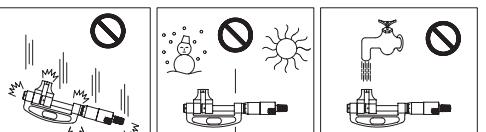


# キャリパー形外側マイクロメータ

# Bügelmessschraube mit Messschenkeln

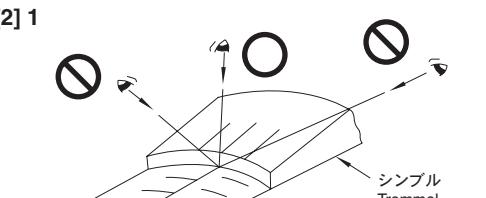
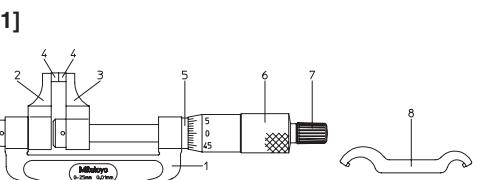


**安全に関する注意**

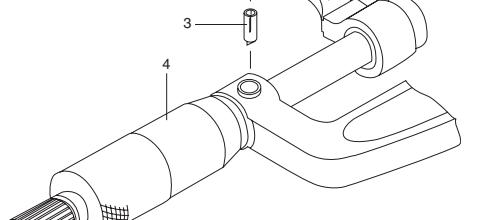
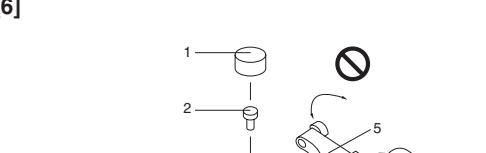
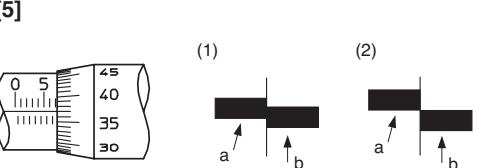
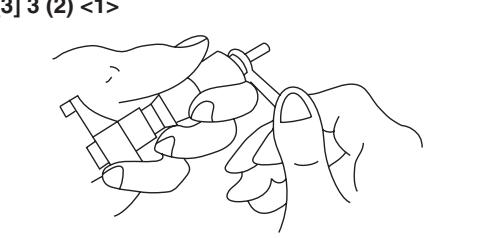
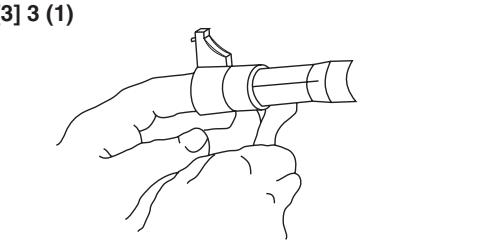
J  
商品のご使用に当たっては、記載の仕様・機能・使用上の注意に従ってご使用ください。それ以外でご使用になりますと安全性を損なうおそれがあります。

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基線	Bezugslinie
Bezugslinie	Línea de referencia
Referentielijn	Referentielijn
Reference line	Ligne de référence
Linea di riferimento	Referentielijn
Referenzlinie	Referentielijn
기준선	기준선
基准	基准
基線	基准



Mitutoyo Corporation  
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**Sicherheitsmaßnahmen**

Aus Sicherheitsgründen bei Benutzung dieses Geräts die in der Bedienungsanleitung angegebenen Anleitungen befolgen und die technischen Daten beachten.

**Hinweise zu Exportbestimmungen**

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**本器の測定面は鋭利に尖っています。身体を傷つけないよう、取り扱いには十分気を付けてください。**

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# Caliper Type Outside Micrometer

# Micrometro per esterni con becchi

# Bygelmikrometer för utvändig mätning

# 캘리퍼스형 외측マイクロメータ

# 卡鉗型外徑千分尺

# 卡尺型外徑測微器

## Safety Precautions

To ensure operator safely, use this instrument in conformance with the directions and specifications given in this User's Manual.



## Precauzioni relative alla sicurezza

Per garantire la sicurezza dell'operatore, utilizzare questo strumento in conformità alle direttive e alle specifiche fornite nel manuale d'uso.



## Säkerhetsåtgärder

När detta instrument används ska alla specifikationer, funktioner och försiktighetsåtgärder beaktas enligt beskrivningen i denna handbok. Om instrumentet används på annat sätt eller för annat ändamål kommer det att inträffa på säkerheten.



## Note sulle Norme di Esportazione

Rimane implicito che vi impegnate a non compiere alcuna azione che, diretta o indiretta, violi leggi o norme del Giappone o del vs. Paese, o qualsiasi altro trattato internazionale relativo all'esportazione o rieimportazione di qualsiasi prodotto.



## Ang. exportrestriktioner

Ni kan samtycka till att inte begå någon handling som på något sätt, direkt eller indirekt, strider mot japanska, eller lokala, lagar och bestämmelser såväl som andra internationella överenskommelser gällande export eller vidareexport av Mitutoyo produkter.

## 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.

**CAUTION** The tip of the contact point on this micrometer is sharp. Handle it with care so as not to scratch yourself.

**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 sufficiently to prevent damage.

• Do not store the micrometer at sites where it will be exposed to dust and moisture.

• When using the micrometer in a position where it may be splashed directly with coolant, or the like, apply rust prevention measures after use. Occurrence of rust can lead to micrometer malfunction.

• Do not apply sudden shocks including a drop or excessive force to the caliper type outside micrometer.

• Always perform zero setting 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 diluted neutral detergent. Do not use any organic solvent (Thinner, etc.). It may deform or damage the instrument.

Refer to the illustrations on the reverse side while reading this manual.

## [1] Name of Each Part

1. Frame	2. Left jaw	3. Right jaw	4. Anvil
5. Sleeve	6. Thimble	7. Ratchet stop	8. Key wrench

## [2] Precautions

### 1. Parallax error

Note the following for micrometers in which the reference line on the surface of the outer sleeve and the graduated surface of the thimble are not co-planar. As such, the point of coincidence of two graduation lines for taking readings shifts according to the viewing point of the operator. In taking measurements with a micrometer, determine the point of coincidence of reference line of the outer sleeve and the graduation line of the thimble from the view point normal to the point of coincidence.

### 2. Measuring force

Always take micrometer measurements under the constant measuring force exerted by the ratchet stop. The appropriate measuring force is obtained by rotating the ratchet stop three to four times by the fingers only after the measuring faces having been brought into a slight contact with the workpiece and stopped. Due to the unique structure of this micrometer, an excessive measuring force will produce measurement errors, and thus requires due attention.

### 3. Operating state

Should thimble operation become tight, do not forcibly rotate it. Forcible rotation will break the keyway, thus due care is required.

## [3] Zero point adjustment

### IMPORTANT

• Use a periodically inspected gage block or standard for micrometer for zero point adjustment, to adjust the zero point of this device.

• Apply the same orientation and conditions for the zero adjustment and measurement, following the steps below.

1. Thoroughly wipe the gage to be used and the measuring face.

2. Confirm that both measuring faces or the measuring face and the gage gently contact, rotate the ratchet stop, then apply a measuring force to read the dial.

3. If the read value is zero or differs from the method of the gage, perform the following adjustment.

(1) The zero point error is about  $\pm 0.01$  mm or less.

Insert the accompanying key wrench into the hole on the sleeve on the opposite side of the index line, and rotate the sleeve to align the index line with the thimble zero graduation line.

(2) The zero point error is about  $\pm 0.01$  mm or more.

<1> Loosen the ratchet stop, using a key wrench.

<2> Press the thimble outward (in the direction of the ratchet) so that it can freely move, then align the thimble zero graduation line with the sleeve index line.

<3> Fasten the ratchet stop, using the key wrench until it is fastened at the original position to secure the thimble. If the zero point is not completely adjusted, follow the procedure in (1) for adjustment.

## [4] How to measure

Read the indicated value in the same way as that for zero point adjustment. Perform measurement, keeping the same orientation and condition as when the zero point adjustment was made.

## [5] How to read

The example below shows the reading to the specified minimum reading of 0.01mm. With the advanced experience or skill, you will be able to take reading to 0.001mm as shown.

Sleeve : 7. a: Sleeve  
Thimble : .37 b: Thimble  
Reading : 7.37mm (1) about +1μm (2) about +2μm

## [6] Adjusting the Jaws Looseness

1. Cap 2. Set-screw 3. Key 4. Thimble 5. Right Jaw

Do not apply excessive force circumferentially to the jaws (force that twists jaws; see Fig.6). This will cause the thimble to operate improperly, the jaws to loosen, and the key to break. Should the jaws loosen, use the procedures below to rectify the looseness.

Make an adjustment if more than 0.2 mm looseness is observed at extreme end of the right jaw when it is moved in the direction of sleeve circumference. Do not, however, make an adjustment if the looseness is less than 0.2 mm.

<1> Remove the cap and loosen the set-screw.

<2> Press the key to reduce the looseness of the right jaw to less than 0.2 mm, then tighten the set-screw.

<3> Replace the cap.

Note that an excessive reduction of the looseness of the right jaw will prevent smooth rotation of the thimble.

## [7] Specifications

• Instrumental error (20°C)

$\pm(4 \times \text{max. measuring length}/25) \mu\text{m}^{\pm}(0.0002+0.0005X (\text{max. measuring length}/1))$

Max. measuring length = 100 mm or below.

$\pm(6 \times \text{max. measuring length}/50) \mu\text{m}$

Max. measuring length = over 100 mm / 300 or below.

\*Fraction rounded up

• Graduation : 0.01mm / .001"

• Operation Temperature : 5°C to 40°C

• Storage Temperature : -10°C to 60°C

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