



Groove Micrometer

Safety Precautions

To ensure operator safety, use this product according to the directions, functions and specifications given in this User's Manual.

Use under other conditions may compromise safety.

CAUTION Shows risks that could result in minor or moderate injury.

This product has sharp parts such as the measuring surfaces. Handle them with sufficient care to avoid bodily injury.

NOTICE Shows risks that could result in property damage.

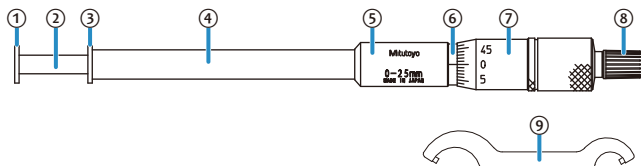
- Do not use this product for purposes other than measurement.
- Do not disassemble or modify. Doing so will void the warranty.
- Do not use or store the product in a place with sudden temperature changes. Adapt the product to ambient temperature before use.
- Do not store the product in a place with high humidity or a lot of dust.
- Do not use the product in a place where it may contact water, etc.
- Apply anti-rust treatment after use if the product is used in a place where it is directly exposed to splashes of coolant, etc. Rust may cause malfunction.
- Do not apply excessive force or subject to sudden impacts such as dropping.
- Remove dust, cutting chips, etc. and apply anti-rust oil after use.
- Remove any dirt on the product by wiping gently with a soft non-linty cloth. Do not use organic solvents such as cleaning agents or thinner.
- Do not move or dangle the product while it is still set on the workpiece.

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1. Names of Components

146 Series GVM-SNR/NR

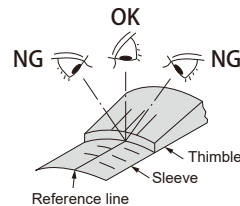


- | | |
|-----------------|----------------|
| ① Outer anvil | ⑥ Sleeve |
| ② Rod | ⑦ Thimble |
| ③ Inner anvil | ⑧ Ratchet stop |
| ④ Extension rod | ⑨ Wrench |
| ⑤ Holder | |

2. Precautions for Use

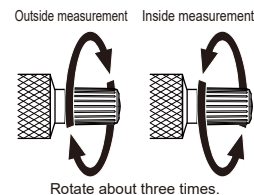
Parallax

- Because of the structure of the product, the reference line surface on the sleeve and the graduation line surface on the thimble are not on the same plane, so the point where the two lines meet will deviate depending on the position of your eyes. When reading measured values, do so with reference to the figure at right, perpendicular from the point where the reference line on the sleeve is aligned with the graduation line on the thimble.
- If looking from a different direction as in the figure at right, there will be a parallax of roughly 2 μm.



Measuring Force

- Use the ratchet stop to ensure consistent measuring force.
- The appropriate measuring force is about three rotations of the ratchet stop with your fingers after the measuring surface lightly contacts the workpiece. Note that excessive measuring force may cause measurement error.



Precautions and Cleaning after Use

- After use, clean the entire anvils with a soft, lint-free cloth and check that none of the parts are damaged.
- If oil, cutting fluid, or liquid itself has adhered to the product, or if the product is very dirty, clean it with a soft, lint-free cloth moistened with a volatile solvent (cleaning alcohol, etc.).
- After use, apply anti-rust treatment to the anvils, using Micrometer Oil (part No. 207000).
- If using in places exposed to water-based cutting fluid, always apply anti-rust treatment after cleaning.
- If Micrometer Oil is unavailable and the only option is a commercial product, we recommend low-viscosity anti-rust oil of ISO VG10 or so.

3. Reference Point Setting

Important

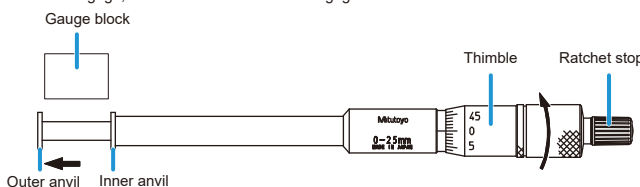
- Be sure to follow the procedure below to confirm and adjust the reference point prior to measuring.
- When setting the reference point for this product, make sure to use a calibrated gage (gauge block, etc.).
- Remove any dirt or oil from the measuring surfaces of the gage and product prior to setting the reference point.
- Use the same orientation and conditions when measuring and setting the reference point.
- Gauge blocks, half round jaws, and holders are not included with this product.
- The reference point for outside measurement does not match that for inside measurement, due to the deviation caused by the play of the screw and the difference of the thickness of the anvils. If inside measurement is performed with the reference point for outside measurement being set, measurement error occurs due to the deviation between the two reference points. To avoid such errors, it is necessary to set the reference point for each type of measurement.
- If inside measurement and outside measurement are performed alternately, it is also possible to obtain the value of deviation between two reference points beforehand, then use it as a correction value for calculating the measured value.

NOTICE Shows risks that could result in property damage.

Do not over-rotate the thimble. The anvil may fall off.

Reference Point Setting for Outside Measurement

- 1 Remove any dirt or dust from the measuring surfaces of the gage and the product.
- 2 Rotate the thimble to set the distance from the inner anvil to the outer anvil slightly longer than that of the gage.



- 3 Rotate the ratchet stop and bring the measuring surfaces gently into contact with the gage.

Important

When bringing the measuring surfaces into contact with the gage, insert until the gage is close to the base of the measuring surfaces.

- 4 Rotate the ratchet stop three times or so to apply the predetermined measuring force.
- 5 Read the measured value. If it differs from the gage dimensions, rotate the sleeve with the wrench until the thimble scale is aligned with the gage dimension value.

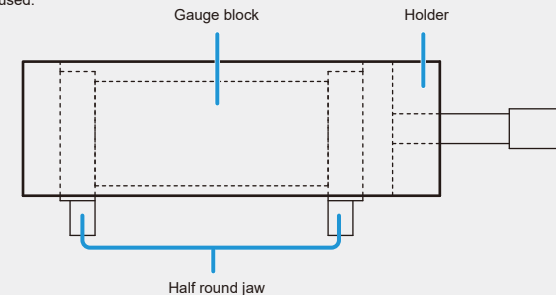
Reference Point Setting for Inside Measurement

- 1 Remove any dirt or dust from the measuring surfaces of the gage and the product.

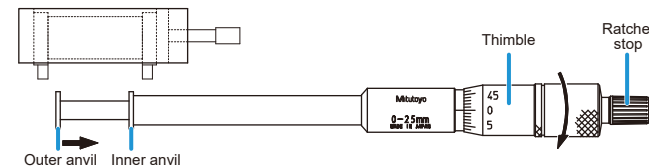
Tips

As an example, the figure shows the use of a gauge block, half round jaws, and holder for inside measurement reference point setting.

For details of the gage assembly method, etc., see the instruction manual for the accessory set to be used.



- 2 Rotate the thimble to set the distance from the inner anvil to the outer anvil slightly shorter than that of the gage, and then insert them into the gage.



- 3 Rotate the ratchet stop and bring the measuring surfaces gently into contact with the gage.

Important

When bringing the measuring surfaces into contact with the gage, insert until the gage is close to the base of the measuring surfaces.

- 4 Rotate the ratchet stop three times or so to apply the predetermined measuring force.
- 5 Read the measured value. If it differs from the gage dimensions, rotate the sleeve with the wrench until the thimble scale is aligned with the gage dimension value.

4. Measurement Method

Important

- Be sure to perform reference point setting prior to measurement for accurate measurement.
- It is necessary to set the reference point for each type of measurement: outside measurement and inside measurement.

When measuring, insert the product into the workpiece with the same orientation and procedure as the reference point setting, apply the predetermined measuring force, and read the measured value.

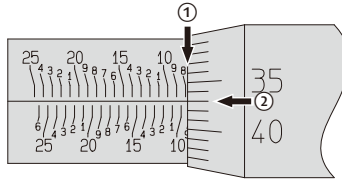
5. How to Read Graduations

■ Outside Measurement

Read the graduations as below for outside measurement.

Read the upper graduations on the sleeve.

① Sleeve reading	7.5 mm
② Thimble reading	0.37 mm
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	7.87 mm



Read the thimble at the location where the sleeve reference line matches the graduation line on the thimble.

Tips

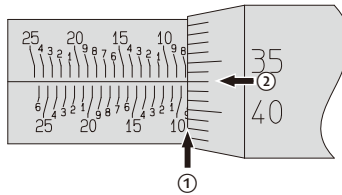
The inside measurement graduation lines (lower graduations) are 0.5 mm lines.

■ Inside Measurement

Read the graduations as below for inside measurement.

Read the lower graduations on the sleeve.

① Sleeve reading	9.0 mm
② Thimble reading	0.37 mm
	<hr/>
	9.37 mm

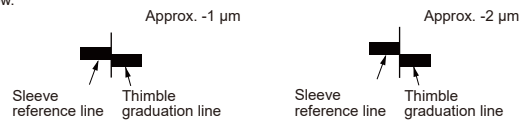


Read the thimble at the location where the sleeve reference line matches the graduation line on the thimble.

Tips

The outside measurement graduation lines (upper graduations) are 0.5 mm lines.

It can normally read up to 0.01 mm as shown above, but it can also read up to 0.001 mm by eye as shown below.



6. Specifications

- Maximum allowable error : $\pm 10 \mu\text{m}$ ($\pm 0.0004 \text{ in}$)
- Parallelism : $10 \mu\text{m}$ (0.0004 in)
- Graduation : 0.01 mm (0.001 in)
- Operating temperature : 5 °C to 40 °C
- Storage temperature : -10 °C to 60 °C
- Standard accessories : Wrench (part No. 301336)

7. Paid Maintenance

We recommend periodic inspections to check and maintain the product's accuracy. Also, if the following defects occur, please contact the agent where you purchased the product or a Mitutoyo sales office.

- Inconsistent measured values
Burr or nicks generated by an impact on the measurement surfaces may affect measurement repeatability.