

# MANOSTAR WO71

製品一覧表

WO71

WO81

**NEW**

RoHS

WO71

Manostar Gauge WO71 General purpose compact type Micro Differential Pressure Gage Made in Japan

RoHS compliant

FR51A

- Flag pointer is installed normally, which are easily to manage predicted value or threshold value of differential pressure.
- It is easy to convert polarity enable by piping connector.

WO70

- Even when the pressure becomes excessive, the original mechanism avoid damage to moving parts.
- Small hysteresis is realized by the silicone rubber diaphragm.
- The pointer is not fluctated by the original band-linked mechanism.

MS99

**NEW MANUOSTAR GAUGE WO71 TO REPLACE OLD MODEL WO70**

MS30

MS61A

MS65

EMD8A

EMD7

EMT1

EMTGP1

EMT1H

EMT6

EMP5

EMRT1

HWS15A

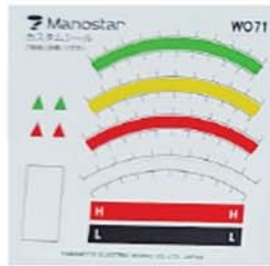
EB3C

アクセサリ

応用

注意事項

保守

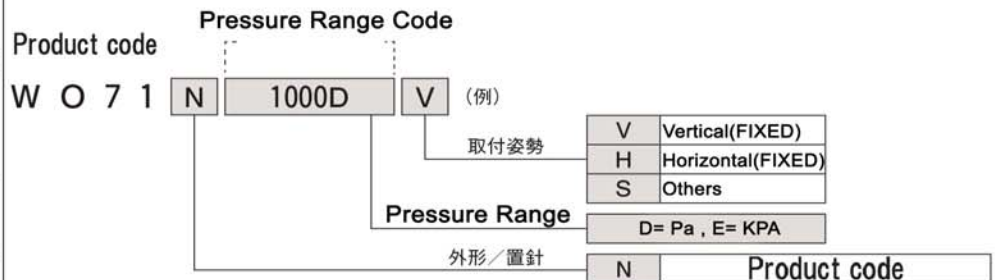


WO71

**<Example of main use field>**  
 Air conditioning control system of factories  
 Measuring negative pressure in bag filter and differential pressure in air conditioning  
 Monitoring of pressure loss in filter  
 Production lines of precision machine  
 Air conditioning control system of buildings

**<Example of use>**  
 Detector of a pressure loss in an air filter  
 Measuring the inside pressure of clean rooms  
 Detector of a pressure loss in a bag filter  
 Measuring of dynamic pressure in a ventilator and an exhauster

\* (refer to p.93)



◆ If you order or ask, please specify the product code and the pressure range code.

# MANOSTAR WO71

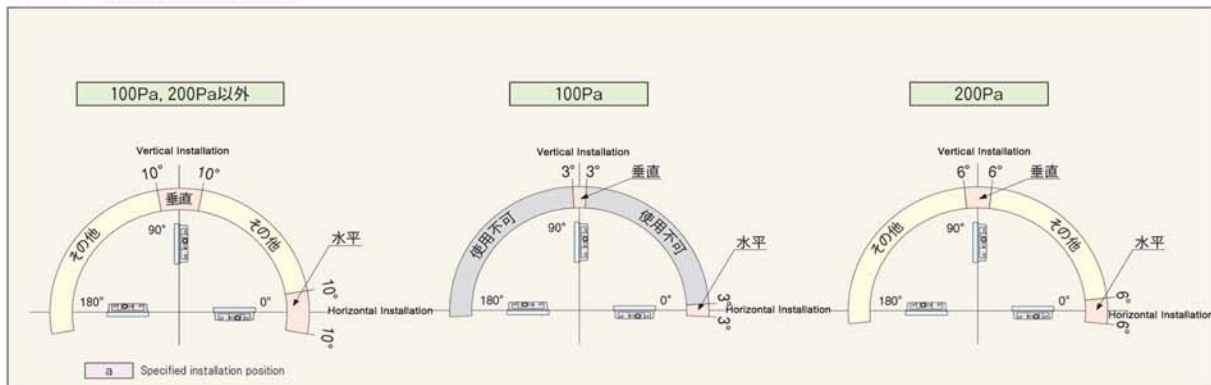
## WO71

### Specification

Types	WO71				
Pressure units	Pa, kPa				
Pressure measuring method	Measuring differential pressure				
Flag pointer color	Red				
Pressure receiving element	Diaphragm				
Gas to be measured	Air or non-corrosive gas (not liquid)				
Scale indicating angle	Approximately 90°				
Medium and ambient temperature	- 10 to + 50 °C (no freezing)				
Ambient humidity	90 % RH or less (no dewing)				
Withstanding pressure of instrument body	50 kPa (refer to p.104)				
Material of the outer case	Polycarbonate and polyamide				
Withstanding vibration	5 to 10 Hz Amplitude : 10 mm, 10 to 50 Hz Acceleration : 39 m/s <sup>2</sup> (each two hours on triaxial directions)				
Withstanding impact	100 m/s <sup>2</sup> (each six times on triaxial directions)				
Applicable piping	<ul style="list-style-type: none"> <li>· Vinyl or plastic tube or rubber tube (I.D. 6)··The resinous piping connectors (installed) for Vinyl or plastic tube</li> <li>· Metal tube (O.D. 6 ± 0.1)··Metal type piping connector (option) is needed.</li> <li>· Hard plastic tube (O.D. 6 × I.D. 4)··Metal type piping connector (option) and Inner sleeve set (XIN6 × 4) are needed.(refer to p.92)</li> </ul>				
Piping connector polarity	<ul style="list-style-type: none"> <li>· The piping connector indicated red color is high pressure side and blue color is low pressure side.</li> <li>· Enabling to convert the polarity by changing connectors of high pressure side for low pressure side.</li> </ul>				
Mass	Approximately 200 g.				
Accessory	One set of installation nuts(only for WO70PV type)				
Pressure range codes	Pressure ranges	Standard installation position	Accuracy (at 20 °C)	Material of pressure receiving element	Withstanding pressure of receiving element (refer to p.104)
100 D	0 ~ 100 Pa	Installation position from upward horizontal to vertical is available.	± 2.5 % FS	Silicone rubber	20 kPa
200 D	0 ~ 200 Pa				
300 D	0 ~ 300 Pa				
500 D	0 ~ 500 Pa				
1000 D	0 ~ 1000 Pa				
2 E	0 ~ 2 kPa				
3 E	0 ~ 3 kPa				
5 E	0 ~ 5 kPa				
+ - 100 D	- 100 ~ + 100 Pa				
+ - 200 D	- 200 ~ + 200 Pa				
+ - 300 D	- 300 ~ + 300 Pa				
+ - 500 D	- 500 ~ + 500 Pa				



### WO71 Installation position



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FR51A

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EMD8A

EMD7

EMT1

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EB3C

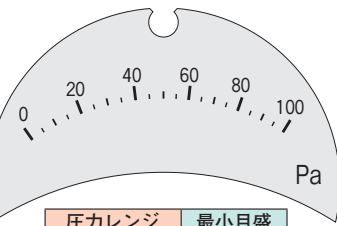
アクセサリ

応用

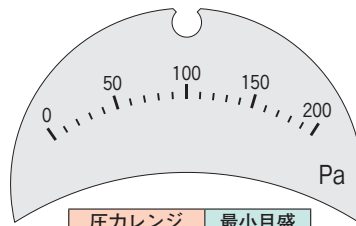
注意事項

保守

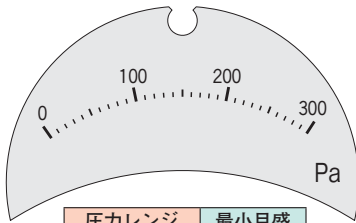
## WO71 目盛一覧



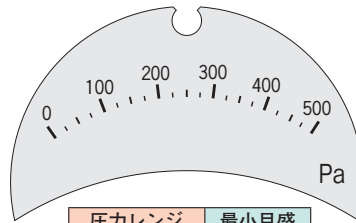
圧カレンジ	最小目盛
0 ~ 100 Pa	5 Pa



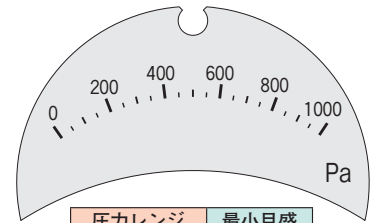
圧カレンジ	最小目盛
0 ~ 200 Pa	10 Pa



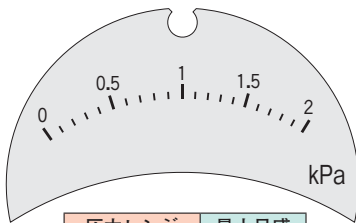
圧カレンジ	最小目盛
0 ~ 300 Pa	10 Pa



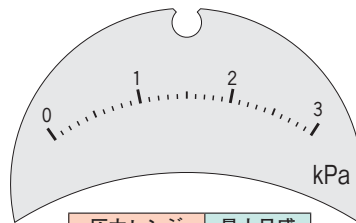
圧カレンジ	最小目盛
0 ~ 500 Pa	25 Pa



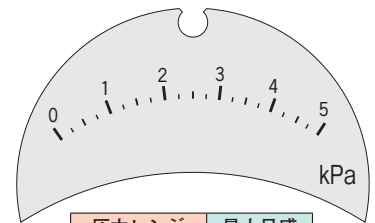
圧カレンジ	最小目盛
0 ~ 1000 Pa	50 Pa



圧カレンジ	最小目盛
0 ~ 2 kPa	0.1 kPa

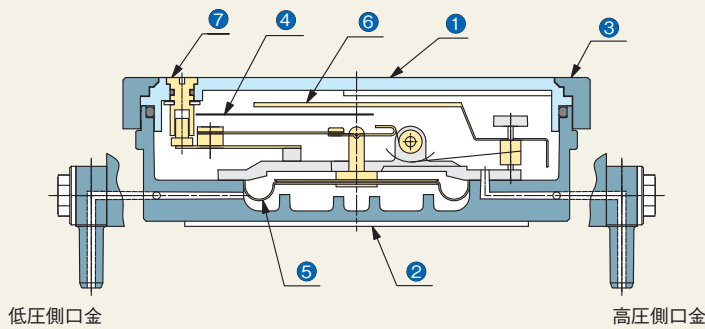


圧カレンジ	最小目盛
0 ~ 3 kPa	0.1 kPa



圧カレンジ	最小目盛
0 ~ 5 kPa	0.25 kPa

### 構造概要



番号	名称
1	透明カバー
2	ハウジング
3	グリル
4	目盛板
5	ダイヤフラム
6	指針
7	零点設定器

低圧側口金

高圧側口金

### WO71 専用アクセサリ

RoHS

※計器本体購入時にはすでに装着または付属されています。

**取付板**  
(補用品)

品番	材質
ADPL-WO71	鋼

計器本体の取り付けに使用します。

**VR形口金**  
(補用品)

品番	材質
KGA71VR	ポリカーボネート・アルミ

口金のチューブ取付部が回転するエルボとなっています。内径4のビニル管またはゴム管を接続できます。

**カスタムシール**  
(補用品)

品番	材質
SEAL-WO71	ポリエステルフィルム

計器本体に貼り付けて色分目盛や置針を自由に設定できます。

## WO71 VT口金装着型

2017年発売予定

- ・ WO81口金との共通化(p.23~24参照)
- ・ WO70と同じ取付ピッチ

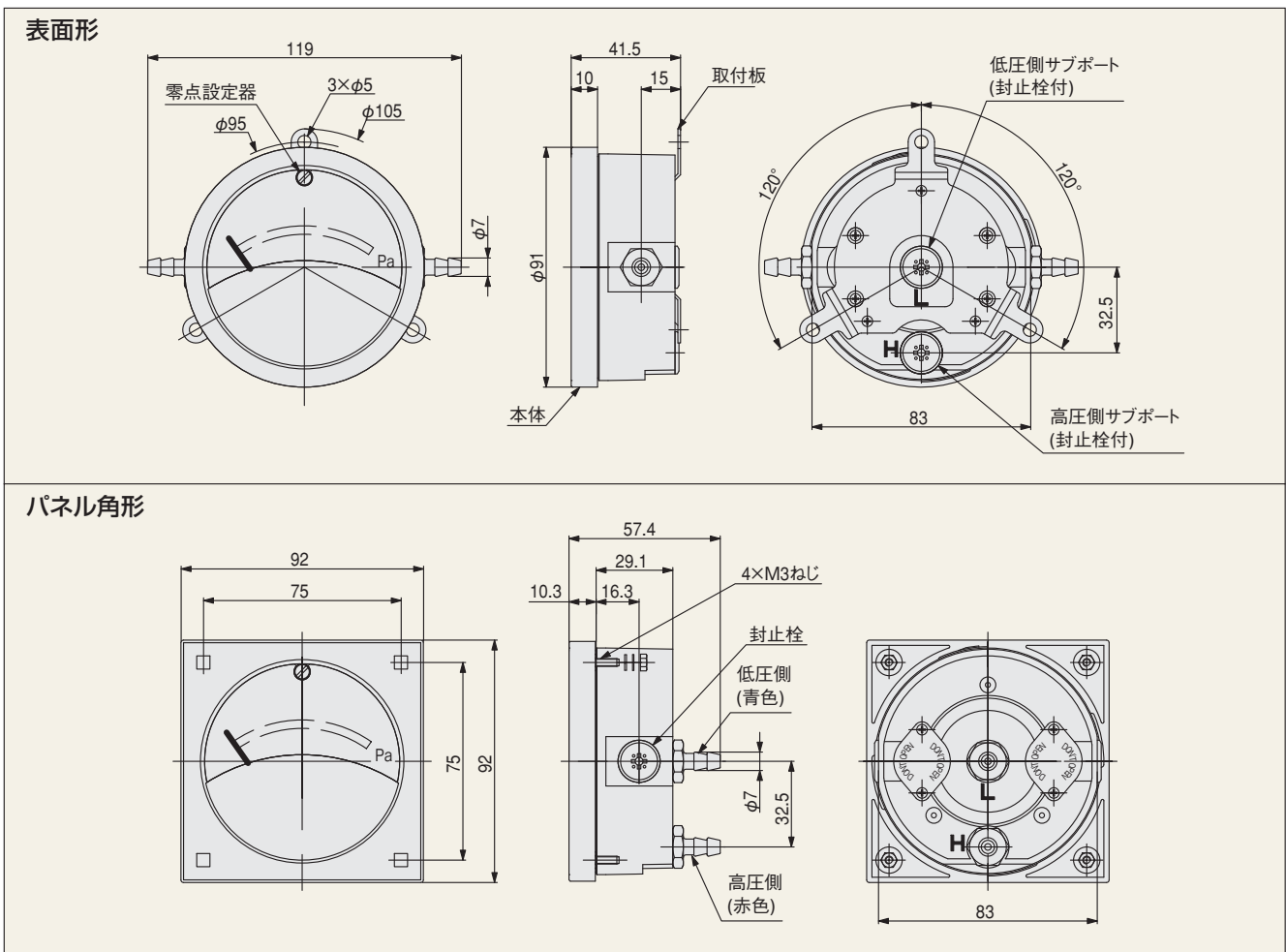
表面形



パネル角形

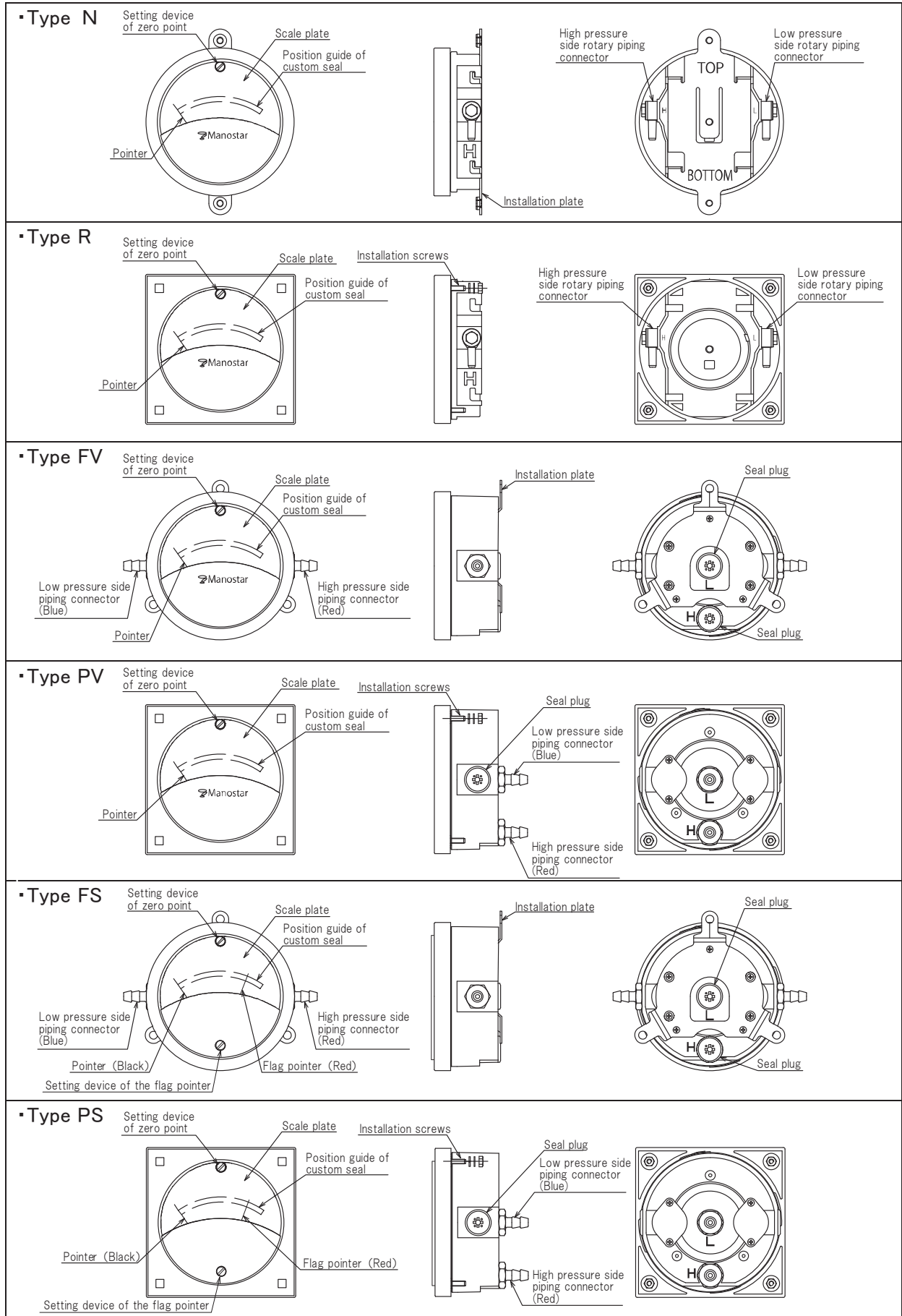


### 外形寸法図



※製品の仕様および内容につきましては、改善等のため断りなしに変更する場合がありますのであらかじめご了承ください。

## II . THE NAME OF EACH PART



### III. INSTALLATION

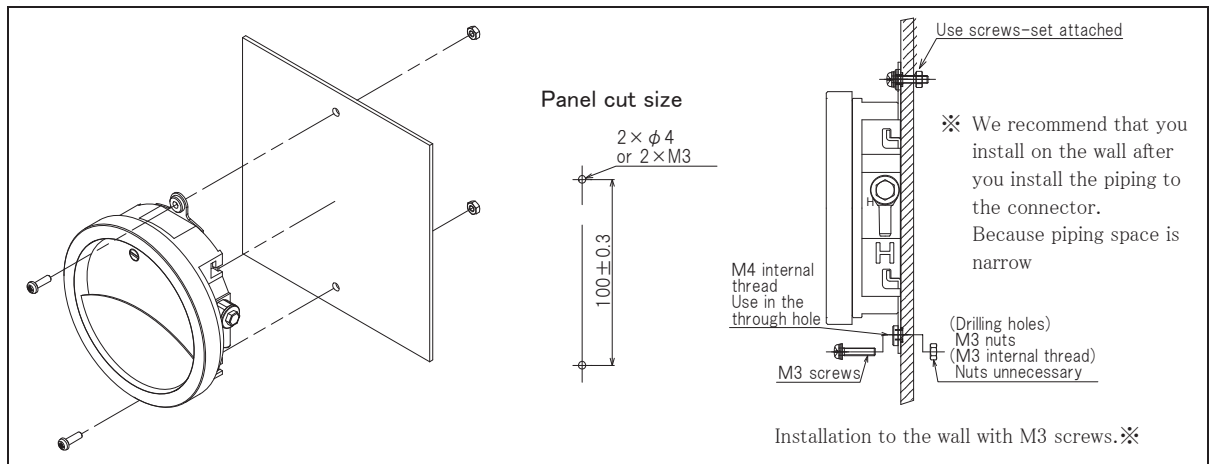
Before using this instrument, make sure if it is the type that you requested and meets the demand of the environment, pressure and piping conditions where it is used, by specification.

#### 1. Caution of service condition

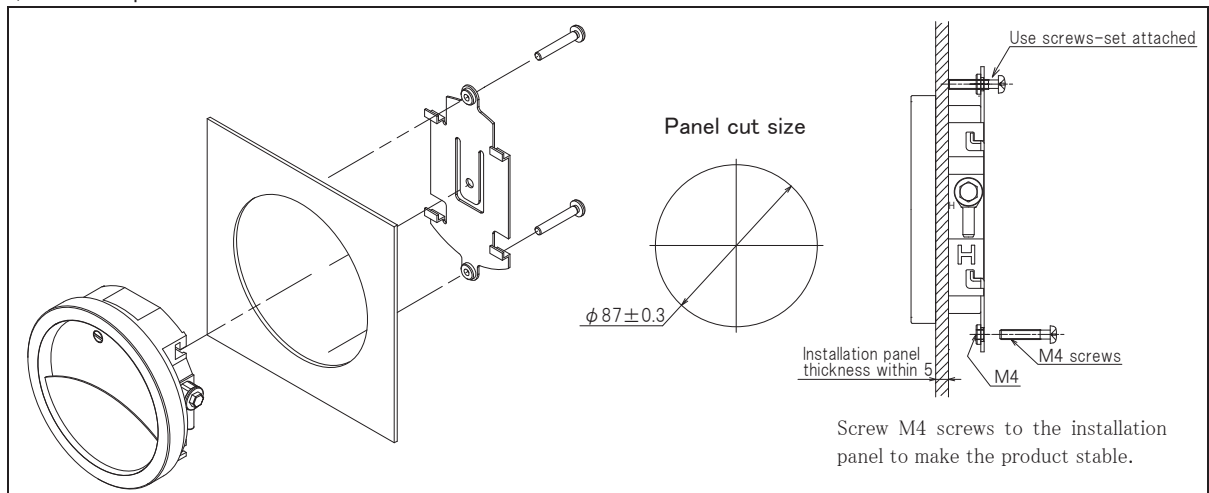
- Do not use the instrument in a place subjected to direct sunlight, vibration or shock, or excessive moisture. In particular, vibration and shock to the instrument should shorten its life.
- Use under the medium and ambient temperature from  $-10$  to  $+50$  °C.
- The instrument is not waterproof. 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

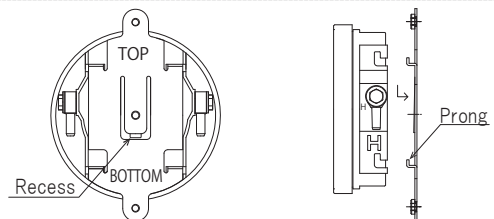


##### b) In case of panel embedded installed



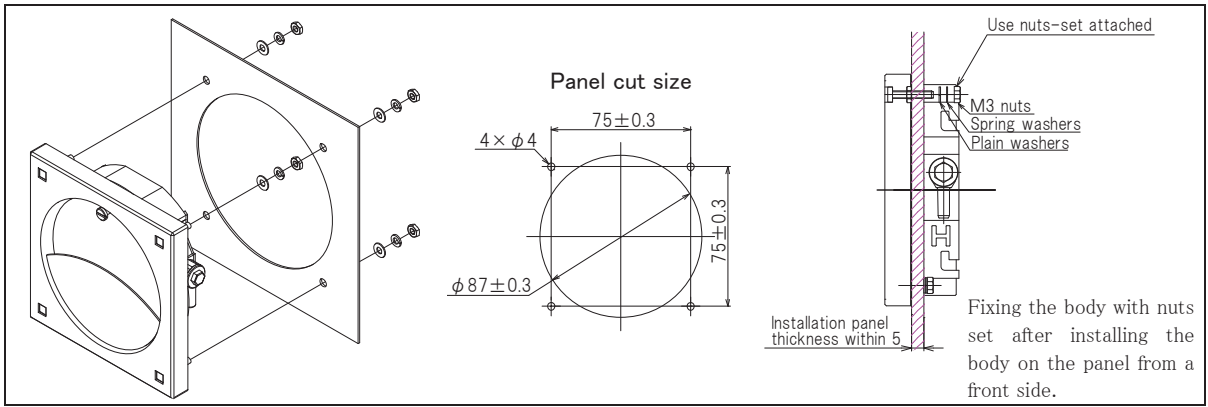
##### <Description method of an installation board>

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.

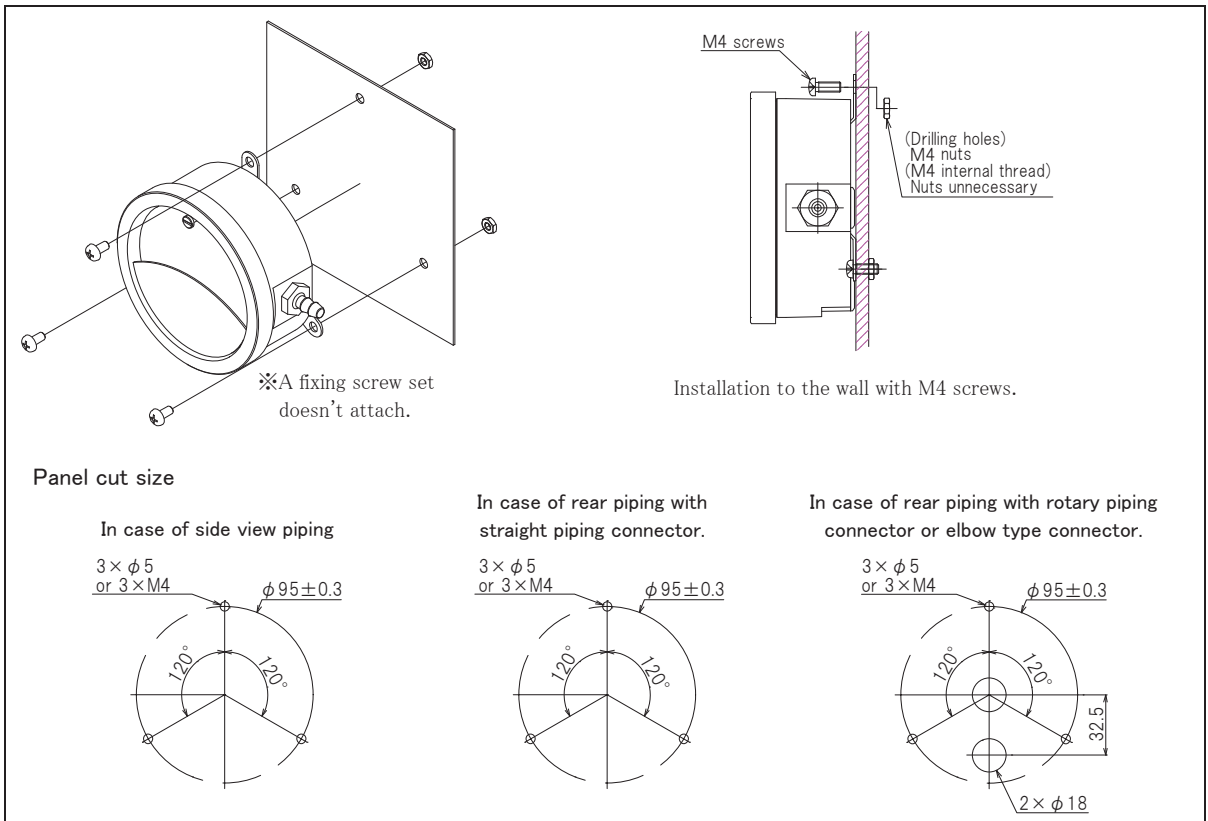


- The tightening torque of the screw is  $0.8 \text{ N} \cdot \text{m}$ .
- Do not apply excessive torque more than stipulated value, otherwise it will damage the body of the instrument.

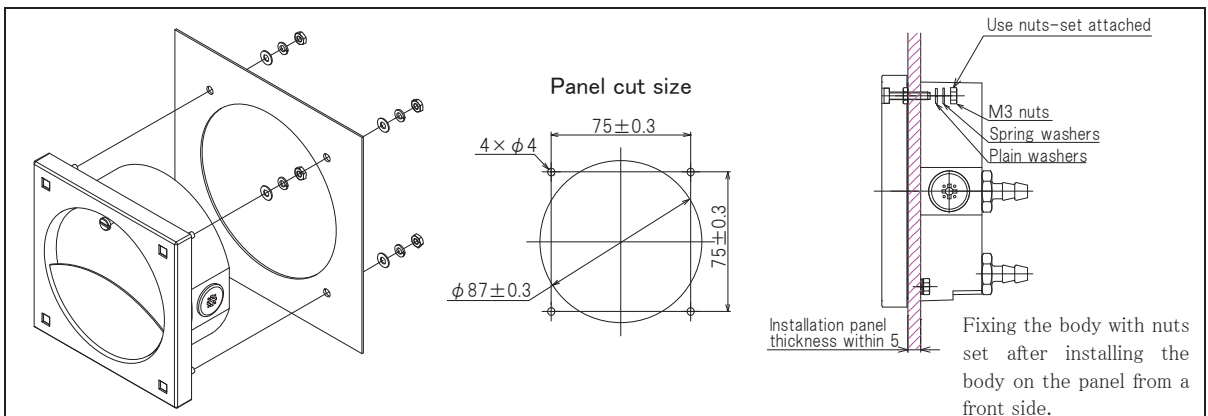
### 3. Installation of type R



### 4. Installation of type FV, type FS



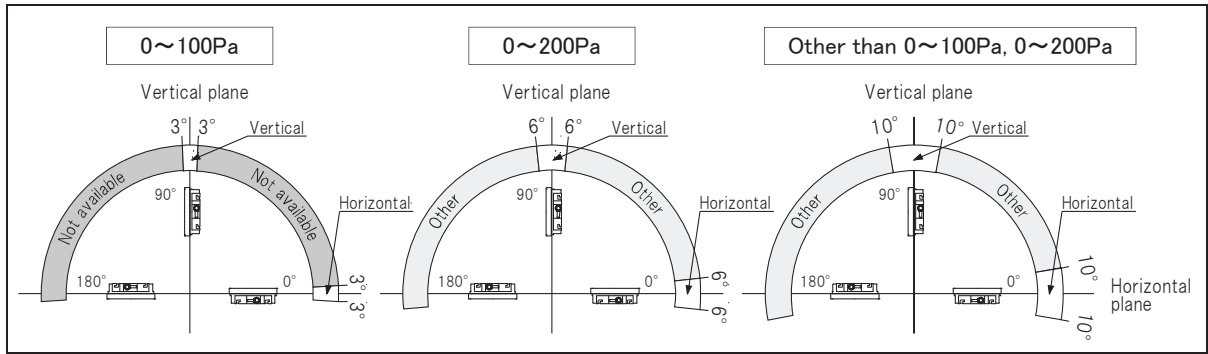
### 5. Installation of type PV, type PS



 <b>Caution</b>	<ul style="list-style-type: none"> <li>• The tightening torque of the screw is 0.8 N·m.</li> <li>• Do not apply excessive torque more than stipulated value, otherwise it will damage the body of the instrument.</li> </ul>
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## 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.



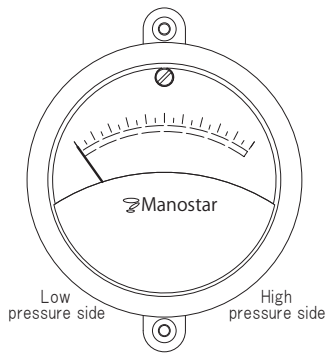
 <b>Caution</b>	<p>To become not covered by the warranty, do not use other than the specified installation position at the time of order.</p>
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## 7. Use in a position other than the specified is out of accuracy warranty

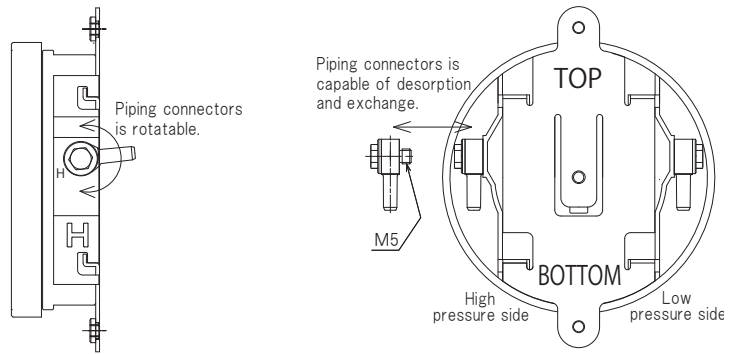
### •Type N, type R

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

<Front view>



<Rear view>

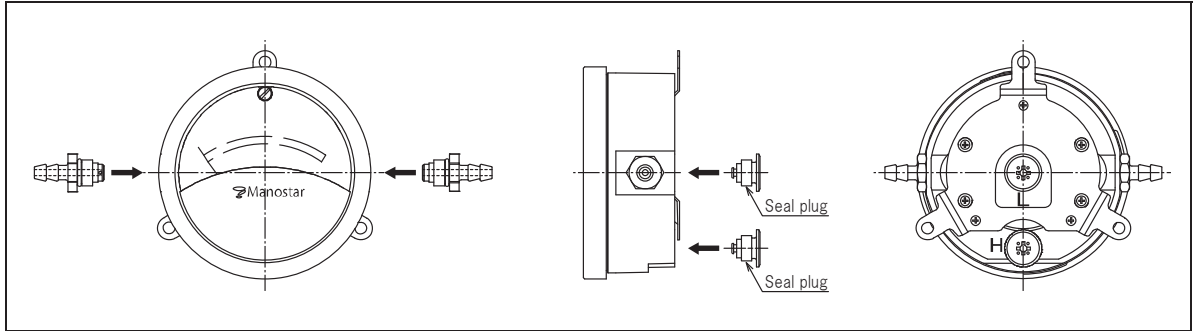


 <b>Caution</b>	<ul style="list-style-type: none"> <li>•The tightening torque of the connector is 0.5Nm. There is a fear that the meter body and nut thread are damaged for fastening beyond the stipulated value.</li> </ul> <p>VR connector (KGA71VR) :</p> <ul style="list-style-type: none"> <li>•The desorption of the base, please use the box driver or wrench of Hex.7</li> <li>•O-rings is not fixed. Please be careful not to lose the O-rings at the time of piping connector removal.</li> <li>•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.</li> </ul>	 <p>The structure of type VR piping</p>
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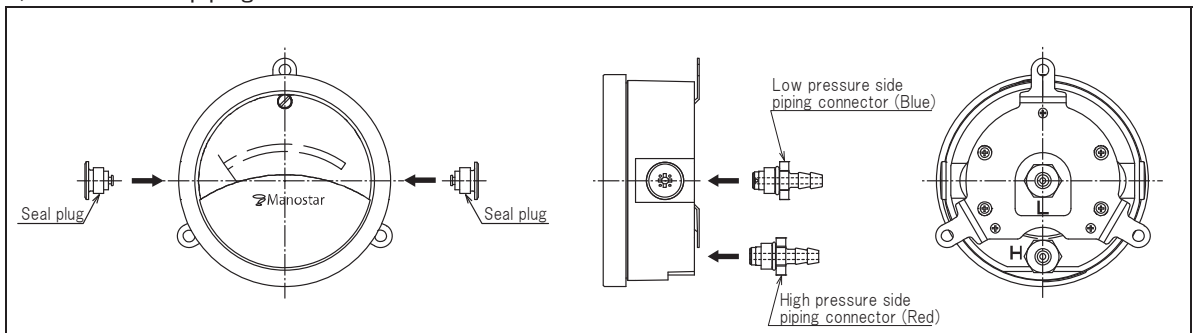
• Type FV, type PV, type FS, type PS

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.


 <b>Caution</b>	<p>Type FV, type FS</p> <p>Adaptor for rear piping (KGA81FBA-H and L) are necessary to avoid interference with piping connectors and panel to make a locking spacer easier.</p>	
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 <b>Caution</b>	<p>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.</p> <ul style="list-style-type: none"> <li>• Piping connector for vinyl or rubber tube and metal tube..... 1N·m</li> <li>• Seal plugs..... 0.5N·m</li> </ul> <p>Tightening with locking spanner</p> <p>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 adaptor. Be careful not to apply the tightening torque directly to the instrument body.</p>	
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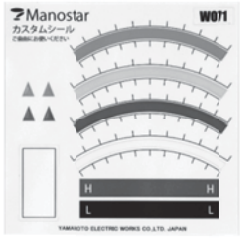
## 8. Accessory for WO71

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.

 <b>Caution</b>
<ul style="list-style-type: none"> <li>• Accessories for WO71 cannot be used in other products.</li> <li>• No polarity of the low pressure side and the high pressure side to the VR connector. (KGA71VR)</li> </ul>


## 9. Accessory for type FV, type PV, 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.

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

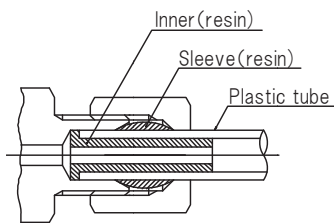
This is connector can be connected to stainless tube (O.D.6±0.1).


<b>Adaptor for rear piping</b> 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 FV and type FS.

<b>Inner sleeve set for plastic tube</b> 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)




<b>R1/8 Connector adapter</b> 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)

<b>Seal plug polypropylene-made [installed]</b>	
	Product code
	KGA71PLG

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

 <b>Caution</b>	Commercial products (connectors etc) can't be used, because the structure is different. Be sure to use exclusive connectors.
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## 10. Zero point setting

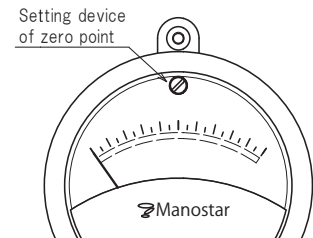
Set the zero point of the gage or the pressure transmitter by turning the zero adjuster, after installing them in the position which they are used. Please use a flat-blade screwdriver of the max. width 2 ~ 3mm.

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.

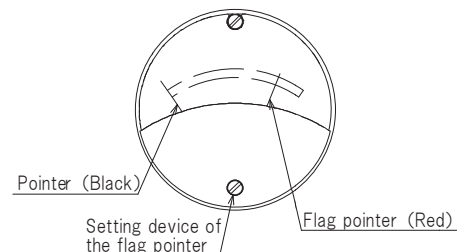
Zero point setting, please do at a temperature of environment you use.



## 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.

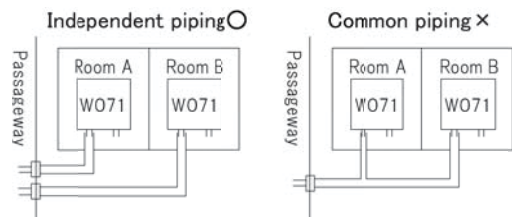
### c) Measurement of differential pressure

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.

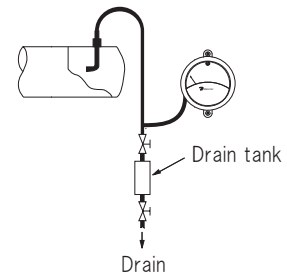


### 2. Prevention of clogged piping due to drain

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.

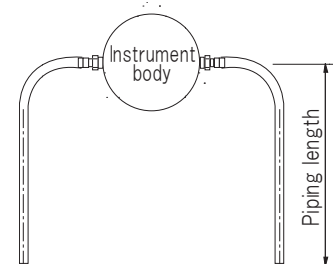
### 4. Errors caused by long distance piping

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.