

Starrett®

PKG08786- UM3201/3202

TRUST IS IN THE NAME

User Manual

READ THIS MANUAL BEFORE USING THE INSTRUMENT

**ANTES DE UTILIZAR EL INSTRUMENTO,
LEA ATENTAMENTE ESTE MANUAL**

LIRE CE MANUEL AVANT D'UTILISER L'INSTRUMENT

**LEIA ATENTAMENTE ESTE MANUAL ANTES
DE UTILIZAR O INSTRUMENTO**

使用仪器前请阅读本操作手册

**DIESES HANDBUCH VOR DER VERWENDUNG
DES MESSGERÄTS LESEN**

**LEGGERE ATTENTAMENTE QUESTO MANUALE PRIMA
DI UTILIZZARE QUESTO STRUMENTO**

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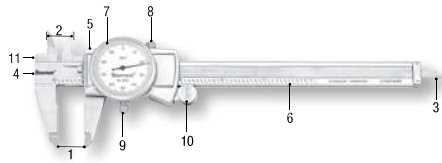
**3201 AND 3202 DIAL CALIPER
USER MANUAL**

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COMPONENTS



- | | |
|--|---|
| <p>1. Jaws for external measurement</p> <ul style="list-style-type: none"> - Mordazas para medición externa - Mâchoires pour mesures extérieures - Garras para medidas externas - 外尺寸测量卡爪 - Außenmessschenkel - Ganasce per misurazione di esterni | <p>6. Graduated scale</p> <ul style="list-style-type: none"> - Escala graduada - Barre graduée - Escala graduada - 刻度尺身 - Skala - Scala graduata |
| <p>2. Jaws for internal measurement</p> <ul style="list-style-type: none"> - Mordazas para medición interna - Mâchoires pour mesures intérieures - Garras para medidas internas - 内尺寸测量卡爪 - Innenmessschenkel - Ganasce per misurazione di interni | <p>7. Dial for reading 100ths and thousandths</p> <ul style="list-style-type: none"> - Carátula para lectura de centésimas y milésimas - Cadran de lecture des centièmes et des millièmes - Mostrador para leitura de centésimos e milésimos - 百分位和千分位读数刻度盘 - Messuhr zum Ablesen von Hundertstein und Tausendstein - Quadrante per la lettura di centesimi e millesimi |
| <p>3. Depth measuring rod</p> <ul style="list-style-type: none"> - Varilla para medición de profundidad - Tige de profondeur - Haste para medição da profundidade - 深度测杆 - Tiefenmaß - Asta di misurazione della profondità | <p>8. Slide locking screw</p> <ul style="list-style-type: none"> - Tornillo de bloqueo del cursor - Vis de blocage de la coulisse - Parafuso de fixação do cursor - 滑动头锁紧螺钉 - Messschieber-Feststellschraube - Vite di bloccaggio del corsoio |
| <p>4. Scribing face</p> <ul style="list-style-type: none"> - Cara de trazado - Face de traçage - Face de traçado - 划线面 - Oberseite - Superficie di tracciatura | <p>9. Dial indicator locking screw</p> <ul style="list-style-type: none"> - Tornillo de bloqueo del indicador de carátula - Vis de blocage du cadran - Parafuso de fixação do relógio comparador - 刻度指示盘锁紧螺钉 - Messuhr-Feststellschraube - Vite di bloccaggio del quadrante |
| <p>5. Slide</p> <ul style="list-style-type: none"> - Cursor - Coulisse - Cursor - 滑动读数头 - Schieber - Corsoio | |

COMPONENTS

- | | |
|-----------------------------------|--|
| 10. Fine adjustment thumb roll | 11. Scribing Reference Face |
| - Ruedecilla de ajuste fino | - Cara de referencia de trazado |
| - Bouton de réglage précis | - Face de référence du traçage |
| - Botão de ajuste fino | - Face de referência do traçado |
| - 微调滚轮 | - 划线参考面 |
| - FeinEinstellung mit Daumenrad | - Referenzfläche |
| - Rotella per l'accostamento fine | - Superficie di tracciatura di riferimento |

NOTE: The pictures shown are illustrative; the components may vary according to the model.

NOTA: Las figuras aquí presentadas son ilustrativas; los componentes pueden cambiar conforme el modelo del instrumento.

REMARQUE : les images sont données à titre illustratif ; les composants peuvent varier selon les modèles.

NOTA: As imagens são para fins ilustrativos; os componentes variam de acordo com o modelo.

注:上图仅作说明之用,组件可能随型号的不同而有所不同。

HINWEIS: Die Bilder dienen nur der Veranschaulichung; die Komponenten können von Modell zu Modell unterschiedlich aussehen.

NOTA: le figure sono solo a scopo illustrativo; i componenti possono variare a seconda del modello.

3201 AND 3202 DIAL CALIPER



THIS IS A STARRETT USER GUIDE FOR THE
3201 AND 3202 DIAL CALIPER.
ALL SPECIFICATIONS IN THIS DOCUMENT ARE CORRECT AT TIME
OF PRODUCTION AND ARE SUBJECT TO CHANGE. PLEASE CONTACT
STARRETT FOR FURTHER INFORMATION.

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CHARACTERISTICS

| | 3201M | 3202M | 3202 |
|-------------------------|--------------|--------------|-----------|
| Range | Up to 200 mm | Up to 300 mm | Up to 12" |
| Resolution ¹ | 0.01 mm | 0.02 mm | 0.001" |
| Accuracy ² | ±0.03 mm | ±0.03 mm | ±0.001" |

1. Resolution: Smallest difference between indicators of a displaying device that can be meaningfully distinguished. For a digital displaying device, this is the change in the indication when the least significant digit changes by one step (VIM).

2. Accuracy: Closeness of the agreement between the result of a measurement and a true value of the measure and (VIM).

P.S.: VIM - Internal Metrology Vocabulary

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PRECAUTIONS WHEN USING THE CALIPER

- Before using the instrument, clean the measuring jaws and the graduated scale with a smooth cloth or chamois.
- Do not expose the caliper to direct sunlight or extreme temperatures.
- Avoid mechanical shocks or abrupt movements, which might damage the instrument.
- Do not disassemble the caliper.
- Do not use compressed air on the caliper; this can contaminate the rack.
- Do not wash or immerse the caliper in any liquid.
- For a good working caliper, always keep the rack clean. Use a small soft brush or paint brush for cleaning.
- Keep the caliper clean and dry, and avoid handling with oily hands.
- Store caliper in its own package; avoid leaving it out with other tools.

PRECAUTIONS WHEN MEASURING

- Do not measure a rotating part; it is dangerous and causes the faces in contact to wear.
- Do not apply excessive pressure when measuring (fig. 1)

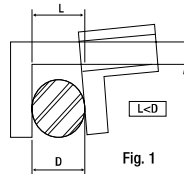


Fig. 1

Parallax Error: Be careful when measuring to avoid the parallax error (Δx). This error occurs when the observation point is not perpendicular to the display (fig. 2A). Take the reading perpendicularly to the dial display (3) (fig. 2B).

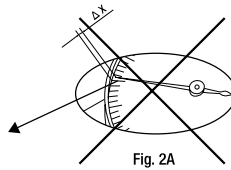


Fig. 2A

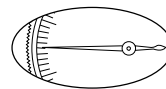
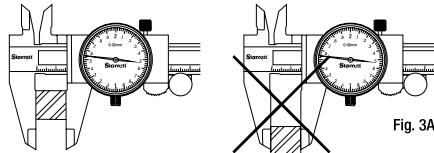


Fig. 2B

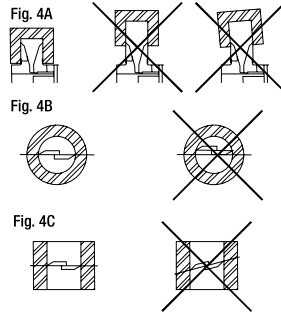
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OPERATING INSTRUCTIONS

- Loosen the slide locking screw (8) to move the slide (5).
- **External Measurement:** put the part to be measured as close as possible to the scale (fig. 3A) and adjust the external measuring faces (1) to the part surface (fig. 3B).



- **Internal measurement:** introduce the internal measuring jaws (2) as deep as possible inside the part (fig. 4A) and adjust them to the part surface. To obtain the measurement of an internal diameter see fig. 4B. To obtain the measurement of a slot see fig. 4C.



- **Depth Measurement:** place the depth-measuring rod (3) perpendicular to the part bottom to be measured (fig. 5).

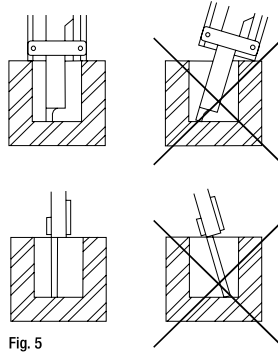


Fig. 5

- **Cam Measurement:** open the jaws slightly larger than the width of the cam, place the scribing face against the bottom of the cam. Move the scribing reference (11) face to the part surface (fig. 6)

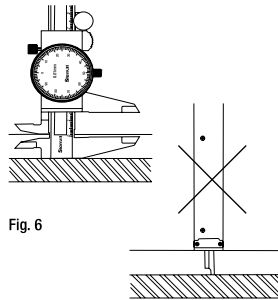


Fig. 6

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- **Scribing Face:** adjust the reference face for scribing (11) to the part reference and move the slide (5) to the chosen measurement, lock it and then scribe (fig. 7)

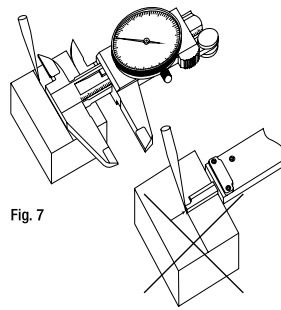


Fig. 7

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HOW TO READ A CALIPER

For instruments 3202 Series:

- Each bar graduation (6) represents 0.1", numbered in sequence 1, 2, 3, etc. Each tenth graduation represents 1", numbered in sequence 1 (1"), 2 (2"). The dial has its display graduated in 100 parts, each one representing 0.001 ". Each tenth trace is numbered in sequence 10 (0.01 "), 20 (0.02"), allowing direct reading in a thousandth of inch (a complete revolution of the dial represents 0.1").
- To take the reading on the instrument, first count how many inches and inch tenths exist between the zero trace of the bar and the left side of the slide (zero reference of the slide). Then, look for the graduation indicated for the dial hand and write down its value in thousandth of inch. Add the thousandth of inch reading from the dial indicator to the number from the bar. This is the total reading.

To obtain the reading see the example on fig. 10, adding:

- a. ... 0.60" on the bar
 - b. ... 0.022" on the dial (each revolution represents 0.1")
- 0.622" is the reading

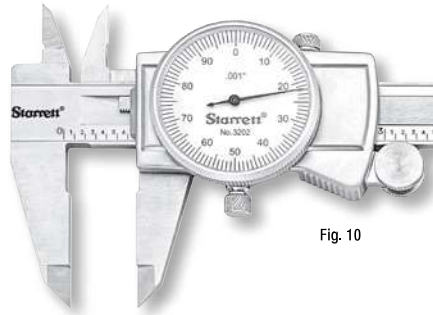


Fig. 10

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HOW TO READ A CALIPER

For instruments 3201M Series:

- Each bar graduation (6) represents 1 mm, numbered in sequence 10, 20, 30 etc. Each tenth graduation represents 10 mm, numbered in sequence 10 (10 mm), 20 (20 mm). The dial has its display graduated in 100 parts, each one representing 0.01 mm.
- To take the reading on the instrument, first count how many mm and mm hundredths exist between the zero trace of the bar and the left side of the slide (zero reference of the slide). Then, look for the graduation indicated for the dial hand and write down its value in hundredths of a mm. Add the hundredths of mm reading from the dial indicator to the number from the bar. This is the total reading.

To obtain the reading see the example on fig. 11, adding:

- a. ... 14.0 mm on the bar
 - b.81 mm on the dial (each revolution represents 1 mm)
- 14.81 is the reading

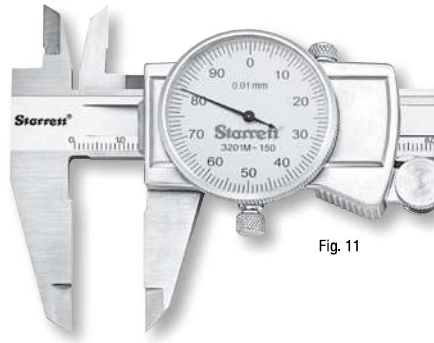


Fig. 11

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HOW TO READ A CALIPER

For instruments 3202M Series:

- Each bar graduation (6) represents 1 mm, numbered in sequence 10, 20, 30, etc. Each tenth graduation represents 10 mm, numbered in sequence 10 (10 mm), 20 (20 mm). The dial has its display graduated in 100 parts, each one representing 0.02 mm. Each fifth trace is numbered in sequence .1 (0.1 mm), .2 (0.2 mm), allowing direct reading two hundredths of a mm (a complete revolution of the dial represents 2 mm).
- To take the reading on the instrument, first count how many mm exist between the zero trace of the bar and the left side of the slide (zero reference of the slide). Then, look for the graduation indicated for the dial hand and write down its value in .02 mm. Add the .02 mm reading from the dial indicator to the number from the bar. This is the total reading.

To obtain the reading see the example on fig. 12, adding:

- ... 13.0 mm on the bar
 -66 mm on the dial (each revolution represents 2 mm)
- 13.66 mm is the reading

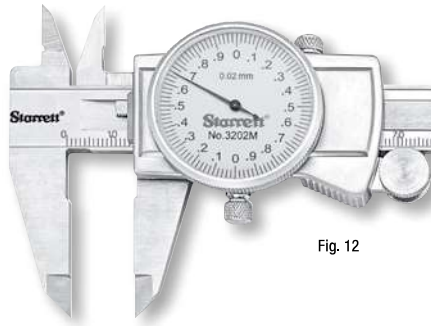


Fig. 12