ASANUMA GIKEN CO., LTD.

Quality Master T

Instruction Manual

We sincerely appreciate your purchase of the Quality Master T.
Please read this manual carefully to ensure that you adequately utilize the Quality Master T to its fullest in a safe manner.

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1. Safety Cautions

Please follow the following points that are important in ensuring safe use of this product.

Cautions in handling 

(1) This product is a gauge for validating 3D coordinate measuring machines.
Please never use the product for any other purpose.

(2) Please clean the grease adhered on the ring gauges thoroughly.
Please do not put fingers, etc. in the ring gauge bores when holding up.

(3) After cleaning, do not touch the ring gauges with a bare hand to prevent rust formation.

(4) Please do not sit or place a heavy item on the product to prevent deformation or damage.
When not using for a long period of time, please apply anti-rust treatment to the ring gauges before storing.

(5) Please do not disassemble, repair or modify the product on your own.

(6) This is a product of precise processing. Please do not dismantle, apply a strong impact, or handle roughly. Please avoid any place with trash, dust, water drops, oily smoke, or vibration.

(7) Please do not handle with hands that have water, oil, etc. on them and handle with hands with clean gloves or the like.

Warnings 

(1) Falling of this product can harm your body.
Please use caution when moving. Please do not place at an unstable place to prevent falling and use caution to prevent falling.

(2) Please use extra caution when placing or removing the product from the measuring instrument to prevent serious injury from dropping it on your feet and pinching your fingers.

(3) Please avoid any humidity, water drops, dust, oil, direct sunlight, strong impact, magnetism, large vibration, and corrosive gas.

Caution when taking Quality Master T outside Japan

Local regulations vary by country. When taking the product outside Japan, please notify us.
If the product is taken out of Japan without giving us a prior notice and an accident occurs, we will not bear any responsibility for any trouble that may arise as a result.

2. Package Contents

○ Quality Master T (Please observe the safety instructions and handle with care.)

○ Dedicated case (This is a product of precise processing. Please ensure not to turn over, drop, or apply strong impact on the dedicated case.)

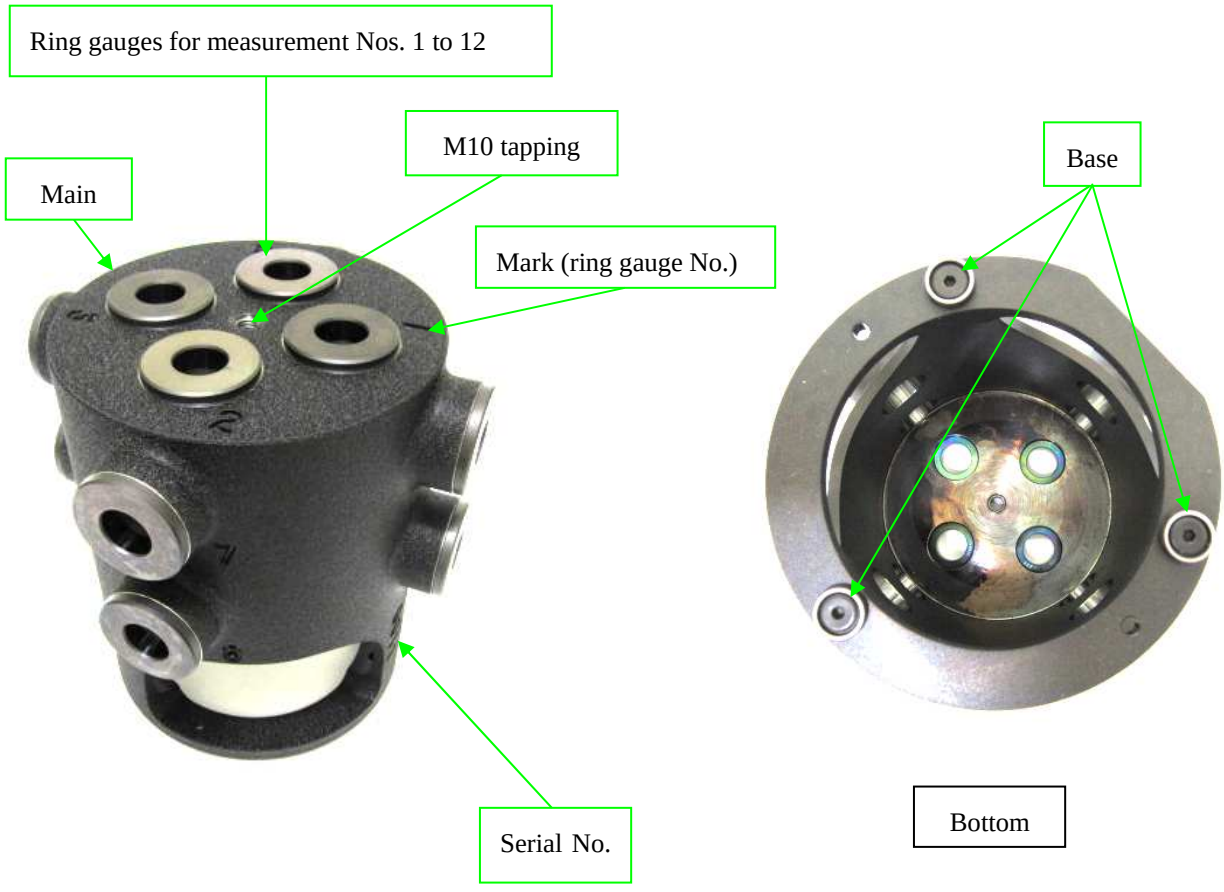
○ Plug (Fitted in the M10 tapping hole at the center of the main body on delivery.)

○ Calibration certificate (Please ensure to check that the serial No. marked on the main body matches the one that is in the calibration certificate and store the certificate with care.)

○ Quality Master T examination result certificate (Please post this where you can refer to any time.)

○ Quality Master T instruction manual (This manual. Please read thoroughly.)

3. Part Names



4. Preparations before Use

4-1 Preparation/Installation (Unpackaging to Installation)

*Caution: This dedicated case has a very simple structure. Please use extra caution when handling.

Latches

(1) Disengage the latches and open the lid.

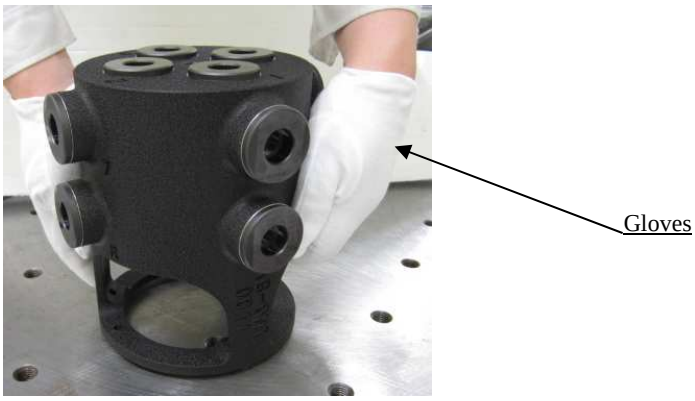
Rust-inhibitor

(2) Remove the rust-inhibitor from the main body and take out the main body from the case.

To store the Quality Master outside the dedicated case to facilitate the daily inspection, place it at a designated location or on a table that is a safe place not obstructing the operations after use and cover it with the rust-inhibitor gently like putting a hat over it.

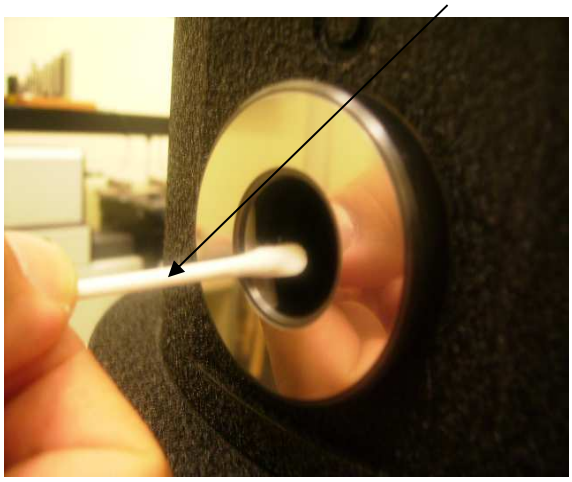
(3) Gently place the main body on the table.

It is recommended that the main body is placed at a point near the place where the daily measurement takes place.



4-2 Preparation/Cleaning and Inspection

Cleaning



Thoroughly remove anti-rust grease/oil or fouling from each of the 12 “superprecision ring gauges”.

Cautions

- Please ensure not to leave the grease at the back of the bores.
- Please use caution to ensure that the measuring faces are wiped thoroughly.

Reference

Dust, etc. can be removed by air blow or cotton swabs. A penlight is handy for

Reference

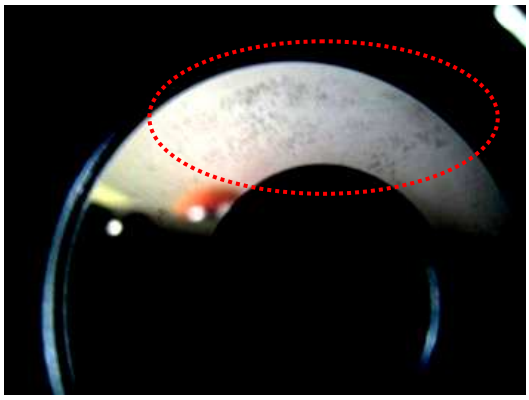
We apply benzene, ethanol, etc. on an industrial wipe and wipe off the oil using a uniform force at Asanuma Giken (because oil affects measurement values in a micron unit). Please note that this is only reference information and we will not bear any responsibility for any problems caused by acting on this reference information.

Inspection

Please ensure that the main body is free from scratches and spot marks.
Calibration is recommended when not confident.

<Example problems>

Photo showing rust



Although the measuring surface of the “superprecision ring gauge” is coated with anti-rust coating, taking weekly anti-rust measures suitable for changes in environmental conditions is recommended.

Reference: Please refer to “6. Storage and Maintenance Methods) of this document.

Coating peeling off of cast iron portion of main body

E.g. Quality Master

When using the optional part “carrier”, please use extra caution because the coating on the edges of the flange of the main body might come off depending on how it is handled.

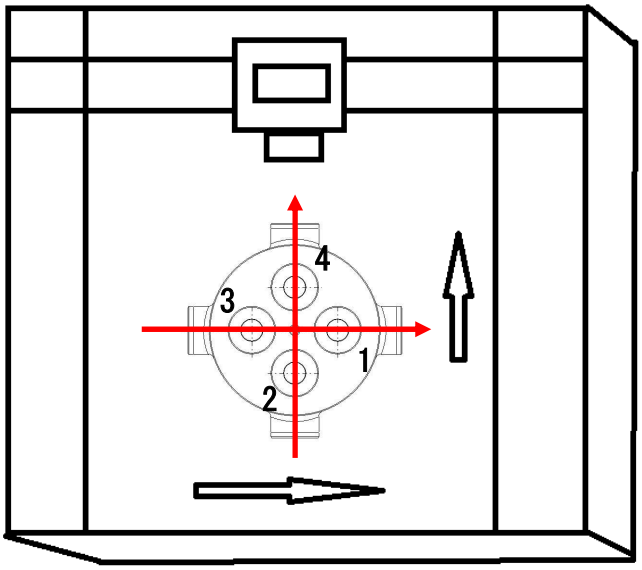
Reference: Instruction Manual for Carrier

5-1 Measurement/Placement and Fixing Methods

Placement method

Please place the Quality Master following (1) to (3) below.

(1) Please place the main body so that the ring gauge No. 1 is at the +X side of the instrument's axis.
(Please note that the instrument's axis direction varies between 3D coordinate measuring machine manufacturers.)
(2) Please place the main body so that the axis passing through the bore center points of ring gauges Nos. (1) and (3) is parallel to instrument's axis.
(3) Please place the main body to ensure measurements in the same direction at the same position.



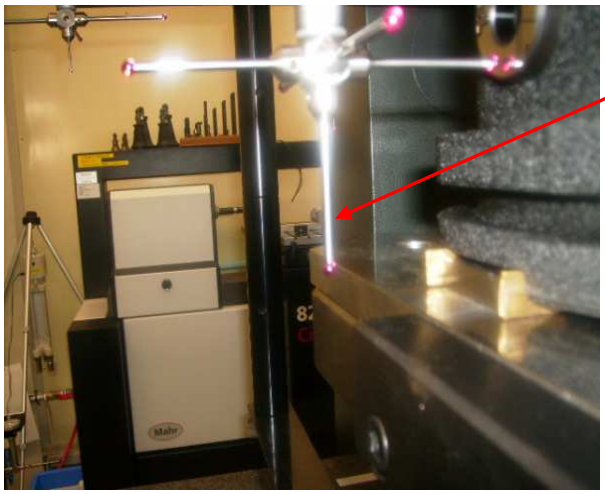
Fixing method

Measurement can be performed without clamping in principle.
However, if the contact pressure, etc. affects the measurement values, fix the main body with a V-block or the like. In such a case, please avoid any use of a clamping means that distorts the main body.

5-2 Measurement/Cautions in Selecting Probes

As shown in the photo on the left, probes for inspection purposes may be used, however, it is recommended that probes that are used for regular precision control, etc. are used.
Probes of a different type may be used to verify the precision.

▲ Probe pins for inspection

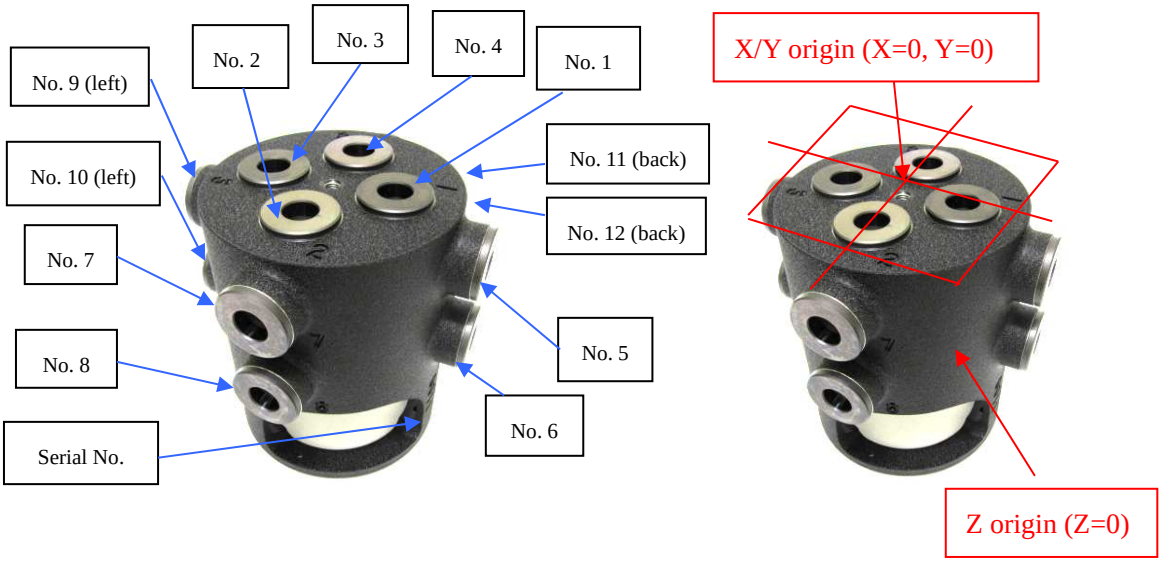


Please adjust the height of the probes to prevent interference to prevent failure or damage to the probes.

<Caution for probe placement>

Please use caution to prevent the probes from contacting the table.

5-3 Measurement/ Result Data Necessary for Measurement



Measurement results for analysis software

When performing an evaluation using the “Quality Master T 3D Coordinate Measuring Machine Precision Evaluation Program”, the measurement items below are necessary.

No.		Item	Design value	No.		Item	Design value
1	**X**	Ring gauge X position	40.0000	7	**X**	Ring gauge X position	0.0000
	Y	Ring gauge Y position	0.0000		**Y**	Ring gauge Y position	-100.0000
	Z	Ring gauge Z position	0.0000		**Z**	Ring gauge Z position	-35.0000
	D	Ring gauge bore	20.0000		**D**	Ring gauge bore	20.0000
2	**X**	Ring gauge X position	0.0000	8	**X**	Ring gauge X position	0.0000
	Y	Ring gauge Y position	-40.0000		**Y**	Ring gauge Y position	-100.0000
	Z	Ring gauge Z position	0.0000		**Z**	Ring gauge Z position	-95.0000
	D	Ring gauge bore	20.0000		**D**	Ring gauge bore	20.0000
3	**X**	Ring gauge X position	-40.0000	9	**X**	Ring gauge X position	-100.0000
	Y	Ring gauge Y position	0.0000		**Y**	Ring gauge Y position	0.0000
	Z	Ring gauge Z position	0.0000		**Z**	Ring gauge Z position	-35.0000
	D	Ring gauge bore	20.0000		**D**	Ring gauge bore	20.0000

4	**X**	Ring gauge X position	0.0000	10	**X**	Ring gauge X position	-100.0000
	Y	Ring gauge Y position	40.0000		**Y**	Ring gauge Y position	0.0000
	Z	Ring gauge Z position	0.0000		**Z**	Ring gauge Z position	-95.0000
	D	Ring gauge bore	20.0000		**D**	Ring gauge bore	20.0000
5	**X**	Ring gauge X position	100.0000	11	**X**	Ring gauge X position	0.0000
	Y	Ring gauge Y position	0.0000		**Y**	Ring gauge Y position	100.0000
	Z	Ring gauge Z position	-35.0000		**Z**	Ring gauge Z position	-35.0000
	D	Ring gauge bore	20.0000		**D**	Ring gauge bore	20.0000
6	**X**	Ring gauge X position	100.0000	12	**X**	Ring gauge X position	0.0000
	Y	Ring gauge Y position	0.0000		**Y**	Ring gauge Y position	100.0000
	Z	Ring gauge Z position	-95.0000		**Z**	Ring gauge Z position	-95.0000
	D	Ring gauge bore	20.0000		**D**	Ring gauge bore	20.0000

5-4 Measurement/Procedures

(1) Temporary reference setting → (2) Reference setting → (3) Measurement

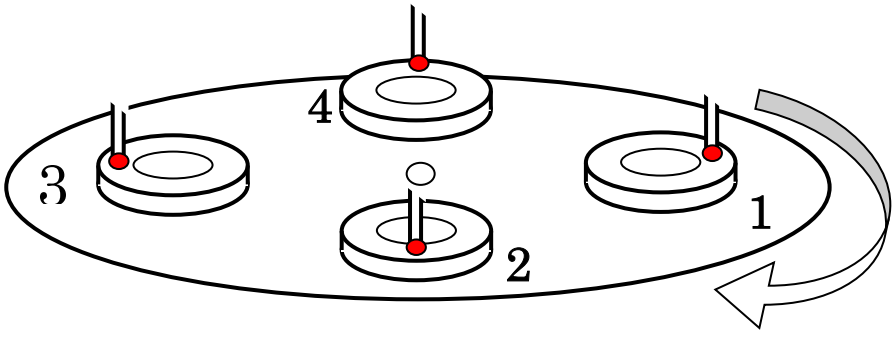
(1) Temporary reference setting

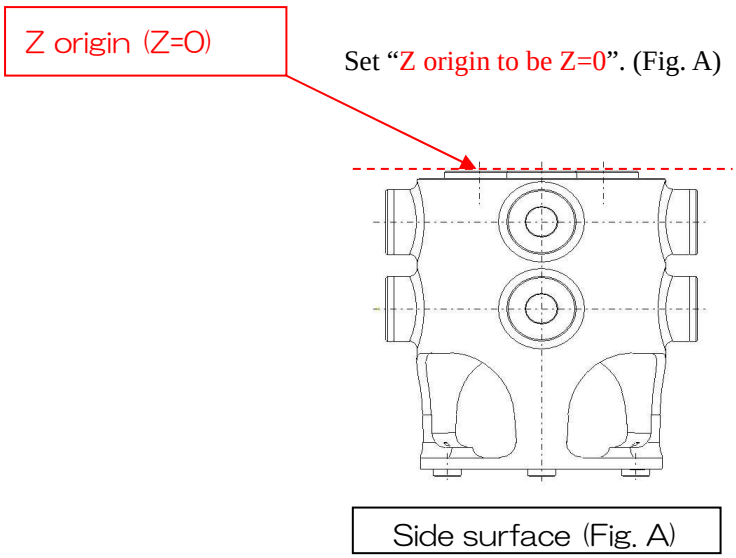
Temporary reference surface setting (Z＝0)

The purpose of this step is “to teach the instrument at which point of it the QM is placed”.

“Procedure”

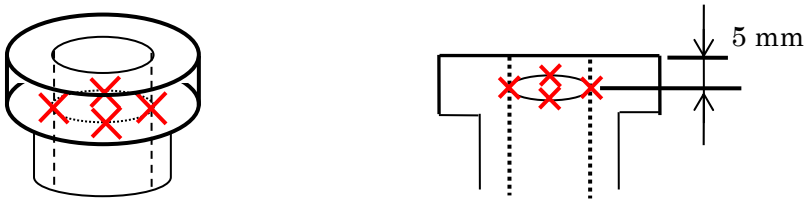
Perform probing on 4 points (one point on the top face per ring gauge for ring gauges (1) to (4)) using a controller, etc. (by manual operation) and take the plane passing through these points as the Z reference plane.





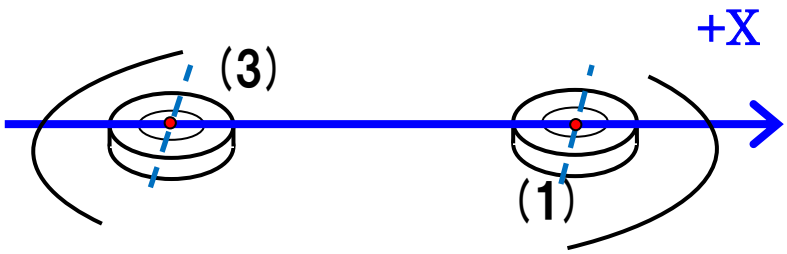
Temporary reference bore measurement

Measure the inner diameter of the bores of ring gauges Nos. 1 to 4 and obtain the center point of each bore. Measure the bore at points approx. 5 mm deep from the end face. Although the number of measurements per bore is set to be 4 in principle, an arbitrary number may be selected if using a uniform number.



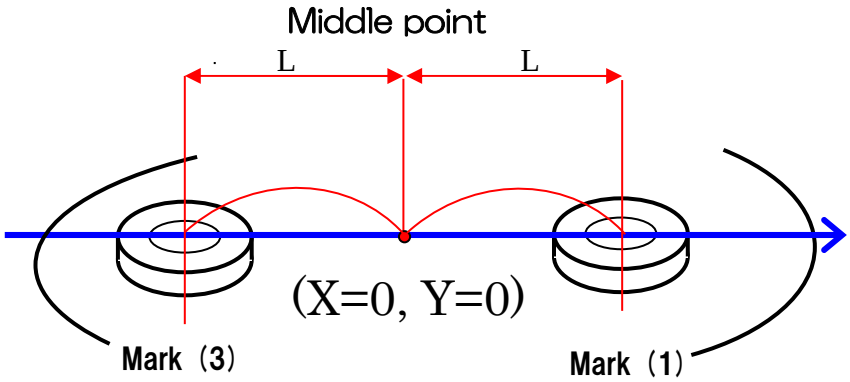
Reference axis setting

Set the axis passing through the bore center points of ring gauges (3) and (1) of the temporary reference bores to be the reference axis. Take this axis as the +X-axis.



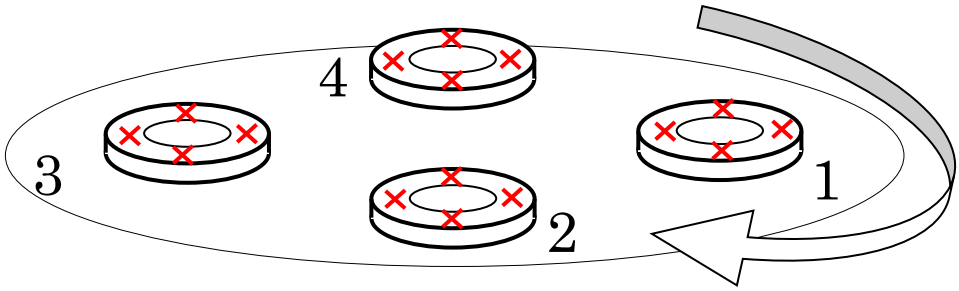
Temporary origin setting (X＝0, Y＝0)

Set the middle point between the obtained bore center points of ring gauges (1) and (3) to be the temporary origin (X=0, Y=0).

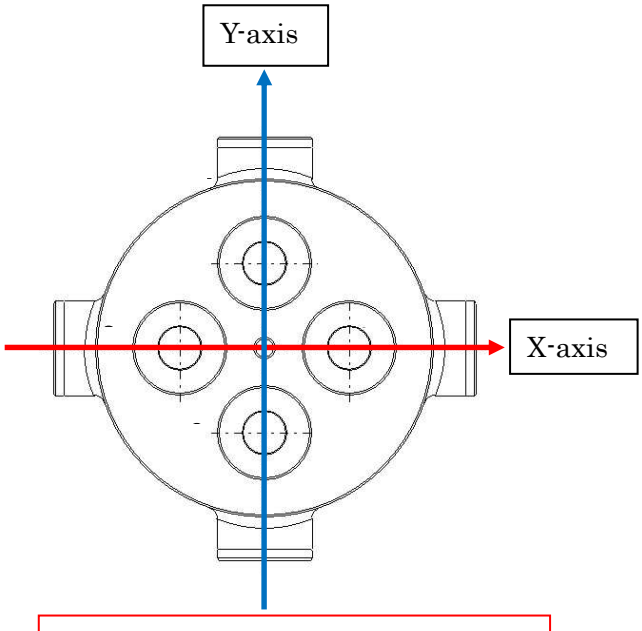


(2) Reference setting

(1) Reference plane setting (X＝0, Y＝0)

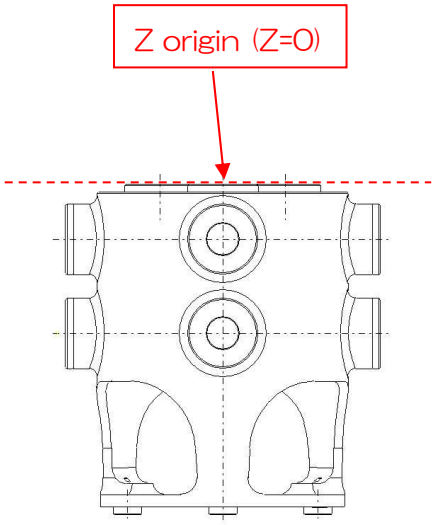


Perform probing on 16 points (4 points on the top face of each of ring gauges (1) to (4)), evaluate the Z plane, and take the plane passing through these points as the Z reference plane.
Take this plane to be Z=0.



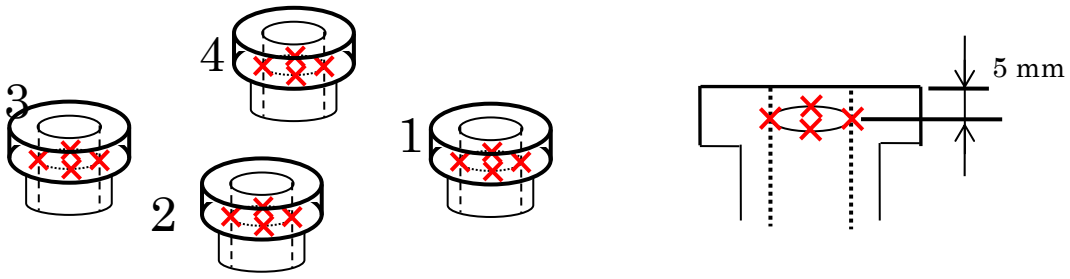
X/Y coordinate origin (X=0, Y=0)

Top face (Fig. B)



Side surface (Fig. A)

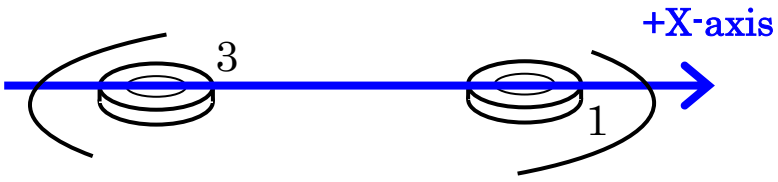
Reference bore setting



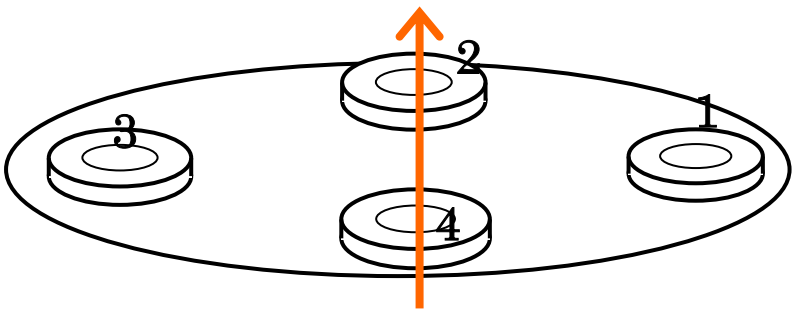
Measure the inner diameter of the bores of ring gauges Nos. (1) to (4) and obtain the center point of each bore. Measure the bore at points approx. 5 mm deep from the end face. Although the number of measurements per bore is set to be 4 in principle, an arbitrary number may be selected if using a uniform number.

Reference axis measurement

(2) Set the axis passing through the obtained bore center points of ring gauges (3) and (1) to be the reference axis. Take this axis as the +X-axis.

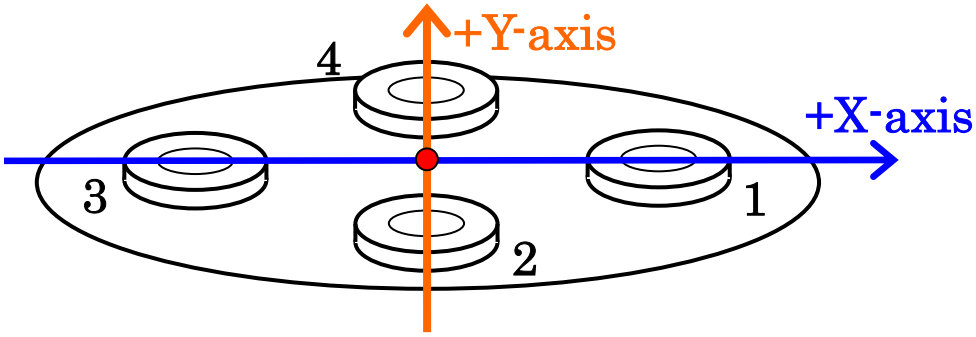


Then create an axis that passes through the center points of marks (2) and (4).



Origin setting

Intersecting point between reference axis X (3-1) and Y-axis



(3) Measurement

X, Y, Z, and inner diameter (D) data will be measured.

Once-through data will be necessary for daily inspection.

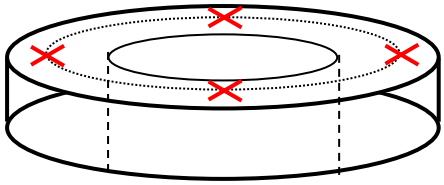
[Measurement sequence]

(1) Face measurement

(2) Cylinder measurement

(3) Data calculation intersecting point between face and cylinder

(1) **Face measurement** → Perform probing at 4 points on end face of ring gauge (1).



(2) **Cylinder measurement** → Perform probing at 8 points of inner diameter of ring gauge (1)
Measure the inner diameter of the bore at 2 cross-sections and take this as the cylinder measurement.

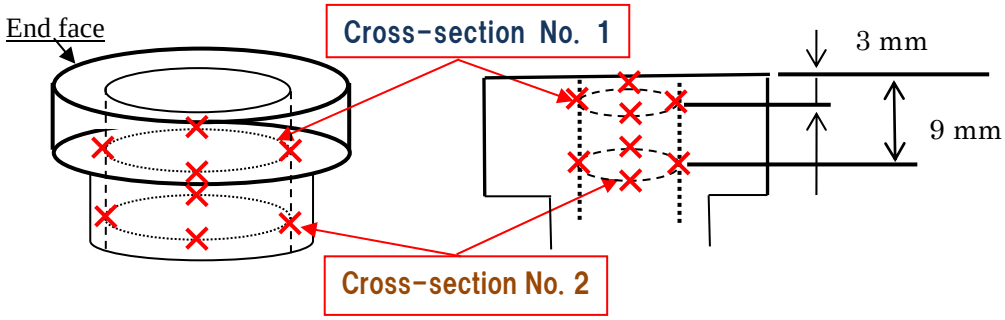
⇒ Measure at least 4 points per cross-section.

[Measurement positions]

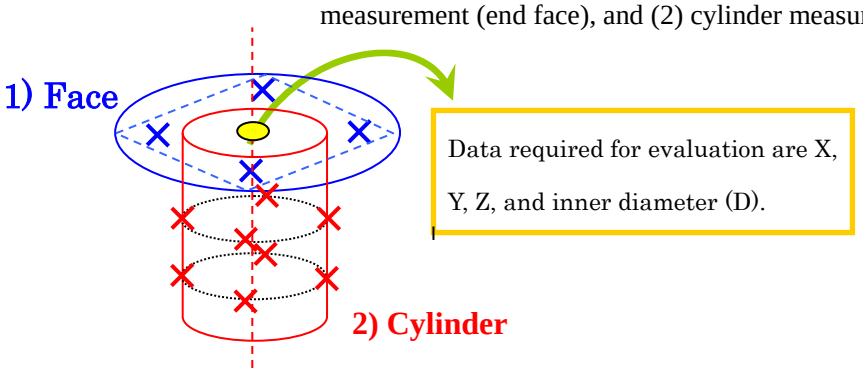
Cross-section No. 1: Measure the bore at points approx. 3 mm deep from the end face.

Cross-section No. 2: Measure the bore at points approx. 9 mm deep from the end face.

*Although the number of measurements per bore is arbitrary, use a uniform number for all gauges.



(3) **Data calculation** → Obtain an intersecting point using the center axis obtained from (1) face measurement (end face), and (2) cylinder measurement (bore).



(4) Perform the face measurement, cylinder measurement, and data calculation in the procedures explained above also for ring gauges (2) through (12).

6. Storage and Maintenance Methods

6-1 Daily Maintenance

Storage on the table of the 3D coordinate measuring machine is recommended. However, if it interferes with other measurements, please store the product in the same room where the 3D coordinate measuring machine is installed. Storage in a clean place with less oil, humidity, trash, dust, etc. is recommended. Please keep the measuring faces clean and use extra caution to prevent rust formation, scratches, and the like.

◆ Reference

At Asanuma Giken, we typically use water displacement oil spray as anti-rust treatment of the main body including the cylinder portions. (Up to 10 mm from the end face.)

*Application also on the bases on the bottom face is recommended.

6-2 Long-Term Storage Method

When not using for a long period of time (a month or more), please apply anti-rust treatment to the end faces and the bores of the ring gauges and use caution to prevent rust formation and the like.

7. Warranty Period and After-Purchase Service

Warranty period: One year from purchase

A repair fee will be charged although within warranty period if any of the following conditions applies.

- Failure or damage due to incorrect usage, modification, or unreasonable repair
- Failure or damage due to transfer, transport, dropping, or the like after purchase
- Failure or damage due to inadequate maintenance, management, or storage
- Failure or damage due to running out of consumable items
- Failure or damage due to fire, earthquake, flood, lightning strike, any other natural disaster, pollution, air pollution, or gas (sulfurizing gas)
- Failure or damage due to any reasons we are not liable for

After-purchase service: Should any problems arise with the Quality Master T within the warranty period, repair service or a new product will be provided without a fee judging the circumstances.

When any problems arise after or within the warranty period due to inadequate handling (damage due to falling or impact, rust, etc.), repair service or a new product will be provided for a fee.

Re-measurement of the main body of the Quality Master T will be provided for a fee at any time upon request. The inspection result certificate will be sent along with the main body.

8. Request

Please never repair or modify the product on your own.

That can void your warranty on the product.

This is a precision measuring instrument. Please handle with special care.

For any inquiry regarding the product, please contact us at below.

Manufacturer: Operating Division, Asanuma Giken Co., Ltd.
4079-1 Koto-cho, Nishi-ku, Hamamatsu-shi, Shizuoka-ken 431-1103, Japan
Phone: 053-486-1240
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