	og output					
Displa	ay method	3½ digit LED 7segment				
Min. I	Display interval	1digit(psi unit: 2 digits are fixed) 2digits			2digits	
	sure unit	kPa, kgf/cm²,bar, psi, mmHg, mmH2O, inHg	kPa, kgf/cm	n², bar, psi	kPa, kgf/cm², bar. psi, mmHg, mmH2O, inHg	
Displa	ay accuracy	0 to 50°C: Max. ± 1% F.S., -10 to 0°C: Max. ± 2% F.S.				
Vibra		1.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hours				
	Ambient temperature	-10 to 50, Storage: -20 to 60°C				
-ment	Ambient humidity	35 to 85%RH, Storage: 35 to 85%RH				
Mate	rial	●PSA ☞ Front case:PC, Rear case:PC(Insert glass), Pressure port:die-cast(Zn) ●PSB ☞ Case, Pressure port:PA ●PSB-C ☞ Case, Pressure port, Cover: IXEF				
Prote	ection	IP40(IEC standard)				
Cable	Cable intergrated type	ø 4, 5-wire, Length: 2m(AWG 24, Core diameter: 0.08mm, Number of cores: 40, Insulation diameter: ø 1mm)				
Cable	Connector type	5-wire, Length: 3m(AWG 24, Insulation diameter: ø 1.4mm)				

PSA: Approx. 120g, PSB: Approx. 70g, PSB-C: Approx. 80g Unit weight

Unit weight

X1: T' is pressure port type.

X2: In F I mode, hysteresis is variable.

XF.S. is the rated pressure.

XF.S. is the rated pressure.

XF.S. is the rated pressure port in hysteresis by pressure unit calculation error.

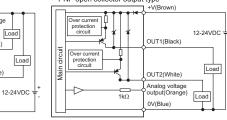
XThere may be 1 digit error in hysteresis by pressure unit calculation error.

XThe specification of pressure port is marked on the upper part of the case. Pressure ports are distinguished by the colors, silver[Rc(PT)1/8] or black[NPT1/8].

XEnvironment resistance is rated at no freezing or condensation.

#### NPN open collector output type PNP open collector output type

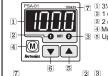
Analog voltage output (Orange) Load OUT1(Black) Load



\*There is no over current protection circuit in analog voltage output type. Do not connect this unit to power source or capacitive load directly.

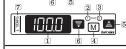
Explease observe input impedance of connected equipment when using analog voltage output. And be sure with voltage drop by resistance of extended wire.

#### Front panel identification and function



**⚠** Caution

[7] II 3/2 LED display(Red): Displays sensing pressure, every setting value and display error
 [2] 1 output indicator(Red): Output 1 is ON, LED will be ON
 [3] 2 output indicator(PSA: Red, PSB: Green): Output 2 is ON, LED will be ON
 [4] Mode key: Enter to parameter setting mode or preset setting mode, and save setting valie
 [3] IV key: Sets the setting value to upper step in preset setting or pressure unit, output
 mode, response time, analog output scale, key lock, peak hold value, bottom
 hold value display in parameter setting



- © 2 3

  © Down key: Sets setting value to lower step in preset setting or pressure unit output mode, response time, analog output scale, key lock, peak hold, bottom hold display in parameter setting.

  (7) Range of rating pressure: It is possible to change the pressure unit in pressure sensor. Please use different unit label for your application.

It may cause mechanical trouble.

the hexagon wrench bolt.

It may cause mechanical trouble

The tightening torque of one touch fitting should be Max. 100kgf-cm.

PSA series has 2kinds of brackets so it is able to install it in two different ways.
 At first, please unscrew hexagon wrench bolt and assemble the bracket on this unit by fixing

In this case, tightening torque of hexagon wrench should be max. 30kgf.cm.

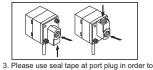
Bracket(PSO-01) and front protection cover (PSO-02) are sold separately.

Please refer to the below pictures for installation

#### Installation PSA series

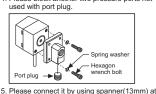
- Nhen installing pressure port it is able to bring pressure from 3 directions by changing the mounting direction of the pressure port.

   Pressure port has two types, PT1/8 and NPT1/8, therefore be sure to use proper port when using one touch fitting.

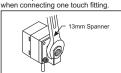


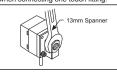
prevent pressure leak.
4. Please block another two pressure ports not

used with port plug.

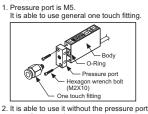


the metal part in order not to overload on the body vhen connecting one touch fitting.





**PSB** series



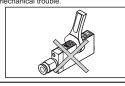
according to environment. In this case O-Ring between pressure port and its body should not be taken out in order to prevent pressure leak.



Please connect it by using spanner(10mm) at pressure port in order not to overload on the body when connecting one touch fitting.



The tightening torque of one touch fitting and hexagon wrench should be Max. 50kgf-cm and 20kgf-cm. It may cause mechanical trouble. Please do not use spanner to install as it may cau mechanical trouble



ı	- LIIOI	E LIIOI					
I	Error display	Description	Countermeasures				
l	Erl	If external pressure applied, when adjusting Zero point	Please try again after external pressure removing				
l	Er2	When overloaded on control output	Remove overload				
l	Er3	When the setting value is not matched with setting condition	Set proper setting value after checking setting condition				
l	ннн	When the applied pressure exceeds the upper display pressure range up	Apply pressure within display pressure				
l	LLL	When the applied pressure exceeds the lower display pressure range down	range				

## Accessory

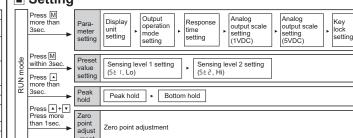


PSA • Port plug





#### Setting



- Zero point adjustment

  1. press 

  and 

  keys for over 1sec. at the same time putting an applied pressure in state of the atmospheric pressure.

  2. When the zero point adjustment is completed, it displays 

  and returns to RUN mode automatically.
- If executing zero point adjustment on external pressure being at pressure port [£2] flashes 3times. Please execute it in the atmospheric pressure after removing external pressure. Please execute zero point adjustment regularly.
- Parameter setting

  1. Set to pressure display unit, output operation mode, response time(Chattering prevention), analog output scales or key lock.

  2. Please set parameter after unlocking key lock function when key lock function is set.
  (Please see below key lock setting)
  - RUN mode ♣ PressM more than 3sec

Display unit setting

UnE and previous set unit flash in 0.5sec. by turns
• Select the unit by ♠, ▼ key. 

Display pressure unit of positive pressure type Display pressure unit of vacuum pressure type and compound pressure type

(Pressing M key shortly, the unit is saved, then move to the next setting mode.) 

♣ Press Mone time

Output operation mode setting out and previous set output mode flash in 0.5sec (Pressing Mkey shortly, the output operation mode is saved, then moves to the next setting mode.)

♣ Press Mone time

Response time setting • **5PJ** and previous set response time flashes in 0.5sec. by turns.
• Select the response time by ▲ , ▼ key.

2.5 ★ 5.0 ★ 100 ★ 500 ★ 500ms (Pressing Mkey shortly, the response time is saved then moves to the next setting mode.)

▲ Press Mone time Analog output scale setting(1VDC)

• A - 1 and previous set pressure flash in 0.5sec. by

Set the pressure value which 1VDC is output by ▲, ▼key. Available setting range: Min. value of rated pressure ≤ [R - 1] ≤ 90% of

rated pressure (Pressing M key shortly one time, the selected pressure is set as 1VDC scales then moves to the next setting mode.)

♣ Press Mone time Analog output scale setting(5VDC)

[R-5] and previous set pressure will flashes in 0.5sec. by turns.

• Set the pressure value which 5VDC is output by [A]. [7] key.

Available setting range: [R-1]+10% of rated pressure ≤ [R-5] ≤ Max. value of rated pressure (Pressing M key shortly one time, the selected pressure is set as 5VDC scales then moves to the

♣ Press Mone time

Key lock setting • **FEY** and previous set key lock flashes by turns • Select key lock by ▲, ▼ key.

Loc PA.L UnL

(Pressing  $\boxed{\text{M}}$  key shortly one time, key lock is set then moves to the display unit setting mode.)

Press M more than 3sec. (Saves in EEPROM) Return to RUN mode

XWhen pressing Mkey for over 3sec. in any setting mode, it returns to RUN mode memorizing set value at EEPROM. Also, if no key touched for 60sec. it displays previous setting value with ignoring current setting.

XSetting data is saved at by EEPROM even though the power off. But, note that the life cycle of EEPROM is 100,000 times.

Peak hold and bottom hold

1. Press \_afor more than 3sec. in RUN mode.
2. PEH and memorized max. pressure(Vacuum type is for max. vacuum pressure) flashes in 0.5sec. by 3. Press ▲ key one time shortly, then it displays bottom

hold value. **bo H**) and memorized min. pressure (Vacuum type is for max. vacuum pressure) flashes in 0.5sec. by turns. 4. If pressing A key one time shortly, memorized peak

hold and bottom hold value is removed then returns to RUN mode. 

range, it displays LLL.

# Preset value setting " - procesure sensing level.

- Set the pressure sensing level.
   Please set preset value after unlocking key lock when key lock function is set.
- (Please see key lock setting) Be sure that the setting method is different by each output operation mode.
- When hysteresis mode(F I) and independent two output mode(F ∃, F Ч, F 5)

#### RUN mode ♣ Press Mone time

#### Pressure sensing level 1 setting 5£ I and previous set sensing level1 flash in 0.5sec.

- Set the pressure sensing level 1 by ▲, ▼key. Enable setting range: Min. value of setting pressure  $<5 \pm 1 \le Max$ . value of setting pressure (if pressing [M] key shortly one time, sensing level 1 is set then move to the next setting mode.)
  - ▶ Press Mone time

#### Pressure sensing level 2 setting

5£2 and previous set sensing level 2 flash in 0.5sec

Set the pressure sensing level 2 by A, V key.

Set the pressure sensing level 2 by A, V key.

Enable setting range: Hysteresis mode -
Min. value of setting pressure ≤ 5 ± 2 < 5 ± 1

independent two output mode -- Min. value of setting pressure < 5 ± 2 ≤ Max. value of setting pressure (PressingM key shortly one time, the setting is completed then returns to RUN mode.)

Press Mone time (Saves in EEPROM)

#### Return to RUN mode

Automatic sensitivity setting mode(F - 2)

RUN mode ♣ Press Mone time Pressure sensing level 1 setting

pressure. If pressing ▲ key shortly one time, current sensing pressure is set sensing level 1, [5] and the set sensing level 1 flash by turn (0.5sec.).

♣ Press Mone time

#### Pressure sensing level 2 setting

562 and previous set sensing level 2 flash in 0.5se Apply the needed pressure(5 £ 2 ) within the rated pressure

If pressing A key shortly one time, current sensing pressure is set as sensing level 2, then \( \frac{5\cdot 2}{2} \) and the set sensing level 2 flash in 0.5sec. by turns.

set sensing level 2 flash in 0.5sec. by turns. Enable setting range; 5£ 1+1% of rated pressure ≤ 5£ 2 ≤ Max. value of setting range ※If differences of between 5£ 1 and sensing level are not enough, [₹-3] flashes 3 times then retruns to 5£ 2 setting. Please re-execute the setting for condition. ※It is possible to set repeatedly by [♣] key, the last setting is set as the sensing level2.

Automatic sensitivity setting and fine

#### adjustment **SEE** and sensing level(5E t ) flash in 0.5sec. by turns

5Et= (5t 1 + 5t2)

Adjust sensing level(5££) by [A], [7] key, when fine adjustment of the sensing level(5££) is needed. (Enable adjustment range: -Between 5£ / and 5£2)

### ♣ Press Mone time (Saves in EEPROM) Return to RUN mode

When checking the value of sensing level 1, 2(5£ 1, 5£?) and automatic sensitivity setting value, please press [M]key shortly and sequently.

Example of the setting in automatic sensitivity setting mode (To check absorption of component by vacuum pressure). The state of removed target is 5£! and the state of absorbing target is 5£? By ☐key, sensing level (5££) value is set in the middle between 5£! and 5£? automatically.

■ Window comparison output mode (F - 5)

#### RUN mode ♣ Press Mone time

Pressure sensing level 1 setting

Lo and the previous sensing level 1 flashes in 0.5sec. by turns Set pressure sensing level 1 by ♠, ▼ key.

Enable setting range: Min. setting pressure ≤ Lo < Max. value of setting pressure (Pressing  $\boxed{M}$  key shortly one time, sensing level 1 is

set then move to next setting mode.) ♣ Press Mone time

## Pressure detecting level 2 setting

HI and the previous detection level 2 flashes in 0.5sec. by turns. 0.5sec. by turns.

Set pressure sensing level 2 by ▲ , ▼ key.

Enable setting range: L o < HI ≤ Max. value of setting pressure

(Pressing Mkey shortly one time, the setting is completed then returns to RUN mode.)

Press Mone time
(Saves in EEPROM)

#### Return to RUN mode XPlease check the preset value again when output

operation mode is changed. %When the display unit is changed, preset value is calculated according to the dis XIf no key touched for 60sec., it returns to RUN mode [Except for automatic sensitivity setting

mode(F - ?) |  $\times$ Whenever  $\blacktriangle$  ( $\blacktriangledown$  )key touched one time, 1digit (2digits when using psi unit or compound pressure type) is increased(decreased) and it is continuously increased(decreased) by pressing key constantly.

## Caution for using

Do not insert any sharp or pointed object into pressure port

It could not operate normally due to mechanical trouble.

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

3. Be sure to avoid transient time(within 3sec.) after initial power on.

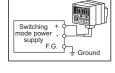
4. When a switching moving regulator is used for power supply, frame ground (F.G.) terminal of its switching mode power supply part must be grounded

 Avoid wrining 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 then use it.

 Do not press the setting button with sharp or pointed object No not apply over 30N tensile strength on connection part or load.
 When using mmHzO unit, multiply display value by 100.
 Installation environment

 It shall be used indoor ② Altitude Max. 2.000m ③ Pollution Degree 2 Installation Category III XIt may cause malfunction if above instructions are not follow

■ Graphic/Logic panels



#### Main products Proximity sensors Fiber optic sensors Pressure sensors Timers

- Panel meters Temperature controllers Tachometer/Pulse(Rate) meters
- Temperature/Humidity transducers
- Imperature/Huminity transducers
   Switching power supplies
   Stepping motors/drivers/motion controllers
   Field network devices
   Laser marking system(CO2, Nd:YAG)
   Laser welding/soldering system

# Autonics Corporation

SEAS SALES :

The proposal of a product improvement

and development : product@autonics.co

EP-KE-77-0001M