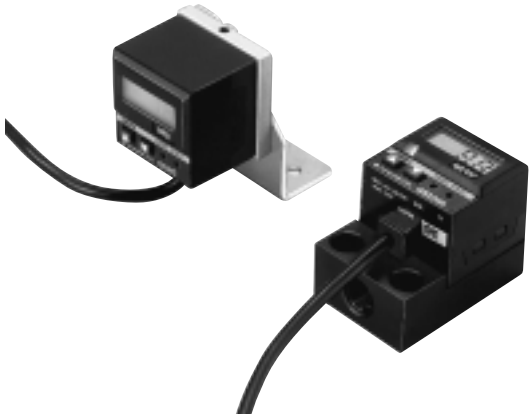
DIGITAL PRESSURE GAUGES WITH BUILT-IN SENSORS

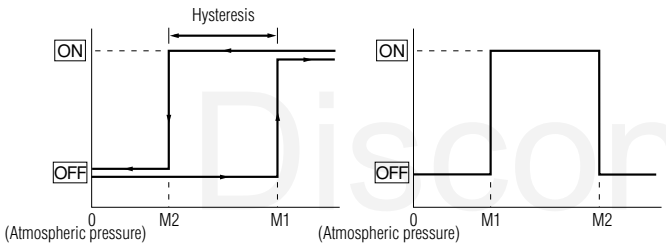


Caution: **GS2** negative pressure is displayed in -cmHg, while positive pressure is displayed in kgf/cm^2.

Characteristics

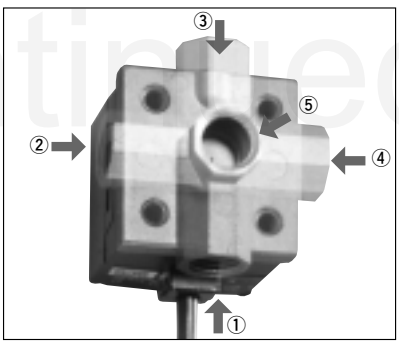
- Can set pressure while reading displays. (2½ digit LCD display)
  Can align with the current situation while confirming the pressure setting in the display.
- Electronic lifetime is almost perpetual.
  Uses diffusion-type semiconductor transductor.
  Offers high reliability and long life even under the rigorous environment of changing pressures.
- 2-point setting
  The 2-point setting of pressure allows selection of two different kinds of modes, the hysteresis mode and window comparator mode. Adaptable to all kinds of utilizations.

① Hysteresis mode | **② Window comparator mode**

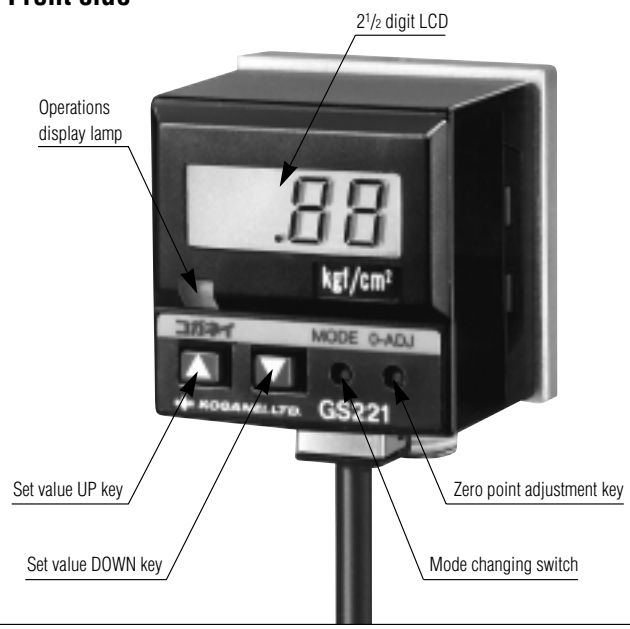


Discontinued

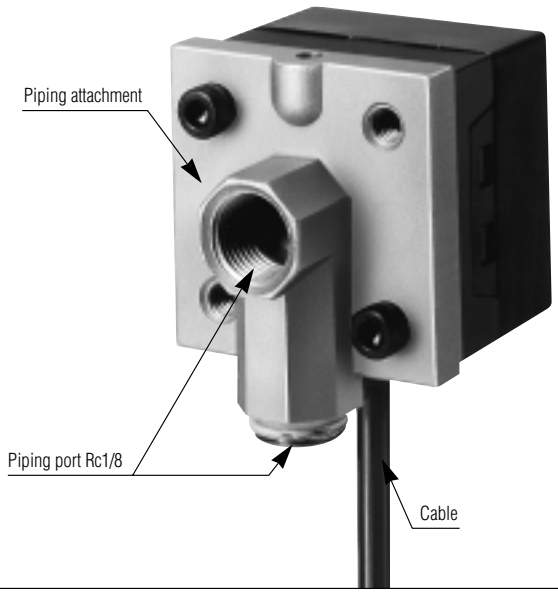
- Connections in five directions.
  Change the mounting direction of piping attachments to select five different kinds of connection directions.



Front side



Rear side



Specifications

Item \ Category		Negative pressure		Positive pressure			
				1kgf/cm² type		10kgf/cm² type	
		Digital pressure gauge		Digital pressure gauge		Digital pressure gauge	
		Comparative output	With analog output	Comparative output	With analog output	Comparative output	With analog output
	Model	**GS210** **GS210D**	**GS210A** **GS210AD**	**GS221** **GS221D**	**GS221A** **GS221AD**	**GS220** **GS220D**	**GS220A** **GS220AD**
	Rated pressure range	0～-76cmHg		0～1kgf/cm² {0～100kPa}		0～9.9kgf/cm² {0～990kPa}	
	Set pressure range	0～-76cmHg		0～1kgf/cm² {0～100kPa}		0～9.9kgf/cm² {0～990kPa}	
	Proof pressure	5kgf/cm² {500kPa}				15kgf/cm² {1500kPa}	
	Media	Air or non-corrosive gas					
	Repeatable accuracy (comparative output)	±1%FS max.					
	Power supply voltage	DC12～24V ±10% ripple P-P10% max.					
	Consumption current	30mA max.					
Output method	Comparative output	NPN transistor, open collector ● Output capacity: DC30V, 100mA max. ● Residual voltage: 1V max. (at rush current of 100mA) 0.4V max. (at rush current of 16mA)					
Output method	Analog output	——	● Output voltage: 1～5V (0～-76cmHg) ● Output impedance: 1KΩ ● Linearity: ±1%FS	——	● Output voltage: 1～5V (0～1kgf/cm²) ● Output impedance: 1KΩ ● Linearity: ±1%FS	——	● Output voltage: 1～5V (0～10kgf/cm²) ● Output impedance: 1KΩ ● Linearity: ±1%FS
	Display	2 1/2 digit LCD display (sampling period 4 times/second)					
	Operations display lamp	Red LED (lights up when output ON)					
	Response frequency	200Hz					
	Temperature characteristics	At a temperature range of 0～+50°C, with detection output of ±3%FS max. at 25°C					
Environmental resistance	Protective configuration	IP40 (IEC144)					
Environmental resistance	Anti-noise	240Vp • pulse width 0.5 μs (power supply line radiation)					
Environmental resistance	Withstand voltage	AC1000V in 1 minute					
Environmental resistance	Insulation resistance	50MΩ max. (at DC500V meggers)					
Environmental resistance	Anti-vibration	10～55Hz, double amplitude 1.5mm, 2 hours in each X, Y, Z direction					
Environmental resistance	Shock resistance	98m/s² (10G), 3 times in each X, Y, Z direction					
Material	Front case	ABS					
Material	Rear case	Aluminium die-cast					
Material	Piping attachments	Zinc die-cast					
	Cable	0.18SQ oil-proof, heat-resistant, cold-resistant cable (standard 0.5m)					
	Mass	About 100g					

Discontinued

Order Codes

GS2 □ □ □ – □ – □

Digital pressure gauge with built-in sensor

Pressure range
10 —— For negative pressure 0～-76cmHg
20 —— For positive pressure 0～10kgf/cm²
21 —— For positive pressure 0～1kgf/cm²

Output method
Blank —— Comparative output
A —— With analog output

Mounting method
Blank —— With piping attachment
D —— With flange mount

Piping fitting
Blank —— No fitting
F —— With R1/8 straight fitting

Mounting device (for piping attachment only)
Blank —— No mounting device
B —— With mounting bracket
P —— With panel mounting part

Additional Parts (Sold Separately)

Mounting bracket

GS2-B

R1/8
Straight fitting

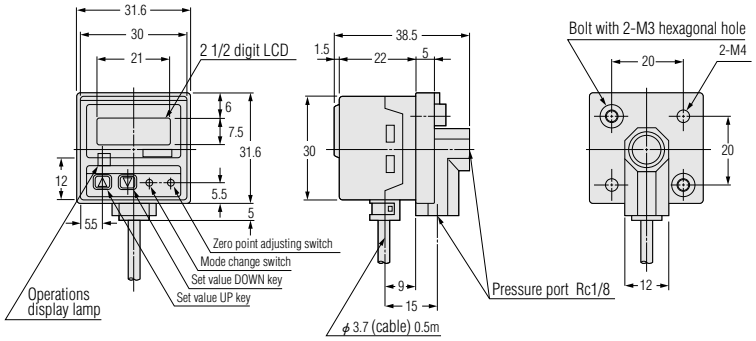
GS2-F

Panel mounting part

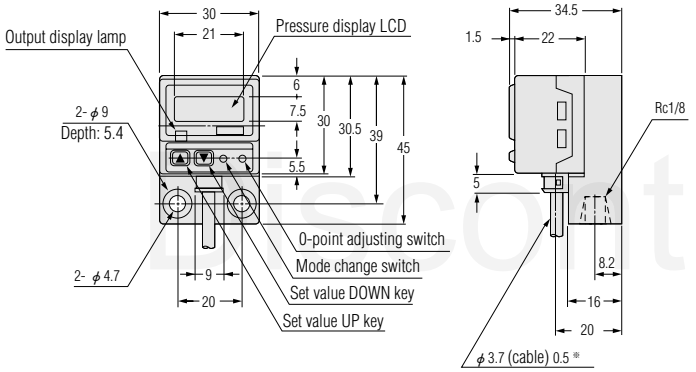
GS2-P

Dimensional Drawings (Scale: 1/2, Unit: mm)

●GS2 □□ (With piping attachment)



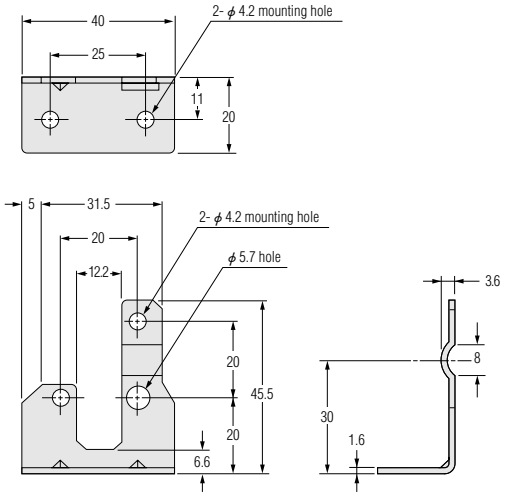
●GS2 □□D (With flange mount)



※ **GS210, GS210D** are 3 leads,
GS210A, GS210AD are 4 leads.

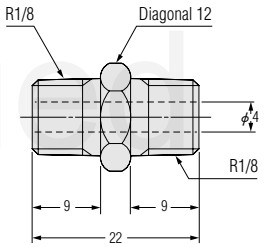
●GS2-B Mounting bracket

Material: SPC (unichrome plate)
M4×6mm pan screws
With 2 spring washers



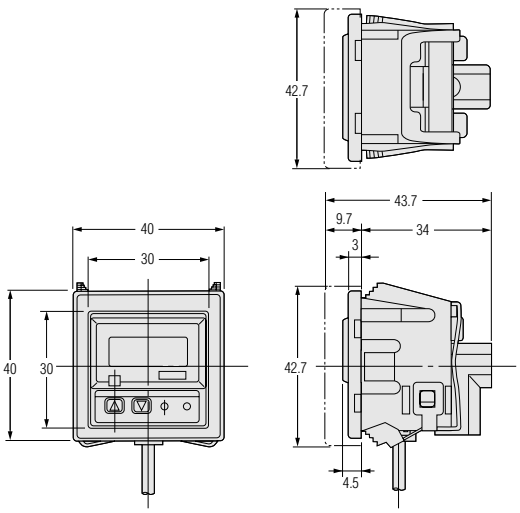
●GS2-F R1/8 straight fitting

(Scale: 1/1, Unit: mm)



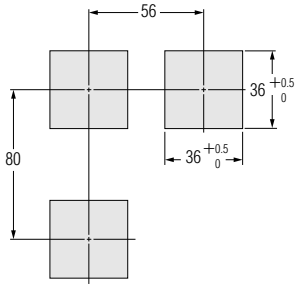
●GS2-P (Installation diagram of panel mounting part)

Applicable only to items with piping attachments.



Note: The chained double-dashed line shows a situation where all-surface protection cover is attached.

● Panel cutaway dimension (Scale: 1/4, Unit: mm)



Notes: 1. Set the mounting board thickness at 1～3.2mm.
2. The panel cutaway dimensions are $36^{+0.5}_{0}$×$36^{+0.5}_{0}$mm.
3. When installing close to other items, leave space according to the values shown in the above diagram, or more.

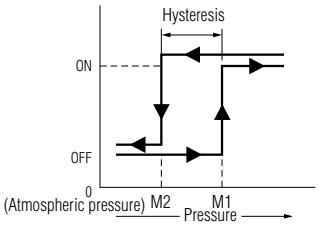
Discontinued

Setting the Operating Pressure

1) Output mode

For the output mode, use the 2-point settings of M1 and M2 to select from 2 output modes, ① hysteresis mode and ② window comparator mode.

① Hysteresis mode (M1≧M2)

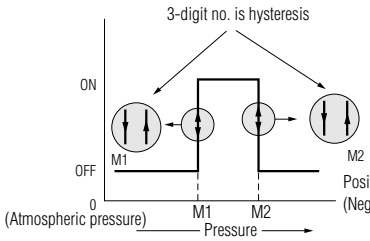


Application example

- Confirmation of absorption, etc.

Positive pressure 1kg/cm^2 or 9.9kgf/cm^2
(Negative pressure is -76cmHg)

② Window comparator mode (M1＜M2)



Application example

- Cylinder pushing pressure control
- Confirmation of supply pressure, etc.

Positive pressure 1kg/cm^2 or 9.9kgf/cm^2
(Negative pressure is -76cmHg)

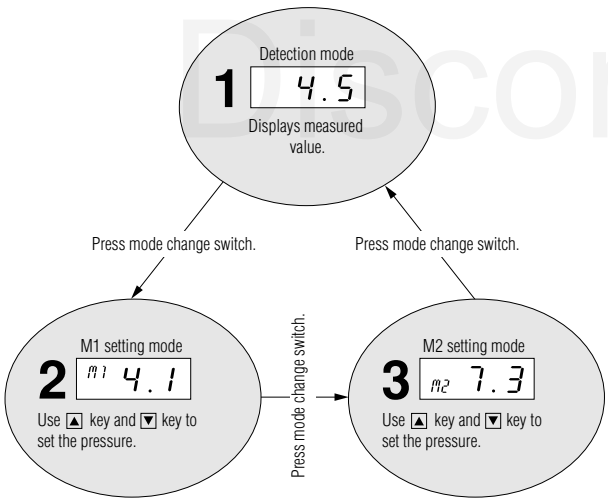
Note: Separate M1 and M2 by 6 digits min.

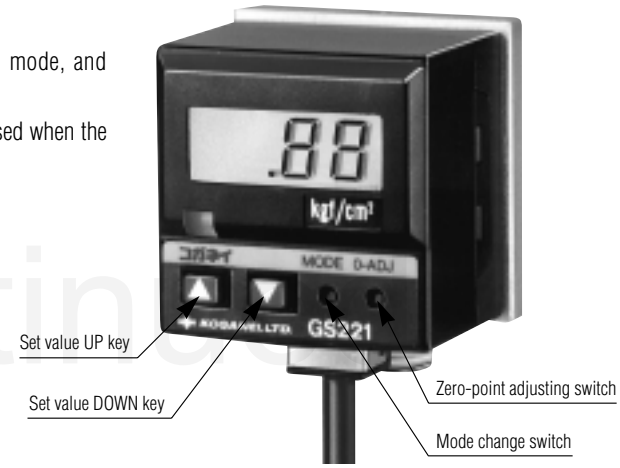
("Digit" refers to the minimum unit on the digital display.)

2) Setting method

Display modes include the detection mode, M1 setting mode and M2 setting mode, and pressing the mode change switch allows switching from one mode to another.

(The set values are written directly to the EEP・ROM and therefore are not erased when the power supply is turned OFF.)





☆ When an error occurs, take the following measures:

Error display	Content	Measures
E 1	Load is short-circuited and eddy current is flowing.	Turn off the power supply and confirm the load.
E 3	Pressure appears during zero-point adjustment.	Return the applied pressure to atmospheric pressure level, and then adjust the zero-point again.
- - -	Applied pressure surpasses rated pressure range.	Return the applied pressure within the rated pressure range.

Step No.	Setting item	Mode	Setting method
1	Zero-point adjustment	Detection mode	Return the applied pressure to atmospheric pressure level, and press the zero-point adjusting switch. If pressure is applied during zero-point adjustment, message E3 is displayed.
2	M1 level setting	M1 setting mode	Use the ▲ key and ▼ key to set the M1 level. Pressing the ▲ key raises the value, while pressing the ▼ key reduces the value. Settings are, for positive pressure, in the 0～1kgf/cm^2 and 0～9.9kgf/cm^2 ranges, and for negative pressure, in the 0～-76cmHg range. If it surpasses the range, UP or LO will be displayed. Positive pressure / Negative pressure Display goes up to 10.0: UP, 1.00, .99, ⋮, .01, 0, LO / UP, 10.0, 9.9, ⋮, 0.1, 0, LO Negative pressure: UP, –76, –75, ⋮, –1, –0, LO
3	M2 level setting	M2 setting mode	In the same way as the M1 level settings, use the ▲ key and the ▼ key to set the M2 level.
4	——	Detection mode	Press the mode change switch to complete the setting.

Discontinued

Application Examples

Air Chuck Clamp Force Control (Positive Pressure, Window Comparator Mode)

Application: Conveyor Robot, Etc.

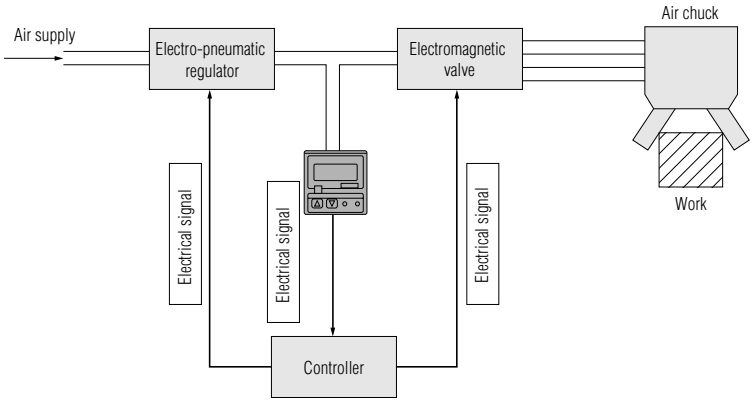
Analog control of pressure can be done with analog output.

● Summary

Changes and controls the supply pressure according to work to alter the air chuck's clamp force.

● Operating Instructions

The air chuck's clamp force is virtually proportional to the supply pressure.
Analog electrical signals from the controller can change the pressure supplied from the electro-pneumatic regulator. A pressure sensor confirms the pressure, and the analog voltage corresponding to the pressure is fed back to the controller.



Seating Confirmation (Positive Pressure, Hysteresis Mode)

Application: Machine Tools, Press Machinery, Etc.

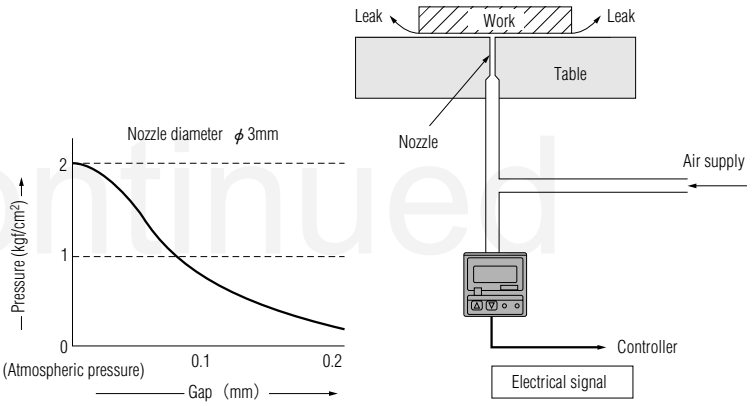
Pressure setting can be accurately conducted in 0.1kgf.cm^2 units.

● Summary

In processing metals, poorly fixed work can lead to degraded machining accuracy.
Here, low-pressure air supplied from the worktable can be used to check air leaks in the gap between the worktable and the work to determine whether the work is perfectly seated or not.

● Operating Instructions

As can be seen in the graph on the right, the larger the gap, the greater the volume of leakage, and pressure falls. Leakage volume can also be affected by the size of the nozzle diameter.



Discontinued

Confirmation of Work Adsorption (Negative Pressure, Hysteresis Mode)

Application: Conveyor Machinery, Semiconductor Manufacturing Equipment, Etc.

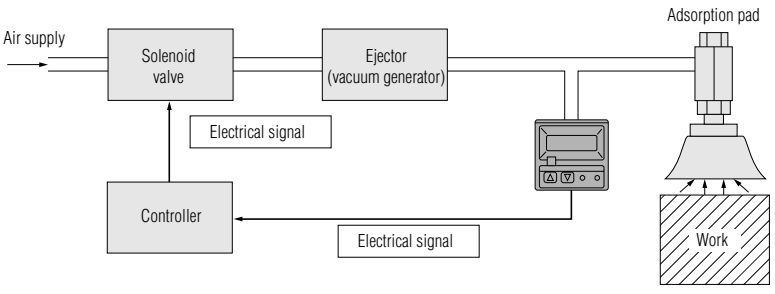
Hysteresis can be set to any value.

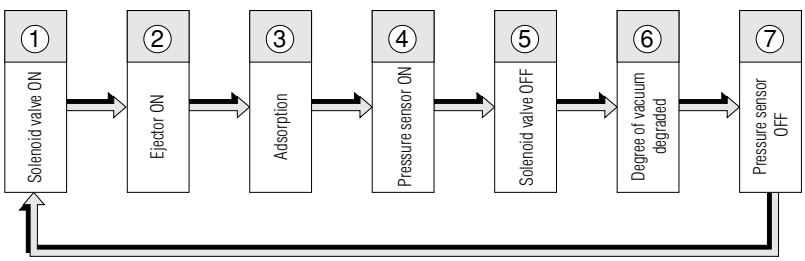
● Summary

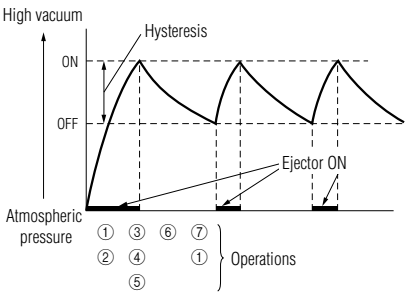
In a work adsorption conveyor system, a combination of ejectors (vacuum generators) and pressure sensors make an economical air circuit.

● Operating Instructions

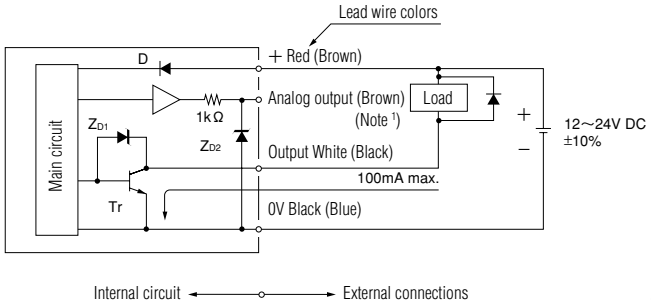
The pressure sensor is used to confirm vacuum and air pressure, and to turn the solenoid valve for the supply air ON or OFF.
(Even when the solenoid valve is OFF, the vacuum is maintained until the adsorption is broken.)







■ Input/Output Circuit Diagrams



Notes: 1. Not included in units without analog output.
2. Although 0.5m cable is standard, for extensions use cable of 0.18SQ min. (Can be extended up to 100m max.)

Code ····· D: Diode for reverse connection protection of power supply
Z_{D1}, Z_{D2}: Zener diodes for absorption of surge voltage
Tr: Output transistor

Comment: In 1993, the lead wire colors were changed to the colors shown in parentheses ( ).

■ Please Use Correctly

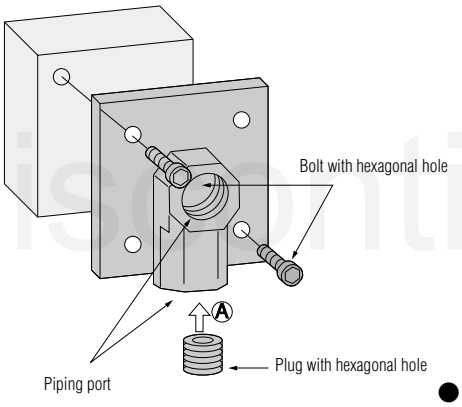
● **Setting the direction of pipe connections**

By freely removing the piping attachments and changing their mounting directions, the direction of pipe connections can be changed. The tightening torque should 30N•cm{3kgf•cm} max.

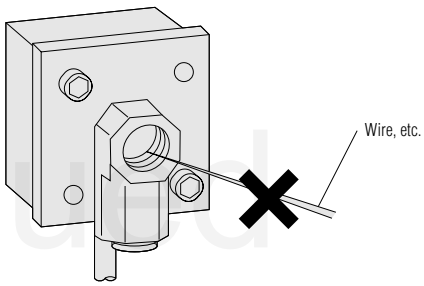
Note: Always block unused piping ports with the hexagonal plug provided.

(Tightening torque is 1000N•cm {100kgf•cm} max.)

At delivery, port Ⓐ is blocked by a hexagonal plug (with sealing tape).

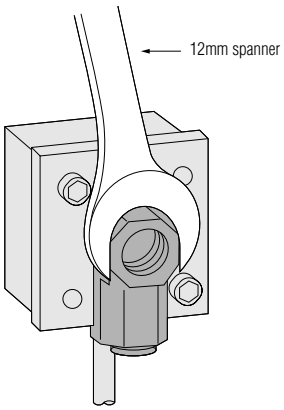


● Do not insert wires from the piping port.
It damages the diaphragm, making it impossible to obtain accurate operations.



● **Piping**

When connecting a fitting to the piping attachment, use a spanner (12mm) on the hexagonal portion of the piping port. The tightening torque should be at 1000N·cm{100kgf·cm} max. In addition, connect by putting sealing tape around the male screws to prevent leaks.



● The digital pressure gauge with a built-in sensor is for non-corrosive gases. Do not use it with liquids or corrosive gases.

● When using with the power supply switching regulators that are available on the market, ground it with a frame gland (F.G.) terminal.

● Do not use while the power supply is in a transient state during start-up (about 50ms).

● Avoid using in parallel lines or shared ducts with high-pressure or power lines. It could result in induction-caused erratic operations.

※ For an explanation of terms and a table of pressure unit conversions, see page 353.

Discontinued