⚠ Precautions common to instruments

Precautions on handling

- When pressure that exceeds the withstand pressure of a pressure-receiving element is applied to an instrument, the diaphragm and the surrounding portion will break.
- When pressure that exceeds the instrument body withstand pressure is applied to an instrument, the instrument case, transparent cover, and other parts will explode or break.
- When pressure that exceeds the withstand pressure of a pressure-receiving element is simultaneously applied to each of the high-pressure (H) side and low-pressure (L) side of an instrument, the arriving pressures may differ from each other depending on the difference in chamber capacity or piping capacity between the high-pressure (H) side and low-pressure (L) side of the instrument to cause a force that exceeds the withstand pressure of the pressure-receiving element, possibly leading to breakage or deformation of the diaphragm and its surrounding portion. When simultaneously applying pressure that exceeds the withstand pressure of a pressure-receiving element from the high-pressure (H) side and low-pressure (L) side, gradually increase the pressure by taking time. Also, when releasing the pressure, gradually decrease the pressure.

What is the withstand pressure of a pressure-receiving element?
This term refers to the maximum pressure (withstand pressure on one side) that a diaphragm can withstand so as not to break and deform, and it is the pressure to be applied to either one of the high-pressure (H) side or the low-pressure (L) side.

What is instrument body withstand pressure?
This term refers to the maximum pressure (withstand pressure on both sides) that an instrument body can safely withstand without breaking, and it is the pressure to be applied to both the high-pressure (H) side and the low-pressure (L) side. The term does not mean the pressure that guarantees the airtightness of an instrument.

- Manostar products are precision devices. If you drop a Manostar product, its exterior and the internal mechanism may break.
- Do not disassemble Manostar products.
- When removing dirt from a product surface, wipe the dirt off with a cloth moistened with mild neutral detergent. When an organic solvent is used on a Manostar product, its surface may corrode from the solvent, and the resin may crack.
- In the event of an overcurrent that exceeds the contact specification, the contact of a switch will be welded.
- Install such an instrument that requires a power source away from machines that generate strong high frequencies (high-frequency welder, high-frequency sealer, etc.) and strong drive power sources as much as possible.
- When a power supply is connected to a signal input and output terminal by mistake, the device interior will be burned.
- For current/voltage input and output signal lines, use wires with shielding in order to prevent induction problems. Do not put input and output signal lines close to a power line or pass them through the same conduit as that for a power line.

Use environment

- Avoid using a product in a location exposed to direct sunlight, strong vibrations or impacts, or with high humidity for many hours. In particular, vibrations and impacts shorten the service life of the instrument.
- Because our instruments are not waterproof, do not use them in locations directly exposed to rainwater and other liquids. Our instruments cannot be directly installed outdoors. When it is necessary to install an instrument at an outdoor location, house the instrument in a drip-proof housing for outdoor use.

Zero point setting

- After installing an instrument, adjust the zero point in the orientation in which the instrument is used.
- Be sure to conduct the zero-point setting after opening the high-pressure side and low-pressure side bases to the atmosphere or stopping the machine and then completely eliminating the residual pressure.

High-pressure side and low-pressure side polarities

- High-pressure side and low-pressure side polarities depend on the bases.
- On models WO81 and WO71 FS type/PS type (side face piping), it is possible to convert the polarity by exchanging the bases. The high-pressure and low-pressure sides are identified with the colors of red and blue, respectively.
- In a single pressure measurement, if a measurement is conducted by removing a base for which piping is not necessary, the gauge will not operate normally.

Precautions on use

⚠ Precautions common to instruments

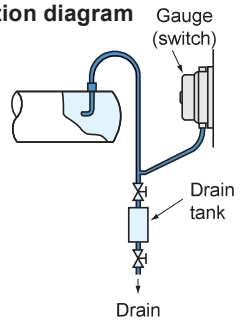
Measurement of single pressure

○For Manostar products, “differential pressure” is indicated. “Absolute pressure” and “gauge pressure” are not indicated. Once either one of the bases on the high-pressure and low-pressure sides is opened to the atmosphere, the indication will be “gauge pressure.” This is called “single pressure” in contrast to differential pressure.
○When conducting a single pressure measurement by opening one of bases, carefully check the duct internal pressure (line pressure) and use the gauge in a range suitable for the pressure.
○To measure positive pressure, connect a pipe to the high-pressure side base (red, or H). Although the low-pressure side is open to the atmosphere, do not remove the low-pressure side base (blue, or L).
○To measure negative pressure, connect a pipe to the low-pressure side base (blue, or L). Although the high-pressure side is open to the atmosphere, do not remove the high-pressure side base (red, or H).
○To measure a single pressure with a zero center range instrument, connect a pipe to the high-pressure side base (red, or H). Do not remove the low-pressure side base, which will be open to the atmosphere. The significant value on the scale plate indicates the single pressure.

Prevention of clogging of pipe by drainage

○When drainage accumulates in the middle of a pipe, pressure measurements are subject to errors. Therefore, be sure to install an instrument at a location higher than the pressure extraction port of a pressure detector to prevent drainage from accumulating in part of the pipe.
○If this precaution cannot be observed out of necessity, install a drain tank in the middle of the pipe as shown on the right and periodically clean the tank.
○After cleaning, confirm that airtightness is positively maintained.

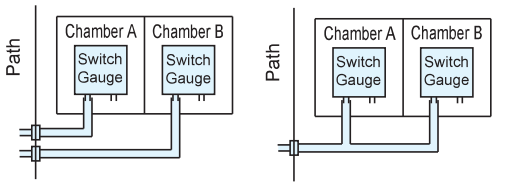
Drain tank installation diagram



Prohibition of shared piping

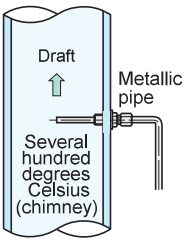
○In piping with a pressure detector and an instrument, provide a single pipe for each system as shown on the right, and do not share the pipe with the neighboring system.
○When shared piping is made, the pressures of the respective systems interfere with each other, leading to errors.

Individual piping ○ **Shared piping ×**



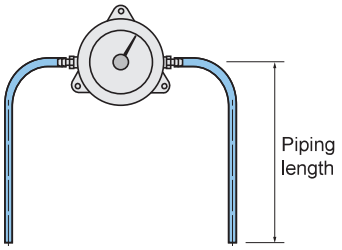
Measurement of pressure of high-temperature gas

○To measure the pressure of a high-temperature gas, use temperature-resistant metal (stainless steel, for example) in the pressure detector (Pitot tube), and connect to an instrument body with a metal pipe having a length necessary for cooling the high-temperature gas.



Error due to long-distance piping

○When the pipe of an instrument is long, the instrument’s response speed will be slower.
Make the size of the pipe in the middle as large as possible.
If the piping condition significantly differs between the high-pressure side and low-pressure side, the piping resistance also differs between the high-pressure side and low-pressure side, and there will be a difference in the pressure arrival time, making it impossible to accurately measure the differential pressure.



Precautions common to instruments

Installation of base

●Common

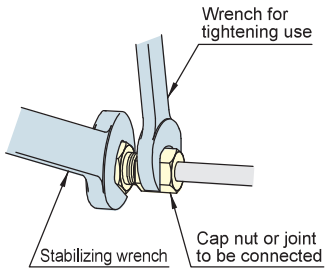
• Tightening torque

The airtightness between the base connection part of an instrument and the base and sealing cap is maintained by an O-ring. Install the bases and sealing caps to the following tightening torques. Do not tighten to a torque that exceeds the specified value because doing so breaks the instrument body.

- Base for metallic/vinyl pipe.....1N·m
- Sealing cap .....0.5N·m
- Combined use of a stabilizing wrench

When tightening a cap nut on a base for metallic pipe, a joint to be connected to an adapter, or other part, positively secure the base or adapter body with a stabilizing wrench. If a cap nut or joint is tightened without securing the base or adapter, the instrument body or the base body will break.

Also, when loosening the cap nut or joint, a stabilizing wrench is necessary.



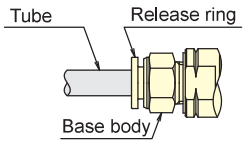
●PT base, PR base

• Connection of tube

Insert a tube whose end is cut at a right angle to the base all the way to the end.

• Disconnection of tube

Push the tube once, and then pull out the tube while pushing the release ring along the tube.

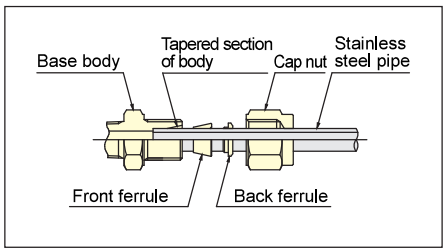


Although the operating ambient temperature of the PT base and PR base is 0°C to 60°C (no freezing allowed), do not use them in an environment where the ambient temperature exceeds the operating ambient temperature of the instrument. Failure to follow this instruction may lead to a failure or breakage of the instrument. Use a tube with a difference between its maximum outer diameter and minimum outer diameter of 0.2 mm or less and an exterior free of scratches.

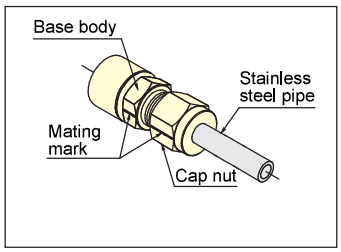
When a tube is going to be subject to repetitive connection and disconnection, cut off the tip of the tube by 3 mm or longer.

●MTW base

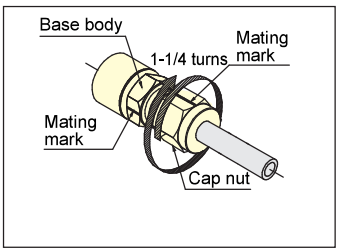
• Method to tighten pipe and base



1. Confirm whether the parts of a base fit as shown in the figure above, and then insert a stainless steel tube until its end makes contact with the back of the body.



2. After tightening the cap nut with the fingers up to the point where it does not turn any further, put a mating mark on each of the base body and the cap nut.



3. From this position, tighten the cap nut by turning it one and one-quarter turns with a wrench.

• Method to retighten pipe after a disconnection

1. Before connecting the pipe, confirm that no foreign substances, such as dirt, are attached to the tapered section of the body and the front ferrule.
2. Insert the pipe until the front ferrule makes contact with the tapered section of the body, and then tighten the cap nut with the fingers to the point where it does not turn any further.
3. Hook a stabilizing wrench to the base body, and tighten the cap nut by turning it one and one-quarter turns.

Warranty

Warranty period

The warranty period for our product is one (1) year from delivery to the location specified by the orderer who makes a direct transaction with us.

Scope of warranty

If any failure or defect attributable to us becomes clear during the above warranty period, we will repair the product or supply a substitute product free of charge. However, even during the warranty period, we will exclude the product from the scope of the warranty if the failure or defect corresponds to any of the following:

(1) The failure or defect was caused by an unreasonable condition, environment, handling, or usage not mentioned in the instruction manual, specifications, and our product catalog.
(2) The failure or defect was caused by a factor other than our product.
(3) The failure or defect was caused by a modification or repair conducted by a party other than us.
(4) The failure or defect was caused by an event that could not be foreseen at the scientific and technical levels at the time of product shipment from us.
(5) The failure or defect was caused by an external factor not attributable to us, such as acts of God and disasters.

Please note that the warranty mentioned here means the warranty for our individual product, and damage provoked by a failure or defect of the product is excluded from the scope of the warranty.

*This warranty is valid only in Japan.

Application and usage

Our products are designed and manufactured as general-purpose instruments for general industries.
Therefore, our products are not intended for the following uses, and our products used in such a manner are outside the scope of application.

(1) Equipment that is anticipated to greatly affect lives and properties, such as nuclear power generation, aviation, railways, marine vessels, vehicles, and medical devices
(2) Utilities that include electricity, gas, and service water
(3) Use in outdoor locations and under similar conditions or environments other than those stipulated in the instruction manual
(4) Usage to which considerable safety consideration and attention equivalent to (1) and (2) above need to be given

Service

Scope of service

Because the product price does not include service expenses, such as the dispatch of engineers, we will separately charge for the expenses in the following cases:

(1) Instruction for installation and adjustment and a witnessed test run
(2) Maintenance inspection, adjustments, and repairs
(3) Technical guidance and technical education
(4) Witnessed inspections of products at our factory

<<Note>> The product specifications and information in this catalog are subject to change without prior notice for product improvement or other reasons.

●For order placement, contact

General agent **Manostar Co., Ltd.**

1-2-3 Nishishiriike-cho, Nagata-ku, Kobe City, Hyogo 653-0031
TEL. +81-78-621-7000 FAX. +81-78-621-7788

Manufacturer **Yamamoto Electric Works Co., Ltd.**

1-2-3 Nishishiriike-cho, Nagata-ku, Kobe City, Hyogo 653-0031
TEL. +81-78-631-6000 FAX. +81-78-631-6020

SEPTEMBER 2021 YAMAMOTO ELECTRIC WORKS CO., LTD., JAPAN