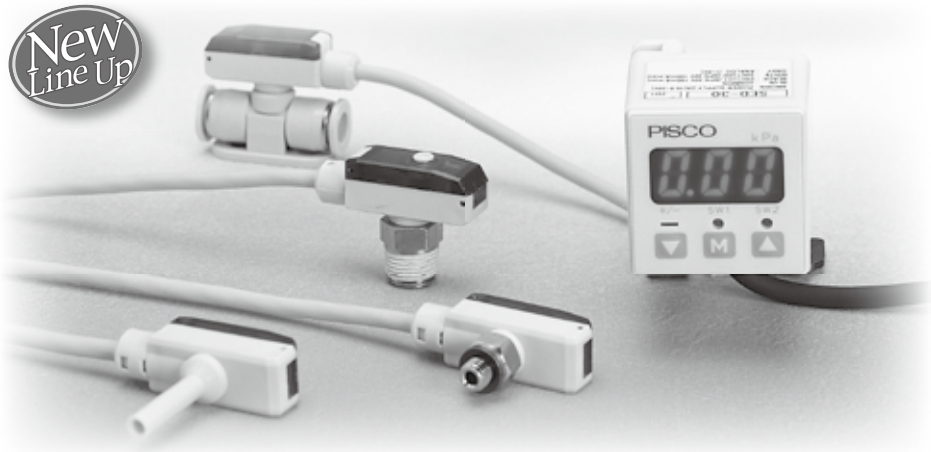





Sensor Heads, Separate display type Pressure sensor and Vacuum Switch

# Small Pressure Sensor 11-series



## Sensor Heads

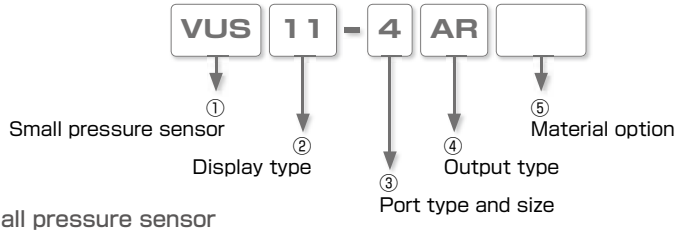
- *Small-sized pressure sensor head. Width: 10mm, Height: 10mm, Length: 24.5mm*
- *"Union" , "Nipple" , and "Male screw" are available.*
- *Use of an analog output type and display (SED30-series) has made a separate display system possible.*
- *Our small-sized pressure sensors can handle "positive pressure" , "negative pressure" , and "Compound pressure" . Switch output, a total of six different specifications are available.*

## Display (31mm)

- *High level of visibility with its the large-sized LED display.*
- *All settings can be done using just three push buttons.*
- *11 different types of indication units are available.*
- *Two different kinds of output methods are offered- analog output or switch output.*
- *Various types of installation: in the rear, on a flat surface, panel buried, and protection of display.*
- *Energy-saving by non-display mode.*
- *Data saving by Panel Lock.*
- *Copper alloy free material and against low ozone concentration on the air flow path.*

Metal parts material is non-copper metals. HNBR for seal rubber material.

## Model Designation of Sensor Heads (Example)




### ① Small pressure sensor

| Code | SEU | VUS |
|---|---|---|
| Sensor | For Positive pressure | For Negative pressure |

### ② Display type

| Code | 11 |
|---|---|
| Display | No display |

### ③ Port type and size

| | Metric Thread (mm) | Push-In-Fitting (mm) | | Stem Type | |
|---|---|---|---|---|---|
| Code | M5 | 4U | 6U | 4 | 6 |
| Size | M5×0.8 | ø4 with holder | ø6 with holder | ø4 | ø6 |

### ④ Output type

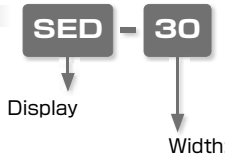
| Code | A | AR | S | SR |
|---|---|---|---|---|
| Output | Analog output | Compound type / Analog output | NPN open collector | Compound type / NPN open collector |

※. "AR" and "SR" are available with "① VUS" only.

### ⑤ Material option

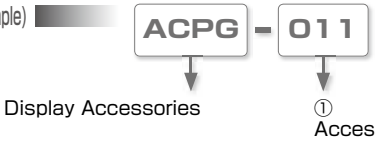
| Code | No code | -S3 |
|---|---|---|
| Material | Standard | Copper alloy free material |
| Port type | All types | All types |

## Model Designation of Display (Example)




※. Copper alloy free material is not available for Display.

## Model Designation of Individual Display accessories (Example)




### ① Accessory type

| Code | 011 | 012 | 003 | 004 | 007 |
|---|---|---|---|---|---|
| Accessory type | Wall bracket | Upright bracket | Panel holder set | Holder cover set | Holder stopper set |
| including | M3x4 screw (2pcs) | M3x4 screw (2pcs) | Panel holder cover, Panel holder and Panel stopper | Panel holder cover and Panel holder | Panel holder and Panel stopper |

## Specifications of Sensor Heads

### Switch output

| Series | | SEU11 Series | VUS11 Series | VUS11-R Series |
|---|---|---|---|---|
| Fluid medium | | Air / Inert gas | | |
| Pressure detection | | Diffusion type semiconductor pressure switch | | |
| Rated voltage | | DC10.8 ~ 30V (including Ripple) | | |
| Power consumption | | 20mA or less (No-load at DC24V) | | |
| Operating pressure range | | 0 ~ 1MPa | -100 ~ 0kPa | -100 ~ 300kPa |
| Proof pressure | | 1.5MPa | 200kPa | 600kPa |
| Storage temperature range | | -20 ~ 70°C (Atmospheric pressure / Humidity: 60% RH or less) | | |
| Operating temp. range | | 0 ~ 60°C (No freezing) | | |
| Operating humidity range | | 35 ~ 85%RH (No dew condensation) | | |
| Protective structure | | Equivalent to IEC / IP40 | | |
| Switch output | No. of pressure setting | 1 | | |
| | Switch output | NPN open collector / 30V 80mA or less / Residual voltage: 0.8V or less | | |
| | Operation indicator | N.O. (Red LED turns ON, when pressure is above the setting) | | |
| | Hysteresis | Fixed (2% F.S. or less) | | |
| | Operating accuracy | ±3%F.S. max. (at Ta=25°C) | | |
| | Response time | About max. 1m·sec. | | |
| | Pressure setting range | 0 ~ 1MPa | -100 ~ 0kPa | -100 ~ 300kPa |

### Analog output

| Series | | SEU11 Series | VUS11 Series | VUS11-R Series |
|---|---|---|---|---|
| Fluid medium | | Air / Inert gas | | |
| Pressure detection | | Diffusion type semiconductor pressure switch | | |
| Rated voltage | | DC10.8 ~ 30V (including Ripple) | | |
| Power consumption | | 20mA or less (No-load at DC24V) | | |
| Operating pressure range | | 0 ~ 1MPa | -100 ~ 0kPa | -100 ~ 300kPa |
| Proof pressure | | 1.5MPa | 200kPa | 600kPa |
| Storage temperature range | | -20 ~ 70°C (Atmospheric pressure / Humidity: 60% RH or less) | | |
| Operating temp. range | | 0 ~ 60°C (No freezing) | | |
| Operating humidity range | | 35 ~ 85%RH (No dew condensation) | | |
| Protective structure | | Equivalent to IEC / IP40 | | |
| Analog output | Output voltage | 1 ~ 5V | | |
| | Zero-point voltage | 1±0.1V | | |
| | Voltage at max. rated pressure | 5±0.1V | | |
| | Output current | 1mA or less (Load resistance: 5kΩ) | | |
| | Linearity | ±0.5%F.S. max. (at Ta=25°C) | | |

## Specifications of Display

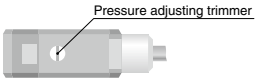
| | | | |
|---|---|---|---|
| Model code | | SED-30 | |
| Rated voltage | | DC10.8 ~ 30V | |
| Power consumption | | 50mA or less (Rated voltage: DC10.8V / 2 switch outputs: ON) | |
| Storage temperature range | | -20 ~ 70°C (Atmospheric pressure / Humidity: 60% RH or less) | |
| Operating temp. range | | 0 ~ 50°C (No freezing) | |
| Operating humidity range | | 35 ~ 85%RH (No dew condensation) | |
| Protective structure | | Equivalent to IEC / IP40 | |
| Pressure Display | Display frequency | 4 times / sec. | |
| | Response time | Variable by digital filter (About 5, 25, 250 and 2500m·sec) | |
| | Display accuracy | ±1%F.S. | |
| | Temperature characteristic | ±0.5%F.S. (0~50℃ (Standard temp.: 25℃ )) | |
| | Monitoring system | Out of display digit range | Blinking "999" |
| | | Out of pressure detection range | Blinking "_ _ _" (Rated pressure: 110% or more) |
| | | Output overload detection | Applying overload current: Blinking "E-1" and Output LED |
| | Zero point adjusting function | | Zero point adjustment by panel control |
| | | Adjusting error | More than 10% F.S. of residual pressure remains in a pneumatic system during Zero point adjustment: Blinking "E2". Release it by panel control. |
| | Sensor Resolution | 1 digit | |
| | Display element | 3-digit and 7-segment LED display / Height of Red LED display: 8mm | |
| | Sign element | Red LED (ON: negative pressure) | |
| | Rated display range | Unit and pressure range are selectable by panel control. | |
| Switch Output | No. of pressure setting | 2 switch outputs (SW1, SW2) | |
| | Switch output | NPN open collector | |
| | Switch capacity | DC30V 100mA max. | |
| | Residual voltage | Max. 1.2V (load current: 100mA) | |
| | Pressure adjusting method | by panel control | |
| | Pressure setting range | -999 ~ 999 count (Decimal point follows the rated pressure range) | |
| | Operation indicator | LED(SW1: Green, SW2: RED) / Blinking (Output: ON) | |
| | Operating accuracy | ±0.2F.S. ±1count | |
| | Temperature characteristic | ±0.5F.S. (0~50℃ (Standard temp.: 25℃ )) | |
| | Response time | Changeable by digital filter (About 5, 25, 250 and 2500m·sec) | |
| | Hysteresis adjustment | 0 ~ 300count (Adjustable by digital filter) | |
| | Overload protection | 2 switch outputs (SW1, SW2) / OFF (overload current: about over 200mA or more) | |
| Analog output | Output voltage | 1 ~ 5V | |
| | Output current | 1mA or less (Load resistance: 5kΩ) | |
| Sensor input | Input signal voltage | 1±0.1 ~ 5±0.1V | |

| Pressure sensor | | VUS11-□A | VUS11-□AR | SEU11-□A |
|---|---|---|---|---|
| Display magnification (unit) | Pressure unit | kPa | | |
| | Setting code | -12P | 32r | 13P |
| ×1(kPa) | Display range of rated pressure (PL ~ PH) | 0.0 ~ -99.9 | -100 ~ 300 | 0 ~ 999 |
| ×0.0102(kgf/cm²) | | 0.00 ~ -1.02 | -1.02 ~ 3.06 | 0.00 ~ (9.99) |
| ×10.2(gf/cm²) | | 0 ~ (-999) | – | – |
| ×7.501(mmHg) | | 0 ~ -750 | – | – |
| ×102(mm$H_2O$) | | – | – | – |
| ×0.01(bar) | | 0.00 ~ -1.02 | -1.00 ~ 3.00 | 0.0 ~ 9.99 |
| ×10(mbar) | | 0 ~ -999 | – | – |
| ×0.145(psi) | | 0.0 ~ -14.5 | -14.5 ~ 43.5 | 0 ~ 145 |
| ×0.000145(Kpsi) | | – | – | – |
| ×0.001(MPa) | | – | -0.10 ~ 0.30 | 0.00 ~ 1.00 |
| ×0.2953(in. Hg) | | 0.0 ~ -29.5 | -29.5 ~ -88.5 | 0 ~ 295 |
| Display of analog output mode | | 3 | 1 | 2 |

## Using Method of Sensor Head

### Switch Output

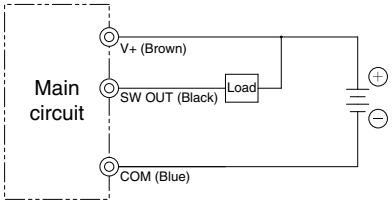
- Power ON (supply DC power after checking wire arrangement)
- Adjust the pressure adjusting trimmer by the flathead screwdriver (accessory) in order to meet the desired value.
- Apply pressure and check the sensor works correctly.



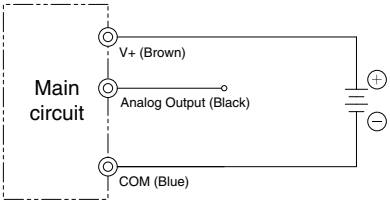

### Analog Output (Sensor Head only)

- Power ON (supply DC power after checking wire arrangement)
- Check the output condition with a tester (1-5V).

Example of wiring: Switch Output

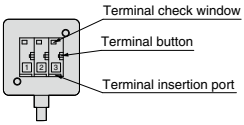



Example of wiring: Analog Output

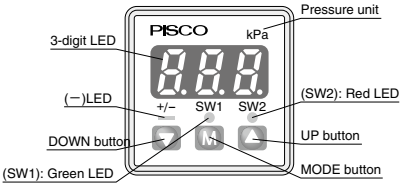



## Using Method of Display

- Press terminal buttons (1-3) with a flathead driver and insert wire terminals of Sensor Head into terminal insertion ports.
  1：V+
  2：Analog OUT
  3：common
- Make sure that each terminal is inserted properly through the terminal check window.
- Power ON (supply DC power after checking wire arrangement)




## Parts names and LED Display at start up



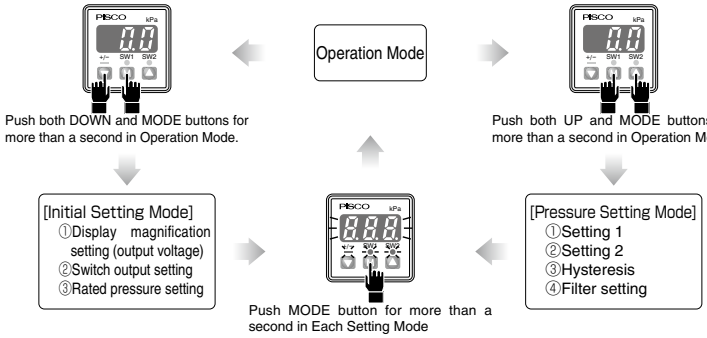

■LED Display at Startup (about 3 seconds)

All LED flash off twice.

Setting code of rated pressure is displayed with flashing.

Start up Operation Mode (pressure detection).

## Operation Procedure of Display




## Zero Point Adjustment of Display

Push both UP and DOWN buttons for more than a second in Operation Mode after releasing the residual pressure in pressure port.

Stop pushing the keys after "0Ad" flashes in the 3-digit LED. Zero-point adjustment starts.

Zero-point adjustment is completed in about a second after "0Ad" flashes. "E-2" (error) is displayed when more than 10% F.S. of the residual pressure remains in the pressure port.

The display shows "0" and returns to Operation Mode. It does not link with a voltage output.

## Error and Special Messages: Display

■ 3-digit LED has error messages and special indications. Refer to countermeasures below.

| Messages | Error contents | Countermeasures |
|---|---|---|
| E-1 | An overload current is supplied to SW. LED of SW1 or SW2 flashes by receiving the overload current, and both outputs turn off. | Turn off the power and check the overload condition. |
| E-2 | Pressure is supplied or a residual pressure still remains in pressure port during Zero Point Adjustment.) | Press [M]MODE button to release "[E-2]" for more than a second. Release the pressure in pressure port and adjust zero-point again. |
| E-3 | The set data may have been lost. | Restart the Display and check initial and pressure settings. Also fluctuation of power supply voltage, startup time and surge voltage need to be checked. |
| E-4 | Require an investigation by PISCO. | Contact us. |
| 999 | Not an error. Out of digit range. | Both switch output and output voltage are normally operated. The display "999" shows the inaccuracy of digit range. |
| - - - | Not an error. Out of pressure detection range. | Both switch output and output voltage are normally operated. The display "_ _ _" shows that the pressure detection range exceeds 110% F.S. |

## Initial Setting Mode (Start from the rated pressure setting, when the rated pressure needs to be changed)

Push both DOWN and MODE buttons for more than a second in Operation Mode.

LED "-" flashes to indicate Display Magnification Setting, but go to the setting mode of rated pressure first.
Press MODE button twice and skip two settings.
All settings are saved by pressing MODE button for a second and returns to Operation Mode (for the function of MODE button, the same applies to the following).

③Three LEDs (-, SW1 and SW2) flash to indicate the setting mode of the display range of rated pressure.
Factory setting is 3-digit LED "12P" (0-100kPa).
Select the range by pressing DOWN or UP button.
VUS11-□A: "-12P"
VUS11-□AR: "32r"
SEU11-□A: "13P"

When "-12P" (0-100kPa) is selected, it flashes to indicate the selection of the display range. Press MODE button to save the range and move the next setting.

② LED (SW2) flashes to indicate SW Output Setting. The third LED shows "4" (separate mode: L/L).
Select the code for SW Output Setting by pressing DOWN or UP button.
You can return to setting③ or save all settings and go back to Operation Mode by operating MODE button.

When "4" (-750) is selected, it flashes to indicate that it is "selectable". Press MODE button to move to the next setting.
(The second digit: Output Voltage Setting is selected automatically when Display Magnification Setting is selected)

①LED "-" flashes to indicate Display Magnification Setting.
The third digit shows "1" (kPa).
Select the code of Display Magnification Setting by pressing DOWN or UP button.

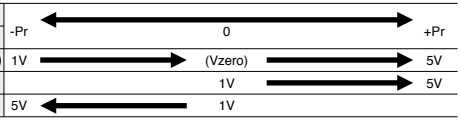
Caution

1. Once the setting③ of rated pressure is saved, the code set by ① and ② are automatically initiated per rated pressure range. Do not setup the above procedure after the setting③ (rated pressure setting) is completed.
2. When SW Output Setting ② is changed, especially Separate or Wind Comparator Mode is switched, the set value (1 / 2 / Hysteresis) at Pressure Setting Mode may be automatically changed in order to avoid a contradiction.

## Output Voltage operation

· Output Voltage Setting: The code is displayed in the second digit of 3-digit LED in Intial Setting Mode.
Output Mode is fixed per rated pressure, and can not be changed.

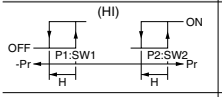
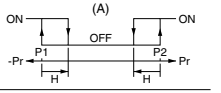
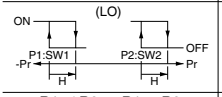
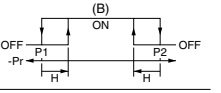
| Output Voltage Setting | |
|---|---|
| Code | Output Mode |
| "1" | Mode R (compound pressure) |
| "2" | Mode G (positive pressure) |
| "3" | Mode V (negative pressure) |




## SW Output Setting / Operation Drawing

· SW Output Setting: Setup a requested mode when LED (SW2) starts flashing in Initial Setting Mode.
· Factory setting is "1" Separate Mode (HI / HI). When the setting of rated pressure is changed to negative pressure "-12P" or "-12F" , SW Output Setting is initialized to "4" Separate Mode (LO / LO).

| Output | SW1 | | | | SW2 | | | |
|---|---|---|---|---|---|---|---|---|
| Mode | Separate | | Wind Comparator | | Separate | | Wind Comparator | |
| Operation | HI | LO | A | B | HI | LO | A | B |
| 1 | ○ | | | | ○ | | | |
| 2 | ○ | | | | | ○ | | |
| 3 | | ○ | | | ○ | | | |
| 4 | | ○ | | | | ○ | | |
| 5 | | | ○ | | | | ○ | |
| 6 | | | ○ | | | | | ○ |
| 7 | | | | ○ | | | ○ | |
| 8 | | | | ○ | | | | ○ |
| | Setting1 | | Lower limit : Setting1<br>Upper limit : Setting2 | | Setting2 | | Lower limit : Setting1<br>Upper limit : Setting2 | |
| | Caution 1 | | Caution 2 | | Caution 1 | | Caution 2 | |

| Separate Mode | Wind Comparator Mode |
|---|---|
|  |  |
|  |  |
| P1 ≦ P2 or P1 ≧ P2 | P1 ≦ P2-2H |

P1: Setting1 / P2: Setting2 / H: Hysteresis

## ■ Pressure Setting Mode (Setup rated pressure and SW Output Setting in Initial Setting Mode before this setting)

Push both MODE and UP buttons for more than a second in Operation Mode.

LED (SW1) starts flashing to indicate Setting Mode of Setting Value 1. When "4" (0 to -750) is selected in Display Magnification Setting, Setting Value 1 shows "-500" by 3-digit LED and "-" LED.
Select a requested value by pressing DOWN or UP button.
When DOWN or UP button is pressed for a while, the speed of digital number count becomes faster.
LED "-" shows minus (negative pressure).

Example) Setting Value 1: "-700" is selected. Press MODE button to the next setting. If MODE button is pressed for a second, all settings are saved and the display returns to Operation Mode (for the function of MODE button, the same applies to the following).

② LED (SW2) starts flashing to indicate Setting Mode of Setting Value 2. The display shows "-500" same as Setting Value 1.
Select a requested value for Setting Value 2 by pressing DOWN or UP button.

Example) Setting Value 2: "0" is selected. Press MODE button to the next setting.

③ LED "-" starts flashing to indicate Hysteresis Setting Mode. "20" is displayed. Select a requested value (0-300 counts) for hysteresis by operating DOWN or UP button.
Press MODE button to the next setting.

④ LED stops flashing."F--*" will be shown on 3-digit LED which indicates Digital Filter Setting Mode.
In the above figure, "F-0" (5msec) is selected. Select a requested filter setting code from 4 types(F-0, 1, 2, 3) by operating DOWN and UP button.
You can return to setting① or save all settings and go back to Operating Mode by operating MODE button.

Caution

1. Setup SW Output Setting in Initial Setting Mode in advance. Especially when the setting Separate / Wind Comparator Mode is switched, the set value (1 / 2 / Hysteresis) in Pressure Setting Mode may be automatically changed in order to avoid a contradiction.

## ■ SW Output Setting / Pressure Setting

- Pressure value setting in SW (Setting Value 1 / Setting Value 2): Set a requested value, when each LED (SW1 or SW2) starts flashing in Pressure Setting Mode.
- Factory setting value is "500" for both Setting Value 1 and 2. "-500" is displayed for negative pressure (Rate pressure code "12" and "-12F" ). Selectable range of setting counts is from -999 to 999. Position of a decimal point is determined by Rated Pressure or Display Magnification Setting.

Note) When Wind Comparator is selected in SW Output Setting, Setting Value 1 and 2 (P1 and P2) and Hysteresis (H) have a limited range of setting value based on the formula (P1 ≦ P2-2H). Set a requested value of Setting Value 1 or 2 in advance, which is not restricted.

## ■ SW Output Setting / Hysteresis Setting

- Pressure value setting of SW (Hysteresis): Set a requested value, when LED "-" starts flashing in Pressure Setting Mode.
- Factory setting value is "20" . Selectable range of setting counts is from 0 to 300. Position of a decimal point is determined by Rated Pressure or Display Magnification Setting.

Note) When Wind Comparator is selected in SW Output Setting, Setting Value 1 and 2 (P1 and P2) and Hysteresis (H) have a limited range of setting value based on the formula (P1 ≦ P2-2H). Set a value of Hysteresis "0" first and Setting Value 1 or 2. After that, set a requested value of Hysteresis.

## ■ Digital Filter Setting

- Digital Filter Setting: Set a requested value, when LEDs (- / SW1 / SW2) do not flash in Pressure Setting Mode and "F-*" is displayed on 3-digit LED.
- Factory setting is "F-0" (5msec). Selectable filter is "F-0" , "F-1" (25msec), "F-2" (250msec) and "F-3" (2500msec). This function is useful when a detected pressure has a instant fluctuation and a difficulty in control.

Note) Filtering process for this product means averaging the data from every 5msec. cycle and providing SW output on each response time.

## ■ Display Magnification and Rated Pressure Setting

### ■ Display Magnification Setting

· Set a code of Display Magnification, when LED "-" starts flashing in Initial Setting Mode.
· Factory setting code is "1" (unit: kPa).

### ■ Rated Pressure Setting

· Set a code of Rated Pressure, when LEDs (- / SW1 / SW2) start flashing in Initial Setting Mode.
· Factory setting code is "12P" (rated pressure range: 0-100kPa).

| Mode | | Pressure type | Gauge pressure / Absolute pressure | | Compound pressure |
|---|---|---|---|---|---|
| | | Pressure unit | kPa | | kPa |
| Display Magnification Setting | | Rated pressure range | 0 ~ -100 | 0 ~ -1000 | -100 ~ 300 |
| Code | Magnification | Setting code | "-12P" | "-13P" | "32r" |
| 1 | ×1 (kPa) | Rated pressure display (PL ~ PH) | 0.0<br>-99.9 | 0<br>999 | -100<br>300 |
| 2 | ×0.0102 (kgf/cm²) | | 0.00<br>-1.02 | 0.00<br>9.99 | -1.02<br>3.06 |
| 3 | ×10.2 (gf/cm²) | | 0<br>-999 | | |
| 4 | ×7.501 (mmHg) | | 0<br>-750 | | |
| 6 | ×0.01 (bar) | | 0.00<br>-1.02 | 0.0<br>9.99 | -1.00<br>3.00 |
| 7 | ×10 (mbar) | | 0<br>-999 | | |
| 8 | ×0.145 (psi) | | 0.0<br>-14.5 | 0<br>145 | -14.5<br>43.5 |
| A | ×0.001 (MPa) | | | 0.00<br>1.00 | -0.10<br>0.30 |
| b | ×0.2953 (inHg) | | 0<br>-29.5 | 0<br>295 | -29.5<br>88.5 |

## ■ Other Functions

### ■ Non-Display Setting

○ Non-Display Mode [Temporary]

- Non-Display Mode [Temporary] starts when there is no operation for more than 10 seconds in Operation Mode.
- LED of a decimal point starts flashing to indicate the sensor is in operation.
- All settings are memorized in EEPROM and the data is saved even if the power turns off.
- When an error is detected, the error notice is displayed. After the error message is released, it returns to Non-Display Mode [Temporary] again.
- Button operation is available during Non-Display Mode. After a pressure value is displayed, it will be back to Non-Display Mode [Temporary] again.
- Non-Display Mode [Full time] is also selectable.

(Setting / Unsetting of Function)


- Press ▼ DOWN button for 4 seconds or more in Operation Mode. Stop pressing the button once the display SOF starts flashing. Non-Display Mode [Temporary] will be set and the display returns to Operation Mode. The display turns off in 10 seconds.
- In order to release the function, press ▼ DOWN button for 4 seconds or more. Stop pressing the button once the display LOn starts turning on. Non-Display Mode will be unset and the display returns to Operation Mode.

○ Non-Display Mode [Full time]

- The display turns off in Operation Mode and the panel control is locked.
- LED of a decimal point turns on to indicate that Non-Display Mode [Full time] is active.
- All settings are memorized in EEPROM and the data is saved even if the power turns off.
- Once an error is detected, the error notice is displayed. After the error message is released, it returns to Non-Display Mode [Full time].
- Any button operation other than setting / unsetting of this Function will not be accepted.

(Setting / Unsetting of Function)


- Press Ⓜ MODE button for 4 seconds or more in Operation Mode. Stop pressing the button once the display COF starts flashing. Non-Display Mode [Full time] will be set and the display returns to Operation Mode. The display turns off.
- In order to unset the function, press Ⓜ MODE button for 4 seconds or more. Stop pressing the button once the display LOn turns on. Non-Display Mode will be unset and the display returns to Operation Mode.

### ■ Setting Protection (Panel Lock)

○ Panel Lock Mode

- This function protects the setting condition from misoperation by pressing buttons.
- All settings are memorized in EEPROM and the data is saved even if power turns off.

(Setting / Unsetting of Function)

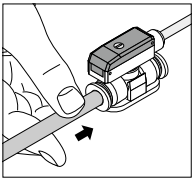

- Press ▲ UP button for 4 seconds or more in Operation Mode. Stop pressing the button once the display PL flashes. Panel Lock will be set and the display returns to Operation Mode. Any button operation is not available after this procedure.
- In order to unset the function, press ▲ UP button for 4 seconds or more. Stop pressing the button once the display PA turns on. Panel Lock will be unset and the display returns to Operation Mode. Button operation is available after this procedure.

## How to insert and disconnect

### 1. How to insert and disconnect tubes

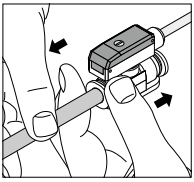
① Tube insertion

Insert a tube into Push-In Fitting up to the tube end. Lock-claws bite the tube and fix it automatically, then the elastic sleeve seals around the tube.
Refer to "2. Instructions for Tube Insertion" under "Common Safety Instructions for Fittings" .



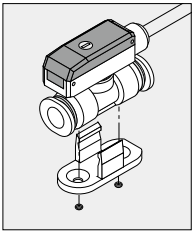
② Tube disconnection

The tube is disconnected by pushing release-ring to release Lock-claws.
Make sure to stop air supply before the tube disconnection.



### 2. How to fix body

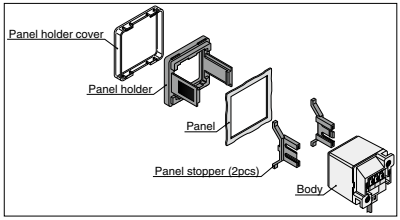
In order to fix Small Pressure Sensor 11-series, use the fixing holes on the body to tighten with M3 screws (accessory). Refer to the dimensional drawings of the hole pitch.



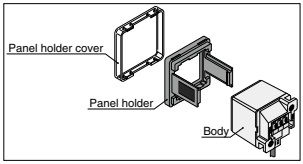




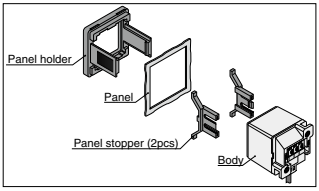
### 3. Assembling Method of Panel Holder Set (ACPG-003)




### 4. Assembling Method of Holder Cover Set (ACPG-004)




### 5. Assembling Method of Holder Stopper Set (ACPG-007)



## ⚠ Detailed Safety Instructions

Before using PISCO products, be sure to read “Safety Instructions” and “Safety Instruction Manual” on page 35-39, “Common Safety Instructions for Pressure Sensors” on page 794.

### Warning

1. Avoid using the sensor under the condition of corrosive gas. Also do not use the gas as a fluid medium.
2. Avoid using this product in the flammable explosive gas, liquid or ambience. This product is not designed explosive-proof and may cause fire or explosion under these conditions.
3. Use the product within the described temperature range. Otherwise, there is a possibility of malfunction of the sensor by the heat.
4. Make sure to turn off the power before wiring. Check the wire colors, and do not short-circuit output terminals, power supply terminals and COM terminals when wiring. Short-circuits may cause a sensor trouble.

### Caution

1. Supply a stable DC power to the product.
2. Add a surge absorption circuit to relays or solenoid valves, etc. which are to be connected with output terminal and source terminal. Avoid any use which involves over 80mA in current.
3. Ground the FG terminal when using a unit power source such as switching current.
4. Output terminals and other terminals should not be short-circuited.
5. Avoid strong external impacts and excessive force to the sensor body.
6. Wiring or ways by which noise or other disturbance is caused may cause a sensor trouble.
7. When adjusting pressure setting, use the accompanied flathead screwdriver. Do not apply an excessive force on the trimmer. Applying excessive force may damage the sensor.
8. Keep the display (SED-30) away from water/oil drops or dusts, since it is not drip/dust proof structure.
9. For the SED-30 display’s sensor heads, use “VUS 11···A” or “SEU 11···A” type analog output head. Using the head with different specifications may not achieve the required level of accuracy.
10. Avoid an excessive tensile force and bending force on a lead wire of the vacuum switch. Otherwise, there is a possibility of wire breaking and damaging the connector part.

## ■ Applicable Tube and Related Products

### Polyurethane Tube
### (1. Piping products catalog P.596)

■ Polyurethane Tube is for general pneumatic piping and suitable for piping compactly.

### Nylon Tube
### (1. Piping products catalog P.608)

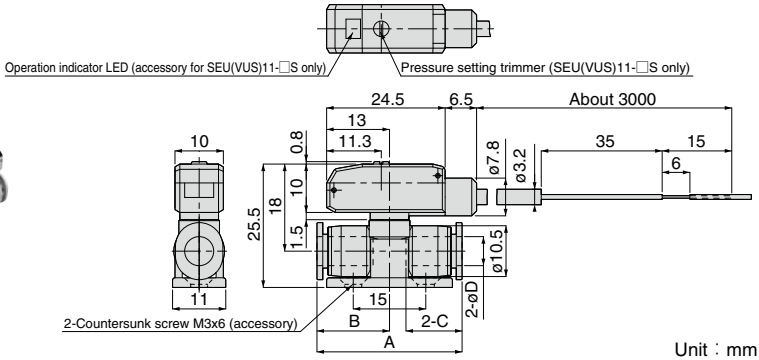
■ Nylon Tube is for general pneumatic piping and suitable for a high-pressure fluid medium up to 1.5MPa (NB tube: 1.0MPa).

### Vacuum Generators ・・・・・ P.52

■ Vacuum Generator changes over from compressed air to vacuum air

## SEU Sensor Head / Positive Pressure / Union Type
## VUS Sensor Head / Negative Pressure / Union Type

RoHS compliant
Copper alloy free
Selectable




Unit：mm

| Model code | Tube O.D. øD | C | A | B | Weight (g) |
|---|---|---|---|---|---|
| SEU11-4U□ | 4 | 11 | 29.2 | 14.6 | 48 |
| SEU11-6U□ | 6 | 11.6 | 30 | 15 | 48 |
| VUS11-4U□ | 4 | 11 | 29.2 | 14.6 | 48 |
| VUS11-6U□ | 6 | 11.6 | 30 | 15 | 48 |

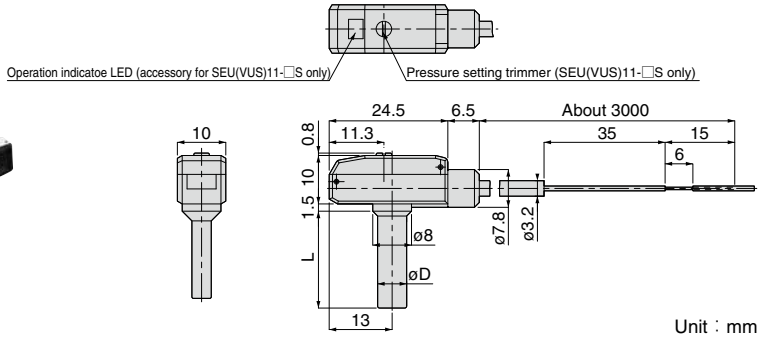
※. Add "-S3" at the end of model code for air path parts "Copper alloy free".





## SEU Sensor Head / Positive Pressure / Stem Type
## VUS Sensor Head / Negative Pressure / Stem Type

RoHS compliant
Copper alloy free
Selectable



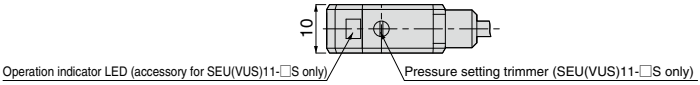

Unit：mm

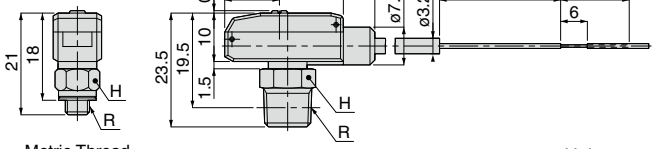
| Model code | Tube O.D. øD | L | Weight (g) |
|---|---|---|---|
| SEU11-4□ | 4 | 18 | 44 |
| SEU11-6□ | 6 | 20 | 45 |
| VUS11-4□ | 4 | 18 | 44 |
| VUS11-6□ | 6 | 20 | 45 |

※. Add "-S3" at the end of model code for a seal rubber (HNBR) as countermeasure against low ozone concentration.

# SEU Sensor Head / Positive Pressure / Metric Thread
# VUS Sensor Head / Negative Pressure / Metric Thread

RoHS compliant
Copper alloy free
Selectable



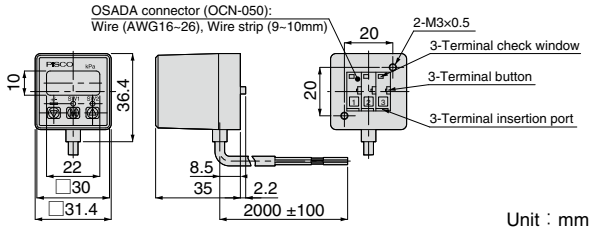

Unit：mm

| Model code | R | Hex. H | Weight (g) |
|---|---|---|---|
| SEU11-M5□ | M5×0.8 | 8 | 46 |
| SEU11-01□ | R1/8 | 10 | 49 |
| VUS11-M5□ | M5×0.8 | 8 | 46 |
| VUS11-01□ | R1/8 | 10 | 49 |

※. Add "-S3" at the end of model code for air path parts with copper based material free.

# SED Display

RoHS compliant

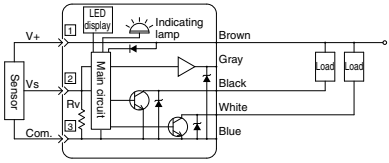



Unit：mm

| Model code | Weight (g) |
|---|---|
| SED-30 | 80 |

| Lead Wire | Connection Terminal |
|---|---|
| Brown | Power (DC10.8 ~ 30V) |
| Blue | COMMON |
| Black | SW output 1 |
| White | SW output 2 |
| Gray | Analog output (1 ~ 5V) |

Internal Circuit Diagram and Connection Method

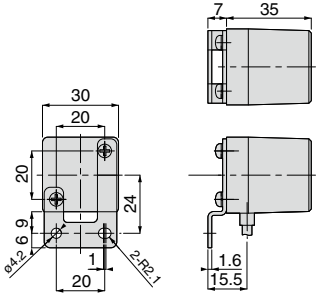


## ACPG Wall Bracket (Display Accessory)

RoHS compliant

Unit : mm

| Model code | Weight (g) |
|---|---|
| ACPG-011 | 11 |

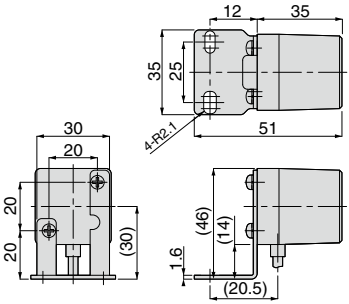



## ACPG Upright Bracket (Display Accessory)

RoHS compliant

Unit : mm

| Model code | Weight (g) |
|---|---|
| ACPG-012 | 13 |



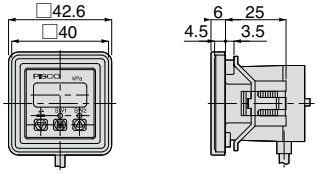




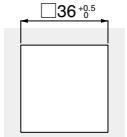

## ACPG Panel Holder Set (Display Accessory)

Unit : mm

| Model code | Weight (g) |
|---|---|
| ACPG-003 | 11 |

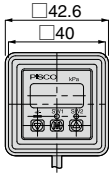


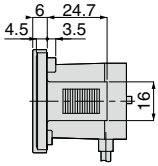

●Panel cut dimension




Panel thickness : 1 ~ 3.6mm

## ACPG Holder Cover Set (Display Accessory)

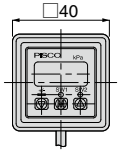


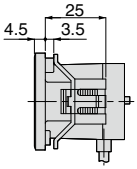




Unit：mm

| Model code | Weight (g) |
|---|---|
| ACPG-004 | 9.5 |

## ACPG Holder Stopper Set (Display Accessory)

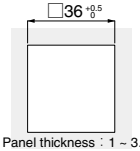



Unit：mm

| Model code | Weight (g) |
|---|---|
| ACPG-007 | 10 |

●Panel cut dimension




Panel thickness：1 ~ 3.6mm

# ⚠ SAFETY Instructions

This safety instructions aim to prevent personal injury and damage to properties by requiring proper use of PISCO products.

Be certain to follow ISO 4414 and JIS B 8370

ISO 4414 : Pneumatic fluid power…Recomendations for the application of equipment to transmission and control systems.

JIS B 8370 : General rules and safety requirements for systems and their components.

This safety instructions is classified into “Danger”, “Warning” and “Caution” depending on the degree of danger or damages caused by improper use of PISCO products.

| | |
|---|---|
| ⚠ Danger | Hazardous conditions. It can cause death or serious personal injury. |
| ⚠ Warning | Hazardous conditions depending on usages. Improper use of PISCO products can cause death or serious personal injury. |
| ⚠ Caution | Hazardous conditions depending on usages. Improper use of PISCO products can cause personal injury or damages to properties. |

## ⚠ Warning

1. Selection of pneumatic products
   ① A user who is a pneumatic system designer or has sufficient experience and technical expertise should select PISCO products.
   ② Due to wide variety of operating conditions and applications for PISCO products, carry out the analysis and evaluation on PISCO products. The pneumatic system designer is solely responsible for assuring that the user's requirements are met and that the application presents no health or safety hazards. All designers are required to fully understand the specifications of PISCO products and constitute all systems based on the latest catalog or information, considering any malfunctions.

2. Handle the pneumatic equipment with enough knowledge and experience
   ① Improper use of compressed air is dangerous. Assembly, operation and maintenance of machines using pneumatic equipment should be conducted by a person with enough knowledge and experience.

3. Do not operate machine / equipment or remove pneumatic equipment until safety is confirmed.
   ① Make sure that preventive measures against falling work-pieces or sudden movements of machine are completed before inspection or maintenance of these machine.
   ② Make sure the above preventive measures are completed. A compressed air supply and the power supply to the machine must be off, and also the compressed air in the systems must be exhausted.
   ③ Restart the machines with care after ensuring to take all preventive measures against sudden movements.

## Disclaimer

1. PISCO does not take any responsibility for any incidental or indirect loss, such as production line stop, interruption of business, loss of benefits, personal injury, etc., caused by any failure on use or application of PISCO products.

2. PISCO does not take any responsibility for any loss caused by natural disasters, fires not related to PISCO products, acts by third parties, and intentional or accidental damages of PISCO products due to incorrect usage.

3. PISCO does not take any responsibility for any loss caused by improper usage of PISCO products such as exceeding the specification limit or not following the usage the published instructions and catalog allow.

4. PISCO does not take any responsibility for any loss caused by remodeling of PISCO products, or by combinational use with non-PISCO products and other software systems.

5. The damages caused by the defect of Pisco products shall be covered but limited to the full amount of the PISCO products paid by the customer.

# ⚠ SAFETY INSTRUCTION MANUAL

PISCO products are designed and manufactured for use in general industrial machines. Be sure to read and follow the instructions below.

## ⚠ Danger

1. Do not use PISCO products for the following applications.
   ① Equipment used for maintaining / handling human life and body.
   ② Equipment used for moving / transporting human.
   ③ Equipment specifically used for safety purposes.

## ⚠ Warning

1. Do not use PISCO products under the following conditions.
   ① Beyond the specifications or conditions stated in the catalog, or the instructions.
   ② Under the direct sunlight or outdoors.
   ③ Excessive vibrations and impacts.
   ④ Exposure / adhere to corrosive gas, inflammable gas, chemicals, seawater, water and vapor. *
   * Some products can be used under the condition above(④), refer to the details of specification and condition of each product.
2. Do not disassemble or modify PISCO products, which affect the performance, function, and basic structure of the product.
3. Turn off the power supply, stop the air supply to PISCO products, and make sure there is no residual air pressure in the pipes before maintenance and inspection.
4. Do not touch the release-ring of push-in fitting when there is a working pressure. The lock may be released by the physical contact, and tube may fly out or slip out.
5. Frequent switchover of compressed air may generate heat, and there is a risk of causing burn injury.
6. Avoid any load on PISCO products, such as a tensile strength, twisting and bending. Otherwise, there is a risk of causing damage to the products.
7. As for applications where threads or tubes swing / rotate, use Rotary Joints, High Rotary Joints or Multi-Circuit Rotary Block only. The other PISCO products can be damaged in these applications.
8. Use only Die Temperature Control Fitting Series, Tube Fitting Stainless SUS316 Series, Tube Fitting Stainless SUS316 Compression Fitting Series or Tube Fitting Brass Series under the condition of over 60℃ (140° F) water or thermal oil. Other PISCO products can be damaged by heat and hydrolysis under the condition above.
9. As for the condition required to dissipate static electricity or provide an antistatic performance, use EG series fitting and antistatic products only, and do not use other PISCO products. There is a risk that static electricity can cause system defects or failures.
10. Use only Fittings with a characteristic of spatter-proof such as Anti-spatter or Brass series in a place where flame and weld spatter is produced. There is a risk of causing fire by sparks.
11. Turn off the power supply to PISCO products, and make sure there is no residual air pressure in the pipes and equipment before maintenance. Follow the instructions below in order to ensure safety.
    ① Make sure the safety of all systems related to PISCO products before maintenance.
    ② Restart of operation after maintenance shall be proceeded with care after ensuring safety of the system by preventive measures against unexpected movements of machines and devices where pneumatic equipment is used.
    ③ Keep enough space for maintenance when designing a circuit.
12. Take safety measures such as providing a protection cover if there is a risk of causing damages or fires on machine / facilities by a fluid leakage.

## ⚠ Caution

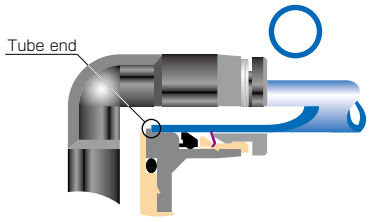
1. Remove dusts or drain before piping. They may get into the peripheral machine / facilities and cause malfunction.
2. When inserting an ultra-soft tube into push-in fitting, make sure to place an Insert Ring into the tube edge. There is a risk of causing the escape of tube and a fluid leakage without using an Insert Ring.
3. The product incorporating NBR as seal rubber material has a risk of malfunction caused by ozone crack. Ozone exists in high concentrations in static elimination air, clean-room, and near the high-voltage motors, etc. As a countermeasure, material change from NBR to HNBR or FKM is necessary. Consult with PISCO for more information.
4. Special option "Oil-free" products may cause a very small amount of a fluid leakage. When a fluid medium is liquid or the products are required to be used in harsh environments, contact us for further information.
5. In case of using non-PISCO brand tubes, make sure the tolerance of the outer tube diameter is within the limits of Table 1.

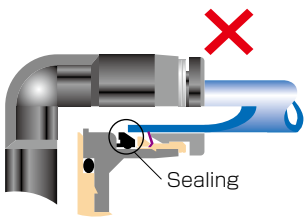
● Table 1. Tube O.D. Tolerance

| mm size | Nylon tube | Polyurethane tube |
|---|---|---|
| ø1.8mm | — | ±0.05mm |
| ø3mm | — | ±0.15mm |
| ø4mm | ±0.1mm | ±0.15mm |
| ø6mm | ±0.1mm | ±0.15mm |
| ø8mm | ±0.1mm | ±0.15mm |
| ø10mm | ±0.1mm | ±0.15mm |
| ø12mm | ±0.1mm | ±0.15mm |
| ø16mm | ±0.1mm | ±0.15mm |

| inch size | Nylon tube | Polyurethane tube |
|---|---|---|
| ø1/8 | ±0.1mm | ±0.15mm |
| ø5/32 | ±0.1mm | ±0.15mm |
| ø3/16 | ±0.1mm | ±0.15mm |
| ø1/4 | ±0.1mm | ±0.15mm |
| ø5/16 | ±0.1mm | ±0.15mm |
| ø3/8 | ±0.1mm | ±0.15mm |
| ø1/2 | ±0.1mm | ±0.15mm |
| ø5/8 | ±0.1mm | ±0.15mm |

6. Instructions for Tube Insertion
   ① Make sure that the cut end surface of the tube is at right angle without a scratch on the surface and deformations.
   ② When inserting a tube, the tube needs to be inserted fully into the push-in fitting until the tubing edge touches the tube end of the fitting as shown in the figure below. Otherwise, there is a risk of leakage.




Tube is not fully inserted up to tube end.

   ③ After inserting the tube, make sure it is inserted properly and not to be disconnected by pulling it moderately.

※. When inserting tubes, Lock-claws may be hardly visible in the hole, observed from the front face of the release-ring. But it does not mean the tube will surely escape. Major causes of the tube escape are the followings;
①Shear drop of the lock-claws edge
②The problem of tube diameter (usually small)
Therefore, follow the above instructions from ① to ③, even lock-claws is hardly visible.

7. Instructions for Tube Disconnection
   ① Make sure there is no air pressure inside of the tube, before disconnecting it.
   ② Push the release-ring of the push-in fitting evenly and deeply enough to pull out the tube toward oneself. By insufficient pushing of the release-ring, the tube may not be pulled out or damaged by scratch, and tube shavings may remain inside of the fitting, which may cause the leakage later.
8. Instructions for Installing a fitting
   ① When installing a fitting, use proper tools to tighten a hexagonal-column or an inner hexagonal socket. When inserting a hex key into the inner hexagonal socket of the fitting, be careful so that the tool does not touch lock-claws. The deformation of lock-claws may result in a poor performance of systems or an escape of the tube.
   ② Refer to Table 2 which shows the recommended tightening torque. Do not exceed these limits to tighten a thread. Excessive tightening may break the thread part or deform the gasket and cause a fluid leakage. Tightening thread with tightening torque lower than these limits may cause a loosened thread or a fluid leakage.
   ③ Adjust the tube direction while tightening thread within these limits, since some PISCO products are not rotatable after the installation.

● Table 2: Recommended tightening torque / Sealock color / Gasket materials

| Thread type | Thread size | Tightening torque | Sealock color | Gasket materials |
|---|---|---|---|---|
| Metric thread | M3 × 0.5 | 0.7N·m | — | SUS304 NBR |
| | M5 × 0.8 | 1.0 ~ 1.5N·m | | |
| | M6 × 1 | 2 ~ 2.7N·m | | |
| | M3 × 0.5 | 0.5 ~ 0.6N·m | | POM |
| | M5 × 0.8 | 1 ~ 1.5N·m | | |
| | M6 × 0.75 | 0.8 ~ 1N·m | | |
| | M8 × 0.75 | 1 ~ 2N·m | | |
| Taper pipe thread | R1/8 | 7 ~ 9N·m | White | — |
| | R1/4 | 12 ~ 14N·m | | |
| | R3/8 | 22 ~ 24N·m | | |
| | R1/2 | 28 ~ 30N·m | | |
| Unified thread | No.10-32UNF | 1.0 ~ 1.5N·m | — | SUS304、NBR |
| National pipe thread taper | 1/16-27NPT | 7 ~ 9N·m | White | — |
| | 1/8-27NPT | 7 ~ 9N·m | | |
| | 1/4-18NPT | 12 ~ 14N·m | | |
| | 3/8-18NPT | 22 ~ 24N·m | | |
| | 1/2-14NPT | 28 ~ 30N·m | | |

※ These values may differ for some products. Refer to each specification as well.

9. Instructions for removing a fitting
   ① When removing a fitting, use proper tools to loosen a hexagonal-column or an inner hex bolt.
   ② Remove the sealant stuck on the mating equipment. The remained sealant may get into the peripheral equipment and cause malfunctions.
10. Arrange piping avoiding any load on fittings and tubes such as twist, tensile, moment load, shaking and physical impact. These may cause damages to fittings, tube deformations, bursting and the escape of tubes.

# ⚠ Common Safety Instructions for Pressure Sensors

Before selecting or using PISCO products, read the following information. Regarding the instructions of each series, please follow each Detailed Safety Instructions.

## ⚠ Warning

1. Avoid an excessive tensile strength, twisting force, bending, dropping and strong impact on pressure sensors. Otherwise, there is a possibility of damaging the products.
2. Supply clean air to the operating pressure source. There is a possibility of malfunction of sensors by sludge or dusts.

## ⚠ Caution

1. Refer to "Common Safety Instructions for Fittings" for handling Fittings.
2. Instructions for Installation
   ①. Use a proper tool to tighten hexagonal-columns of body.
   ②. Refer to the following recommended tightening torque to tighten thread. Do not exceed these limits to tighten a thread. Excessive tightening may break the thread part or deform the gasket to cause a fluid leakage. Tightening thread with tightening torque less than these limits may cause a loosened thread or fluid leakage.

● Table: Recommended tightening torque (Hexagonal-column)

| Thread type | Thread size | Tightening torque |
|---|---|---|
| Metric thread | M5×0.8 | 1.5 ~ 1.9N·m |
| Taper pipe thread | R1/8 | 7 ~ 9N·m |

3. Instructions for Removal
   ①. Use a proper tool to tighten hexagonal-columns of body.
   ②. Remove the sealant stuck on the mating equipment. The remained sealant may get into the peripheral equipment and cause malfunctions.