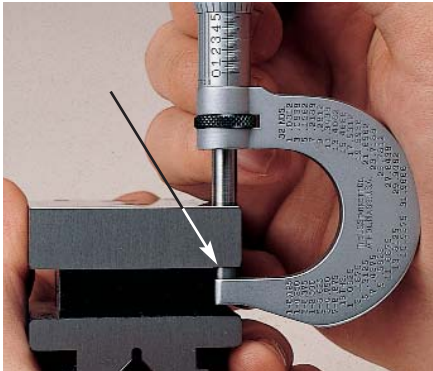
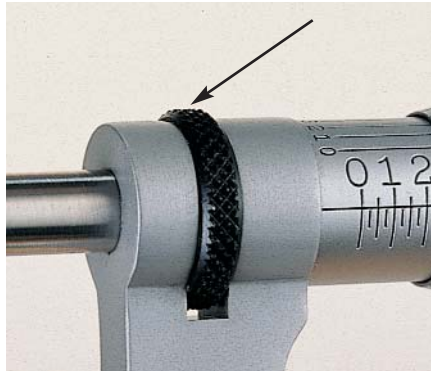




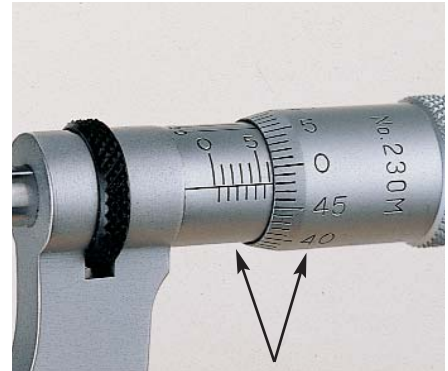
Starrett Reliable Precision Micrometer Design and Manufacturing Features



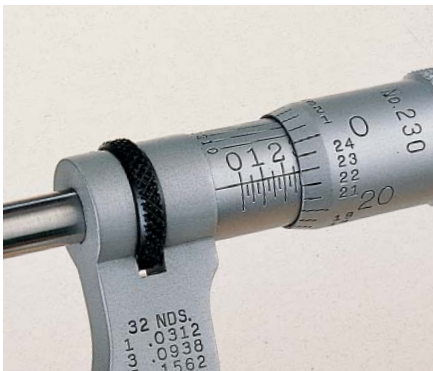
Tapered frame – a Starrett original feature – permits measurements in narrow slots and tight places. Standard with Starrett.



Ring-type lock nut convenient to use. Permits locking of spindle at any reading.



Easy to read with distinct black figures against satin-chrome finish.



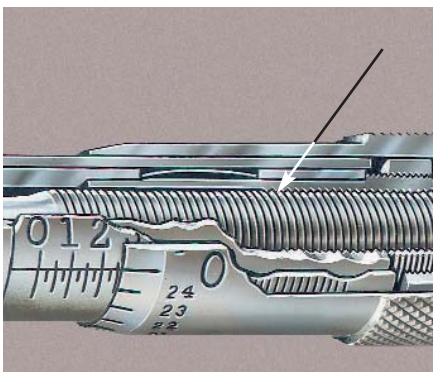
Staggered graduations, advanced design, a Starrett original feature. Quick reading figures on inch reading micrometers. Every graduation numbered for quick, positive identification. **Easy to read** with distinct black figures against satin-chrome finish.



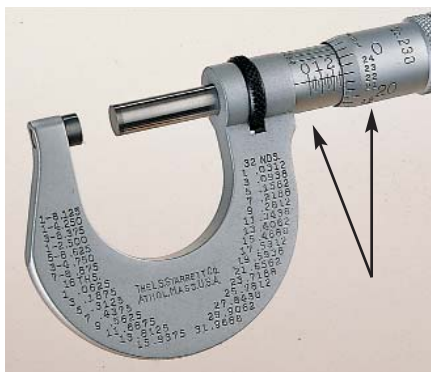
Friction thimble, smooth uniform pressure independent of “feel.”



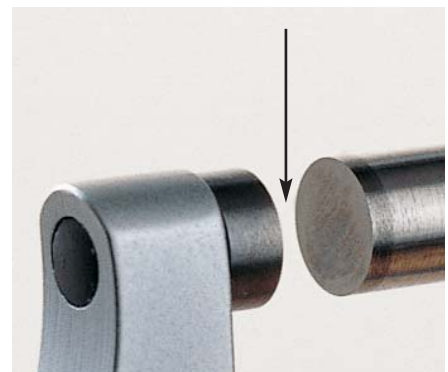
Ratchet stop/speeder for consistent measurements and to speed opening or closing of tool.



EXTRA HARD THREADS WITH EXTREME LEAD ACCURACY. Special high carbon steel gives harder threads which are hardened, stabilized, and precision ground from the solid to insure long and accurate life.



Balanced design; plus no-glare satin chrome finish makes the tool easy to hold and read, plus resistant to stains, corrosion and wear.



MICRO-LAPPED “MIRROR” FINISH on the measuring faces – a Starrett original feature that insures more accurate measurements. Available with carbide faces or hardened, high-carbon steel faces.

NOTE: No. 230 Micrometer series used in illustrations.



Micrometer Quality and Accuracy

Product quality and accuracy cannot be valid unless referenced to a quality and accuracy standard.

All Starrett precision measuring tool standards meet or exceed accuracy and performance specifications of national and international standards and are traceable to the National Institute of Standards and Technology.

The Starrett Company does not rely on statistical sampling inspection. Every precision measuring tool is individually inspected.

Starrett Micrometer Accuracy Standards

(Unless Otherwise Noted on the Catalog Page)

	Range	Readout	Accuracy
Mechanical	1"	.001"	±.0001"
	1"	.0001"	±.00005"
	25mm	0.01mm	±0.002mm
	25mm	0.001mm	±0.002mm
Electronic	1"	.00005"	±.0001"
	25mm	0.001mm	±0.002mm

All Starrett micrometers have the same accurate heads as outlined in the chart. Further inaccuracies because of size can be minimized if the tools are set accurately to

standard, and measurements are carried out in a similar position with similar pressure.

Measuring Tips from Our Experience

- ◆ Most obvious to everyone is to keep the work to be measured and the micrometer anvil and spindle faces clean.
- ◆ For very fine measurements, the micrometer should be set to zero or to a standard by your "feel", by the friction thimble, or by the ratchet, whichever you will be using.
- ◆ The most popular micrometer option has been the ratchet speeder because it does three things well – it speeds opening and closing, it applies uniform pressure from the ratchet, and it allows for using the thimble for individual "feel".
- ◆ The speeder is helpful because it takes forty turns to cover the range of a typical English-reading tool and fifty turns to cover the range of a metric-reading tool.
- ◆ Large micrometers especially should be set to a standard in the same approximate position in which they will be used, that is, vertical or horizontal, to minimize any frame flexure influence.
- ◆ Too much speed in approaching the work will result in an inaccurate measurement.
- ◆ If the micrometer has been set to a flat standard, you can get approximately .0001" (0.0025mm) difference when measuring over a round because the same pressure is being applied to a point or line contact.
- ◆ Carbide or hardened steel measuring faces are a matter of choice. Carbide wears longer but many craftsmen think they get a better "feel" with highly finished steel measuring surfaces.
- ◆ Insulating pads on micrometers are a matter of personal preference. With the Starrett balanced micrometer design, there is no need for insulation. Insulation from hand heat is usually more beneficial on long sections, such as end measuring rods.

How to Adjust Starrett Micrometers

Adjustments to Starrett Micrometers are rarely needed; however, if it becomes necessary, they can be readily adjusted in two easy operations as follows:



1. If any play should develop in the spindle screw threads due to wear of the spindle nut after long use, first back off the thimble, insert the spanner wrench in the slot of the adjusting nut and tighten just enough to eliminate play. Illustration shows how easily this is done.



2. After carefully cleaning all dirt or grit from the measuring faces of anvil and spindle, bring them together and insert the spanner wrench in the small slot of the sleeve. Then turn the sleeve until the line on the sleeve coincides with the zero line on the thimble as shown.



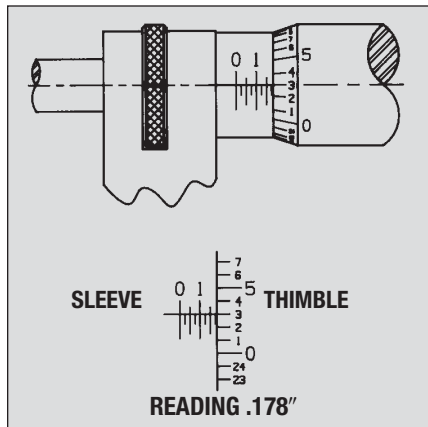
How to Read a Starrett Micrometer Graduated in Thousandths of an Inch (.001")

The pitch of the screw thread on the spindle is 40 threads per inch. One revolution of the thimble advances the spindle face toward or away from the anvil face precisely 1/40" or .025 inches.

The reading line on the sleeve is divided into 40 equal parts by vertical lines that correspond to the number of threads on the spindle. Therefore, each vertical line designates 1/40" or .025 inches. Lines vary in length for easy reading. Every fourth line, which is longer than the others, designates a hundred thousandth. For example: the line marked "1" represents .100" and the line marked "2" represents .200", etc.

The beveled edge of the thimble is divided into 25 equal parts with each line representing .001" and every line numbered consecutively. Rotating the thimble from one of these lines to the next moves the spindle longitudinally 1/25 of .025", or .001". Rotating two divisions represents .002", etc. Twenty-five divisions indicate a complete revolution of .025" or 1/40 of an inch.

To read the micrometer in thousandths, multiply the number of vertical divisions visible on the sleeve by .025", and to this add the number of thousandths indicated by the line on the thimble which coincides with the reading line on the sleeve.



EXAMPLE:
 The "1" line on sleeve is visible, representing100"
 There are 3 additional lines visible, each representing .025"
 3 x .025" = .075"
 Line "3" on the thimble coincides with the reading line on the sleeve, each line representing .001"
 3 x .001" = .003"
 The micrometer reading is178"

How to Read a Starrett Micrometer Graduated in Ten-Thousandths of an Inch (.0001")

Starrett micrometers graduated in ten-thousandths of an inch read like micrometers graduated in thousandths, except that an additional reading in ten-thousandths is obtained from a vernier scale on the sleeve.

The vernier consists of ten divisions on the sleeve, which occupy the same space as nine divisions on the thimble (Fig. B). Therefore, the difference between the width of one of the ten spaces on the vernier and one of the nine spaces on the thimble is one-tenth of a division on the thimble, or one ten-thousandth (.0001").

To read a ten-thousandths micrometer, first obtain the thousandths reading, then see which of the lines on the vernier coincides with a line on the thimble. If it is the line marked "1" on the sleeve, add one ten-thousandth, if it is the line marked "2", add two ten-thousandths, etc.

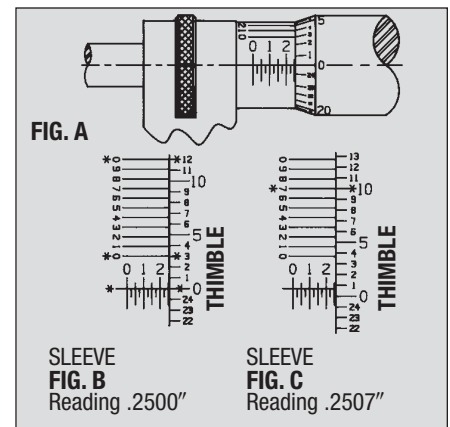


FIGURE C – READING .2507"
 The "2" line on sleeve is visible, representing200"
 There are two additional lines visible, each representing .025"050"
 The reading line on the sleeve lies between the "0" and "1" on the thimble indicating that a vernier reading must be added
 The "7" line is the only line on the vernier that coincides with a line on the thimble, representing
 7 x .0001" = .0007"
 The micrometer reading is2507"



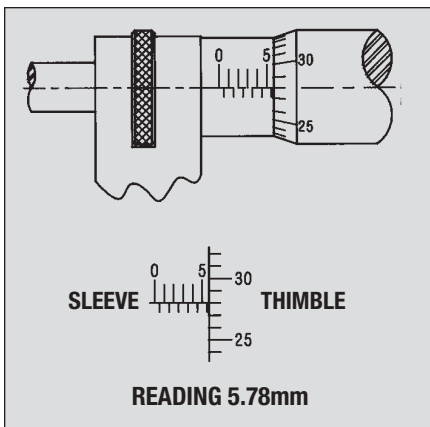
How to Read a Starrett Micrometer Graduated in Hundredths of a Millimeter (0.01mm)

The pitch of the screw thread is one-half millimeter (0.5mm). One revolution of the thimble advances the spindle face toward or away from the anvil face precisely 0.5mm.

The reading line on the sleeve is graduated above the line in millimeters (1.0mm) with every fifth millimeter being numbered from 0 to 25. Each millimeter is also divided in half (0.5mm) below the reading line. It requires two revolutions of the thimble to advance the spindle 1.0mm.

The beveled edge of the thimble is divided into fifty equal parts, with each line representing 0.01mm and every fifth line being numbered from 0 to 50. Rotating the thimble from one of these lines to the next moves the spindle longitudinally 0.01mm; rotating two divisions represents 0.02mm, etc.

To read the micrometer, add the number of millimeters and half-millimeters visible on the sleeve to the number of hundredths of a millimeter indicated by the thimble graduation which coincides with the reading line on the sleeve.



EXAMPLE:

The 5mm sleeve graduation is visible 5.00mm
 One additional 0.5mm line is visible on the sleeve 0.50mm
 Line 28 on the thimble coincides with the reading line on the sleeve, so 28 x 0.01mm = 0.28mm
 The micrometer reading is 5.78mm

How to Read a Starrett Vernier Micrometer Graduated in Two-Thousandths of a Millimeter (0.002mm)

Metric vernier micrometers graduated in 0.002mm are used like those graduated in hundredths of a millimeter (0.01mm), except that an additional reading in two-thousandths of a millimeter (0.002mm) is obtained from a vernier scale on the sleeve.

The vernier consists of five divisions on the sleeve, which occupy the same space as nine divisions on the thimble (Fig. B). Therefore, the difference between the width of one of the five spaces on the vernier and one of the nine spaces on the thimble is one-fifth or two-tenths of a division on the thimble, or two-thousandths (0.002mm).

To read a 0.002mm micrometer, first obtain the hundredth of a millimeter (0.01mm) reading, then see which of the lines on the vernier coincides with a line on the thimble. If it is the line marked "2" add 0.002mm, if it is the line marked "4" add 0.004mm, etc.

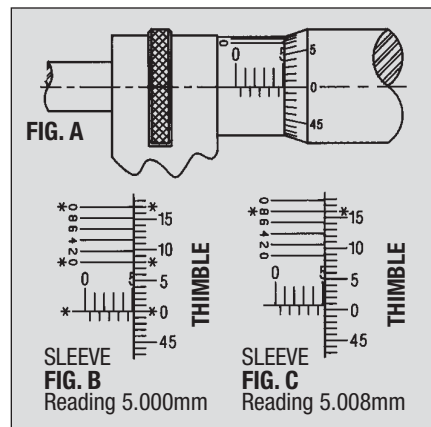


FIGURE C – READING 5.008mm

The 5mm sleeve graduation is visible 5.000mm
 No additional lines on the sleeve are visible 0.000mm
 The reading line on the sleeve lies between zero and the first line on the thimble, indicating that a vernier reading must be added.
 Line 8 on the vernier is the only line that coincides with a line on the thimble 0.008mm
 The micrometer reading is 5.008mm

How to Read a Starrett Vernier Micrometer Graduated in One-Thousandth of a Millimeter (0.001mm)

Reading a 0.001mm micrometer is exactly like reading a 0.002mm micrometer except that there are ten divisions on the vernier occupying the same space as nine divisions on the thimble (Fig. B). Therefore, the difference between the width of one of the spaces on the vernier and one of the nine spaces on the thimble is one-tenth of a division on the thimble, or one-thousandth (0.001mm).

First obtain the hundredth of a millimeter (0.01mm) reading. Next, see which of the lines on the vernier coincides with a line on the thimble. If it is the first line add 0.001mm to the reading, if it is the second line add 0.002mm, etc. Only every second vernier line is numbered on a 0.001mm reading tool because of space congestion.

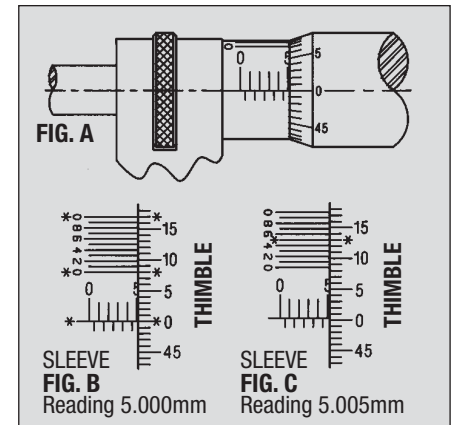


FIGURE C – READING 5.005mm

The 5mm sleeve graduation is visible, representing 5.000mm
 No additional lines on the sleeve are visible 0.000mm
 The reading line on the sleeve lies between zero and the first line on the thimble, indicating that a vernier reading must be added
 Line 5 on the vernier is the only line that coincides with a line on the thimble 0.005mm
 The micrometer reading is 5.005mm