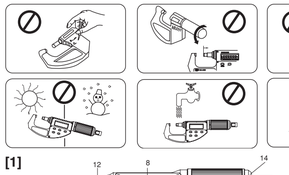
測定用可変式デジマチックマイクロメータ/Digimatic Messschraube mit verstellbarer Mikrometer/Micrómetro Digimatic con Fuerza de Medición Ajustable/Digimatic micrometer met regelbare meetkracht數字式可變力測微計

[1]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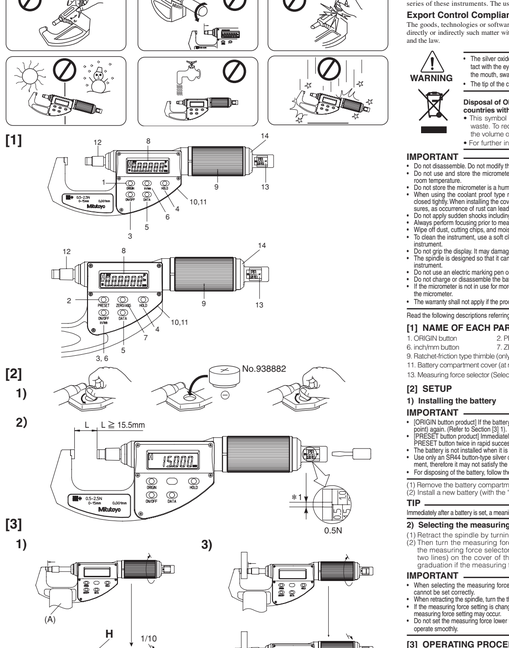
Adjustable Measuring Force Digimatic Micrometer/Micrómetro Digimatic a forza de misura regolabile/Micromètre numérique à force de mesure réglable/Micrometro Digimatic con regolazione forza di misura/Digimatic micrometer med inställbar mätkraft/측정력 가변식 디지털 마이크로메터

User's Manual
No.99MAB018M2
Series No.227



Safety Precautions (GB)

Be sure to comply with the specifications, functions, and precautions for use described in this manual when using either series of these instruments. The use of the instrument in another way or for another purpose will impair safety.

Export Control Compliance

The goods, technologies or software described herein may be subject to National or International, or Japanese Export Controls. To export directly or indirectly such matter without due approval from the appropriate authorities may therefore be a breach of export control regulations and the law.

WARNING

- The silver oxide battery used for this instrument contains irritating substance. Should the liquid content accidentally come into contact with the eye or skin, rinse with water immediately, then consult a physician. Should it get into the mouth, immediately rinse inside the mouth, swallow plenty of water and vomit it, then consult a physician.
- The tip of the contact point on this micrometer is sharp. Handle it with care so as not to scratch yourself.

Disposal of Old Electrical & Electronic Equipment (Applicable in the European Union and other European countries with separate collection systems)

- This symbol on the product or on its packaging indicates that this product shall not be treated as household waste. To reduce the environmental impact of WEEE (Waste Electrical and Electronic Equipment) and minimize the volume of WEEE entering landfills, please reuse and recycle.
- For further information, please contact your local dealer or distributors.

IMPORTANT

- Do not disassemble. Do not modify this instrument. It may damage the instrument.
- Do not use and store the micrometer at sites where the temperature will change abruptly.Prior to use thermally stabilize the micrometer suffi ciently at room temperature.
- Do not store the micrometer is a humid or dusty environment.
- When using the socket proof type micrometer in a position where it may be splashed directly with coolant, or the like, ensure that the battery cover is closed tightly. When installing the cover, ensure that the fi xing screws are fightly fastened and that there are no gaps. After use, apply rust prevention measures, as occurrence of rust can lead to device malfunction.
- Do not apply sudden shocks including a drop or excessive force to the micrometer.
- Always perform focusing prior to measurement.
- Wipe off dust, cutting chips, and moisture from the instrument after use.
- To clean the instrument, use a soft cloth soaked in a diluted neutral detergent. Do not useany organic solvent (Thinner, etc.). It may deform or damage the instrument.
- Do not drop the display. It may damage the instrument.
- The spindle is designed so that it can not be removed from the inner sleeve. Do not move it past the upper limit of the measuring range it may damage the instrument.
- Do not use an electric marking pen or other such devices on the micrometer.
- Do not charge or disassemble the battery. Doing so may cause a fire or chemical burns.
- If the micrometer is not in use for more than 3 months, remove the battery from the micrometer for safe keeping. The battery could leak and cause damage to the micrometer.
- The warranty shall not apply if the product fails or is damaged as a result of wear and tear or heat and tear including battery drain.

Read the following descriptions referring to the figures on the left.

[1] NAME OF EACH PART

1. ORIGIN button 2. PRESET button 3. ON/OFF button 4. HOLD button
6. inch/mm button 7. ZERO/ABS button 5. DATA button
8. LCD
9. Ratchet /friction type thimble (only for the 0.5-2.5N model) 10. Data output connector (at rear)
11. Battery compartment cover (at rear) 12. Stroke end buttons(only on the micrometer)
13. Measuring force selector (Selectable measuring force varies depending on the model.) 14. Cover for measuring force selector

[2] SETUP

1) Installing the battery

IMPORTANT

- ORIGIN button product: If the battery is removed once then reinstalled, the ORIGIN (zero point) set is canceled. If this is the case, set the ORIGIN (zero point) again. (Refer to Section [3] 1).
- PRESET button product: Immediately after the battery has been set up, the origin information is cleared, displaying "_ _ _ _" on the LCD. Press the PRESET button twice in rapid succession to enter the count mode, and then set a reference point.
- The battery is not installed when it is shipped. Install the battery as shown in the figure on the left.
- Use only an SR44 button-type silver oxide cell. (The supplied battery is used only for the purpose of checking the functions and performance of the instrument, therefore it may not satisfy the specified battery life.)
- For disposing of the battery, follow the local ordinances or regulations.

TIP

Immediately after a battery is set, a meaningless display or an "E" indicator will appear, but this is not an anomaly. This state can be canceled by setting the ORIGIN.

2) Selecting the measuring force

(1) Retract the spindle by turning the thimble slowly until it stops.
(2) Then turn the measuring force selector with the supplied screwdriver. (*1 Be sure that the reference line on the center of the measuring force selector should falls within the measuring force determination range (which is the range between the two lines) on the cover of the measuring force selector.) Measuring force setting can be changed by the amount of one graduation if the measuring force selector is turned two rotations.

IMPORTANT

- When selecting the measuring force, be sure to retract the spindle until the thimble stops turning. If the spindle is not fully retracted, the measuring force cannot be set correctly.
- When retracting the spindle, turn the thimble slowly. The instrument may be damaged if the stroke end bush is bumped hard.
- If the measuring force setting is changed, be sure to set the ORIGIN (zero point) (Refer to Section [3], 1). If this is neglected, measurement error due to the measuring force setting may occur.
- Do not set the measuring force lower than its minimum value. The measuring force can not be ensured if it is blow its minimum value and the spindle may not operate smoothly.

[3] OPERATING PROCEDURE

1) Setting up the ORIGIN (zero point)

(1) Set the instrument horizontally to the micrometer stand (A). (See Fig. [5], 1).
(2) Press the ON/OFF button to turn on the power.
(3) Turn the thimble gently to bring the spindle into contact with the anvil. Turn the thimble further until an "H" indicator appears on the display. The "H" indicator appears if the thimble is turned approximately one tenth of a rotation.
(4) Hold down the ORIGIN (zero point) button for 2 seconds or more until "0.000" is displayed.
(5) Thus, the ORIGIN (zero point) for the selected measuring force is stored. The point that the measuring faces are come into contact under this ORIGIN (zero point) setting is retained as the ABS point.

IMPORTANT

- After installing a battery or changing the measuring force setting, be sure to set the ORIGIN (zero point).
- Prior to origin setting, wipe off dust/oil from the measuring faces.
- If the power is not turned on though the ON/OFF button is pressed, turn the thimble back approximately one tenth of a rotation in the reverse direction, then press the ON/OFF button. The power cannot be turned on when the internal HOLD contact is closed.
- The "H" indicator appears at a minimum when the selected measuring force is generated. If the thimble is turned further, measuring force greater than the selected is exerted on the spindle. Therefore, slowly turn the thimble until the "H" indicator appears, then set the ORIGIN (zero point).
- The ratchet/friction type thimble is a safety product protecting the instrument from being overloaded or failure. If the ORIGIN (zero point) is set during the ratchet/friction type thimble is working, this ORIGIN (zero point) is set with an extremely great measuring force, resulting in a measurement error. (The ratchet/friction type thimble is provided only for the 0.5-2.5N measuring force model.)

2) Registering a preset value (reference point)

<Example> When registering 25.000mm as a reference point:
To preset a reference point, store zero or the size of a master gage (e.g. standard bar) in the mmicrometer.
(1) Mount this micrometer horizontally on the micrometer stand.
(2) Press the ON/OFF button to turn on the power.
(3) Slowly bring the spindle into contact with the master gage (e.g. standard bar), and then rotate the thimble approximately one-tenth turn to display the "H" sign indicating the HOLD mode. Stop rotating the thimble immediately when the "H" sign lights up. Sufficient care is required when bringing the thimble into contact with the master gage (e.g. standard bar). (refer to [5] 3).
(4) Press the PRESET button shortly to turn off the "H" sign. Pressing the PRESET button shortly again displays the previously preset value and blinks the "P" sign.
(5) Holding down the PRESET button changes a blinking sign or digit sequentially. Hold down the PRESET button until the digit to be set starts blinking. Release the switch when a desired digit starts blinking.
(6) Press the PRESET button and release it when the "P" sign blinks. Inverse signs are displayed at the desired digit.
(7) Repeat the procedure in steps (5) and (6) above to set the figures at other digits.
(8) Hold down the PRESET button and release it when the "P" sign blinks. The "H" indicator appears.
(9) Press the PRESET button shortly, then the "P" sign goes off and presetting the reference point is complete.
At this time the "H" sign lights up. After reverse setting, if the reverse value is set one or more, press the HOLD button to turn off the "H" sign.
* To cancel the reference point presetting, press the ZERO/ABS button, then the previous display value is restored.
**While the reference point is being preset, no display value changes even if the thimble is rotated.

3) Measurement

(1) Turn the thimble gently to bring the spindle into contact with the workpiece. Turn the thimble further approximately one tenth of a rotation, then the H" indicator appears on the display. (Inversely, the "H" indicator disappears if the "H" indicator has already been displayed.)
(2) Displayed value is held automatically when the "H" indicator appears. (Inversely, hold state is released when the "H" indicator disappears.)
(3) To release the hold state, turn the thimble backward approximately one tenth of a rotation in the reverse direction, then press the HOLD button, or repeat the previous steps (1) and (2).

IMPORTANT

- The "H" indicator appears at the moment when the selected measuring force is generated. Be sure to turn the thimble slowly and stop turning at the moment when the "H" indicator appears so that the force exerted on the workpiece should be minimized.
- To release the HOLD state, press the HOLD button after turning the Thimble backward approximately one tenth of a rotation in the reverse direction. The HOLD state cannot be released when the "H" indicator appears (It is when the internal HOLD contact is closed).
- If data is output by pressing the DATA button (when an external output device is connected), the hold state is released automatically.
- If performing measurement only with a part of the measuring face on the micrometer of order No.227-221 or 222, preset a reference point under the same condition as that of measurement.

[4] ERROR DISPLAY AND REMEDY

1) "B" indicator: The battery voltage is low. Replace the battery with a new one.

2) "Err C" indicator: Water drops may be condensed on the detector unit due to sudden thermal change or the detector unit may be contaminated due to oil mist or dust. If this indicator appears, wait for 24 hours of thermal stabilization with power turned off, the instrument needs to be repaired. Contact the nearest Mitutoyo sales office.

3) Least significant digit display "E" (ABS data composition error): A temporary error is caused due to extremely quick displacement of the spindle. Keep on using the instrument, since there is no effect on measurement. If this indicator still appears, remove the battery once, and then install it again. If this indicator still remains, the instrument needs to be repaired. Contact the nearest Mitutoyo sales office.

[5] TIPS FOR MEASUREMENT

1) Error due to measuring posture

Measuring force of the instrument is largely affected by measuring posture. To obtain the measurement accuracy specified in the table with the selected measuring force, set the instrument in a micrometer stand in (A) a horizontal orientation (within ±3°), and then take measurements. Approximate measuring force change with the measuring posture variation in horizontal direction is (0.3N or less/±30°).

2) Error caused by temperature

Temperature fluctuation will remarkably affect the measuring accuracy of such a high-resolution (0.001mm) instrument. Avoid sudden temperature change. Allow the instrument to stabilize sufficiently to the room temperature before starting measurement. Deviation of the ORIGIN (zero point)/PRESET (reference point) position due to temperature change must be offset by resetting the ORIGIN (zero point)/PRESET (reference point).

3) Measuring force

If the workpiece is swayed during measurement, an excessive force is exerted on the spindle, resulting in unstable measurements. Hold the workpiece firmly when taking measurements so that no greater force than the selected measuring force will be exerted.

4) Stroke end bush

The stroke end bush is a marker used for distinguishing a measuring range (15mm). Do not move or remove it to avoid instrument failure, though doing so may not have any effect on measurement result. (The home position of the stroke end bush is 6mm from the end surface of the spindle.)

[6] OUTPUT FUNCTION

1) Output connector specifications
2) Output data format
3) Timing chart
*2 Time interval between the falling of READY to LOW and the input of REQUEST depends on the performance of the data processor being connected.

[7] SPECIFICATION

1) Specifications for each series

Measuring range	0-15mm (0- 6")
	15-30mm (.6"-1.2")
Instrumental error (at 20°C)	±2μm (Excluding the quantizing error)
	±4μm(CLM-DK)
Variation in measuring force	0.1N or less (0.5-2.5N)
	0.4Nor less (2-10N)
Accuracy for selected force	±(0.1+selected measuring force/10)N(0.5-2.5N)
	±(0.4+ selected measuring force /10)N(2-10N)
Battery life	Approx. 3 years under normal operation (ORIGIN)
	Approx. 1 year under normal operation (PRESET)

2) Specifications Common to All series

Minimum reading	: 0.001mm
Quantizing error	: ±1 count
Power supply	: Silver oxide cell (SR44 No.938882)
Measuring posture	: Only in a horizontal orientation (Inclination within ±3° is recommended)
Temperature range	: 5 to 40°C Operating temperature
	: -10°C to 60°C Storage temperature

[8] Option

For information on various optional parts, refer to the related catalog or contact the nearest Mitutoyo sales office.
Button Function

[9] Button Function

ZERO/ABS button: Zero-sets a display value and indicates an incremental value by pressing this button shortly. Holding down the button indicates a length from the reference point (anvil measuring face).
DATA button: Outputs data to an external output device if connected with the data output cable.
in/mm (ON/OFF shared) button: Switches the unit between inch and mm by holding down this button.

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Précautions d'emploi (F)

Veillez à respecter les spécifications, fonctions et instructions qui figurent dans cette notice. Le non-respect de ces instructions lors de l'utilisation de votre instrument ou l'utilisation de votre instrument à des fins autres que celles pour lesquelles il a été conçu peut compromettre votre sécurité.

Notes sur les règles d'export

Vous devez accepter de ne pas commettre d'action qui directement ou indirectement, violerait les lois et réglements du Japon ou de votre pays, ou de tout autre traité international, relatif aux exports ou re-exports de l'empté ports