

# QuantuMike MDE-MX/PX



## 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.
- Firmly close the battery compartment cover if the product is used in a place where it is directly exposed to splashes of coolant, etc. For the type with output, when mounting the output cable and cover, firmly tighten the fixing screws so that there is no gap. As well, clean and apply anti-rust treatment after use. Rust may cause malfunction.
- Do not use submerged, as coolant ingress cannot be completely prevented. Complete prevention of coolant ingress, etc., may also not be possible if the product is used in locations exposed to direct jets of liquid.
- 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.
- Rotating the thimble once will move the spindle 2 mm. Because the spindle moves quickly, do not allow it to make violent contact with the measuring surface when measuring or during reference point setting.
- 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.

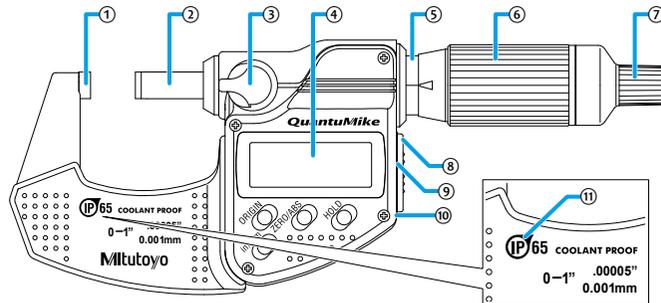
## Key operation icon



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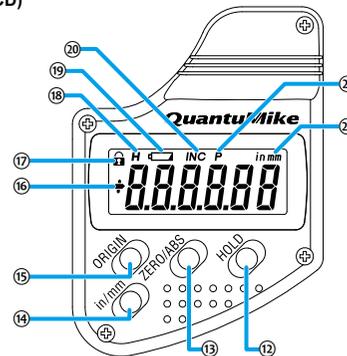
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## 1. Names of Components



- |  |  |
|--|--|
| ① Anvil  | ⑦ Speeder ratchet<br>(constant pressure device built-in) |
| ② Spindle  | ⑧ Cover (type with output only)                          |
| ③ Swivel clamp<br>(locks the spindle to prevent motion)  | ⑨ Data output connector<br>(type with output only)       |
| ④ Display unit (LCD)                                     | ⑩ Battery compartment cover (at rear)                    |
| ⑤ Sleeve   | ⑪ Waterproof mark  |
| ⑥ Thimble ratchet<br>(constant pressure device built-in) |  |

## ■ Display Unit (LCD)



- |                                     |                       |
|-------------------------------------|-----------------------|
| ⑫ [HOLD] key                        | ⑱ Hold display        |
| ⑬ [ZERO/ABS] key                    | ⑲ Low voltage display |
| ⑭ [in/mm] key (in/mm products only) | ⑳ INC display         |
| ⑮ [ORIGIN] key                      | ㉑ Preset display      |
| ⑯ Sign display                      | ㉒ Unit display        |
| ⑰ Function Lock display             |                       |

## 2. Installing the Battery

**NOTICE** Shows risks that could result in property damage.

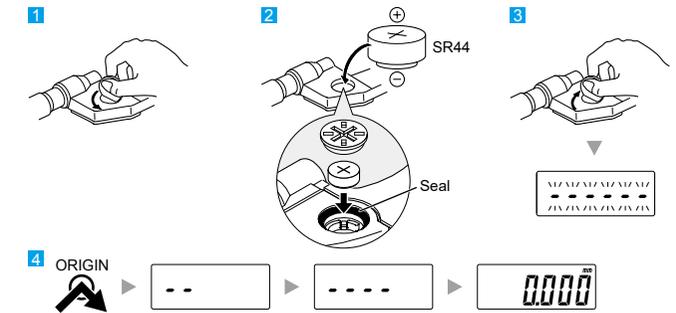
Always align the battery compartment cover with the threads and install so that the seal does not protrude. The product may display an error or malfunction if the battery compartment cover or seal is not mounted correctly.

### Tips

- Be sure to use SR44 (silver oxide button battery Part No. 938882) for the battery.
- Do not rotate the ratchet 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 ratchet, reinstall the battery.
- The battery supplied is for confirming the functions and performance of the product. Note that this battery 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 battery is not installed into the product at purchase. Install the battery as follows.

- 1 Insert a coin or similar object into the groove on the battery compartment cover, and turn it to the left to remove the cover.
  - 2 Install the battery (SR44) with the positive side facing up.
  - 3 Position the battery compartment cover and rotate clockwise to attach.
  - 4 Press the [ORIGIN] key.
    - » Count display appears and counting starts.
- Moving on, set the ORIGIN (reference point) (refer to "4. ORIGIN (Reference Point) Setting").



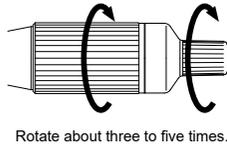
### Tips

- Re-installing the battery will erase the ORIGIN (reference point) position. Perform reference point setting again (refer to "4. ORIGIN (Reference Point) Setting").
- If an abnormal display is shown, such as an error display or not counting, etc., try removing the battery and reinstalling.

### 3. Precautions for Use

#### Measuring Force

- Make sure to use the thimble ratchet or speeder ratchet to ensure consistent measuring force.
- The appropriate measuring force is achieved with the following procedure: make light contact between the measurement surfaces and the workpiece, stop momentarily, and then manually turn the thimble ratchet or speeder ratchet about three to five times.
- Rotating the thimble once will move the spindle 2 mm. Because the spindle moves quickly, be sure to make contact slowly and gently with the measuring surface when measuring or during reference point setting.

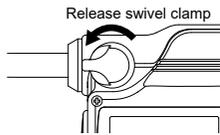


#### Precautions for Measurement

- 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 using in places exposed to water-based cutting fluid, always apply anti-rust treatment after cleaning.
- For storage, leave a gap of 0.2 to 2 mm open for the measurement surfaces, and release the swivel clamp.
- 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 battery 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 (Reference Point) Setting

- ! Reference point setting and measurement should be made in the same orientation and conditions with the procedure as below.

#### ORIGIN (Reference Point) Setting

- 1 Clean both anvil and spindle measurement surfaces, together with the gage if it is used, to remove all debris or dust.
- 2 For 0 to 25 mm measurement range:
  - After making light contact with both measurement surfaces, stop momentarily, and then apply the appropriate measuring force (refer to "Measuring Force" in "3.Precautions for Use").
- For above the 0 to 25 mm measurement range:
  - After clamping the gage between the measuring surfaces, bring the spindle into light contact with the gage, stop momentarily, and then apply the appropriate measuring force (refer to "Measuring Force" in "3. Precautions for Use").

- ! Use a periodically inspected (calibrated) gage (gauge block, setting standard for outside micrometer, etc.).

- 3 Press the [ORIGIN] key.
  - › Check that [P] is blinking and the ORIGIN (reference point) value\* is displayed (\*refer to "Tips" below).
- 4 Press the [ORIGIN] key again.
  - › [P] goes out and the ORIGIN (reference point) value is set.

- For 0 to 25 mm measurement range:



- For above the 0 to 25 mm measurement range (e.g., 25 to 50 mm):



#### Tips

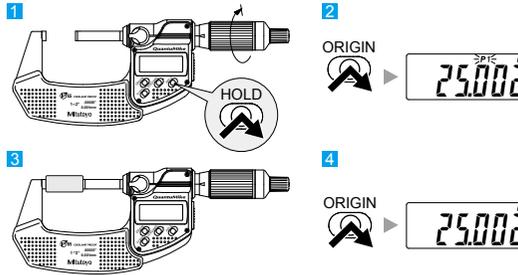
- The display of this product automatically turns off if not used for 20 minutes or more. To display again, either rotate the ratchet or press the [ZERO/ABS] key.
- If the [ORIGIN] key is accidentally pressed while making a measurement, press the [ZERO/ABS] key to return to the former state. If this does not enable the product to recover, perform "4. ORIGIN (Reference Point) Setting" once more.
- The following table shows the relationship between measurement range and ORIGIN (reference point) value.

Measuring range	ORIGIN (reference point) value	Measuring range	ORIGIN (reference point) value
0 - 25 mm	0.000 mm	0 - 1 in	0.00000 in
25 - 50 mm	25.000 mm	1 - 2 in	1.00000 in
50 - 75 mm	50.000 mm	2 - 3 in	2.00000 in
75 - 100 mm	75.000 mm	3 - 4 in	3.00000 in

#### Using a Reference Gage other than the Setting Standard for Outside Micrometer (Standard Accessory)

First set the ORIGIN (reference point) using the standardly equipped setting standard for outside micrometer.

- 1 Turn the ratchet until the target value is displayed, and then press the [HOLD] key to hold the value.
- 2 Press the [ORIGIN] key.
  - › [P] blinks.
- 3 Clamp the reference object and apply the appropriate measuring force with the constant pressure device (refer to "Measuring Force" in "3. Precautions for Use").
- 4 Press the [ORIGIN] key again.
  - › [P] goes out and setting is complete.



#### Tips

To return to the default ORIGIN (reference point) value, reinstall the battery.

#### Key operation icon



### 5. Measurement Method

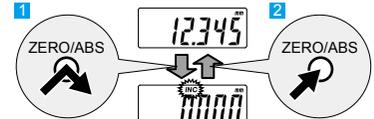
- ! Be sure to perform reference point setting before measurement.
- Bring the measuring surface of the spindle slowly into contact with the workpiece. Moving too quickly could deform the workpiece and affect measurement results.

Gradually and lightly bring the measurement surfaces into contact with the workpiece in the same orientation and conditions as for reference point setting, apply the appropriate measuring force, and then read the display value (refer to "Measuring Force" in "3. Precautions for Use").

### 6. Key Functions

#### [ZERO/ABS] Key

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



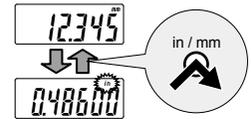
#### [HOLD] Key

- 1 Press the [HOLD] key.
  - › [H] is displayed, and the display value is held.
- 2 Press the key again to release the value.



#### [in/mm] Key (in/mm Products Only)

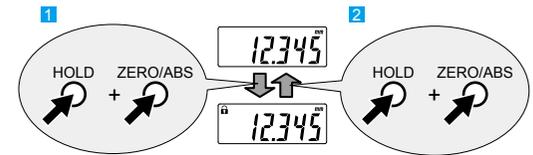
- Press the [in/mm] key.
  - › [in] and [mm] switch back and forth each time the key is pressed.



### 7. Function Lock Function (Preventing Accidental Operation)

This product has the Function Lock function, which disables the ORIGIN (reference point) function and ZERO/ABS function in order to avoid accidental changes to the reference point position. Setting the Function Lock causes [L] on the LCD to light up and disables the [ORIGIN] key, [ZERO/ABS] key, and [in/mm] key (in/mm products only), with only the hold operation function enabled.

- 1 First press and hold the [HOLD] key, and then additionally press and hold the [ZERO/ABS] key (for at least 2 seconds).
  - › [H] display and [L] display light up in sequence ([H] turns off first).
- 2 Perform the same operation to release the Function Lock.



### 8. 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 battery 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 battery and reinstalling.

## 9. Specifications

Maximum measuring length	Maximum permissible error $J_{MPE}^{*1}$
25, 50 mm	$\pm 1 \mu\text{m}$
75, 100 mm	$\pm 2 \mu\text{m}$
1, 2 in	$\pm 0.00005 \text{ in}$
3, 4 in	$\pm 0.00010 \text{ in}$

Measuring force\*2 : 7 N to 12 N

Resolution : 0.001 mm  
0.00005 in (in/mm products only)

Display unit : LCD (6-digit and minus sign)

Power supply : Button type silver-oxide battery (SR44 No.938882), x1

Battery life : Approximately 2.4 years

Temperature range : 5 °C to 40 °C (operating temperature),  
-10 °C to 60 °C (storage temperature)

Standard accessories : Wrench (No. 301336), standard bar (equipped as standard with products with measurement range exceeding 25 mm/1 in)

IP protection level : IP65 (refer to IEC60529 for details).

Dust resistance (level 6) : No ingress of dust allowed.

Protection against water jets (level 5) : Water projected by a nozzle from any direction shall have no harmful effects.

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).

\*2: Measuring force when using the speeder ratchet.

## 10. Output Function (Function for Type with Output Only)

### Display Value External Output

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

### Connection Cable Installation Method

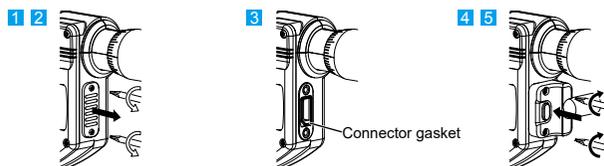
**NOTICE** Shows risks that could result in property damage.

- Always use the 0-size Phillips screwdriver (No.05CZA619) supplied with the connection cable (option) when installing/removing screws, and tighten with a torque of 5 to 8 cN·m or so. Tightening with a high torque could cause damage.
- When connecting the connection cable, ensure that the connector gasket does not protrude. If the connector gasket is not installed properly, waterproof functionality may decrease and lead to malfunctions.

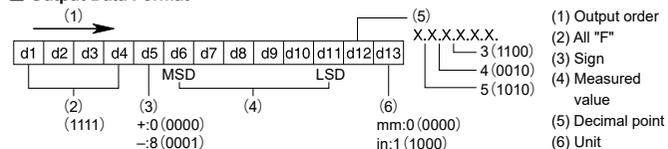
### Tips

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

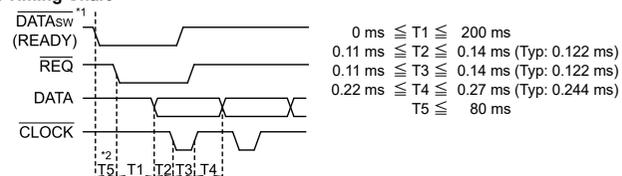
- Use the Phillips screwdriver supplied with the connection cable to remove the cover fixing screws (M1.7 x 0.35 x 2.5, No.09GAA376).
- Remove the cover.
- Check that the connector gasket (No.04AAC126) is correctly installed at the proper position (do not remove the connector gasket).
- Mount the connection cable plug.
- Hold the plug manually so that there is no gap between the plug and the connector on the micrometer body, and fasten using the fixing screws on the connection cable.



## Output Data Format



## Timing Chart



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

\*2: The time T5 until DATASw goes to the LOW level and REQ is input is determined by the data processing device performance.

## 11. Options

- Connection cable: No.05CZA662 (1 m)
- Connection cable: No.05CZA663 (2 m)

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

## 12. 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.