

Digimatic Micrometer Head MHD-MB



Safety Precautions

To ensure operator safety, use this product in conformance with the directions, functions and specifications given in this User's Manual. Use under other conditions may compromise safety.

WARNING Shows risks that could result in death or serious injury.

- Always keep batteries out of reach of children, and if swallowed, consult a physician immediately.
- Batteries should never be short-circuited, disassembled, deformed or come in contact with extreme heat or flames.
- If battery alkaline liquid comes in contact with the eyes, flush eyes immediately with clean water and consult a physician. If battery alkaline liquid comes in contact with the skin, flush the exposed area thoroughly with clean water.

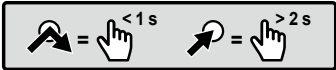
CAUTION Shows risks that could result in minor or moderate injury.

- Never attempt to charge the primary battery or reverse the positive-negative terminals when mounting. Improper battery handling or mounting may cause the battery to explode, cause battery leakage and/or serious bodily injury or malfunctioning.
- Always handle the sharp measuring faces of this product with care to avoid injury.

NOTICE Shows risks that could result in property damage.

- Do not disassemble or modify.
- 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 or oil.
- Do not apply excessive force or subject to sudden impacts such as dropping.
- Remove dust, cutting chips, etc. before and after use.
- When cleaning, wipe this product with a soft cloth moistened with diluted neutral detergent. Do not use an organic solvent such as thinner, which may cause the product to deform or malfunction.
- The spindle structure prevents pulling out, so do not try to forcibly retract in excess of the measurement range.
- Dirt on the spindle may lead to malfunction. If the spindle becomes dirty, wipe it clean with a cloth containing a small amount of alcohol and apply a small amount of micrometer oil (Part No. 207000).
- If Micrometer Oil is not available and you must use a commercially available product, we recommend using an anti-rust agent with low viscosity almost equivalent to ISO VG10.
- Do not write numbers, etc. with an electric pen.
- If the product is to be out of use for three months or more, remove the battery before storage. Liquid leakage from the battery may damage the product.

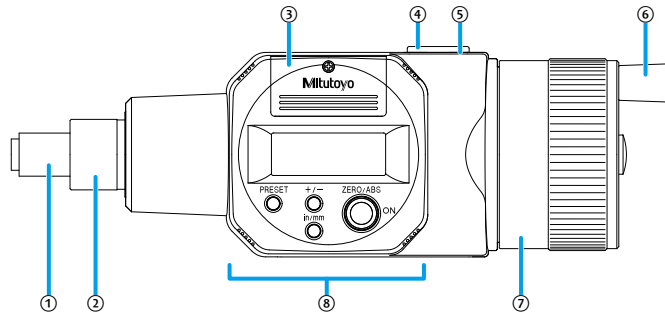
Key operation icon



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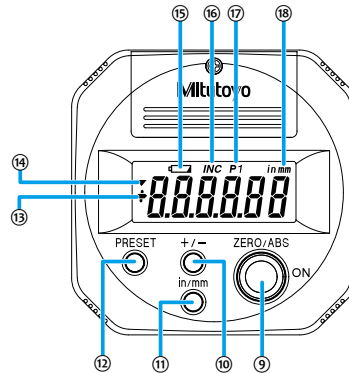
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1. Names of Components



- | | |
|-----------------------------|-------------------------|
| ① Spindle | ⑤ Data output connector |
| ② Stem | ⑥ Speeder |
| ③ Battery compartment cover | ⑦ Thimble |
| ④ Connector cap | ⑧ Display unit |

■ Display Unit (LCD)



- | | |
|-------------------------------------|-------------------------|
| ⑨ [ZERO/ABS] key, [ON] key | ⑭ Reverse count display |
| ⑩ [+/-] key | ⑮ Low voltage display |
| ⑪ [in/mm] key (in/mm products only) | ⑯ INC display |
| ⑫ [PRESET] key | ⑰ Preset display |
| ⑬ Sign display | ⑱ Unit display |

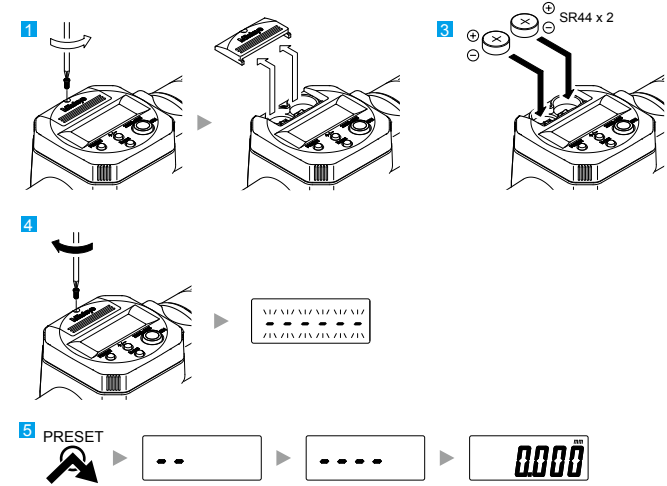
2. Installing the Battery

Tips

- Be sure to use SR44 (silver oxide button battery Part No. 938882) for the battery.
- Do not rotate the thimble until the count is displayed. Initial setting of the electrical components may fail, or the product may not count normally. If you mistakenly move the thimble, reinstall the batteries.
- The batteries supplied are for confirming the functions and performance of the product. Note that these batteries may not fulfill the predetermined life.
- Malfunction or damage due to depleted batteries, etc. is not covered by the warranty.
- Follow local rules and regulations regarding battery disposal.

The batteries are not installed into the product at purchase. Install the batteries as follows.

- 1 Use the supplied Phillips screwdriver (No.05CAA952) to loosen the battery compartment cover fixing screw (No.04GAB130), and then remove the battery compartment cover.
- 2 If replacing existing batteries, remove the old batteries.
- 3 Install the batteries (SR44) with the positive side facing up.
- 4 Place the battery compartment cover over the battery compartment and hold down the edge by hand while making sure there is no gap between the cover and body, and then tighten it using the screws.
 - » The "-----" display blinks.
- 5 Press the [PRESET] key.
 - » Count display appears and counting starts.



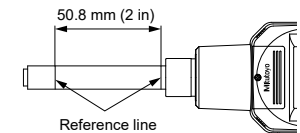
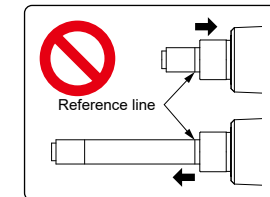
Tips

- Re-installing the batteries will erase the PRESET value (origin) position. Perform origin setting again (refer to "4. Origin Setting").
- If an abnormal display is shown, such as an error display or not counting, etc., try removing the batteries and reinstalling.

3. Precautions for Use

■ Precautions for Measurement

- The reference line on the spindle shows the measurement range. Rotate the thimble slowly and carefully when near the limits of the measurement range, so as not to cross the reference line.



- Use caution when measuring magnetized workpieces. If the product becomes magnetized, measurement results may be affected.

■ Precautions after Use

- After use, clean the entire product and check that none of the parts are damaged.
- If the product will not be used for three months or longer, apply micrometer oil (Part No. 207000) to the spindle to prevent rust, and store it with its batteries removed.
- If Micrometer Oil is not available and you must use a commercially available product, we recommend using an anti-rust agent with low viscosity almost equivalent to ISO VG10.

4. Origin Setting

Set an arbitrary preset value (origin registration) prior to setting the origin.



Origin setting should be made in the same orientation and conditions as measurement with the procedure as below.

1) Origin registration

Register (preset) the origin to the product.

<Example> Registering 50.000 mm to P1

- 1 Briefly press the [PRESET] key.
 - » The previously registered number is displayed and [P1] blinks.

Tips

Zero will be displayed immediately after replacing the batteries.

- 2 Press and hold the [PRESET] key.
 - » The sign blinks.

Tips

Briefly press the [PRESET] key to switch between [+] and [-].

- 3 Press and hold the [PRESET] key.
 - » The number on the left blinks.

Tips

The numbers will switch in order from [0] to [1] to [2] up to [9] and then [0] each time the [PRESET] key is briefly pressed.

- 4 Briefly press the [PRESET] key until [0] is displayed.

- 5 Press and hold the [PRESET] key.
 - » The number in the next digit blinks.

- 6 Briefly press the [PRESET] key until [5] is displayed.

- 7 Press and hold the [PRESET] key.
 - » The number in the next digit blinks.
 - Repeat steps 6 and 7, so that [0] is displayed for each digit.

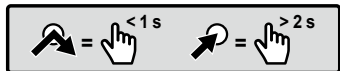
- 8 Press and hold the [PRESET] key until [P1] blinks.

- 9 Briefly press the [PRESET] key.
 - » [P1] goes out and registration is complete.

Tips

- To stop origin registration, press the [ZERO/ABS (ON)] key to return to the original display value.
- The display will not change during registration, even if the thimble is rotated.

Key operation icon



2) Origin setting

- 1 Remove any debris or dust from the spindle measuring surface.
- 2 Rotate the thimble to move the spindle to the position to be set as the origin (refer to "■ Precautions for Measurement" in "3. Precautions for Use").
- 3 Briefly press the [PRESET] key.
 - » [P1] blinks, and the registered preset value (zero if not registered) is displayed.

Tips

To change the preset value, refer to steps 2 through 9 in "1) Origin registration".

- 4 Briefly press the [PRESET] key.
 - » [P1] goes out, and origin setting is complete.

Tips

- The display of this product automatically turns off if not used for 20 minutes or more. To display again, either rotate the thimble or press the [ZERO/ABS (ON)] key.
- If the [PRESET] key is accidentally pressed during measurement, press the [ZERO/ABS (ON)] key to return to the former state. If this does not enable the product to recover, perform "4. Origin Setting" once more.

5. Measurement Method



- Be sure to confirm and set the origin prior to measuring.
- Bring the measuring surface of the spindle slowly into contact with the workpiece. Moving too quickly could deform the workpiece and affect measurement results.

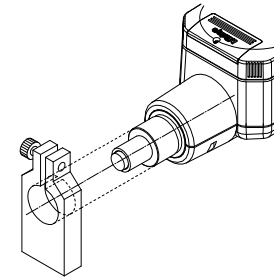
Using the same orientation and conditions as for origin setting, bring the workpiece gently into contact with the measuring surface, and then read the display value (refer to "■ Precautions for Measurement" in "3. Precautions for Use").

6. Mounting

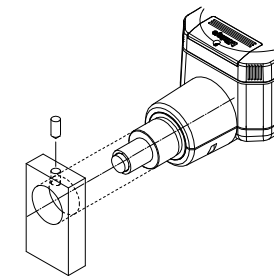
Mounting to a measuring instrument or precision machine is possible for use in measuring, feeding, positioning, and other operations.



- If using the product on a mounting bracket, ensure that the mounting bracket applies uniform force along the circumference of the stem.



- Avoid applying partial pressure, such as securing the product using a setting screw. Otherwise, the spindle operation may deteriorate.

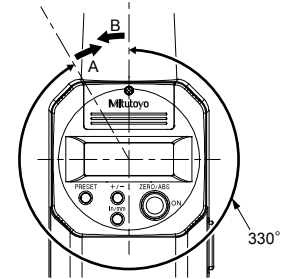


7. Display Unit Angle Adjustment

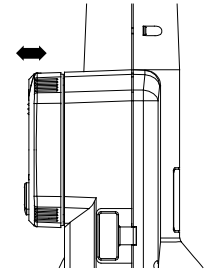
Turn the bezel to rotate the display unit. After mounting the product, adjust it to an angle which makes reading easy. Rotate the display unit to the right (clockwise) to 330°.



When rotating the display unit to the right (clockwise) from the normal position to where it contacts the stopper, do not exceed 330° (the position indicated with arrow A). Do not turn it to the left (counterclockwise) past the standard position (the position indicated with arrow B). This may cause damage.



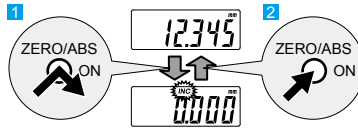
Do not pull the display unit out or press it in forcefully. This may cause damage.



8. Key Functions

■ [ZERO/ABS (ON)] Key

- Briefly press the [ZERO/ABS (ON)] key.
 - [INC] is displayed, and the display is set to zero.
- Press and hold the [ZERO/ABS (ON)] key (for at least 2 seconds).
 - [INC] goes out, and the length from the origin (measuring surface) is displayed.



Tips

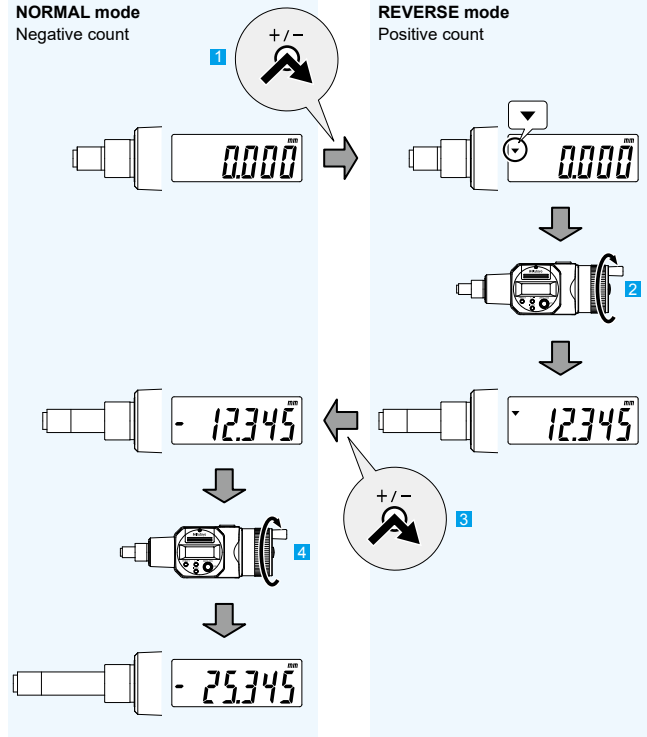
The display of this product automatically turns off if not used for 20 minutes or more. Press the [ZERO/ABS (ON)] key to turn the display back on.

■ [+/-] Key

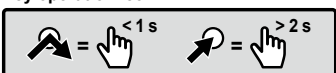
- Press the [+/-] key in NORMAL mode.
 - [▼] is displayed (set to REVERSE mode).
 - Turn the thimble in the direction of spindle forward motion.
 - The display value counts up.
 - Press the [+/-] key in REVERSE mode.
 - [▼] goes out (set to NORMAL mode).
 - Turn the thimble in the direction of spindle forward motion.
 - The display value counts down.
- The counting direction of the display value switches each time the [+/-] key is pressed.

NORMAL mode Negative count

REVERSE mode Positive count

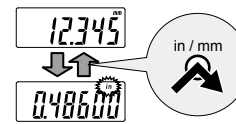


Key operation icon



■ [in/mm] Key (in/mm Products Only)

- Press the [in/mm] key.
 - [in] and [mm] switch back and forth each time the key is pressed.



9. Errors and Troubleshooting

Error Display	Causes and Countermeasures
Power Voltage Drop 	The battery voltage is low. Replace the battery promptly.
Counting Error 	A counting error has occurred due to excessive speed or noise. Try removing the batteries and reinstalling.
Counting Error 	Initial setting of the electrical components failed, or a counting error has occurred due to a sensor signal error. Try removing the batteries and reinstalling.
Display Overflow 	The display value exceeds ± 999.999 . Rotate the thimble in the opposite direction so that it starts counting again correctly.

10. Specifications

Maximum permissible error

$J_{MPE} *1$: $\pm 3 \mu m$
 ± 0.00015 in (in/mm products only)

Stem diameter : $\phi 18^{+0.02}$
 Stem shape : Straight
 Resolution : 0.001 mm

Display unit : LCD (6-digit and minus sign)
 Power supply : Button type silver-oxide battery (SR44 No.938882), x2
 Battery life : Approximately 1.8 years
 Temperature range : 5 °C to 40 °C (operating temperature),
 -10 °C to 60 °C (storage temperature)

Standard accessories : Phillips screwdriver (No. 05CAA952)
 CE marking/UKCA marking : EMC Directive/Electromagnetic Compatibility Regulations: EN 61326-1
 Immunity test requirement: Clause 6.2 Table 2
 Emission limit: Class B
 RoHS Directive/The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations: EN IEC 63000

*1: Maximum permissible error for indicated value via contact with full measuring face J_{MPE} (20 °C).

11. Output Function

■ Display Value External Output

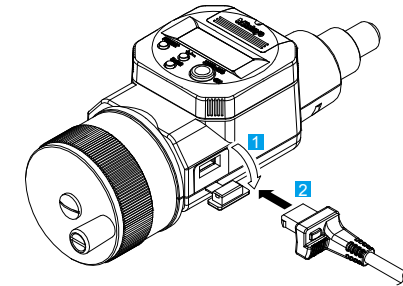
The display value can be output to a device by connecting the product and the external device with a connection cable (option).

■ Connection Cable Installation Method

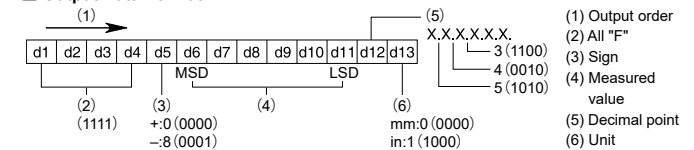
- Remove the connector cap.
- Mount the connection cable plug.

Tips

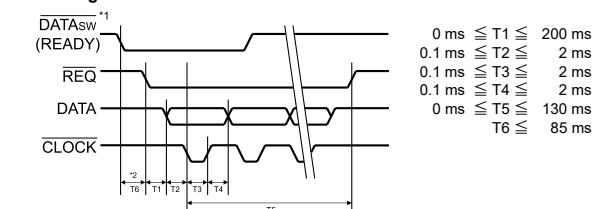
Note that using this product in a location with high noise may cause malfunctions (flickering or errors).



■ Output Data Format



■ Timing Chart



*1: DATASw is LOW while the data output key is being pressed.

*2: The time T6 until DATASw goes to the LOW level and REQ is input is determined by the data processing device performance.

12. Options

- Connection cable: No.959149 (1 m)
- Connection cable: No.959150 (2 m)

For options other than the above, refer to the General Catalog.

13. Off-Site Repairs (Subject to Charge)

Off-site repair (subject to charge) is required in the case of the following malfunctions. Please contact the agent where you purchased the product or a Mitutoyo sales representative.

- Faulty spindle operation
 - If the spindle is scratched, these scratches may interfere while the spindle is retracting, causing faulty operation.
 - Operation may also suffer if the spindle is rusted.
- Inconsistent measured values
 - If there are burrs or nicks generated by an impact on the measuring surfaces, it may affect measurement repeatability.
- Count value error/faulty operation
 - If the thimble of this product is retracted too far, the internal sensor will be damaged. This may cause count errors or faulty operation.