



READ THE INSTRUCTION MANUAL BEFORE USING

INSTRUCTION MANUAL

M A N O S T A R G A G E

W O 7 1

N o . T R - W O 7 1 - E 0 7

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INTRODUCTION

Thank you very much for purchasing of "MANOSTAR GAGE WO71".

 Caution	To ensure your safety in using this instrument : •Be sure to read the instruction manual carefully before using the instrument so that you can use it properly. Wrong use may result in failure of the instrument and lead to its damage and accident. This manual should be kept in a proper place so that you can refer to it any time you need.
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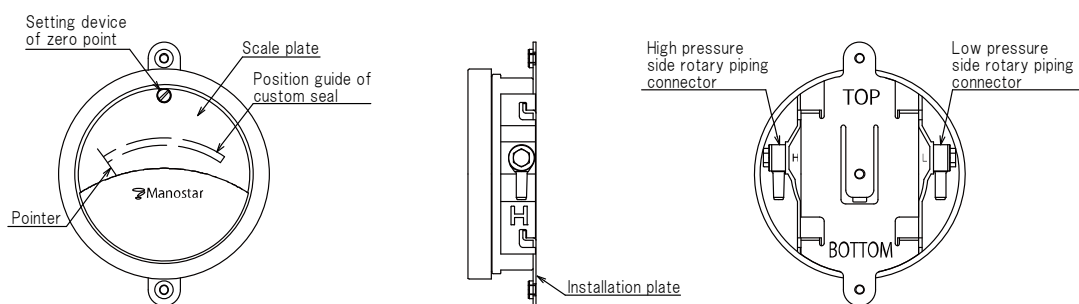
I . PRECAUTIONS

 Warning
•Do not use the instrument where flammable gas is present. The instrument is not explosion-proof. Do not use instrument in the circumstance where flammable gas is present or with flammable liquid. It may cause explosion. •Do not use the instrument at the place where corrosive gas is present. The instrument is not corrosion resistance construction. Measuring corrosive gas may corrode the receiving element and housing material of the instrument. It is expected that corrosive gas which leaks out of the instrument may cause harm to humans. •Do not apply the pressure to the instrument more than it can withstand. The diaphragm and the retainer break and may cause injury and disaster. The body itself breaks and may cause injury and disaster, if the pressure which exceed the withstanding pressure of instrument body is applied. •The instrument is measurable for air and non-corrosive gas only. When it is used to measure the pressure of water or oil, it breaks. It may also cause injury and disaster. •Avoid using the instrument in places subject to large vibrations and shocks. When the instrument is used in places subject to large vibrations and shocks, it may lead to performance degradation, breakdown, injury and disaster. •Use within the operating temperature and humidity range. When the instrument is used out the operating temperature and humidity range, the body breaks and may cause injury and disaster. •Do not disassemble or reconstruct the instrument. Disassembly and remodeling are not only void of the warranty and lead to performance degradation or breakdown, but also cause injury and disaster.

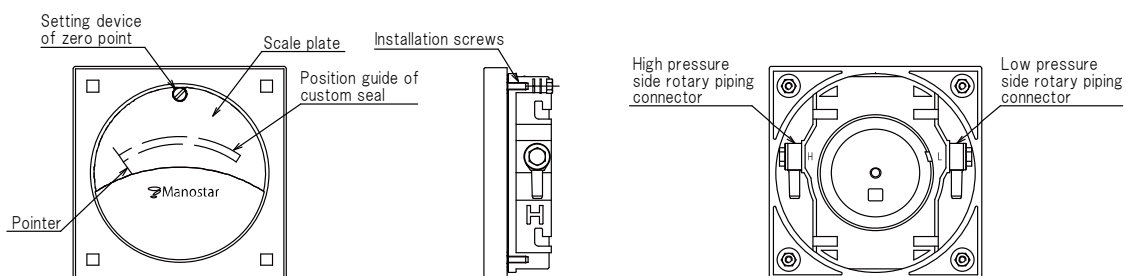
 Caution
•As to where to install and how to install this instrument, be sure to follow the instruction manual provided so as to ensure a proper method. •Use the instrument indoors. •Use in a dry and clean place indoors. Using in a place exposed to direct sunlight or in a humid place may cause deterioration or breakdown. •Do not use organic solvent for cleaning. Use a cloth soaked with water-diluted neutral detergent to wipe the surface of a product. Using organic solvent causes damage on the surface. •Do not drop the product. Product is a precision instrument. If you drop the product, there is a possibility that not only the exterior, but also the interior mechanism may damage. •Do not pull the pipe with a strong force. If you pull the pipe with a strong force, there is a possibility that the pipe cap may break.

II . THE NAME OF EACH PART

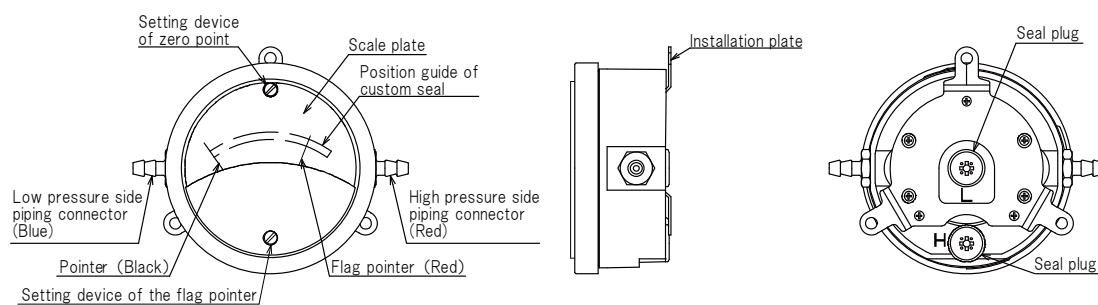
•Type N



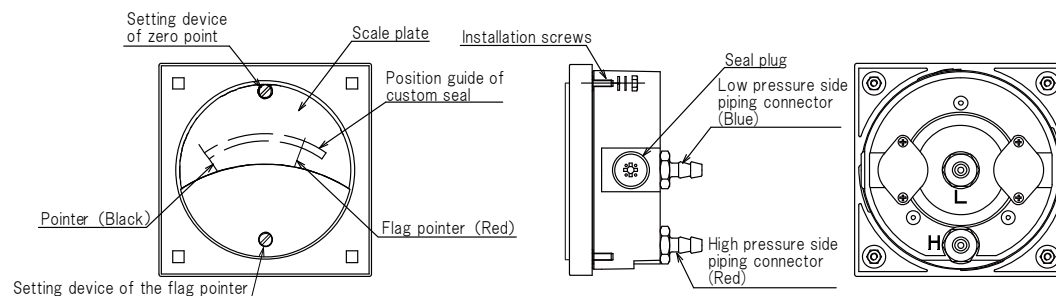
•Type R



•Type FS



•Type PS



III. INSTALLATION

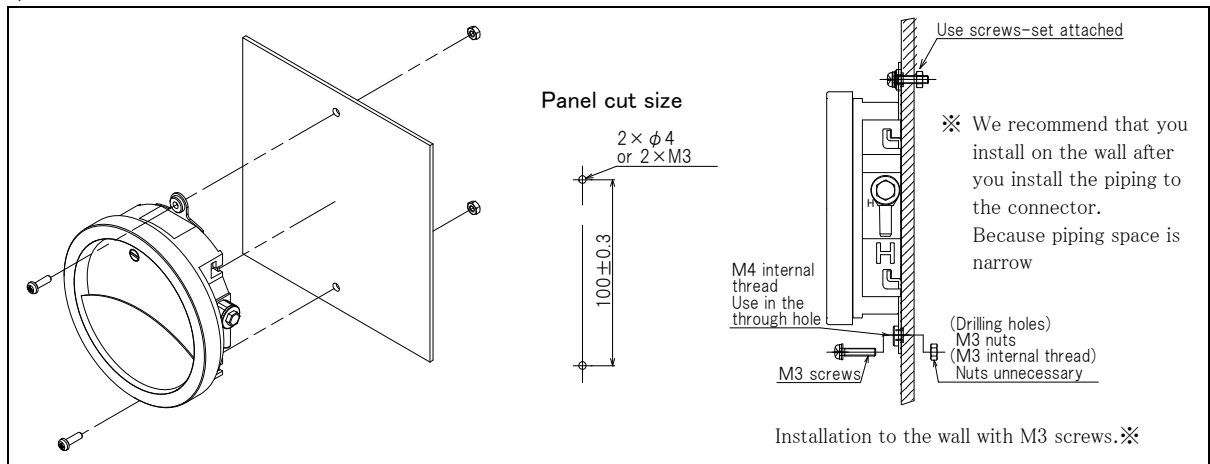
Before using this instrument, make sure if it is the type that you requested and meets the demand of the environment, pressure and piping conditions where it is used, by specification.

1. Caution of service condition

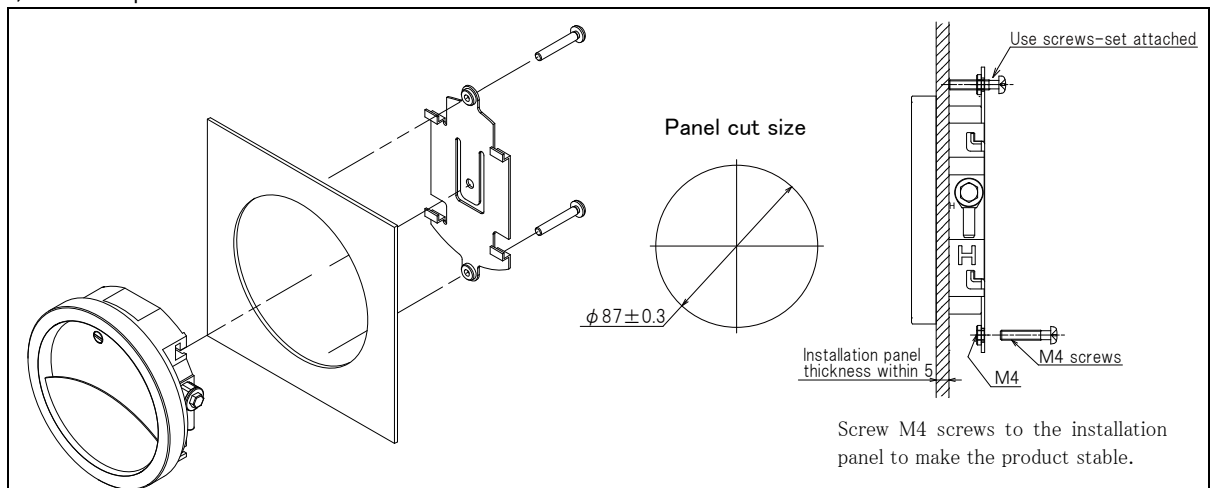
- Do not use the instrument in a place subjected to direct sunlight, vibration or shock, or excessive moisture. In particular, vibration and shock to the instrument should shorten its life.
- Use under the medium and ambient temperature from -10 to $+50$ °C.
- The instrument is not waterproof. Do not use it in a place subjected to rain, or other splashing water.
- In installing the instrument, select the place where the ground is smooth and flat.

2. Installation of type N

a) In case of wall surface installed

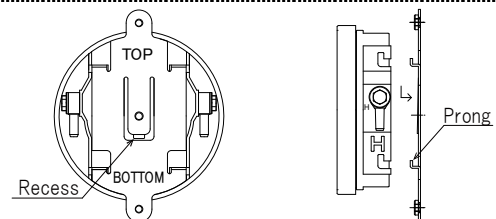


b) In case of panel embedded installed



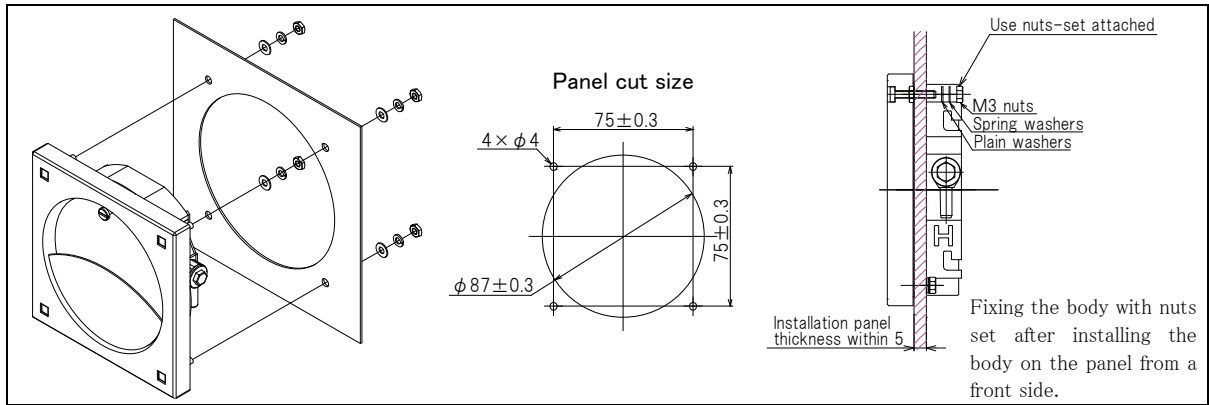
<Desorption method of an installation board>

The prongs on the mounting plate are held by the gage. To remove the plate, use a flat head screwdriver gently to lift the bottom of the U-shaped groove on the plate, and slide the plate downwards. To attach the plate, align the prongs with the indentations on the back of the gage, and slide the plate upward to engage.

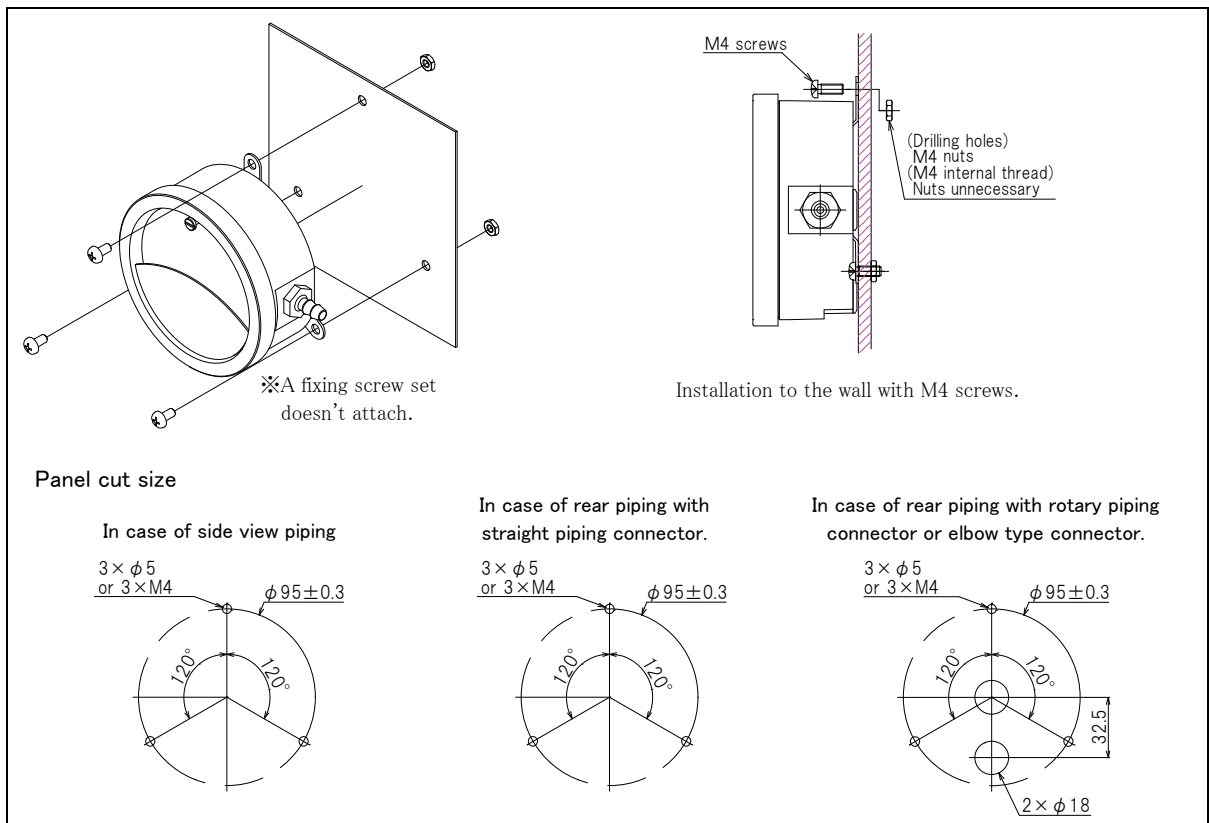


- The tightening torque of the screw is $0.8 \text{ N} \cdot \text{m}$.
- Do not apply excessive torque more than stipulated value, otherwise it will damage the body of the instrument.

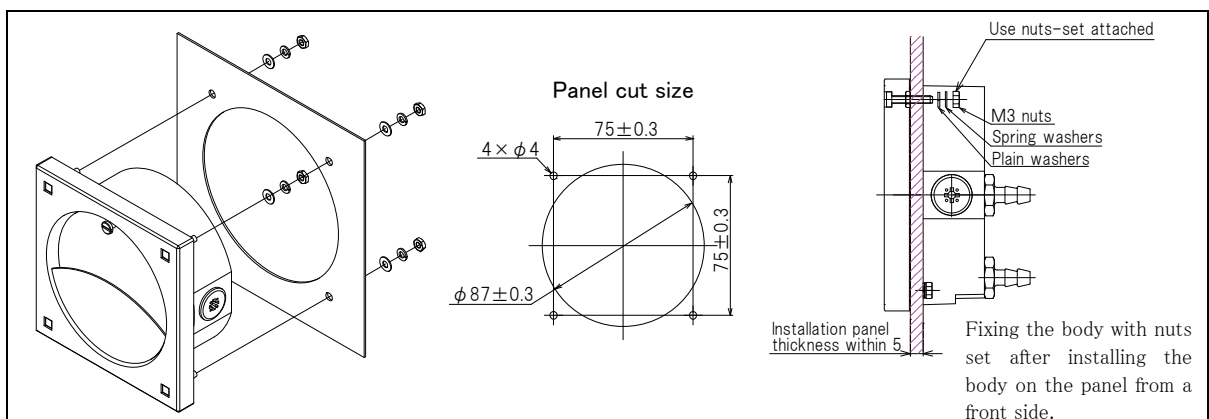
3. Installation of type R



4. Installation of type FS



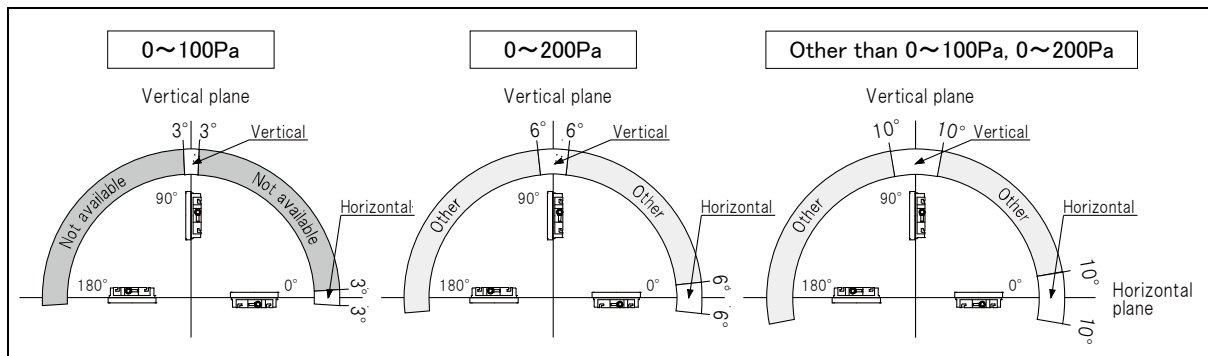
5. Installation of type PS



- The tightening torque of the screw is 0.8 N·m.
- Do not apply excessive torque more than stipulated value, otherwise it will damage the body of the instrument.

6. Installation position

Must be specified at the time of ordering. After inspection and adjustment in accordance with the specified installation position, it will be.



Caution

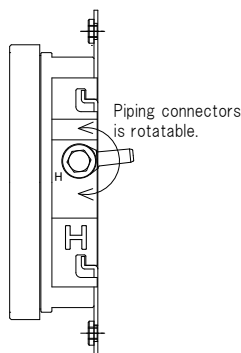
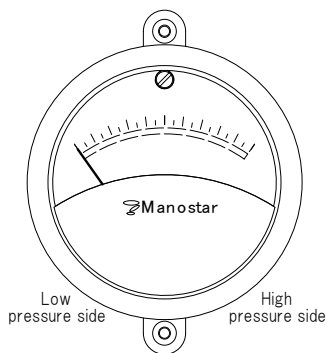
To become not covered by the warranty, do not use other than the specified installation position at the time of order.

7. Use of in a position other than the specified is out of accuracy warranty

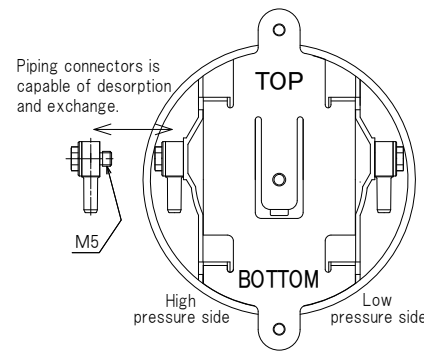
•Type N, type R

Polarity can't be changed, because there is distinction between high pressure side and low pressure side.

<Front view>



<Rear view>

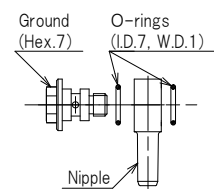


Caution

•The tightening torque of the connector is 0.5Nm. There is a fear that the meter body and nut thread are damaged for fastening beyond the stipulated value.

VR connector (KGA71VR) :

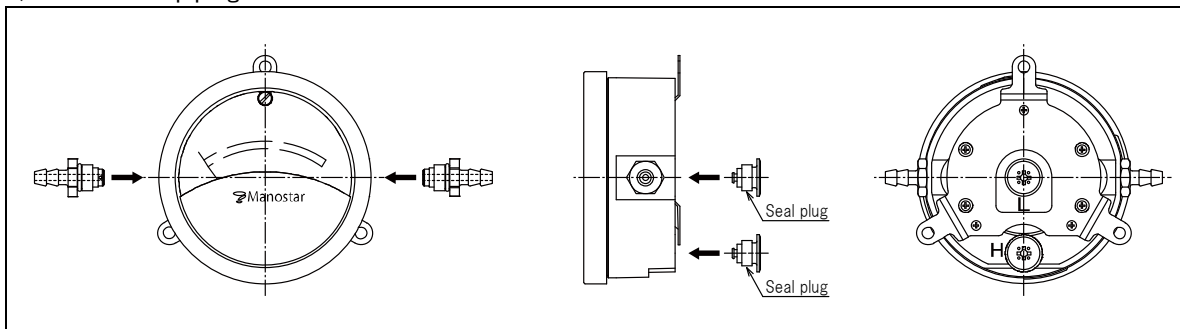
- The desorption of the base, please use the box driver or wrench of Hex.7
- O-rings is not fixed. Please be careful not to lose the O-rings at the time of piping connector removal.
- At the time of installation, please don't forget to connect O-rings, or to bite O-rings. Forget connecting O-rings and biting O-ring, it will be airtightness failure of the piping connector.



The structure of type VR piping

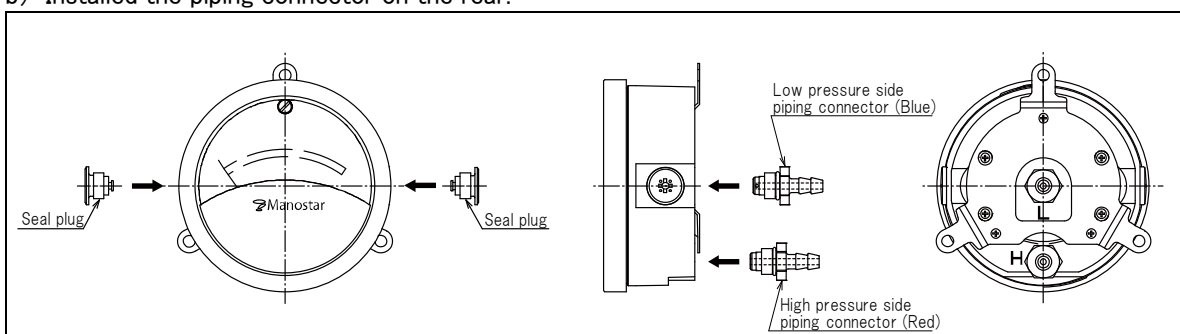
• Type FS, type PS

a) Installed the piping connector on the side.



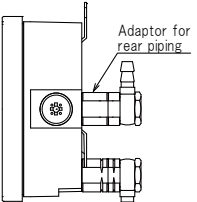
About side connector ports of the instrument body, there is no distinction between high pressure side and low pressure side. The polarity of the high and low pressure side is determined by the piping connector attached. It is able to convert the polarity by changing connectors. The high pressure side and the low pressure side are identified with red and blue color respectively.

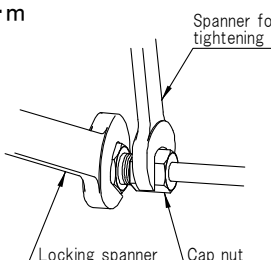
b) Installed the piping connector on the rear.



The rear port can't be changed because it has a distinction between high pressure side and low pressure side. Install the red connector to the port with the sign of "H" and the blue connector to the port with the sign of "L".

In addition, if one of the connectors is attached to the side, it is not possible to measure properly. Be sure to attach both the connectors to the back.

 Caution	Type FS Adaptor for rear piping (KGA81FBA-H and L) are necessary to avoid interference with piping connectors and panel to make a locking spacer easier.	
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 Caution	The plug sealing between the piping connector port of the instrument, the piping connector, and the sealing plug is achieved by O-rings. Apply the tightening torque specified below when tightening the piping connector and sealing plug. The instrument body will be broken if excessive torque is applied. •Piping connector for vinyl or rubber tube and metal tube.....1N·m •Seal plugs.....0.5N·m Tightening with locking spanner Always use locking spanner to tighten the cap nut of MT connectors, MR connectors, and MTW connectors or piping R1/8 connector to the R1/8 Connector adapter. Be careful not to apply the tightening torque directly to the instrument body.	
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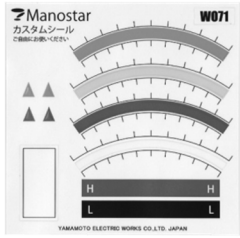
8. Accessory for WO71

Installation plate steel-made [installed]	
	(for type N)
	Product code
	ADPL71

Used with the installation of the instrument body.

VR connector polycarbonate duralumin made [installed]	
	(for type N, type R)
	Product code
	KGA71VR

These connectors are rotary elbow type and can be connected to vinyl or rubber tube of I.D.4.

Custom seal polyester film made [installed]	
	
	Product code
	SEAL-WO71

Freely set the color-scale and flag pointer and paste it into the instrument body.

⚠ Caution	
• Accessories for WO71 cannot be used in other products. • No polarity of the low pressure side and the high pressure side to the VR connector. (KGA71VR)	

9. Accessory for type FS, type PS

VT connector for vinyl or rubber tube resin-made [installed]		
	Product code	
	High pressure	Low pressure
	KGA81VT-H-P	KGA81VT-L-P

Be sure to use I.D.6 and thickness of 1mm or more. However, the vinyl or rubber tube with enough withstanding pressure (including vacuum pressure) is required when the instrument range or the line pressure is higher than 50 kPa.

VR connector for vinyl or rubber tube brass-made [option]		
	Product code	
	High pressure	Low pressure
	KGA81VR-H	KGA81VR-L

These connectors are rotary elbow type and can be connected to vinyl or rubber tube of I.D. 6.

PT connector for plastic tube PBT, brass-made [option]		
	Product code	
	High pressure	Low pressure
	KGA81PT-H	KGA81PT-L

The joint installed tube is push-in type. Use the optional tube or the applicable tube (JIS B8381-1).

MT connector for metal tube brass-made [option]		
	Product code	
	High pressure	Low pressure
	KGA81MT-H	KGA81MT-L

This connector can be connected to the metal tube (O.D.6±0.1) made from copper, aluminum and so on. When this connector is connected to plastic tube (O.D.6, I.D.4), remove the brass-made sleeve and use the resinous inner sleeve set (XIN6×4) that is sold separately. (please use the type MTW connector for the stainless steel pipe)

MR connector for metal tube brass-made [option]		
	Product code	
	High pressure	Low pressure
	KGA81MR-H	KGA81MR-L

This connector is rotary elbow type and can be connected to the metal tube (made from copper and aluminum and so on). Applicable piping material is the same as MT connector.

PR connector for plastic tube PBT, brass-made [option]		
	Product code	
	High pressure	Low pressure
	KGA81PR-H	KGA81PR-L

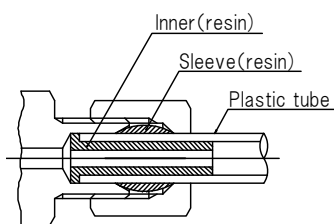
The joint installed tube is push-in and rotary elbow type. Applicable piping material is the same as PT connector.

MTW connector stainless steel-made [option]		
	Product code	
	High pressure	Low pressure
	KGA81MTW-H-S	KGA81MTW-L-S

This is connector can be connected to stainless tube (O.D.6±0.1).

Inner sleeve set for plastic tube polypropylene-made [option]	
	Product code
	XIN6X4

You need this to connect plastic tube (O.D.6, I.D.4) to the connectors for metal tube. (the following figure)



Adaptor for rear piping brass-made [option]		
	Product code	
	High pressure	Low pressure
	KGA81FBA-H	KGA81FBA-L

It's used when attaching MT, VR and MR connector (Except MTW) to the back with type FS.

R1/8 Connector adapter brass-made [option]		
	Product code	
	High pressure	Low pressure
	KGA81R1/8AD-H	KGA81R1/8AD-L

Joint of R1/8 can be connected.

※Specifications are different from the adaptor for rear piping. (KGA81FBA)

Seal plug polypropylene-made [installed]	
	Product code
	KGA71PLG

※Seal plugs of other products can't be used, because the structure is different.

 Caution	Product code
	Commercial products (connectors etc) can't be used, because the structure is different. Be sure to use exclusive connectors.

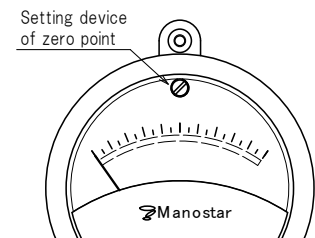
10. Zero point setting

Set the zero point of the gage or the pressure transmitter by turning the zero adjuster, after installing them in the position which they are used. Please use a flat-blade screwdriver of the max. width 2 ~ 3mm. Before setting the zero point, be sure to open the high and low pressure piping connector to atmosphere, or stop the equipment to run low the residual pressure to zero.

Setting device of zero point to the right pointer by turning to the right, pointer by turning to the left will move to the left.

This instrument has zero point fluctuations due to temperature drift.

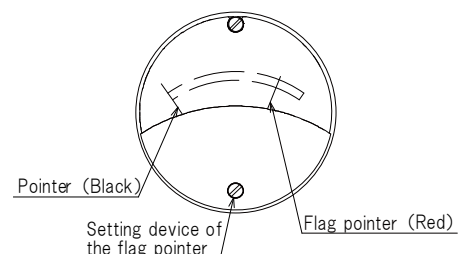
Zero point setting, please do at a temperature of environment you use.



11. Setting of flag pointer

The flag pointer is used for indicating a predicted values or a limit values. Set it at the predicted or limit values.

If you turn the setting device of the flag pointer clockwise, the flag pointer moves counter-clockwise.



12. Pressure of measurement and connection of piping

a) Measurement of positive pressure

Connect the tube to the high pressure side piping connector (indicated by red color or letter H). The lower pressure port (blue or L) should be opened to atmosphere, but do not remove the piping connector.

b) Measurement of negative pressure

Connect the tube to the low pressure side piping connector (blue or L). The high pressure port (red or H) should be opened to atmosphere, but do not remove the piping connector.

c) Measurement of differential pressure

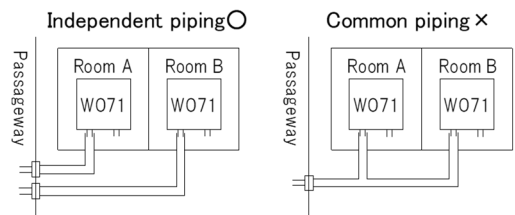
Connect the tube from the high pressure piping connector to the high pressure port (red or H) and from the low pressure piping connector to the low pressure port (blue or L).

IV. GENERAL PRECAUTIONS

1. Prohibition of common piping

Piping each of pressure detectors and pressure receiving instruments tube exclusively dedicated for it, and do not connect the piping commonly with the adjacent system as shown in the right figure.

Common piping causes measurement error because the pressure of each system interferes.

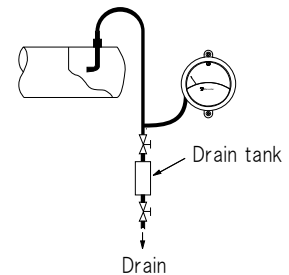


2. Prevention of clogged piping due to drain

If drain remains within the line, it causes measurement error. Be sure to install the pressure receiving instrument above the pressure outlet port of the pressure detector and arrange the line so that the drain water should not remain in the slack piping.

If the arrangement mentioned above is not possible, install a drain tank within the line as shown in the right figure and clean it once in a while. After the cleaning of the tank, check that the air tightness is fully kept.

Installation diagram of drain tank



3. Measurement of high temperature gases

In the pressure measurement of high temperature gas, use the pressure detector (pitot tube) made of the heat-proof metal (such as stainless steel), and connect it with the pressure receiving instrument through a metal tube which is long enough to cool down the high temperature gas.

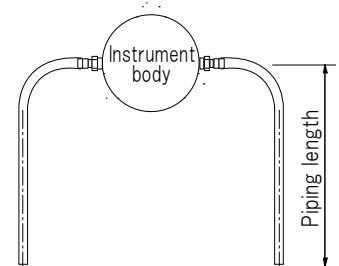
4. Errors caused by long distance piping

The speed of response is delayed when the product is used for remote monitoring.

In such application, the I.D. of the connection tube should be as large as possible.

The time constant is almost inversely proportional to the inner cross sectional area of the piping. (refer to the diagram below)

If the piping conditions of the high and low pressure side are significantly different, the difference in the piping resistance between high and low pressure side causes the difference in pressure transmission time, and the measurement becomes inaccurate.



V. PERIODIC INSPECTION

Generally speaking, it is important not to exert external stress to keep life and reliability of the instrument for a long time.

Proper use of this instrument will ensure its faultless service over many years without any necessity of periodic lubrication.

However, it is recommended that it is subjected to periodic inspection (calibration) once a year.

VI. PRODUCT WARRANTY

Warranty Period

The warranty period shall be for one year from the date that the product has been delivered to the location specified by the purchaser.

Warranty Scope

In the event of any failure or defect in the product or non-conformity of specifications due to the reasons solely attributable to Yamamoto Electric Works, Yamamoto Electric Works shall remedy such malfunctioning or defective product at its own cost in one of the following ways to be selected by Yamamoto Electric Works:

i) repair such product, ii) replace such product.

However, this Warranty shall not cover the damages or defects that arise due to any of the following reasons.

- (1) Any failure resulting from improper conditions, improper environments, improper handling, or improper usage other than described in the instruction manual or the specifications arranged between the purchaser and Yamamoto Electric Works.
- (2) Any failure resulting from factors other than a defect of our product, such as the purchaser's equipment or the design of the purchaser's software.
- (3) Any failure resulting from modifications or repairs carried out by any person other than Yamamoto Electric Works' staff.
- (4) Any failure caused by a factor that cannot be foreseen at a scientific/technical level at the time when the product has been shipped from Yamamoto Electric Works.
- (5) Any disaster such as fire, earthquake, and flood, or any other external factor, such as abnormal voltage, for which we are not liable.

Yamamoto Electric Works specifically disclaims all implied warranties of merchantability and/or fitness for a particular use or purpose, as well as liability for incidental, special, indirect, consequential or other damages relating to the product.

*This product warranty is only valid within Japan.

Product Applicability

Our products are designed and manufactured as general-purpose products for general industries. Therefore, our products are not intended for the applications below and are not applicable to them.

- (1) Facilities where the product may greatly affect human life or property, such as nuclear power plants, aviation, railroads, ships, motor vehicles, or medical equipment
- (2) Public utilities such as electricity, gas, or water services
- (3) Usage outdoors, under similar conditions or in similar environments

This document has been translated from the original Japanese version, and the original Japanese version takes first priority.

Be sure to refer to the original Japanese for the details of this warranty.

<Prior notice>

The specifications and description of the product explained in this instruction manual may be subject to change without prior notice because of modification and the like.