RoHS

READ THE INSTRUCTION MANUAL BEFORE USING

INSTRUCTION MANUAL

MANOSTAR GAGE

WO81

No. TR-WO81-E15

Manostar

Yamamoto Electric Works Co., Ltd.

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TABLE OF CONTENTS

INTRODUCTION

Thank you very much for purchasing of "MANOSTAR GAGE WO81".

⚠ 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.

Ⅰ. PRECAUTIONS

⚠ Warning

・Do not use the instrument where flammable gas is present.
The instrument is not explosion-proof. Do not use instruments in the circumstance where flammable gas is present. 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 leaked out of the instrument will harm a person.

・Do not apply the pressure to the instrument more than it can withstand.
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.

・The instrument is measurable for air and non-corrosive gas only.
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.

・Avoid using where the instrument is subject to many vibration and impact.
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.

・Do not exceed rated surrounding temperature, humidity and altitude in use.
Using the instrument by exceeding rated surrounding temperature and humidity and altitude it may be damaged and cause the accident.

・Do not disassemble or reconstruct the instrument.
It may void the warranty.

⚠ 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.

・In case of not being installed in dry and well-kept clean locations, the instrument must be enclosed in box.

・Do not use organic solvent for cleaning.
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.

・Dropping the product.
Product is a precision instrument. If you drop the product, there is a possibility that the exterior, also the interior mechanism damage.

・Removal of the piping
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.

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

a) 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.

b) 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.

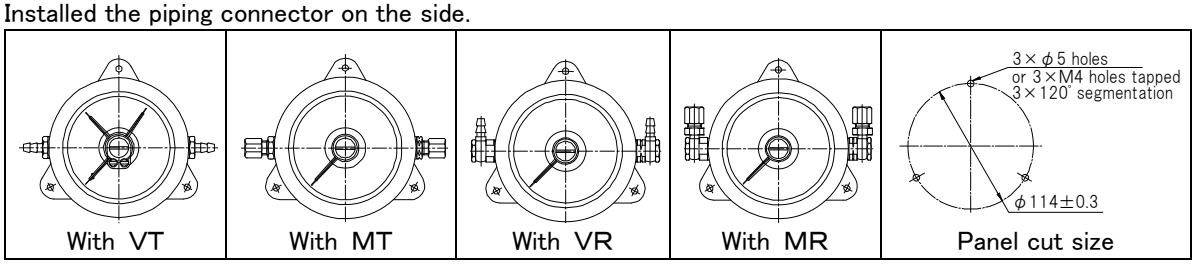
d) The instrument cannot be installed outdoors without an appropriate protection. If outdoor installing is required, the instrument should be housed in a box of drip-proof type for outdoor use.

e) In installing the instrument, select the place where the ground is smooth and flat.

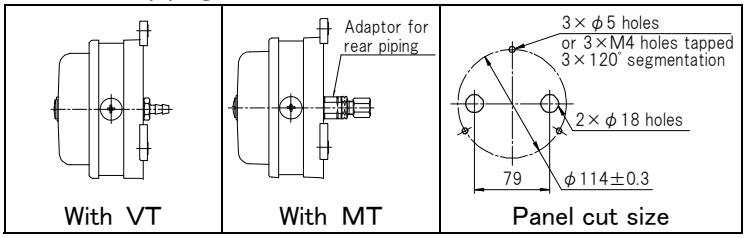
2. Installation of WO81F

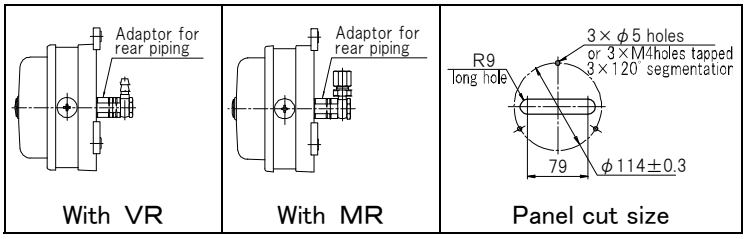
a) Panel cut size

Installed the piping connector on the side.



Installed the piping connector on the rear.

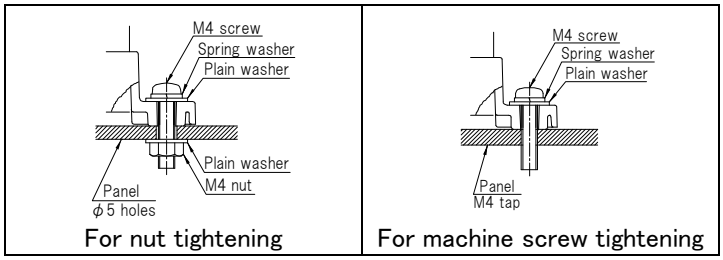




> **⚠ Caution**
>
> ・When you install MT, VR and MR connector to the back piping connector port, use the piping adaptor for rear piping. (KGA81FBA-L, KGA81FBA-H). It is necessary to avoid interference with piping connectors and panel and to help put a locking spanner at this adaptor as a spacer.
>
> ・MT, VR and MR connectors are sold separately as “connector for replacement” (refer to p. 5)

b) How to install

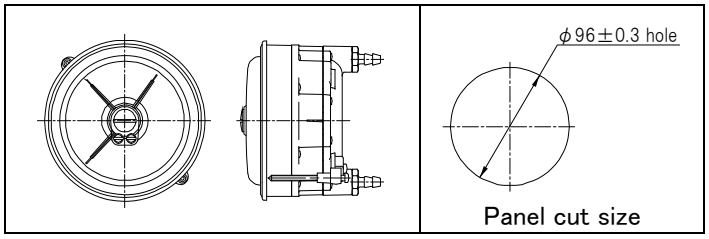
Mount installation feet for the instrument by attached screws.



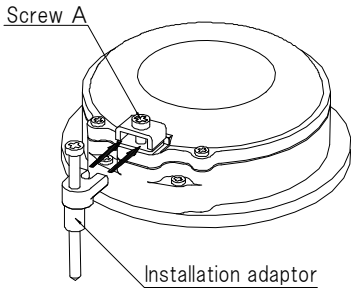
⚠ Caution	Tighten the piping connectors with the torque of 1 N·m. Do not apply excessive torque more than necessary, otherwise it will damage the instrument body.

3. Installation of WO81PC

a) Panel cut size

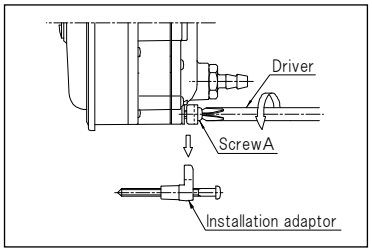


The same panel cut size can be used for gages with MT, VR and MR connectors available separately.

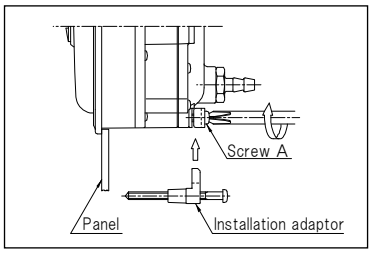


(Fig. Ⅱ-1)

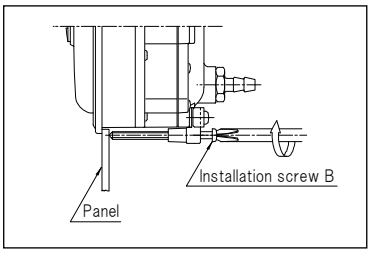
b) How to install



1. Loosen screw A and remove two installation adaptors.



2. Install the instrument body from the front side of the panel. Set two installation adaptors and tighten the screws A so that they were put into the original position. (Fig. Ⅱ -1)

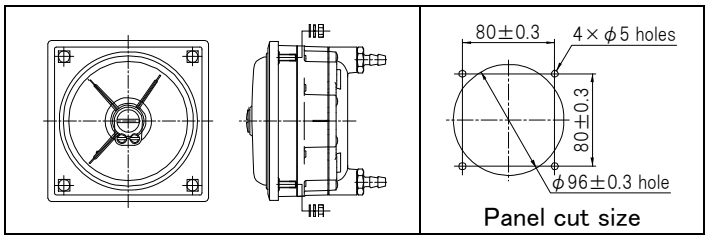


3. Tighten two installation screw B alternately and fasten the instrument body to the panel.

⚠ Caution	Tighten the installation screws B with the torque from 0.5 to 0.6 N・m. Do not apply excessive torque more than necessary, otherwise it will damage the instrument body.

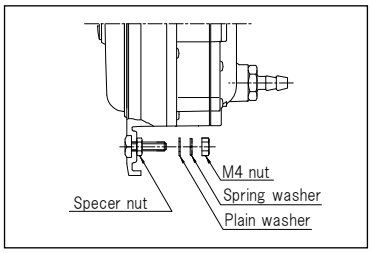
4. Installation of WO81PR

a) Panel cut size

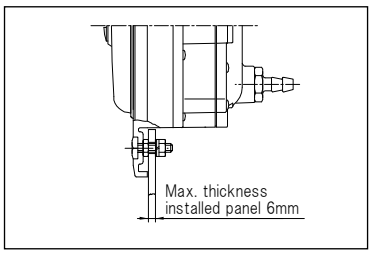


The same panel cut size can be used for gages with MT, VR and MR connectors available separately.

b) How to install



1. Remove M4 nuts, spring washers and plain washers on four corners, but don't remove spacer nuts. (When you install the instrument body on the panel, keep on attaching spacer nuts to the instrument body.)



2. After installing the instrument body on the panel, set plain washers and spring washers. Then tighten four sets of M4 nuts from the back of the panel.

⚠ Caution
・If you install the instrument on the panel without spacer nuts, the instrument body will be broken. ・Tighten the installation M4 nut with the torque from 1N・m. Do not apply excessive torque more than necessary, otherwise it will damage the instrument body.

5. Installation position

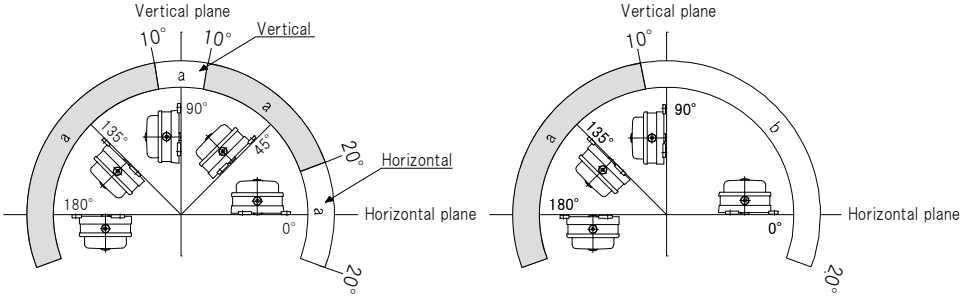
0～50 Pa, 0～100 Pa, -50～+50 Pa

Specification of the installation position (horizontal, vertical, other) is necessary at the time of an order.

※135° or more with the range 0～50 Pa is not available.

All other ranges except for the following

Installation position from upward horizontal to vertical is available.



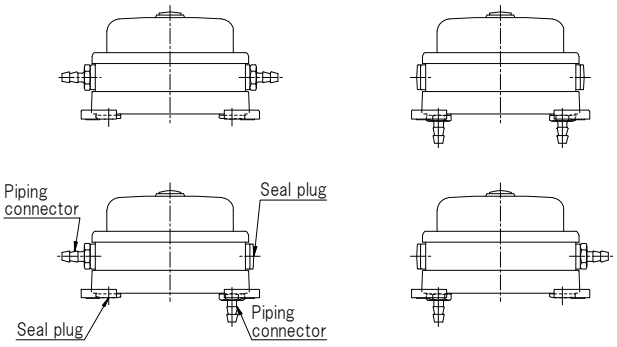
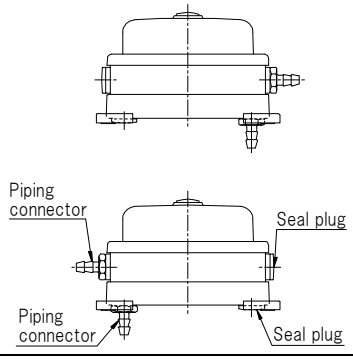
a Specified installation position　b Following installation position is available

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

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

6. To change arrangement of piping connectors of WO81F

WO81F have two piping connector ports on the sides and back.
It is possible to four kinds of arrangement by combination of piping.

Possible arrangement of piping connectors	Impossible arrangement of piping
	

⚠ Caution	With seal plugs, be sure to close the two piping connector ports where connectors are not attached.

7. Accessory for WO81

Installation bracket to set for WO81 PC type
Aluminum die cast, steel-made [installed (PC type)]

Product code
TKA81PC

The combination shown in the above photo is a set of the installation adaptor.
This set is intended for reserve. These two sets are attached to the body as standard accessory.

Portable box for WO81 model
Steel-made [option]

Product code
PB-01

※The gage is not included.

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

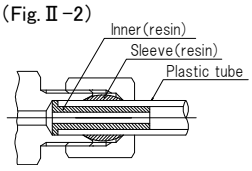
The joint installed tube is push-in type. Use the optional tube or the applicable tube (JIS B8381-1).

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).

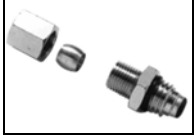
Inner sleeve set for plastic tube polypropylene-made [option]	
	Product code
	XIN6X4

(Fig. Ⅱ-2)



You need this to connect plastic tube (O.D.6, I.D.4) to the connectors for metal tube. (Fig. Ⅱ-2)

Seal plug polypropylene-made [installed]	
	Product code
	KGA81PLG

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.

Adaptor for rear piping brass-made [option]		
(for F type)	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.

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

Joint of R1/8 can be connected.
※Specifications are different from the adaptor for rear piping. (KGA81FBA)

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

8. About tightening piping connector

a) Tightening torque

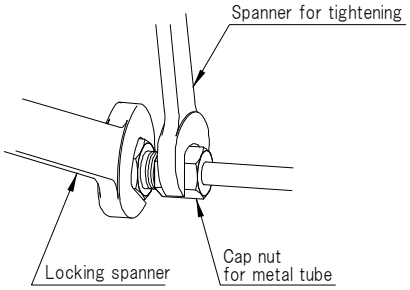
The plug sealing between the piping connector port of the instrument, the piping connector, and the sealing plug is achieved by O-rings. Apply the tightening torque specified below when tightening the piping connector and sealing plug. The instrument body will be broken if excessive torque is applied.

・Piping connector for
vinyl or rubber tube and metal tube ···· 1 N・m

・Seal plugs ..... 0.5 N・m

b) Tightening with locking spanner

Always use locking spanner to tighten the ring joints for MT connectors (for metal tube) or MR connectors (rotating type for metal tube) and be careful not to apply the tightening torque directly to the instrument body.
The locking spanner is also needed to ease the cap nuts. (Fig. Ⅱ-2)



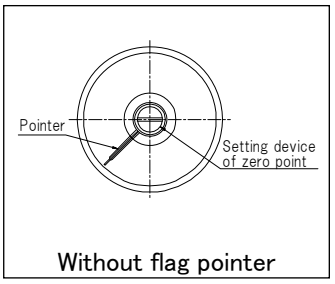
(Fig. Ⅱ-2)

⚠ Caution

Do not directly tightening a cap nut without a locking spanner, or it will cause the damage to ports of connectors at the main body of the instrument.

9. 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. 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.

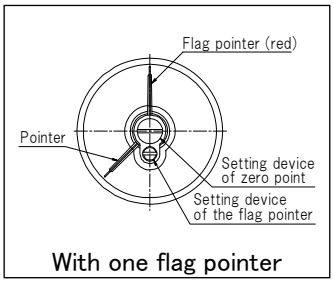


Without flag pointer

10. Setting of flag pointer

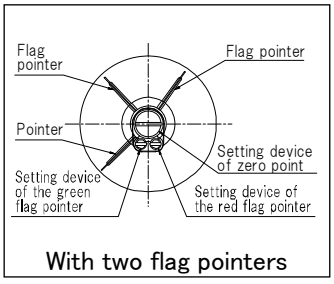
The flag pointer is used for indicating a predicted values or a limit values. Set it at the predicted or limit values.

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



With one flag pointer

With two flag pointers :
If you adjust the right setting device of the flag pointer and the red pointer moves, likewise, adjust the left setting device of the flag pointer, the green pointer moves. Turn the setting device of the flag pointer clockwise, and the flag pointer moves counter- clockwise.



With two flag pointers

11. Polarity of high and low pressure side

The polarity of the high and low pressure side is determined by the piping connector attached. In the model WO81 and WO70, the polarity can be inverted by switching the piping connector each other. The high pressure side and the low pressure side are identified with red and blue color respectively.

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 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

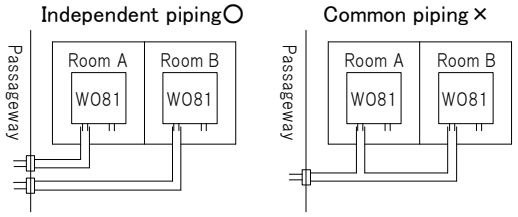
Connect the tube from the high pressure piping connector to the high pressure port (red or H) and from the low pressure piping connector to the low pressure port (blue or L).

⚠ Caution	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 (+−).

Ⅲ. GENERAL PRECAUTIONS

1. Prohibition of common piping

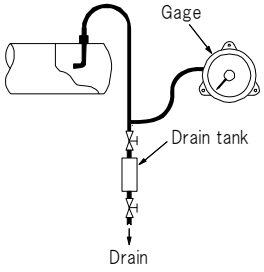
Piping each of pressure detectors and pressure receiving instruments tube exclusively dedicated for it, and do not connect the piping commonly with the adjacent system as shown in the right figure.
Common piping causes measurement error because the pressure of each system interferes.



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 in 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

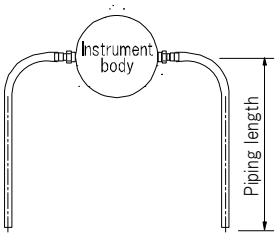


3. Measurement of high temperature gases

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.
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

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.