New Products

High-Accuracy Digimatic Micrometer

Refer to pages B-3 to B-4 for details.

QuantuMike

Refer to pages B-5 to B-6 for details.

Coolant Proof Micrometers

Refer to pages B-7 to B-8 for details.

Digimatic Micrometer Heads

Refer to pages B-73 to B-75 for details.

Micrometer Heads (Fine Spindle Feed of 0.1 mm/rev)

Refer to pages B-97 to B-98 for details.

Micrometers

Micrometer Heads

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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 Maximum permissible error to ±0.5 µm, 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-25 for details).

PROPRIETARY INSPECTION CERTIFICATE
An inspection certificate is supplied as standard. Refer to page U-9 for details.

ABSOLUTE™

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

With heat shield attached

Heat shield

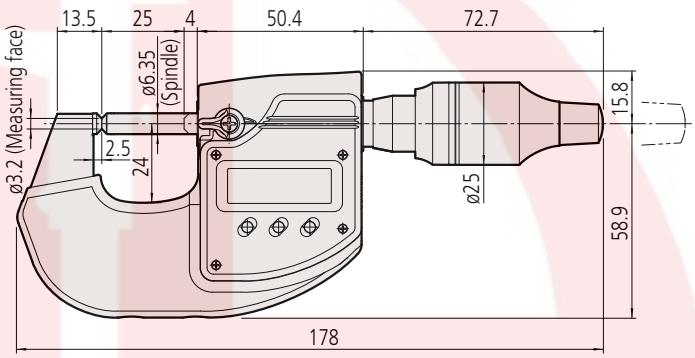
Optional Accessories

- 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**
  160 mm: **02AZD790B**
  For foot switch: **02AZE140B**
  Refer to page A-21 for details.
- Cleaning paper for measuring faces (1,000 sheets):
  04AZB581

Recommended micrometer stand: **156-101-10**

DIMENSIONS

Unit: mm



SPECIFICATIONS

	Metric	Inch/Metric
Order No.	**293-100-10**	**293-130-10**
Measuring range	0 – 25 mm	0 – 1 in
Resolution	0.0001 mm/0.0005 mm (switchable)	0.000005 in/0.00002 in 0.0001 mm/0.0005 mm (switchable)
Maximum permissible error J_{MPE}	±0.5 µm	±0.00002 in
Flatness/Parallelism	0.3 µm/0.6 µm	0.000012 in/0.000024 in
Measuring surface	ø3.2 mm	
Measuring force	7 to 9 N	
Measuring system	Electromagnetic induction type ABS rotary sensor	
Mass	400 g (440 g with heat shield attached)	
Power supply	Lithium battery (CR2032) ×1	
Battery life	Approx. two years when used under normal conditions	

Mitutoyo

Micrometer

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

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-25 for details).

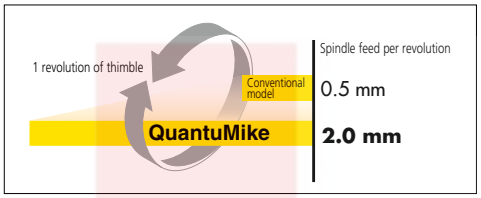
These marks indicate that a product has successfully passed IP65-level testing, which is carried out by the independent German certification organization TÜV Rheinland.

Dust- and Water-Protected
TÜVRheinland CERTIFIED
www.tuv.com ID 0000040191

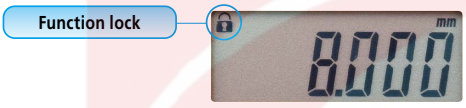
PROPRIETARY INSPECTION CERTIFICATE
An inspection certificate is supplied as standard. Refer to page U-9 for details.
(Maximum measuring range up to 50 mm)

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

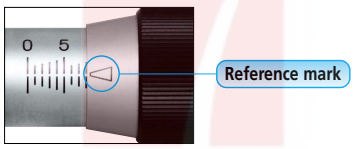
- Advanced pioneering technology has created the next generation of micrometer, the most revolutionary advance in micrometer technology since James Watt invented the instrument.
- Faster measurement is achieved by using a coarser thread which feeds the spindle by 2 mm per revolution of the thimble. This 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.



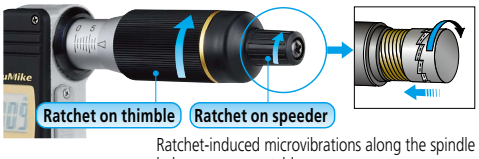
- A graduated scale is provided on the sleeve for use with a reference mark on the thimble so that every millimeter displacement can be checked to provide extra confidence.



- 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-5 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.

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

- 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.



Ratchet-induced microvibrations along the spindle help ensure repeatable measurements.

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)*1
- Measuring force: 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 to 25 mm (0 to 1 in) models) Spanner (**301336**), 1 pc.

*1 Rustproofing shall be applied after use.
*2 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*3: 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.

*3 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**
- **U-WAVE-T** dedicated connection cable
  160 mm: **02AZD790B**
  For foot switch: **02AZE140B**

Wireless Data Output U-WAVE fit

- **U-WAVE-TM 264-622** (IP67 type) **264-623** (Buzzer type)
- **U-WAVE-TMB** Transmitter
  Mitutoyo *Bluetooth*® U-WAVE
  264-626 (IP67 type)
  264-627 (Buzzer type)
  Refer to page A-10 for details.
- Connecting unit for **U-WAVE-TM/TMB**
  02AZF310 (IP67/buzzer type common specification)
  Refer to pages A-10 and A-12 for details.

SPECIFICATIONS

Metric

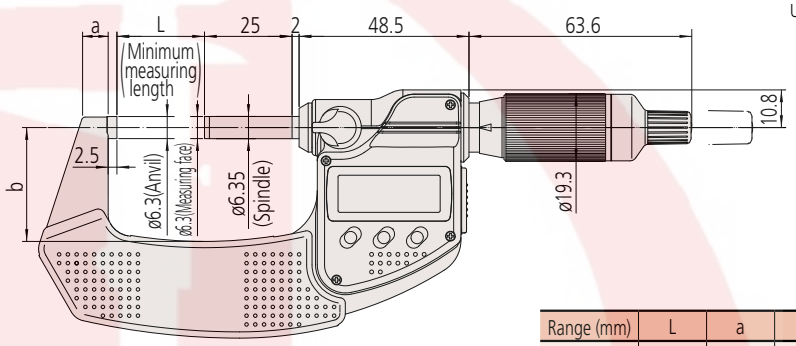
	Order No.	Range (mm)	Resolution (mm)	Maximum permissible error J_{MPE} (µm)	Flatness (µm)	Parallelism (µm)	Mass (g)
with SPC data output	**293-140-30**	0 - 25	0.001	±1	0.3	1	265
	293-141-30	25 - 50					325
	293-142-30	50 - 75		±2		2	465
	293-143-30	75 - 100					620
without SPC data output	**293-145-30**	0 - 25		±1		1	265
	293-146-30	25 - 50					325
	293-147-30	50 - 75		±2		2	465
	293-148-30	75 - 100					620

Inch/Metric

	Order No.	Range (in)	Resolution	Maximum permissible error J_{MPE} (in)	Flatness (in)	Parallelism (in)	Mass (g)
with SPC data output	**293-180-30**	0 - 1	0.00005 in/ 0.001 mm	±0.00005	0.000012	0.00004	265
	293-181-30	1 - 2					325
	293-182-30	2 - 3		±0.0001		0.00008	465
	293-183-30	3 - 4					620
without SPC data output	**293-185-30**	0 - 1		±0.00005		0.00004	265
	293-186-30	1 - 2					325
	293-187-30	2 - 3		±0.0001		0.00008	465
	293-188-30	3 - 4					620

DIMENSIONS

Unit: mm

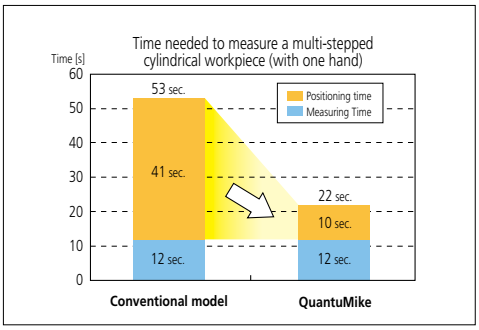


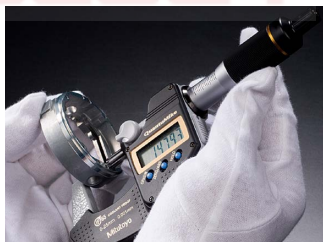
Range (mm)	L	a	b
0 - 25	0	6.5	25
25 - 50	25	7.3	32.5
50 - 75	50	10.1	47
75 - 100	75	11.5	60

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.





Mitutoyo

Micrometer

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

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-5 for details.)
- Two types of constant-force devices are available: Ratchet Stop and Ratchet Thimble.
- Measuring faces: Carbide.

293-230-30

293-252-30

293-233-30
293-231-30
293-230-30
293-232-30

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-25 for details).

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

TÜVRheinland® CERTIFIED
Dust- and Water-Protected
www.tuv.com ID 0000040191

PROPRIETARY INSPECTION CERTIFICATE
An inspection certificate is supplied as standard.
Refer to page U-9 for details.
(Maximum measuring range up to 50 mm)

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 to 25 mm (0 to 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**
- **U-WAVE-T** dedicated connection cable
  160 mm: **02AZD790B**
  For foot switch: **02AZE140B**
  Refer to page A-21 for details.

Wireless Data Output U-WAVE fit

U-WAVE-TM **264-622** (IP67 type)
264-623 (Buzzer type)

- **U-WAVE-TMB** Transmitter
  Mitutoyo *Bluetooth*® U-WAVE
  264-626 (IP67 type)
  264-627 (Buzzer type)
  Refer to page A-10 for details.
- Connecting unit for **U-WAVE-TM**/**TMB**
  02AZF310 (IP67/buzzer type common specification)
  Refer to pages A-10 and A-12 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:
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*:
Models equipped with this function have an output port for transferring measurement data to a Statistical Process Control (SPC) system.
* 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 (mm)	Resolution (mm)	Maximum permissible error J_{MPE} (µm)	Parallelism (µm)	Constant-force device	Mass (g)
with SPC data output	**293-230-30**	0 - 25	0.001	±1	1	With ratchet stop	270
	293-231-30	25 - 50					330
	293-232-30	50 - 75		±2	2		470
	293-233-30	75 - 100					625
	293-250-30	100 - 125			3		600
	293-251-30	125 - 150					740
	293-252-30	150 - 175		±3			800
	293-253-30	175 - 200			4		970
	293-254-30	200 - 225					1100
	293-255-30	225 - 250		±4			1270
	293-256-30	250 - 275					1370
	293-257-30	275 - 300			5		1590
	293-234-30	0 - 25		±1	1	With ratchet thimble	280
	293-235-30	25 - 50					340
	293-236-30	50 - 75		±2	2		480
	293-237-30	75 - 100					635
without SPC data output	**293-240-30**	0 - 25	0.001	±1	1	With ratchet stop	270
	293-241-30	25 - 50					330
	293-242-30	50 - 75		±2	2		470
	293-243-30	75 - 100					625
	293-244-30	0 - 25		±1	1	With ratchet thimble	280
	293-245-30	25 - 50					340
	293-246-30	50 - 75		±2	2		480
	293-247-30	75 - 100					635

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

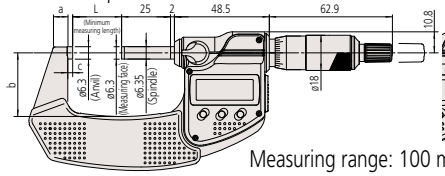
Inch / Metric

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

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

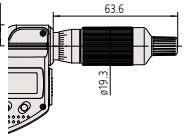
DIMENSIONS

Ratchet stop

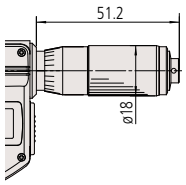


Measuring range: 100 mm or less

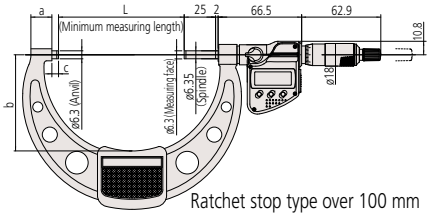
Ratchet thimble type



Friction thimble type



Unit: mm



Ratchet stop type over 100 mm

Range (mm)	Order No.	L	a	b	c
0 - 25	**293-230-30 / 293-240-30**	0	6.5	25	2.5
25 - 50	**293-231-30 / 293-241-30**	25	7.3	32.5	
50 - 75	**293-232-30 / 293-242-30**	50	10.1	47	
75 - 100	**293-233-30 / 293-243-30**	75	11.5	60	
0 - 25	**293-234-30 / 293-244-30**	0	6.5	25	
25 - 50	**293-235-30 / 293-245-30**	25	7.3	32.5	
100 - 125	**293-250-30**	100	16.7	76	5.3
125 - 150	**293-251-30**	125	18.8	90	5.7
150 - 175	**293-252-30**	150	19.1	103	6.1
175 - 200	**293-253-30**	175	18.2	115	6.3
200 - 225	**293-254-30**	200	16.8	126	6.7
225 - 250	**293-255-30**	225	18	139	5.5
250 - 275	**293-256-30**	250		152	6.5
275 - 300	**293-257-30**	275		166	

Micrometer

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

Digimatic Outside Micrometers SERIES 293

MeasurLink® ENABLED
Data Management Software by Mitutoyo

- Equipped with measurement data output function, it can form part of a statistical process control system or networked measurement system.
- Constant-force device: ratchet stop

293-582

- 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-5 for details.)
- Measuring faces: Carbide.

SPECIFICATIONS

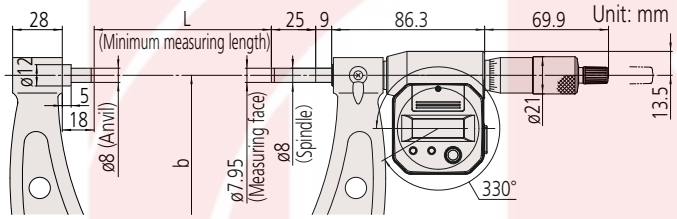
Metric

Order No.	Range (mm)	Maximum permissible error J_{MPE} (µm)	Flatness (µm)	Parallelism (µm)
293-582	300 - 325	±6	0.6	5
293-583	325 - 350			
293-584	350 - 375			
293-585	375 - 400	±7		6
293-586	400 - 425			
293-587	425 - 450			
293-588	450 - 475	±8		7
293-589	475 - 500			

Inch / Metric

Order No.	Range (in)	Maximum permissible error J_{MPE} (in)	Flatness (in)	Parallelism (in)
293-782	12 - 13	±0.0003	0.000024	0.0002
293-783	13 - 14			
293-784	14 - 15			
293-785	15 - 16	±0.00035		0.00024
293-786	16 - 17			
293-787	17 - 18			
293-788	18 - 19	±0.0004		0.00028
293-789	19 - 20			

DIMENSIONS



Range (mm)	L	b
300 - 325	300	187
325 - 350	325	199
350 - 375	350	212
375 - 400	375	224
400 - 425	400	236
425 - 450	425	248
450 - 475	450	261
475 - 500	475	273

Technical Data

- Resolution: 0.001 mm or 0.0001 in/0.001 mm
- Measuring force: 10 to 15 N
- SR44 (2 pcs.), **938882**, for initial operational checks (standard accessory)
- Battery life: Approx. 1.8 years under normal use
- Length standard: Electromagnetic rotary sensor
- Standard accessories: Reference bar, 1 pc. Spanner (**200154**), 1 pc.

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.
Function lock:
This function allows the PRESET (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 about 20 minutes, but the reading and measurement mode are retained. Turning the spindle causes the reading to reappear.
Data output:
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.

Optional Accessories

- Connecting Cables
- 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 A-21 for detailed information about recommended cables.

SERIES 293 — Digimatic Outside Micrometers

- Extended battery life of approximately 2.4 years.
- Simple design and excluding the data output function keeps price economical.
- One switch operation (Origin Set) for easy use.
- Equipped with Ratchet Stop for constant measuring force.
- Measuring faces: Carbide.

293-821-30

PROPRIETARY INSPECTION CERTIFICATE

An inspection certificate is supplied as standard. Refer to page U-9 for details.

Technical Data

- SR44 (1 pc.), **938882**, for initial operational checks (standard accessory)
- Length standard: Electromagnetic rotary sensor
- Battery life: Approx. 2.4 years under normal use
- Spanner (**301336**), 1 pc.

Functions

Zero-setting:
A brief press on the ORIGIN button sets display to zero at the current spindle position (zero-setting), which allows easy comparison measurement.
Auto power ON / OFF:
The reading on the LCD disappears after this instrument is idle for about 20 minutes, but the reading is retained. Turning the spindle causes the reading on the LCD to reappear.

SPECIFICATIONS

Metric With ratchet stop/Measuring force: 5 to 10 N

Order No.	Range (mm)	Resolution (mm)	Maximum permissible error J_{MPE} (µm)
293-821-30	0 - 25	0.001	±2

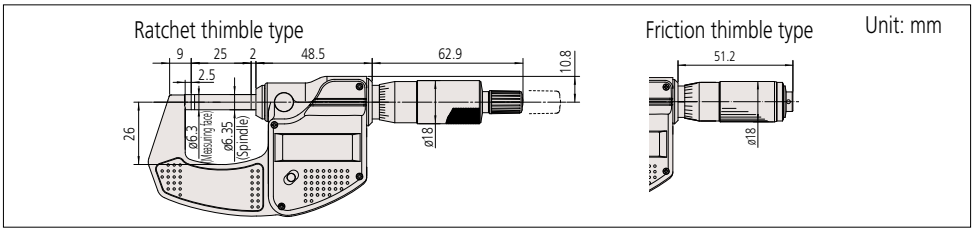
Inch / Metric With ratchet stop/Measuring force: 5 to 10 N

Order No.	Range (in)	Resolution	Maximum permissible error J_{MPE} (in)
293-831-30	0 - 1	0.00005 in/ 0.001 mm	±0.0001

Inch / Metric With friction thimble/Measuring force: 5 to 10 N

Order No.	Range (in)	Resolution	Maximum permissible error J_{MPE} (in)
293-832-30	0 - 1	0.00005 in/ 0.001 mm	±0.0001

DIMENSIONS



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.

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-25 for details).

ABSOLUTE™

IP65

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

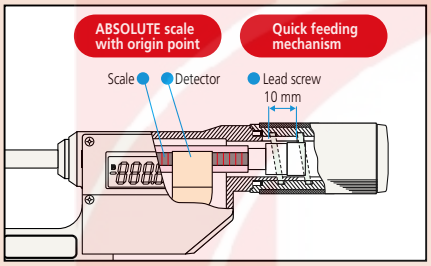
TÜVRheinland CERTIFIED
Dust- and Water-Protected
www.tuv.com ID 0000063013

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 to 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 previous models **293-667**/**68**/**69**/**77**/**78**/**79**)
- Length standard: Electrostatic capacity absolute sensor
- Standard accessories: Reference bar, 1 pc.
  (except for measuring range 0 to 30 mm (0 to 1.2 in) models)
- Maximum response speed: without limit
- The non-rotating spindle enables even inexperienced operators to perform measurements repeatably and accurately.



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**
  160 mm: **02AZD790B**
  For foot switch: **02AZE140B**
  Refer to page A-21 for details.

Quickmike
SERIES 293 — IP65 ABSOLUTE
Digimatic Micrometers

MeasurLink® ENABLED
Data Management Software by Mitutoyo

- 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.
- Excellent resistance against oil, water and dust (IP65 protection level) enables this product to be used in machining operations that includes splashing coolant fluid.
- Equipped with a large LCD offering easy readability.
- Pressing the HOLD button freezes the current value in the display.
- With function lock added to prevent unintended operation.
- A new low current consumption IC provides extremely long battery life.
- Measuring faces: Carbide.
- Supplied with a Ratchet Stop for constant measuring force.
- The lineup includes Blade Micrometer types (refer to page B-47), Disk Micrometer types (refer to page B-33) and Crimp Height Micrometer types (refer to page B-40).

293-666-20

293-667-20

293-668-20

293-669-20

SPECIFICATIONS

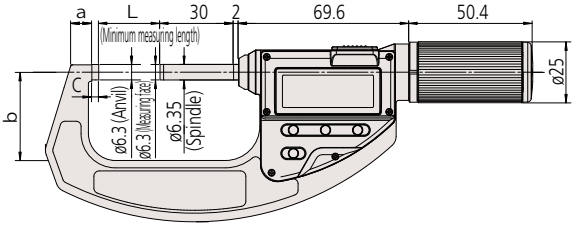
Metric

Order No.	Range (mm)	Maximum permissible error J_{MPE} (µm)	Flatness (µm)	Parallelism (µm)	Constant-force device	Mass (g)	Output function
293-666-20	0 - 30	±2	0.3	2	Yes	275	With
293-667-20	25 - 55					340	
293-668-20	50 - 80	±3				480	
293-669-20	75 - 105			3		585	

Inch / Metric

Order No.	Range (in)	Maximum permissible error J_{MPE} (in)	Flatness (in)	Parallelism (in)	Constant-force device	Mass (g)	Output function
293-676-20	0 - 1.2	±0.0001	0.000012	0.00008	Yes	275	With
293-677-20	1 - 2.2					340	
293-678-20	2 - 3.2	±0.00015				480	
293-679-20	3 - 4.2			0.00012		585	

DIMENSIONS



Unit: mm

Range (mm)	L	a	b	c
0 - 30	0	6.2	25	2
25 - 55	25	8.5	36	2.8
50 - 80	50	10.3	47	2.8
75 - 105	75	10.7	60	2.8

Mitutoyo

Micrometer

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

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-25 for details).

ABSOLUTE™

ABSOLUTE Digimatic Micrometers SERIES 227 — with Adjustable Measuring Force

- 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.
- In addition to standard specification, a non-rotating spindle type tooth thickness micrometer (refer to page B-33 for details) is also available.

227-201-20

227-205-20

Technical Data

- Flatness: 0.3 µm/0.000012 in
- Parallelism: 2 µm/0.00008 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
- Length standard: Electrostatic capacity absolute sensor
- Standard accessories: Reference bar, 1 pc. (except for measuring range 0 to 15 mm (0 to 0.6 in)/ 0 to 10 mm (0 to 0.4 in) models)
  Screwdriver (**210183**), 1 pc.

Functions

Adjustable measuring force mechanism
Origin point setting
Zero setting
Hold
Function Lock
Auto power off
Measurement data output
Error alarm

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**
  160 mm: **02AZD790B**
  For foot switch: **02AZE140B**
  Refer to page A-21 for details.

SPECIFICATIONS

Metric

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

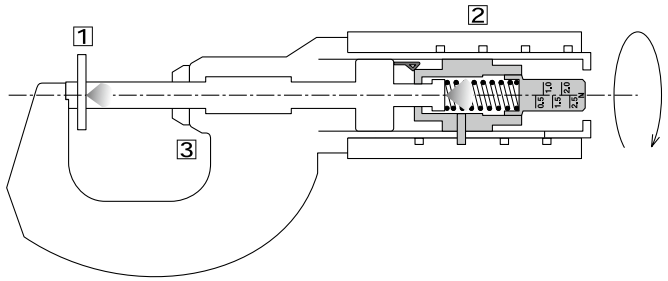
* These values are guaranteed when micrometer is used in a horizontal orientation (within ±3 degrees)

Inch / Metric

Order No.	Measuring force (N)	Range (in)	Resolution	Maximum permissible error J_{MPE} (in)	Measuring force (N)	Accuracy of the selected measuring force* (N)	Repeatability of measuring force* (N)	Mass (g)
227-211-20	0.5 - 2.5 (adjustable)	0 - 0.6	0.00005 in/ 0.001 mm	±0.0001	0.5, 1.0, 1.5, 2.0, 2.5	± (0.1+ the selected measuring force/10)	within 0.1	300
227-213-20		0.6 - 1.2						380
227-215-20	2 - 10 (adjustable)	0 - 0.4			2, 4, 6, 8, 10	± (0.4+ the selected measuring force/10)	within 0.4	345
227-216-20		0.4 - 0.8						425
227-217-20		0.8 - 1.2						415

* These values are guaranteed when micrometer is used in a horizontal orientation (within ±3 degrees)

Constant-Measuring-Force Mechanism



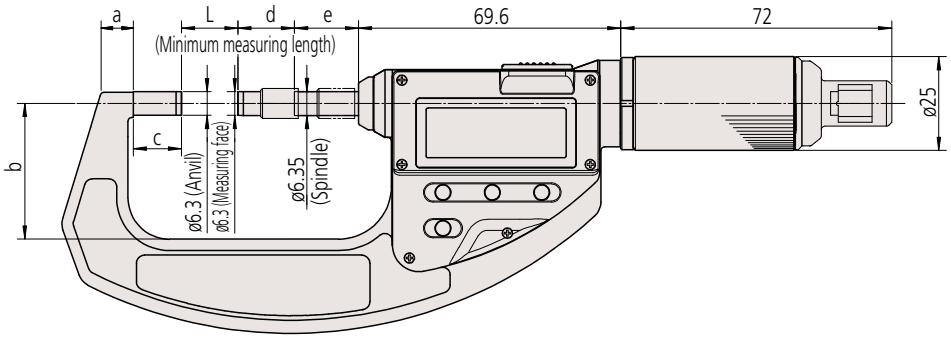
1 Measuring force is generated by the action of trapping a workpiece between the spindle face and the anvil.
2 The constant-force unit applies the specified measuring force.
3 When the preset measuring force is reached, the count on the LCD is automatically held and the hold symbol appears. (To cancel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

Adjustable Measuring Force

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

DIMENSIONS

Unit: mm



Range (mm)	L	a	b	c	d	e
0 - 15	0	6.2	25	2	15	17
15 - 30	15	8.5	36	12.8		
0 - 10	0	6.2	25	2	10	22
10 - 20	10	8.5	36	17.8		
20 - 30	20			7.8		

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.
- Equipped with Ratchet Stop for constant measuring force.
- Measuring faces: Carbide.
- In addition to standard specification, a non-rotating spindle type tooth thickness micrometer (refer to page B-33 for details) is also available.

Ratchet stop
102-301

PROPRIETARY INSPECTION CERTIFICATE

An inspection certificate is supplied as standard.
Refer to page U-9 for details.

Common specifications

- Measuring force: 5 to 10 N
- Standard accessories: Reference bar, 1 pc.
  (except for measuring range 0 to 25 mm models)
  Spanner (**301336**), 1 pc.
  (for measuring range 0 to 25 mm/25 to 50 mm models)
  Spanner (**200877**), 1 pc.
  (for measuring range 50 to 75 mm/75 to 100 mm models)

Ratchet stop type

Friction thimble type

SPECIFICATIONS

Metric

Order No.	Range (mm)	Graduation (mm)	Maximum permissible error J_{MPE} (µm)	Flatness (µm)	Parallelism (µm)	Constant-force device
102-301	0 - 25	0.01	±2	0.6	2	Ratchet stop
102-302	25 - 50					
102-303	50 - 75					
102-304	75 - 100		±3		3	

Metric

Order No.	Range (mm)	Graduation (mm)	Maximum permissible error J_{MPE} (µm)	Flatness (µm)	Parallelism (µm)	Constant-force device
102-311	0 - 25	0.001	±1	0.3	1	Ratchet stop
102-313						Friction thimble
102-312	25 - 50					Ratchet stop

Inch

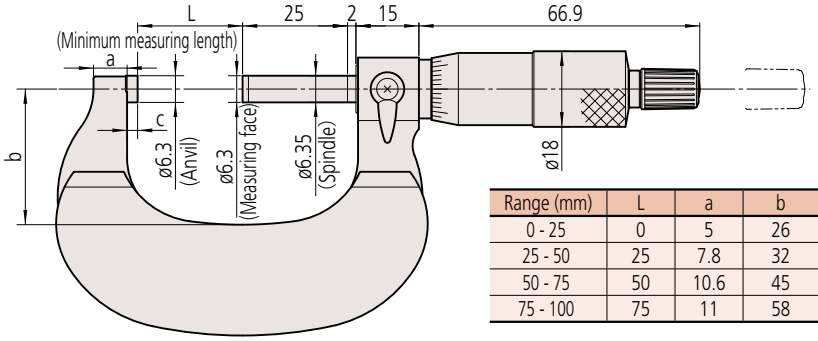
Order No.	Range (in)	Graduation (in)	Maximum permissible error J_{MPE} (in)	Flatness (in)	Parallelism (in)	Constant-force device
102-327-10	0 - 1	0.0001	±0.0001	0.000024	0.00008	Ratchet stop
102-329-10						Friction thimble
102-328-10	1 - 2					Ratchet stop
102-330-10						Friction thimble
102-331-10	2 - 3					Ratchet stop
102-332-10	3 - 4		±0.00015		0.00012	Ratchet stop

Metric Micrometer set

Order No.	Range (mm)	Models included
102-911-40	0 - 100 (Four micrometers per set)	• **102-301** **102-302** **102-303** **102-304** • 3 micrometer standards

DIMENSIONS

Unit: mm



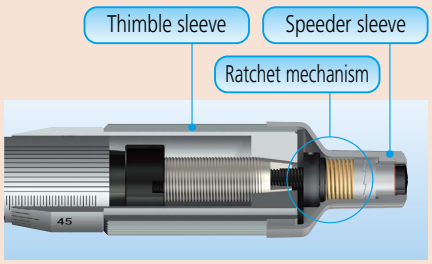
Range (mm)	L	a	b	c
0 - 25	0	5	26	2.5
25 - 50	25	7.8	32	
50 - 75	50	10.6	45	
75 - 100	75	11	58	

An inspection certificate is supplied as standard.
Refer to page U-9 for details.

Technical Data

- Measuring force: 5 to 10 N
- Standard accessories: Reference bar, 1 pc. (except for measuring range 0 to 25 mm (0 to 1 in) models) Spanner (**301336**), 1 pc.

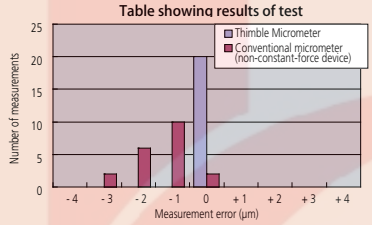
Internal Structure

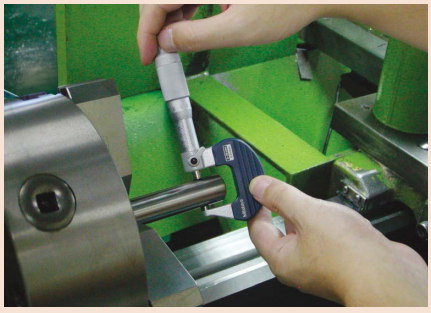


Greatly Improved Accuracy and Repeatability

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.

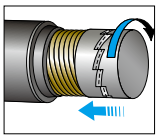




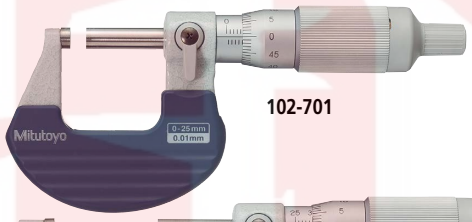
Ratchet Thimble Micrometer
SERIES 102 — Outside Micrometers

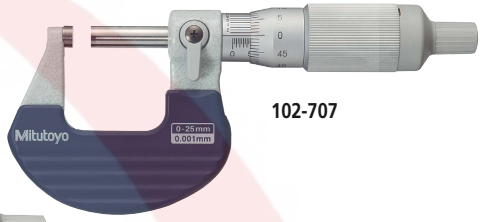
- More accurate in one-handed operation: inexperienced operators measure significantly more accurately with the new micrometer.
- Ratchet function works both from the thimble and the speeder.

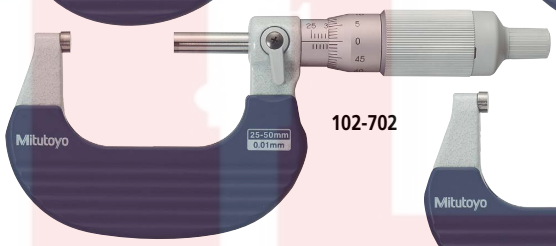
- Rotating the thimble/speeder when the workpiece is between the anvil and spindle causes the ratchet mechanism to operate and apply a constant measuring force to the workpiece.



- 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

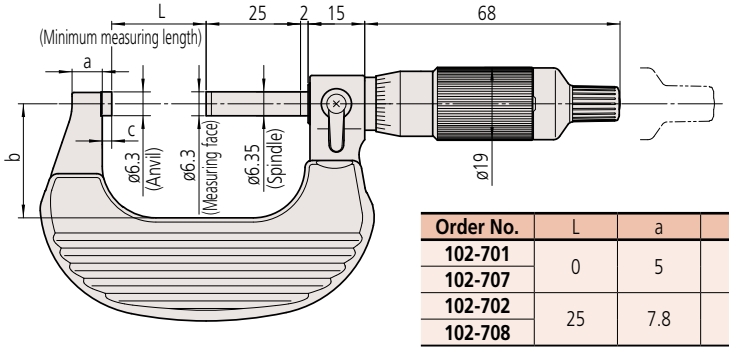
Order No.	Range (mm)	Graduation (mm)	Maximum permissible error J_{MPE} (µm)	Flatness (µm)	Parallelism (µm)	Mass (g)
102-701	0 - 25	0.01	±2	0.6	2	180
102-707		0.001				
102-702	25 - 50	0.01				270
102-708		0.001				

Inch

Order No.	Range (in)	Graduation (in)	Maximum permissible error J_{MPE} (in)	Flatness (in)	Parallelism (in)	Mass (g)
102-717	0 - 1	0.0001	±0.0001	0.000024	0.00008	180
102-718	1 - 2					270

DIMENSIONS

Unit: mm



Order No.	L	a	b	c
102-701	0	5	26	2.5
102-707				
102-702	25	7.8	30	
102-708				

Micrometer

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

An inspection certificate is supplied as standard.
Refer to page U-9 for details.

Outside Micrometers
SERIES 103

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

103-137

103-139-10

Technical Data

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

Metric With ratchet stop

Order No.	Range (mm)	Graduation (mm)	MPE*1 (µm)	Measuring force (N)	Flatness (µm)	Parallelism (µm)
103-129	0 - 25	0.001	±2	5 - 10	0.6	2
103-130	25 - 50	0.001				
103-139-10	50 - 75	0.01	±3			3
103-140-10	75 - 100					
103-141-10	100 - 125					
103-142-10	125 - 150		±4			4
103-143-10	150 - 175					
103-144-10	175 - 200					
103-145-10	200 - 225		±5			
103-146-10	225 - 250					
103-147-10	250 - 275					5
103-148-10	275 - 300					
103-149	300 - 325		±6	10 - 15	1	
103-150	325 - 350					
103-151	350 - 375					
103-152	375 - 400		±7			6
103-153	400 - 425					
103-154	425 - 450					
103-155	450 - 475		±8			
103-156	475 - 500					7
103-157	500 - 525					
103-158	525 - 550		±9			
103-159	550 - 575					
103-160	575 - 600					8
103-161	600 - 625		±10			
103-162	625 - 650					
103-163	650 - 675					
103-164	675 - 700		±11			9
103-165	700 - 725					
103-166	725 - 750					
103-167	750 - 775		±12			
103-168	775 - 800					10
103-169	800 - 825					
103-170	825 - 850		±13			
103-171	850 - 875					
103-172	875 - 900					
103-173	900 - 925		±14			11
103-174	925 - 950					
103-175	950 - 975					
103-176	975 - 1000		±15			12

Inch With ratchet stop

Order No.	Range (in)	Graduation (in)	MPE*1 (in)	Measuring force (N)	Flatness (in)	Parallelism (in)
103-177	0 - 1	0.001	±0.0001	5 - 10	0.000024	0.00008
103-131		0.0001				
103-178	1 - 2	0.001				
103-132		0.0001				
103-179	2 - 3	0.001	±0.00015			0.00012
103-180	3 - 4					
103-181	4 - 5					
103-182	5 - 6					
103-183	6 - 7		±0.0002			0.00016
103-184	7 - 8					
103-185	8 - 9					
103-186	9 - 10		±0.00025			
103-187	10 - 11					
103-188	11 - 12					0.0002
103-189	12 - 13		±0.0003	10 - 15	0.00004	
103-190	13 - 14					
103-191	14 - 15					
103-192	15 - 16		±0.00035			0.00024
103-193	16 - 17					
103-194	17 - 18					
103-195	18 - 19		±0.0004			
103-196	19 - 20					0.00028
103-197	20 - 21					
103-198	21 - 22		±0.00045			
103-199	22 - 23					
103-200	23 - 24					0.00032
103-201	24 - 25		±0.0005			
103-202	25 - 26					
103-203	26 - 27					
103-204	27 - 28		±0.00055			0.00036
103-205	28 - 29					
103-206	29 - 30					
103-207	30 - 31		±0.0006			
103-208	31 - 32					0.0004
103-209	32 - 33					
103-210	33 - 34		±0.00065			
103-211	34 - 35					
103-212	35 - 36					0.00044
103-213	36 - 37		±0.0007			
103-214	37 - 38					
103-215	38 - 39					
103-216	39 - 40		±0.00075			0.00048

Metric With ratchet stop

Order No.	Range (mm)	Graduation (mm)	MPE*1 *2 (µm)	Measuring force (N)	Flatness (µm)	Parallelism (µm)
103-137	0 - 25	0.01	±2	5 - 10	0.6	2
103-138	25 - 50	0.01				

Inch With friction thimble

Order No.	Range (in)	Graduation (in)	MPE*1 *2 (in)	Measuring force (N)	Flatness (in)	Parallelism (in)
103-135	0 - 1	0.0001	±0.0001	5 - 10	0.000024	0.00008
103-136	1 - 2					

*1 MPE: Maximum permissible error J_{MPE}
*2 Maximum permissible error of the indication measured by contacting the full measuring face with the object to be measured. J_{MPE} is a term specified by JIS B 7502: 2016 which has been prepared based on ISO 3611: 2010 with some modifications of the technical contents.
The measurement method has not been changed from JIS B 7502: 1994. For details refer to page B-70.

Technical Data

- Standard accessories:
  Reference rod 1 pc.
  (Excluding the measuring range 0 to 25 mm)
  Spanner (**301336**), 1 pc.
  (Maximum measuring length Less than 300 mm)
  Spanner (**200154**), 1 pc.
  (Maximum measuring length More than 325 mm)

103-904-10

103-905-10

103-906

Metric Micrometer set/With ratchet thimble

Order No.	Range (mm)	Models included
103-927-10	0 - 75 (3 pcs./set)	**103-137, 103-138, 103-139-10,** 2 micrometer standards
103-913-50	0 - 150 (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 (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 (12 pcs./set)	All micrometers of **103-913-50** and **103-915-10** in one set, 11 micrometer standards

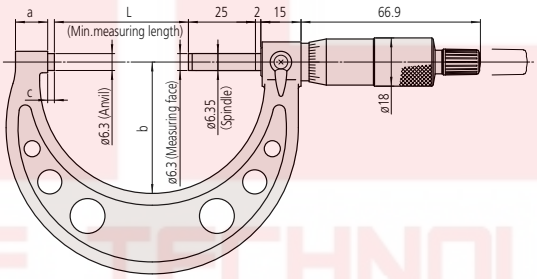
Inch Micrometer set/With ratchet thimble

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

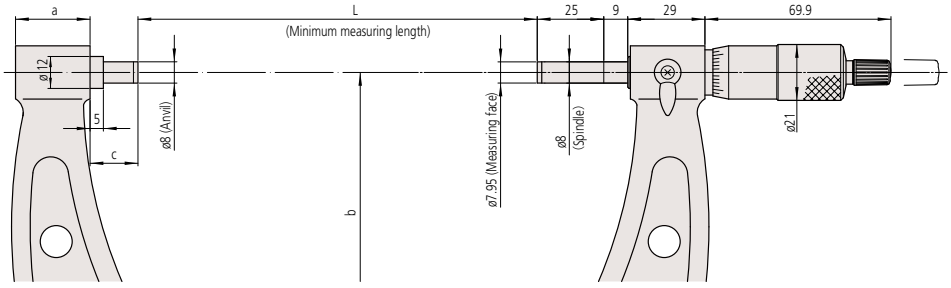
DIMENSIONS

Unit: mm

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



Models 325 mm to 1000 mm



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

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

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

Micrometer

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

Digit Outside Micrometers SERIES 193

- Mechanical digit counter with 0.01 mm or 0.001 in resolution for quick and error-free reading.
- Measuring faces: Carbide.
- Equipped with Ratchet Stop for constant measuring force.

Technical Data

- Counter Reading: 0.01 mm or 0.001 in
- Parallelism:
  Measuring range 0 to 75: 2 µm
  Measuring range 75 to 100: 3 µm
- Standard accessories: Reference bar, 1 pc.
  (except for measuring range 0 to 25 mm (0 to 1 in) models)
  Spanner (**301336**), 1 pc.

B

SPECIFICATIONS

Metric With ratchet stop

Order No.	Range (mm)	Graduation (mm)	Maximum permissible error J_{MPE} (µm)	Flatness (µm)
193-111	0 - 25	0.001 (reading is obtained with vernier)	2	0.6
193-112	25 - 50			
193-113	50 - 75			
193-114	75 - 100		3	
193-101	0 - 25	0.01	2	
193-102	25 - 50			
193-103	50 - 75			
193-104	75 - 100		3	

Inch With friction thimble

Order No.	Range (in)	Graduation (in)	Maximum permissible error J_{MPE} (in)	Flatness (in)
193-211	0 - 1	0.0001	0.0001	0.000024
193-212	1 - 2			

Inch With ratchet stop

Order No.	Range (in)	Graduation (in)	Maximum permissible error J_{MPE} (in)	Flatness (in)
193-213	2 - 3	0.0001	0.0001	0.000024
193-214	3 - 4		0.00015	

Metric Micrometer set

Order No.	Range (mm)	Models included	Flatness (µm)
193-901	0 - 75 (3 pcs./set)	• **193-101, 193-102, 193-103** • 2 micrometer standards	0.6
193-902	0 - 100 (4 pcs./set)	• **193-101, 193-102, 193-103, 193-104** • 3 micrometer standards	

Inch Micrometer set

Order No.	Range (in)	Models included	Flatness (in)
193-923	0 - 3 (3 pcs./set)	• **193-211, 193-212, 193-213** • 2 micrometer standards	0.000024

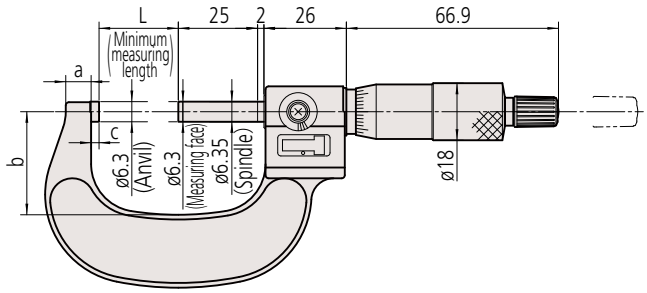
193-101

193-111

193-112

DIMENSIONS

Unit: mm

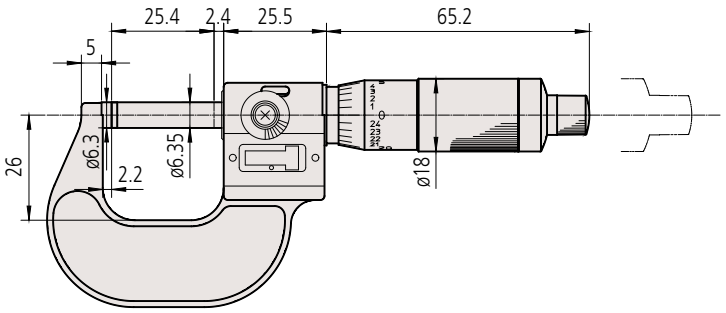


Range (mm)	L	a	b	c
0 - 25	0	5	26	2.5
25 - 50	25	8	32	2.0
50 - 75	50	9	45	
75 - 100	75		57	

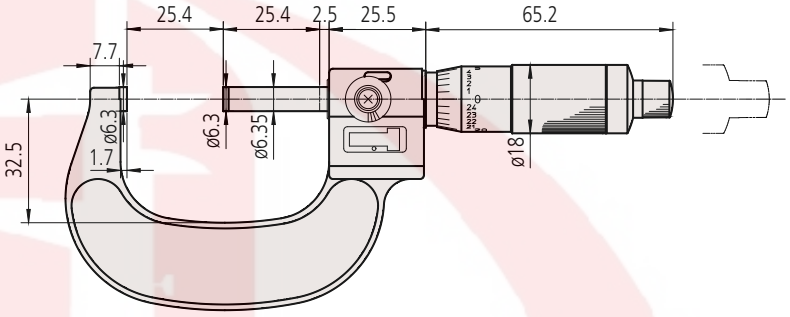
DIMENSIONS

Unit: mm

193-211



193-212



Micrometer

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

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-25 for details).

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 ø6.35 mm
- Equipped with Ratchet Stop for constant measuring force.

406-250-30

Metric

Order No.	Range (mm)	Resolution (mm)	Maximum permissible error J_{MPE} (µm)	Flatness (µm)	Parallelism (µm)
406-250-30	0 - 25	0.001	±3	0.3	3
406-251-30	25 - 50				
406-252-30	50 - 75				
406-253-30	75 - 100		±4		4

Note: For functional details of **series 406**, refer to page B-8. Please note that these models are not water-proof.

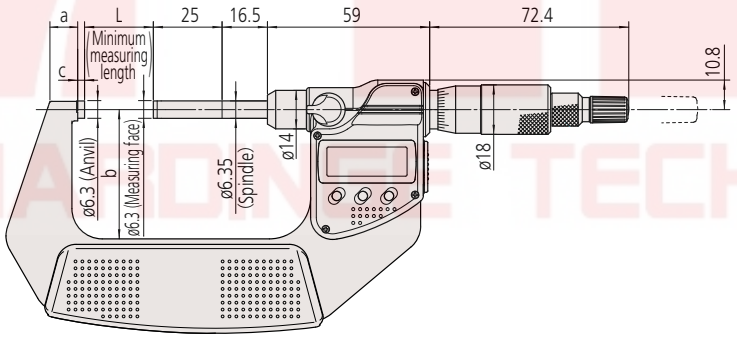
Inch / Metric

Order No.	Range (in)	Resolution	Maximum permissible error J_{MPE} (in)	Flatness (in)	Parallelism (in)
406-350-30	0 - 1	0.00005 in / 0.001 mm	±0.00015	0.000012	0.00012
406-351-30	1 - 2				
406-352-30	2 - 3				
406-353-30	3 - 4		±0.0002		0.00016

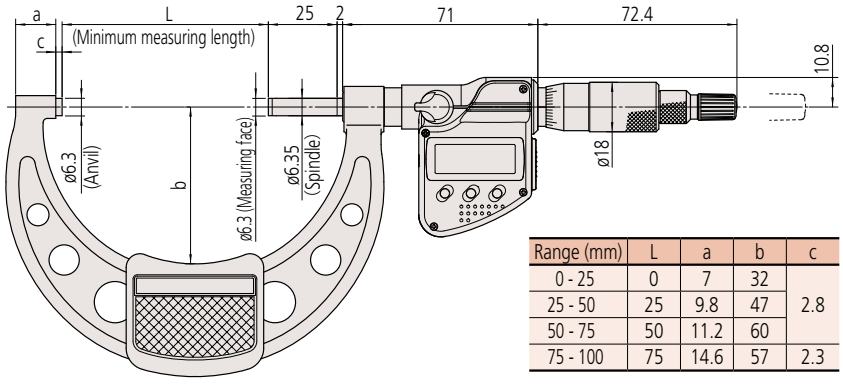
DIMENSIONS

Digimatic models up to 75 mm measuring range

Unit: mm



Digimatic models over 75 mm measuring range



Range (mm)	L	a	b	c
0 - 25	0	7	32	2.8
25 - 50	25	9.8	47	
50 - 75	50	11.2	60	
75 - 100	75	14.6	57	2.3

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 to 25 mm (0 to 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**
- **U-WAVE-T** dedicated connection cable
  160 mm: **02AZD790B**
  For foot switch: **02AZE140B**
  Refer to page A-21 for details.

Wireless Data Output U-WAVE fit

- **U-WAVE-TM 264-622** (IP67 type)
  264-623 (Buzzer type)
- **U-WAVE-TMB** Transmitter
  Mitutoyo *Bluetooth*® U-WAVE
  264-626 (IP67 type)
  264-627 (Buzzer type)
  Refer to page A-10 for details.
- Connecting unit for **U-WAVE-TM/TMB**
  02AZF310 (IP67/buzzer type common specification)
  Refer to pages A-10 and A-12 for details.

Standard Accessories

Reference bar, 1 pc.
(except for measuring range 0 to 25 mm models)
Spanner (**301336**), 1 pc.

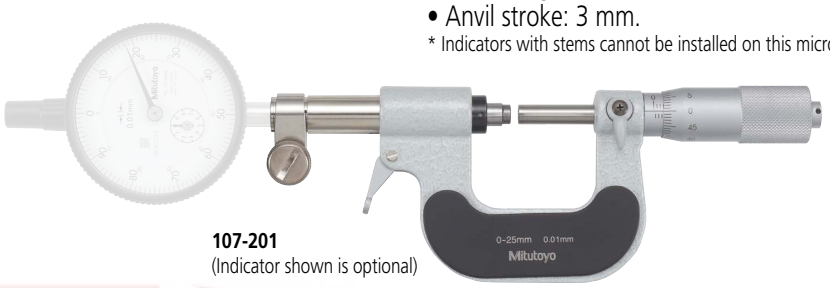
Typical Indicator Choice

Dial indicator (0.01 mm)/**2046AB**
Dial indicator (0.001 mm)/**2109AB-10**
ABS Digimatic Indicator (0.01 mm)/**543-400B**
ABS Digimatic Indicator (0.001 mm)/**543-390B**

Indicator Type Micrometers
SERIES 107

- Designed to mount a dial indicator for direct GO/±NG judgment on mass-produced parts.
- Anvil retracting trigger for quick measurement.
- Various kinds of indicators* are selectable depending on the measurement type (accuracy required, measuring range, etc.).
- Measuring faces: Carbide.
- Anvil stroke: 3 mm.

* Indicators with stems cannot be installed on this micrometer.



107-201
(Indicator shown is optional)

SPECIFICATIONS

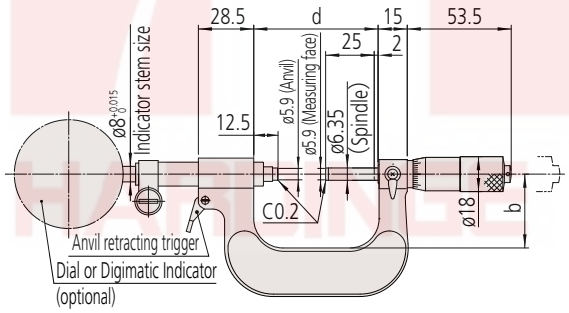
Metric

Order No.	Range (mm)	Spindle feed error (µm)	Flatness (µm)	Parallelism (µm)
107-201	0 - 25	3	0.6	2
107-202	25 - 50			
107-203	50 - 75			3
107-204	75 - 100			
107-205	100 - 125			
107-206	125 - 150			
107-207	150 - 175			4
107-208	175 - 200			

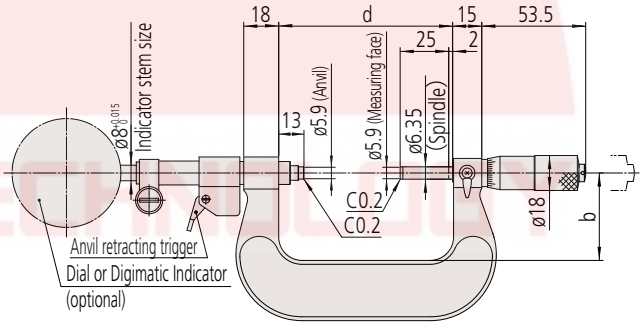
DIMENSIONS

Unit: mm

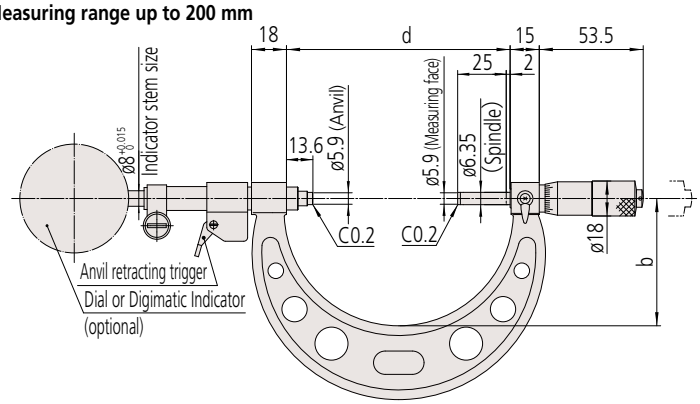
Measuring range up to 50 mm



Measuring range up to 75 mm



Measuring range up to 200 mm



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

Micrometer

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

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-25 for details).

IP65

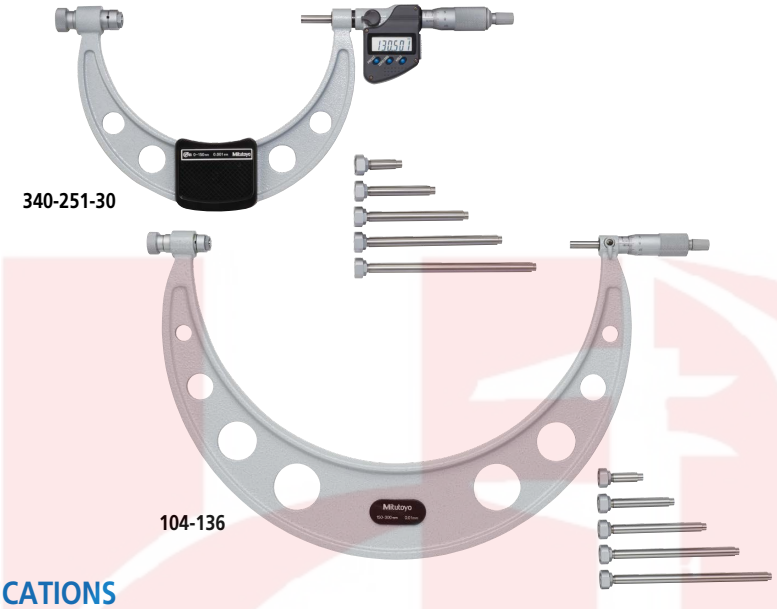
These marks indicate that a product has successfully passed IP65-level testing, which is carried out by the independent German certification organization TÜV Rheinland.

TÜVRheinland® CERTIFIED
Dust- and Water-Protected
www.tuv.com ID 0000040191

Applicable models:
340-251-30, **340-252-30**, **340-351-30**, **340-352-30**

Outside Micrometers SERIES 340, 104 — with Interchangeable Anvils

- Wide measuring range with interchangeable anvils.
- Measuring face of the spindle is carbide tipped (standard model).
- IP 65 water/dust protection (**340-251-30**, **340-252-30**, **340-351-30**, **340-352-30**).
- Equipped with Ratchet Stop for constant measuring force.



340-251-30

104-136

IP Codes (340-251-30, 340-252-30, 340-351-30, 340-352-30)

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

- Spindle feed error: 3 µm/0.00015 in
- Flatness
  Measuring range 0 to 300: 0.6 µm
  Measuring range 300 to 1000: 1.0 µm
- Parallelism
  Measuring range 0 to 75: 2 µm
  Measuring range 75 to 150: 3 µm
  Measuring range 150 to 1000
  (2+R/100) µm, R=max. range (mm) (fraction rounded up)

SPECIFICATIONS

Metric

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

Inch / Metric

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

Metric

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

Inch

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

* The frame is fitted with a heat shield.

Note 1: For functional details of **340-251-30**, **340-252-30**, **340-351-30**, **340-352-30**, refer to page B-8.
Please note that origin setting of these models is by presetting.
Optional connecting cable is available only for water-proof type (Digimatic model).

Note 2: For functional details of **340-520** to **340-723**, refer to page B-9.

Technical Data

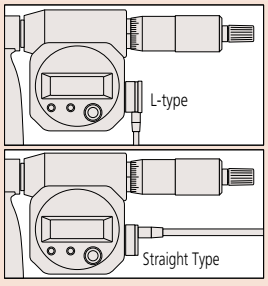
- Battery for **series 340**
  340-251-30, **340-252-30**,
  340-351-30, **340-352-30**: SR44 (1 pc.)
  340-520 to **340-526**
  340-720 to **340-723**: SR44 (2 pcs.)
  938882, for initial operational checks (standard accessory)
- Battery life: Approx. 2.4 years under normal use
  (for **340-2XX**, **340-3XX**)
  Approx. 1.8 years under normal use
  (for **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

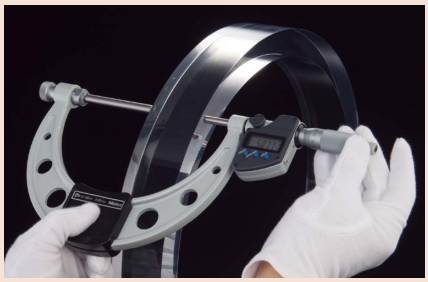
- Connecting cables for
  340-251-30, **340-252-30**, **340-351-30** and **340-352-30**
  1 m: **05CZA662**
  2 m: **05CZA663**
- USB Input Tool Direct
  USB-ITN-B (2 m): **06AFM380B**
- SPC cables for **U-WAVE-T** w/data switch (160 mm):
  02AZD790B
  For foot switch: **02AZE140B**

Wireless Data Output* U-WAVE fit

- **U-WAVE-TM** **264-622** (IP67 type)
  264-623 (Buzzer type)
- **U-WAVE-TMB** Transmitter
  Mitutoyo *Bluetooth*® U-WAVE
  264-626 (IP67 type)
  264-627 (Buzzer type)
  Refer to page A-10 for details.
- Connecting unit for **U-WAVE-TM**/**TMB**
  02AZF310 (IP67/buzzer type common specification)
  Refer to pages A-10 and A-12 for details
  * Only **340-251-30**, **340-252-30**, **340-351-30** and **340-352-30** can be attached
- 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**



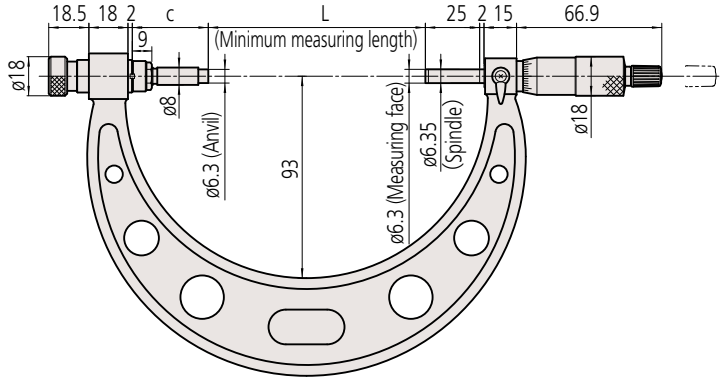
Refer to page A-21 for detailed information about recommended cables.



DIMENSIONS

104-135A

Unit: mm

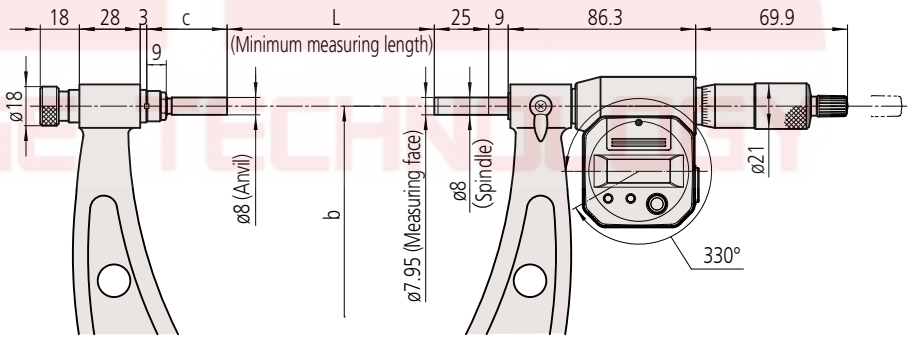


Interchangeable Anvil

		L: Range (mm)					
Range	0 - 150 mm models	0 - 25	25 - 50	50 - 75	75 - 100	100 - 125	125 - 150
Range	150 - 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 - 400 mm models	300 - 325	325 - 350	350 - 375	375 - 400
Range	400 - 500 mm models	400 - 425	425 - 450	450 - 475	475 - 500
Range	500 - 600 mm models	500 - 525	525 - 550	550 - 575	575 - 600
Range	600 - 700 mm models	600 - 625	625 - 650	650 - 675	675 - 700
Range	700 - 800 mm models	700 - 725	725 - 750	750 - 775	775 - 800
Range	800 - 900 mm models	800 - 825	825 - 850	850 - 875	875 - 900
Range	900 - 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



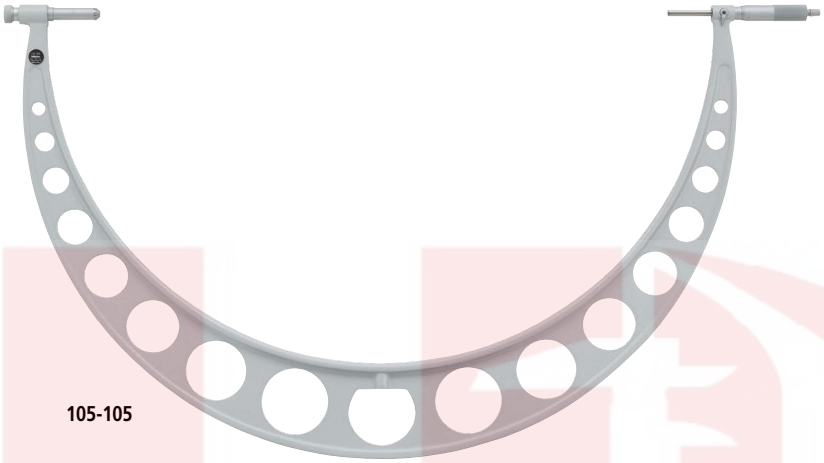
		L: Range (mm)				b
Range	300 - 400 mm models	300 - 325	325 - 350	350 - 375	375 - 400	224
Range	400 - 500 mm models	400 - 425	425 - 450	450 - 475	475 - 500	273
Range	500 - 600 mm models	500 - 525	525 - 550	550 - 575	575 - 600	332
Range	600 - 700 mm models	600 - 625	625 - 650	650 - 675	675 - 700	382
Range	700 - 800 mm models	700 - 725	725 - 750	750 - 775	775 - 800	430
Range	800 - 900 mm models	800 - 825	825 - 850	850 - 875	875 - 900	480
Range	900 - 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.



105-105

Technical Data

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

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

Standard Accessories

Spanner (**200154**), 1 pc.

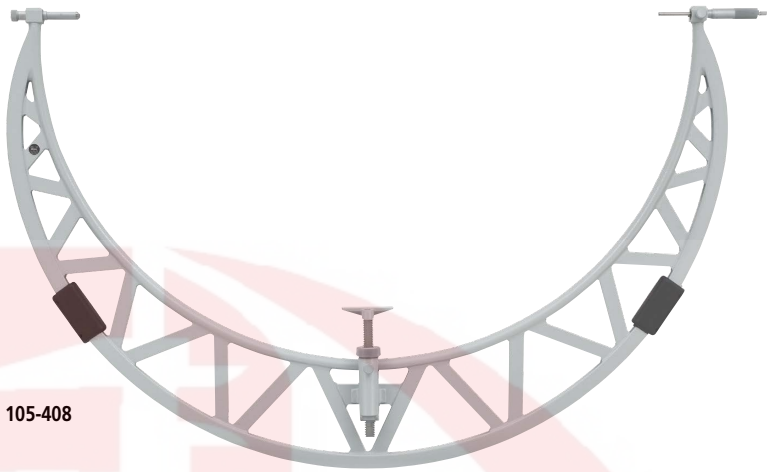
SPECIFICATIONS

Metric

Order No.	Range (mm)	Graduation (mm)	Extension Collars	Setting Standard	Spindle feed error (µm)	Flatness (µm)	Parallelism (µm)
105-103	500 - 600	0.01	1 pc. (50 mm)	2 pcs.	6	1.3	8
105-104	600 - 700						9
105-105	700 - 800						10
105-106	800 - 900						11
105-107	900 - 1000						12

Outside Micrometers
SERIES 105 — with Anvil Extension Collars

- Large, lightweight micrometer with excellent strength based on a pipe-structure frame made of a combination of square and round pipes.
- Wide measuring range with anvil extension collars.
- 50 mm/2 in spindle stroke.
- Measuring faces: Carbide.
- Equipped with Ratchet Stop for constant measuring force.



105-408

Standard Accessories

Spanner (**200154**), 1 pc.

SPECIFICATIONS

Metric

Order No.	Range (mm)	Graduation (mm)	Extension Collars	Setting Standard (pcs.)	Spindle feed error (µm)	Flatness (µm)	Parallelism (µm)
(every 100 mm)							
105-408	1000 - 1100	0.01	1 pc. (50 mm)	2	6	1.3	13
105-409	1100 - 1200						14
105-410	1200 - 1300						15
105-411	1300 - 1400						16
105-412	1400 - 1500						17
105-413	1500 - 1600						18
105-414	1600 - 1700						19
105-415	1700 - 1800						20
105-416	1800 - 1900						21
105-417	1900 - 2000						22
(every 200 mm)							
105-418	1000 - 1200	0.01	2 pcs. (50 mm, 100 mm)	4 (every 50 mm)	6	1.3	14
105-419	1200 - 1400						16
105-420	1400 - 1600						18
105-421	1600 - 1800						20
105-422	1800 - 2000						22

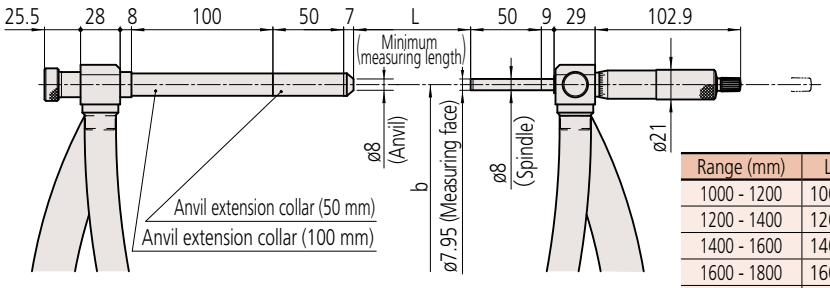
Inch

Order No.	Range (in)	Graduation (in)	Extension Collars	Setting Standard (pcs.)	Spindle feed error (in)	Flatness (in)	Parallelism (in)
105-428	40 - 44	0.001	1 pc. (2 in)	2	0.0003	0.000052	0.00052
105-429	44 - 48						0.00056
105-430	48 - 52						0.00060
105-431	52 - 56						0.00063
105-432	56 - 60						0.00067
105-433	60 - 64						0.00071
105-434	64 - 68						0.00075
105-435	68 - 72						0.00079
105-436	72 - 76						0.00083
105-437	76 - 80						0.00087

DIMENSIONS

Over 1200 mm up to 2000 mm

Unit: mm



b: distance to workpiece stop

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

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