# PSQ Series

## Small Size, Dual LCD Display Digital Pressure Sensor

### ■ Features

**NEW**

- Pressure measurement of any gas, liquid or oil [Fluid type]
  (※except substances which may corrode stainless steel 316L)
- Simultaneous display of present value (PV) and set value (SV)
  ※Selectable SV, pressure unit, or none display for SV display part
- Selectable NPN, PNP open collector output by parameter setting
- 3 colors for PV display part (run mode: red or green / setting mode: orange)
- 12-segment LCD display for easier value reading
- Measurement range: -100.0 to 100.0kPa, -100 to 1,000kPa
  (pneumatic type: compound pressure, fluid type: sealed gauge pressure)
- Analog output: voltage (1-5VDC), current (DC4-20mA)
- Parameter copy function
- Option input/output: Auto Shift, Remote Zero, Hold (only for PSQ-□C□□U-□)
- Forced output control mode for device testing and maintenance
- Min. display unit: 0.1kPa, 1kPa (variable by model)
- One-touch connector type for easy wiring and maintenance
- Password setting for SV

⚠ **Please read "Safety Considerations" in operation manual before using.**

C€

**Pneumatic type**

**Fluid type**

### ■ Ordering Information

**PS** **Q** **—** **□** **C** **01** **C** **□** **—** **Rc1/8**

| Pressure port | Rc1/8 | Standard (pneumatic type) |
|---|---|---|
| | R1/8 | Standard (fluid type) |

| Output type | No mark | NPN or PNP open collector output |
|---|---|---|
| | U | NPN or PNP open collector output + analog output or external input type |

| Cable | No mark | Cable type |
|---|---|---|
| | C | Connector type |

| Pressure range | 01 | 100kPa |
|---|---|---|
| | 1 | 1,000kPa |

| Pressure type | C | Compound pressure |
|---|---|---|

| Applicable fluid | No mark | Pneumatic type (air, non-corrosive gas) |
|---|---|---|
| | B | Fluid type (gas, liquid, oil) |

| Appearance | Q | Regular square type (30×30mm), Dual display |
|---|---|---|

| Item | PS | Pressure Sensor |
|---|---|---|

### ■ Pressure and Max. Pressure Display Range

| Type | MPa | kPa | kgf/cm² | bar | psi | mmHg | inHg | mmH₂O |
|---|---|---|---|---|---|---|---|---|
| Compound pressure | — | -100.0 to 100.0 (-101.3 to 110.0) | -1.020 to 1.020 (-1.033 to 1.122) | -1.000 to 1.000 (-1.013 to 1.100) | -14.50 to 14.50 (-14.70 to 15.95) | -750 to 750 (-760.0 to 825.1) | -29.5 to 29.5 (-29.91 to 32.48) | -102.0 to 102.0 (-103.3 to112.2) |
| | — | -100 to 1000 (-101 to 1100) | -1.020 to 10.20 (-1.030 to 11.22) | -1.000 to 10.00 (-1.01 to 11.00) | -14.50 to 145.0 (-14.65 to 159.5) | -750 to 7500 (-757.6 to 8251) | -29.5 to 295 (-29.83 to 324.8) | -102.0 to 1020 (-103.0 to 1122) |

※( ) is Max. pressure display range.
※For using a unit mmH₂O, multiply display value by 100.

### ■ Pressure Conversion Chart

| from \ to | Pa | kPa | MPa | kgf/cm² | mmHg | mmH₂O | psi | bar | inHg |
|---|---|---|---|---|---|---|---|---|---|
| 1Pa | 1 | 0.001 | 0.000001 | 0.000010197 | 0.007501 | 0.101972 | 0.000145038 | 0.00001 | 0.0002953 |
| 1kPa | 1000.000 | 1 | 0.001 | 0.010197 | 7.500617 | 101.971626 | 0.145038 | 0.01 | 0.2953 |
| 1MPa | 1000000 | 1000 | 1 | 10.197162 | 7500.61683 | 101971.626 | 145.038243 | 10 | 295.299875 |
| 1kgf/cm² | 98066.5 | 98.0665 | 0.098067 | 1 | 735.55924 | 10000.0005 | 14.223393 | 0.980665 | 28.959025 |
| 1mmHg | 133.322368 | 0.133322 | 0.000133 | 0.001359 | 1 | 13.595099 | 0.019337 | 0.001333 | 0.039370 |
| 1mmH₂O | 9.80665 | 0.009807 | — | 0.000099 | 0.073556 | 1 | 0.00142 | 0.000098 | 0.002896 |
| 1psi | 6894.733 | 6.89473 | 0.006895 | 0.070307 | 51.714752 | 703.016716 | 1 | 0.068947 | 2.036014 |
| 1bar | 100000.0 | 100.0000 | 0.100000 | 1.019716 | 750.062 | 10197.1626 | 14.503824 | 1 | 29.529988 |
| 1inHg | 3386.388 | 3.386388 | 0.003386 | 0.034532 | 25.40022 | 345.315507 | 0.491156 | 0.033864 | 1 |

E.g.) For calculating 760mmHg to kPa : According to above chart, 1mmHg is 0.133322kPa, therefore 760mmHg will be 760×0.133322kPa=101.32472kPa.

**Autonics**

## ■ Specifications

| Pressure type | Gauge pressure (In case of fluid type, standard pressure are sealed gauge pressure[1]) | | | |
|---|---|---|---|---|
| Type | NPN or PNP open collector output type | | NPN or PNP open collector output+ analog output or external input type | |
| Model | **PSQ-□C01□-□** | **PSQ-□C1□-□** | **PSQ-□C01□U-□** | **PSQ-□C1□U-□** |
| Rated pressure range | -100.0 to 100.0kPa | -100 to 1,000kPa | -100.0 to 100.0kPa | -100 to 1,000kPa |
| Display&Setting pressure range | -101.3 to 110.0kPa | -101 to 1,100kPa | -101.3 to 110.0kPa | -101 to 1,100kPa |
| Min. display unit | 0.1kPa | 1kPa | 0.1kPa | 1kPa |
| Max. pressure range — Pneumatic type | 2 times of rated pressure | 1.5 times of rated pressure | 2 times of rated pressure | 1.5 times of rated pressure |
| Max. pressure range — Fluid type | 3 times of rated pressure | | | |
| Applied fluid | • **Pneumatic type:** Air, Non-corrosive gas<br>• **Fluid type:** 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 | | Max. 50mA (current output: max. 70mA) | |
| Control output | NPN or PNP open collector output<br>· Load voltage: Max. 30VDC⎓   · Load current: Max. 100mA   · Residual voltage: Max. 2VDC⎓ | | | |
| Control output — Hysteresis[2] | Min. display interval | | | |
| Control output — Repeat error | ±0.2% F.S. ± Min. display interval | | | |
| Control output — Response time | Select one; 2.5ms, 5ms, 10ms, 25ms, 50ms, 100ms, 250ms, 500ms, 1,000ms, 5,000ms | | | |
| Control output — Protection circuit | Output short over current protection circuit | | | |
| Analog output[3] — Voltage output | — | | · Output voltage: 1-5VDC⎓ ±2.5% F.S.<br>· Linear: Max. ±1% F.S.<br>· Resolution: 1/2,000<br>· Output impedance: Approx. 240Ω<br>· Response time: 50ms | |
| Analog output[3] — Current output | — | | · Output current: DC4-20mA ±2.5% F.S.<br>· Linear: Max. ±1% F.S.<br>· Resolution: 1/2,000<br>· Output impedance: Approx. 100kΩ<br>· Response time: 50ms | |
| External input[3] (Auto shift/ Remote zero/Hold) | — | | · ON voltage: Max. 0.4VDC⎓<br>· OFF voltage: 5-Vin or open<br>· Resolution: 1/2,000<br>· Output impedance: Approx. 100kΩ | |
| Display digits | Present value (PV) display part, Setting value (SV) display part: 4-digit | | | |
| Display method | 12-segment LCD method | | | |
| Min. display interval — MPa | 0.001 | 0.001 | 0.001 | 0.001 |
| Min. display interval — kPa | 0.1 | 1 | 0.1 | 1 |
| Min. display interval — kgf/cm$^2$ | 0.001 | 0.01 | 0.001 | 0.01 |
| Min. display interval — bar | 0.001 | 0.01 | 0.001 | 0.01 |
| Min. display interval — psi | 0.02 | 0.2 | 0.02 | 0.2 |
| Min. display interval — mmHg | 1 | —— | 1 | —— |
| Min. display interval — inHg | 0.1 | —— | 0.1 | —— |
| Min. display interval — mmH$_2$O | 0.1 | —— | 0.1 | —— |
| Display accuracy | 0 to 50℃: Max. ±0.5% F.S., -10 to 0℃: Max. ±1% F.S. | | | |
| Insulation resistance | Over 50MΩ (at 500VDC megger) | | | |
| Dielectric strength | 1,000VAC 50/60Hz for 1min | | | |
| Vibration | 1.5mm amplitude at frequency of 10 to 55Hz (for 1min) in each X, Y, Z direction for 2 hours | | | |
| Environment — Ambient temperature | -10 to 50℃, storage: -20 to 60℃ | | | |
| Environment — Ambient Humidity | 30 to 80%RH, storage: 30 to 80%RH | | | |
| Cable (fluid type) | Ø4mm, 5-wire, 3m (AWG24, core diameter: 0.08mm, number of cores: 40, insulator out diameter: Ø1mm) | | | |
| Protection structure | • **Pneumatic type:** IP40 (IEC standard)   • **Fluid type:** IP65 (IEC standard) | | | |
| Material | • **Pneumatic type -** Front case: Polycarbonate, Rear case: Polycarbonate, Pressure port: Brass-nickel plated<br>• **Fluid type -** Front case: Polycarbonate, Rear case: Polyamide 6, Pressure port: Stainless steel 316L | | | |
| Approval | C€ | | | |
| Weight[4] | • **Pneumatic type:** Approx. 165g (approx. 80g)   • **Fluid type:** Approx. 210g (approx. 125g) | | | |

※1: The unit is sealed structure. It is based on atmospheric pressure 101.3kPa.
※2: In hysteresis output mode, it is variable.
※3: Select one between analog output (voltage or current) and external input.
※4: The weight includes packaging. The weight in parenthesis is for unit only.
※Environment resistance is rated at no freezing or condensation.

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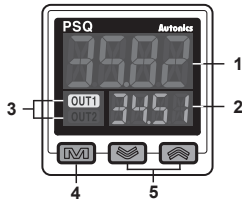**(Q)** Stepper Motors & Drivers & Controllers
**(R)** Graphic/ Logic Panels
**(S)** Field Network Devices
**(T)** Software
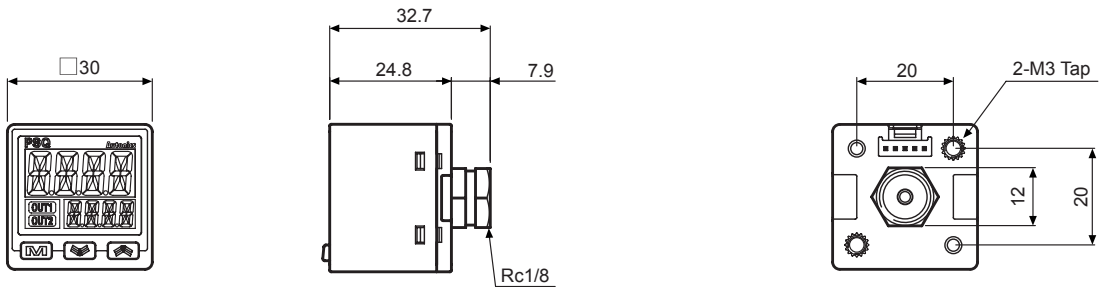
# PSQ Series

## ▣ Unit Description



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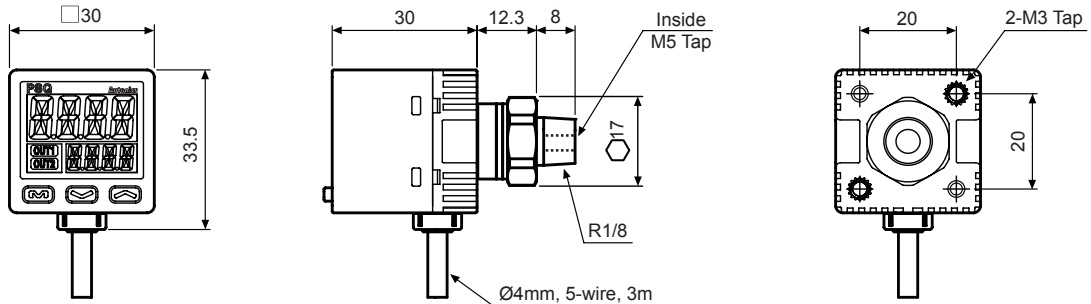   Setting mode: Changes the parameter.
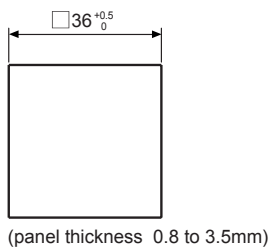
## ▣ Dimensions

(unit: mm)

### ◎ Pneumatic type
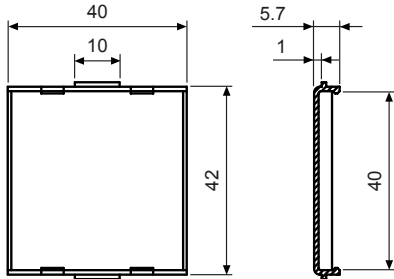


### ◎ Fluid type



### ◎ Panel cut-out



(panel thickness 0.8 to 3.5mm)

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# Pressure Sensor

## ▣ Dimensions

### ◎ Sold separately

(unit: mm)

● **Front cover (PSO-P01)**

40
10
42
5.7
1
40

● **Panel bracket (PSO-B02)**

25.8
40
30
20
28.2
40
3
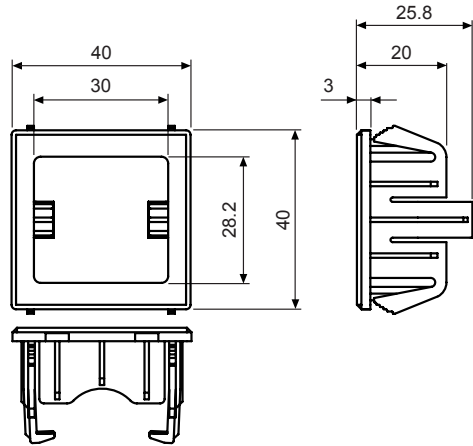
● **M5 gender (PSO-Z01)**

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

### ◎ Accessory

(unit: mm)

● **Bracket A**

20   3-Ø3.2
4.2
40   45
20
20   Ø4.2
30
15
1.6
13

● **Bracket B**

4.2
6   22
25
35   Ø4.2

30
20   3-Ø3.2
40   45
20
1.6

● **Bracket C**

30
4.2
22
3.5

Ø22   20   4-Ø3.2
20
40
36   55   15
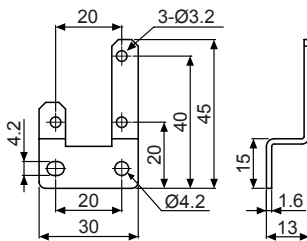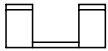
※Bracket A, B: Pneumatic type
　Bracket C: Fluid type
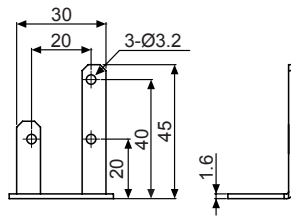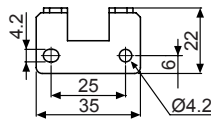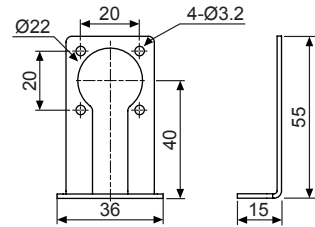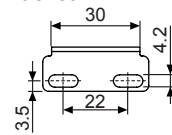
● **Connector cable (PSO-C01)**
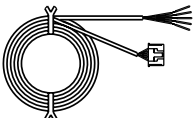
※Ø4mm, 5-wire, 2m
(AWG24, core diameter: 0.08mm, number of cores: 40, insulator diameter: Ø1mm)

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# PSQ Series

## ▣ Input/Output Circuit and Connections

### ◎ NPN open collector output type

```
Main circuit
                    (brown) +V
                    (black) OUT1      Load
Output short                          Load
over current
protection circuit  (white) OUT2
                                      12-24VDC  +
Output short                                    -
over current
protection circuit  (blue) 0V
```

### ◎ PNP open collector output type

```
Main circuit
                    (brown) +V
Output short                          12-24VDC  +
over current                                    -
protection circuit  (black) OUT1
Output short
over current                          Load
protection circuit  (white) OUT2
                                      Load
                    (blue) 0V
```

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

```
Main circuit
                    (brown) +V
                    (black) OUT1      Load
Output short                          Load
over current
protection circuit  (white) OUT2
                                      12-24VDC  +
Output short                                    -
over current
protection circuit  (orange) analog output/
                             external input
                    (blue) 0V
```

### ◎ PNP open collector output+ analog output or external input type

```
Main circuit
                    (brown) +V
Output short                          12-24VDC  +
over current                                    -
protection circuit  (black) OUT1
Output short
over current                          Load
protection circuit  (white) OUT2
                    (orange) analog output/
                             external input
                                      Load
                    (blue) 0V
```

※ ⬚ : output impedance

※ ⬚ : output impedance

## ▣ Setting for Each Mode
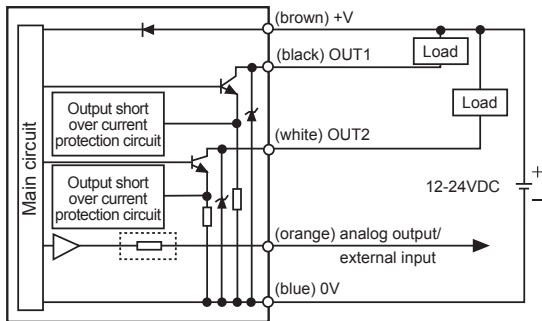
| Zero-point adjustment | ⋁+⋀ for over 1 sec | | ⋁, ⋀ | Preset value setting |

※It sets reference pressure to the current atmospheric pressure as zero.

M

| High/Low peak hold | M+⋀ for over 1 sec | RUN mode | M for over 2 sec | Parameter 1 group |

M

| Key lock | M+⋁ for over 1 sec | | M for over 4 sec | Parameter 2 group |

M for over 2 sec

## ▣ Zero-point Adjustment

**1** [PSQ display: 0.3 / 20.0]  →  **2** [PSQ display: 0.0 / 20.0]
Press over 1 sec

[PSQ display: ERR1 / 20.0]
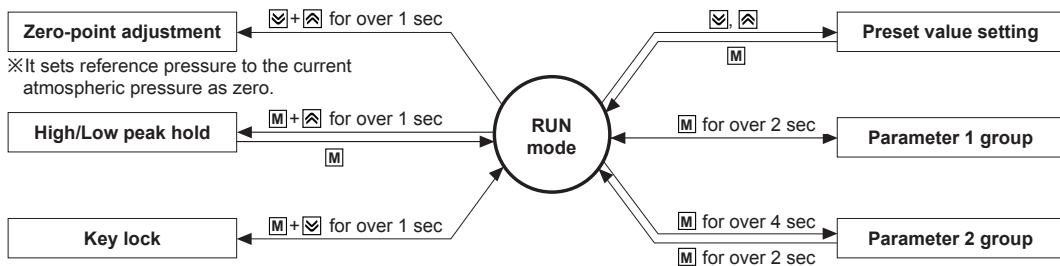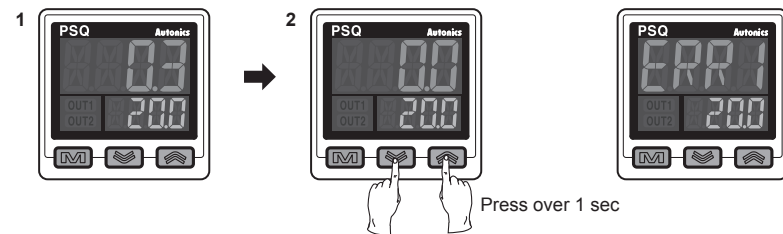
※If executing zero-point adjutment when external pressure over ±5% of rated pressureis applied, ERR1 flashes five times during pressing the keys. Remove external pressure and execute zero point again.

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

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## ▣ Parameter Setting

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

### ◎ Parameter 1 group



**RUN mode**

Ⓜ for over 2 sec | Ⓜ for over 2 sec

OUT1 operation mode
[ oUt 1 ] → [ HYS.M ] ↔ [ WI N ] ↔ [ AUto ] ↔ [ F.oUt ]

Ⓜ

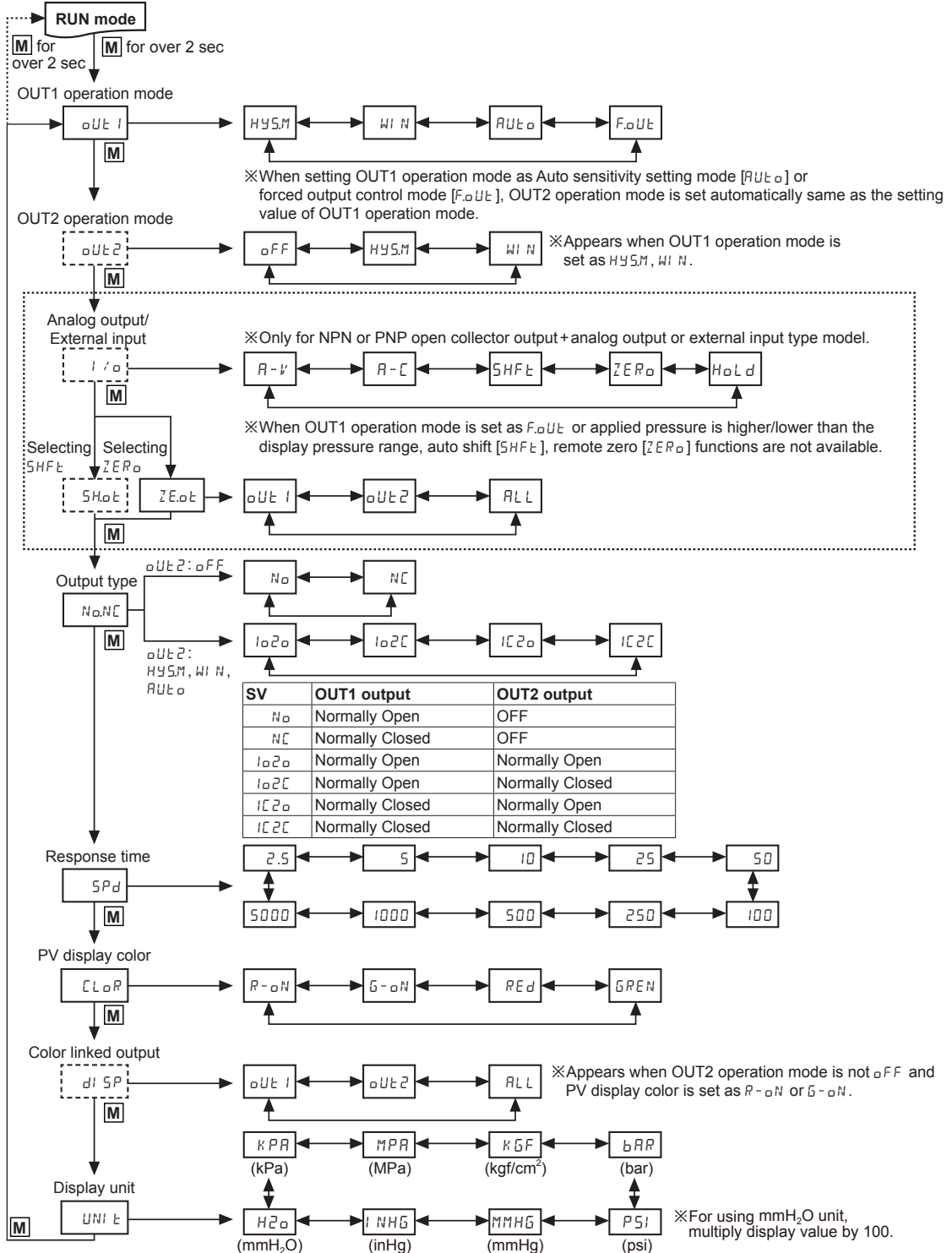※When setting OUT1 operation mode as Auto sensitivity setting mode [AUto] or forced output control mode [F.oUt], OUT2 operation mode is set automatically same as the setting value of OUT1 operation mode.

OUT2 operation mode
[ oUt2 ] → [ oFF ] ↔ [ HYS.M ] ↔ [ WI N ]

Ⓜ

※Appears when OUT1 operation mode is set as HYS.M, WI N.

Analog output/ External input
[ I /o ] → [ A-V ] ↔ [ A-C ] ↔ [ SHFt ] ↔ [ ZERo ] ↔ [ HoLd ]

Ⓜ

※Only for NPN or PNP open collector output+analog output or external input type model.

※When OUT1 operation mode is set as F.oUt or applied pressure is higher/lower than the display pressure range, auto shift [SHFt], remote zero [ZERo] functions are not available.

Selecting SHFt | Selecting ZERo
[ SH.ot ] [ ZE.ot ] → [ oUt 1 ] ↔ [ oUt2 ] ↔ [ ALL ]

Ⓜ

Output type
[ No.NC ] → oUt2:oFF → [ No ] ↔ [ NC ]

Ⓜ

oUt2: HYS.M, WI N, AUto → [ Io2o ] ↔ [ Io2C ] ↔ [ IC2o ] ↔ [ IC2C ]

| SV | OUT1 output | OUT2 output |
|------|----------------|----------------|
| No | Normally Open | OFF |
| NC | Normally Closed | OFF |
| Io2o | Normally Open | Normally Open |
| Io2C | Normally Open | Normally Closed |
| IC2o | Normally Closed | Normally Open |
| IC2C | Normally Closed | Normally Closed |

Response time
[ SPd ] → [ 2.5 ] ↔ [ 5 ] ↔ [ 10 ] ↔ [ 25 ] ↔ [ 50 ]

Ⓜ

[ 5000 ] ↔ [ 1000 ] ↔ [ 500 ] ↔ [ 250 ] ↔ [ 100 ]

PV display color
[ CLoR ] → [ R-oN ] ↔ [ G-oN ] ↔ [ REd ] ↔ [ GREN ]

Ⓜ

Color linked output
[ dI SP ] → [ oUt 1 ] ↔ [ oUt2 ] ↔ [ ALL ]

Ⓜ

※Appears when OUT2 operation mode is not oFF and PV display color is set as R-oN or G-oN.

Display unit
[ UNI t ] → [ KPA ] ↔ [ MPA ] ↔ [ KGF ] ↔ [ bAR ]
(kPa) (MPa) (kgf/cm$^2$) (bar)

Ⓜ

[ H2o ] ↔ [ I NHG ] ↔ [ MMHG ] ↔ [ PSI ]
(mmH$_2$O) (inHg) (mmHg) (psi)

※For using mmH$_2$O unit, multiply display value by 100.

# PSQ Series

## ▣ Parameter Setting

### ◎ Parameter 2 group

RUN mode

[M] for over 2 sec / [M] for over 4 sec

SV display part
`5Ub` → (displaying SV) `5td` ↔ (displaying unit) `UNIt` ↔ (none) `oFF`

[M]

Parameter copy
`CoPY` → `oFF` ↔ `oN` ↔ `oN-L`

[M]

Reset
`INIt` → `oFF` ↔ `oN`

[M]

Password
`PWd` → `0000` ↔ `0000` ↔ `0000` ↔ `0000` ↔ `0000`

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

[M]

Control output switching
`5.oUt` → `NPN` ↔ `PNP`

[M]

## ▣ High/Low Peak Hold

Clearing Max./Min. pressure value

※Clearing Max./Min. pressure value.
1. Turn OFF the power.
2. Press the [∨]+[∧] keys for over 1 sec while High/Low Peak value is flashing.

[M]+[∧] for over 1 sec

[∨]+[∧] for over 1 sec

[M]

Retained maximum and minimum pressure value will flash every 0.5 sec

※When the memorized Max. pressure is higher than the rated pressure, it displays `HHHH`. When it is lower than the rated pressure, it displays `LLLL`.

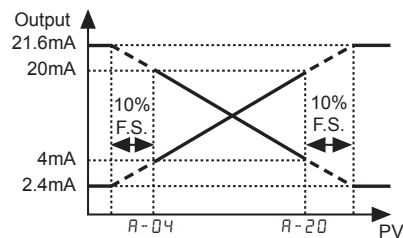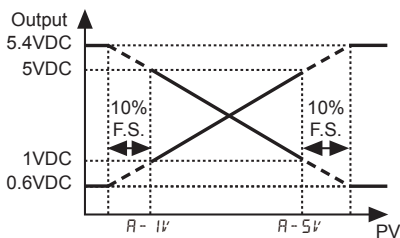## ▣ Analog Output Scale Adjustment

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

Output
5.4VDC
5VDC
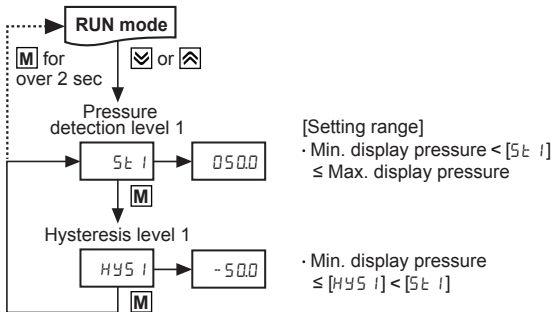10% F.S.   10% F.S.
1VDC
0.6VDC
`A-1V`   `A-5V`   PV

Output
21.6mA
20mA
10% F.S.   10% F.S.
4mA
2.4mA
`A-04`   `A-20`   PV

## ▣ Preset Setting

**<Factory default of preset>**

| Output mode | | Pressure range | -100.0 to 100.0kPa | -100 to 1,000kPa | Output mode | | Pressure range | -100.0 to 100.0kPa | -100 to 1,000kPa |
|---|---|---|---|---|---|---|---|---|---|
| HYS.M | oUt 1 | St 1 | 050.0 | 0500 | AUto | St 1 | | -50.0 | 0000 |
| | | HYS 1 | -50.0 | 0000 | | St2 | | 050.0 | 0500 |
| | oUt2 | St2 | 050.0 | 0500 | | SEt | | 000.0 | 0250 |
| | | HYS2 | -50.0 | 0000 | A-V | A-1V | | -100.0 | 0000 |
| WI N | oUt 1 | Lo 1 | -50.0 | 0000 | | A-5V | | 100.0 | 1000 |
| | | HI 1 | 050.0 | 0500 | A-C | A-04 | | -100.0 | 0000 |
| | oUt2 | Lo2 | -50.0 | 0000 | | A-20 | | 100.0 | 1000 |
| | | HI 2 | 050.0 | 0500 | | | | | |

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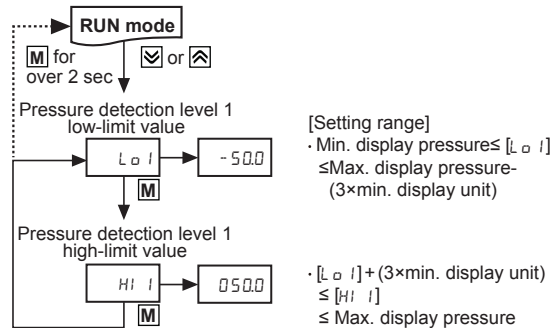
### ◎ NPN or PNP open collector output type
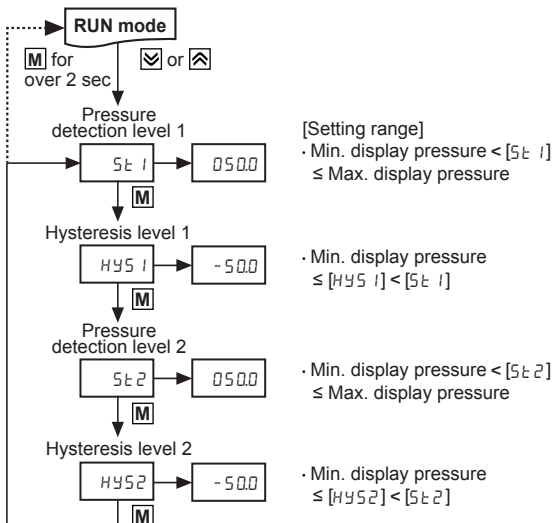
※Press the ⊻+⊼ key to set the setting value.

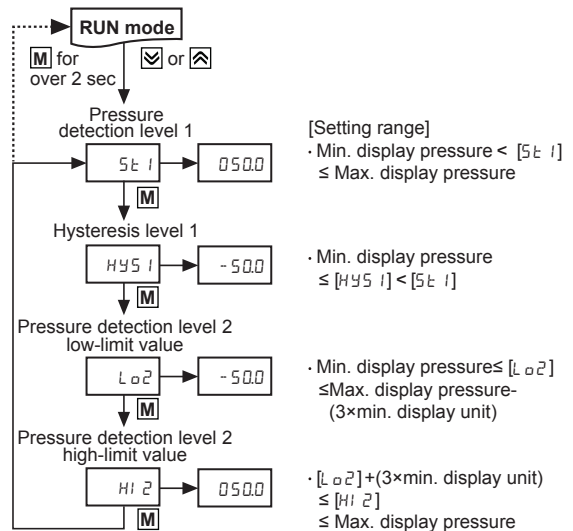● **OUT1=Hysteresis mode [HYS.M],**
  **OUT2=OFF [oFF]**

RUN mode

M for over 2 sec / ⊻ or ⊼

Pressure detection level 1

St 1 → 050.0

M

[Setting range]
· Min. display pressure < [St 1] ≤ Max. display pressure

Hysteresis level 1

HYS 1 → -50.0

M

· Min. display pressure ≤ [HYS 1] < [St 1]

● **OUT1=Window comparison output mode [WI N],**
  **OUT2=OFF [oFF]**

RUN mode

M for over 2 sec / ⊻ or ⊼

Pressure detection level 1 low-limit value

Lo 1 → -50.0

M

[Setting range]
· Min. display pressure ≤ [Lo 1] ≤ Max. display pressure - (3×min. display unit)

Pressure detection level 1 high-limit value

HI 1 → 050.0

M

· [Lo 1]+(3×min. display unit) ≤ [HI 1] ≤ Max. display pressure

● **OUT1=Hysteresis mode [HYS.M],**
  **OUT2=Hysteresis mode [HYS.M]**

RUN mode

M for over 2 sec / ⊻ or ⊼

Pressure detection level 1

St 1 → 050.0

M

[Setting range]
· Min. display pressure < [St 1] ≤ Max. display pressure

Hysteresis level 1

HYS 1 → -50.0

M

· Min. display pressure ≤ [HYS 1] < [St 1]

Pressure detection level 2

St2 → 050.0

M

· Min. display pressure < [St2] ≤ Max. display pressure

Hysteresis level 2

HYS2 → -50.0

M

· Min. display pressure ≤ [HYS2] < [St2]

● **OUT1=Hysteresis mode [HYS.M],**
  **OUT2=Window comparison output mode [WI N]**

RUN mode

M for over 2 sec / ⊻ or ⊼

Pressure detection level 1

St 1 → 050.0

M

[Setting range]
· Min. display pressure < [St 1] ≤ Max. display pressure

Hysteresis level 1

HYS 1 → -50.0

M

· Min. display pressure ≤ [HYS 1] < [St 1]

Pressure detection level 2 low-limit value

Lo2 → -50.0

M

· Min. display pressure ≤ [Lo2] ≤ Max. display pressure - (3×min. display unit)

Pressure detection level 2 high-limit value

HI 2 → 050.0

M

· [Lo2]+(3×min. display unit) ≤ [HI 2] ≤ Max. display pressure

# PSQ Series

## ▣ Preset Setting

● **OUT1=Window comparison output mode [Wi N],**
**OUT2=Hysteresis mode [HYS.M]**
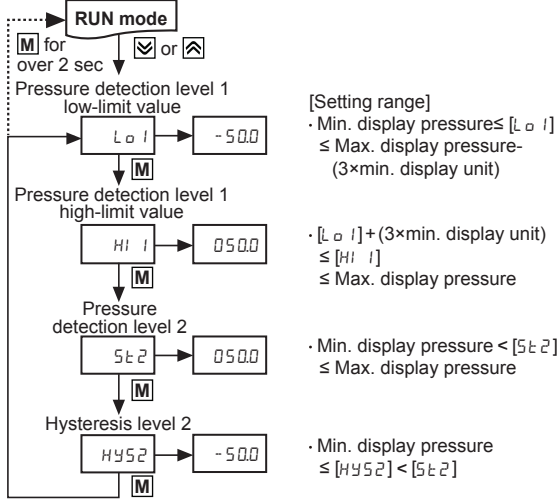


```
    ┌──────────────────────────┐
····▶│        RUN mode          │
    └──────────────────────────┘
[M] for        [∨] or [∧]
over 2 sec
Pressure detection level 1
    low-limit value
    ┌──────┐     ┌──────┐
    │ Lo 1 │────▶│ -50.0│
    └──────┘     └──────┘
       [M]
Pressure detection level 1
    high-limit value
    ┌──────┐     ┌──────┐
    │ HI 1 │────▶│ 050.0│
    └──────┘     └──────┘
       [M]
     Pressure
 detection level 2
    ┌──────┐     ┌──────┐
    │ St2  │────▶│ 050.0│
    └──────┘     └──────┘
       [M]
 Hysteresis level 2
    ┌──────┐     ┌──────┐
    │ HYS2 │────▶│ -50.0│
    └──────┘     └──────┘
       [M]
```

[Setting range]
· Min. display pressure≤ [Lo 1]
  ≤ Max. display pressure-
   (3×min. display unit)

· [Lo 1]+(3×min. display unit)
  ≤ [HI 1]
  ≤ Max. display pressure

· Min. display pressure < [St2]
  ≤ Max. display pressure

· Min. display pressure
  ≤ [HYS2] < [St2]
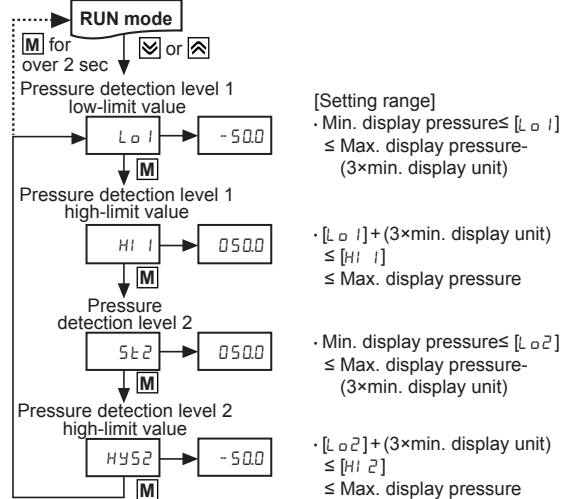
● **OUT1=Auto sensitivity setting mode [AUto],**
**OUT2=Auto sensitivity setting mode [AUto]**

※Press the [∧] key to set St 1, St2 during applying St 1, St2 pressure.
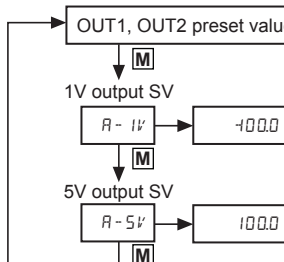※The set SEt value is adjustable by pressing the [∨], [∧] keys.

```
    ┌──────────────────────────┐
····▶│        RUN mode          │
    └──────────────────────────┘
[M] for        [∨] or [∧]
over 2 sec
     Pressure
 detection level 1
    ┌──────┐     ┌──────┐
    │ St 1 │◀───▶│ 010.0│
    └──────┘     └──────┘
       [M]
     Pressure
 detection level 2
    ┌──────┐     ┌──────┐
    │ St2  │◀───▶│ 020.0│
    └──────┘     └──────┘
       [M]
     Pressure
 detection level
    ┌──────┐     ┌──────┐
    │ SEt  │◀───▶│ 015.0│
    └──────┘     └──────┘
       [M]
```

[Setting range]
· Min. display pressure≤ [St 1]
  ≤Max. display pressure-
   1% of rated pressure

· [St 1]+1% of rated pressure
  ≤ [St2]≤ Max. display pressure

· [St 1]≤[SEt]≤[St2]
  $SEt = \frac{(St1+St2)}{2}$

● **OUT1=Window comparison output mode [Wi N],**
**OUT2=Window comparison output mode [Wi N]**



```
    ┌──────────────────────────┐
····▶│        RUN mode          │
    └──────────────────────────┘
[M] for        [∨] or [∧]
over 2 sec
Pressure detection level 1
    low-limit value
    ┌──────┐     ┌──────┐
    │ Lo 1 │────▶│ -50.0│
    └──────┘     └──────┘
       [M]
Pressure detection level 1
    high-limit value
    ┌──────┐     ┌──────┐
    │ HI 1 │────▶│ 050.0│
    └──────┘     └──────┘
       [M]
     Pressure
 detection level 2
    ┌──────┐     ┌──────┐
    │ St2  │────▶│ 050.0│
    └──────┘     └──────┘
       [M]
Pressure detection level 2
    high-limit value
    ┌──────┐     ┌──────┐
    │ HYS2 │────▶│ -50.0│
    └──────┘     └──────┘
       [M]
```

[Setting range]
· Min. display pressure≤ [Lo 1]
  ≤ Max. display pressure-
   (3×min. display unit)

· [Lo 1]+(3×min. display unit)
  ≤ [HI 1]
  ≤ Max. display pressure

· Min. display pressure≤ [Lo2]
  ≤ Max. display pressure-
   (3×min. display unit)

· [Lo2]+(3×min. display unit)
  ≤ [HI 2]
  ≤ Max. display pressure

● **OUT1=Forced output control mode [F.oUt],**
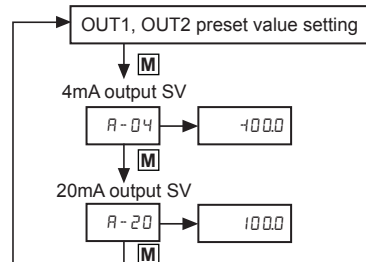**OUT2=Forced output control mode [F.oUt]**

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

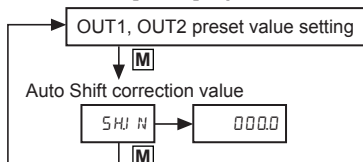## ◎ NPN or PNP open collector output+analog output or external input type

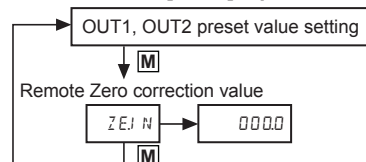●**Analog voltage output [A-V] scale setting**

```
    ┌──────────────────────────────┐
    │ OUT1, OUT2 preset value setting│
    └──────────────────────────────┘
              [M]
     1V output SV
    ┌──────┐     ┌──────┐
    │ A-1V │────▶│ -100.0│
    └──────┘     └──────┘
              [M]
     5V output SV
    ┌──────┐     ┌──────┐
    │ A-5V │────▶│ 100.0│
    └──────┘     └──────┘
              [M]
```

●**Analog current output [A-C] scale setting**

```
    ┌──────────────────────────────┐
    │ OUT1, OUT2 preset value setting│
    └──────────────────────────────┘
              [M]
     4mA output SV
    ┌──────┐     ┌──────┐
    │ A-04 │────▶│ -100.0│
    └──────┘     └──────┘
              [M]
    20mA output SV
    ┌──────┐     ┌──────┐
    │ A-20 │────▶│ 100.0│
    └──────┘     └──────┘
              [M]
```

● **Auto Shift [SHFt] input**

```
    ┌──────────────────────────────┐
    │ OUT1, OUT2 preset value setting│
    └──────────────────────────────┘
              [M]
Auto Shift correction value
    ┌──────┐     ┌──────┐
    │ SHi N│────▶│ 000.0│
    └──────┘     └──────┘
              [M]
```

● **Remote Zero [ZERo] input**

```
    ┌──────────────────────────────┐
    │ OUT1, OUT2 preset value setting│
    └──────────────────────────────┘
              [M]
Remote Zero correction value
    ┌──────┐     ┌──────┐
    │ ZE.i N│───▶│ 000.0│
    └──────┘     └──────┘
              [M]
```
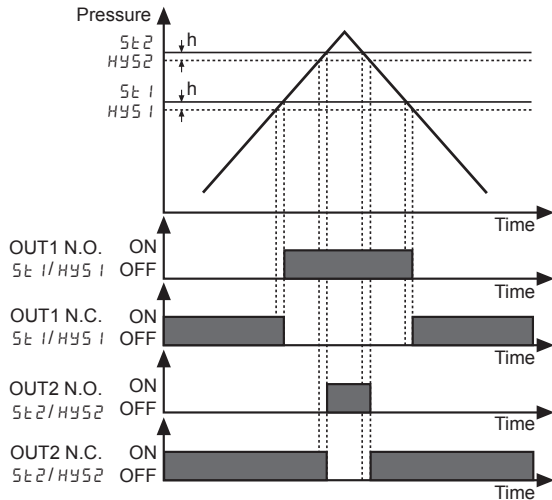
※Analog output (voltage or current) and external input (auto shift/remote zero/hold) are not available at the same time.

## ■ Output Operation Mode

※**PSQ Series has 4 output operation mode. Use the proper operation mode in accordance with the desired application of detection.**
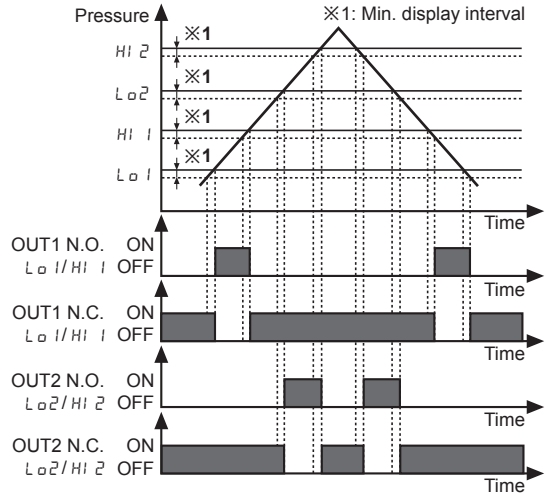
### ◎ Hysteresis mode [HYS.M]

· Set the hysteresis of pressure detection.
· Set the pressure detection level [St1, St2] and hysteresis [HYS1, HYS2].

Pressure

OUT1 N.O.
St1/HYS1    ON / OFF

OUT1 N.C.
St1/HYS1    ON / OFF

OUT2 N.O.
St2/HYS2    ON / OFF

OUT2 N.C.
St2/HYS2    ON / OFF

### ◎ Auto sensitivity setting mode [Auto]

· It sets the proper detection sensitivity automatically.
· It sets by the two pressure points [St1, St2].
· Hysteresis is fixed as Min. display interval.
· The pressure detection level [SEt] is shown in the below formula.

$$SEt = \frac{(St1 + St2)}{2}$$

Pressure    ※1: Min. display interval

OUT1 N.O.
SEt    ON / OFF

OUT1 N.C.
SEt    ON / OFF

OUT2 N.O.
St1/St2    ON / OFF

OUT2 N.C.
St1/St2    ON / OFF

### ◎ Window comparison output mode [WIN]

· It detects pressure at the desired range.
· Set high-limit value of pressure detection level [HI1, HI2], and low-limit value of pressure detection level [Lo1, Lo2].
· Hysteresis is fixed as Min. display interval.

Pressure    ※1: Min. display interval

OUT1 N.O.
Lo1/HI1    ON / OFF

OUT1 N.C.
Lo1/HI1    ON / OFF

OUT2 N.O.
Lo2/HI2    ON / OFF

OUT2 N.C.
Lo2/HI2    ON / OFF

### ◎ Forced output control mode [F.oUt]

· Regardless of setting value, it maintains comparison output OFF and displays present pressure.
· Set OUT1 operation mode [oUt1] of parameter 1 group as [F.oUt] and return to RUN mode. The PV display part displays the measured pressure and the SV display part displays [F.oUt].
· During forced output control mode, press the ⊻ or ⊼ key to turn ON/OFF OUT1, 2 manually.
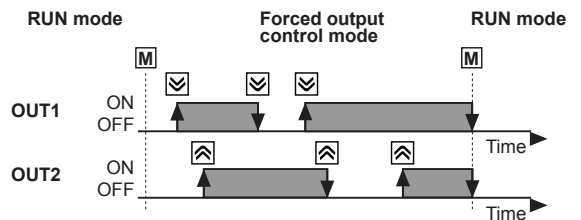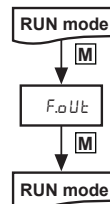
RUN mode
↓ M
F.oUt
↓ M
RUN mode

RUN mode    Forced output control mode    RUN mode

OUT1    ON / OFF

OUT2    ON / OFF

# PSQ Series

## ■ Functions

### ◎ Parameter copy

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

[Master]  (brown) +V  [Slave]
(blue) 0V
(black) OUT1  (black) OUT1
(white) OUT2 ✕ (white) OUT2

※1

**At Master unit,**
**Set parameter copy [** $CoPY$ **] of**
**PA 2 group as** $oN$ **or** $oN-L$

**[M]**

**At Master unit,**
**SV display part:** $REdY$

**Turn OFF the Master unit**

**Connect Master/Slave units** ←──── ※4

※2

**Turn ON the Master/Slave units**
**with pressing the [M] key**

※3

**[Master unit]**
**PV display: arbitrary value**
**SV display:** $CoPY$
**[Slave unit]**
**PV display: arbitrary value**
**SV display:** $oK$

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

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

### ◎ Analog output scale adjustment

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

Set output voltage, output current to the current display value at 1-5VDC voltage output [$A-V$], DC4-20mA [$A-C$] current output.
 · Set pressure value for 1VDC output [$A-1V$] and pressure value for 5VDC output [$A-5V$].
   [$A-1V$] setting range: 0% F.S.≤ [$A-1V$]≤100% F.S.
   [$A-5V$] setting range: 0% F.S.≤ [$A-5V$]≤ [$A-1V$]-10% F.S. or
               [$A-1V$]+10% F.S.≤ [$A-5V$]≤100% F.S.
 · Set pressure value for 4mA output [$A-04$] and pressure value for 20mA output [$A-20$].
   [$A-04$] setting range: 0% F.S.≤ [$A-04$]≤100% F.S.
   [$A-20$] setting range: 0% F.S.≤ [$A-20$]≤ [$A-04$]-10% F.S. or
               [$A-04$]+10% F.S.≤ [$A-20$]≤100% F.S.

### ◎ Auto Shift/Remote Zero/Hold input

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

● **Auto Shift [** $SHFt$ **], Remote Zero [** $ZERo$ **]**
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 as 0 forcibly. When changing analog output and external input setting, auto shift correction value [$SHiN$], remote zero correction value [$ZEiN$] 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 [$I/o$] of parameter 1 group as [$SHFt$] or [$ZERo$], press the [M] key to select control output at [$SH.ot$], [$ZE.ot$] to be with correction value.
 · Deleting correction value
  : Press the [∨]+[∧] keys for over 1 sec to delete set auto shift correction.

● **Hold [** $HoLd$ **]**
The function to hold PV and control output while signal is input.

### ◎ Output mode change

● **OUT1 operation mode**
There are 4 kinds of control output mode in order to realize the various pressure detection.
• Hysteresis mode [$HYS.M$]
 : When needed to change hysteresis for detecting pressure.
• Window comparison output mode [$WiN$]
 : When needed to detect pressure in certain area.
• Automatic sensitivity setting mode [$AUto$]
 : When needed to set detection sensitivity automatically at proper position.
• Forced output control mode [$F.oUt$]
 : When needed to display pressure with remaining comparison output OFF regardless of setting value.

● **OUT2 operation mode**
Select control output mode between two types or $oFF$.
In case of OUT1 operation mode, select automatic sensitivity setting mode [$AUto$] or forced output control mode [$F.oUt$]. OUT2 operation mode setting is inactive.
• Hysteresis mode [$HYS.M$]
 : When needed to change hysteresis for detecting pressure.
• Window comparison output mode [$WiN$]
 : When needed to detect pressure in certain area.
• OFF [$oFF$]

**Autonics**

## ◎ Control output change

Type of control output for OUT1 and OUT2 can be able to set Normally Open or Normally Closed.
※Note that Normally Open and Normally Closed provide opposite output.

| SV | OUT1 output | OUT2 output |
|----|-------------|-------------|
| No | Normally Open | OFF |
| NC | Normally Closed | OFF |
| 1o2o | Normally Open | Normally Open |
| 1o2C | Normally Open | Normally Closed |
| 1C2o | Normally Closed | Normally Open |
| 1C2C | Normally Closed | Normally Closed |

## ◎ Response time (chattering prevention)

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

## ◎ PV display color and color linked output

You can select PV display color to the linked output status. There are 4 types as below.
Select color linked output among [oUt 1], [oUt2], or [ALL].

| SV | PV display color |
|----|-------------------|
| R-oN | Green in normal status. When the set color linked output turns ON, it displays red. |
| G-oN | Red in normal status. When the set color linked output turns ON, it displays green. |
| REd | Red is fixed. |
| GREN | Green is fixed. |

## ◎ Pressure unit change

PSQ series has 8 kinds of pressure unit.
Please select the proper unit for application.
• kPa, Mpa, kgf/cm$^2$, bar, psi, mmHg, inHg, mmH$_2$O
※When using mmH$_2$O unit, multiply display value by 100.

## ◎ SV display part

Select the display type at the SV display part in RUN mode.
There are 3 types; displaying SV [Std], displaying unit [UNIt], none [oFF]

## ◎ RESET

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

## ◎ Password

This function is to limit parameter settings, to check the parameter or to change the parameter settings only for entering the set password.
• 0000: Password function OFF
• 0001: Only checking parameters
• Setting range: 0002 to 9999

## ◎ Control output change

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

## ◎ Key lock

The key lock function prevents key operations so that conditions set in each mode.
· Press the [M]+[▽] key over 1 sec in RUN mode to lock keys. The PV display part displays [LoCK], and the SV display part displays [oN] for 1 sec and it returns in RUN mode.
· Press the [M]+[▽] key over 1 sec in RUN mode to unlock keys. The PV display part displays [LoCK], and the SV display part displays [oFF] for 1 sec and it returns in RUN mode.

## ◎ Zero-point adjustment

The zero-point adjustment function forcibly sets the pressure value to "zero" when the pressure port is opened to atmospheric pressure. When the zero adjustment is applied, analog output [Voltage or Current] is changed by this function.
To set zero atmospheric pressure forcibly,
press the [▽]+[△] keys over 1 sec in RUN mode with the opened pressure port.

## ◎ High/Low Peak Hold

This function is to diagnose malfunction of the system caused by parasitic pressure through memorizing input the max./min. pressure occurred from the system.
Press the [M]+[△] key more than 1 sec in RUN mode and set the Peak Hold.

## ◎ Error and troubleshooting

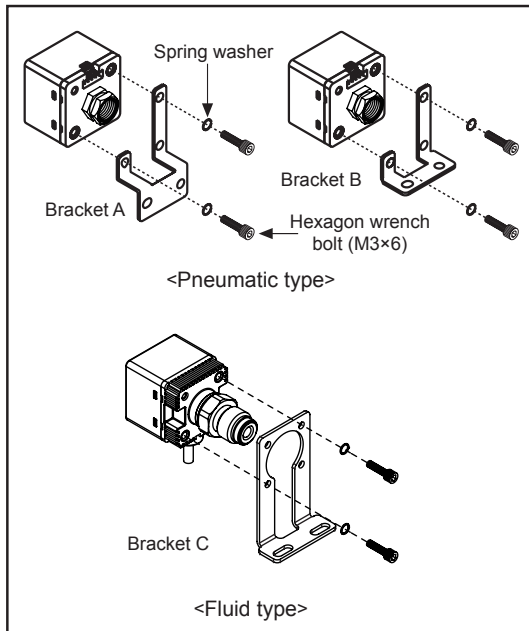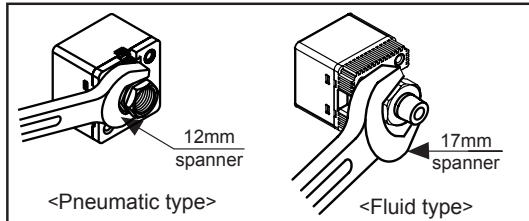| Display | Cause | Troubleshooting |
|---------|-------|-----------------|
| ERR1 | When adjusting zero point while external pressure is input. | Try again after removing external pressure. |
| ERR2 | When over current is applied on control output | Remove the over current conditions by adjusting load resistance. |
| ERR3 | When the range of Auto sensitivity setting mode ST1, ST2 is set incorrectly. | Check the setting range and set St1, St2. |
| ERR4 | When connection between master and slave is wrong during copying parameters. | Check the cables between sensors and the connection of the same models. |
| ERR5 | When entering invalid password. | Enter valid password. |
| HHHH | When applied pressure exceeds the high-limit of display pressure range. | Apply pressure within the display pressure range. |
| LLLL | When applied pressure exceeds the low-limit of display pressure range. | |
| -HH- | When the correction value of auto shift, remote zero exceeds the high-limit of the setting range. | Set the correction value of auto shift, remove zero within the setting range. |
| -LL- | When the correction value of auto shift, remote zero exceeds the low-limit of the setting range. | |
| -HL- | When [HH], [LL] occur both. | |

# PSQ Series

## ■ Installation

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

### ⚠ Caution

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



12mm spanner
<Pneumatic type>

17mm spanner
<Fluid type>



Spring washer

Bracket A

Bracket B

Hexagon wrench bolt (M3×6)

<Pneumatic type>

Bracket C

<Fluid type>

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.



Panel bracket (PSO-B02)

Front cover (PSO-P01)

Body (PSQ)

Mounting panel (panel thickness 0.8~3.5mm)
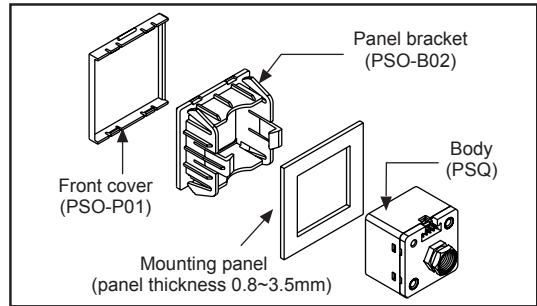
## ■ Proper Usage

### ⚠ Caution

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

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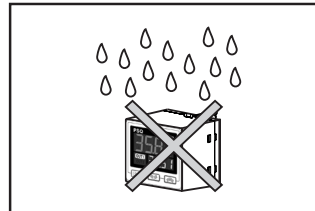


· Do not use the product in preparation time (within 3 sec). for operationg after power-on.
· When using switching mode power supply, frame ground (F.G.) terminal of power supply should be grounded.



SMPS

F.G.
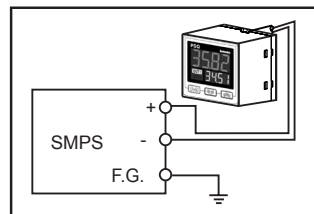
· Avoid wiring with power line or high voltage line. It may cause malfunction by noise.
· When moving this unit from cold place to warm place, please remove the humidity on the cover.
· Do not press the setting button with sharp or pointed object.
· Do not apply a tensile strength in excess of 30N to the cables or connector.
· This unit may be used in the following environment.
   ① Indoors
   ② Altitude max. 2,000m
   ③ Pollution degree 3
   ④ Installation category II

**Autonics**