

Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

High-Accuracy Digimatic Micrometer SERIES 293

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

- Enabling 0.1 μm resolution measurement, this micrometer is ideal for customers who need to make highly accurate measurements with a hand-held tool.
- The High-Accuracy Digimatic Micrometer utilizes Mitutoyo's innovative 0.1 μm resolution ABS (absolute) rotary sensor*1 and high-accuracy screw machining technology to reduce the instrumental error to $\pm 0.5 \mu\text{m}$, delivering higher accuracy without sacrificing operability.

*1. Patent pending in Japan, the United States of America, the European Union, and China.

- A highly rigid frame and high-performance constant-force mechanism*2 enable more stable measurement, while the clicks emitted while the workpiece is being measured assure the operator that measurement is proceeding normally.

*2. Patent pending in Japan, the United States of America, the European Union, and China.

- Body heat transferred to the instrument is reduced by a (removable) heat shield, minimizing the error caused by thermal expansion of the frame when performing handheld measurements.

- The ABS (absolute) rotary sensor also eliminates the need to perform origin setting each time the power is turned on, letting you start measuring straight away. With no possibility of overspeed errors, the High-Accuracy Digimatic Micrometer also delivers a higher level of reliability.
- The High-Accuracy Digimatic Micrometer has a range of features to enable flexible measurement including switchable resolution (0.0001 mm / 0.0005 mm), function lock and preset.
- Carbide-tipped measuring faces



Function lock



293-100-10

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo



Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).

An inspection certificate is supplied as standard. Refer to page X for details.

ABSOLUTE[™] Absolute Encoder

Technical Data

Measuring force: 7 to 9 N
Power supply: Lithium battery (CR2032) x 1
Battery life: Approx. two years when used under normal conditions

Functions

Preset (ABS measurement system):

The measurement origin can be preset to any value within the display range for convenience in measuring.

Zero-setting (INC measurement system):

The display can be zeroed at any position of the spindle, making comparison measurement easier. Returning to the absolute-measurement mode is easily accomplished.

Hold:

The displayed value is held while the spindle is withdrawn and the micrometer moved so that the display can be read at the operator's convenience. After cancelling the hold, the instrument returns to the previous measuring mode (absolute or incremental).

Resolution switching:

The resolution of the display can be switched. If 0.1 μm measurement is not required, the resolution can be switched to 0.5 μm .

Function lock:

Functions such as preset or zero-set can be locked to avoid inadvertently changing the origin position.

On/off:

The power can be turned off after measurement is complete. Even after the power is turned off, the origin or last zero-set position remains in the memory.

Auto power off:

Even if the power is left on, the power turns off automatically if the micrometer is not used within a 20-minute period.

Measurement data output:

Measurement data can be output, allowing easy incorporation of this instrument into a statistical process control or measurement system.

Error alarm:

In the unlikely event of a display overflow or calculation error, an error message is displayed and measurement stops. Measurement cannot continue until the error is corrected.

Also, if the battery voltage drops below a certain point, the battery indicator will turn on before measurement becomes impossible, warning the user that the battery needs to be replaced.

Standard Accessories

Heat shield (**04AAB969A: 293-100-10**
04AAB969B: 293-130-10) x 1

Lithium battery CR2032 (1 pc),
for initial operational checks (standard accessory)
Spanner (**200877**) x 1
Screwdriver (**04AAB985**) x 1
Cleaning paper for measuring faces
Inspection certificate



With heat shield*
attached

Heat shield



Optional Accessories

Connecting cables with output switch

1 m: **05CZA662**

2 m: **05CZA663**

USB Input Tool Direct

USB-ITN-B (2 m): 06AFM380B

Connecting cables for U-WAVE-T

02AZD790E 160 mm

For foot switch: **02AZE140E**

Refer to page B-68 for details

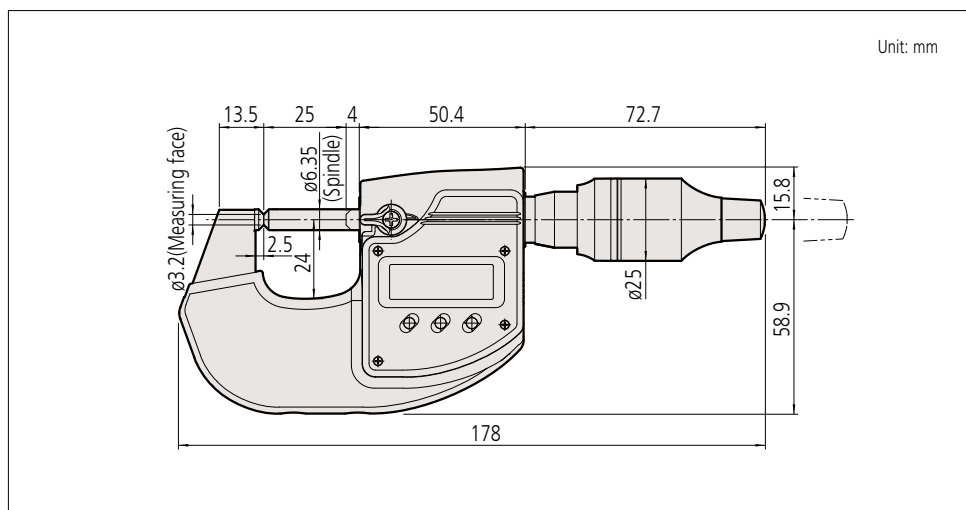
Cleaning paper for measuring faces (1000 sheet): **04AZB581**



Recommended micrometer stand: **MS-RB (156-101-10)**



DIMENSIONS



SPECIFICATIONS

Metric					
Order No.	Range	Resolution	Accuracy*	Anvil/spindle faces	Mass
293-100-10	0 - 25 mm	0.0001/0.0005 mm (switchable)	±0.5 µm	ø3.2 mm	400 g

* Excluding quantizing error of ±1 count

Inch/Metric					
Order No.	Range	Resolution	Accuracy*	Anvil/spindle faces	Mass
293-130-10	0 - 1 in	0.000005/0.00002 in 0.0001/0.0005 mm (switchable)	0.00002 in	ø3.2 mm	400 g

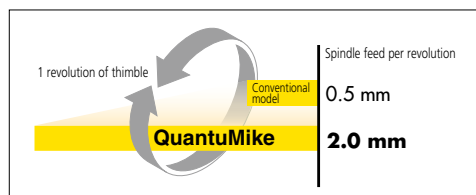
* Excluding quantizing error of ±1 count

Micrometer

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QuantuMike SERIES 293 — IP65 Micrometer with 2 mm/rev Spindle Feed

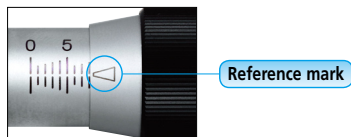
- Advanced pioneering technology has created the next generation of micrometer, the most revolutionary advance in micrometer technology since James Watt invented the instrument.
- Faster measurement is achieved by using a coarser thread which feeds the spindle by 2 mm per revolution of the thimble. This increase in thread lead has been made possible thanks to new high precision thread-cutting and testing techniques.



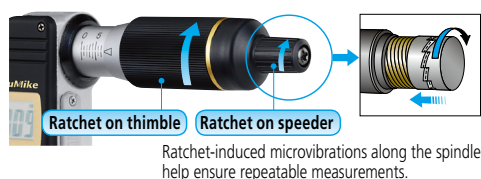
- QuantuMike is equipped with a function lock feature to prevent the origin point being moved by mistake during measurement.



- A graduated scale is provided on the sleeve for use with a reference mark on the thimble so that every millimeter displacement can be checked to provide extra confidence.

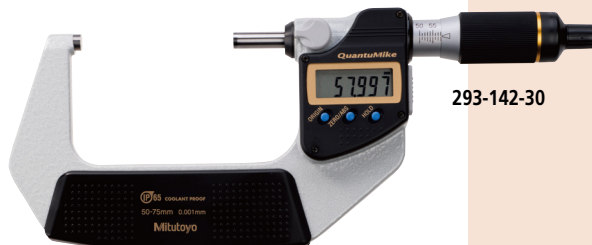


- The ratchet thimble mechanism helps ensure repeatable results by transmitting microvibrations along the spindle to the contact face to provide a constant measuring force and encourage good contact with the workpiece. The ratchet works from the thimble as well as the speeder so it is always easy to use – even when making measurements one-handed. The sound of the ratchet provides the user with a sense of confidence and the speeder enables the rapid spindle feed needed when measuring widely different dimensions.



- A statistical process control system and a measurement network system can be established to share information regarding quality with a model equipped with the data output function. (Refer to page A-3 for details.)
- There is a lineup of convenient Interface Input Tools which enable the conversion of measurement data to keyboard signals and directly input them to cells in off-the-shelf spreadsheet software such as Excel. (Refer to page A-13 for details.)
- Excellent resistance against oil, water and dust (IP65 protection level) enables this product to be used in machining situations that include splashing coolant fluid.
- Measuring faces: Carbide.

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo



- The name QuantuMike is from Quantum and Micrometer, reflecting our belief this tool represents a quantum leap in micrometer ergonomics.



Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).



These marks indicate that a product has successfully passed IP65-level testing, which is carried out by the independent German certification organization TÜV Rheinland.



An inspection certificate is supplied as standard. Refer to page X for details.

IP Codes

Level 6: Dust -proof.

No ingress of dust allowed.

Level 5: Protected against water jets.

Water projected in jets against the enclosure from any direction shall have no harmful effects.

Technical Data

Dust/Water protection level: IP65 (IEC60529)*2

Measuring force: 7 to 12 N*3

Battery: **SR44** (1 pc), **938882**, for initial operational checks (standard accessory)

Length standard: Electromagnetic rotary sensor

Battery life: Approx. 1.2 years under normal use

Standard accessories: Reference bar, 1 pc

(except for 0-25 mm (0-1 in) models)

Spanner (**301336**), 1 pc

*2 Rustproofing shall be applied after use.

*3 Measuring force when using the speeder ratchet (Apply a measuring force in the same condition as for measurement and then set the origin.)

Functions

Origin point setting (ABS length measurement system):

Pressing the ORIGIN button resets the ABS origin at the current spindle position. Origin values can be set depending on each size.

Zero setting (INC length measurement system):

A brief press on the ZERO/ABS button sets display to zero at the current spindle position and switches to the incremental (INC) measuring mode. A longer press resets to the ABS measuring mode.

Hold:

Pressing the HOLD button freezes the current value in the display. This function is useful for preserving a measurement in situations of poor visibility when the instrument must be moved away from the workpiece before the reading can be recorded.

Function lock:

This function allows the ORIGIN (origin point setting) function and the ZERO (zero setting) function to be locked to prevent these points being reset accidentally.

Auto power ON/OFF:

The reading on the LCD disappears after this instrument is idle for approx. 20 minutes, but the origin point is retained. Turning the spindle causes the reading on the LCD to reappear.

Data output*4:

Models equipped with this function have an output port for transferring measurement data to a Statistical Process Control (SPC) system.

Error alarm:

In case of an overflow on the LCD or a computing error, an error message appears on the LCD, and the measuring function stops. This prevents an instrument from giving an erroneous reading. Also, when the battery voltage drops to a certain level, the low-battery-voltage alarm annunciator appears well before the micrometer becomes unusable.

*4: Only for the models with SPC data output

Optional Accessories

(Only for models with data output function)

Connecting cables with output switch

1 m: **05CZA662**

2 m: **05CZA663**

USB Input Tool Direct

USB-ITN-B (2 m): **06AFM380B**

Wireless data output **U-WAVE-TM**

264-622 (IP67 type)

264-623 (Buzzer type)

Connecting unit for U-WAVE-TM

02AZF310 (IP67 type)

Refer to page A-15 for details



SPECIFICATIONS

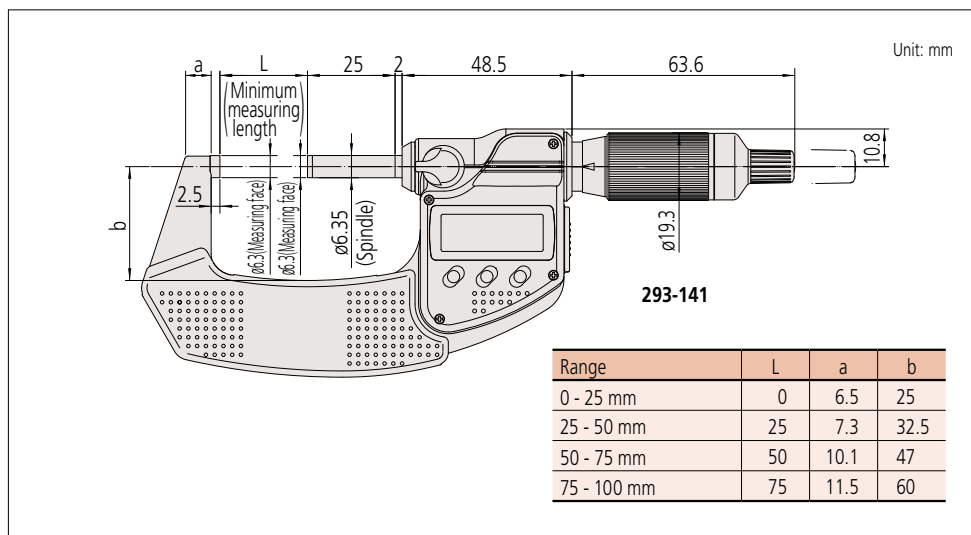
Metric							
	Order No.	Range	Resolution	Accuracy*1	Flatness	Parallelism	Mass
with SPC data output	293-140-30	0 - 25 mm	0.001 mm	±1 μm	0.3 μm	1 μm	265 g
	293-141-30	25 - 50 mm					325 g
	293-142-30	50 - 75 mm		2 μm		465 g	
	293-143-30	75 - 100 mm				620 g	
without SPC data output	293-145-30	0 - 25 mm		±1 μm		1 μm	265 g
	293-146-30	25 - 50 mm					325 g
	293-147-30	50 - 75 mm		2 μm		465 g	
	293-148-30	75 - 100 mm				620 g	

*1 Excluding quantizing error of ±1 count

Inch/Metric							
	Order No.	Range	Resolution	Accuracy*1	Flatness	Parallelism	Mass
with SPC data output	293-180-30	0 - 1 in	0.00005 in/ 0.001 mm	±0.00005 in	0.000012 in	0.00004 in	265 g
	293-181-30	1 - 2 in					325 g
	293-182-30	2 - 3 in		±0.0001 in		0.00008 in	465 g
	293-183-30	3 - 4 in					620 g
without SPC data output	293-185-30	0 - 1 in		±0.00005 in		0.00004 in	265 g
	293-186-30	1 - 2 in					325 g
	293-187-30	2 - 3 in		±0.0001 in		0.00008 in	465 g
	293-188-30	3 - 4 in					620 g

*1 Excluding quantizing error of ±1 count

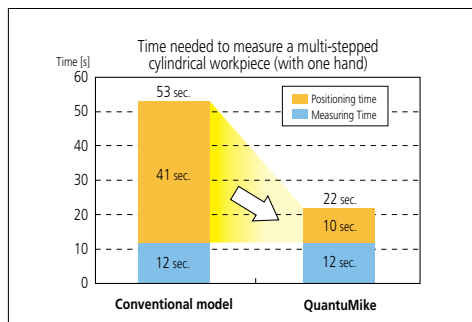
DIMENSIONS



Measuring time on a 6-stepped workpiece with one hand

Thanks to the quick movement, positioning times are reduced by 60 %* and measuring times by 35 %* compared with a conventional micrometer.

*According to Mitutoyo's comparison test data for measuring time on typical workpieces.



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Coolant Proof Micrometers SERIES 293 — with Dust/Water Protection Conforming to IP65 Level

MeasurLink® ENABLED
Data Management Software by Mitutoyo

- World's highest performing micrometer overall.
- Extended battery life of approximately 2.4 years.
- Ergonomic anti-slip frame cover and front panel for more comfortable hand-held measurements.
- Ratchet thimble provides better operability for one-handed operation.
- Oil-resistant material used for all plastic parts.
- Models equipped with a Digimatic output port can form part of a statistical process control or networked measurement system. (Refer to page A-3 for details.)
- Interface Input Tools are available that enable the conversion of measurement data to keyboard signals that are then directly input to cells in off-the-shelf spreadsheet software such as Excel. (Refer to page A-13 for details.)
- Two types of constant-force devices are available: Ratchet Stop and Ratchet Thimble.
- Measuring faces: Carbide.



293-230-30



293-252-30



293-234-30
With ratchet thimble

MeasurLink® ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).



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An inspection certificate is supplied as standard. Refer to page X for details.

IP Codes

Level 6: Dust-proof.

No ingress of dust allowed.

Level 5: Protected against water jets.

Water projected in jets against the enclosure from any direction shall have no harmful effects.

Technical Data

Flatness: 0.3 μm /0.000012 in
Dust/water protection level: IP65 (IEC60529)*1
Measuring force: 5 to 10 N (ratchet thimble type is 7 to 12 N)*2
Battery: **SR44** (1 pc), **938882**, for initial operational checks (standard accessory)
Battery life: Approx. 2.4 years under normal use
Length standard: Electromagnetic rotary sensor
Standard accessories: Reference bar, 1 pc (except for 0-25 mm (0-1 in) models)
Spanner (**301336**), 1 pc

*1 Rustproofing shall be applied after use.

*2 Refer to page B-6 for details.

Optional Accessories

(Only for models with data output function)

Connecting cables with output switch

1 m: **05CZA662**

2 m: **05CZA663**

USB Input Tool Direct

USB-ITN-B (2 m): **06AFM380B**

Wireless data output **U-WAVE**™

U-WAVE-TM **264-622** (IP67 type)

264-623 (Buzzer type)

Connecting unit for U-WAVE-TM

02AZF310 (IP67 type)

Refer to page A-15 for details



Functions

Origin point setting (ABS measurement system):

Resets the ABS origin at the current spindle position to the minimum value of the measuring range and switches to ABS mode.

Zero-setting (INC measurement system):

A brief press on the ZERO/ABS button sets display to zero at the current spindle position and switches to the incremental (INC) measuring mode. A longer press resets to the ABS measuring mode.

Hold:

Pressing the HOLD button freezes the current value in the display. This function is useful for preserving a measurement in situations of poor visibility where the instrument must be moved away from the workpiece before the reading can be recorded.

Data output*1:

Models equipped with this function have an output port for transferring measurement data to a Statistical Process Control (SPC) system.

*1: Only models with the data output function

Auto power ON/OFF:

The reading on the LCD disappears after this instrument is idle for about 20 minutes, but the reading and measurement mode are retained. Turning the spindle causes the reading to reappear.

Error alarm:

In case of an overflow on the LCD or a computing error, an error message appears on the LCD, and the measuring function stops. This prevents an instrument from giving an erroneous reading. Also, when the battery voltage drops to a certain level, the low-battery-voltage alarm annunciator appears well before the micrometer becomes unusable.

Function lock:

This function allows the ORIGIN (origin point setting) function and the ZERO (zero-setting) function to be locked to prevent these points being reset accidentally.

SPECIFICATIONS

Metric							
	Order No	Range	Resolution	Accuracy*	Parallelism	Constant-force device	Mass
with SPC data output	293-230-30	0 - 25 mm	0.001 mm	±1 μm	1 μm	With ratchet stop	270 g
	293-231-30	25 - 50 mm					330 g
	293-232-30	50 - 75 mm		2 μm	470 g		
	293-233-30	75 - 100 mm			625 g		
	293-250-30	100 - 125 mm		±2 μm	3 μm		600 g
	293-251-30	125 - 150 mm					740 g
	293-252-30	150 - 175 mm		±3 μm	4 μm		800 g
	293-253-30	175 - 200 mm					970 g
	293-254-30	200 - 225 mm		±4 μm	5 μm		1100 g
	293-255-30	225 - 250 mm					1270 g
	293-256-30	250 - 275 mm			1370 g		
	293-257-30	275 - 300 mm			1590 g		
	293-234-30	0 - 25 mm		±1 μm	1 μm	With ratchet thimble	280 g
	293-235-30	25 - 50 mm					340 g
293-236-30	50 - 75 mm	±2 μm	2 μm	480 g			
293-237-30	75 - 100 mm			635 g			
without SPC data output	293-240-30	0 - 25 mm	0.001 mm	±1 μm	1 μm	With ratchet stop	270 g
	293-241-30	25 - 50 mm					330 g
	293-242-30	50 - 75 mm		2 μm	470 g		
	293-243-30	75 - 100 mm			625 g		
	293-244-30	0 - 25 mm		±1 μm	1 μm	With ratchet thimble	280 g
	293-245-30	25 - 50 mm					340 g
	293-246-30	50 - 75 mm		±2 μm	2 μm		480 g
	293-247-30	75 - 100 mm					635 g

* Excluding quantizing error of ±1 count

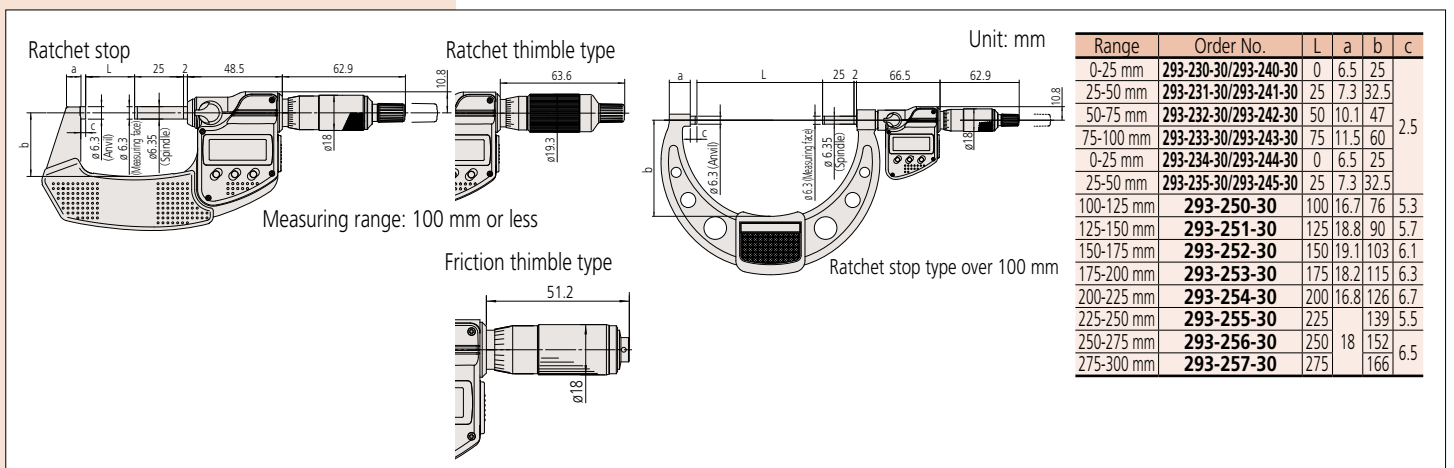
Note: All digits of models over 125 mm (5 in) measuring range are presettable.

Inch/Metric							
	Order No	Range	Resolution	Accuracy*	Parallelism	Constant-force device	Mass
with SPC data output	293-330-30	0 - 1 in	0.00005 in /0.001 mm	±0.00005 in	0.00004 in	With ratchet stop	270 g
	293-331-30	1 - 2 in					330 g
	293-332-30	2 - 3 in		0.00008 in	470 g		
	293-333-30	3 - 4 in			625 g		
	293-350-30	4 - 5 in	0.0001 in /0.001 mm	±0.0001 in	0.00012 in		600 g
	293-351-30	5 - 6 in					740 g
	293-352-30	6 - 7 in		±0.00015 in	0.00016 in		800 g
	293-353-30	7 - 8 in					970 g
	293-354-30	8 - 9 in		±0.0002 in	0.0002 in		1100 g
	293-355-30	9 -10 in					1270 g
	293-356-30	10 - 11 in				1370 g	
	293-357-30	11 - 12 in				1590 g	
	293-334-30	0 - 1 in	0.00005 in /0.001 mm	±0.00005 in	0.00004 in	With ratchet thimble	280 g
	293-335-30					With friction thimble	275 g
293-336-30	1 - 2 in						335 g
without SPC data output	293-340-30	0 - 1 in	0.00005 in /0.001 mm	±0.00005 in	0.00004 in	With ratchet stop	270 g
	293-341-30	1 - 2 in					
	293-342-30	2 - 3 in			0.00008 in		470 g
	293-343-30	3 - 4 in		625 g			
	293-344-30	0 - 1 in		±0.00005 in	0.00004 in	With ratchet thimble	280 g
	293-345-30	1 - 2 in					
	293-346-30	2 - 3 in			0.00008 in		480 g
	293-347-30	3 - 4 in		635 g			
	293-348-30	0 - 1 in		±0.00005 in	0.00004 in	With friction thimble	275 g

* Excluding quantizing error of ±1 count

Note: All digits of models over 125 mm (5 in) measuring range are presettable.

DIMENSIONS



ABSOLUTE™ Absolute Encoder



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(Refer to page X for details.)

IP Codes

Level 6: Dust -proof.

No ingress of dust allowed.

Level 5: Protected against water jets.

Water projected in jets against the enclosure from any direction shall have no harmful effects.

Technical Data

Resolution: 0.001 mm, 0.00005 in/0.001 mm

Accuracy: Refer to the list of specifications.

Measuring force: 5 - 12 N

SR44 (1 pc), **938882**, for initial operational checks (standard accessory)

Battery life: Approx. 5 years under normal use

Approx. 18,000 hours in continuous use

(1 year for No. 293-667/68/69/77/78/79)

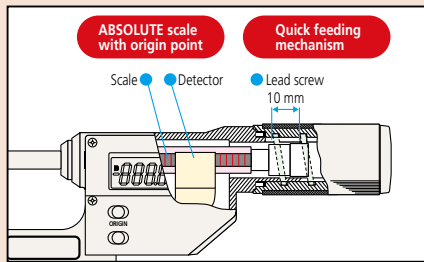
Length standard: Electrostatic capacity absolute sensor

Standard accessories: Reference bar, 1 pc

(except for measuring range 0-30 mm (0-1.2 in) models)

Maximum response speed: without limit

The non-rotating spindle enables even inexperienced operators to perform measurements repeatably and accurately.



Functions

Origin point setting

Zero-setting

Function lock

On/off

Auto power off

Data output

Error alarm

Min Value hold

Optional Accessories

Connecting cables

1 m: **05CZA662**

2 m: **05CZA663**

USB Input Tool Direct

USB-ITN-B (2 m): **06AFM380B**

Connecting cables for U-WAVE-T

02AZD790B 160 mm

For foot switch: **02AZE140B**

Refer to page B-68 for details.



Quickmike SERIES 293 — IP65 ABSOLUTE Digimatic Micrometers

- The Quickmike provides a speedy spindle feed of 10 mm per thimble rotation which enables widely differently sized features to be measured quickly.
- Set the origin only once. The absolute linear scale maintains the origin throughout the life of battery, meaning no more zero setting (presetting) or overspeed error.

- Measuring faces: Carbide.
- Supplied with a Ratchet Stop for constant measuring force.
- The lineup includes Blade Micrometer types (refer to page B-49), Disk Micrometer types (refer to page B-35) and Crimp Height Micrometer types (refer to page B-42).



293-666-20



293-667-20



293-668-20



293-669-20

SPECIFICATIONS

Metric						
Order No.	Range	Accuracy*	Flatness	Parallelism	Mass	Output function
293-666-20	0 - 30 mm	±2 μm	0.3 μm	2 μm	275 g	With
293-667-20	25 - 55 mm				340 g	
293-668-20	50 - 80 mm	±3 μm		3 μm	480 g	
293-669-20	75 - 105 mm				585 g	

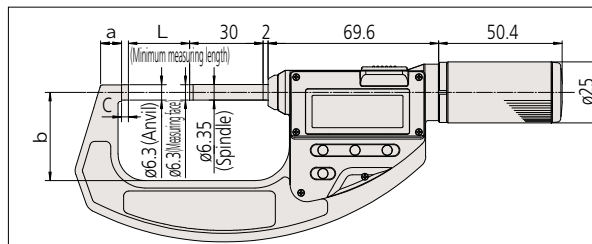
* Excluding quantizing error of ±1 count

Inch/Metric						
Order No.	Range	Accuracy*	Flatness	Parallelism	Mass	Output function
293-676-20	0 - 1.2 in	±0.0001 in	0.000012 in	0.00008 in	275 g	With
293-677-20	1 - 2.2 in				340 g	
293-678-20	2 - 3.2 in	±0.00015 in		0.00012 in	480 g	
293-679-20	3 - 4.2 in				585 g	

* Excluding quantizing error of ±1 count

DIMENSIONS

Unit: mm					
Range	L	a	b	c	
0 - 30	0	7	25	2	
25 - 55	25	8.5	36		
50 - 80	50	10.3	47	2.8	
75 - 105	75	10.7	60		



Micrometer

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ABSOLUTE Digimatic Micrometers SERIES 227 — with Adjustable Measuring Force

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

- Digimatic micrometer dedicated to applications requiring a constant/low measuring force such as measuring wire, paper, and plastic/rubber parts.
- Ratchet mechanism in the thimble applies constant force to workpiece.
- Compact and easy to handle.
- Measuring force is adjustable (in steps) to suit various kinds of workpieces.
- High-accuracy measurement can be performed even by unskilled operators due to the repeatability of the automatically applied measuring force.
- Non-rotating spindle.
- Measuring faces: Carbide.



227-201-20

SPECIFICATIONS

Metric								
Order No.	Range	Measuring force	Resolution	Accuracy*	Measuring force	Accuracy of the selected measuring force*1	Repeatability of measuring force*1	Mass
227-201-20	0 - 15 mm	0.5 - 2.5 N	0.001 mm	±2 μm	0.5, 1.0, 1.5, 2.0, 2.5 N	± (0.1+ the selected measuring force/10) N	within 0.1 N	300 g
227-203-20	15 - 30 mm							380 g
227-205-20	0 - 10 mm	2 - 10 N	0.001 mm	±2 μm	2, 4, 6, 8, 10 N	± (0.4+ the selected measuring force/10) N	within 0.4 N	345 g
227-206-20	10 - 20 mm							425 g
227-207-20	20 - 30 mm							415 g

* Excluding quantizing error of ±1 count

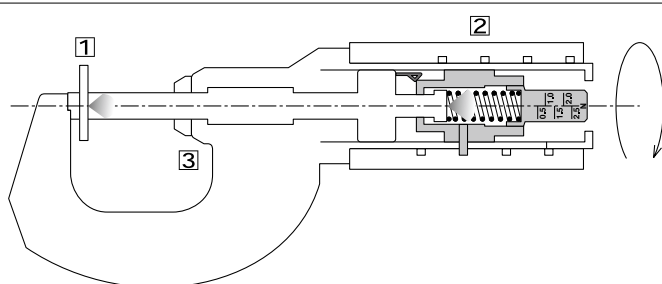
* 1: These values are guaranteed used in a horizontal orientation (within ±3 degrees)

Inch/Metric								
Order No.	Range	Measuring force	Resolution	Accuracy*	Measuring force	Accuracy of the selected measuring force*1	Repeatability of measuring force*1	Mass
227-211-20	0 - 0.6 in	0.5 - 2.5 N	0.00005 in / 0.001 mm	±0.0001 in	0.5, 1.0, 1.5, 2.0, 2.5 N	± (0.1+ the selected measuring force/10) N	within 0.1 N	345 g
227-213-20	0.6 - 1.2 in							380 g
227-215-20	0 - 0.4 in	2 - 10 N	0.00005 in / 0.001 mm	±0.0001 in	2, 4, 6, 8, 10 N	± (0.4+ the selected measuring force/10) N	within 0.4 N	345 g
227-216-20	0.4 - 0.8 in							425 g
227-217-20	0.8 - 1.2 in							415 g

* Excluding quantizing error of ±1 count

* 1: These values are guaranteed used in a horizontal orientation (within ±3 degrees)

Constant-Measuring-Force Mechanism



- ① Measuring force is generated by the action of trapping a workpiece between the spindle face and the anvil.
- ② The constant-force unit applies the specified measuring force.
- ③ When the preset measuring force is reached, the count on the LCD is automatically held and the hold symbol appears.
(To cancel the hold, reverse the thimble more than 1/10 revolution and press the hold button.)

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).

ABSOLUTE[™] Absolute Encoder

Technical Data

Flatness: 0.3 μm/0.00012 in
Parallelism: 2 μm/0.0008 in
Measurement posture: horizontal orientation only
(Recommended spindle inclination: within ±3°)

SR44 (1 pc), **938882**, for initial operational checks (standard accessory)
Battery life: Approx. 5 years under normal use
Approx. 18,000 hours in continuous use
Length standard: Electrostatic capacity absolute sensor
Standard accessories: Reference bar, 1 pc
(except for measuring range 0-15 mm (0-0.6 in) / 0-10 mm (0-0.4 in) models)
Screwdriver (210183), 1 pc

Functions

Preset
Zero setting
Hold
Function Lock
On/off
Auto power off
Data output
Error alarm
Adjustable measuring force mechanism

Optional Accessories

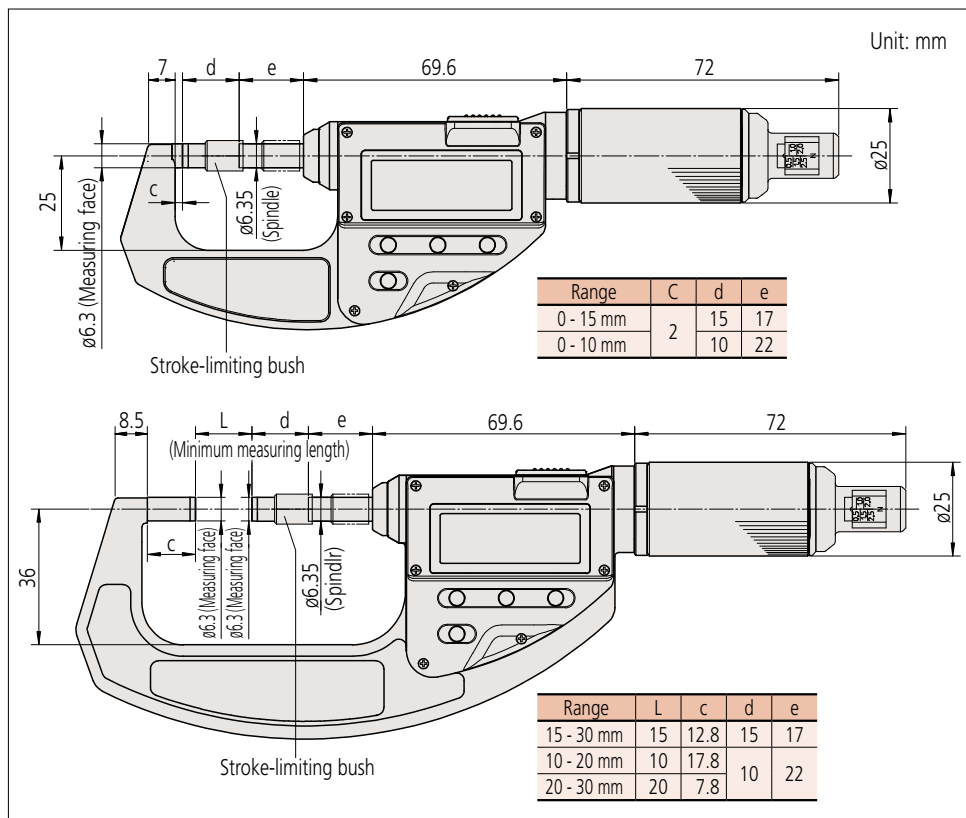
Connecting cables
1 m: **05CZA662**
2 m: **05CZA663**
USB Input Tool Direct
USB-ITN-B (2 m): **06AFM380B**
Connecting cables for **U-WAVE-T**
02AZD790B 160 mm
For foot switch: **02AZE140B**
Refer to page B-68 for details.

Adjustable Measuring Force

To preset the measuring force, adjust the measuring force setting scale on the thimble with the screwdriver supplied.



DIMENSIONS



Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

Outside Micrometers SERIES 102

- Heat-insulated frame.
- Cut-away frame (behind anvil) for measuring in hard-to-reach places.
- A ratchet stop or a friction thimble for a constant measuring force.
- Measuring faces: Carbide.



Ratchet stop
102-301



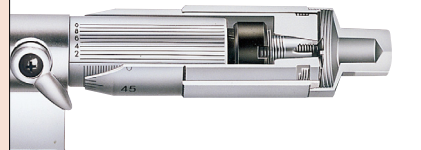
An inspection certificate is supplied as standard.
Refer to page X for details.

Common specifications:
Standard accessories: Reference bar, 1 pc
(except for measuring range 0-25 mm models)
Spanner (301336), 1 pc
(for measuring range 0-25 mm / 25-50 mm models)
Spanner (200877), 1 pc
(for measuring range 50-75 mm / 75-100 mm models)

Ratchet stop type



Friction thimble type



SPECIFICATIONS

Metric

Order No.	Range	Graduation	Maximum permissible error J_{MPE}	Flatness	Parallelism	Constant-force device
102-301	0 - 25 mm	0.01 mm	$\pm 2 \mu\text{m}$	0.6 μm	2 μm	Ratchet stop
102-302	25 - 50 mm					

Metric

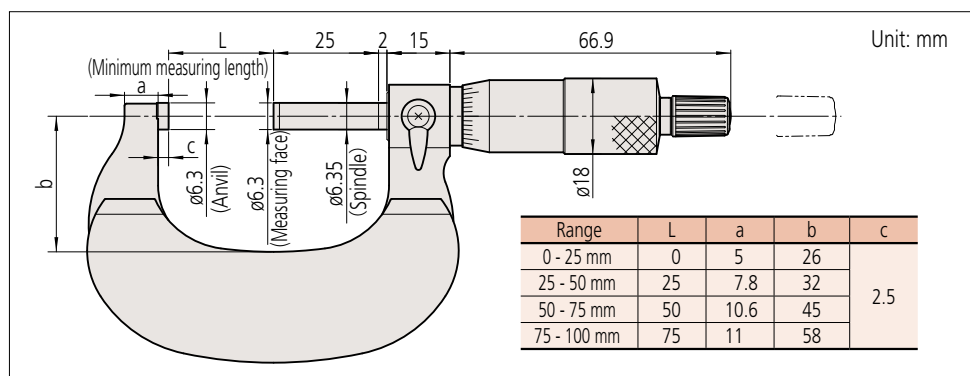
Order No.	Range	Graduation	Accuracy	Flatness	Parallelism	Constant-force device
102-311	0 - 25 mm	0.001 mm	$\pm 1 \mu\text{m}$	0.3 μm	1 μm	Ratchet stop
102-313						friction thimble
102-312	25 - 50 mm	0.01 mm	$\pm 2 \mu\text{m}$	0.6 μm	2 μm	Ratchet stop
102-303	50 - 75 mm					
102-304	75 - 100 mm		$\pm 3 \mu\text{m}$		3 μm	

Metric

Micrometer set

Order No.	Range	Models included
102-911-40	0 - 100 mm (Four micrometers per set)	<ul style="list-style-type: none"> • 102-301 • 102-302 • 102-303 • 102-304 • 3 micrometer standards

DIMENSIONS



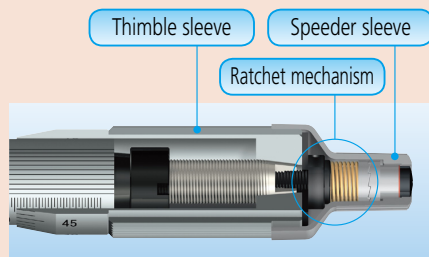


An inspection certificate is supplied as standard.
Refer to page X for details.

Technical Data

Flatness: 0.6 μm /0.000024 in
Parallelism: 2 μm /.00008 in
Measuring force: 5 - 10 N
Standard accessories: Reference bar, 1 pc
(except for measuring range 0-25 mm (0-1 in) models)
Spanner (301336), 1 pc

Internal Structure

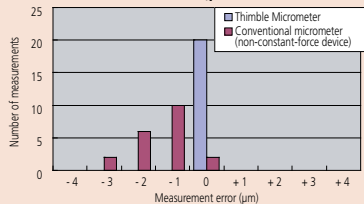


Greatly Improved Accuracy and Repeatability

Measurement results of one-handed operation

A beginner performed a test by measuring a workpiece 20 times using a conventional micrometer and a Ratchet Thimble Micrometer.

Table showing results of test

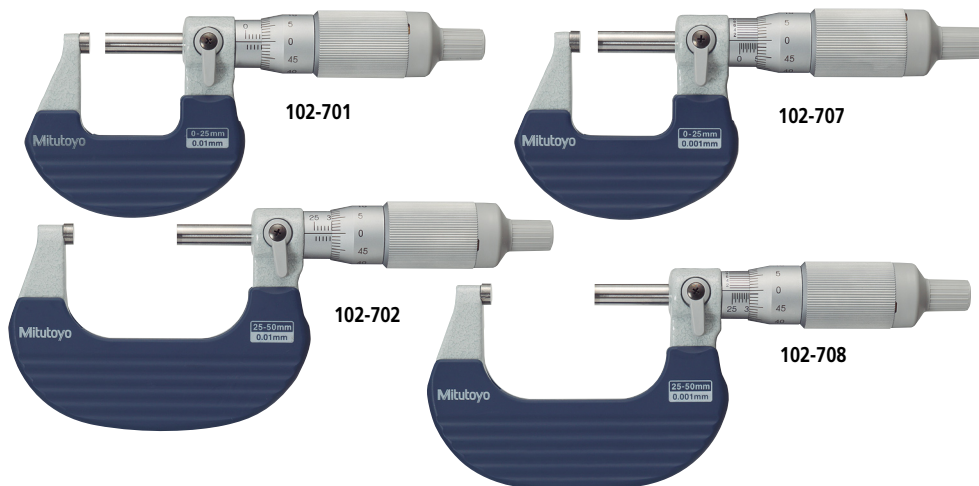
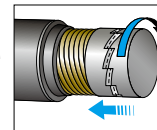


Ratchet Thimble Micrometer SERIES 102 — Outside Micrometers

- More accurate in one-handed operation: inexperienced operators measure significantly more accurately with the new micrometer.
- Ratchet function works both from the thimble and the speeder.



- Rotating the thimble/speeder when the workpiece is between the anvil and spindle causes the ratchet mechanism to operate and apply a constant measuring force to the workpiece.
- Clearly audible ratchet operation for reassurance that measurement is being performed at constant, preset force.
- The speeder is always available for quick rotation of spindle.
- A simple mechanism, which requires neither parts maintenance nor special technique, is employed in the constant-force device.
- Heat-insulated frame.
- Measuring faces: Carbide.

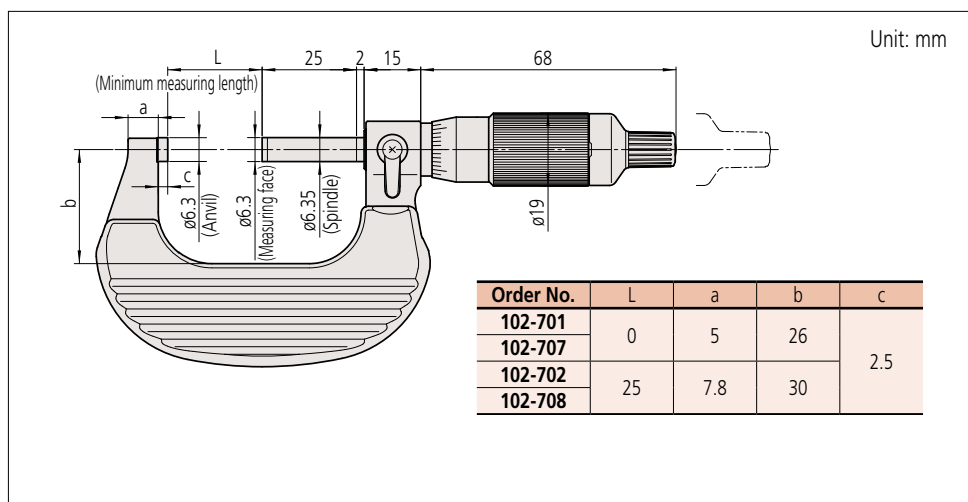


SPECIFICATIONS

Metric				
Order No.	Range	Graduation	Accuracy	Mass
102-701	0 - 25 mm	0.01 mm	$\pm 2 \mu\text{m}$	180 g
102-707		0.001 mm		
102-702	25 - 50 mm	0.01 mm		270 g
102-708		0.001 mm		

Inch				
Order No.	Range	Graduation	Accuracy	Mass
102-717	0 - 1 in	0.0001 in	± 0.0001 in	180 g
102-718	1 - 2 in	0.0001 in		270 g

DIMENSIONS

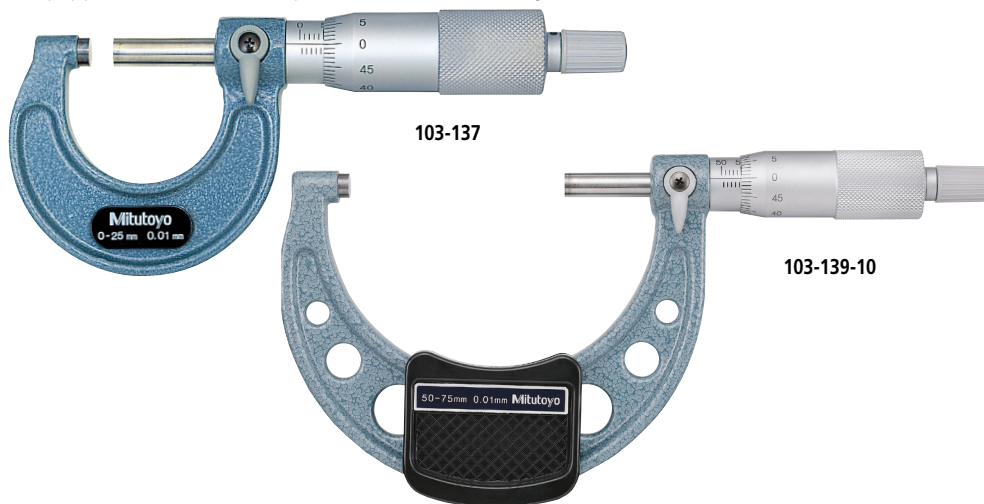


Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

Outside Micrometers SERIES 103

- Baked-enamel-finished frame.
- Measuring faces: Carbide.
- Equipped with Ratchet Stop for constant measuring force.



Metric With ratchet stop			
Order No.	Range	Graduation	Accuracy
103-129	0 - 25 mm	0.001 mm	±2 μm
103-130	25 - 50 mm	0.001 mm	
103-139-10	50 - 75 mm	0.001 mm	
103-140-10	75 - 100 mm	0.01 mm	±3 μm
103-141-10	100 - 125 mm		
103-142-10	125 - 150 mm		
103-143-10	150 - 175 mm	0.01 mm	±4 μm
103-144-10	175 - 200 mm		
103-145-10	200 - 225 mm		
103-146-10	225 - 250 mm	0.01 mm	±5 μm
103-147-10	250 - 275 mm		
103-148-10	275 - 300 mm		
103-149	300 - 325 mm	0.01 mm	±6 μm
103-150	325 - 350 mm		
103-151	350 - 375 mm		
103-152	375 - 400 mm	0.01 mm	±7 μm
103-153	400 - 425 mm		
103-154	425 - 450 mm		
103-155	450 - 475 mm	0.01 mm	±8 μm
103-156	475 - 500 mm		
103-157	500 - 525 mm		
103-158	525 - 550 mm	0.01 mm	±9 μm
103-159	550 - 575 mm		
103-160	575 - 600 mm		
103-161	600 - 625 mm	0.01 mm	±10 μm
103-162	625 - 650 mm		
103-163	650 - 675 mm		
103-164	675 - 700 mm	0.01 mm	±11 μm
103-165	700 - 725 mm		
103-166	725 - 750 mm		
103-167	750 - 775 mm	0.01 mm	±12 μm
103-168	775 - 800 mm		
103-169	800 - 825 mm		
103-170	825 - 850 mm	0.01 mm	±13 μm
103-171	850 - 875 mm		
103-172	875 - 900 mm		
103-173	900 - 925 mm	0.01 mm	±14 μm
103-174	925 - 950 mm		
103-175	950 - 975 mm		
103-176	975 - 1000 mm	0.01 mm	±15 μm

Inch	With ratchet stop		
Order No.	Range	Graduation	Accuracy
103-177	0 - 1 in	0.001 in	±0.0001 in
103-131		0.0001 in	
103-178		0.001 in	
103-132	1 - 2 in	0.0001 in	±0.00015 in
103-179	2 - 3 in	0.001 in	
103-180	3 - 4 in		
103-181	4 - 5 in	±0.0002 in	
103-182	5 - 6 in		0.001 in
103-183	6 - 7 in		
103-184	7 - 8 in	±0.00025 in	
103-185	8 - 9 in		0.001 in
103-186	9 - 10 in		
103-187	10 - 11 in	±0.0003 in	
103-188	11 - 12 in		0.001 in
103-189	12 - 13 in		
103-190	13 - 14 in	±0.00035 in	
103-191	14 - 15 in		0.001 in
103-192	15 - 16 in		
103-193	16 - 17 in	±0.0004 in	
103-194	17 - 18 in		0.001 in
103-195	18 - 19 in		
103-196	19 - 20 in	±0.00045 in	
103-197	20 - 21 in		0.001 in
103-198	21 - 22 in		
103-199	22 - 23 in	±0.0005 in	
103-200	23 - 24 in		0.001 in
103-201	24 - 25 in		
103-202	25 - 26 in	±0.00055 in	
103-203	26 - 27 in		0.001 in
103-204	27 - 28 in		
103-205	28 - 29 in	±0.0006 in	
103-206	29 - 30 in		0.001 in
103-207	30 - 31 in		
103-208	31 - 32 in	±0.00065 in	
103-209	32 - 33 in		0.001 in
103-210	33 - 34 in		
103-211	34 - 35 in	±0.0007 in	
103-212	35 - 36 in		0.001 in
103-213	36 - 37 in		
103-214	37 - 38 in	±0.00075 in	
103-215	38 - 39 in		0.001 in
103-216	39 - 40 in		

Metric With ratchet stop			
Order No.	Range	Graduation	Accuracy
103-137	0 - 25 mm	0.01 mm	±2 μm
103-138	25 - 50 mm	0.01 mm	

Inch With friction thimble			
Order No.	Range	Graduation	Accuracy
103-135	0 - 1 in	0.0001 in	±0.0001 in
103-136	1 - 2 in		



An inspection certificate is supplied as standard. Refer to page X for details.

Technical Data

Measuring Force:

5 - 10 N (for maximum measuring range 300 mm or less)

10 - 15 N (for maximum measuring range 325 mm or more)

Flatness: 0.6 μm/0.000024 in for models up to 300 mm/12 in

1 μm/0.00004 in for models over 300 mm/12 in

Parallelism:

(2 + R/100) μm, R = max, range (mm)

[0.00008+0.00004 (R/4)] in, R = max, range (inch)

*fraction rounded down

Standard accessories: Reference bar, 1 pc

(except for measuring range 0-25 mm (0-1 in) models)

Spanner (301336), 1 pc

(for maximum measuring range up to 300 mm (12 in))

Spanner (200154), 1 pc

(for maximum measuring range 325 mm (13 in) or over)



103-904-10



103-905-10



103-906

Technical Data

Standard accessories:

Reference rod 1 pc.

(Excluding the measuring range 0 - 25 mm)

Spanner (301336) 1 pc.

(Maximum measuring length Less than 300 mm)

Spanner (200154) 1 pc.

(Maximum measuring length More than 325 mm)



Metric Micrometer set / With ratchet thimble

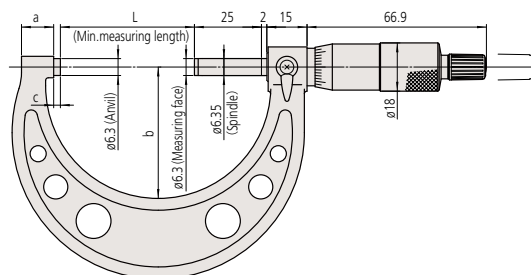
Order No.	Range	Models included
103-927-10	0 - 75 mm (3 pcs./set)	103-137, 103-138, 103-139-10, 2 micrometer standards
103-913-50	0 - 150 mm (6 pcs./set)	103-137, 103-138, 103-139-10, 103-140-10, 103-141-10, 103-142-10, 5 micrometer standards
103-915-10	150 - 300 mm (6 pcs./set)	103-143-10, 103-144-10, 103-145-10, 103-146-10, 103-147-10, 103-148-10, 6 micrometer standards
103-914-50	0 - 300 mm (12 pcs./set)	All micrometers of 103-913-50 and 103-915-10 in one set, 11 micrometer standards

Inch Micrometer set / With ratchet thimble

Order No.	Range	Models included
103-929	0 - 3 in (3 pcs./set)	103-177, 103-178, 103-179, 2 micrometer standards
103-930	0 - 4 in (4 pcs./set)	103-177, 103-178, 103-179, 103-180, 3 micrometer standards
103-904-10	0 - 6 in (6 pcs./set)	103-177, 103-178, 103-179, 103-180, 103-181, 103-182, 5 micrometer standards
103-906	6 - 12 in (6 pcs./set)	103-183, 103-184, 103-185, 103-186, 103-187, 103-188, 6 micrometer standards
103-905-10	0 - 12 in (12 pcs./set)	All micrometers of 103-904-10 and 103-906 in one set, 11 micrometer standards

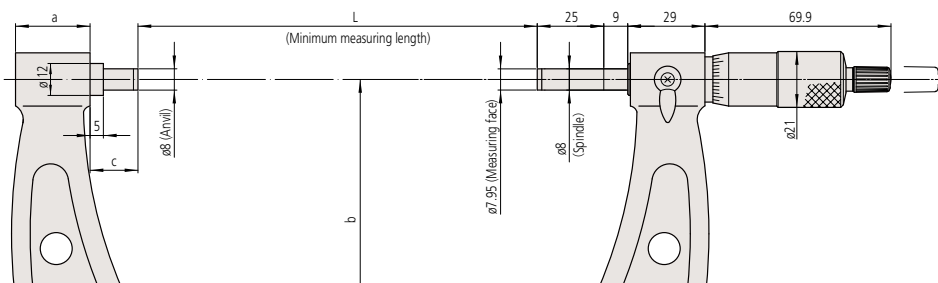
DIMENSIONS

103-137 and 103-138, Models 75mm to 300 mm



Unit: mm

Models 325 mm to 1000 mm



Range	L	a	b	c
0-25 mm	0	9	28	2.5
25-50 mm	25	10	38	
50-75 mm	50	12	49	
75-100 mm	75	14	60	
100-125 mm	100	16.7	79	5.3
125-150 mm	125	18.8	94	5.7
150-175 mm	150	19.1	106	6.1
175-200 mm	175	18.2	118	6.3
200-225 mm	200	16.8	130	6.7
225-250 mm	225	18	143	5.5

Range	L	a	b	c
250-275 mm	250	18	156	6.5
275-300 mm	275		169	
300-325 mm	300		187	
325-350 mm	325		199	
350-375 mm	350	28	212	18
375-400 mm	375		224	
400-425 mm	400		236	
425-450 mm	425		248	
450-475 mm	450		261	
475-500 mm	475		273	

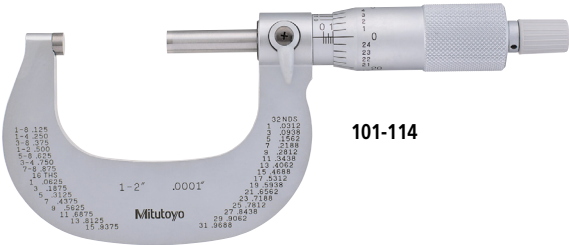
Range	L	a	b	c
500-525 mm	500	28	307	40
525-550 mm	525			15
550-575 mm	550		332	40
575-600 mm	575			15
600-625 mm	600		355	40
625-650 mm	625			15
650-675 mm	650		382	40
675-700 mm	675			15
700-725 mm	700		405	40
725-750 mm	725			15
750-775 mm	750		430	40
775-800 mm	775			15
800-825 mm	800		455	40
825-850 mm	825			15
850-875 mm	850		480	40
875-900 mm	875			15
900-925 mm	900		505	40
925-950 mm	925			15
950-975 mm	950		530	40
975-1000 mm	975			15

Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

Outside Micrometers SERIES 101

- Satin-chrome-finished frame, tapered (on the anvil side) for hard-to-reach places.
- Supplied with a setting standard (except for 0-1 in models).
- Measuring faces: Carbide.

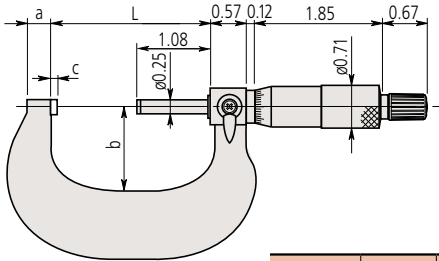


SPECIFICATIONS

Inch	With ratchet stop		
Order No.	Range	Graduation	Accuracy
101-113	0 - 1 in	0.0001 in	±0.0001 in
101-114	1 - 2 in		
101-119	2 - 3 in		
101-120	3 - 4 in		±0.00015 in

Inch	With friction thimble		
Order No.	Range	Graduation	Accuracy
101-117	0 - 1 in	0.0001 in	±0.0001 in
101-118	1 - 2 in		

DIMENSIONS

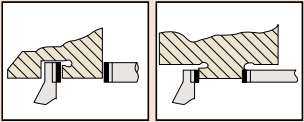


Range	L	a	b	c
0 - 1 in	1.18	0.20	1.10	0.10
1 - 2 in	2.16	0.31	1.28	0.08
2 - 3 in	3.19	0.33	1.77	0.11
3 - 4 in	4.19	0.33	2.28	0.11

Note: The shape of the thimble is different on the model with a friction thimble.

Technical Data

Flatness: 0.000024 in
Parallelism: 0.00008 in for models up to 3 in
0.00012 in for models over 3 in
Standard accessories: Reference bar, 1 pc
(except for measuring range 0-1 in models)
Spanner (301336), 1 pc
(for measuring range 0-1 in / 1-2 in models)
Spanner (200877), 1 pc
(for measuring range 2-3 in / 3-4 in models)



Technical Data

Counter Reading : 0.01 mm or 0.001 in

Flatness: 0.6 µm/0.000024 in

Parallelism:

(2 + R/100) µm, R = max. range (mm)

[0.00008 in + 0.00004(R/4)] in R = max. range (inch)
fraction rounded down

Standard accessories: Reference bar, 1 pc

(except for measuring range 0-25 mm (0-1 in) models)

Spanner (301336), 1 pc

Digit Outside Micrometers SERIES 193

- Mechanical digit counter with 0.01 mm or 0.001 inch resolution for quick and error-free reading.
- Measuring faces: Carbide.

- Equipped with Ratchet Stop for constant measuring force.

SPECIFICATIONS

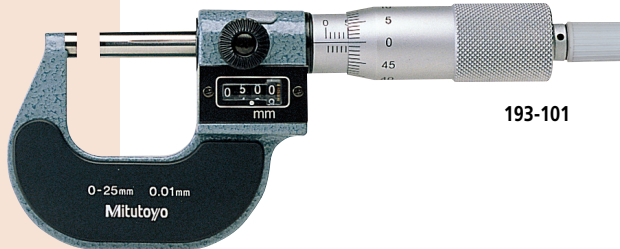
Metric	With ratchet stop		
Order No.	Range	Graduation	Accuracy
193-101	0 - 25 mm	0.01 mm	±2 µm
193-111		0.001 mm	
193-102		0.01 mm	
193-112	25 - 50 mm	0.001 mm	±2 µm
193-103		0.01 mm	
193-113	50 - 75 mm	0.001 mm	±3 µm
193-104		0.01 mm	
193-114		0.001 mm	

Inch	With friction thimble		
Order No.	Range	Graduation	Accuracy
193-211	0 - 1 in	0.0001 in	±0.0001 in
193-212	1 - 2 in		

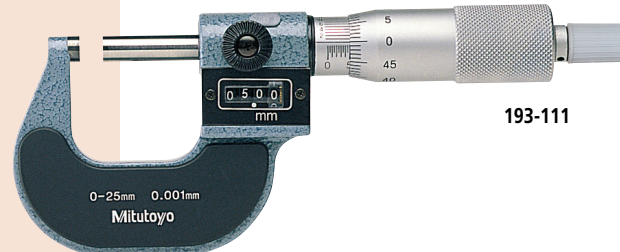
Inch	With ratchet stop		
Order No.	Range	Graduation	Accuracy
193-213	2 - 3 in	0.0001 in	±0.0001 in
193-214	3 - 4 in		±0.00015 in

Metric	Micrometer set	
Order No.	Range	Models included
193-901	0 - 75 mm (3 pcs./set)	• 193-101, 193-102, 193-103 • 2 micrometer standards
193-902	0 - 100 mm (4 pcs./set)	• 193-101, 193-102, 193-103, 193-104 • 3 micrometer standards

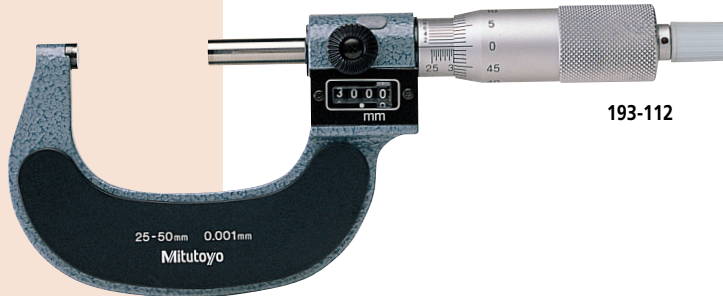
Inch	Micrometer set	
Order No.	Range	Models included
193-923	0 - 3 in (3 pcs./set)	• 193-211, 193-212, 193-213 • 2 micrometer standards



193-101



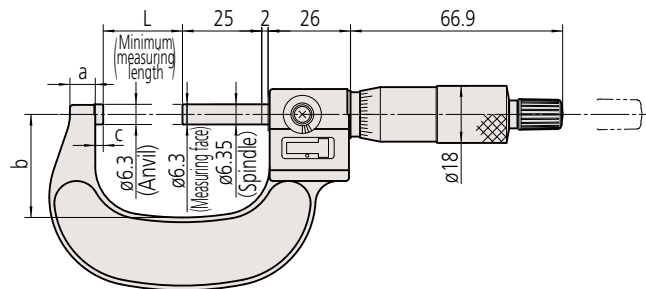
193-111



193-112

DIMENSIONS

Unit: mm



Range	L	a	b	c
0 - 25 mm	0	5	26	2.5
25 - 50 mm	25	8	32	2.0
50 - 75 mm	50	9	45	
75 - 100 mm	75		57	

Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

Outside Micrometers SERIES 406 — Non-Rotating Spindle Type

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

- Non-rotating spindle.
- Measuring face of the spindle is carbide tipped.
- Spindle $\phi 6.35$
- Equipped with Ratchet Stop for constant measuring force.



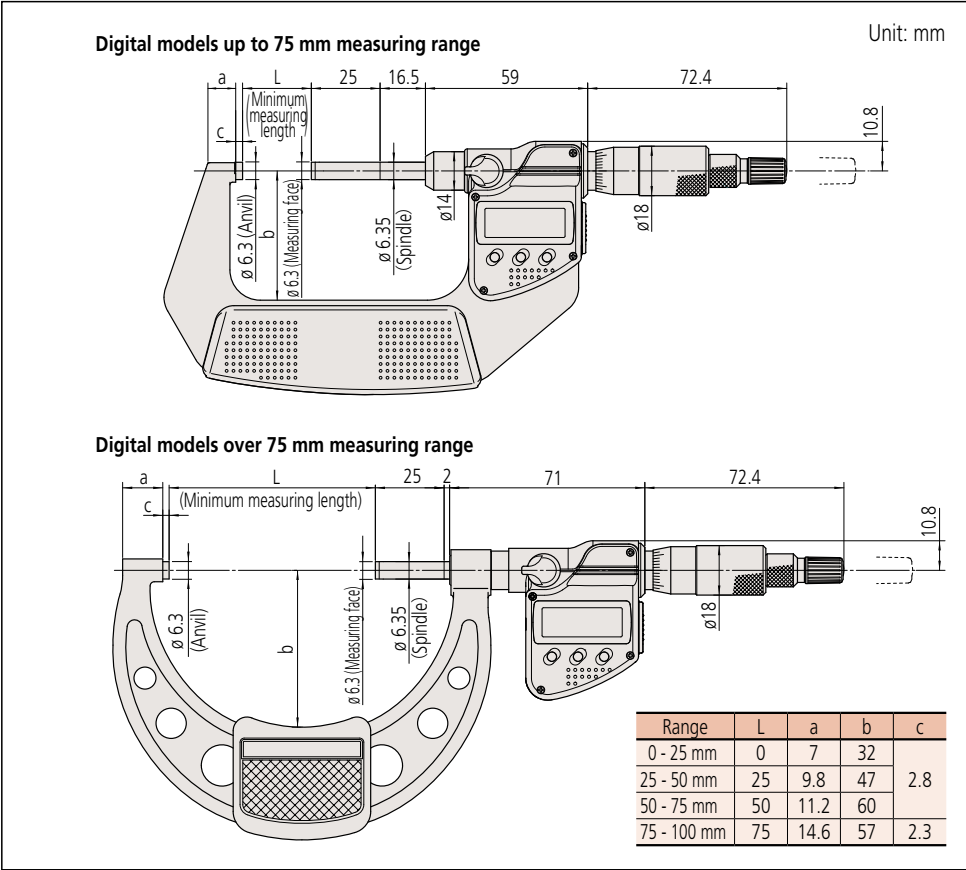
Metric					
Order No.	Range	Resolution	Accuracy*	Flatness	Parallelism
406-250-30	0 - 25 mm	0.001 mm	$\pm 3 \mu\text{m}$	0.3 μm	3 μm
406-251-30	25 - 50 mm				
406-252-30	50 - 75 mm				
406-253-30	75 - 100 mm		$\pm 4 \mu\text{m}$		4 μm

* Excluding quantizing error of ± 1 count

Inch/Metric					
Order No.	Range	Resolution	Accuracy*	Flatness	Parallelism
406-350-30	0 - 1 in	0.00005 in/ 0.001 mm	± 0.00015 in	0.000012 in	0.00012 in
406-351-30	1 - 2 in				
406-352-30	2 - 3 in				
406-353-30	3 - 4 in		± 0.0002 in		0.00016 in

* Excluding quantizing error of ± 1 count

DIMENSIONS



MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).

Technical Data

Battery: **SR44** (1 pc), **938882**, for initial operational checks (standard accessory)
Battery life: Approx. 2.4 years under normal use
Length standard: Electromagnetic rotary sensor
Standard accessories: Reference bar, 1 pc (except for measuring range 0-25 mm (0-1 in) models)
Spanner (301336), 1 pc

Optional Accessories

Connecting cables
1 m: **05CZA662**
2 m: **05CZA663**
USB Input Tool Direct
USB-ITN-B (2 m): **06AFM380B**
Wireless data output **U-WAVE[®] fit**
U-WAVE-TM **264-622** (IP67 type)
264-623 (Buzzer type)
Connecting unit for U-WAVE-TM
02AZF310 (IP67 type)
Refer to page A-15 for details



Flatness: 0.6 μm

Flatness: 0.6 μm

Parallelism:

$(2 + R/100) \mu\text{m}$, $R = \text{max. measuring range (mm)}$
fraction rounded down

Standard accessories: Reference bar, 1 pc
(except for measuring range 0-25 mm models)

Spanner (301336), 1 pc



Dial indicator (0.01 mm) / **2046SB**

Dial indicator (0.01 mm) / **2046SB**

Dial indicator (0.001 mm) / **2109SB-10**

ABS Digimatic Indicator (0.01 mm) / **543-400B**

ABS Digimatic Indicator (0.001 mm) / **543-390B**

*1 Indicators with stems cannot be installed on this micrometer.

- Designed to mount a dial indicator for direct GO/ \pm NG judgment on mass-produced parts.
- Anvil retracting trigger for quick measurement.

- Various kinds of indicators*¹ are selectable depending on the measurement type (accuracy required, measuring range, etc.).
- Measuring faces: Carbide.
- Anvil stroke: 3 mm.



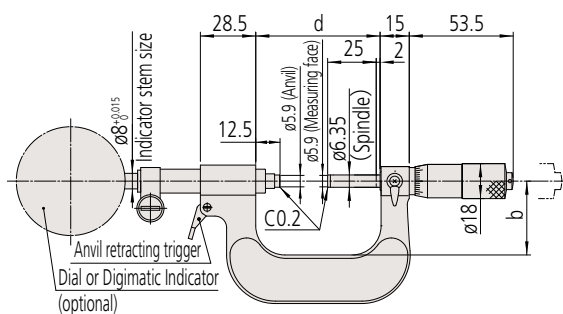
107-201
(Indicator shown is optional)

SPECIFICATIONS

Metric		
Order No.	Range	Accuracy
107-201	0 - 25 mm	±2 μm
107-202	25 - 50 mm	
107-203	50 - 75 mm	
107-204	75 - 100 mm	±3 μm
107-205	100 - 125 mm	
107-206	125 - 150 mm	
107-207	150 - 175 mm	±4 μm
107-208	175 - 200 mm	

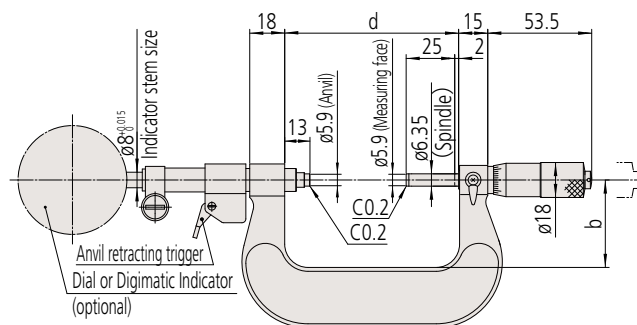
DIMENSIONS AND MASS

Measuring range up to 50 mm

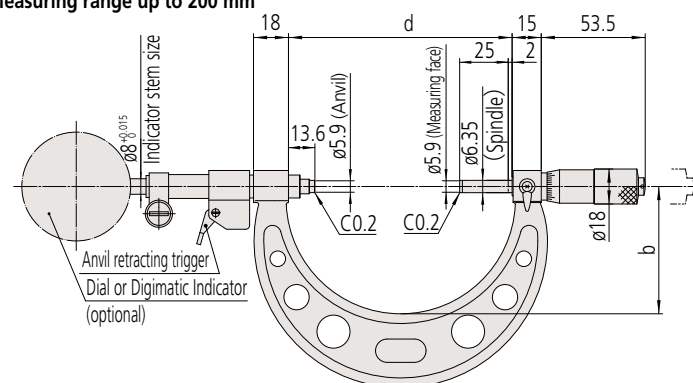


Measuring range up to 75 mm

Unit: mm



Measuring range up to 200 mm



Range	b	d
0 - 25 mm	30	39
25 - 50 mm	38	64
50 - 75 mm	45	89.5
75 - 100 mm	65	115.1
100 - 125 mm	79	140.1
125 - 150 mm	93	165.1
150 - 175 mm	105	190
175 - 200 mm	118	214

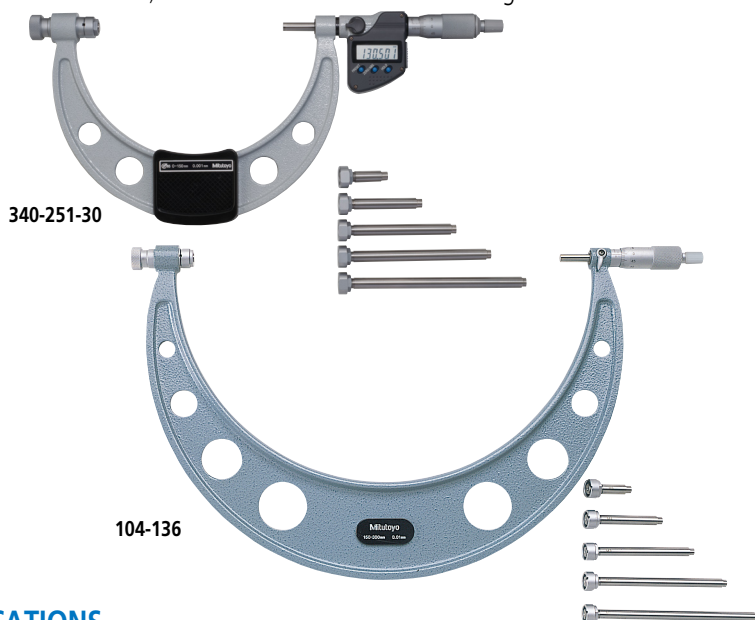
Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

Outside Micrometers SERIES 340, 104 — with Interchangeable Anvils

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

- Wide measuring range with interchangeable anvils.
- Measuring face of the spindle is carbide tipped (standard model).
- IP 65 water/dust protection (series 340)*.
* Models with a measuring range up to 300 mm.
- Equipped with Ratchet Stop for constant measuring force.



SPECIFICATIONS

Metric						
Order No.	Range	Resolution	Interchangeable anvils	Setting Standard		Micrometer head stroke
				Qty	Size	
Digimatic (LCD)						
340-251-30	0 - 150 mm	0.001 mm	6 pcs.	5	25-125 mm	25 mm
340-252-30	150 - 300 mm			6	150-275 mm	
340-520	300 - 400 mm		4 pcs.	4	300-375 mm	
340-521	400 - 500 mm				400-475 mm	
340-522	500 - 600 mm				500-575 mm	
340-523	600 - 700 mm				600-675 mm	
340-524	700 - 800 mm				700-775 mm	
340-525	800 - 900 mm				800-875 mm	
340-526	900 - 1000 mm				900-975 mm	

Metric						
Order No.	Range	Graduation	Interchangeable anvils	Setting Standard		Micrometer head stroke
				Qty	Size	
Analog						
104-171*	0 - 50 mm	0.01 mm	1 pc.	1	25 mm	25 mm
104-139A	0 - 100 mm		4 pcs.	3	25-75 mm	
104-135A	0 - 150 mm		6 pcs.	5	25-125 mm	
104-161A	50 - 150 mm		4 pcs.	4	50-125 mm	
104-140A	100 - 200 mm				100-175 mm	
104-136A	150 - 300 mm		6 pcs.	6	150-275 mm	
104-141A	200 - 300 mm		4 pcs.	4	200-275 mm	
104-142A	300 - 400 mm				300-375 mm	
104-143A	400 - 500 mm				400-475 mm	
104-144A	500 - 600 mm				500-575 mm	
104-145A	600 - 700 mm				600-675 mm	
104-146A	700 - 800 mm				700-775 mm	
104-147A	800 - 900 mm				800-875 mm	
104-148A	900 - 1000 mm				900-975 mm	

* The frame is fitted with a heat shield.

Inch/Metric						
Order No.	Range	Resolution	Interchangeable anvils	Setting Standard		Micrometer head stroke
				Qty	Size	
Digimatic (LCD)						
340-351-30	0 - 6 in	0.00005 in/ 0.001 mm	6 pcs.	5	1 - 5 in	1 in
340-352-30	6 - 12 in	0.0001 in/ 0.001 mm		6	6 - 11 in	
340-720	12 - 18 in				12 - 17 in	
340-721	18 - 24 in				18 - 23 in	
340-722	24 - 30 in				24 - 29 in	
340-723	30 - 36 in				30 - 35 in	

Inch						
Order No.	Range	Interchangeable anvils	Graduation	Setting Standard		Micrometer head stroke
				Qty	Size	
Analog						
104-165	0 - 2 in	1 pc.	0.0001 in	1	1 in	1 in
104-149	0 - 4 in	4 pcs.	0.001 in	3	1 - 3 in	
104-137	0 - 6 in	6 pcs.		5	1 - 5 in	
104-162	2 - 6 in	4 pcs.		4	2 - 5 in	
104-150	4 - 8 in				4 - 7 in	
104-138	6 - 12 in	6 pcs.		6	6 - 11 in	
104-151	8 - 12 in	4 pcs.		4	8 - 11 in	
104-152	12 - 16 in				12 - 15 in	
104-201	12 - 18 in	6 pcs.		6	12 - 17 in	
104-153	16 - 20 in	4 pcs.		4	16 - 19 in	
104-202	18 - 24 in	6 pcs.		6	18 - 23 in	
104-154	20 - 24 in	4 pcs.		4	20 - 23 in	
104-155	24 - 28 in				24 - 27 in	
104-203	24 - 30 in	6 pcs.		6	24 - 29 in	
104-156	28 - 32 in	4 pcs.		4	28 - 31 in	
104-204	30 - 36 in	6 pcs.		6	30 - 35 in	
104-157	32 - 36 in	4 pcs.		4	32 - 35 in	
104-158	36 - 40 in				36 - 39 in	
104-205	36 - 42 in	6 pcs.		6	36 - 41 in	

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).



These marks indicate that a product has successfully passed IP65-level testing, which is carried out by the independent German certification organization TÜV Rheinland.



IP Codes (series 340)

Level 6: Dust -proof.

No ingress of dust allowed.

Level 5: Protected against water jets.

Water projected in jets against the enclosure from any direction shall have no harmful effects.

Technical Data

Flatness:

0.6 µm/ 0.000024 in for models up to 300 mm / 12 in

1.0 µm/ 0.00004 in for models over 300 mm / 12 in

Parallelism:

2 µm/ 0.00008 in for models up to 75 mm / 3 in

3 µm/ 0.00012 in for models up to 150 mm / 6 in

(2+R/100) µm for models over 150 mm,

R= max. range (mm)

Fraction rounded up

±[0.00008 in + .00004 (R/4)] in For models over 6 in

R= max. range (inch)

Fraction rounded up

Accuracy:

±(4+R/75) µm, R = max. range (mm)

±[0.00016 in + 0.00004 (R/3)] in R = max. range (inch)

(excluding quantizing error for digital models)

Fraction rounded up

Excluding quantizing error

Battery for Series 340

SR44 (1 pc), **938882**, for initial operational checks (standard accessory)

Battery life: Approx. 2.4 years under normal use
(for series 340-2XX, 340-3XX)

Approx. 1.8 years under normal use
(for series 340-5XX, 340-7XX)

Length standard: Electromagnetic rotary sensor (for series 340)

Standard accessories: Spanner (301336), 1 pc

(for maximum measuring range up to 300 mm (12 in))

Spanner (200154), 1 pc

(for maximum measuring range 400 mm (16 in) or over)

Optional Accessories

Connecting cables for

340-251-30, **340-252-30**, **340-351-30** and **340-252-30**

Wireless data output **U-WAVE**™

U-WAVE-TM **264-622** (IP67 type)

264-623 (Buzzer type)

Connecting unit for U-WAVE-TM

02AZF310 (IP67 type)

Refer to page A-15 for details

USB Input Tool Direct

USB-ITN-B (2 m): **06AFM380B**

SPC cables for U-WAVE-T w/ data switch (160 mm):

02AZD790B

For foot switch: **02AZE140B**

Connecting cables for

340-5XX, **340-7XX**

Recommended cables:

L-Type (does not interfere with operating the thimble.)

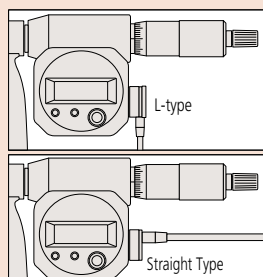
1 m: **04AZB512**

2 m: **04AZB513**

Straight type (may interfere with operating the thimble.)

1 m: **959149**

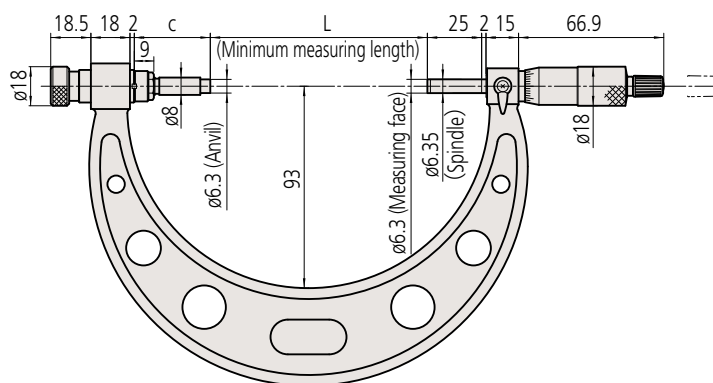
2 m: **959150**



DIMENSIONS

104-135A

Unit: mm

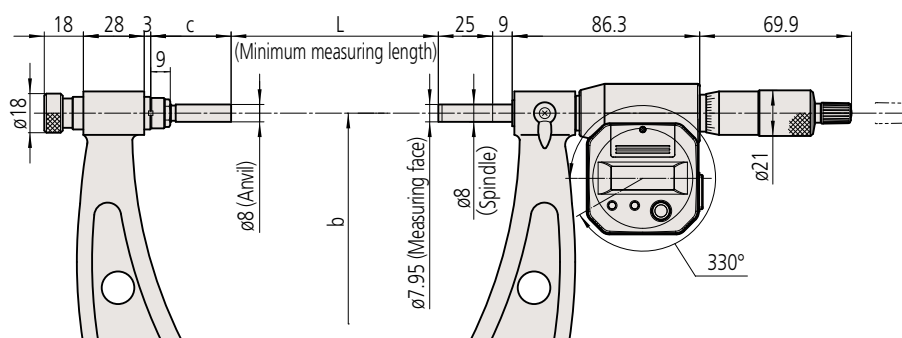


Interchangeable Anvil

		L : Range (mm)					
Range	0 to 150 mm models	0 - 25	25 - 50	50 - 75	75 - 100	100 - 125	125 - 150
Range	150 to 300 mm models	150 - 175	175 - 200	200 - 225	225 - 250	250 - 275	275 - 300
Order No.		303950	303951	303952	303953	303954	303955
c: Overall length (mm)		135	110	85	60	35	10
Interchangeable anvil		M1	M2	M3	M4	M5	M6

		L : Range (mm)			
Range	300 to 400 mm models	300 - 325	325 - 350	350 - 375	375 - 400
Range	400 to 500 mm models	400 - 425	425 - 450	450 - 475	475 - 500
Range	500 to 600 mm models	500 - 525	525 - 550	550 - 575	575 - 600
Range	600 to 700 mm models	600 - 625	625 - 650	650 - 675	675 - 700
Range	700 to 800 mm models	700 - 725	725 - 750	750 - 775	775 - 800
Range	800 to 900 mm models	800 - 825	825 - 850	850 - 875	875 - 900
Range	900 to 1000 mm models	900 - 925	925 - 950	950 - 975	975 - 1000
Order No.		304001	304002	304003	304004
c: Overall length (mm)		87	62	37	12
Interchangeable anvil		M3	M4	M5	M6

Over 400 mm up to 1000 mm



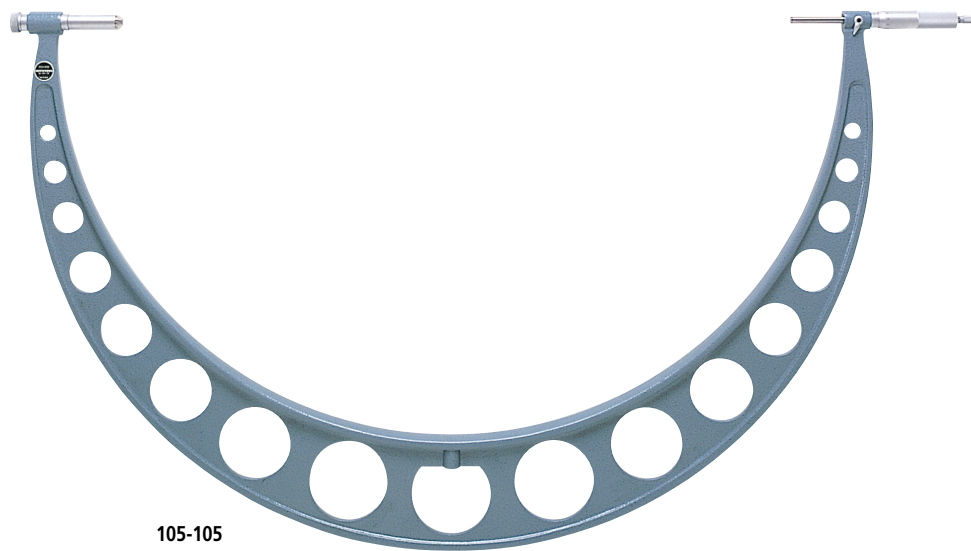
		L : Range (mm)					b
Range	300 to 400 mm models	300 - 325	325 - 350	350 - 375	375 - 400		224
Range	400 to 500 mm models	400 - 425	425 - 450	450 - 475	475 - 500		273
Range	500 to 600 mm models	500 - 525	525 - 550	550 - 575	575 - 600		332
Range	600 to 700 mm models	600 - 625	625 - 650	650 - 675	675 - 700		382
Range	700 to 800 mm models	700 - 725	725 - 750	750 - 775	775 - 800		430
Range	800 to 900 mm models	800 - 825	825 - 850	850 - 875	875 - 900		480
Range	900 to 1000 mm models	900 - 925	925 - 950	950 - 975	975 - 1000		530
Order No.		304001	304002	304003	304004		
c: Overall (mm)		87	62	37	12		
Interchangeable anvil		M3	M4	M5	M6		

Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

Outside Micrometers SERIES 105 — with Anvil Extension Collars

- Adjustable measuring range with extension collars.
- 50 mm / 2 in spindle stroke.
- Measuring faces: Carbide.
- Equipped with Ratchet Stop for constant measuring force.



SPECIFICATIONS

Metric				
Order No.	Range	Graduation	Extension Collars	Setting Standard
105-103	500 - 600 mm	0.01 mm	1 pc (50 mm)	2 pcs.
105-104	600 - 700 mm			
105-105	700 - 800 mm			
105-106	800 - 900 mm			
105-107	900 - 1000 mm			

Technical Data

Flatness: 1.3 μ m
Parallelism:
(2 + R/100) μ m, R = max. range (mm)
fraction rounded down
Accuracy:
 $\pm(6+R/75)$ μ m, R = max. range (mm)
fraction rounded up
Standard accessories: Spanner (200154), 1 pc

Anvil Extension Collar



Measuring range 700 to 750 mm
with **105-105**



Measuring range 750 to 800 mm
with **105-105**

Technical Data

Flatness: 1.3 μm /0.000052 in

Parallelism:

($2 + R/100$) μm , R = max. Range (mm)

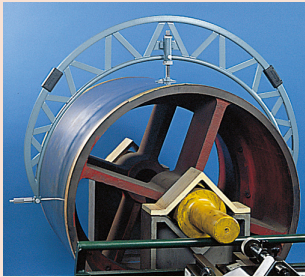
[0.00008 in + 0.00004(R/4)] in, R = max. Range (inch)
fraction rounded down

Accuracy:

$\pm(6+R/75)$ μm , R = max. Range (mm)

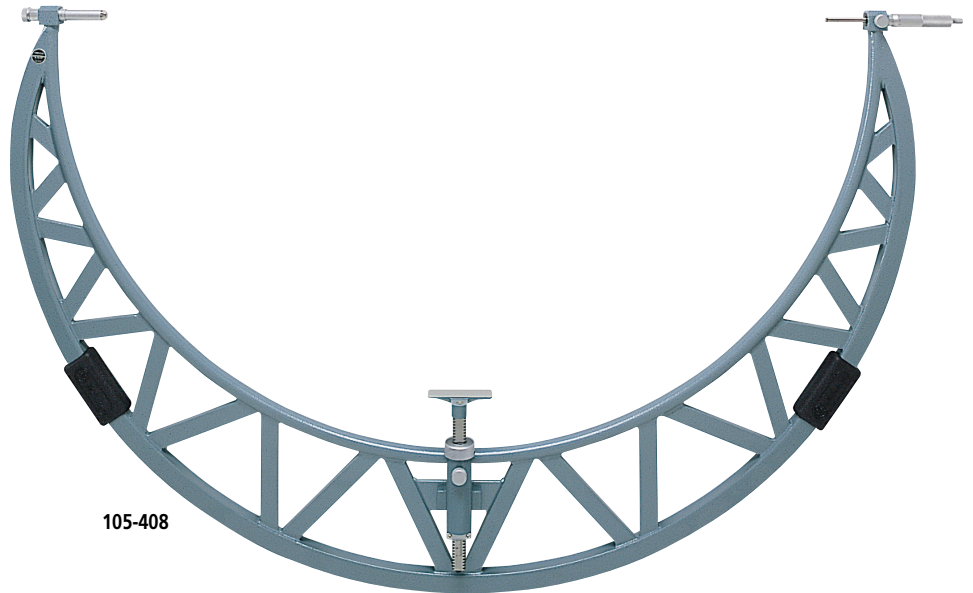
$\pm[0.0003 \text{ in} + 0.00005 \text{ in} (R/3)]$ in, R = max. range (inch)
fraction rounded up

Standard accessories: Spanner (200154), 1 pc



Outside Micrometers SERIES 105 — with Anvil Extension Collars

- Wide measuring range with anvil extension collars.
- 50 mm / 2 in spindle stroke.
- Measuring faces: Carbide.
- Equipped with Ratchet Stop for constant measuring force.



SPECIFICATIONS

Metric				
Order No.	Range	Graduation	Extension Collars	Setting Standard (pcs)
(every 100 mm)				
105-408	1000 - 1100 mm	0.01 mm	1 pc (50 mm)	2
105-409	1100 - 1200 mm			
105-410	1200 - 1300 mm			
105-411	1300 - 1400 mm			
105-412	1400 - 1500 mm			
105-413	1500 - 1600 mm			
105-414	1600 - 1700 mm			
105-415	1700 - 1800 mm			
105-416	1800 - 1900 mm			
105-417	1900 - 2000 mm			
(every 200 mm)				
105-418	1000 - 1200 mm	0.01 mm	2 pcs (50 mm, 100 mm)	4
105-419	1200 - 1400 mm			
105-420	1400 - 1600 mm			
105-421	1600 - 1800 mm			
105-422	1800 - 2000 mm			

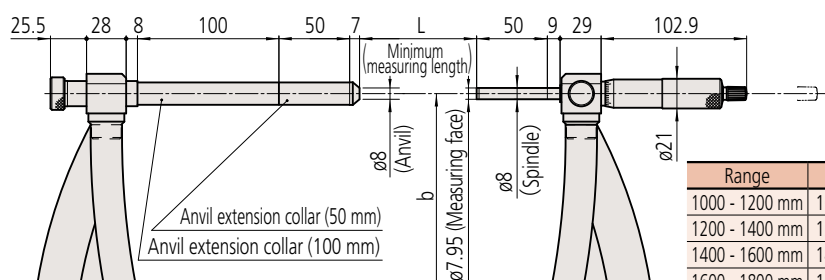
Inch				
Order No.	Range	Graduation	Extension Collars	Setting Standard (pcs)
105-428	40 - 44 in	0.001 in	1 pc (2 in)	2
105-429	44 - 48 in			
105-430	48 - 52 in			
105-431	52 - 56 in			
105-432	56 - 60 in			
105-433	60 - 64 in			
105-434	64 - 68 in			
105-435	68 - 72 in			
105-436	72 - 76 in			
105-437	76 - 80 in			



DIMENSIONS

Over 1200 mm up to 2000 mm

Unit: mm



b: distance to workpiece stop

Range	L	b
1000 - 1200 mm	1000	500 - 600
1200 - 1400 mm	1200	600 - 700
1400 - 1600 mm	1400	700 - 800
1600 - 1800 mm	1600	800 - 900
1800 - 2000 mm	1800	900 - 1000

Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

Caliper Type Micrometers SERIES 343, 143

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

- Effective for measuring workpiece features where access is difficult.
- Measuring faces: Carbide.
- Equipped with Ratchet Stop for constant measuring force.



SPECIFICATIONS

Metric			
Order No.	Range	Resolution	Accuracy*
Digimatic (LCD)			
343-250-30	0 - 25 mm	0.001 mm	±5 μm
343-251-30	25 - 50 mm		±6 μm
343-252-30	50 - 75 mm		±7 μm
343-253-30	75 - 100 mm		±8 μm

* Excluding quantizing error of ±1 count

Metric			
Order No.	Range	Graduation	Accuracy
Analog			
143-101	0 - 25 mm	0.01 mm	±5 μm
143-102	25 - 50 mm		±6 μm
143-103	50 - 75 mm		±7 μm
143-104	75 - 100 mm		±8 μm
143-105	100 - 125 mm		±9 μm
143-106	125 - 150 mm		
143-107	150 - 175 mm		±10 μm
143-108	175 - 200 mm		
143-109	200 - 225 mm		±11 μm
143-110	225 - 250 mm		
143-111	250 - 275 mm		±12 μm
143-112	275 - 300 mm		

Inch/Metric			
Order No.	Range	Resolution	Accuracy*
Digimatic (LCD)			
343-350-30	0 - 1 in	0.00005 in/ 0.001 mm	±0.00025 in
343-351-30	1 - 2 in		±0.0003 in
343-352-30	2 - 3 in		±0.00035 in
343-353-30	3 - 4 in		±0.0004 in

* Excluding quantizing error of ±1 count

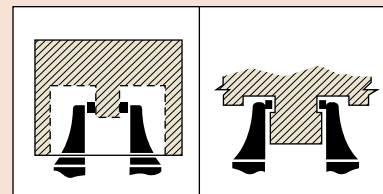
Inch			
Order No.	Range	Graduation	Accuracy
Analog			
143-121	0 - 1 in	0.001 in	±0.00025 in
143-122	1 - 2 in		±0.0003 in
143-123	2 - 3 in		±0.00035 in

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).

Technical Data

Flatness: 0.3 μm/0.000012 in
Parallelism: (3+R/75) μm, R = max. range (mm)
[0.00012 in+0.00004(R/3)] in R = max. range (inch)
fraction rounded down



Battery for Series 343

SR44 (1 pc), **938882**, for initial operational checks (standard accessory)

Battery life: Approx. 2.4 years under normal use (for series 343)

Length standard: Electromagnetic rotary sensor (for series 343)

Standard accessories: Reference bar, 1 pc

(except for measuring range 0-25 mm (0-1 in) models)

Spanner (301336), 1 pc

Optional Accessories for Series 343

Connecting cables

1 m: **05CZA662**

2 m: **05CZA663**

USB Input Tool Direct

USB-ITN-B (2 m): **06AFM380B**

Wireless data output **U-WAVE[™] fir**

U-WAVE-TM 264-622 (IP67 type)

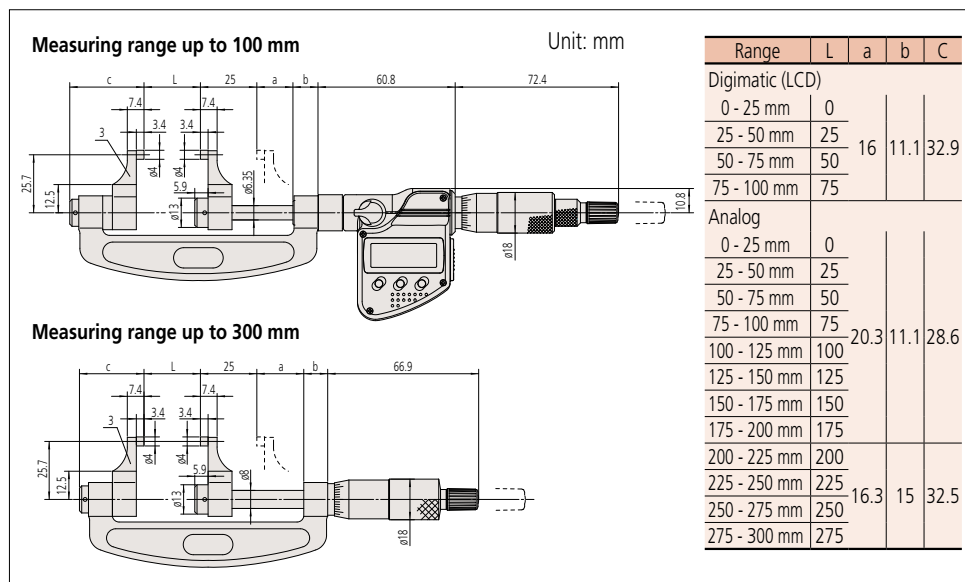
264-623 (Buzzer type)

Connecting unit for U-WAVE-TM

02AZF310 (IP67 type)

Refer to page A-15 for details

DIMENSIONS



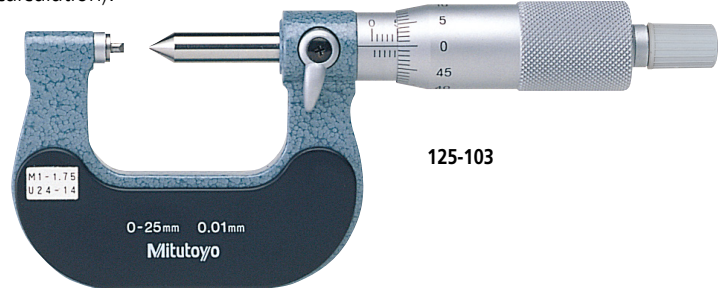
Technical Data

Accuracy: $\pm(2+R/75) \mu\text{m}$, R = max. range (mm)
fraction rounded up
Standard accessories: Spanner (301336), 1 pc



Screw Thread Micrometers SERIES 125

- Fixed anvil type to suit 60° threads.
- Directly indicates screw pitch diameter (no need for calculation).
- Equipped with Ratchet Stop for constant measuring force.



125-103

SPECIFICATIONS

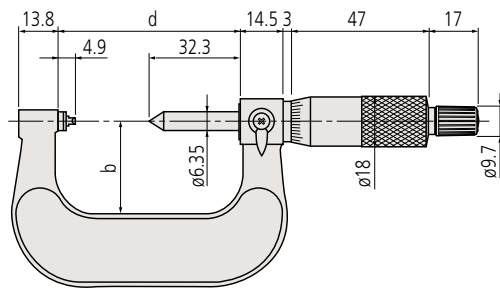
Metric			
Order No.	Thread to be measured (Metric/Unified)	Range	Graduation
125-101	0.4 - 0.5 mm/64 - 48TPI	0 - 25 mm	0.01 mm
125-102	0.6 - 0.9 mm/44 - 28TPI		
125-103	1 - 1.75 mm/24 - 14TPI		
125-104	2 - 3 mm/13 - 9TPI		
125-105	3.5 - 5 mm/8 - 5TPI		
125-106	0.4 - 0.5 mm/64 - 48TPI	25 - 50 mm	
125-107	0.6 - 0.9 mm/44 - 28TPI		
125-108	1 - 1.75 mm/24 - 14TPI		
125-109	2 - 3 mm/13 - 9TPI		
125-110	3.5 - 5 mm/8 - 5TPI		

Metric			
Order No.	Thread to be measured (Metric/Unified)	Range	Graduation
125-111	0.6 - 0.9 mm/44 - 28TPI	50 - 75 mm	0.01 mm
125-112	1 - 1.75 mm/24 - 14TPI		
125-113	2 - 3 mm/13 - 9TPI		
125-114	3.5 - 5 mm/8 - 5TPI		
125-115	5.5 - 7 mm/4.5 - 3.5TPI		
125-116	0.6 - 0.9 mm/44 - 28TPI	75 - 100 mm	
125-117	1 - 1.75 mm/24 - 14TPI		
125-118	2 - 3 mm/13 - 9TPI		
125-119	3.5 - 5 mm/8 - 5TPI		
125-120	5.5 - 7 mm/4.5 - 3.5TPI		

* A setting standard is supplied with each model (except for 0-25 mm measuring range).
The setting standard is for metric threads (unified) 60°.

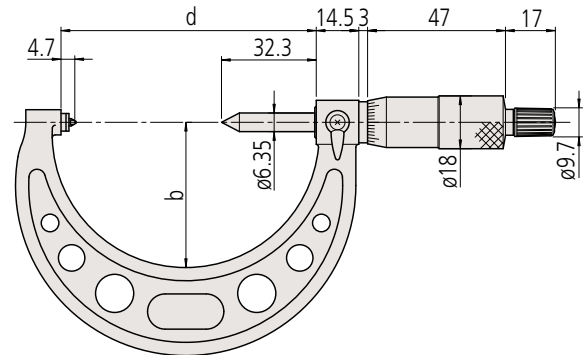
DIMENSIONS

125-101, 125-106



Range	b	d
0 - 25 mm	25	37.2
25 - 50 mm	32	62.2

125-111, 125-116



Range	b	d
50 - 75 mm	49	87
75 - 100 mm	63	112

Unit: mm

The origin of Mitutoyo's trustworthy brand of small tool instruments

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- Anvils and spindle tips are interchangeable in matching pairs to enable measurement of Metric/Unified or Whitworth threads.
- Direct reading of screw pitch diameter (no need for calculation).
- Equipped with Ratchet Stop for constant measuring force.
- Interchangeable anvils / spindle tips are optional.



Metric			
Order No.	Range	Resolution	Accuracy*
Digimatic (LCD)			
326-251-30	0 - 25 mm	0.001 mm	±4 µm
326-252-30	25 - 50 mm		
326-253-30	50 - 75 mm		
326-254-30	75 - 100 mm		±5 µm

Metric			
Order No.	Range	Graduation	Accuracy
Analog			
126-125	0 - 25 mm	0.01 mm	±4 μm
126-126	25 - 50 mm		
126-127	50 - 75 mm		
126-128	75 - 100 mm		
126-129	100 - 125 mm		±5 μm
126-130	125 - 150 mm		
126-131	150 - 175 mm		
126-132	175 - 200 mm		±6 μm
126-133	200 - 225 mm		
126-134	225 - 250 mm		±7 μm
126-135	250 - 275 mm		
126-136	275 - 300 mm		

Please note that origin setting of these models is free-digit preset type. Also, connecting cables (optional) have to be a waterproof type.

Unit: mm

Technical drawing of the HSK-A63 tool holder. The drawing shows the tool holder with dimensions: 18, d, 27.5, 14.5, 3, 47, 17, and b. A callout indicates a hole for mounting interchangeable anvils and tips with a diameter of $\phi 3.5$. The table below lists the ranges for the tool holder.

Range	b	d
0 - 25 mm	25	39.5
25 - 50 mm	32	64.5
50 - 75 mm	45	90
75 - 100 mm	65	115.6
100 - 125 mm	79	140.6
125 - 150 mm	93	165.6
150 - 175 mm	105	190.5
175 - 200 mm	118	214.5
200 - 225 mm	131	240.5
225 - 250 mm	144	265.5
250 - 275 mm	156	290.5
275 - 300 mm	169	314.5

Range	b	d
0 - 25 mm	25	39.5
25 - 50 mm	32	64.5
50 - 75 mm	45	90
75 - 100 mm	65	115.6
100 - 125 mm	79	140.6
125 - 150 mm	93	165.6
150 - 175 mm	105	190.5
175 - 200 mm	118	214.5
200 - 225 mm	131	240.5
225 - 250 mm	144	265.5
250 - 275 mm	156	290.5
275 - 300 mm	169	314.5



These marks indicate that a product has successfully passed IP65-level testing, which is carried out by the independent German certification organization TÜV Rheinland.



Level 6: Dust-proof.

No ingress of dust allowed.

Level 5: Protected against water jets.

Water projected in jets against the enclosure from any direction shall have no harmful effects.

Technical Data



SR44 (1 pc), **938882**, for initial operational checks (standard accessory)

Battery life: Approx. 2.4 years under normal use (for series 326)

Length standard: Electromagnetic rotary sensor (for series 326)

Standard accessories: Spanner (301336), 1 pc

Connecting cables

1 m: **05CZA662**

2 m: 05CZA663

USB Input Tool Direct

USB-ITN-B (2 m): 06AFM380B

Wireless data output **U-WAVE^{fit}**

U-WAVE-TM **264-622** (IP67 type)

264-623 (Buzzer type)

Connecting unit for U-WAVE-TM

02AZF310 (IP67 type)

Refer to page A-15 for details

Sets of interchangeable anvils / spindle tips

- For Metric/Unified threads (pair)

Order No.	Matching anvils/spindle tips included
126-800	0.4 - 0.5 mm/64 - 48TPI (126-801)
	0.6 - 0.9 mm/44 - 28TPI (126-802)
	1 - 1.75 mm/24 - 14TPI (126-803)
	2 - 3 mm/13 - 9TPI (126-804)
	3.5 - 5 mm/8 - 5TPI (126-805)
	5.5 - 7 mm/4.5 - 3.5TPI (126-806)

- For Whitworth threads (pair)

Order No.	Matching anvils/spindle tips included
126-810	60 - 48TPI (126-811) 48 - 40TPI (126-812) 40 - 32TPI (126-813) 32 - 24TPI (126-814) 24 - 18TPI (126-815) 18 - 14TPI (126-816) 14 - 10TPI (126-817) 10 - 7TPI (126-818) 7 - 4.5TPI (126-819) 4.5 - 3.5TPI (126-820)

- Anvils / spindle tips

Allowable error of the angle of anvils
and spindle tips



Type	Metric (Unified)	Whitworth (Unified)	Half angle error
Pitch (mm), Nominal designation of threads per inch		W1	±30°
	M1 (U1)	W2	±30°
		W3	±20°
	M2 (U2)	W4	±20°
		W5	±15°
	M3 (U3)	W6	±15°
	M4 (U4)	W7	±10°
		W8	±10°
	M5 (U5)	W9	±10°
	M6 (U6)	W10	±10°

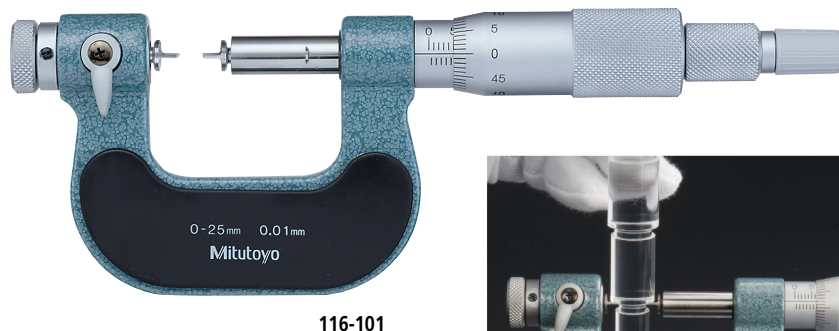
Note) This chart indicates the difference between the angle made by anvil's contact faces and spindle's axes and the half angle with error α .
Metric/Unified $\theta = 60^\circ$
Whitworth $\theta = 55^\circ$

Technical Data

Standard accessories: Spanner (301336), 1 pc

Universal Micrometer SERIES 116 — Interchangeable Anvil Type

- Non-rotating spindle type which accepts seven forms of optional interchangeable anvil / spindle tip (flat, spline, spherical, point, knife-edge, disk, and blade) for a wide range of applications.
- Equipped with Ratchet Stop for constant measuring force.
- Optional anvils / spindle tips for screw thread measurement (matching V and cone) are also available.



116-101



SPECIFICATIONS

Metric			
Order No.	Range	Graduation	Accuracy
116-101	0 - 25 mm	0.01 mm	±4 μm
116-102*1	25 - 50 mm		

*1 116-102 is provided with a plain setting standard (167-101) and a 60°-thread setting standard (167-261) for adjusting the minimum range point according to the application.

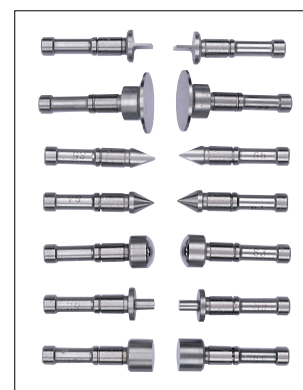
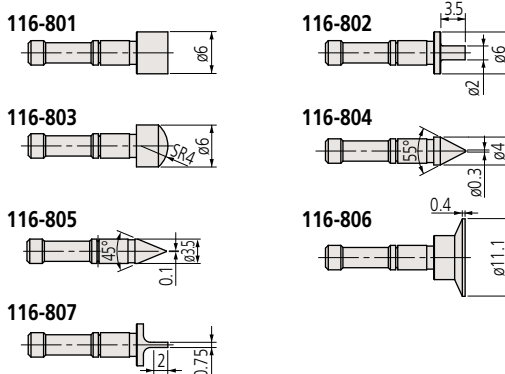
Inch			
Order No.	Range	Graduation	Accuracy
116-105	0 - 1 in	0.001 in	±0.0002 in
116-106*2	1 - 2 in		

*2 116-106 is provided with a plain setting standard (167-141) and a 60°-thread setting standard (167-294) for adjusting the minimum range point according to the application.

Order No.	Description
116-801	Flat
116-802	Spline
116-803	Spherical
116-804	Point
116-805	Knife-edge
116-806	Disk
116-807	Blade
116-800	Anvils / spindle tips set (7 pairs) (116-801 - 116-807 Set)

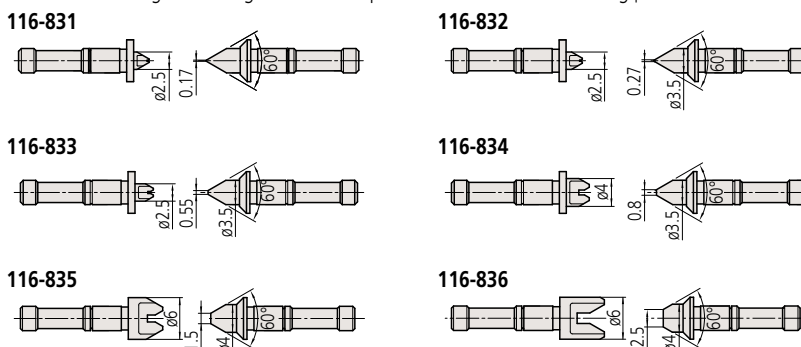
Optional Accessories

- Interchangeable anvils / spindle tips are available in matching pairs.



Interchangeable contact points (optional)

- Thread-measuring interchangeable contact points are available in matching pairs.



Order No.	Set Identifier Range of measurement (mm)
116-831	0.4 - 0.5 mm/64 - 48TPI
116-832	0.6 - 0.9 mm/44 - 28TPI
116-833	1 - 1.75 mm/24 - 14TPI
116-834	2 - 3 mm/13 - 9TPI
116-835	3.5 - 5 mm/8 - 5TPI
116-836	5.5 - 7 mm/4.5 - 3.5TPI
116-830	116-831 - 116-836 M (U) Set

* The shape differs from the interchangeable contact point of TMC.

Micrometer

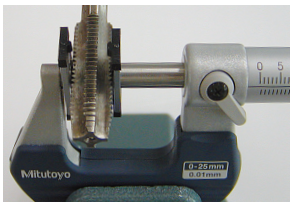
The origin of Mitutoyo's trustworthy brand of small tool instruments

3-Wire Units SERIES 313

- Enables measurement of the pitch diameter of screw threads with a standard micrometer.
- Determination of the pitch diameter: refer to "Quick Guide to Precision Measuring Instruments".

Technical Data

Accuracy of wire diameter: ± 0.002 mm



SPECIFICATIONS

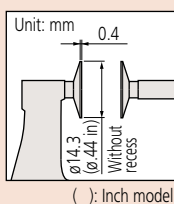
3-Wire Units set

Order No.	Set	Wire dia. (mm)	Support spindle dia. (mm)
313-101	18	0.170 - 3.200	6.35

Order No. (One pair) (Support spindle dia.) 6.35 mm (0.25 in)	Wire dia. (mm)	Pitch		
		Metric thread (mm)	Unified thread (threads per inch)	Whitworth thread (threads per inch)
952131	0.170	0.2, 0.25, 0.3	80	—
952132	0.195	0.35	72	—
952133	0.220	0.4	64	—
952134	0.250	0.45	56	60
952135	0.290	0.5	48	48
952136	0.335	0.6	44, 40	40
952137	0.390	0.7	36	36
952138	0.455	0.75, 0.8	32	32
952139	0.530	0.9	28	28, 26
952140	0.620	1.0	24	24, 22
952141	0.725	1.25	20	20, 19, 18
952142	0.895	1.5	18, 16	16
952143	1.100	1.75, 2.0	14, 13, 12	14, 12
952144	1.350	2.5	11, 10	11, 10
952145	1.650	3.0	9, 8	9, 8
952146	2.050	3.5	7	7
952147	2.550	4, 4.5	6	6
952148	3.200	5, 5.5, 6	5, 4.5	5, 4.5



Anvil Dimensions



Technical Data

Standard accessories: Spanner (301336), 1 pc

Paper Thickness Micrometers SERIES 169 — Non-Rotating Spindle Type

- For paper thickness measurement.
- Non-rotating spindle.
- Anvil diameter 14.3 mm (without recess)
- Equipped with Ratchet Stop for constant measuring force.
(8.02 ± 0.8 N)



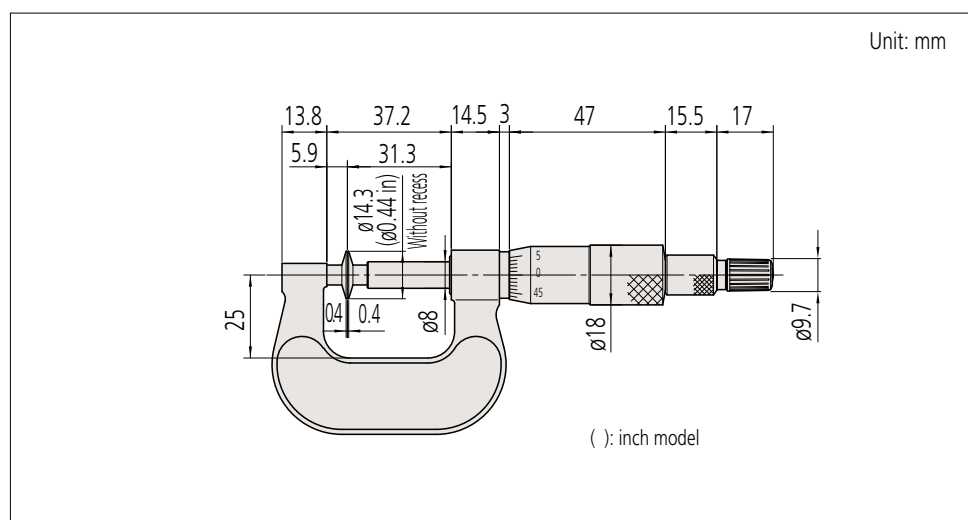
169-101

SPECIFICATIONS

Metric					
Order No.	Range	Graduation	Accuracy	Flatness	Parallelism
169-101	0 - 25 mm	0.01 mm	$\pm 4 \mu\text{m}$	1 μm	3 μm

Inch					
Order No.	Range	Graduation	Accuracy	Flatness	Parallelism
169-103	0 - 1 in	0.001 in	± 0.0002 in	0.00004 in	0.00015 in

DIMENSIONS



Micrometer

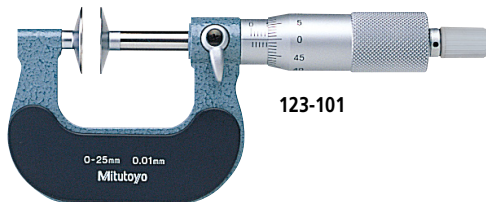
The origin of Mitutoyo's trustworthy brand of small tool instruments

Disk Micrometers SERIES 323, 223, 123

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

- Measures "root tangent length" of spur gears and helical gears.
- Determination of the root tangent length: refer to "Quick Guide to Precision Measuring Instruments".

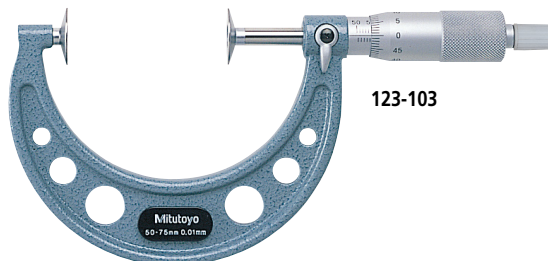
- Equipped with Ratchet Stop for constant measuring force.
- Supplied with a setting standard (except for 0-25 mm / 0-1 in measuring range).



123-101



323-250-30



123-103

SPECIFICATIONS

Metric					
Order No.	Range	Resolution	Accuracy*	Anvil dia.	Measurable module
Digimatic (LCD)					
323-250-30	0 - 25 mm	0.001 mm	±4 μm	ø20 mm	0.5 - 6
323-251-30	25 - 50 mm				
323-252-30	50 - 75 mm				
323-253-30	75 - 100 mm		±6 μm		

* Excluding quantizing error of ±1 count

Metric					
Order No.	Range	Graduation	Accuracy	Anvil dia.	Measurable module
Mechanical counter model					
223-101	0 - 25 mm	0.01 mm	±4 μm	ø20 mm	0.5 - 6
223-102	25 - 50 mm				
Analog					
123-101	0 - 25 mm	0.01 mm	±4 μm	ø20 mm	0.5 - 6
123-113*					
123-102	25 - 50 mm				
123-114*					
123-103	50 - 75 mm				
123-115*					
123-104	75 - 100 mm		±6 μm		
123-116*					
123-105	100 - 125 mm		±7 μm	ø30 mm	0.7 - 11
123-106	125 - 150 mm				
123-107	150 - 175 mm				
123-108	175 - 200 mm		±8 μm		
123-109	200 - 225 mm				
123-110	225 - 250 mm	±9 μm			
123-111	250 - 275 mm				
123-112	275 - 300 mm				

* The measuring disks have carbide tips.

Inch/Metric					
Order No.	Range	Resolution	Accuracy*	Anvil dia.	Measurable module
Digimatic (LCD)					
323-350-30	0-1 in	0.00005 in/ 0.001 mm	±0.0002 in	0.787 in	0.5 - 6
323-351-30	1-2 in				
323-352-30	2-3 in		±0.0003 in		
323-353-30	3-4 in				

* Excluding quantizing error of ±1 count

Inch					
Order No.	Range	Graduation	Accuracy	Anvil dia.	Measurable module
Mechanical counter model					
223-125	0-1 in	0.001 in	±0.0002 in	0.787 in	0.5 - 6
Analog					
123-125	0-1 in	0.001 in	±0.0002 in	0.787 in	0.5 - 6
123-126	1-2 in				
123-127	2-3 in				
123-128	3-4 in		±0.0003 in		

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).



These marks indicate that a product has successfully passed IP65-level testing, which is carried out by the independent German certification organization TÜV Rheinland.



IP Codes (series 323)

Level 6: Dust-proof.

No ingress of dust allowed.

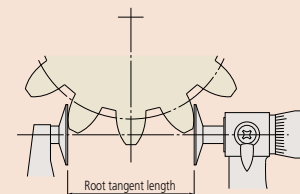
Level 5: Protected against water jets.

Water projected in jets against the enclosure from any direction shall have no harmful effects.

Technical Data

Flatness: 1 μm/0.00004 in for models up to 100 mm/4 in
1.6 μm/0.00063 in for models over 100 mm/4 in
Parallelism: 4 μm for models up to 50 mm
0.0002 in for models up to 2 in
6 μm for models up to 100 mm
0.0003 in for models up to 4 in
(5+R/75) μm for models over 100 mm,
R = max. range (mm)
fraction rounded up

Root Tangent Length of Gear (En)



Battery for Series 323

SR44 (1 pc), **938882**, for initial operational checks (standard accessory)

Battery life: Approx. 2.4 years under normal use (for series 323)

Length standard: Electromagnetic rotary sensor (for series 323)

Standard accessories: Reference bar, 1 pc

(except for measuring range 0-25 mm (0-1 in) models)

Spanner (301336), 1 pc

Optional Accessories for Series 323

Connecting cables

1 m: **05CZA662**

2 m: **05CZA663**

USB Input Tool Direct

USB-ITN-B (2 m): **06AFM380B**

Wireless data output **U-WAVE**

U-WAVE-TM 264-622 (IP67 type)

264-623 (Buzzer type)

Connecting unit for U-WAVE-TM

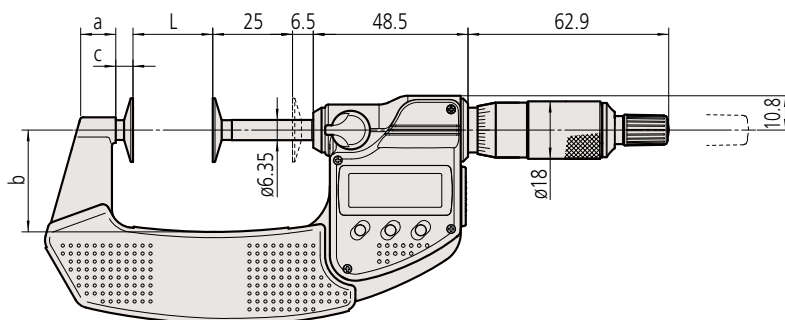
02AZF310 (IP67 type)

Refer to page A-15 for details

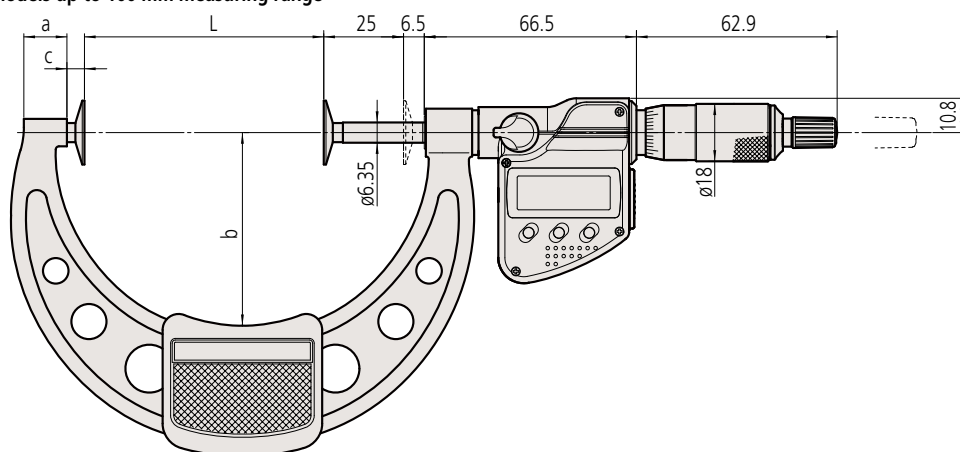
DIMENSIONS

Digital models up to 75 mm measuring range

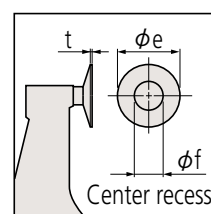
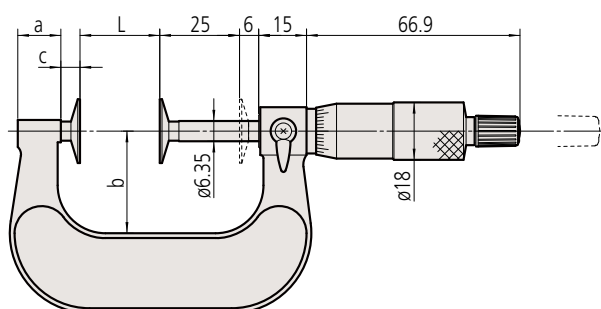
Unit: mm



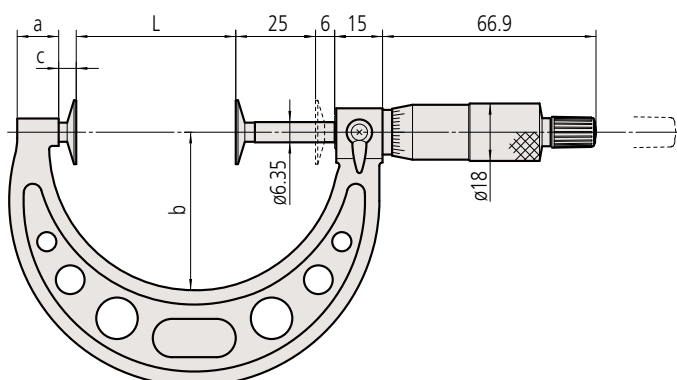
Digital models up to 100 mm measuring range



Analog models up to 50 mm measuring range



Analog over 50 mm measuring range



Range	L	a	b	c	e	f	t
Digimatic (LCD)							
0 - 25 mm	0	9.2	25	4.5	20	8	0.7
25 - 50 mm	25	11	31	5.4			
50 - 75 mm	50	12.2	50	5.5			
75 - 100 mm	75	14	60				
Analog							
0 - 25 mm	0	13.8	25	5.7	20	8 (9.8)	0.7 (0.7)
25 - 50 mm	25		32				
50 - 75 mm	50	12	49	5.5			
75 - 100 mm	75	14	63				
100 - 125 mm	100	12	79	6	30	12	1
125 - 150 mm	125	14.5	94				
150 - 175 mm	150	15.2	106				
175 - 200 mm	175	14.5	118				
200 - 225 mm	200	13.5	130				
225 - 250 mm	225		143				
250 - 275 mm	250	14.5	156				
275 - 300 mm	275		169				

Note: Data in () applies to those with carbide-faced disks.

Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

Gear Tooth Micrometers SERIES 324, 124 — Interchangeable Ball Anvil / Spindle Tip Type

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

- Measures over-pin diameter of gears using precision steel (or carbide) ball anvils / spindle tips.
- Series 324: IP65 Digimatic gear tooth micrometers.
- Determination of the over-pin diameter: refer to "Quick Guide to Precision Measuring Instruments".
- Interchangeable ball anvils / spindle tips for various gear modules (0.5-5.25) are optional.
- Equipped with Ratchet Stop for constant measuring force.
- Ball anvil / spindle tips: optional.



SPECIFICATIONS

Metric			
Order No.	Range	Resolution	Accuracy*
Digimatic (LCD)			
324-251-30	0 - 25 mm	0.001 mm	±4 μm
324-252-30	25 - 50 mm		
324-253-30	50 - 75 mm		±5 μm
324-254-30	75 - 100 mm		

* Excluding quantizing error of ±1 count

Metric			
Order No.	Range	Graduation	Accuracy
Analog			
124-173	0 - 25 mm	0.01 mm	±4 μm
124-174	25 - 50 mm		
124-175	50 - 75 mm		
124-176	75 - 100 mm		±5 μm
124-177	100 - 125 mm		
124-178	125 - 150 mm		
124-179	150 - 175 mm		±6 μm
124-180	175 - 200 mm		
124-181	200 - 225 mm		
124-182	225 - 250 mm		±7 μm
124-183	250 - 275 mm		
124-195	275 - 300 mm		

Inch/Metric			
Order No.	Range	Resolution	Accuracy*
Digimatic (LCD)			
324-351-30	0 - 1 in	0.00005 in/ 0.001 mm	±0.0002 in
324-352-30	1 - 2 in		
324-353-30	2 - 3 in		±0.00025 in
324-354-30	3 - 4 in		

* Excluding quantizing error of ±1 count

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).



These marks indicate that a product has successfully passed IP65-level testing, which is carried out by the independent German certification organization TÜV Rheinland.



IP Codes (series 324)

Level 6: Dust-proof.

No ingress of dust allowed.

Level 5: Protected against water jets.

Water projected in jets against the enclosure from any direction shall have no harmful effects.



Optional Accessories

- Interchangeable ball anvil / spindle tip set

Order No.	Diameter* (mm)	Gear module	Dia. pitch
124-801	0.8	0.5 - 0.55	50
124-802	1.0	0.6 - 0.65	45
124-803	1.191 (³ / ₆₄ "	0.7 - 0.8	35 - 30
124-821	1.5	0.9 - 1	28 - 26
124-804	1.588 (¹ / ₁₆ "	0.9 - 1	28 - 26
124-805	2.0	1.25	22
124-806	2.381 (³ / ₃₂ "	1.5	17
124-822	2.5	1.5	17
124-807	3.0	1.75	15
124-808	3.175 (¹ / ₈ "	—	14
124-823	3.5	2	13
124-809	3.969 (⁵ / ₃₂ "	2	13
124-810	4.0	2.25	11
124-824	4.5	2.5	10
124-811	4.763 (³ / ₁₆ "	2.5	10
124-812	5.0	2.75	9
124-813	5.556 (⁷ / ₃₂ "	3.0 - 3.25	8
124-814	6.0	3.5	7
124-815	6.35 (¹ / ₄ "	3.75	7
124-816	7.0	4.0	6.5
124-817	7.144 (⁹ / ₃₂ "	4.25	6
124-818	7.938 (⁵ / ₁₆ "	4.5	5.5
124-819	8.0	4.75	5.5
124-820	8.731 (¹¹ / ₃₂ "	5.0 - 5.25	5

* 2 mm less for/ carbide-tipped type

Battery for Series 324

SR44 (1 pc), **938882**, for initial operational checks

(standard accessory)

Battery life: Approx. 2.4 years under normal use (for series 324)

Length standard: Electromagnetic rotary sensor (for series 324)

Standard accessories: Reference bar, 1 pc

(except for measuring range 0-25 mm (0-1 in) models)

Spanner (301336), 1 pc

Optional Accessories for Series 324

Connecting cables for **series 324**

1 m: **05CZA662**

2 m: **05CZA663**

USB Input Tool Direct

USB-ITN-B (2 m): **06AFM380B**

Wireless data output **U-WAVETM**

U-WAVE-TM **264-622** (IP67 type)

264-623 (Buzzer type)

Connecting unit for U-WAVE-TM

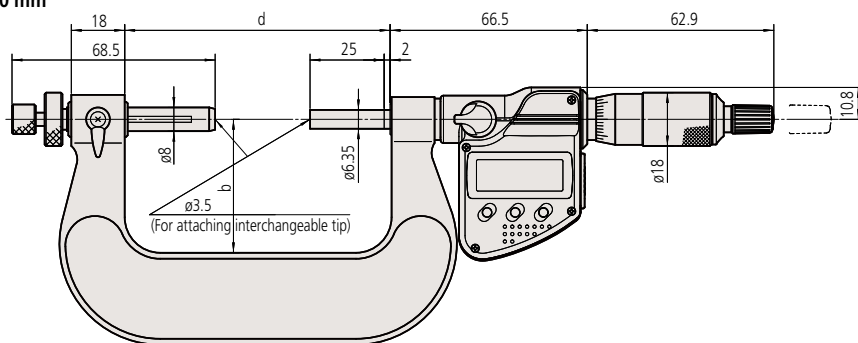
02AZF310 (IP67 type)

Refer to page A-15 for details

DIMENSIONS

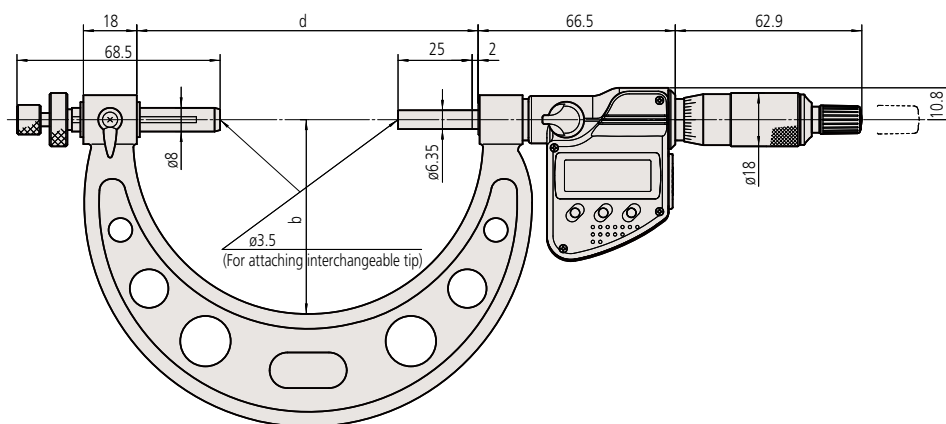
Unit: mm

Digital models up to 50 mm



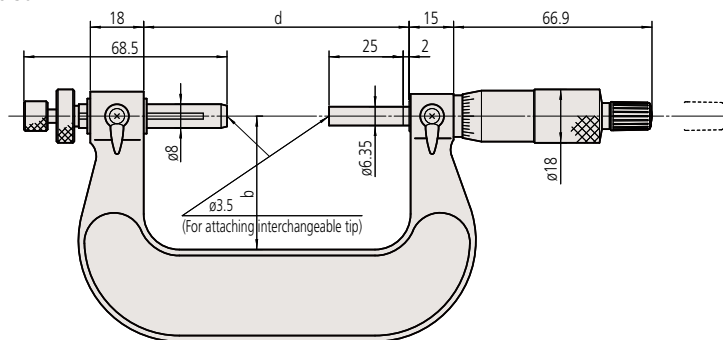
Range	b	d
0 - 25 mm	32	64
25 - 50 mm	45	89.5

Digital models over 50 mm up to 100 mm



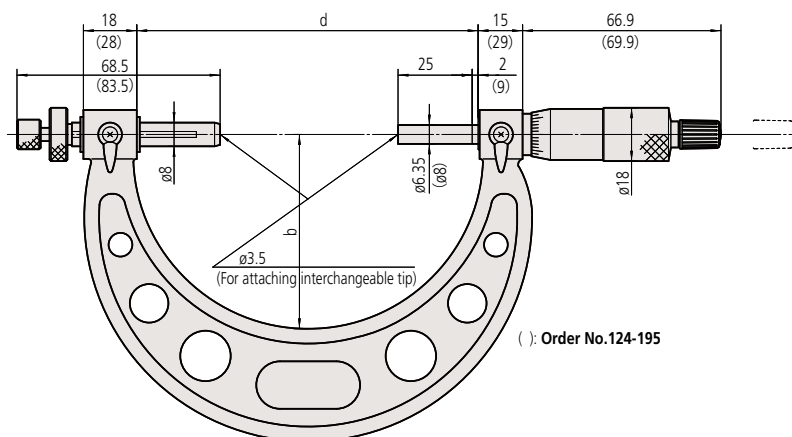
Range	b	d
50 - 75 mm	65	115.1
75 - 100 mm	79	140.1

Analog models up to 50 mm



Range	b	d
0 - 25 mm	32	64
25 - 50 mm	45	89.5

Analog models over 50 mm up to 300 mm



(): Order No.124-195

Range	b	d
50 - 75 mm	65	115.1
75 - 100 mm	79	140.1
100 - 125 mm	93	165.1
125 - 150 mm	105	190
150 - 175 mm	118	214
175 - 200 mm	131	240
200 - 225 mm	144	265
225 - 250 mm	156	290
250 - 275 mm	169	314
275 - 300 mm	187	352

Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

Disk Micrometers

SERIES 369, 227, 169 — Non-Rotating Spindle Type

MeasurLink[®] ENABLED

Data Management Software by Mitutoyo

- Measures "root tangent length" of spur gears and helical gears.
- Determination of the root tangent length: refer to "Quick Guide to Precision Measuring Instruments".
- Non-rotating spindle type.
- Measurable range of gear pitch: 0.5 to 6 module (series 227: 0.4 to 3 module).
- Equipped with Ratchet Stop for constant measuring force.
- Supplied with a setting standard (except for 0-25 mm / 0-1 in measuring range).



Digimatic (LCD)
369-250-30



Quickmike type (LCD)
369-411-20

IP65 ABSOLUTE



169-201

SPECIFICATIONS

Metric										
	Order No.	Range	Resolution	Accuracy*	Anvil dia.	Flatness	Parallelism	Measuring force		
Digimatic (LCD)	369-250-30	0 - 25 mm	0.001 mm	±4 μm	20 mm	1 μm	4 μm	—		
	369-251-30	25 - 50 mm		±6 μm			6 μm			
	369-252-30	50 - 75 mm								
	369-253-30	75 - 100 mm								
Quickmike type (LCD)	369-411-20	0 - 30 mm		±4 μm	14.3 mm		1 μm	4 μm	—	
	369-412-20	25 - 55 mm								
Quickmike type adjustable measuring force (LCD)	227-221-20	0 - 15 mm						3 μm		0.5 - 2.5 N
	227-223-20	0 - 10 mm								

* Excluding quantizing error of ±1 count

Metric								
	Order No.	Range	Graduation	Accuracy	Anvil dia.	Flatness	Parallelism	Measuring force
Analog	169-201	0 - 25 mm	0.01 mm	±4 μm	20 mm	1 μm	4 μm	—
	169-202	25 - 50 mm		±6 μm			6 μm	
	169-205	50 - 75 mm					6 μm	
	169-207	75 - 100 mm					6 μm	

Inch/Metric									
	Order No.	Range	Resolution	Accuracy*	Anvil dia.	Flatness	Parallelism	Measuring force	
Digimatic (LCD)	369-350-30	0 - 1 in	0.00005 in/ 0.001 mm	±0.0002 in	20 mm	0.00004 in	0.0002 in	—	
	369-351-30	1 - 2 in		±0.0003 in					
	369-352-30	2 - 3 in							
	369-353-30	3 - 4 in		±0.0002 in					
Quickmike type (LCD)	369-421-20	0 - 1.2 in	0.0002 in						
	369-422-20	1 - 2.2 in							

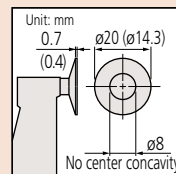
* Excluding quantizing error of ±1 count

Inch							
	Order No.	Range	Graduation	Accuracy	Anvil dia.	Flatness	Parallelism
Analog	169-203	0 - 1 in	0.001 in	±0.0002 in	20 mm	0.00004 in	0.0002 in
	169-204	1 - 2 in		±0.0003 in			0.0003 in
	169-206	2 - 3 in					
	169-208	3 - 4 in					

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).

Anvil



(): Adjustable measuring force type

Battery for Series 369 and 227

SR44 (1 pc), **938882**, for initial operational checks (standard accessory)

Battery life: Approx. 2.4 years under normal use

(for series 369-2XX, 3XX)

Approx. 5 year under normal use

(for series 369-4XX)

Approx. 5 years under normal use

(for series 227-2XX)

Approx. 18,000 hours in continuous use

Length standard: Electromagnetic rotary sensor

(for series 369-2XX, 3XX)

Electrostatic capacity absolute sensor

(for series 369-4XX, 2XX)

Standard accessories: Reference bar, 1 pc

(except for measuring range 0-10 mm / 0-15 mm /

0-25 mm / 0-30 mm (0-1/0-1.2 in) models)

Spanner (301336), 1 pc (for series 169-2XX, 369-2XX, 3XX)

Screwdriver (No.210183), 1 pc (for series 227-2XX)

Optional Accessories

- Connecting cables

for **369, 227 Series**

1 m: **05CZA662**

2 m: **05CZA663**

- USB Input Tool Direct**

USB-ITN-B (2 m): **06AFM380B**

Wireless data output **U-WAVETM**

U-WAVE-TM **264-622** (IP67 type)

264-623 (Buzzer type)

Connecting unit for U-WAVE-TM

02AFZ310 (IP67 type)

Refer to page A-15 for details

Note: cannot be used with Quickmike type



Quickmike

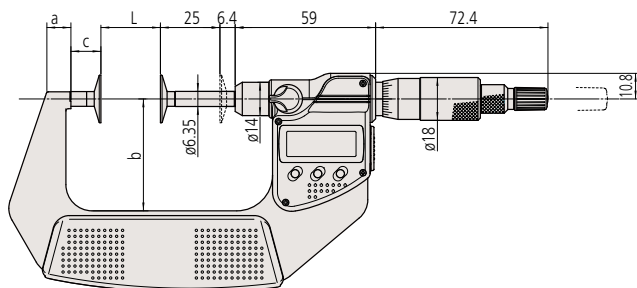
Provides a speedy spindle feed of 10 mm per thimble rotation, which enables widely differently sized features to be measured quickly.

Quickmike Type with Adjustable Measuring Force

Digimatic micrometer dedicated to applications requiring a constant/low measuring force such as measuring wire, paper, and plastic/rubber parts.

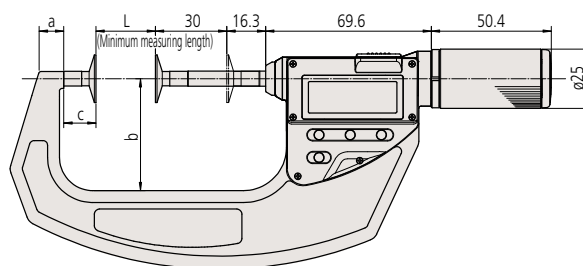
DIMENSIONS

Digital models up to 75 mm



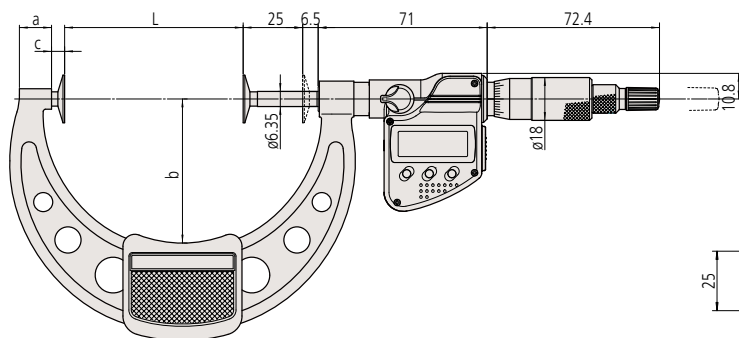
Quickmike type

Unit: mm

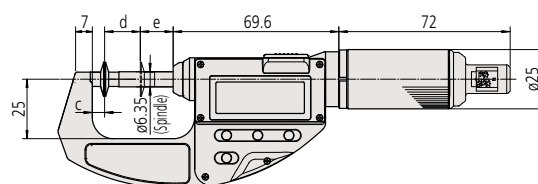


Range	L	a	b	c
0 - 30 mm	0	8.5	36	13.5
25 - 55 mm	25	10.3	47	

Digital models over 75 mm



Quickmike adjustable measuring force type

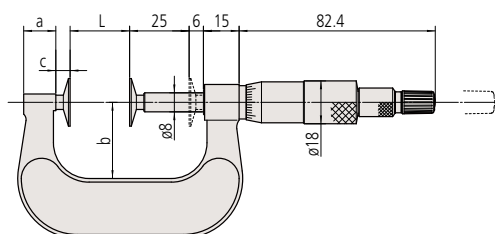


Digital models

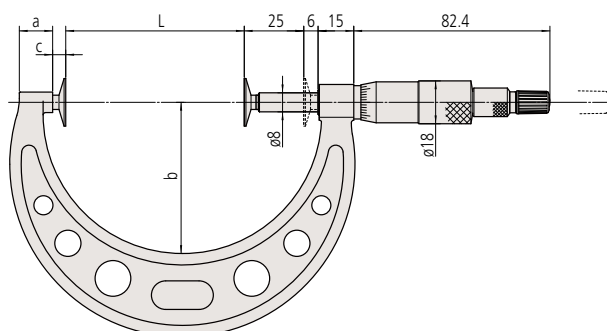
Range	L	a	b	c
0 - 25 mm	0	7	32	12.9
25 - 50 mm	25	9.8	47	
50 - 75 mm	50	11.2	60	
75 - 100 mm	75	13.5		5.5

Range	C	d	e
0 - 15 mm	5.2	15	13.8
0 - 10 mm		10	18.8

Analog models up to 50 mm



Analog models over 50 mm



Analog models

Range	L	a	b	c
0 - 25 mm	0	13.8	25	5.7
25 - 50 mm	25		32	
50 - 75 mm	50	12	49	5.5
75 - 100 mm	75	14	63	

The origin of Mitutoyo's trustworthy brand of small tool instruments

MeasurLink® ENABLED
Data Management Software by Mitutoyo

- Measures thickness of sheet metal.
- IP65 water/dust protection (series 389).
- Measuring faces: Carbide.
- Profile of measuring faces: Flat-Flat, Spherical-Flat and Spherical-Spherical.
- Equipped with Ratchet Stop for constant measuring force.



389-251-30



118-102

Metric					
Order No.	Range	Resolution	Accuracy*	Throat depth	Measuring surfaces
Digimatic (LCD)					
389-251-30	0 - 25 mm	0.001 mm	±4 µm	150 mm	F-F
389-261-30					S-F
389-271-30			S-S		
389-514			±5 µm	300 mm*1	F-F
389-252-30	25 - 50 mm	0.001 mm	±4 µm	150 mm	S-F
389-262-30					S-S
389-272-30					

* Excluding quantizing error of ± 1 count

Metric					
Order No.	Range	Graduation	Accuracy	Throat depth	Measuring surfaces
Analog					
118-101	0 - 25 mm	0.01 mm	±4 µm	100 mm	F-F
118-102				150 mm	S-F
118-114			±5 µm	300 mm*1)	S-S
118-118					S-S
118-103					F-F
118-110	25 - 50 mm		±4 µm	150 mm	F-F
118-126					S-S

*1 Models with a 300 mm (12 in) throat are equipped with a stand for convenience of measurement in the horizontal orientation as standard.

Inch/Metric					
Order No.	Range	Resolution	Accuracy*	Throat depth	Measuring surfaces
Digimatic (LCD)					
389-351-30	0 - 1 in	0.00005 in/ 0.001 mm	±0.0002 in	6 in	F-F
389-361-30					S-F
389-371-30					S-S
389-714					
389-352-30	1 - 2 in		±0.00025 in	12 in*1	F-F
389-362-30					S-F
389-372-30					S-S

* Excluding quantizing error of ± 1 count

Inch					
Order No.	Range	Graduation	Accuracy	Throat depth	Measuring surfaces
Analog					
118-129	0 - 1 in	0.0001 in	±0.0002 in	6 in	F-F
118-116					S-F
118-120					S-S
118-107	1 - 2 in	0.001 in	±0.00025 in	12 in*1	F-F
118-112			±0.0002 in	6 in	

Analog models

389-514

Unit: mm

Order No.	L	a	b
118-101	0	34	110
118-102		43	160
118-114		41	165
118-118		25	165

Order No.	L	a	b
118-101	0	34	110
118-102		43	160
118-114			
118-118			
118-110	25	41	165



Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).



These marks indicate that a product has successfully passed IP65-level testing, which is carried out by the independent German certification organization TÜV Rheinland.



(Refer to page X for details.)

Level 6: Dust-proof.
No ingress of dust allowed.

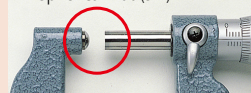
Level 5: Protected against water jets.
Water projected in jets against the enclosure from any direction shall have no harmful effects.

Flatness: 0.6 $\mu\text{m}/0.000024$ in for models with 150 mm/6 in throat
1 $\mu\text{m}/0.00004$ in for models with 300 mm/12 in throat
Parallelism: 3 $\mu\text{m}/0.00012$ in
Quantizing error (**series 389**): excluding ± 1 count

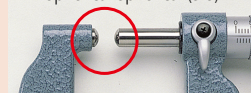
Standard, Flat-Flat (F-F)



Spherical-Flat (S-F)



Spherical-Spherical (S-S)



SR44 (1 pc), **938882, 2 pcs:389-514, 389-714** for initial operational checks (standard accessory)
Battery life: Approx. 2.4 years under normal use (for series 389-2XX, 3XX)
Approx. 1.8 years under normal use (for series 389-514, 714)

Length standard: Electromagnetic rotary sensor (for series 389)
Standard accessories: Reference bar, 1 pc
(except for measuring range 0-25 mm (0-1 in) models)
Spanner (200877), 1 pc (for series 118-1XX)
Spanner (301336), 1 pc (for series 389-2XX, 3XX)
Spanner (200154), 1 pc (for series 118-103/107, 389-514/714)

- Connecting cables for **Series 389**
(excluding **389-514** and **389-714**)
1 m: **05CZA662**
2 m: **05CZA663**

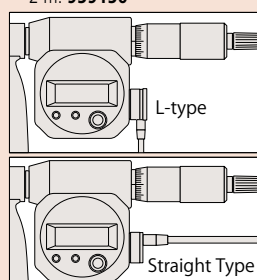
- USB Input Tool Direct
USB-ITN-B (2 m): 06AFM380B
- SPC cables for U-WAVE, series 389
(excluding 389-514 and 389-714)

Wireless data output **U-WAVE^{fit}**
U-WAVE-TM **264-622** (IP67 type)
264-623 (Buzzer type)

Connecting unit for U-WAVE-TM
02AZF310 (IP67 type)

Refer to page A-15 for details

- Connecting cables for **389-514, 389-714**
- Recommended cables: L-Type (does not interfere with operating the thimble.)
 - 1 m: **04AZB512**
 - 2 m: **04AZB513**
- Straight type (may interfere with operating the thimble.)
 - 1 m: **959149**
 - 2 m: **959150**



Refer to page B-68 for detailed information about recommended cables.

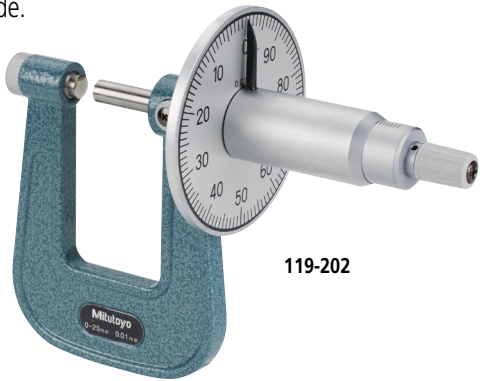


Technical Data

Standard accessories: Spanner (200168), 1 pc

Sheet Metal Micrometer SERIES 119

- Large diameter dial model enables easy and quick measurement of sheet metal thickness.
- Adjustable anvil.
- Measuring faces: Carbide.
- Equipped with Ratchet Stop for constant measuring force.

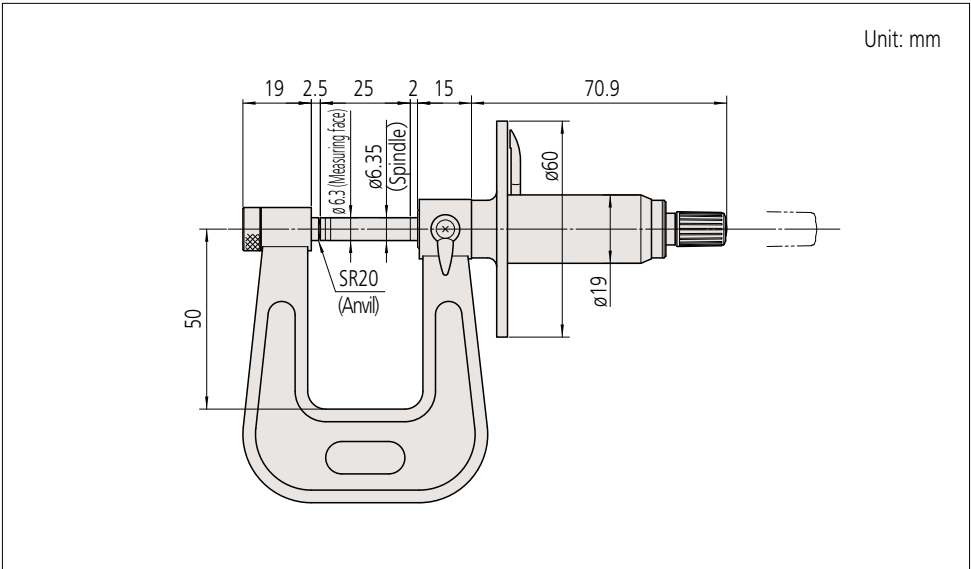


119-202

SPECIFICATIONS

Metric				
Order No.	Range	Graduation	Accuracy	Throat depth
119-202	0 - 25 mm	0.01 mm	$\pm 4 \mu\text{m}$	50 mm

DIMENSIONS



Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

Tube Micrometers SERIES 395, 115, 295

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

- Measuring faces: Carbide.
(**115-101**: only the spindle is carbide tipped.)
- series 395: IP65 digital spherical-flat anvil type micrometer.
- Equipped with Ratchet Stop for constant measuring force.



SPECIFICATIONS

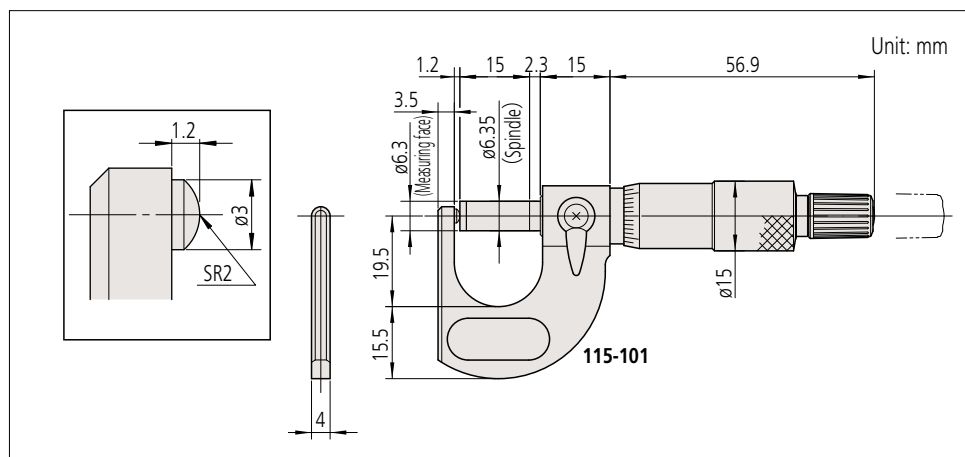
Metric				
Order No.	Range	Resolution	Accuracy*	øD
Digimatic (LCD)				
395-251-30	0 - 25 mm	0.001 mm	±2 µm	ø15
395-252-30	25 - 50 mm			ø19
395-253-30	50 - 75 mm		±3 µm	ø20
395-254-30	75 - 100 mm			ø20

* Excluding quantizing error of ±1 count

Metric				
Order No.	Range	Graduation	Accuracy	øD
Analog				
115-101	0 - 15 mm	0.01 mm	±3 µm	ø5.5
115-115	0 - 25 mm			ø10
115-116	25 - 50 mm			ø11
115-117	50 - 75 mm		ø17	
115-118	75 - 100 mm		±4 µm	ø18
Mechanical counter model				
295-115	0 - 25 mm		±3 µm	ø10

Note: For the function of **series 395**, refer to page B-8.
Also, other than the waterproof type only the connection cable (option) cannot be used.

DIMENSIONS



MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).

IP 65

These marks indicate that a product has successfully passed IP65-level testing, which is carried out by the independent German certification organization TÜV Rheinland.



(Refer to page X for details.)

IP Codes (Series 395)

Level 6: Dust-proof.

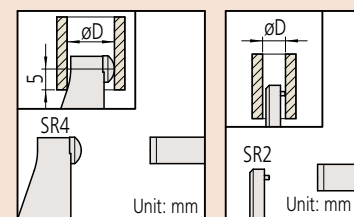
No ingress of dust allowed.

Level 5: Protected against water jets.

Water projected in jets against the enclosure from any direction shall have no harmful effects.

Technical Data

Flatness: 0.6 µm / 0.000024 in (**series 115 & 295**)
0.3 µm / 0.000012 in (**series 395**)



Other than **115-101**

115-101

Battery for Series 395

SR44 (1 pc), **938882**, for initial operational checks (standard accessory)

Battery life: Approx. 2.4 years under normal use (for series 395)

Length standard: Electromagnetic rotary sensor (for series 395)

Standard accessories: Reference bar, 1 pc (except for measuring range 0-15 mm / 0-25 mm (0-1 in) models)

Spanner (200168), 1 pc (for series 115-101)

Spanner (301336), 1 pc (for models other than series 115-101)

Optional Accessories

Connecting cables for **series 395**

1 m: **05CZA662**

2 m: **05CZA663**

USB Input Tool Direct

USB-ITN-B (2 m): **06AFM380B**

Wireless data output **U-WAVE[®] fit**

U-WAVE-TM **264-622** (IP67 type)

264-623 (Buzzer type)

Connecting unit for U-WAVE-TM

02AZF310 (IP67 type)

Refer to page A-15 for details



These marks indicate that a product has successfully passed IP65-level testing, which is carried out by the independent German certification organization TÜV Rheinland.



(Refer to page X for details.)

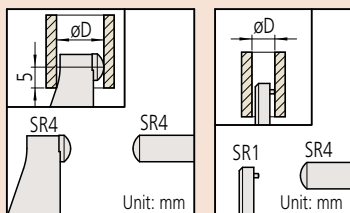
IP Codes (series 395)

Level 6: Dust-proof.

No ingress of dust allowed.

Level 5: Protected against water jets.

Water projected in jets against the enclosure from any direction shall have no harmful effects.



Other than 115-201

115-201

Battery for Series 395

SR44 (1 pc), **938882**, for initial operational checks (standard accessory)

Battery life: Approx. 2.4 years under normal use (for series 395)

Length standard: Electromagnetic rotary sensor (for series 395)

Standard accessories: Reference bar, 1 pc (except for measuring range 0-15 mm/0-25 mm (0-1 in) models)

Spanner (200168), 1 pc (for series 115-201)

Spanner (301336), 1 pc (for models other than series 115-201)

Optional Accessories

Connecting cables for **series 395**

1 m: **05CZA662**

2 m: **05CZA663**

USB Input Tool Direct

USB-ITN-B (2 m): **06AFM380B**

Wireless data output **U-WAVE**

U-WAVE-TM 264-622 (IP67 type)

264-623 (Buzzer type)

Connecting unit for U-WAVE-TM

02AZF310 (IP67 type)

Refer to page A-15 for details

Tube Micrometers SERIES 395, 115, 295 — Spherical Anvil and Spindle Type

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

- Measuring faces: Carbide.
(115-201: only the spindle is carbide tipped.)
- series 395: IP65 spherical anvil and spindle type digital micrometer.
- Equipped with Ratchet Stop for constant measuring force.



SPECIFICATIONS

Metric				
Order No.	Range	Resolution	Accuracy*	øD
Digimatic (LCD)				
395-271-30	0 - 25 mm	0.001 mm	±2 μm	ø15
395-272-30	25 - 50 mm			ø19
395-273-30	50 - 75 mm			
395-274-30	75 - 100 mm			

* Excluding quantizing error of ±1 count

Metric				
Order No.	Range	Graduation	Accuracy	øD
Analog				
115-201	0 - 15 mm	0.01 mm	±3 μm	ø5.5
115-215	0 - 25 mm			ø10
115-216	25 - 50 mm			ø11
115-217	50 - 75 mm			ø17
115-218	75 - 100 mm		±4 μm	ø18
Mechanical counter model				
295-215	0 - 25 mm	0.01 mm	±3 μm	ø10

Note: For the function of **series 395**, refer to page B-8.

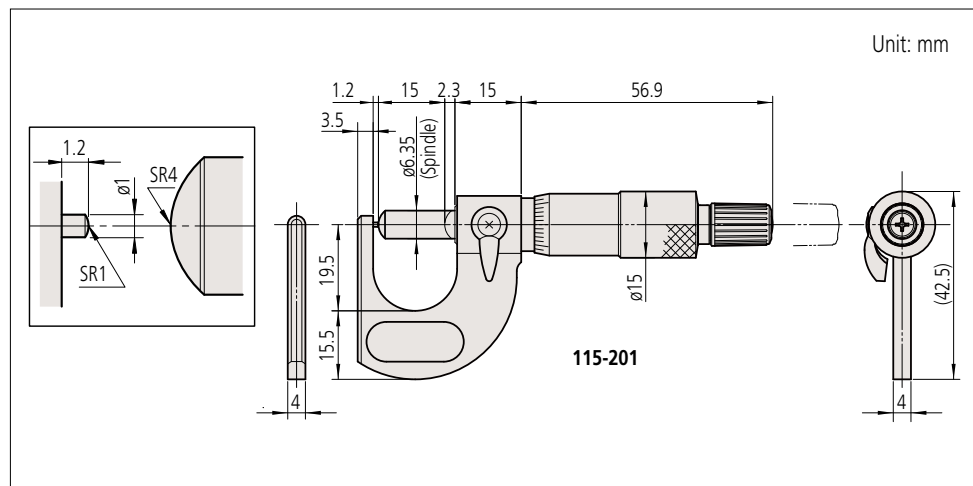
Also, other than the waterproof type only the connection cable (option) cannot be used.

Inch/Metric				
Order No.	Range	Resolution	Accuracy*	øD
Digimatic (LCD)				
395-371-30	0 - 1 in	0.00005 in/ 0.001 mm	±0.0001 in	ø0.59 in
395-372-30	1 - 2 in			ø0.75 in
395-373-30	2 - 3 in			
395-374-30	3 - 4 in		±0.00015 in	ø0.79 in

* Excluding quantizing error of ±1 count

Inch				
Order No.	Range	Graduation	Accuracy	øD
Analog				
115-253	0 - 1 in	0.0001 in	±0.00015 in	ø0.40 in
115-242	1 - 2 in	0.001 in		ø0.44 in
115-243	2 - 3 in			ø0.67 in
Mechanical counter model				
295-253	0 - 1 in	0.0001 in	±0.00015 in	ø0.40 in

DIMENSIONS



Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

Tube Micrometers SERIES 395, 115, 295 — Spherical and Cylindrical Anvil Type

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

- Spindle face: Carbide.
- series 395: IP65 spherical and cylindrical anvil type digital micrometers.
- Equipped with Ratchet Stop for constant measuring force.



395-261-30



SPECIFICATIONS

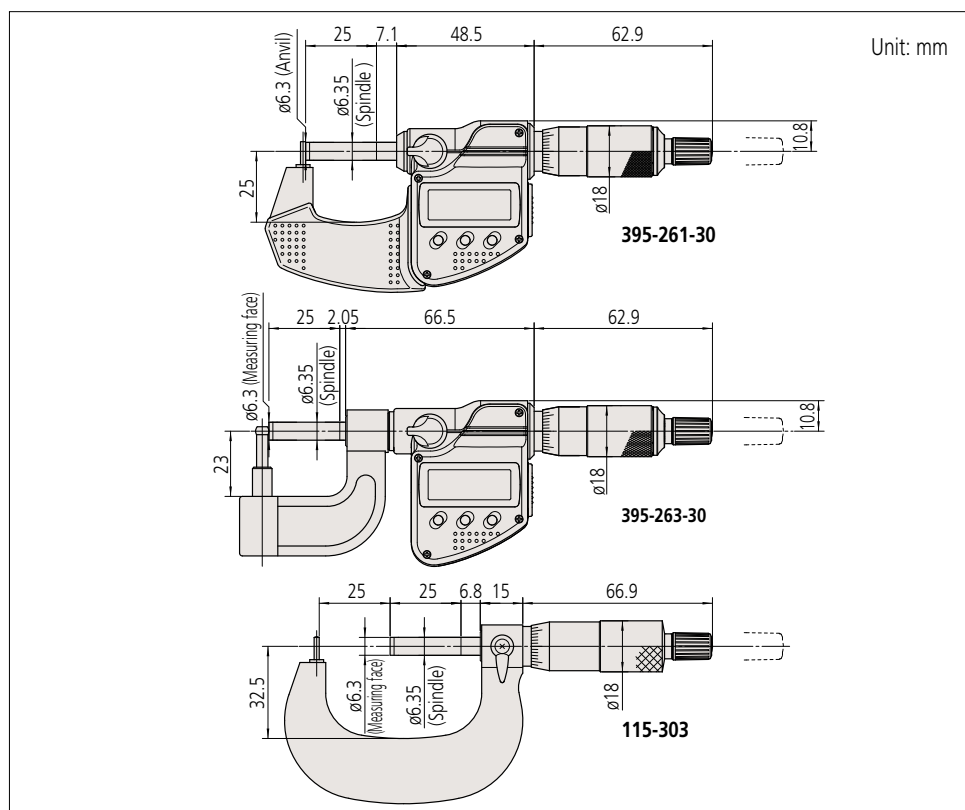
Metric				
Order No.	Range	Resolution	Accuracy*	Remarks
395-261-30	0 - 25 mm	0.001 mm	±3 μm	Type A
395-262-30				Type B
395-263-30				Type C
395-264-30				Type D

* Excluding quantizing error of ±1 count

Metric				
Order No.	Range	Graduation	Accuracy	Remarks
Analog				
115-302	0 - 25 mm	0.01 mm	±3 μm	Type A
115-308				Type B
115-303	25 - 50 mm			Type A
115-309				Type B
115-315	0 - 25 mm			Type C
115-316				Type D

Note: For the function of series 395, refer to page B-8.
Also, other than the waterproof type only the connection cable (option) cannot be used.

DIMENSIONS



MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).

IP 65

These marks indicate that a product has successfully passed IP65-level testing, which is carried out by the independent German certification organization TÜV Rheinland.



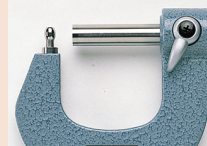
(Refer to page X for details.)

IP Codes (series 395)

- Level 6: Dust-proof.
No ingress of dust allowed.
Level 5: Protected against water jets.
Water projected in jets against the enclosure from any direction shall have no harmful effects.

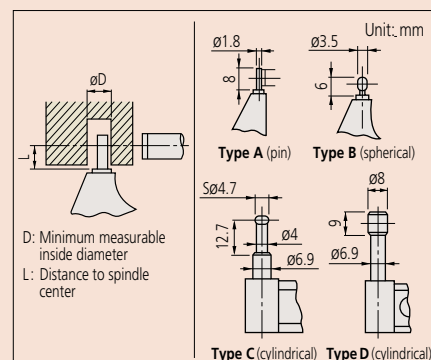
Type A (pin)

Type B (spherical)



Type C (cylindrical)

Type D (cylindrical)



Anvil	D	L
Type A	2	4
Type B	3.6	
Type C	4.8	12
Type D	8.2	22

Battery for Series 395

SR44 (1 pc), 938882, for initial operational checks (standard accessory)
Battery life: Approx. 2.4 years under normal use (for series 395)
Length standard: Electromagnetic rotary sensor (for series 395)
Standard accessories: Reference bar, 1 pc (except for measuring range 0-25 mm (0-1 in) models)
Spanner (301336), 1 pc

Optional Accessories

Connecting cables for series 395

1 m: 05CZA662

2 m: 05CZA663

USB Input Tool Direct

USB-ITN-B (2 m): 06AFM380B

Wireless data output **U-WAVE fit**

U-WAVE-TM 264-622 (IP67 type)

264-623 (Buzzer type)

Connecting unit for U-WAVE-TM

02AZF310 (IP67 type)

Refer to page A-15 for details



These marks indicate that a product has successfully passed IP65-level testing, which is carried out by the independent German certification organization TÜV Rheinland.



(Refer to page X for details.)

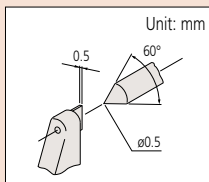
IP Codes (series 342-271-30, 342-371-30, 342-451-20)

Level 6: Dust-proof.

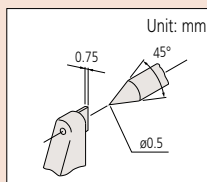
No ingress of dust allowed.

Level 5: Protected against water jets.

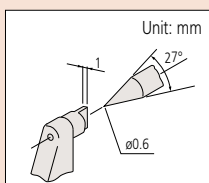
Water projected in jets against the enclosure from any direction shall have no harmful effects.



342-271-30, 342-371-30, 112-401



342-451-20



142-402, 142-403

Battery for Series 342

SR44 (1 pc), **938882**, for initial operational checks (standard accessory)

Battery life: Approx. 2.4 years under normal use (for series 342-271-30/342-371-30)

Approx. 5 years under normal use

Approx. 18,000 hours in continuous use (for series 342-451-20)

Length standard: Electromagnetic rotary sensor (for series 342-271-30/342-371-30)

Electrostatic capacity absolute sensor (for series 342-451-20)

Standard accessories:

Spanner (301336), 1 pc (except for series 342-451)

Optional Accessories

Connecting cables (digital model)

1 m: **05CZA662**

2 m: **05CZA663**

USB Input Tool Direct

USB-ITN-B (2 m): **06AFM380B**

Wireless data output **U-WAVE** for

U-WAVE-TM 264-622 (IP67 type)

264-623 (Buzzer type)

Connecting unit for U-WAVE-TM

02AZF310 (IP67 type)

Note: cannot be used with 342-451-20

Refer to page A-15 for details

Crimp Height Micrometers Series 342,112,142

MeasurLink ENABLED

Data Management Software by Mitutoyo

- Measures the height of crimp contacts.
- Equipped with Ratchet Stop for constant measuring force.
- IP65 water/dust protection (digital model).

- Model **342-451-20** is the Quickmike type which provides a speedy spindle feed of 10 mm per thimble rotation, which enables widely differently sized features to be measured quickly.



Digimatic (LCD)
342-271-30



Quickmike type (LCD)
342-451-20



ABSOLUTE™



112-401

SPECIFICATIONS

Metric			
Order No.	Range	Resolution	Accuracy*
Digimatic (LCD)			
342-271-30	0 - 20 mm	0.001 mm	±3 μm
Quickmike (LCD)			
342-451-20	0 - 15 mm	0.001 mm	±3 μm

* Excluding quantizing error of ±1 count

Metric			
Order No.	Range	Graduation	Accuracy
Mechanical counter model			
142-402	0 - 25 mm	0.01 mm	±3 μm
142-403		0.001 mm	

Metric			
Order No.	Range	Graduation	Accuracy
Analog			
112-401	0 - 25 mm	0.01 mm	±3 μm

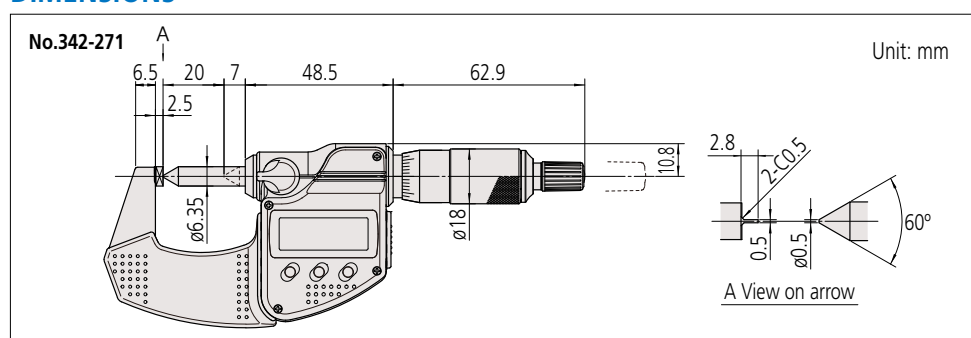
Inch/Metric			
Order No.	Range	Resolution	Accuracy*
Digimatic (LCD)			
342-371-30	0 - 0.8 in	0.00005 in/ 0.001 mm	±0.00015 in

* Excluding quantizing error of ±1 count

Note: For the **series 342** functions, refer to page B-8.

Also, other than the waterproof type only the connection cable (option) cannot be used.

DIMENSIONS



Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

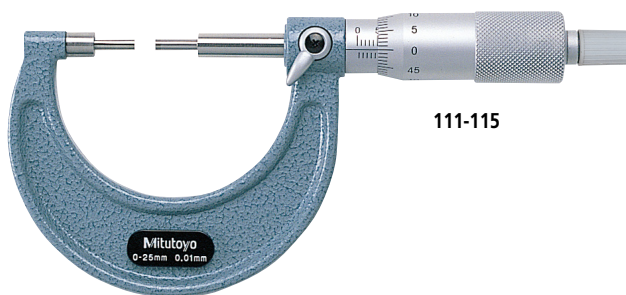
Spline Micrometers SERIES 331, 111, 131

- The anvil and spindle are of small diameter for measuring splined shafts, slots and keyways.
- IP65 water/dust protection (series 331).
- Measuring faces: Carbide.
- Equipped with Ratchet Stop for constant measuring force.

MeasurLink® ENABLED
Data Management Software by Mitutoyo



331-251-30



111-115

SPECIFICATIONS

Metric					
Order No.	Range	Resolution	Accuracy*	Remarks	
Digimatic (LCD)					
331-251-30	0 - 25 mm	0.001 mm	±2 μm	Type A	
331-252-30	25 - 50 mm				
331-253-30	50 - 75 mm				
331-254-30	75 - 100 mm		±3 μm	Type B	
331-261-30	0 - 25 mm		±2 μm		
331-262-30	25 - 50 mm				
331-263-30	50 - 75 mm		±3 μm		
331-264-30	75 - 100 mm				

* Excluding quantizing error of ±1 count

Inch/Metric					
Order No.	Range	Resolution	Accuracy*	Remarks	
Digimatic (LCD)					
331-351-30	0 - 1 in	0.00005 in/ 0.001 mm	±0.0001 in	Type A	
331-352-30	1 - 2 in				
331-353-30	2 - 3 in				
331-354-30	3 - 4 in		±0.00015 in	Type B	
331-361-30	0 - 1 in		±0.0001 in		
331-362-30	1 - 2 in				
331-363-30	2 - 3 in		±0.00015 in		
331-364-30	3 - 4 in				

* Excluding quantizing error of ±1 count

Metric				
Order No.	Range	Graduation	Accuracy	Remarks
Analog				
111-215	0 - 25 mm	0.01 mm	±3 µm	Type B
111-115	0 - 25 mm			Type A
111-116	25 - 50 mm			
111-117	50 - 75 mm			
111-118	75 - 100 mm			
111-119	100 - 125 mm			
111-120	125 - 150 mm			
111-121	150 - 175 mm			
111-122	175 - 200 mm			
111-123	200 - 225 mm			
111-124	225 - 250 mm			
111-125	250 - 275 mm			
111-126	270 - 300 mm			
Mechanical counter model				
131-115	0 - 25 mm		±3 µm	Type A

Inch				
Order No.	Range	Graduation	Accuracy	Remarks
Analog				
111-166	0 - 1 in	0.0001 in	±0.00015 in	Type A

Note: For the function of series 331, refer to page B-8.
Also, other than the waterproof type only the connection cable (option) cannot be used.

MeasurLink® ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).



These marks indicate that a product has successfully passed IP65-level testing, which is carried out by the independent German certification organization TÜV Rheinland.



(Refer to page X for details.)

IP Codes (series 331)

Level 6: Dust-proof.

No ingress of dust allowed.

Level 5: Protected against water jets.

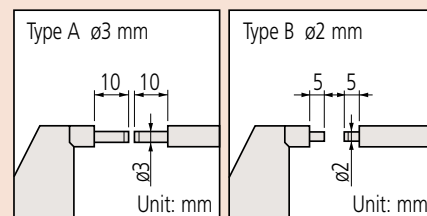
Water projected in jets against the enclosure from any direction shall have no harmful effects.

Technical Data

Flatness: 0.3 µm / 0.000012 in

Parallelism: (2+R/100) µm, R = max. range (mm)

[0.00008 in + 0.00004(R/4)] in R = max range (inch)
fraction rounded down



Battery for Series 331

SR44 (1 pc), **938882**, for initial operational checks (standard accessory)

Battery life: Approx. 2.4 years under normal use (for series 331)

Length standard: Electromagnetic rotary sensor (for series 331)

Standard accessories: Reference bar, 1 pc (except for measuring range 0-25 mm (0-1 in) models)
Spanner (301336), 1 pc

Optional Accessories

Connecting cables for series 331

1 m: **05CZA662**

2 m: **05CZA663**

USB Input Tool Direct

USB-ITN-B (2 m): **06AFM380B**

Wireless data output **U-WAVE**

U-WAVE-TM **264-622** (IP67 type)

264-623 (Buzzer type)

Connecting unit for U-WAVE-TM

02AZF310 (IP67 type)

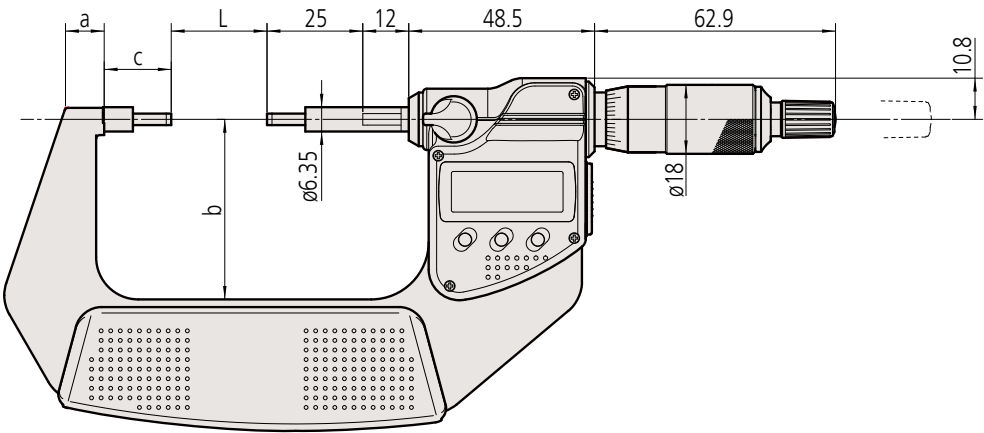
Refer to page A-15 for details

DIMENSIONS

Digital Models

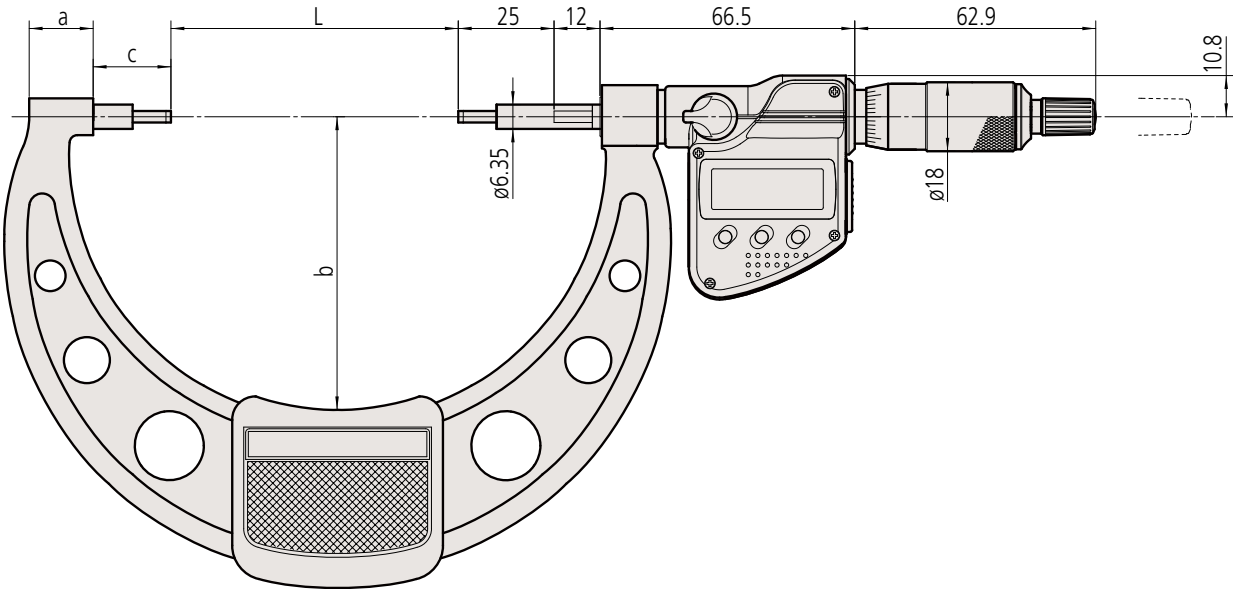
Models up to 75 mm measuring range

Unit: mm



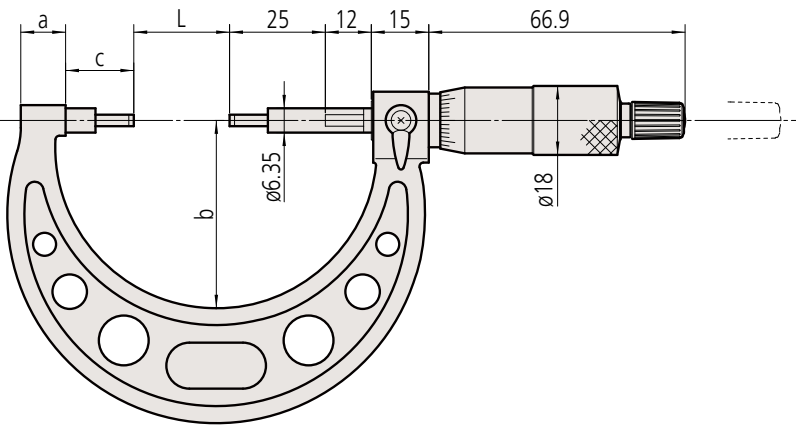
Digital Models

Models over 75 mm measuring range



Analog Models

Models up to 300 mm measuring range



Order No.	L	a	b	c
331-251-30	0	7.3	32.5	17.5
331-261-30	25	10.1	47	
331-252-30	50	11.5	60	
331-262-30	75	16.7	76	
331-253-30	100	18.8	94	20.7
331-263-30	125	19.1	106	21.1
331-254-30	150	18.2	118	21.3
331-264-30	175	16.8	130	21.7
111-215	200	18	143	20.5
111-115	225		156	21.5
111-116	250		169	
111-117	275		181	
111-118	0		38	17.5
111-119	25		49	
111-120	50		60	
111-121	75		79	
111-122	100		94	20.3
111-123	125		106	21.1
111-124	150		118	21.3
111-125	175		130	21.7
111-126	200		143	20.5

Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

Point Micrometers SERIES 342, 142, 112

- Pointed spindle and anvil for measuring the web thickness of drills, small grooves, keyways and other hard-to-reach features.
- The measuring points (carbide tipped) have approximately 0.3 mm radius.
- Series 342: IP65 Digimatic micrometers.
- Equipped with Ratchet Stop for constant measuring force.

MeasurLink[®] ENABLED
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342-251-30



112-201

SPECIFICATIONS

Metric					
Order No.	Range	Resolution	Accuracy*	Point	
Digimatic (LCD) (With carbide tip)					
342-251-30	0 - 25 mm	0.001 mm	±2 μm	15°	
342-252-30	25 - 50 mm				
342-253-30	50 - 75 mm				
342-254-30	75 - 100 mm		±3 μm	30°	
342-261-30	0 - 25 mm				
342-262-30	25 - 50 mm				
342-263-30	50 - 75 mm		±3 μm		
342-264-30	75 - 100 mm				

* Excluding quantizing error of ±1 count

Metric				
Order No.	Range	Graduation	Accuracy	Point
Analog				
112-153	0 - 25 mm		±3 μm	15°
112-154	25 - 50 mm			
112-155	50 - 75 mm		±4 μm	30°
112-156	75 - 100 mm			
112-201	0 - 25 mm	0.01 mm	±3 μm	30°
112-202	25 - 50 mm			
112-203	50 - 75 mm		±4 μm	
112-204	75 - 100 mm			
Analog (With carbide tip)				
112-165	0 - 25 mm	0.01 mm	±3 μm	15°
112-166	25 - 50 mm			
112-167	50 - 75 mm		±4 μm	30°
112-168	75 - 100 mm			
112-213	0 - 25 mm		±3 μm	30°
112-214	25 - 50 mm			
112-215	50 - 75 mm	±4 μm		
112-216	75 - 100 mm			
Mechanical counter model				
142-153	0 - 25 mm		±3 μm	15°
142-201				30°

Inch/Metric					
Order No.	Range	Resolution	Accuracy*	Point	
Digimatic (LCD) (With carbide tip)					
342-351-30	0 - 1 in	0.00005 in/ 0.001 mm	±0.0001 in	15°	
342-352-30	1 - 2 in				
342-353-30	2 - 3 in				
342-354-30	3 - 4 in		±0.00015 in	30°	
342-361-30	0 - 1 in				
342-362-30	1 - 2 in				
342-363-30	2 - 3 in		±0.0001 in		
342-364-30	3 - 4 in				

* Excluding quantizing error of ±1 count

Inch				
Order No.	Range	Graduation	Accuracy	Point
Analog				
112-177	0 - 1 in	0.001 in	±0.00015 in	15°
112-178	1 - 2 in			30°
112-225	0 - 1 in		30°	
112-226	1 - 2 in			
Analog (With carbide tip)				
112-189	0 - 1 in	0.001 in	±0.00015 in	15°
112-190	1 - 2 in			30°
112-191	2 - 3 in			
112-237	0 - 1 in			
112-238	1 - 2 in			
Mechanical counter model				
142-177	0 - 1 in		±0.00015 in	15°
142-225				30°

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).



These marks indicate that a product has successfully passed IP65-level testing, which is carried out by the independent German certification organization TÜV.



(Refer to page X for details.)

IP Codes (series 342)

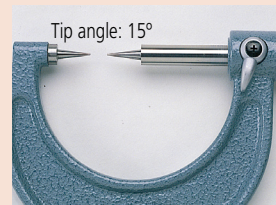
Level 6: Dust-proof.

No ingress of dust allowed.

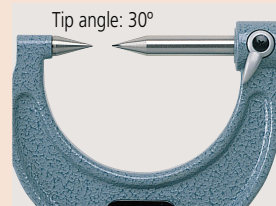
Level 5: Protected against water jets.

Water projected in jets against the enclosure from any direction shall have no harmful effects.

Technical Data



Tip angle: 15°



Tip angle: 30°

Battery for Series 342

SR44 (1 pc), **938882**, for initial operational checks (standard accessory)

Battery life: Approx. 2.4 years under normal use (for series 342)

Length standard: Electromagnetic rotary sensor (for series 342)

Standard accessories: Reference bar, 1 pc (except for measuring range 0-25 mm (0-1 in) models)

Spanner (301336), 1 pc

Optional Accessories

Connecting cables for **series 342**

1 m: **05CZA662**

2 m: **05CZA663**

USB Input Tool Direct

USB-ITN-B (2 m): **06AFM380B**

Wireless data output **U-WAVE**

264-622 (IP67 type)

264-623 (Buzzer type)

Connecting unit for U-WAVE-TM

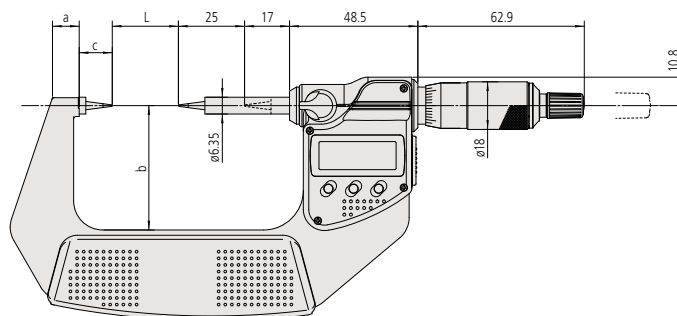
02AZF310 (IP67 type)

Refer to page A-15 for details

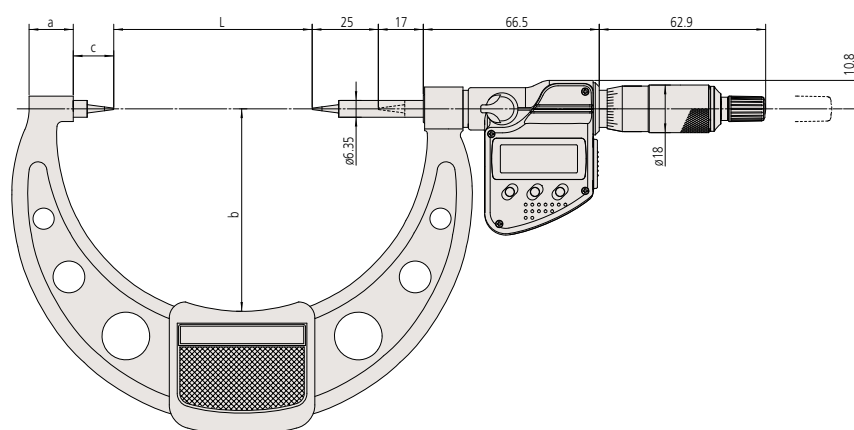
DIMENSIONS

Unit: mm

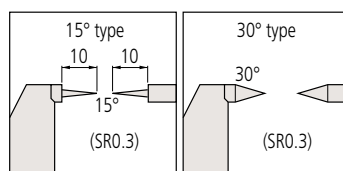
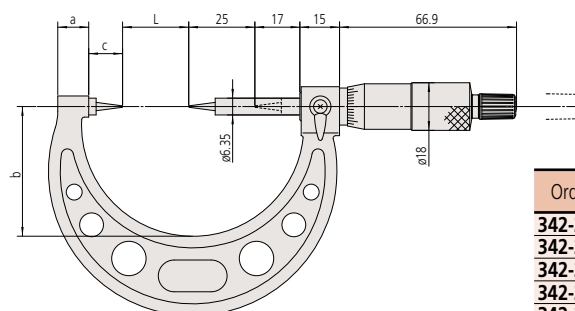
Digital models up to 75 mm measuring range



Digital models over 75 mm measuring range



Analog models measuring range



Order No.	L	a	b	c	Frame thickness*1
342-251-30	0	7.3	32.5		(11.2)
342-261-30					
342-252-30	25	10.1	47	12.5	(12.8)
342-262-30					
342-253-30	50	11.5	60		(12.8)
342-263-30					
342-254-30	75	16.7	76	15.3	(20.8)
342-264-30					
112-153	0	10	38		(9)
112-154	25	12	49	12.5	(10)
112-155	50	14	60		(11)
112-156	75	16.7	79	15.3	(13)

*1 Digimatic type: thickness over heat shield

Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

V-Anvil Micrometers SERIES 314, 114 — 3 Flutes and 5 Flutes

MeasurLink® ENABLED
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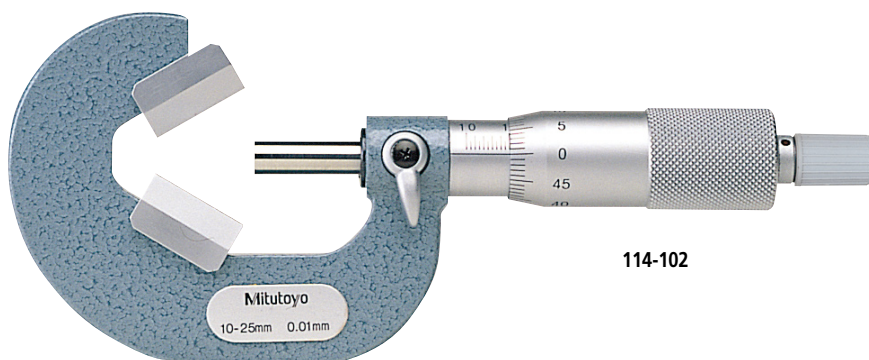
- Measures the outside diameter of cutting tools (such as taps, reamers, end mills) which have three or five flutes.
- Measures pitch diameter: refer to "Quick Guide to Precision Measuring Instruments" on page B-72.
- Measuring faces: Carbide.
- Equipped with Ratchet Stop for constant measuring force.



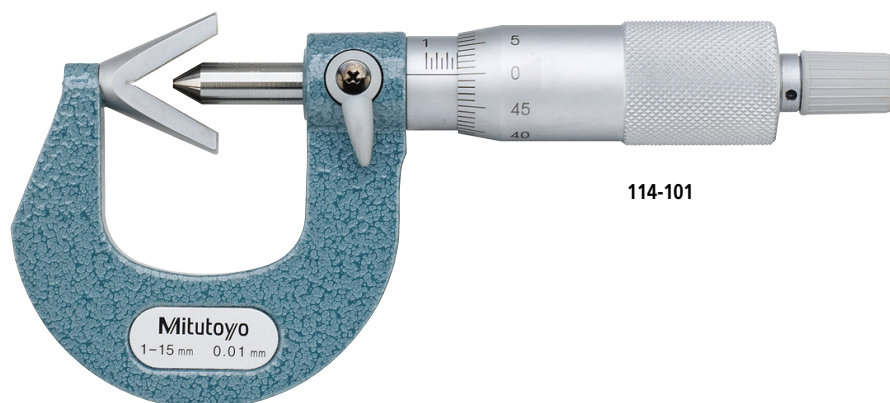
314-251-30



114-121



114-102



114-101

MeasurLink® ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).

Technical Data

Flatness: (Series 114) 0.6 μ m / 0.000024 in (Spindle)
1.3 μ m / 0.000052 in (Anvil)
(Series 314) 0.3 μ m / 0.000012 in (Spindle)
1.0 μ m / 0.00004 in (Anvil)

Battery for Series 314

SR44 (1 pc), **938882**, for initial operational checks (standard accessory)
Battery life: Approx. 2.4 years under normal use (for series 314)
Length standard: Electromagnetic rotary sensor (for series 314)
Standard accessories:
Reference bar, 1 pc
Spanner (301336), 1 pc
(Maximum measuring range up to 55 mm/2.2 in 114-114)*1
(Maximum measuring range up to 45 mm/1 in)*2
Spanner (200877), 1 pc
(for maximum measuring range 70 mm or over)*1
(for maximum measuring range 65 mm or over)*2
*1 For analog type with 3-flute cutting tools.
*2 For analog type with 5-flute cutting tools.

Optional Accessories

Connecting cables for **series 314**

1 m: **05CZA662**

2 m: **05CZA663**

USB Input Tool Direct

USB-ITN-B (2 m): **06AFM380B**

Wireless data output **U-WAVE**™

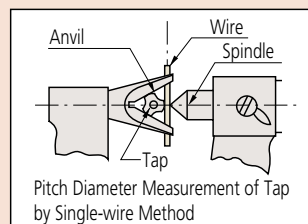
U-WAVE-TM 264-622 (IP67 type)

264-623 (Buzzer type)

Connecting unit for U-WAVE-TM

02AZF310 (IP67 type)

Refer to page A-15 for details



SPECIFICATIONS

Metric For 3-flute cutting tools					
Order No.	Range	Resolution	Accuracy*	Remarks	Anvil
Digimatic (LCD)					
314-251-30	1 - 15 mm	0.001 mm	±4 μm	w/groove	60°
314-252-30	10 - 25 mm				
314-253-30	25 - 40 mm				
314-261-30	1 - 15 mm				
314-262-30	10 - 25 mm				

*Excluding quantizing error of ±1 count

Metric For 3-flute cutting tools					
Order No.	Range	Graduation	Accuracy	Remarks	Anvil
Analog Anvil, Spindle (With carbide tip)					
114-204	2.3 - 25 mm		±4 μm	—	
Analog Spindle (With carbide tip)					
114-101	1 - 15 mm	0.01 mm	±4 μm	w/groove	60°
114-102	10 - 25 mm		±5 μm	—	
114-103	25 - 40 mm		±5 μm	—	
114-104	40 - 55 mm		±6 μm	—	
114-105	55 - 70 mm		±7 μm	—	
114-106	70 - 85 mm		±7 μm	—	
114-161	1 - 15 mm		±4 μm	—	
114-162	10 - 25 mm		±4 μm	—	

Metric	For 5-flute cutting tools						
Order No.	Range	Graduation	Accuracy	Remarks	Anvil		
Analog Anvil, Spindle (With carbide tip)							
114-137	2.3 - 25 mm	0.01 mm	±4 μm	—	108°		
Analog Spindle (With carbide tip)							
114-121	5 - 25 mm		±4 μm	w/groove			
114-122	25 - 45 mm		±5 μm	—			
114-123	45 - 65 mm		±6 μm	—			
114-124	65 - 85 mm		±7 μm	—			
114-165	5 - 25 mm		±4 μm	—			

Inch/Metric For 3-flute cutting tools					
Order No.	Range	Resolution	Accuracy*	Remarks	Anvil
Digimatic (LCD)					
314-351-30	0.05 - .6 in	0.00005 in/ 0.001 mm	±0.0002 in	w/groove	60°
314-352-30	0.4 - 1 in				
314-353-30	1 - 1.6 in				
314-361-30	0.05 - .6 in				
314-362-30	0.4 - 1 in				

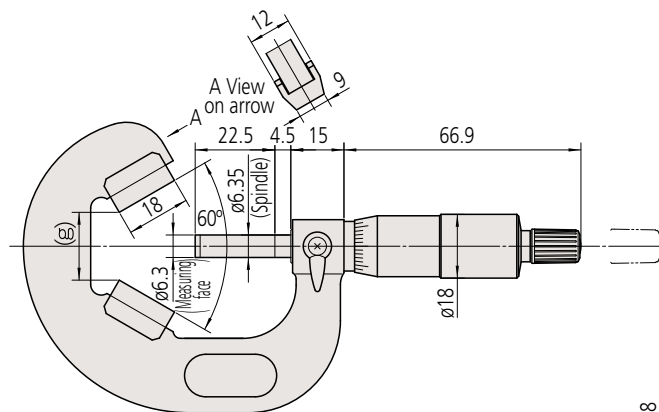
*Excluding quantizing error of ±1 count

Inch For 3-flute cutting tools						
Order No.	Range	Graduation	Accuracy	Remarks	Anvil	
Analog Anvil, Spindle (With carbide tip)						
114-202	0.09 - 1 in	0.0001 in	±0.0002 in	—	60°	
Analog Spindle (With carbide tip)						
114-163	0.05 - 0.6 in	0.0001 in	±0.0002 in	—		
114-113	1 - 1.6 in		±0.00025 in	—		
114-114	1.6 - 2.2 in		±0.0003 in	—		

Inch For 5-flute cutting tools					
Order No.	Range	Graduation	Accuracy	Remarks	Anvil
Analog Anvil, Spindle (With carbide tip)					
114-135	0.09 - 1 in	0.0001 in	±0.0002 in	—	108°

DIMENSIONS

Unit: mm

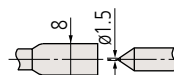


114-103

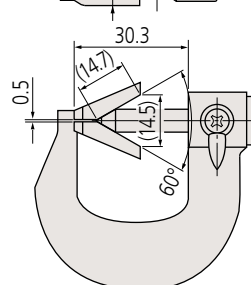
For 3-flute cutting tools

Range	(g)
10 - 25 mm	6.2
25 - 40 mm	19.14
40 - 55 mm	32.13
55 - 70 mm	45.12
70 - 85 mm	58.11

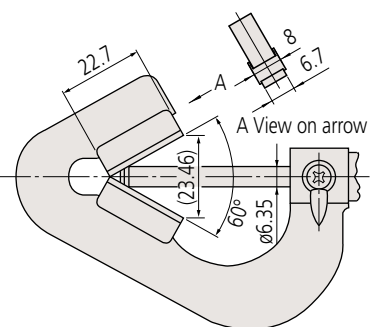
w/o groove model



w/ groove model



114-101



114-204

Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

Blade Micrometers SERIES 422, 122 — Non-Rotating Spindle Type

- The anvil and spindle are blade-shaped for measuring the groove diameter of shafts, keyways, and other hard-to-reach features.
- Carbide-tipped measuring faces are available.
- Non-rotating spindle type.
- Equipped with Ratchet Stop for constant measuring force.



Digimatic (LCD)
422-230-30

122-101

Quickmike Type (LCD)
422-411-20

SPECIFICATIONS

Metric				
Order No.	Range	Resolution	Accuracy*	Remark
Digimatic (LCD)				
422-230-30	0 - 25 mm	0.001 mm	±3 μm	Type A
422-231-30	25 - 50 mm			
422-232-30	50 - 75 mm			
422-233-30	75 - 100 mm		±4 μm	Type B
422-261-30	25 - 50 mm			
422-270-30	0 - 25 mm			
422-271-30	0 - 25 mm		±3 μm	Type C
				Type D

* Excluding quantizing error of ±1 count

Metric Quickmike type				
Order No.	Range	Resolution	Accuracy*	Remark
Digimatic (LCD)				
422-411-20	0 - 30 mm	0.001 mm	±3 μm	Type A
422-412-20	25 - 55 mm			

* Excluding quantizing error of ±1 count

Metric				
Order No.	Range	Graduation	Accuracy	Remark
Analog				
122-101	0 - 25 mm	0.01 mm	±3 μm	Type A
122-102	25 - 50 mm			
122-103	50 - 75 mm			
122-104	75 - 100 mm		±4 μm	
122-105	100 - 125 mm			
122-106	125 - 150 mm		±5 μm	
122-107	150 - 175 mm			
122-108	175 - 200 mm			
122-109	200 - 225 mm		±6 μm	
122-110	225 - 250 mm			
122-111	250 - 275 mm			
122-112	275 - 300 mm		±3 μm	Type B
122-113	0 - 25 mm			
122-114	25 - 50 mm			
Analog (With carbide tip)				
122-161	0 - 25 mm	0.01 mm	±3 μm	Type C
122-162	25 - 50 mm			
122-141	0 - 25 mm			Type D
122-142	25 - 50 mm			

Notes: 1) A heat shield is provided with Digimatic models and 122-101, 122-161, 122-141 as standard.

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Data Management Software by Mitutoyo

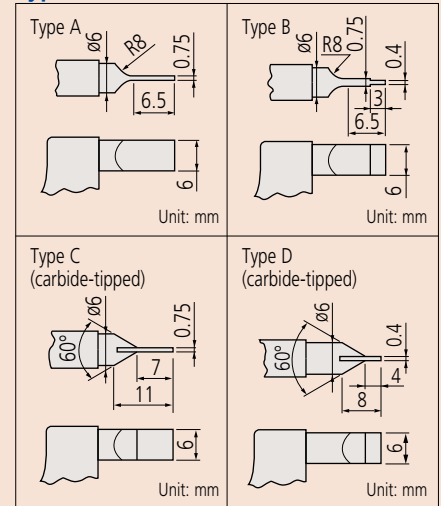
MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).

Technical Data

Parallelism
3 μm for models up to 75 mm
0.00015 in for models up to 3 in
(3+R/100) μm for models over 75 mm
0.0002 in for models over 3 in
R = max. range (mm)
fraction rounded up

Type and Dimensions



Battery for Series 422

SR44 (1 pc), 938882, for initial operational checks (standard accessory)
Battery life: Approx. 2.4 years under normal use (for series 422-2XX, 3XX)
Approx. 5 year under normal use (for series 422-4XX)
Approx. 18,000 hours in continuous use

Length standard: Electromagnetic rotary sensor (for series 422-2XX, 3XX)
Electrostatic capacity absolute sensor (for series 422-4XX)
Standard accessories: Reference bar, 1 pc (except for measuring range 0-25 mm / 0-30 mm (0-1 in/0-1.2 in) models)
Spanner (301336), 1 pc (for series 122-1XX, 422-2XX, 3XX)

Optional Accessories

Connecting cables for digital models

1 m: 05CZA662

2 m: 05CZA663

USB Input Tool Direct

USB-ITN-B (2 m): 06AFM380B

Connecting for 422-230-30 to 422-271-30, 422-330-30 to 422-371-30

Wireless data output U-WAVE[®] III

U-WAVE-TM 264-622 IP67 type

264-623 Buzzer type

Connecting unit for U-WAVE-TM

02AZF310 (IP67 type)

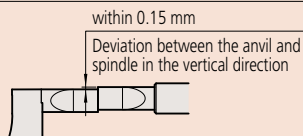
Note: cannot be used with Quickmike type
Refer to page A-15 for details



Quickmike

Provides a speedy spindle feed of 10mm per thimble rotation which enables widely differently sized features to be measured quickly.

Deviation Between the Anvil and Spindle in the Vertical Direction



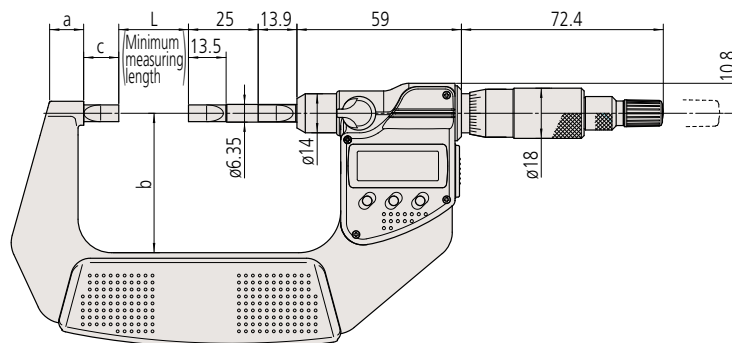
Deviation of 0.15 mm or less* is guaranteed between the anvil and spindle in the vertical direction.

* When the measuring range is 0 - 25 mm

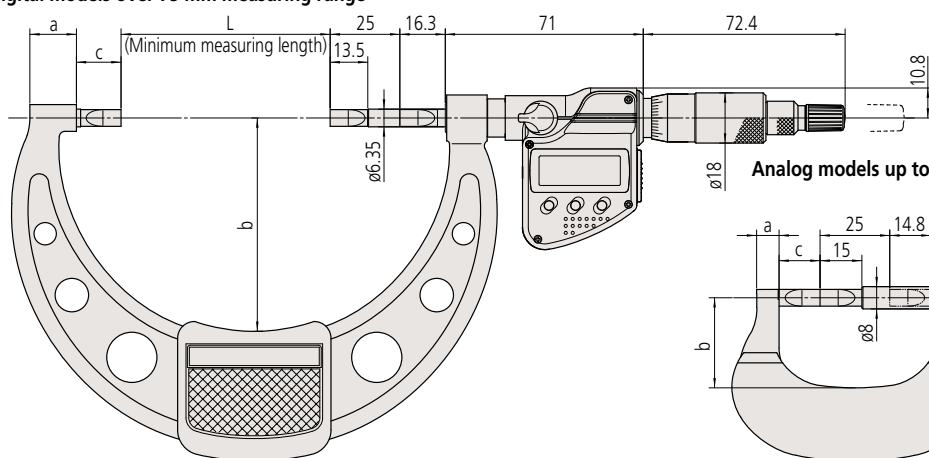
DIMENSIONS

Digital models up to 50 mm measuring range

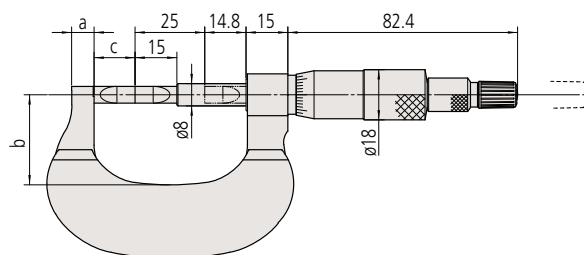
Unit: mm



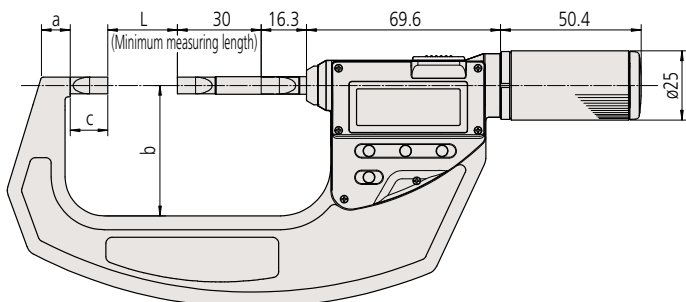
Digital models over 75 mm measuring range



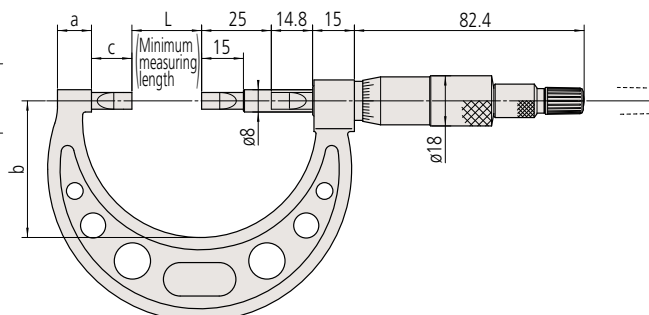
Analog models up to 25 mm measuring range



Quickmike type



Analog models over 50 mm measuring range



Order No.	L	a	b	C
422-230-30	0	11	31	12.5
422-231-30	25	12.2	50	12.6
422-232-30	50	14.6	57	13
422-233-30	75	16.7	76	16
422-260-30	0	11	31	12.5
422-261-30	25	12.2	50	12.6
422-270-30	0	11	31	12.5
422-271-30				
122-101	25	7.8	32	15
122-102		12.2	49	14.5
122-103		14.6	60	
122-104		16.7	79	17.5
122-105	100	18.8	94	17.9
122-106	125	19.1	106	18.3
122-107	150	18.2	118	18.5
122-108	175	16.8	130	18.9
122-109	200	18	143	17.7
122-110	225		156	18.7
122-115	250		169	
112-116	275		181	
422-411	0	8.5	36	13.5
422-412	25	10.3	47	

Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

Can Seam Micrometers SERIES 147

- Measures the width, height, and depth of can seams.



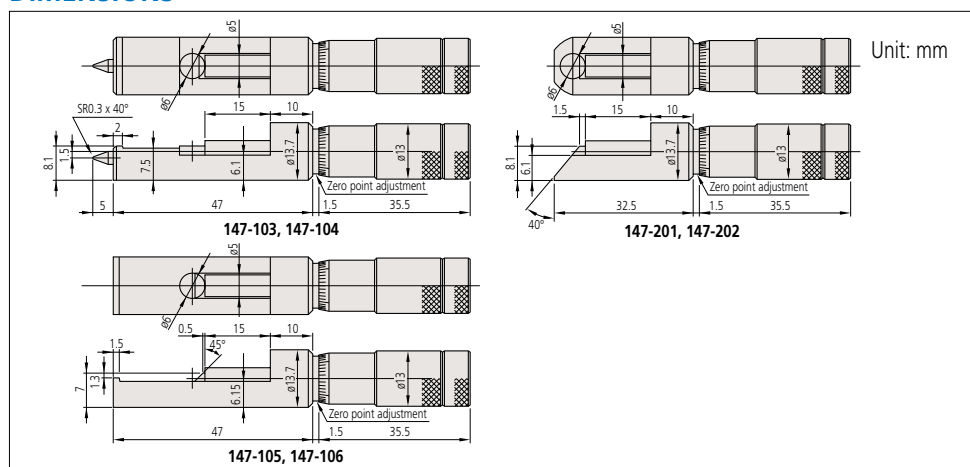
SPECIFICATIONS

Metric				
Order No.	Range	Graduation	Accuracy	Remarks
147-103	0 - 13 mm	0.01 mm	±3 μm	for steel cans
147-105				for aluminum cans
147-202				for spray cans

147-103

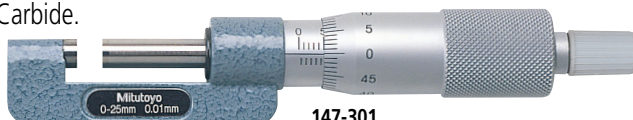
Inch				
Order No.	Range	Graduation	Accuracy	Remarks
147-104	0 - 0.5 in	0.001 in	±0.00015 in	for steel cans
147-106				for aluminum cans
147-201				for spray cans

DIMENSIONS



Hub Micrometers SERIES 147

- Measures hub thickness and shoulders inside a bore.
- Measuring faces: Carbide.
- Equipped with Ratchet Stop for constant measuring force.



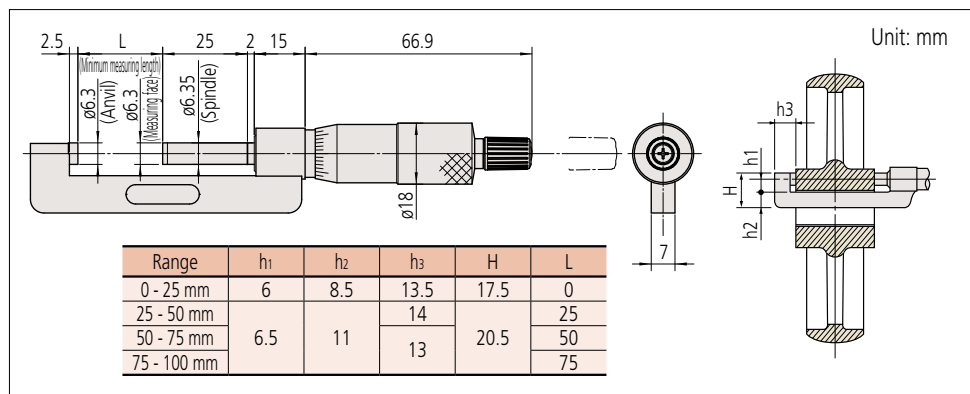
147-301

SPECIFICATIONS

Metric			
Order No.	Range	Graduation	Accuracy
147-301	0 - 25 mm	0.01 mm	±2 μm
147-302	25 - 50 mm		
147-303	50 - 75 mm		
147-304	75 - 100 mm		±3 μm

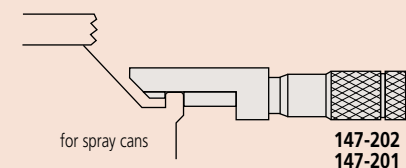
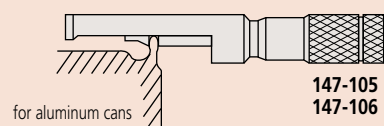
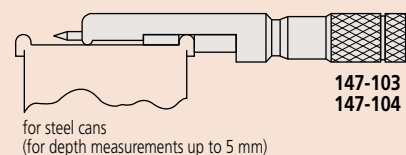
Inch			
Order No.	Range	Graduation	Accuracy
147-351	0 - 1 in	0.001 in	±0.0001 in
147-352	1 - 2 in		
147-353	2 - 3 in		
147-354	3 - 4 in		

DIMENSIONS



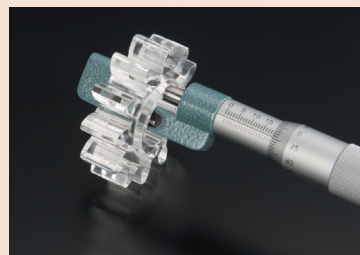
Technical Data

Standard accessories: Spanner (200168), 1 pc
Spanner (202863), 1 pc



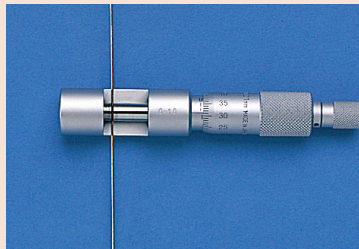
Technical Data

Flatness: 0.6 μm/0.000024 in
Parallelism: 3 μm / 0.00012 in
Standard accessories: Reference bar, 1 pc
(except for measuring range 0-25 mm (0-1 in) models)
Spanner (301336), 1 pc



Technical Data

Flatness: 0.6 µm/0.000024 in
Parallelism: 1.3 µm/0.00005 in



Standard accessories: Spanner (200168), 1 pc

Wire Micrometers Series 147

- Designed for measuring wire thickness.
- Measurable wire dia.: 10 mm or less.
- Measuring faces: Carbide.
- Equipped with Ratchet Stop for constant measuring force.



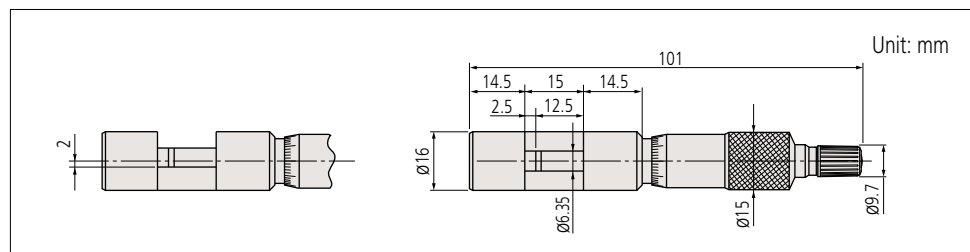
147-401

SPECIFICATIONS

Metric			
Order No.	Range	Graduation	Accuracy
147-401	0 - 10 mm	0.01 mm	±3 µm

Inch			
Order No.	Range	Graduation	Accuracy
147-402	0 - 0.4 in	0.0001 in	±0.00015 in

DIMENSIONS



Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

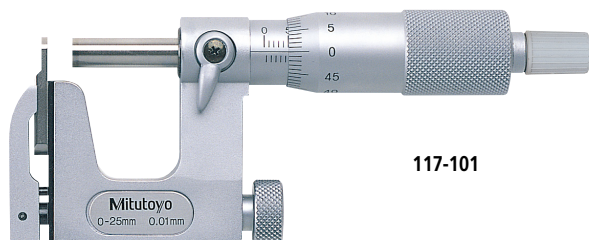
"Uni-Mike"

Series 317, 117 — Interchangeable Anvil Type

- Measures tubing thickness, shoulder-edge distance, rivet head height, etc., with interchangeable anvils (flat anvil, rod anvil, V-anvil).
- IP65 water/dust protection (series 317).
- Equipped with Ratchet Stop for constant measuring force.



317-251-30



117-101

SPECIFICATIONS

Metric			
Order No.	Range	Resolution	Accuracy*
Digimatic (LCD)			
317-251-30	0 - 25 mm	0.001 mm	±4 μm
317-252-30	25 - 50 mm		

* Excluding quantizing error of ±1 count

Metric			
Order No.	Range	Graduation	Accuracy
Analog			
117-101	0 - 25 mm	0.01 mm	±4 μm
117-102	25 - 50 mm		

Inch/Metric			
Order No.	Range	Resolution	Accuracy*
Digimatic (LCD)			
317-351-30	0 - 1 in	0.00005 in / 0.001 mm	±0.0002 in
317-352-30	1 - 2 in		

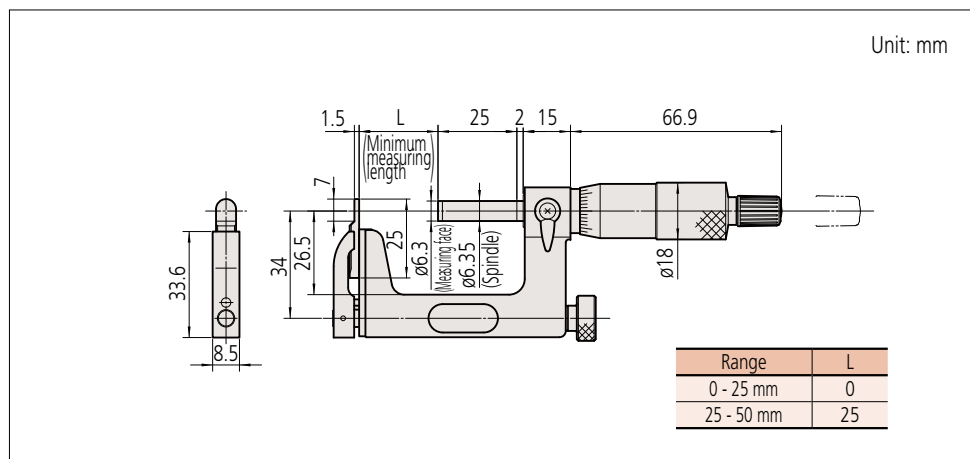
* Excluding quantizing error of ±1 count

Inch			
Order No.	Range	Graduation	Accuracy
Analog			
117-107	0 - 1 in	0.0001 in	±0.0002 in
117-108	1 - 2 in		

Note: For the series 317 functions, refer to page B-8.

Also, other than the waterproof type only the connection cable (option) cannot be used.

DIMENSIONS



MeasurLink ENABLED
Data Management Software by Mitutoyo



Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).

These marks indicate that a product has successfully passed IP65-level testing, which is carried out by the independent German certification organization TÜV Rheinland.



(Refer to page X for details.)

IP Codes (series 317)

Level 6: Dust-proof.

No ingress of dust allowed.

Level 5: Protected against water jets.

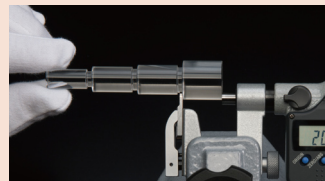
Water projected in jets against the enclosure from any direction shall have no harmful effects.

Technical Data

Flatness: Spindle face 0.6 μm / 0.000024 in

Anvil face 2 μm / 0.00008 in

Parallelism: 3 μm / 0.00012 in



Battery for Series 317

SR44 (1 pc), 938882, for initial operational checks (standard accessory)

Battery life: Approx. 2.4 years under normal use (for series 317)

Length standard: Electromagnetic rotary sensor (for series 317)

Standard accessories: Reference bar, 1 pc (except for measuring range 0-25 mm (0-1 in) models)

Spanner (200877), 1 pc (for series 117-XXX)

Spanner (301336), 1 pc (for series 317-XXX)

Optional Accessories

Connecting cables (series 317)

1 m: 05CZA662

2 m: 05CZA663

USB Input Tool Direct

USB-ITN-B (2 m): 06AFM380B

Wireless data output U-WAVE

U-WAVE-TM 264-622 (IP67 type)

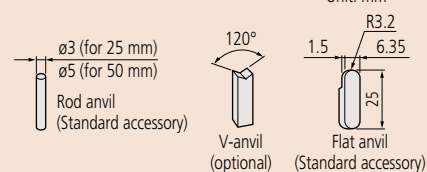
264-623 (Buzzer type)

Connecting unit for U-WAVE-TM

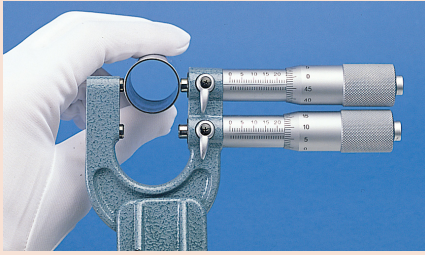
02AZF310 (IP67 type)

Refer to page A-15 for details

Accessories



Order No.	Item
201216	Flat anvil (standard accessory)
201217	Rod anvil (standard accessory for 117-101/117-107/317-251-30/317-351-30)
201379	Rod anvil (standard accessory for 117-102/117-108/317-252-30/317-352-30)
201218	V-anvil (optional)
950758	Base for 25 mm (optional)



Technical Data

Standard accessories: Reference bar, 1 pc
(except for measuring range 0-25 mm models)
Spanner (200877), 1 pc

Limit Micrometers SERIES 113

- Dual-spindle design enables use as a GO/±NG gage by setting upper and lower limits.
- Measuring faces: Carbide.

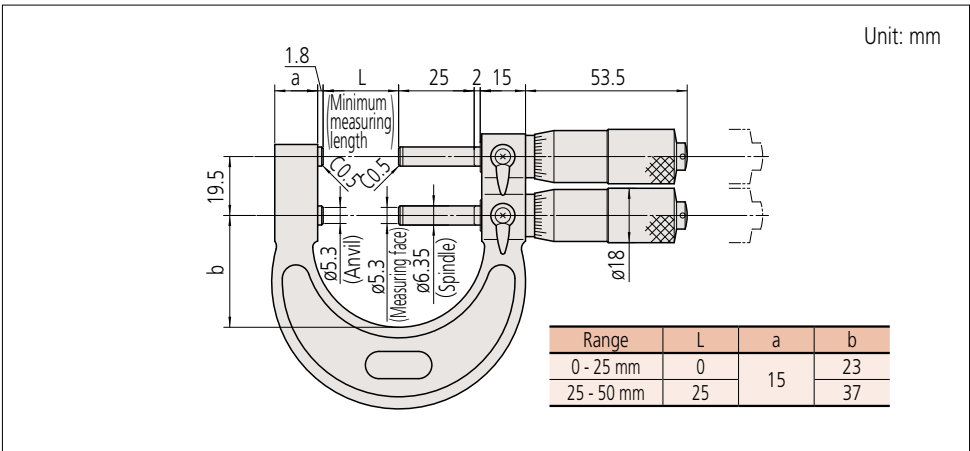


113-102

SPECIFICATIONS

Metric					
Order No.	Range	Graduation	Accuracy	Flatness	Parallelism
113-102	0 - 25 mm	0.01 mm	±3 μm	0.6 μm	3 μm
113-103	25 - 50 mm				

DIMENSIONS

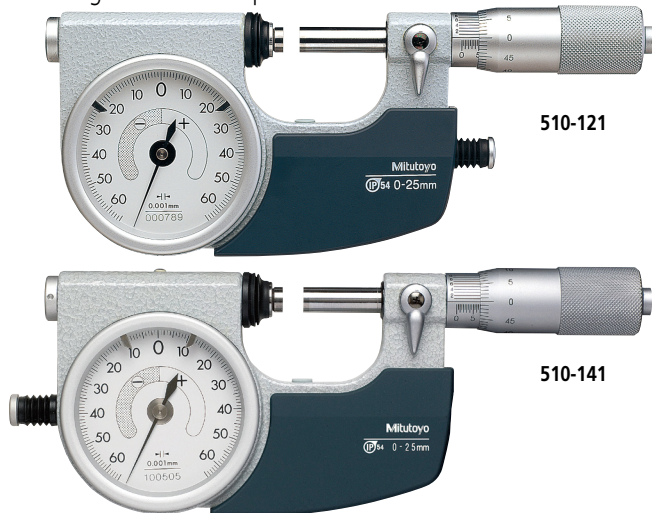


Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

Indicating Micrometers SERIES 510

- Suited to the measurement of low-volume manufactured parts.
- Easy to use when operating one-handed due to retractable anvil.
- In the 25 mm measuring range, the model lineup offers a choice of left or right positioning of the anvil-retraction button.
- Greatly improved accuracy: indication error and graduation of 1 μm .
- Water-proof to protection level IP54.
- Hard-coated crystal: enhanced oil and scratch resistance.
- Indicator scale is large and easy to read.
- The zero position and adjustable limit markers, for GO/ \pm NG testing, are easily set.
- Measuring faces: Carbide.

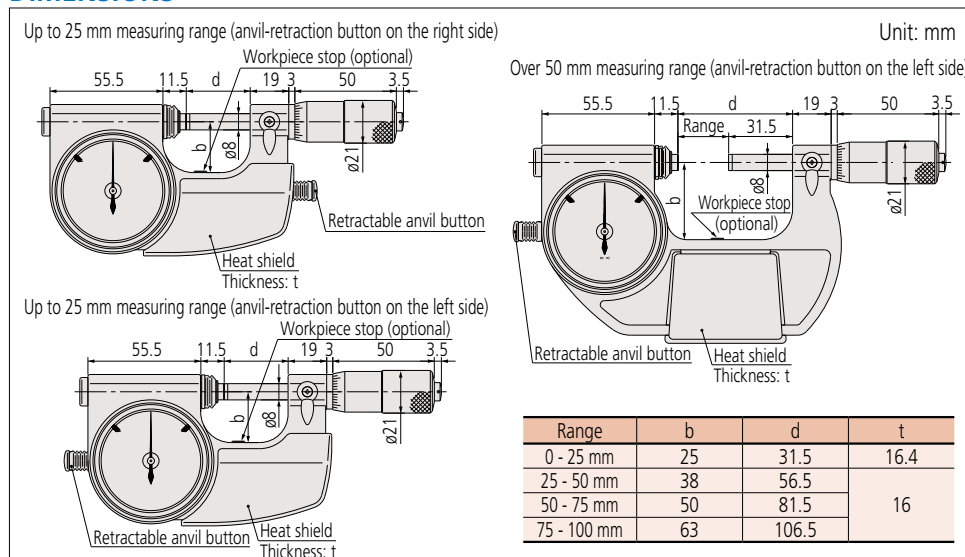


SPECIFICATIONS

Metric							
Order No.	Range	Indicating range	Graduation	Dial graduation	Measuring force	Anvil retraction button	Mass
510-121	0 - 25 mm	± 0.06 mm	0.001 mm	0.001 mm	5 - 10 N	Right side	520 g
510-141						Left side	530 g
510-122	25 - 50 mm					Left side	670 g
510-123	50 - 75 mm					Left side	820 g
510-124	75 - 100 mm					Left side	970 g

Inch							
Order No.	Range	Indicating range	Graduation	Dial graduation	Measuring force	Anvil retraction button	Mass
510-131	0 - 1 in	± 0.0023 in	0.0001 in	0.00005 in	5 - 10 N	Right side	520 g
510-151						Left side	530 g
510-132	1 - 2 in					Left side	670 g
510-133	2 - 3 in					Left side	820 g
510-134	3 - 4 in					Left side	970 g

DIMENSIONS



(Refer to page X for details.)

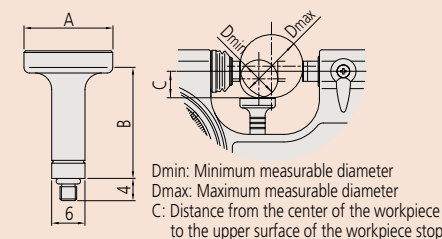
Technical Data

Flatness: 0.3 μm / 0.000012 in
 Parallelism: 0.6 μm / 0.000024 in for models up to 50 mm / 2 in
 1 μm / 0.00004 in for models over 50 mm / 2 in
 Accuracy: ± 2 μm / ± 0.0001 in
 Spindle feed error: 3 μm / 0.00015 in
 Dispersion of indication: 0.4 μm / 0.00002 in
 Dial indication accuracy: 1 μm / 0.00005 in
 Standard accessories: Reference bar, 1 pc
 (except for measuring range 0-25 mm (0-1 in) models)
 Spanner (200154), 1 pc

Workpiece Stop (optional)

Produces more stable measurement.
 Three types are available to suit workpieces of different sizes.

Unit: mm		
Range	A	B
Workpiece stop A 04AZA124	$\phi 16$	23
Workpiece stop B 04AZA125	$\phi 14$	20.5
Workpiece stop C 04AZA126	$\phi 14$	15



Order No 510-121, 510-141, 510-131, 510-151 Unit: mm			
	Dmin	Dmax	C
Workpiece stop A	N/A	N/A	N/A
Workpiece stop B	4	16	5.0
Workpiece stop C	15	25	10.5

510-122 and 510-132			
	Dmin	Dmax	C
Workpiece stop A	25	37	15.5
Workpiece stop B	30	42	18.0
Workpiece stop C	41	50	23.5

510-123 and 510-133			
	Dmin	Dmax	C
Workpiece stop A	50	61	27.5
Workpiece stop B	54	66	30.0
Workpiece stop C	65	75	35.5

510-124 and 510-134			
	Dmin	Dmax	C
Workpiece stop A	75	87	40.5
Workpiece stop B	80	92	43.0
Workpiece stop C	91	100	48.2

Technical Data

Indicator

Indicating range: $\pm 0.06 \text{ mm} / \pm 0.0023 \text{ in}$
 Repeatability of indication: $0.4 \text{ } \mu\text{m} / 0.00002 \text{ in}$
 Dial indication accuracy: $1 \text{ } \mu\text{m} / 0.00005 \text{ in}$
 Flatness: $0.3 \text{ } \mu\text{m} / 0.000012 \text{ in}$
 Parallelism: $0.6 \text{ } \mu\text{m} / 0.000024 \text{ in}$ for models up to 50 mm/2 in measuring range
 $1 \text{ } \mu\text{m} / 0.00004 \text{ in}$ for models over 50 mm/2 in measuring range



Dial Snap Meters SERIES 523

- Suited for the measurement of mass-produced parts.
- Designed for measurement using a stand: produces stable measurement.
- Greatly improved accuracy: indication error and graduation of $1 \text{ } \mu\text{m}$.
- Water-proof to protection level IP54.
- Hard-coated crystal: enhanced oil and scratch resistance.
- Indicator scale is large and easy to read.
- Easily settable adjustable limit markers for GO/±NG testing.
- Equipped with an elevating workpiece stop as standard.
- Measuring faces: Carbide.

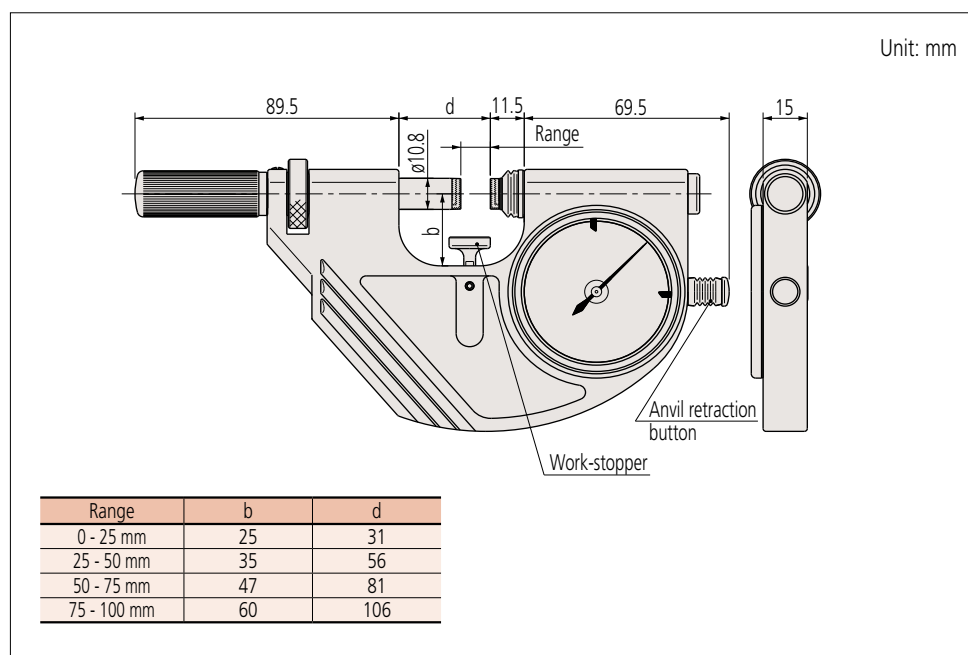


523-121

SPECIFICATIONS

Metric				
Order No.	Range	Dial graduation	Measuring force	Mass
523-121	0 - 25 mm	0.001 mm	5 - 10 N	740 g
523-122	25 - 50 mm			840 g
523-123	50 - 75 mm			950 g
523-124	75 - 100 mm			1080 g
Inch				
Order No.	Range	Dial graduation	Measuring force	Mass
523-131	0 - 1 in	0.00005 in	5 - 10 N	740 g
523-132	1 - 2 in			840 g
523-133	2 - 3 in			950 g
523-134	3 - 4 in			1080 g

DIMENSIONS

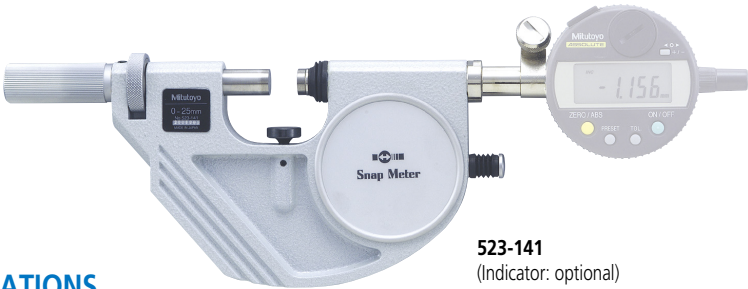


Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

Snap Meters SERIES 523

- Suited for the measurement of mass-produced parts.
- Various types of indicator can be selected according to the measurement application.
- Measuring faces: Carbide.

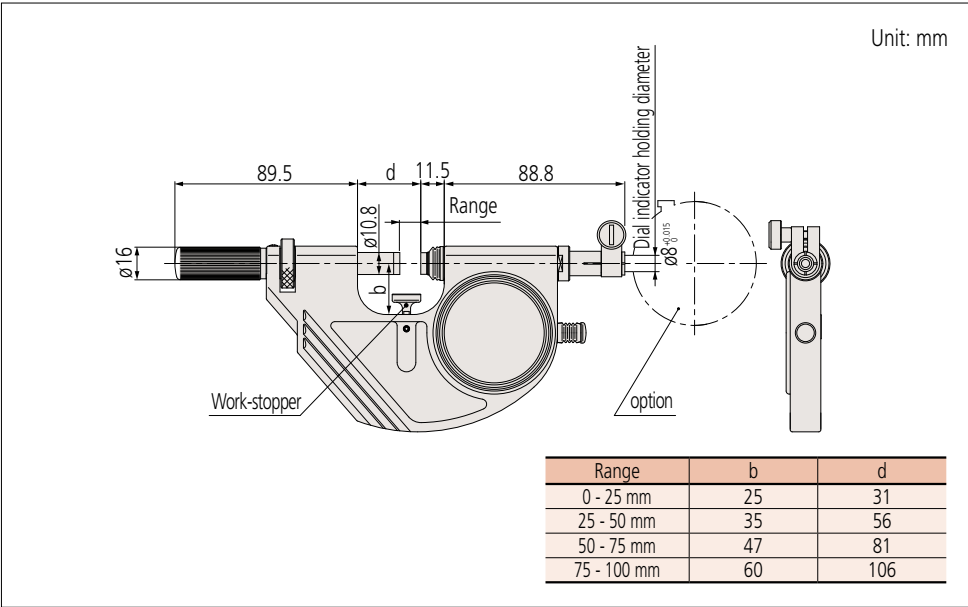


SPECIFICATIONS

Metric				
Order No.	Range	Anvil movement	Measuring force*	Mass
523-141	0 - 25 mm	2 mm	5 - 10 N	710 g
523-142	25 - 50 mm			810 g
523-143	50 - 75 mm			920 g
523-144	75 - 100 mm			1050 g
Inch				
Order No.	Range	Anvil movement	Measuring force*	Mass
523-151	0 - 1 in	0.078 in	5 - 10 N	710 g
523-152	1 - 2 in			810 g
523-153	2 - 3 in			920 g
523-154	3 - 4 in			1050 g

* Measured at the position where the anvil is retracted by 1mm from the free position without installing the indicator.

DIMENSIONS



Accuracy

Flatness: 0.3 μm /0.000012 in
Parallelism: 0.6 μm /0.000024 in for models up to 50 mm/2 in
1 μm /0.00004 in for models over 50 mm/2 in
Repeatability of indication: 0.4 μm /0.00002 in

Typical Indicators Used with Gage

ID-C (0.001 mm)/ **543-390B**
LGF-L (0.0001 mm)/ **542-181** & Counter **542-015**



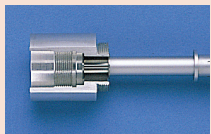
ABS Digimatic Indicator



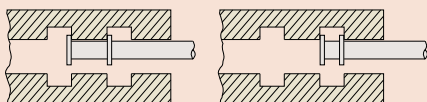
Linear Gage and counter

Technical Data

Parallelism: 10 µm/0.0004 in



Standard accessories: Spanner (301336), 1 pc



Groove Micrometers SERIES 146

- Flanged spindle and anvil for measuring width and location of grooves inside bores and tubes.
- Two-directional ratchet stop.
- For ID and OD (except for 0 - 25 mm) measurement, a master gage is required for adjusting the reference point.



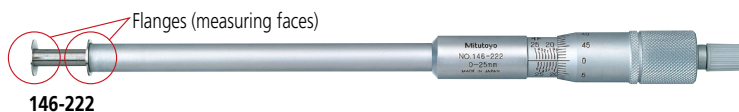
146-121



146-122



146-221



146-222

Flanges (measuring faces)

SPECIFICATIONS

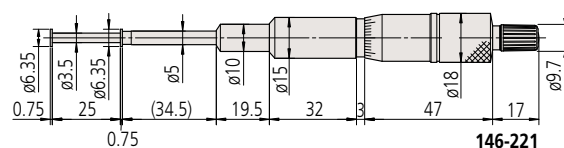
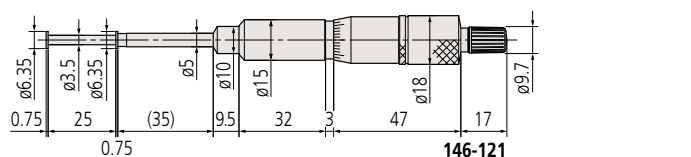
Metric					
Order No.	Range Outside	Range Inside	Graduation	Accuracy	Flange
Rotating spindle					
146-121	0 - 25 mm	1.6 - 26.5 mm	0.01 mm	±10 µm	ø6.35 mm
146-122					
146-123	25 - 50 mm	26.5 - 51.5 mm			ø12.7 mm
146-124	50 - 75 mm	51.5 - 76.5 mm			
146-125	75 - 100 mm	76.5 - 101.5 mm			

Metric					
Order No.	Range Outside	Range Inside	Graduation	Accuracy	Flange
Non-rotating spindle					
146-221	0 - 25 mm	1.6 - 26.5 mm	0.01 mm	±10 µm	ø6.35 mm
146-222					
146-223	25 - 50 mm	26.5 - 51.5 mm			ø12.7 mm
146-224	50 - 75 mm	51.5 - 76.5 mm			
146-225	75 - 100 mm	76.5 - 101.5 mm			

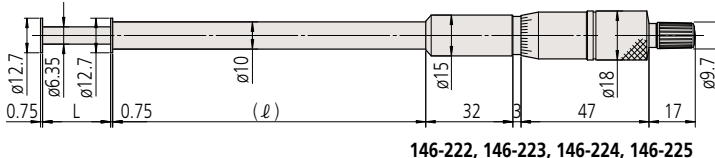
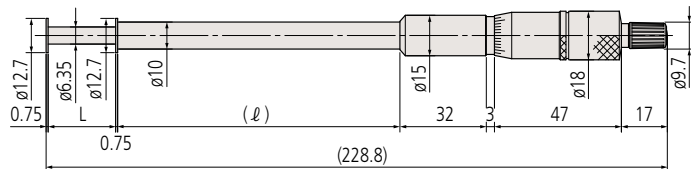
Inch					
Order No.	Range Outside	Range Inside	Graduation	Accuracy	Flange
Rotating spindle					
146-131	0 - 1 in	0.055 - 1.05 in	0.001 in	±0.0004 in	ø0.25 in
146-132					
146-133	1 - 2 in	1.05 - 2.05 in			ø0.5 in
146-134	2 - 3 in	2.05 - 3.05 in			
146-135	3 - 4 in	3.05 - 4.05 in			

Inch					
Order No.	Range Outside	Range Inside	Graduation	Accuracy	Flange
Non-rotating spindle					
146-231	0 - 1 in	0.055 - 1.05 in	0.001 in	±0.0004 in	ø0.25 in
146-232					
146-233	1 - 2 in	1.05 - 2.05 in			ø0.5 in
146-234	2 - 3 in	2.05 - 3.05 in			
146-235	3 - 4 in	3.05 - 4.05 in			

DIMENSIONS



Unit: mm



L	(L)
25	(103.3)
50	(78.3)
75	(53.3)
100	(28.3)

L	(L)
25	(115)
50	(90)
75	(65)
100	(40)

Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

QUICKmini SERIES 700

- Lightweight, compact, palm-sized device.
 - Measurement of small, thin workpieces is possible by only a single operation.
 - Electromagnetic induction type ABSOLUTE encoder is adopted.
 - Built-in ABS (absolute) scale requires no zero-set every time the power is turned on. In addition, reliability has improved by eliminating overspeed errors.
 - 18,000 hours of continuous operation is achieved thanks to adoption of the absolute scale.
- Applications:**
- Measurement of small workpieces: Pearl, jewel, engine tappet shim, screws.
 - Measurement of thin workpieces: Printing paper, polyethylene bags, sheet material, noodles and other food products, medium substrate, foil, thin plate, filter cloth and other medical supplies.
 - Measurement of thin lines and bars: Fishing line, dental reamers, spaghetti, drill for PCBs, wiring.



700-119-30

SPECIFICATIONS

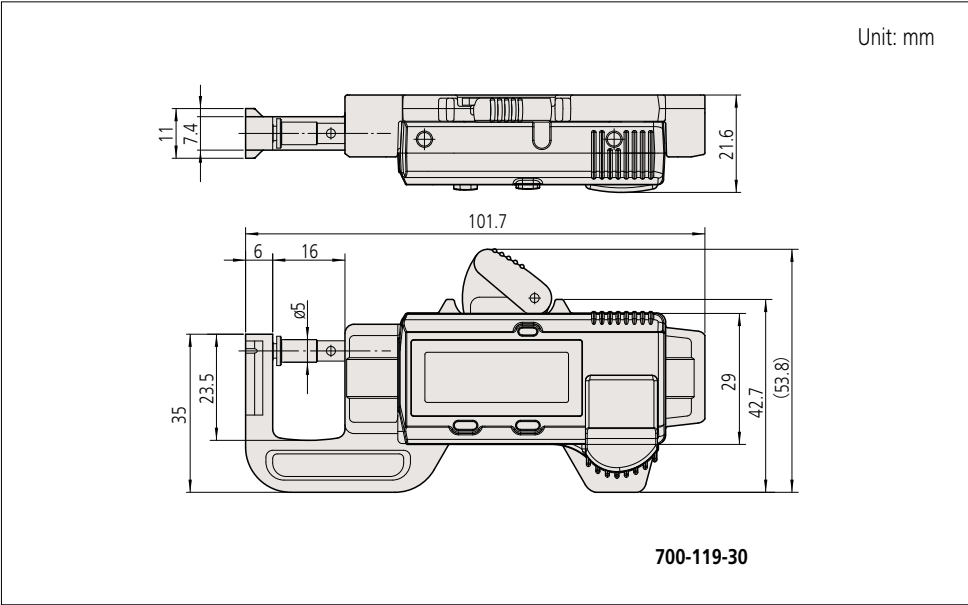
Metric				
Order No.	Range	Resolution	Accuracy*	Mass
700-119-30	0 - 12 mm	0.01 mm	±0.02	100 g

* Excluding quantizing error of ±1 count

Inch/Metric				
Order No.	Range	Resolution	Accuracy*	Mass
700-118-30	0 - 5 in/ 0 - 12 mm	0.0005 in/0.01 mm	±0.001 in	100 g

* Excluding quantizing error of ±1 count

DIMENSIONS



Technical Data

SR44 (1 pc), **938882**, for initial operational checks (standard accessory)

Silver oxide button cell battery **SR44 (938882)**, 1 pc. for monitor (standard accessory)

Functions

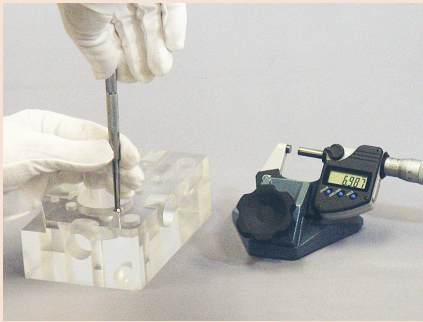
ABS measurement function: after a data is displayed, next measurement can be performed without zero-setting. Also, the ABS origin point can be changed with ORIGIN switch.

INC measurement function: clears the displayed data at any point. The comparative measurement can be easily performed.

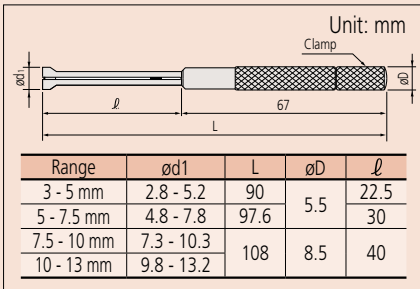
Low battery alarm: notifies that the battery is worn with "B" mark before becoming immeasurable. Thus, the timing for battery replacement can be confirmed in advance.

Small Hole Gage Set SERIES 154

- Extra long for gaging deep and shallow holes, slots, and similar workpiece features.
- Two sprung leaves are fully expanded inside a feature so that its size can be measured with an outside micrometer after extraction.



DIMENSIONS



SPECIFICATIONS

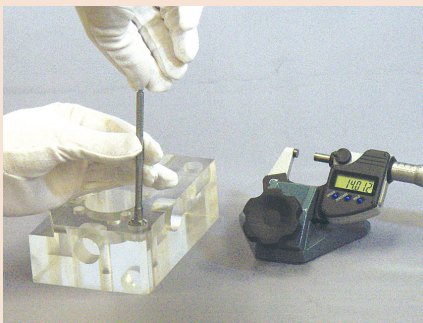
Metric	
Order No.	Range
4-gage Set	
154-902	3 - 13 mm
Gages included	
154-101	3 - 5 mm
154-102	5 - 7.5 mm
154-103	7.5 - 10 mm
154-104	10 - 13 mm

Inch	
Order No.	Range
4-gage Set	
154-901	0.125 - 0.5 in
Gages included	
154-105	0.125 - 0.2 in
154-106	0.2 - 0.3 in
154-107	0.3 - 0.4 in
154-108	0.4 - 0.5 in

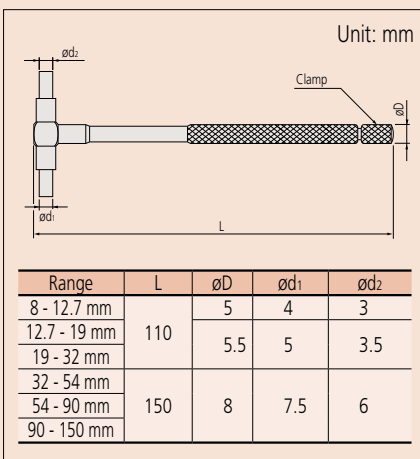
154-902

Telescoping Gage Set SERIES 155

- A spring-loaded plunger expands within a bore (or groove) and is locked in place allowing measurement of diameter (or width) with an outside micrometer after extraction.



DIMENSIONS



SPECIFICATIONS

Metric	
Order No.	Range
6-gage Set	
155-905	8 - 150 mm
Gages included	
155-127	8 - 12.7 mm
155-128	12.7 - 19 mm
155-129	19 - 32 mm
155-130	32 - 54 mm
155-131	54 - 90 mm
155-132	90 - 150 mm

Inch	
Order No.	Range
6-gage Set	
155-903	0.313 - 6 in
Gages included	
155-121	0.313 - 0.5 in
155-122	0.5 - 0.75 in
155-123	0.75 - 1.25 in
155-124	1.25 - 2.125 in
155-125	2.125 - 3.5 in
155-126	3.5 - 6 in



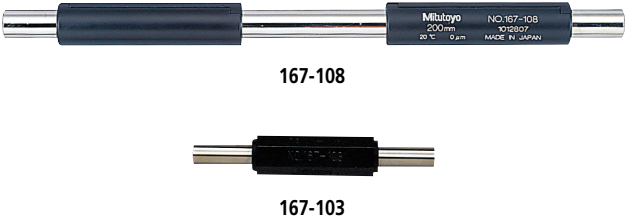
155-905

Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

Setting Standards for Outside Micrometers SERIES 167

- Used for adjusting the reference point of outside micrometers.



SPECIFICATIONS and DIMENSIONS

167-101 – 167-103 167-141 – 167-143		Unit: mm
--	--	----------

Metric					Inch				
Order No.	Length (L)	Tolerance	<i>ℓ</i>	Diameter (D)	Order No.	Length (L)	Tolerance	<i>ℓ</i>	Diameter (D)
167-101	25 mm	±1.5 μm	18	6.35 mm	167-141	1 in	±0.00005 in	18	0.25 in
167-102	50 mm	±2.0 μm	40		167-142	2 in	±0.0001 in	40	
167-103	75 mm	±2.5 μm			167-143	3 in	±0.0001 in		

167-104 – 167-107 167-144 – 167-147		Unit: mm
--	--	----------

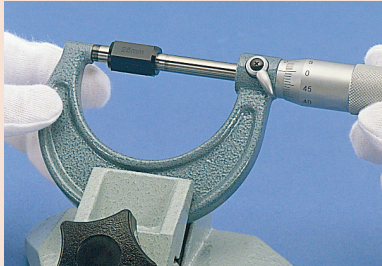
Metric				Inch			
Order No.	Length (L)	Tolerance	Diameter (D)	Order No.	Length (L)	Tolerance	Diameter (D)
167-104	100 mm	±3 μm	7.9 mm	167-144	4 in	±0.0001 in	0.31 in
167-105	125 mm	±3.5 μm		167-145	5 in	±0.00015 in	
167-106	150 mm	±4 μm		167-146	6 in		
167-107	175 mm	±4.5 μm		167-147	7 in		

167-108 – 167-119 167-148 – 167-159		Unit: mm
--	--	----------

Metric					Inch				
Order No.	Length (L)	Tolerance	ℓ	Diameter (D)	Order No.	Length (L)	Tolerance	ℓ	Diameter (D)
167-108	200 mm	±5.0 μm	47	9.4 mm	167-148	8 in	±0.00015 in	47	0.37 in
167-109	225 mm	±5.5 μm	47		167-149	9 in	±0.0002 in	47	
167-110	250 mm	±6.0 μm	52		167-150	10 in	±0.0002 in	52	
167-111	275 mm	±6.5 μm	57		167-151	11 in	±0.0002 in	57	
167-112	300 mm	±7 μm	64		167-152	12 in	±0.00025 in	64	
167-113	325 mm	±7.5 μm	69		167-153	13 in	±0.00025 in	69	
167-114	350 mm	±8 μm	74		167-154	14 in	±0.00025 in	74	
167-115	375 mm	±8.5 μm	80		167-155	15 in	±0.00025 in	80	
167-116	400 mm	±9 μm	85		167-156	16 in	±0.00025 in	85	
167-117	425 mm	±9.5 μm	90		167-157	17 in	±0.00025 in	90	
167-118	450 mm	±10 μm	95		167-158	18 in	±0.00025 in	95	
167-119	475 mm	±10.5 μm	101		167-159	19 in	±0.0003 in	101	

Technical Data

Flatness: 0.3 μm
Parallelism: 2 μm



Micrometer Inspection Gauge Block Set

Refer to page E-11 for details.

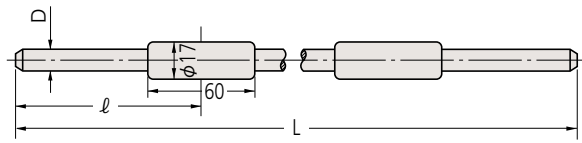


516-152/153/154



Micro Checker (holder only)
516-607

167-120 – 167-404
167-160 – 167-180



Unit: mm

Metric				
Order No.	Length (L)	Tolerance	ℓ	Diameter (D)
167-120	500 mm	±11 μm	106	0.47 in
167-121	525 mm	±11.5 μm	112	
167-122	550 mm	±12.0 μm	117	
167-123	575 mm	±12.5 μm	122	
167-124	600 mm	±13 μm	128	
167-125	625 mm	±13.5 μm	133	
167-126	650 mm	±14 μm	138	
167-127	675 mm	±14.5 μm	142	
167-128	700 mm	±15 μm	147	
167-129	725 mm	±15.5 μm	153	
167-130	750 mm	±16 μm	158	
167-131	775 mm	±16.5 μm	164	
167-132	800 mm	±17 μm	170	
167-133	825 mm	±17.5 μm	175	
167-134	850 mm	±18 μm	180	
167-135	875 mm	±18.5 μm	185	
167-136	900 mm	±19 μm	191	
167-137	925 mm	±19.5 μm	196	
167-138	950 mm	±20 μm	201	
167-139	975 mm	±20.5 μm	207	
167-140	100 mm	±21 μm	211	11.9 mm
167-365	1025 mm	±21.5 μm	217	
167-366	1050 mm	±22 μm	222	
167-367	1075 mm	±22.5 μm	227	
167-368	1100 mm	±23 μm	232	
167-369	1125 mm	±23.5 μm	238	
167-370	1150 mm	±24 μm	243	
167-371	1175 mm	±24.5 μm	248	
167-372	1200 mm	±25 μm	254	
167-373	1225 mm	±25.5 μm	259	
167-374	1250 mm	±26 μm	264	
167-375	1275 mm	±26.5 μm	269	
167-376	1300 mm	±27 μm	275	
167-377	1325 mm	±27.5 μm	280	
167-378	1350 mm	±28 μm	285	
167-379	1375 mm	±28.5 μm	291	
167-380	1400 mm	±29 μm	296	
167-381	1425 mm	±29.5 μm	301	
167-382	1450 mm	±30 μm	306	
167-383	1475 mm	±30.5 μm	312	
167-384	1500 mm	±31 μm	317	
167-385	1525 mm	±31.5 μm	322	
167-386	1550 mm	±32 μm	328	
167-387	1575 mm	±32.5 μm	333	
167-388	1600 mm	±33 μm	338	
167-389	1625 mm	±33.5 μm	343	
167-390	1650 mm	±34 μm	349	
167-391	1675 mm	±34.5 μm	354	
167-392	1700 mm	±35 μm	359	
167-393	1725 mm	±35.5 μm	364	
167-394	1750 mm	±36 μm	370	
167-395	1775 mm	±36.5 μm	375	
167-396	1800 mm	±37 μm	380	
167-397	1825 mm	±37.5 μm	386	
167-398	1850 mm	±38 μm	391	
167-399	1875 mm	±38.5 μm	396	
167-400	1900 mm	±39 μm	401	
167-401	1925 mm	±39.5 μm	407	
167-402	1950 mm	±40 μm	412	
167-403	1975 mm	±40.5 μm	417	
167-404	2000 mm	±41 μm	423	

Inch				
Order No.	Length (L)	Tolerance	ℓ	Diameter (D)
167-160	20 in	±0.0003 in	106	0.47 in
167-161	21 in	±0.0003 in	112	
167-162	22 in	±0.0003 in	117	
167-163	23 in	±0.0003 in	122	
167-164	24 in	±0.0003 in	128	
167-165	25 in	±0.00035 in	133	
167-166	26 in	±0.00035 in	138	
167-167	27 in	±0.00035 in	142	
167-168	28 in	±0.00035 in	147	
167-169	29 in	±0.00035 in	153	
167-170	30 in	±0.00035 in	158	
167-171	31 in	±0.00035 in	164	
167-172	32 in	±0.00035 in	170	
167-173	33 in	±0.00035 in	175	
167-174	34 in	±0.00035 in	180	
167-175	35 in	±0.00035 in	185	
167-176	36 in	±0.00035 in	191	
167-177	37 in	±0.0004 in	196	
167-178	38 in	±0.0004 in	201	
167-179	39 in	±0.0004 in	207	
167-180	40 in	±0.0004 in	211	

Available up to 79 in

Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

Setting Standards for Screw Thread Micrometers SERIES 167

- Used for accurately setting screw thread micrometers at the start or end of the measuring range.



167-264
(60° screw)



167-262
(60° screw)

Metric		
Order No.	Length	Accuracy
Metric (unified) $\theta = 60^\circ$		
167-261	25 mm	$\pm 4 \mu\text{m}$
167-262	50 mm	$\pm 5 \mu\text{m}$
167-263	75 mm	$\pm 6 \mu\text{m}$
167-264	100 mm	$\pm 7 \mu\text{m}$
167-265	125 mm	$\pm 8 \mu\text{m}$
167-266	150 mm	$\pm 9 \mu\text{m}$
167-267	175 mm	$\pm 10 \mu\text{m}$
167-268	200 mm	$\pm 11 \mu\text{m}$
167-269	225 mm	$\pm 12 \mu\text{m}$
167-270	250 mm	$\pm 13 \mu\text{m}$
167-271	275 mm	$\pm 14 \mu\text{m}$
Whitworth $\theta = 55^\circ$		
167-272	25 mm	$\pm 4 \mu\text{m}$
167-273	50 mm	$\pm 5 \mu\text{m}$
167-274	75 mm	$\pm 6 \mu\text{m}$
167-275	100 mm	$\pm 7 \mu\text{m}$
167-276	125 mm	$\pm 8 \mu\text{m}$
167-277	150 mm	$\pm 9 \mu\text{m}$
167-278	175 mm	$\pm 10 \mu\text{m}$
167-279	200 mm	$\pm 11 \mu\text{m}$
167-280	225 mm	$\pm 12 \mu\text{m}$
167-281	250 mm	$\pm 13 \mu\text{m}$
167-282	275 mm	$\pm 14 \mu\text{m}$

Inch		
Order No.	Length (L)	Accuracy
Metric (unified) $\theta = 60^\circ$		
167-294	1 in	± 0.00015 in
167-295	2 in	± 0.0002 in
167-296	3 in	± 0.00025 in
167-297	4 in	± 0.0003 in
167-298	5 in	± 0.00035 in
167-299	6 in	± 0.0004 in
Whitworth $\theta = 55^\circ$		
167-283	1 in	± 0.00015 in
167-284	2 in	± 0.0002 in
167-285	3 in	± 0.00025 in
167-286	4 in	± 0.0003 in
167-287	5 in	± 0.00035 in
167-288	6 in	± 0.0004 in



Setting Standards for V-Anvil Micrometers SERIES 167

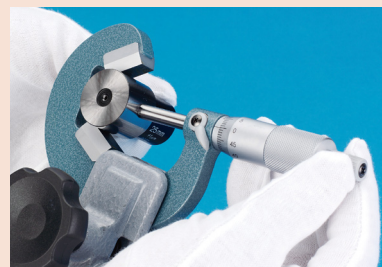
- Specially designed for accurately setting V-anvil micrometers.



167-329

Metric			
Order No.	Length	Accuracy	Type
167-327	5 mm	$\pm 2 \mu\text{m}$	Plug
167-328	10 mm		
167-329	25 mm		
167-330	40 mm	$\pm 3 \mu\text{m}$	Ring
167-331	55 mm		
167-332	70 mm		
167-333	85 mm		

Inch			
Order No.	Length (L)	Accuracy	Type
167-337	0.2 in	± 0.0001 in	Plug
167-338	0.4 in		
167-339	1 in		
167-340	1.6 in	± 0.00015 in	Ring
167-341	2.2 in		
167-342	2.8 in		
167-343	3.4 in		



Optical Parallels SERIES 157

- Designed to inspect parallelism and flatness of measuring faces of micrometers. For details, refer to "Quick Guide to Precision Measuring Instruments".
- Each set consists of 4 sizes to aid in testing parallelism at various angular positions of the micrometer spindle.



157-903

SPECIFICATIONS

Metric						
Order No.	Range of micrometer to be checked	Sizes of parallels included in set	Diameter	Flatness	Parallelism	Remarks
157-903	0 - 25 mm	12.00, 12.12, 12.25, 12.37 mm	ø30	0.1 µm	0.2 µm	For 25 mm
157-904	25 - 50 mm	25.00, 25.12, 25.25, 13.37 mm				For 50 mm
Inch						
Order No.	Range of micrometer to be checked	Sizes of parallels included in set	Diameter	Flatness	Parallelism	Remarks
157-901	0 - 1 in	0.5000 in, 0.5062 in, 0.5125 in, 0.5187 in	ø30	0.1 µm	0.2 µm	For 25 mm
157-902	1 - 2 in	1.0000 in, 1.0062 in, 1.0125 in, 1.0187 in				For 50 mm

Optical Flats SERIES 158

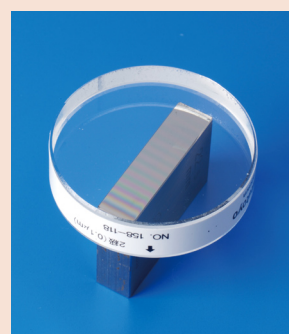
- Used for inspecting the flatness of very flat surfaces. For details, refer to "Quick Guide to Precision Measuring Instruments".



158-118

SPECIFICATIONS

Metric				Inch			
Order No.	Thickness	Diameter	Flatness grade	Order No.	Thickness	Diameter	Flatness grade
158-117	12 mm	45 mm	0.2 µm	158-122	0.5 in	1.8 in	0.000004 in
158-118			0.1 µm	158-124	0.6 in	2.4 in	
158-119	15 mm	60 mm	0.2 µm				
158-120			0.1 µm				



Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

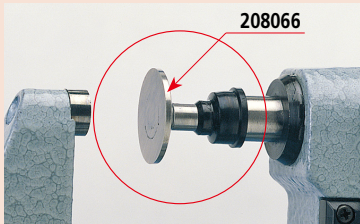
Spindle Attachment Tips

- Simple interchangeable tips attached to standard micrometer spindles enable measurement of contours otherwise unmeasurable (for $\phi 6.35$ spindles only).
- Measuring range changes when a spindle attachment tip is mounted: the maximum measuring range is 10 mm or less (accuracy is not guaranteed).



Technical Data

Tip length: 10 mm $\pm 5 \mu\text{m}$



Specifications and Dimensions

Unit: mm

Order No.	Tip type	Dimensions
208062	Spline	
208063	Comparator	
208064	Blade	
208065	Knife-edge	
208066	Disk-plate	

Micrometer Oil

- Special lubricant for micrometers.



SPECIFICATIONS

Order No.	Product name	Remarks
207000	Micrometer oil	Grease (30 ml)

Color-Coded Ratchet and Speeder Covers

- Ratchet and speeder covers in a choice of seven colors for use in instrument identification control schemes: red, blue, yellow, green, brown, black and gray.

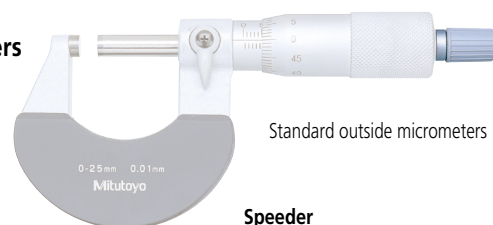
SPECIFICATIONS

Ratchet and speeder covers

Ratchet



Speeder



Standard outside micrometers

Analog type: 0 - 300 mm

Order No.		Color	Material
Ratchet	Speeder		
04GZA239	04GAA260	Gray	Plastic
985056	301708	Black	
985061	301709	Red	
985081	301713	Blue	
985071	301711	Yellow	
985076	301712	Green	
985066	301710	Brown	
950700	—	Gray	Steel

Analog type: 300 - 1000 mm

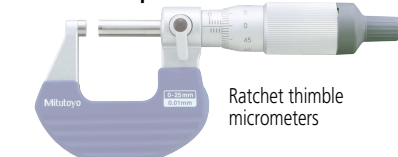
Order No.		Color	Material
Ratchet	Speeder		
04GZA243	04GAA260	Gray	Plastic
—	301708	Black	
—	301709	Red	
—	301713	Blue	
—	301711	Yellow	
—	301712	Green	
—	301710	Brown	
950701	—	Gray	Steel

Digimatic type 0 - 300 mm*

Order No.*		Color	Material
Ratchet	Speeder		
04AZB661	04GAA260	Gray	Plastic
04GZA241	04GAA260	Gray	
—	301708	Black	
—	301709	Red	
—	301713	Blue	
—	301711	Yellow	
—	301712	Green	
—	301710	Brown	
951588	—	Gray	Steel

*Cannot be used for analog types.

Color-coded speeder covers



Ratchet thimble micrometers



QuantuMike

Color-coded speeder covers



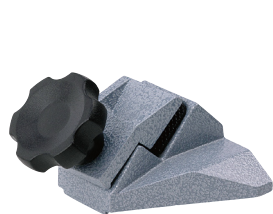
Order No.	Color
04GAA899	Black
04GAA900	Red
04GAA901	Yellow
04GAA902	Green
04GAA903	Blue
04AAB208	Gray

Micrometer

The origin of Mitutoyo's trustworthy brand of small tool instruments

Micrometer Stands SERIES 156

- Designed to allow benchtop use of hand micrometers or other gages which have frames suitable for gripping by the clamp.



156-105-10



156-101-10



156-102



156-105-10



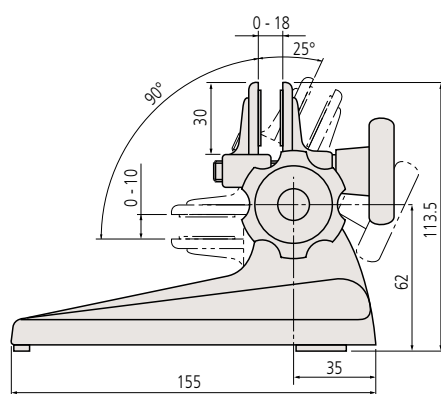
156-101-10

SPECIFICATIONS

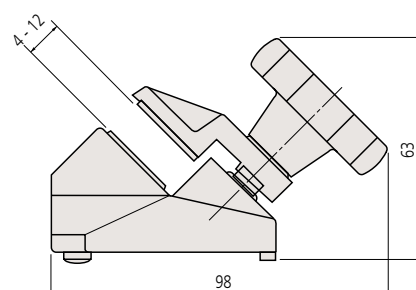
Order No.	Micrometer ranges	Remarks
156-101-10	Up to 100 mm (4 in)*	Adjustable angle type
156-105-10	0-25 mm (0-1 in), 25-50 mm (1-2 in)	Fixed angle type
156-102	125-300 mm (5-12 in)	Vertical type
156-103	300-1000 mm (12-40 in)	Vertical type

* Items that cannot be mounted on these stands
(Order No. 406-253-30, 323-253-30, 331-254-30, 342-254-30, 342-264-30, 369-253-30, 422-232-30, 422-233-30, etc.)

DIMENSIONS

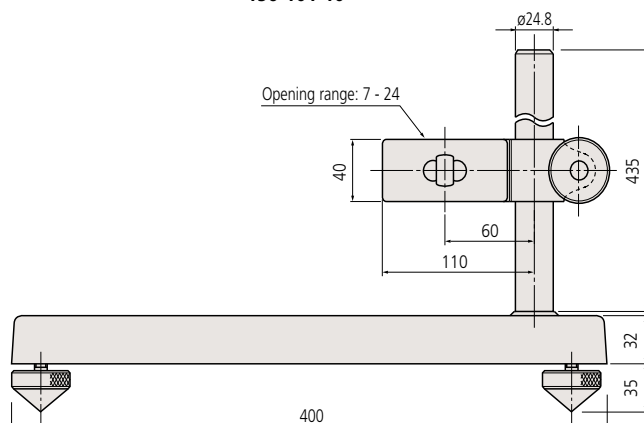


156-101-10

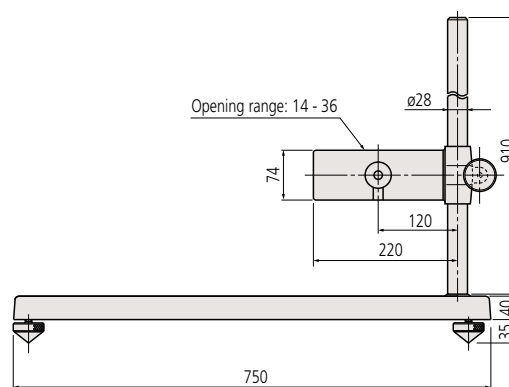


156-105-10

Unit: mm



156-102



156-103

Connecting Optional Measurement Data Recording Tools to Micrometers and Micrometer Heads

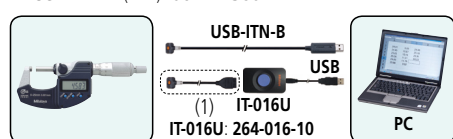
For Digimatic Micrometers other than Quickmike type, and Digimatic Micrometer Heads series 350 (Connector type B)

■ Dedicated connecting cables (optional)

Interface for connecting to PC or PLC, and dedicated printer and its connecting cable.

- PC connection (wired system) ... USB Input Tool (refer to page A-13)

USB-ITN-B (2 m): 06AFM380B



Dedicated cable for models with SPC data output

- (1) 1 m: 05CZA662
- 2 m: 05CZA663

- PC connection (wireless system) ... U-WAVE (refer to page A-17)

U-WAVE-T (IP67): 02AZD730G

U-WAVE-T (buzzer): 02AZD880G



Dedicated cable for models with SPC data output

- (2) For standard 160 mm: 02AZD790B
- For footswitch: 02AZE140B

- Dedicated printer connection (only for wired system) ... DP-1VA LOGGER (refer to page A-23)



Dedicated cable for models with SPC data output

- (1) 1 m: 05CZA662
- 2 m: 05CZA663

- Connecting to PC, PLC, etc. by RS-232C communication (only for wired system) ... IT-007R (refer to page A-14), MUX-10F (refer to page A-24)



Dedicated cable for models with SPC data output

- (1) 1 m: 05CZA662
- 2 m: 05CZA663

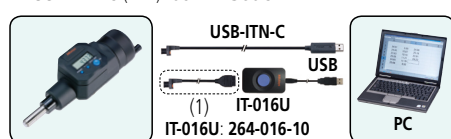
For Digimatic Micrometer Heads series 164 (Connector type C)

■ Dedicated connecting cables (optional)

Interface for connecting to PC or PLC, and dedicated printer and its connecting cable.

- PC connection (wired system) ... USB Input Tool (refer to page A-13)

USB-ITN-C (2 m): 06AFM380C



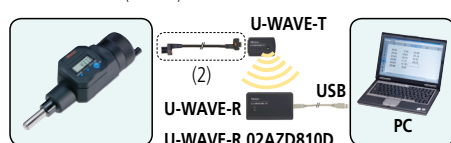
Dedicated cable for models with SPC data output

- (1) 1 m: 959149
- 2 m: 959150

- PC connection (wireless system) ... U-WAVE (refer to page A-17)

U-WAVE-T (IP67): 02AZD730G

U-WAVE-T (buzzer): 02AZD880G



Dedicated cable for models with SPC data output

- (2) For standard 160 mm: 02AZD790C
- For footswitch: 02AZE140C

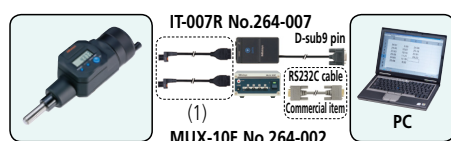
- Dedicated printer connection (only for wired system) ... DP-1VA LOGGER (refer to page A-23)



Dedicated cable for models with SPC data output

- (1) 1 m: 959149
- 2 m: 959150

- Connecting to PC, PLC, etc. by RS-232C communication (only for wired system) ... IT-007R (refer to page A-14), MUX-10F (refer to page A-24)



Dedicated cable for models with SPC data output

- (1) 1 m: 959149
- 2 m: 959150

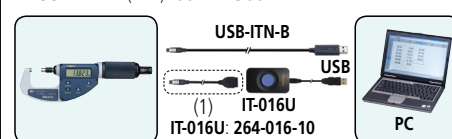
For Quickmike type (Connector type B)

■ Dedicated connecting cables (optional)

Interface for connecting to PC or PLC, and dedicated printer and its connecting cable.

- PC connection (wired system) ... USB Input Tool (refer to page A-13)

USB-ITN-E (2 m): 06AFM380B



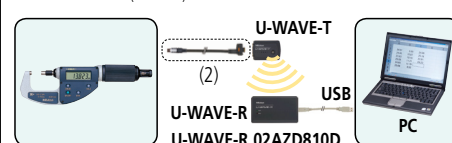
Dedicated cable for models with SPC data output

- (1) 1 m: 937387
- 2 m: 965013

- PC connection (wireless system) ... U-WAVE (refer to page A-17)

U-WAVE-T (IP67): 02AZD730G

U-WAVE-T (buzzer): 02AZD880G



Dedicated cable for models with SPC data output

- (2) For standard 160 mm: 02AZD790E
- For footswitch: 02AZE140E

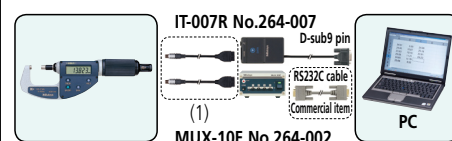
- Dedicated printer connection (only for wired system) ... DP-1VA LOGGER (refer to page A-23)



Dedicated cable for models with SPC data output

- (1) 1 m: 937387
- 2 m: 965013

- Connecting to PC, PLC, etc. by RS-232C communication (only for wired system) ... IT-007R (refer to page A-14), MUX-10F (refer to page A-24)



Dedicated cable for models with SPC data output

- (1) 1 m: 937387
- 2 m: 965013