



READ THE INSTRUCTION MANUAL BEFORE USING

# INSTRUCTION MANUAL

MANOSTAR GAGE

FR51A

No. TR-FR51A-E04

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## INTRODUCTION

Thank you very much for purchasing of "MANOSTAR GAGE FR51A".

 Caution	<p>To ensure your safety in using this instrument :</p> <ul style="list-style-type: none"><li>•Be sure to read the instruction manual carefully before using the instrument so that you can use it properly.</li></ul> <p>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.</p>
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## I . PRECAUTIONS

 Warning
<ul style="list-style-type: none"><li>•<b>Do not use the instrument where flammable gas is present.</b> The instrument is not explosion-proof. Do not use instruments in the circumstance where flammable gas is present. It may cause explosion.</li><li>•<b>Do not use the instrument at the place where corrosive gas is present.</b> 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 leaked out of the instrument will harm a person.</li><li>•<b>Do not apply the pressure to the instrument more than it can withstand.</b> The diaphragm and the retainer are broken and cause of injury or accident, etc. disaster if the pressure exceeding withstanding pressure of the pressure receiving element is applied to the instrument. The case body and the transparent cover of the instrument are broken and cause of injury or accident, etc. disaster if the pressure exceeding withstanding pressure of the instrument body is applied to the instrument.</li><li>•<b>The instrument is measurable for air and non-corrosive gas only.</b> The machine is exclusive use of dry air (90%RH or less). Using measuring the water or oil it may be damaged and causes the accident.</li><li>•<b>Avoid using where the instrument is subject to many vibration and impact.</b> Using the instrument where intensified vibration and impact may be damaged the instrument. It is expected that gas leaks of the instrument which harms a parson.</li><li>•<b>Do not exceed rated surrounding temperature, humidity and altitude in use.</b> Using the instrument by exceeding rated surrounding temperature and humidity and altitude it may be damaged and cause the accident.</li><li>•<b>Do not disassemble or reconstruct the instrument.</b> It may void the warranty.</li></ul>

 Caution
<ul style="list-style-type: none"><li>•<b>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.</b></li><li>•<b>Use the instrument indoors.</b></li><li>•<b>In case of not being installed in dry and well-kept clean locations, the instrument must be enclosed in box.</b></li><li>•<b>Do not use organic solvent for cleaning.</b> Use a cloth soaked with water-diluted neutral detergent to wipe the surface of a product. Using of organic solvent causes damage on the surface.</li><li>•<b>Dropping the product.</b> Product is a precision instrument. If you drop the product, there is a possibility that the exterior, also the interior mechanism damage.</li><li>•<b>Removal of the piping</b> If you replace the old pipes, please do not pull the pipe with a strong force. There is a possibility that the pipe cap is broken.</li></ul>

## II . INSTALLATION

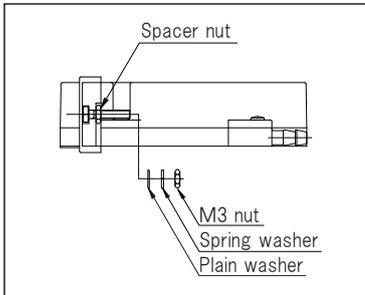
Before using this instrument, make sure if it is the type that you requested and meets the demand of the environment, pressure and piping conditions where it is used, by specification.

### 1. Caution of service condition

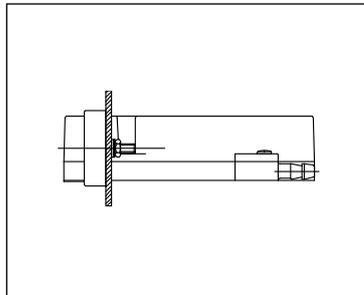
- Do not use the instrument in a place subjected to direct sunlight, vibration or shock, or excessive moisture. In particular, vibration and shock to the instrument should shorten its life.
- Use under the medium and ambient temperature from  $- 10$  to  $+ 50$  °C.
- The instrument is not waterproof. Do not use it in a place subjected to rain, or other splashing water.
- The instrument cannot be installed outdoors without an appropriate protection. If outdoor installing is required, the instrument should be housed in a box of drip-proof type for outdoor use.
- In installing the instrument, select the place where the ground is smooth and flat.

### 2. Installation of FR51A

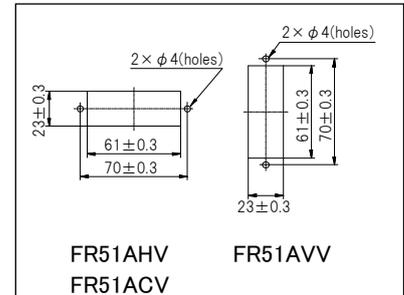
#### How to install



- When you install the instrument body on the panel, keep on attaching spacer nuts to the instrument body.

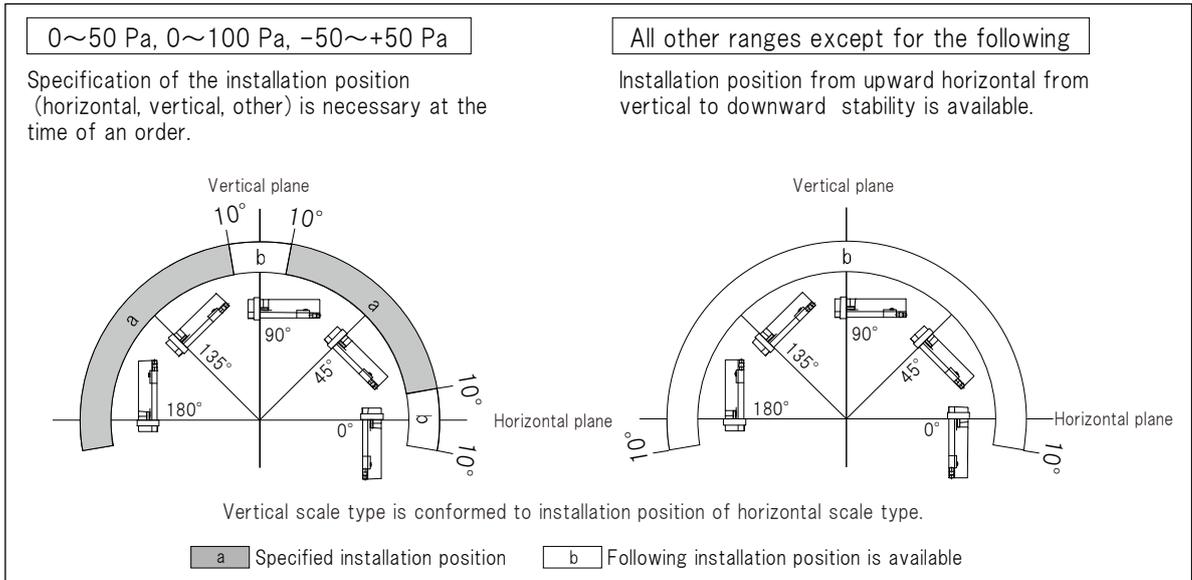


- After installing the instrument body on the panel, set plain washers and spring washers. Then tighten four sets of M3 nuts from the back side of panel.



 <b>Caution</b>	<ul style="list-style-type: none"> <li>·If you install the instrument on the panel without spacer nuts, the instrument body will be broken.</li> <li>·Tighten the installation M3 nut with the torque from 0.8 N·m. Do not apply excessive torque more than necessary, otherwise it will damage the instrument body.</li> </ul>
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### 3. Installation position



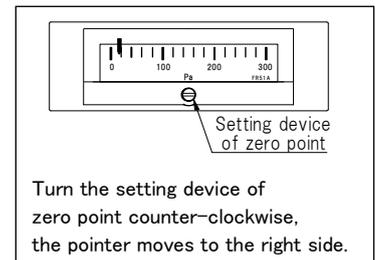
In ordering out of above mentioned installation position, please order us or our agency beforehand. It must be adjusted before the factory shipment.

 <b>Caution</b>	<p style="text-align: center;">Use of in a position other than the specified is out of accuracy warranty.</p>
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### 4. 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.

At that time, use the flat head screwdriver whose max. width 2 to 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.



### 5. Piping material

Please use I.D 4, the wall thickness of 1 mm or more piping material. Vinyl or rubber tubes are suitable. When inserting the piping into the tube tap, please push the piping until it stops.

### 6. 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).

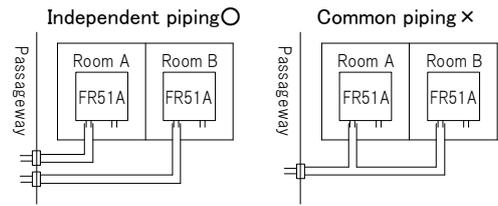
 <b>Caution</b>	<p>Measurement of single pressure using an instrument with zero point center range. Connect the tube to the high pressure side piping connector (red or H). In this case again, leave the piping connector attached to the low pressure side, which is opened to atmosphere. The single pressure is as displayed on a zero point center scale (+-).</p>
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### III. 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.



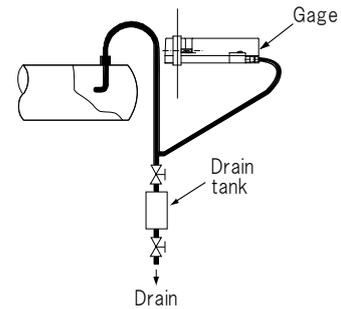
#### 2. Prevention of clogged piping due to drain

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

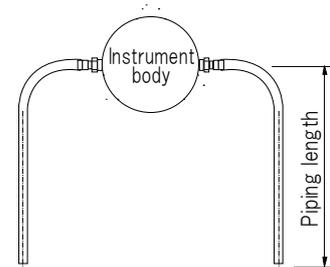


#### 3. Errors caused by long distance piping

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.

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.



## IV. 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.

## V. PRODUCT WARRANTY

### Warranty Period

This product warranty is valid for one year from the date of delivery to a place specified by an ordering party who has transacted directly with Yamamoto Electric Works Co., Ltd.

### Coverage

If a product breaks down due to a reason for which we are responsible during the warranty period and you return the product to us, we will either repair or replace the product free of charge.

This warranty does not cover:

- (1) Usage of the product under any inappropriate conditions or environment contrary to what is described in our product catalog, specifications or manual.  
Handling or usage of the product other than as described in our product catalog, specifications or manual.
- (2) Breakdown due to a reason other than a fault within our product.
- (3) Any product that has been modified or repaired by a party other than us.
- (4) Any breakdown due to a reason that was not foreseeable based on scientific and technical standards applied at the time of shipment.
- (5) Any breakdown due to a reason not attributable to us such as a natural calamity or other disaster.

These terms of warranty represent our entire liability with respect to the product, and we shall have no liability for any other loss arising in connection with a breakdown of the product.

\*This product warranty is only valid within Japan.

This document is a translation from the original Japanese version, and the original Japanese version has priority over this translation.

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.