RoHS

READ THE INSTRUCTION MANUAL BEFORE USING

INSTRUCTION MANUAL

MANOSTAR SWITCH

MS61A-RA

No. TR-MS61A-RA-E00

Manostar

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INTRODUCTION

Thank you very much for purchasing of "MANOSTAR SWITCH MS61A-RA".

⚠ 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.

・Do not exceed rated voltage in using
Using the instrument by exceeding rated voltage may cause fire or electric shock.

・Wire correctly.
Incorrect wiring may cause fire.

⚠ 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.

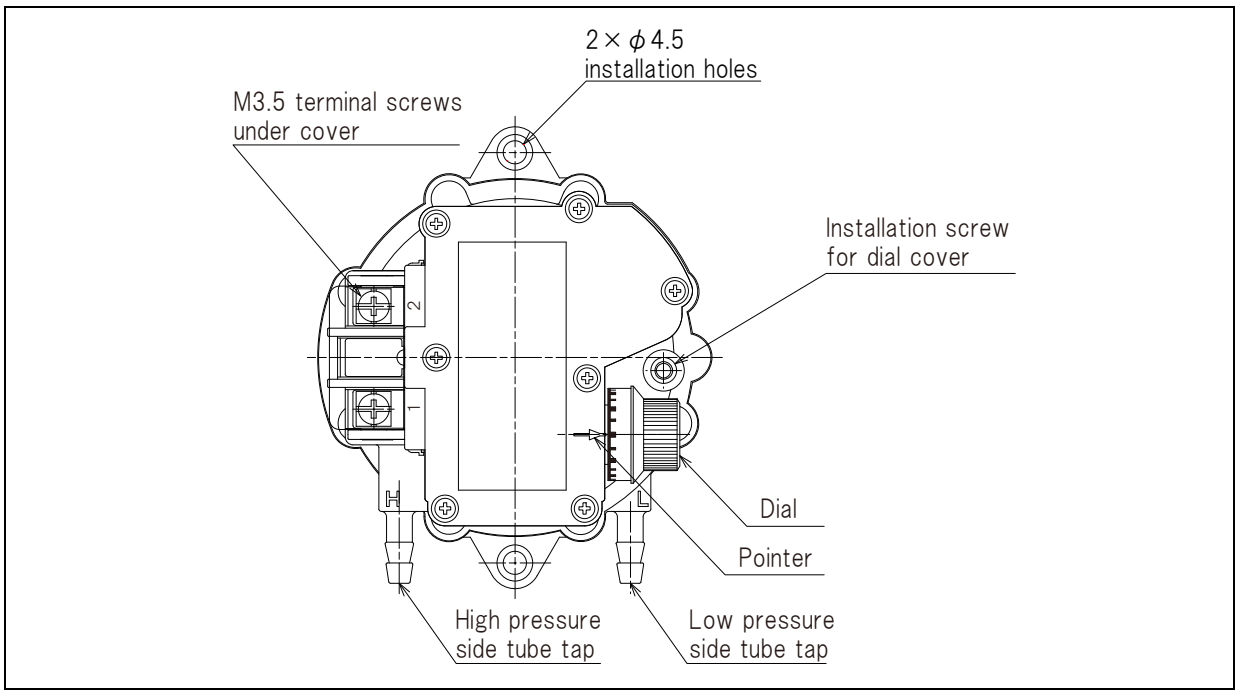
・In case of not being installed in dry and well-kept clean locations, the instrument must be enclosed in box.

・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
Please do not pull the pipe with a strong force. There is a possibility that the pipe cap is broken.

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

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.

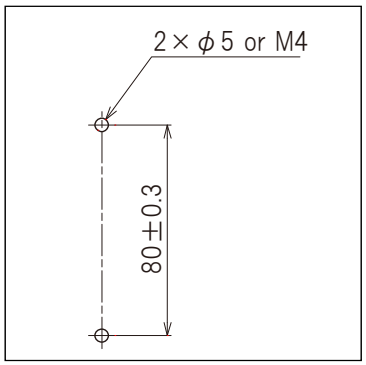
b) Use under the medium and ambient temperature from − 10 to + 50 ℃.

c) The instrument is not waterproof. Do not use it in a place subjected to rain, or other splashing water.

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

2. Installation of MS61A-RA

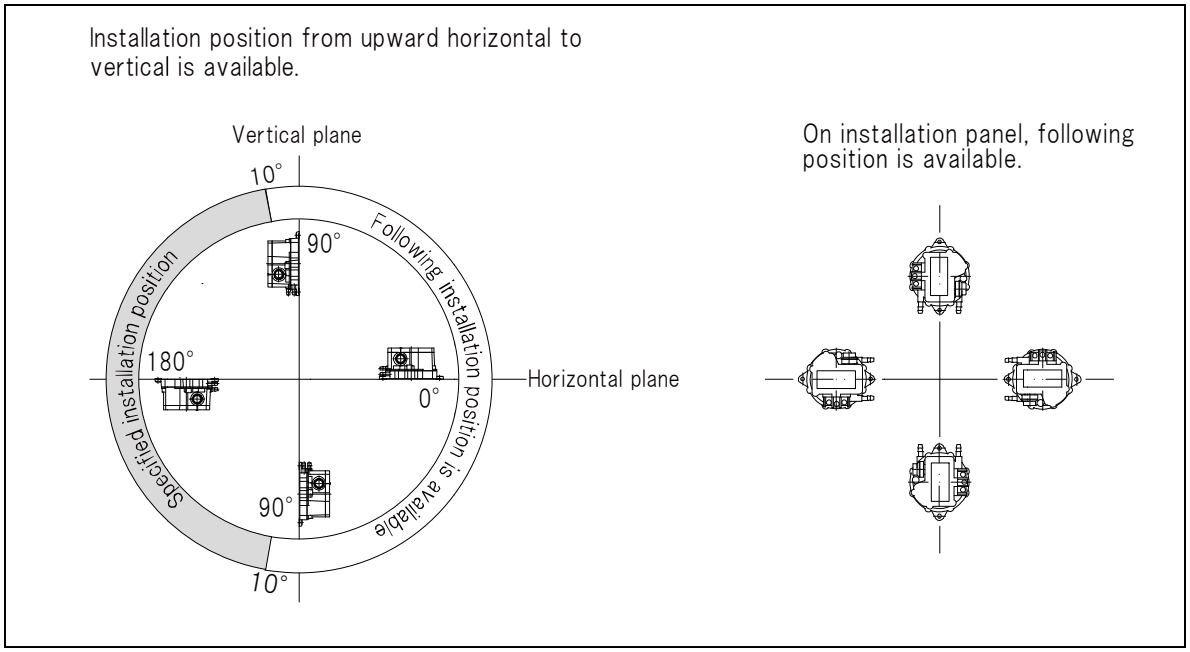
Panel cut size



⚠ Caution	・The tightening torque of the screw is 1 N・m. ・Do not apply excessive torque more than stipulated value, otherwise it will damage the body of the instrument.

3. Installation position

After inspection and adjustment in accordance with the specified installation position, and shipped.



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

4. Wiring material

Choose the wiring material depending on the load. Terminal screw of the product is M3.5.

Wire by performing the termination of the crimping terminal (O.D. less than ϕ8 which matches the general M3.5 screws.)

5. Accessory for MS61A

Dial cover set
brass-made [option]

Product code
TCVRA-61

This cover avoids the trouble that someone turn set dial carelessly.

Terminal cover
Polycarbonate-made [installed]

Product code
TCA-61A

6. Pressure of measurement and connection of piping

a) Measurement of positive pressure

Connect the tube to the high pressure side piping connector (H).
The lower pressure port (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 (L). The high pressure port (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 (H) and from the low pressure piping connector to the low pressure port (L).

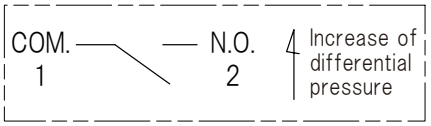
Ⅳ. SETTING OF PRESSURE

1. Switch contact configuration

・Composition of contact of this instrument is as shown on the right.

・When no pressure is applied, the connection between COM (1) and N.O. (2) is open.

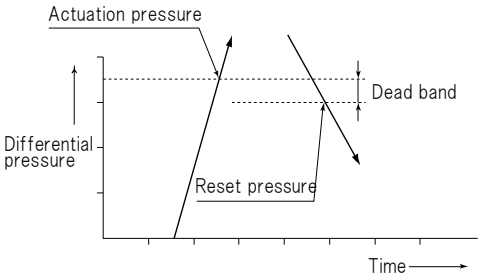
・When the differential pressure increases and reaches the set pressure, the contact between COM. (1) and N.O. (2) is closed.



2. Setting of upper limit/ lower limit

・When differential pressure applied to the instrument is increased starting from zero and changes over the electric contact from N.C. (normal close) to N.O. (normal open), the pressure at this moment is called "**actuation pressure**".

・When this differential pressure decreases from the pressure higher than this actuation pressure activating electrical contact and returning the contact from N.O. (normal open) to N.C. (normal close), the pressure at this moment is called "**reset pressure**".



・There is certain difference between actuation pressure and reset pressure and this is called "**dead band**".

・There are two types of the instrument. One is called "**upper limit setting type**"type (H) whose scale of setting knob is adjusted on actuation pressure, the other is called "**lower limit setting type**"type (L) which is adjusted on reset pressure.

・Depending on the purpose of use, choose the instrument either "upper limit setting type"or "lower limit setting type"

Please confirm the following table about the respective movement.

In case of 50-300 Pa range with set value 100 Pa. (dead band is 60 Pa)

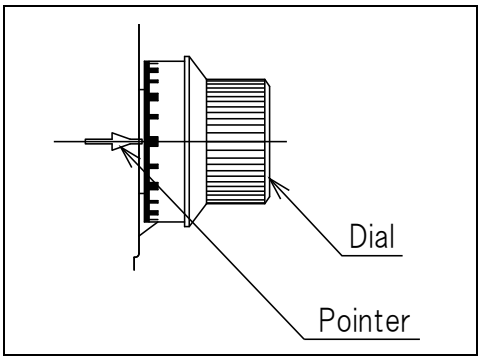
Setting of scale	Adjusting of scale	Movement of contact
Upper limit setting type	Adjusted in activating pressure	When the differential pressure increases, the circuit is closed between N.O. and COM. at 100 Pa. Then as the differential pressure decreases, the circuit is opened between N.O. and COM. at 40 Pa.
Lower limit setting type	Adjusted in reset pressure	When the differential pressure increases, the circuit is closed between N.O. and COM. at 160 Pa. Then as the differential pressure decreases, the circuit is opened between N.O. and COM. at 100 Pa.

⚠ Caution	It can't be changed from the lower limit setting to the upper limit setting or vice versa.

3. Setting the dial

Use the dial and pointer, when you set the “Activating pressure” or “Reset pressure”.

Set the ″Activating pressure″ for the upper limit setting.
Set the ″Reset pressure″ for the lower limit setting.



Set the tip of the pointer to the pressure you desire by knobbing the outer periphery of the dial to rotate the dial. Turning the pointer from the lower side (anti-clockwise) is recommended to set accurately with good reproducibility. Turning the pointer from the lower side (anti-clockwise) is recommended to set accurately with good reproducibility.

⚠ Caution	Do not turn the dial too much exceeding the upper bound or the lower bound of the scale. It causes performance deterioration and the failure.

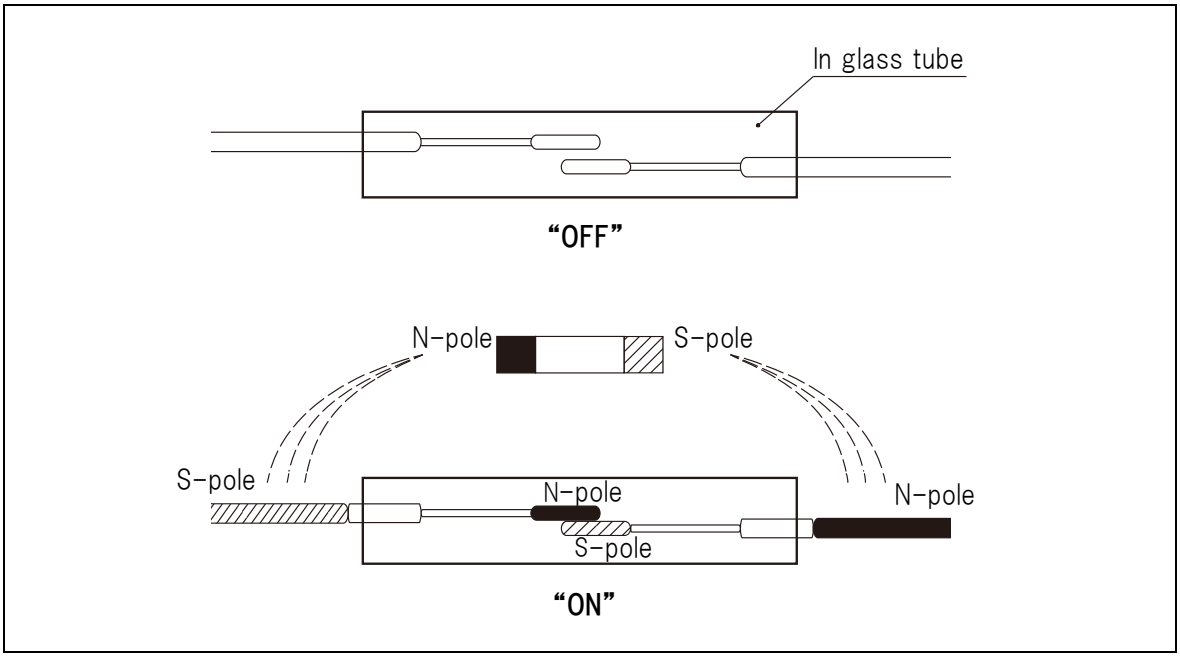
4. Reset time

The reset time means the time needed for the differential pressure to decline to the reset pressure from the activating pressure (i.e., the electrical contact is reset) when the differential pressure is sharply reduced to zero. It is about three seconds at 20 Pa, and one second at more than 50 Pa for Manostar switches. (This value is only for the instrument itself and does not include the effect of piping.) Therefore, a response quicker than this value is not possible.

Ⅴ. ABOUT BUILT-IN SWITCH

1. Reed switch structure and operation principle

A reed switch is a switch that switches the contacts “ON” and “OFF” using a magnetic field, and two ferromagnetic leads face each other with a small gap. In addition, an inert gas is sealed in the glass tube to prevent activation of the contacts, improving reliability and extending the life.
When an external magnetic field is applied in the axial direction of the reed switch’s reed, the reed is magnetized and the opposing reeds come into contact and close the circuit. Also, if the magnetic field is eliminated, the circuit can be opened by the elasticity of the reed.

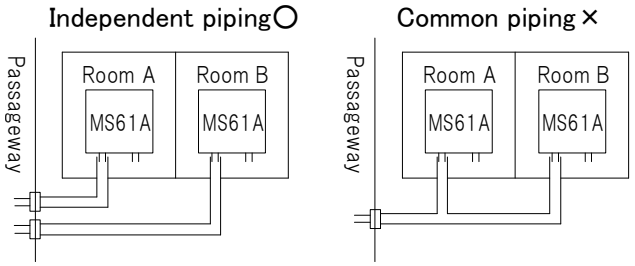


⚠ Caution	The contact may malfunction due to the influence of the external magnetic field. When installing this instrument, keep it sufficiently away from high voltage and large current circuits, or provide a magnetic shield if necessary and check the operation before use.

Ⅵ. GENERAL PRECAUTIONS

1. Prohibition of common piping

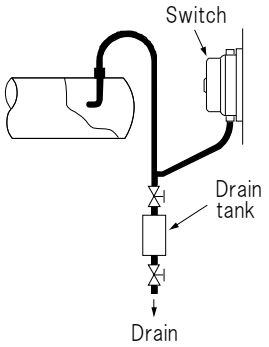
Piping each of pressure detectors and pressure receiving instruments tube exclusively dedicated for it, and do not connect the piping commonly with the adjacent system as shown in the right figure.
Common piping causes measurement error because the pressure of each system interferes.



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

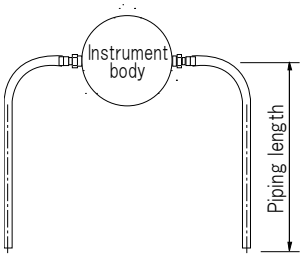


3. Measurement of high temperature gases

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.
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.



Ⅶ. 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.

Ⅷ. 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.