

Absolute Digimatic Micrometer with Adjustable Measuring Force

CLM-QMX, CLM-DKX



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

- Always keep batteries out of reach of children. 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

- Never attempt to charge the primary battery. Never 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.
- The measuring faces of this product are sharp. Always handle with care to avoid injury.

NOTICE

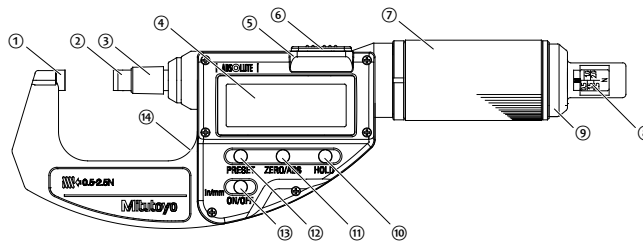
- Do not disassemble or modify. This may cause damage.
- Do not use or store the product in a place with sudden temperature changes. Adapt the product to ambient temperature before use.
- Do not store the product in a place with high humidity or a lot of dust.
- Do not apply excessive force or subject to sudden impacts such as dropping.
- Be sure to perform reference point setting before measurement.
- 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. This may cause damage.
- 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).
- Do not write numbers, etc. with an electric pen. This may cause damage.
- The battery supplied is for confirming the functions and performance of the product. Note that this battery may not fulfill the expected life.
- The display of this product automatically turns off if not used for 20 minutes or more. Press the [ON/OFF] button to turn the display on again.
- If the product is to be out of use for 3 months or more, remove the battery before storage. Liquid leakage from the battery may damage the product.
- Malfunction or damage due to depleted batteries, etc. is not covered by the warranty.

Button icon operation

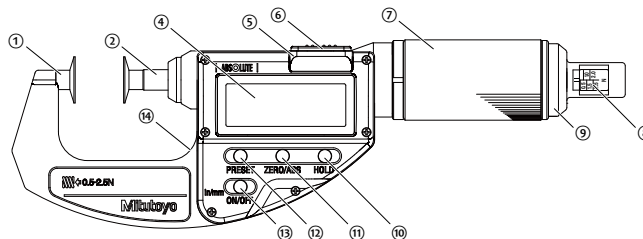


1. Names of Components

• CLM-QMX



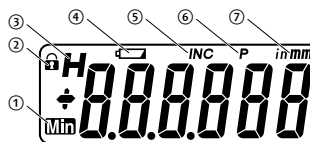
• CLM-DKX



- | | | |
|----------------------------------|--------------------------------------|--|
| ① Anvil | ⑦ Thimble* | ⑬ [ON/OFF in/mm**] button (**only for in/mm model) |
| ② Spindle | ⑧ Measuring force selector | ⑭ Battery compartment cover (at rear) |
| ③ Stroke end bush (CLM-QMX only) | ⑨ Cover for measuring force selector | *Thimble (with constant pressure device): 0.5 N to 2.5 N type only |
| ④ LCD | ⑩ [HOLD] button | |
| ⑤ Data output connector | ⑪ [ZERO/ABS] button | |
| ⑥ Cover | ⑫ [PRESET] button | |

■ Display

- ① Minimum value hold display
- ② Function lock display
- ③ Displayed value hold display
- ④ Battery voltage low display (error display)
- ⑤ Incremental measurement (INC) display
- ⑥ Preset display
- ⑦ Unit display



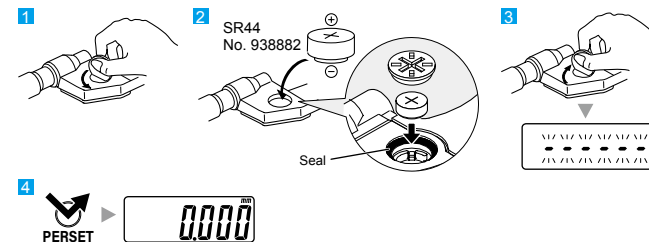
2. Installing the Battery

NOTICE

- Be sure to use SR44 (silver oxide button battery No. 938882) for the battery.
- 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.
- Re-installing the batteries will erase the PRESET value (reference point) setting. Perform reference point setting again (refer to "5. PRESET Value (Reference Point) Setting").
- Follow local rules and regulations regarding battery disposal.

The battery is not installed into the product at purchase. Install the battery as follows.

- 1 Rotate the battery compartment cover counter-clockwise to remove it.
- 2 Install the battery (button type silver-oxide battery; Part No. 938882) with the positive side facing up.
- 3 Position the battery compartment cover and rotate clockwise to attach. Moving on, set the PRESET value (reference point).
- 4 Press the [PRESET] button.
⇒ Count display appears and counting starts.



Tips

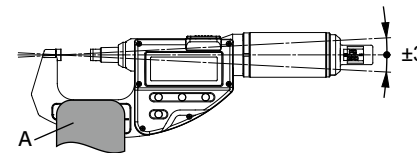
If an abnormal display is shown, such as an error display or not counting, etc., try removing the batteries and reinstalling.

3. Precautions for Use

■ Measurement Orientation

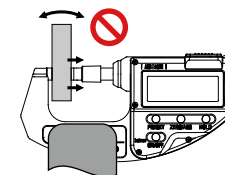
Only a horizontal measurement orientation (horizontal measurement axis for the anvil, spindle, and thimble) is possible for this product.

In order to perform measurement within the guaranteed accuracy, use a micrometer stand (A) and keep the tilt from horizontal orientation within $\pm 3^\circ$. Note that the measuring force will change by $\pm 0.3\text{ N}$ at $\pm 30^\circ$ tilt from horizontal orientation, as a guideline.



■ Measuring Force

Moving the workpiece horizontally applies force more than the set measuring force to the spindle. Hold the workpiece so as to avoid applying any force more than the set measuring force to the spindle during measurement.

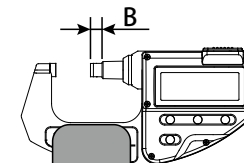


■ Temperature

This product, especially the 0.001 mm resolution model, is easily influenced by temperature changes. Abrupt temperature changes should be avoided and sufficient time should be allowed to adjust to ambient temperature before measuring.

■ Handling the Stroke End Bush (CLM-QMX only)

The stroke end bush acts as a marker for the measurement range (10 mm or 15 mm). Although it will not directly affect the measurement results, do not move or remove it, in order to prevent damage. The home position of the marker (B) is 6 mm or 11 mm from the edge of the spindle.



■ 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.
- For long-term storage, apply anti-rust treatment to the spindle using micrometer oil (Part No. 207000).

4. Measuring Force Setting

NOTICE

- When setting the measuring force, be sure to retract the spindle to position (A), where the thimble stops rotating. If the spindle is not sufficiently retracted, the proper measuring force cannot be set.
- Slowly turn the thimble. If the spindle forcibly reaches position (A), where rotation stops, it may lead to damage.
- After changing the measuring force, be sure to perform reference point setting. Otherwise, this may cause errors. (Refer to "5. PRESET Value (Reference Point) Setting")
- Set the measuring force within the specifications. Measuring force lower than the specification range is not guaranteed, and spindle action will be negatively affected.

This product is a variable measuring force type micrometer. Measuring force settings can be changed as follows.

- 1 Slowly retract the spindle to the position (A) where the thimble cannot be turned any further.
A \geq maximum measurement length + 0.5 mm
- 2 Turn the measuring force selector with the provided slotted screwdriver to set the measuring force.

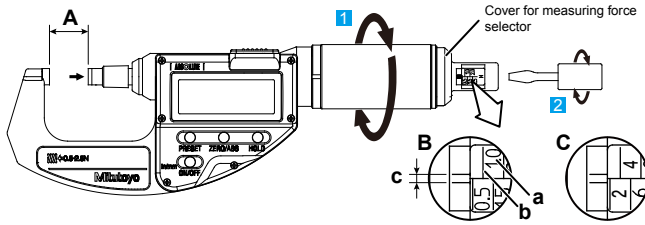
Tips

Measuring force values (a) and scale lines (b) are indicated on the measuring force selector. Adjust so that the scale line for the target measuring force is on the edge of the cover for measuring force selector, and the central line (c) is within the setting range [between the two lines (c)] of the cover for the measuring force selector.

Figure B below: Setting example for measuring force 0.5 N

Figure C below: Setting example for measuring force 2 N

Rotate the measuring force selector twice, to move it by one measuring force setting graduation.



5. PRESET Value (Reference Point) Setting

NOTICE

- For reference point setting, use a periodically inspected reference gage (gauge block, micrometer standard bar, etc.).
- Reference point setting and measurement should be made in the same orientation and conditions and with the same procedure as below.
- When using CLM-DKX, if measuring with only part of the measuring surface, perform reference point setting under the same conditions as the measurement.
- If the reference point changes due to temperature changes, reconfigure the PRESET value (reference point).

Set the reference point according to the following procedure.

- 1 Mount the product horizontally to a micrometer stand (refer to "3. Precautions for Use ■ Measurement Orientation").
- 2 Clean both anvil and spindle measurement surfaces, together with the micrometer standard bar if it is used to remove all debris or dust.
- 3 Press the [PRESET] button.
 - ⇒ [P] blinks on the LCD, and the registered preset value is displayed.

- If not changing the preset value
Proceed to step 3.

- If changing the preset value
Change the preset value according to the following procedure.

- 4 Again, press and hold the [PRESET] button until the target digit starts to blink.
 - ⇒ [P] lights up and each digit starts to blink in turn.

Tips

While the [PRESET] button is held down, the blinking digit will move to the right in turn. Release the [PRESET] button, and the movement of the blinking digit will stop.

- 5 Press the [PRESET] button to change to the target value.
 - ⇒ The value changes each time you press the [PRESET] button.

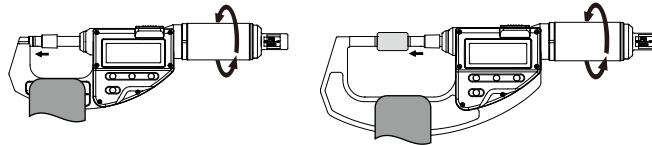
- 6 Repeat step 4 and step 5 to change the value for all digits.
 - Setting example: 8.500 mm (nominal length of the standard bar)

- 7 Again, press and hold the [PRESET] button, and then release it when [P] on the LCD starts to blink.

- 8 Press the [PRESET] button.
 - ⇒ [P] turns off and the preset value is registered. (Lower section: If not changing the preset value [0.000])

- 9 Press the [PRESET] button.
 - ⇒ [P] blinks on the LCD, and the registered preset value is displayed. (Lower section: If the preset value is [0.000])

- 10 If the measurement range is 0 to 10 mm or 0 to 15 mm: Slowly turn the thimble until both measurement surfaces make light contact.
If the measurement range is other than 0 to 10 mm or 0 to 15 mm: Insert the standard bar between the measurement surfaces and slowly turn the thimble until both measurement surfaces make light contact with the standard bar.



- 11 Further turn the thimble by 1/10 rotation to push the spindle in.
 - ⇒ [H] display lights up. (Lower section: If the preset value is [0.000])

- 12 Turn the thimble in the opposite direction by 1/10 rotation or more to retract the spindle, and then press the [HOLD] button.
 - ⇒ [H] display turns off and the hold is released. The current spindle position is displayed. (Lower section: If the preset value is [0.000])

- 4 Press and hold the [PRESET] button.
 - ⇒ [P] lights up and each digit starts to blink in turn.

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- 12 Turn the thimble in the opposite direction by 1/10 rotation or more to retract the spindle, and then press the [HOLD] button.
 - ⇒ [H] display turns off and the hold is released. The current spindle position is displayed. (Lower section: If the preset value is [0.000])

- 12 Turn the thimble in the opposite direction by 1/10 rotation or more to retract the spindle, and then press the [HOLD] button.
 - ⇒ [H] display turns off and the hold is released. The current spindle position is displayed. (Lower section: If the preset value is [0.000])

6. Selecting Measurement Type

Measurement modes include the following 2 measurement types. Select as appropriate for the workpiece.

(Refer to "8. Button Functions ■ Switching Measurement Type/Displayed Value Zero Reset")

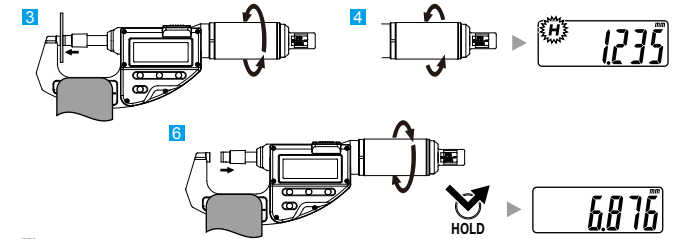
- Absolute measurement (ABS)
Measures the length based on the set PRESET value (from the reference point).
- Incremental measurement (INC)
Zeros the displayed value with the master and measures a difference between the master and a workpiece.

7. Measurement Method

NOTICE

The displayed value will be held ([H] display lights up) as soon as the set measuring force is applied. To obtain stable measurement results, turn the thimble slowly and stop it as soon as the [H] display lights up.

- 1 Mount the product horizontally to a micrometer stand (refer to "3. Precautions for Use ■ Measurement Orientation").
- 2 Clean both the anvil and spindle measurement surfaces and the workpiece to remove all debris or dust.
- 3 Slowly turn the thimble until both measurement surfaces make light contact with the workpiece.
- 4 Further turn the thimble by 1/10 rotation to push the spindle in.
 - ⇒ [H] display lights up and the displayed value is automatically held.
- 5 Read the indicated value.
- 6 Turn the thimble in the opposite direction by 1/10 rotation or more to retract the spindle, and then press the [HOLD] button.
 - ⇒ [H] display turns off and the hold is released. The current spindle position is displayed.



Tips

- Hold will not be released even when the [HOLD] button is pressed in step 4. To make the [HOLD] button function, retract the spindle until no measuring force is applied.
- If the [PRESET] button is accidentally pressed during measurement, press the [ZERO/ABS] button to return to the former state. If this does not enable the product to recover, perform reference point setting once more.

8. Button Functions

■ Power ON/OFF: [ON/OFF in/mm] Button

- Press the [ON/OFF in/mm] button.
- ⇒ Power turns ON.



- Press and hold the [ON/OFF in/mm] button.
- ⇒ Power turns OFF.



■ Switching Measurement Type/Displayed Value Zero Reset: [ZERO/ABS] Button

- Press the [ZERO/ABS] button.
- ⇒ [INC] display lights up and the display is set to zero (incremental measurement).



- Press and hold the [ZERO/ABS] button.
- ⇒ [INC] display turns off and the length from the reference point (anvil measurement surface) is displayed (absolute measurement).



■ Display Value Hold: [HOLD] button

- Press the [HOLD] button.
- ⇒ [H] display lights up and the displayed value is held.
- The displayed value will not change even if the spindle moves.



- Press the [HOLD] button.
- ⇒ [H] display turns off and the hold is released.
- The current spindle position is displayed.



■ Unit Switching (only for in/mm model): [ON/OFF in/mm] Button

- Press the [ON/OFF in/mm] button with the power ON.
- ⇒ Units will switch.



9. Function Lock Function (Mistaken Operation Prevention)

This product has a Function Lock function in order to avoid accidental changes to the reference point position.

Setting the Function Lock causes the [F] LCD to light up and disables the [PRESET] button, [ZERO/ABS] button, and in/mm button (export specifications only), with only the "Hold Operation" and "Power ON/OFF Operation" functions enabled.

• Function Lock Function ON/OFF

- First press and hold the [HOLD] button, and then additionally press and hold the [ZERO/ABS] button.
- ⇒ [H] display and [F] display light up in sequence ([H] turns off first).



- First press and hold the [HOLD] button, and then additionally press and hold the [ZERO/ABS] button.
- ⇒ [F] display turns off and the Function Lock function is released.



10. Errors and Troubleshooting

Error Display	Causes and Countermeasures
Display Overflow 	The displayed value exceeds the number of digits that can be displayed. Normal counting will start again when the thimble is moved in reverse and the displayed value returns to the number of digits that can be displayed.
ABS Synthesis Error 	Although this may be momentarily displayed while the spindle is moving, it is a normal artifact of internal processing. If it occurs while the spindle is not moving, the internal sensor has failed. In this case, repair is required: consult with your dealer or agent or with our sales office.
Power Voltage Drop 	Battery is depleted. Replace with a new battery.
Hardware Error 	A hardware error was generated. In this case, repair is required: consult with your dealer or agent or with our sales office.
Sensor Contamination Detection Error 	A sudden change in temperature may create condensation on the detector, or it may be contaminated by other sources. <ul style="list-style-type: none"> Turn the power OFF and allow the product to adapt to the temperature for about 2 hours. If it does not recover after adapting to the temperature, repair is required: consult with your dealer or agent or with our sales office.

11. Specifications

■ Individual Specifications

CLM-QMX Measurement range	: 0 to 15 mm, 15 to 30 mm, 0 to 0.6 in, 0.6 to 1.2 in (0.5 N to 2.5 N type) : 0 to 10 mm, 10 to 20 mm, 20 to 30 mm, 0 to 0.4 in, 0.6 to 0.8 in, 0.8 to 1.2 in (2 N to 10 N type)
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Maximum permissible error J_{MPE}^*1 : $\pm 2 \mu\text{m}$, ± 0.0001 in (in/mm product)

CLM-DKX Measurement range	: 0 to 15 mm, 0 to 0.6 in (0.5 N to 2.5 N type) : 0 to 10 mm, 0 to 0.4 in (2 N to 10 N type)
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Maximum permissible error J_{MPE}^*1 : $\pm 4 \mu\text{m}$

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

■ Common Specifications

Resolution	: 0.001 mm, 0.00005 in
Measuring force	: 0.5 to 2.5 N, variable (0.5 N to 2.5 N type) : 2 N to 10 N, variable (2 N to 10 N type)
Measuring force scale	: 0.5, 1.0, 1.5, 2.0, 2.5 N (0.5 N to 2.5 N type) : 2, 4, 6, 8, 10 N (2 N to 10 N type)
Measuring force variation	: 0.1 N or less (0.5 N to 2.5 N type) : 0.4 N or less (2 N to 10 N type)
Set measuring force error	: $\pm(0.1 + \text{set measuring force}/10)$ N (0.5 N to 2.5 N type) : $\pm(0.4 + \text{set measuring force}/10)$ N (2 N to 10 N type)
Display	: LCD (6-digit and minus sign)
Power supply	: Button type silver-oxide battery (SR44 No.938882), x1
Battery life	: With typical use approximately 5 years, with continuous use 18,000 hours or more
Measurement orientation	: Horizontal/lateral orientation only (tilt within $\pm 3^\circ$ recommended)
Temperature range	: 5 °C to 40 °C (operating temperature), -10 °C to 60 °C (storage temperature)
Standard accessories	: Slotted screwdriver (Part No. 210183) Standard bar (CLM1-30QMX, CLM2-30QMX only) Gauge block (CLM2-10QMX only)

12. Output Function

■ Display Value External Output

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

NOTICE

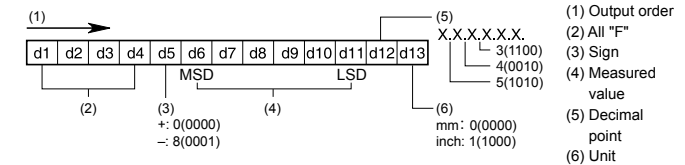
- Always use the 0-size Phillips screwdriver (No.05CZA619) included with the connection cable (option) when installing/removing screws, and tighten to a torque of 5 to 8 cN · m or so.
- Install so that the seal does not protrude. Waterproof functioning will decrease if not installed correctly.

Install connection cables using the following procedure.

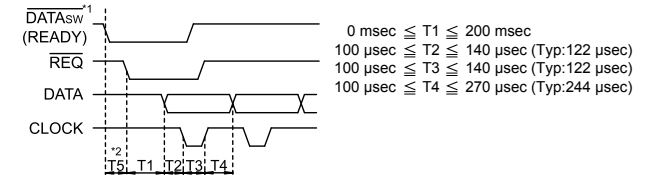
- Use the Phillips screwdriver included with the connection cable to remove the cover fixing screws (M1.7 x 0.35 x 2.5, No.04AAB543).
- Remove the cover.
- Check that the connector seal (No.04AAC126) is correctly installed at the proper position (do not remove the connector seal).
- Mount the connection cable plug.
- Hold the plug manually so that there is no gap between the plug and the Quickmike body, and fasten using the fixing screws on the plug.



■ Output Data Format



■ Timing Chart



*1: DATAsw is LOW while the data output button 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.

13. Options

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

14. Off-Site Repairs (Subject to Charge)

Off-site repair (subject to charge) is required in the case of the following malfunctions. Contact your nearest dealer or our sales office.

- 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 a shock is applied to the measurement surfaces, or if burrs appear on the measurement surfaces. This may affect accuracy.
- 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.