

# B

## Small Tool Instruments Micrometers Micrometers Heads



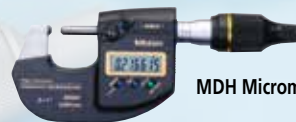
### Micrometers



### Micrometer Heads



MDC Micrometer



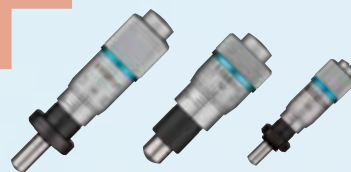
MDH Micrometer



QuantuMike



Digimatic Outside  
Micrometer



Micrometer Heads  
fine spindle feed

### INDEX

<b>Micrometers</b>	
Coolant-Proof Micrometer	B-2,3
Digimatic Micrometer	B-4
Digimatic Micrometer- MDC- Lite	B-4
MDH Micrometer	B-5
QuantuMike	B-6
ABSOLUTE Digimatic Micrometers	B-7
Quickmike	B-8
Outside Micrometers	B-9
Ratchet-Thimble Micrometer	B-10
Outside Micrometers	B-11-19
Spline Micrometers	B-20
Point Micrometers	B-21
Crimp Height Micrometers	B-22
V-Anvil Micrometers	B-23,24
Limit Micrometers	B-25
Pana Micrometers	B-26
Spherical Face Micrometers	B-27
Tube Micrometers	B-28
Uni-Mike	B-29
Sheet Metal Micrometers	B-30
Blade Micrometers	B-31
Disk Micrometers	B-32
Paper Thickness Micrometers	B-33
Disk Micrometers	B-34,35
Gear-Tooth Micrometers	B-36
Screw Thread Micrometers	B-37,38
3-Wire Thread Measuring System	B-39
Can Seam Micrometers	B-40
Hub Micrometers	B-41
Wire Micrometers	B-41
Digit Outside Micrometers	B-42
Indicating Micrometers	B-43
Snap Meters	B-43
Dial Snap Meters	B-44
Caliper-Type Micrometers	B-45
Groove Micrometers	B-46
Small-Hole Gage Set	B-47
Telescoping Gage Set	B-47
Micrometer Stands	B-48
Color Ratchet & Color Speeder	B-49
Spindle Attachment Tip	B-49
Micrometer Oil	B-49
Optical Parallels	B-50
Optical Flats	B-50
Micrometer Standards	B-51
Standards for Screw Thread Micrometers	B-52
Standards for V-Anvil Micrometers	B-52
Tool Kits	B-53,54
<b>Micrometer Heads</b>	
Micrometer Head Selection Guide	B-55
Digimatic Micrometer Heads	B-56
Digimatic Micrometer Heads	B-57
Micrometer Heads	B-58-71
Digital Micrometer Heads	B-72
Micrometer Heads	B-73
Micro Jack	B-72
Precision Lead Screw	B-73
Fixtures for Micrometer Heads	B-74,75

# Coolant-proof Micrometer

**SERIES 293 — with Dust/Water Protection Conforming to IP65 Level**

## FEATURES

- IP65 protection level, enabling use in environments exposed to cutting oil, etc\*.  
\*Anti-corrosion treatment is required after use.
- Measurement data output function is available with a water-resistant connection cable.
- Auto power ON/OFF function.
- A nonslip surface with raised dots is employed for the frame cover and surface panel to achieve stable handheld measurement.
- Certificate of inspection\* is included. (2" /50mm or less range models)\*\*  
\*It is not the type used to obtain calibration certificates.  
\*\* except 293-349-30
- With a standard bar except for 0-1"/0-25mm model.
- Supplied in fitted case. Plastic case up to 6"/150mm, wooden box over 6"/150mm.



293-330-30



293-252-30



Oil-resistant materials are used in all plastic components.



Measurement data output function is available with a water-resistant connection cable.



Employed nonslip surface with raised dots



Mitutoyo		CERTIFICATE OF INSPECTION / 検査成績書	
1. Item / 品名	Digital Micrometer	Inspected Value / 検査値	0.20mm
Model Name / 型番	293-330	Manufacturer / 製造元	Mitutoyo
Lot No. / ロット番号	293-330	Date / 日付	2023/03/01
2. Name of Inspector / 検査員氏名	Y. Y. Y.	Standard Temperature / 標準温度	20 °C
3. Name of Inspected Part / 検査対象部品の名称		Inspected Part / 検査対象部品の名称	
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Certificate of inspection

## Technical Data

- Accuracy: Refer to the list of specifications.  
 Resolution: .00005"/0.001mm or 0.001mm (up to 4" models)  
 .0001" / 0.001mm (over 4" models)  
 Flatness: .000012"/0.3µm  
 Parallelism: .00004"/1µm for models up to 2"/50mm  
 .00008"/2µm for models up to 4"/100mm  
 .00012"/3µm for models up to 7"/175mm  
 .00016"/4µm for models up to 11"/275mm  
 .0002"/5µm for models over 12"/300mm
- Measuring faces: Carbide tipped  
 Display: LCD  
 Battery: SR44 (1 pc.), **938882**  
 Battery life: Approx. 2.4 years under normal use  
 Dust/Water protection level: IP65

## Function

- Origin-set, Zero / ABS, Hold, Auto power on/off,  
 Data output (output models),  
 inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories

- 05CZA662:** SPC cable with data switch (40"/1m)  
**05CZA663:** SPC cable with data switch (80"/2m)



SPC cable with data switch

## SPECIFICATIONS

**Metric** With ratchet stop

Range	Resolution	Order No.	Accuracy
0 - 25mm	0.001mm	<b>293-230-30 / 293-240-30*</b>	±1µm
25 - 50mm	0.001mm	<b>293-231-30 / 293-241-30*</b>	±1µm
50 - 75mm	0.001mm	<b>293-232-30 / 293-242-30*</b>	±1µm
75 - 100mm	0.001mm	<b>293-233-30 / 293-243-30*</b>	±2µm
100 - 125mm	0.001mm	<b>293-250-30</b>	±2µm
125 - 150mm	0.001mm	<b>293-251-30</b>	±2µm
150 - 175mm	0.001mm	<b>293-252-30</b>	±3µm
175 - 200mm	0.001mm	<b>293-253-30</b>	±3µm
200 - 225mm	0.001mm	<b>293-254-30</b>	±3µm
225 - 250mm	0.001mm	<b>293-255-30</b>	±4µm
250 - 275mm	0.001mm	<b>293-256-30</b>	±4µm
275 - 300mm	0.001mm	<b>293-257-30</b>	±4µm

\*without SPC data output

**Metric** With ratchet thimble

Range	Resolution	Order No.	Accuracy
0 - 25mm	0.001mm	<b>293-234-30 / 293-244-30*</b>	±1µm
25 - 50mm	0.001mm	<b>293-235-30 / 293-245-30*</b>	±1µm
50 - 75mm	0.001mm	<b>293-236-30 / 293-246-30*</b>	±1µm
75 - 100mm	0.001mm	<b>293-237-30 / 293-247-30*</b>	±2µm

\*without SPC data output

**Metric** Micrometer Set

Range	Order No.	Included in set
0-50mm (2pcs. Set)	<b>293-966-30</b>	293-230-30, 293-231-30, 25mm CERA block, plastic case
0-75mm (3pcs. Set)	<b>293-962-30</b>	293-230-30, 293-231-30, 293-232-30, 2 standard bars, plastic case
0-100mm (4pcs. Set)	<b>293-963-30</b>	293-230-30, 293-231-30, 293-232-30, 293-233-30, 3 standard bars, wooden box

**Inch/Metric** With ratchet stop

Range	Resolution	Order No.	Accuracy
0 - 1" / 0 - 25.4mm	.00005" / 0.001mm	<b>293-330-30 / 293-340-30*</b>	±.00005"
1" - 2" / 25.4 - 50.8mm	.00005" / 0.001mm	<b>293-331-30 / 293-341-30*</b>	±.00005"
2" - 3" / 50.8 - 76.2mm	.00005" / 0.001mm	<b>293-332-30 / 293-342-30*</b>	±.00005"
3" - 4" / 76.2 - 101.6mm	.00005" / 0.001mm	<b>293-333-30 / 293-343-30*</b>	±.0001"
4" - 5" / 101.6 - 127.0mm	.0001" / 0.001mm	<b>293-350-30</b>	±.0001"
5" - 6" / 127.0 - 152.4mm	.0001" / 0.001mm	<b>293-351-30</b>	±.0001"
6" - 7" / 152.4 - 177.8mm	.0001" / 0.001mm	<b>293-352-30</b>	±.00015"
7" - 8" / 177.8 - 203.2mm	.0001" / 0.001mm	<b>293-353-30</b>	±.00015"
8" - 9" / 203.2 - 228.6mm	.0001" / 0.001mm	<b>293-354-30</b>	±.00015"
9" - 10" / 228.6 - 254.0mm	.0001" / 0.001mm	<b>293-355-30</b>	±.0002"
10" - 11" / 254.0 - 279.4mm	.0001" / 0.001mm	<b>293-356-30</b>	±.0002"
11" - 12" / 279.4 - 304.8mm	.0001" / 0.001mm	<b>293-357-30</b>	±.0002"

\*without SPC data output

**Inch/Metric** With ratchet thimble

Range	Resolution	Order No.	Accuracy
0 - 1" / 0 - 25.4mm	.00005" / 0.001mm	<b>293-334-30 / 293-344-30*</b>	±.00005"
0 - 1" / 0 - 25.4mm	.0001" / 0.001mm	<b>293-349-30*</b>	±.0001"
1" - 2" / 25.4 - 50.8mm	.00005" / 0.001mm	<b>293-345-30*</b>	±.00005"
2" - 3" / 50.8 - 76.2mm	.00005" / 0.001mm	<b>293-346-30*</b>	±.00005"
3" - 4" / 76.2 - 101.6mm	.00005" / 0.001mm	<b>293-347-30*</b>	±.0001"

\*without SPC data output

**Inch/Metric** With friction thimble

Range	Resolution	Order No.	Accuracy
0 - 1" / 0 - 25.4mm	.00005" / 0.001mm	<b>293-335-30 / 293-348-30*</b>	±.00005"
1" - 2" / 25.4 - 50.8mm	.00005" / 0.001mm	<b>293-336-30</b>	±.00005"

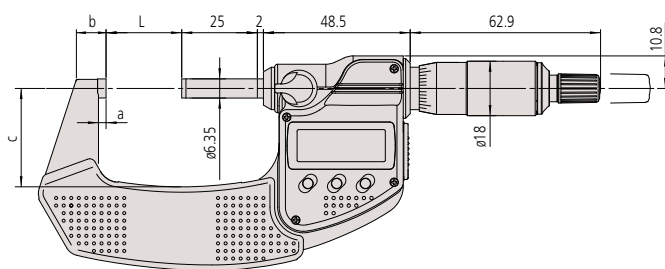
\*without SPC data output

**Inch/Metric** Micrometer Set .00005" / 0.001mm graduation model

Range	Order No.	Included in set
0 - 3" / 0 - 76.2mm (3 pcs. set)	<b>293-960-30</b>	293-330-30, 293-331-30, 293-332-30, 2 standard bars, plastic case
0 - 4" / 0 - 101.6mm (4 pcs. set)	<b>293-961-30</b>	293-330-30, 293-331-30, 293-332-30, 293-333-30, 3 standard bars, wooden box

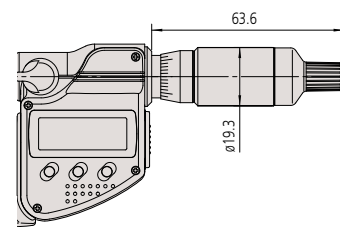
## DIMENSIONS AND MASS

Ratchet-stop type (up to 100mm/4")

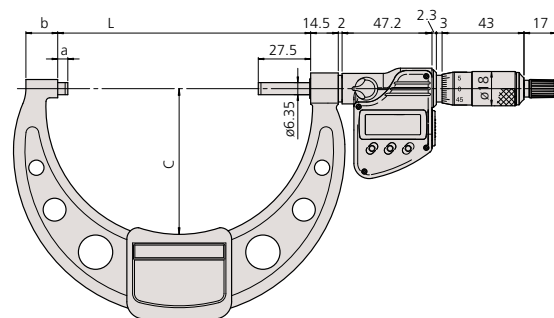


Ratchet-thimble type and friction-thimble type

Unit: mm



Ratchet stop type (over 100mm/4" to 300mm/12")



Range (Metric / Inch)	L	a	b	c	Mass (g)
0 - 25mm / 0-1"	0	2.5	9	(25)	270
25 - 50mm / 1-2"	25	2.5	9.8	(32.5)	330
50 - 75mm / 2-3"	50	2.5	12.6	(47)	470
75 - 100mm / 3-4"	75	2.5	14	(60)	625
100 - 125mm / 4-5"	132.8	5.3	16.7	(76.5)	600
125 - 150mm / 5-6"	158.2	5.7	18.8	(91)	740
150 - 175mm / 6-7"	183.6	6.1	19.1	(103.1)	800
175 - 200mm / 7-8"	208.8	6.3	18.2	(115.3)	970
200 - 225mm / 8-9"	234.2	6.7	16.8	(126.8)	1100
225 - 250mm / 9-10"	258	5.5	18	(139.8)	1270
250 - 275mm / 10-11"	284	18	28	(152.3)	1340
275 - 300mm / 11-12"	309	18	28	(166)	1540

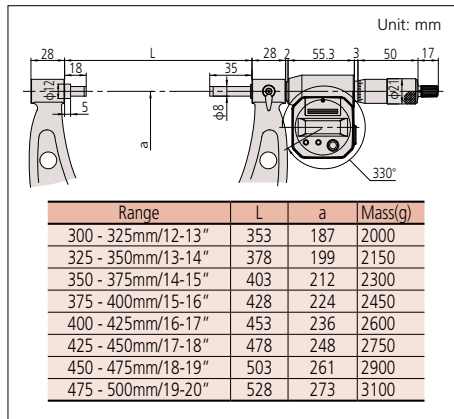
# Digimatic Micrometer

**SERIES 293**



293-582

## DIMENSIONS



## SPECIFICATIONS

Metric  With ratchet stop			
Range	Resolution	Order No.	Accuracy
300 - 325mm	0.001mm	<b>293-582</b>	±6μm
325 - 350mm	0.001mm	<b>293-583</b>	±6μm
350 - 375mm	0.001mm	<b>293-584</b>	±6μm
375 - 400mm	0.001mm	<b>293-585</b>	±7μm
400 - 425mm	0.001mm	<b>293-586</b>	±7μm
425 - 450mm	0.001mm	<b>293-587</b>	±7μm
450 - 475mm	0.001mm	<b>293-588</b>	±8μm
475 - 500mm	0.001mm	<b>293-589</b>	±8μm

Inch/Metric  With ratchet stop			
Range	Resolution	Order No.	Accuracy
12" - 13" / 304.8 - 330.2mm	.0001" / 0.001mm	<b>293-782</b>	±.0003"
13" - 14" / 330.2 - 355.6mm	.0001" / 0.001mm	<b>293-783</b>	±.0003"
14" - 15" / 355.6 - 381.0mm	.0001" / 0.001mm	<b>293-784</b>	±.0003"
15" - 16" / 381.0 - 406.4mm	.0001" / 0.001mm	<b>293-785</b>	±.00035"
16" - 17" / 406.4 - 431.8mm	.0001" / 0.001mm	<b>293-786</b>	±.00035"
17" - 18" / 431.8 - 457.2mm	.0001" / 0.001mm	<b>293-787</b>	±.00035"
18" - 19" / 457.2 - 482.6mm	.0001" / 0.001mm	<b>293-788</b>	±.0004"
19" - 20" / 482.6 - 508.0mm	.0001" / 0.001mm	<b>293-789</b>	±.0004"

## Technical Data

Accuracy: Refer to the list of specifications.  
 Resolution: .0001"/0.001mm or 0.001mm  
 Flatness: .000024" / 0.6μm  
 Parallelism: .0002"/5μm for models up to 15"/375mm  
 .00024"/6μm for models up to 19"/475mm  
 .00028"/7μm for models over 20"/500mm  
 Measuring faces: Carbide tipped  
 Display: LCD  
 Battery: SR44 (2 pcs.), **938882**  
 Battery life: Approx. 1.8 years under normal use

## Function

Preset, Zero-setting, Power ON/OFF, Data hold, Data output, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories

**959149:** SPC cable (40"/1m) Straight type  
**959150:** SPC cable (80"/2m) Straight type  
**04AZB512:** SPC cable L-type (40"/1m)  
**04AZB513:** SPC cable L-type (80"/2m)



# Digimatic Micrometer

**SERIES 293 MDC-Lite**

## FEATURES

- Provided only with zero set and in/mm (inch/metric models only) keys.
- A ratchet stop or friction thimble for a constant measuring force.
- Measurement readout with large characters on the LCD.
- No spindle clamp. No data output.
- Supplied in fitted plastic case.



293-831-30



## SPECIFICATIONS

Metric  With ratchet stop			
Range	Resolution	Order No.	Accuracy
0 - 25mm	0.001mm	<b>293-821-30</b>	±2μm

Inch/Metric  With ratchet stop			
Range	Resolution	Order No.	Accuracy
0 - 1" / 0 - 25.4mm	.00005" / 0.001mm	<b>293-831-30</b>	±.0001"

Inch/Metric  With friction thimble			
Range	Resolution	Order No.	Accuracy
0 - 1" / 0 - 25.4mm	.00005" / 0.001mm	<b>293-832-30</b>	±.0001"

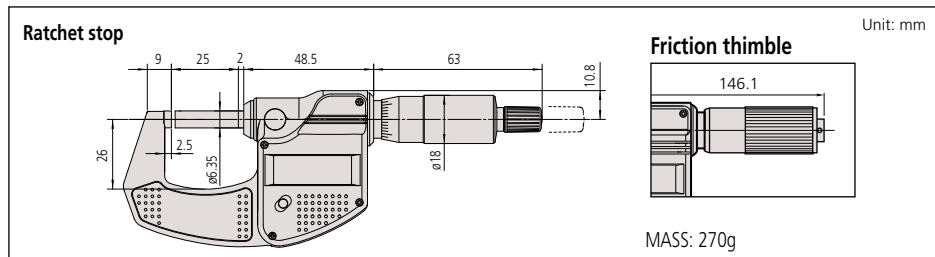
## Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: .00005"/0.001mm or 0.001mm  
 Flatness: .000012" / 0.3μm  
 Parallelism: .00008" / 2μm  
 Measuring faces: Carbide tipped  
 Display: LCD  
 Battery: SR44 (1 pc.), **938882**  
 Battery life: Approx. 2.4 years under normal use

## Function

Origin-set, Automatic power on/off, inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

## DIMENSIONS AND MASS



# MDH Micrometer

## SERIES 293 — High-Accuracy Sub-Micron Digimatic Micrometer

### Technical Data

Flatness: 0.3µm/0.00012"  
 Parallelism: 0.6µm/0.00024  
 Measuring force: 7 to 9N  
 Power supply: Lithium battery 05SAA217 (CR2032) x 1  
 Battery life: Approx. two years when used under normal conditions

### Functions

Preset (ABS measurement system)  
 Zero-setting (INC measurement system)  
 Hold, Resolution switching, Function lock, On/off, Auto power off, Measurement data output, Error alarm

### Optional Accessories

05CZA662: SPC cable with data switch (1m/40")  
 05CZA663: SPC cable with data switch (2m/80")



Function lock

Heat shield



### FEATURES

- Enabling .000005"/0.1µm resolution measurement, this micrometer is ideal for customers who need to make highly accurate measurements with a handheld tool.
- A highly rigid frame and high-performance constant-force mechanism\* enable more stable measurements, while the clicks emitted while the workpiece is being measured assure the operator that measurement is proceeding normally.
- 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 right away. With no possibility of overspeed errors, the High-Accuracy Digimatic Micrometer also delivers a high level of reliability.

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



293-130

### SPECIFICATIONS

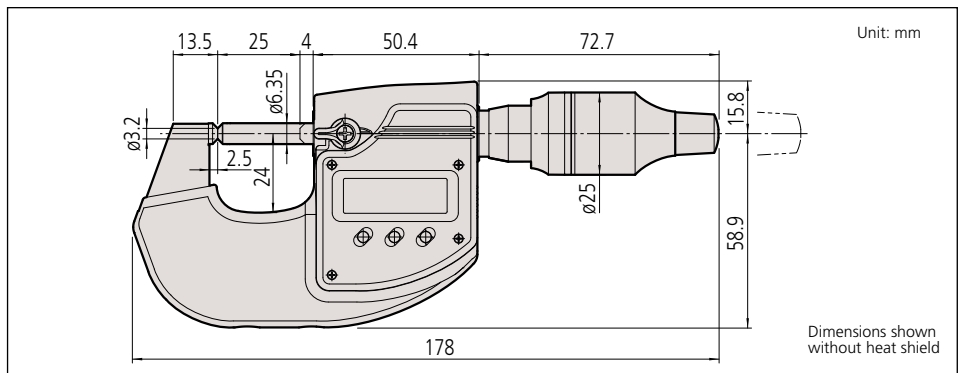
#### Metric

Order No.	Range	Resolution	Accuracy	Measuring surface	Mass
293-100	0 - 25mm	0.0001mm/0.0005mm (switchable)	±0.5µm	ø3.2mm	400g (440g w/Heat shield)

#### Inch/Metric

Order No.	Range	Resolution	Accuracy	Measuring surface	Mass
293-130	0 - 1" / 0 - 25.4mm	.000005"/.00002" / 0.0001mm/0.0005mm (switchable)	±.00002"	ø3.2mm	400g (440g w/Heat shield)

### DIMENSIONS



# QuantuMike

## SERIES 293 — Coolant-proof Micrometer

### FEATURES

- Faster measurement with 2mm per revolution instead of the standard 0.5mm.
- A patented ratchet thimble mechanism helps ensure repeatability.
- A function lock helps prevent error.
- IP-65 protection level.
- Certificate of inspection provided.
- With a standard bar except for 0-25mm/0-1" model.
- Supplied in fitted plastic case.



293-180



293-142

### SPECIFICATIONS

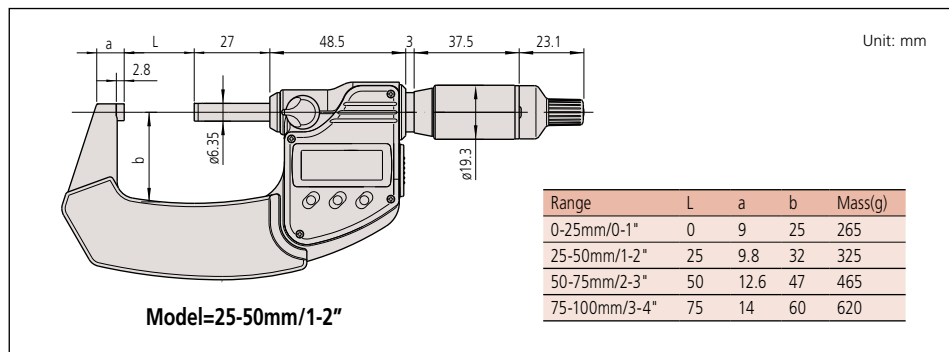
Metric			
Range	Resolution	Order No.	Accuracy
0-25mm	0.001mm	293-140	1µm
0-25mm	0.001mm	293-145*	1µm
25-50mm	0.001mm	293-141	1µm
25-50mm	0.001mm	293-146*	1µm
50-75mm	0.001mm	293-142	2µm
50-75mm	0.001mm	293-147*	2µm
75-100mm	0.001mm	293-143	2µm
75-100mm	0.001mm	293-148*	2µm

\* without SPC data output

Inch/Metric			
Range	Resolution	Order No.	Accuracy
0-1"/0 - 25.4mm	.00005"/0.001mm	293-180	.00005"
0-1"/0 - 25.4mm	.00005"/0.001mm	293-185*	.00005"
1-2"/25.4 - 50.8mm	.00005"/0.001mm	293-181	.00005"
1-2"/25.4 - 50.8mm	.00005"/0.001mm	293-186*	.00005"
2-3"/50.8 - 76.2mm	.00005"/0.001mm	293-182	.0001"
2-3"/50.8 - 76.2mm	.00005"/0.001mm	293-187*	.0001"
3-4"/76.2 - 101.6mm	.00005"/0.001mm	293-183	.0001"
3-4"/76.2 - 101.6mm	.00005"/0.001mm	293-188*	.0001"

\* without SPC data output

### DIMENSIONS AND MASS



Certificate of inspection

### Technical Data

- Accuracy: Refer to the list of specifications
- Resolution: 0.001mm or .00005"/0.001mm
- Flatness: 0.3µm/.000012"
- Parallelism: 1µm/.00004" for models up to 50mm/2"  
2µm/.00008" for models up to 100mm/4"
- Measuring force: 7-12N
- Measuring faces: Carbide tipped
- Display: LCD
- Battery: SR44 (1 pc.), 938882
- Battery life: Approx. 1.2 years under normal use  
Dust/Water protection level: IP65

### Function

- Origin-set, Zero / ABS, Hold, Function lock, Auto power on/off, Data output (output models), inch/mm conversion (on inch/metric models only)
- Alarm: Low voltage, Counting value composition error

### Optional Accessories

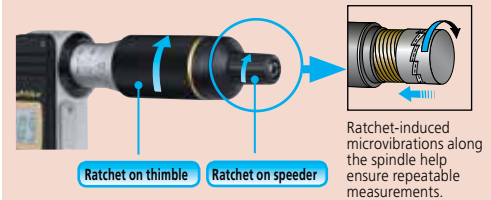
- 05CZA662: SPC cable with data switch (1m/40")
- 05CZA663: SPC cable with data switch (2m/80")



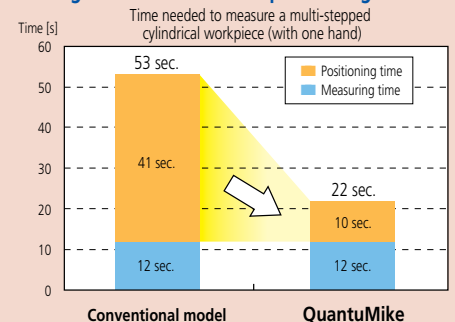
SPC cable with data switch

- 516-529-26 Inspection Gage Block Set  
Rectangular Steel Gage Block  
10 pc. blocks and 1 pc. optical parallel

- 516-319-26 Inspection Gage Block Set  
Rectangular Cera Gage Block  
10 pc. blocks and 1 pc. optical parallel



### Significant reduction in positioning time





# ABSOLUTE Digimatic Micrometers

## SERIES 227 — with Adjustable Measuring Force

### Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: .00005"/0.001mm or 0.001mm  
 Flatness: .000012" / 0.3µm  
 Parallelism: .00008" / 2µm  
 Accuracy of selected measuring force:  
 ± (0.1+selected measuring force/10)N  
 for 0.5-2.5N models  
 ± (0.4+selected measuring force/10)N  
 for 2-10N models

Measuring faces: Carbide tipped  
 Display: LCD  
 Battery: SR44 (1 pc.), **938882**  
 Battery life: Approx. 3 years under normal use  
 (1 year for .6 - 1.2" / 15-30mm, .4 - .8" /  
 10-20mm, .8-1.2" / 20-30mm range model)

### Function

Origin, Hold / Data, ON/OFF, Zero / ABS,  
 inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

### Optional Accessories

**937387:** SPC cable (40" / 1m)  
**965013:** SPC cable (80" / 2m)



### FEATURES

- Constant and low measuring force mechanism in the thimble.
- Adjustable measuring force\* accommodates various types of work materials.  
 \*0.5-2.5N or 2-10N
- The measurement-value hold function automatically retains the data at a specified measuring force, ensuring accuracy.
- Non-rotating spindle and the new ratchet friction thimble.
- Speedy spindle feed by .4"/rev and 10mm/rev for inch/metric model.
- With absolute linear scale.
- With SPC data output.
- With a standard bar to set the origin point (except for 0-15mm, 0-10mm, 0-.6", and 0-.4" models).
- Supplied in fitted plastic case.



227-201

### SPECIFICATIONS

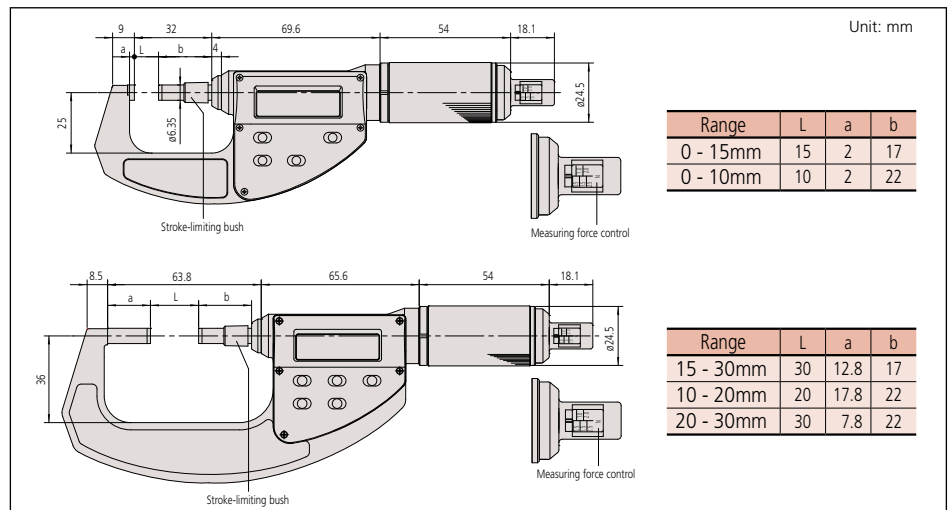
#### Metric

Order No.	Range	Resolution	Accuracy	Measuring Force	Mass(g)
227-201	0-15mm	0.001mm	±2µm	0.5-2.5 (0.5, 1.0, 1.5, 2, 2.5) N	300
227-203	15-30mm	0.001mm	±2µm	0.5-2.5 (0.5, 1.0, 1.5, 2, 2.5) N	380
227-205	0-10mm	0.001mm	±2µm	2-10 (2, 4, 6, 8, 10) N	340
227-206	10-20mm	0.001mm	±2µm	2-10 (2, 4, 6, 8, 10) N	425
227-207	20-30mm	0.001mm	±2µm	2-10 (2, 4, 6, 8, 10) N	415

#### Inch/Metric

Order No.	Range	Resolution	Accuracy	Measuring Force	Mass(g)
227-211	0-.6"	.00005"/0.001mm	±.0001"	0.5-2.5 (0.5, 1.0, 1.5, 2, 2.5) N	300
227-213	.6-1.2"	.00005"/0.001mm	±.0001"	0.5-2.5 (0.5, 1.0, 1.5, 2, 2.5) N	380
227-215	0-.4"	.00005"/0.001mm	±.0001"	2-10 (2, 4, 6, 8, 10) N	340
227-216	.4-.8"	.00005"/0.001mm	±.0001"	2-10 (2, 4, 6, 8, 10) N	425
227-217	.8-1.2"	.00005"/0.001mm	±.0001"	2-10 (2, 4, 6, 8, 10) N	415

### DIMENSIONS AND MASS



# Quickmike

## SERIES 293 — IP-54 ABSOLUTE Digimatic Micrometers

The Quickmike provides a speedy spindle feed of 10mm / .4" per thimble rotation as compared to the conventional micrometer with 0.5mm / .025" per rotation. Its wide 30mm / 1.2" measuring range allows various workpieces with different shapes to be measured quickly.

### FEATURES

- Non-rotating spindle and the new ratchet friction thimble.
- Speedy spindle feed by 10mm/rev and .4"/rev for inch/metric models.
- With absolute linear scale.
- IP54 dust/water protection (when not connected with data output cable).
- With SPC data output.
- With a standard bar to set the origin point (for models with a range over 30mm / 1.2").
- Supplied in fitted plastic case.



293-676



293-677



293-678



293-679

### SPECIFICATIONS

Metric			
Range	Resolution	Order No.	Accuracy
0 - 30mm	0.001mm	293-666	±2μm
25 - 55mm	0.001mm	293-667	±2μm
50 - 80mm	0.001mm	293-668	±3μm
75 - 105mm	0.001mm	293-669	±3μm

Inch/Metric			
Range	Resolution	Order No.	Accuracy
0 - 1.2" / 0 - 30.48mm	.00005" / 0.001mm	293-676	±.0001"
1" - 2.2" / 25.4 - 55.88mm	.00005" / 0.001mm	293-677	±.0001"
2" - 3.2" / 50.8 - 81.28mm	.00005" / 0.001mm	293-678	±.00015"
3" - 4.2" / 76.2 - 106.68mm	.00005" / 0.001mm	293-679	±.00015"

### DIMENSIONS AND MASS

Range	L	a	b	c	Mass
0 - 30mm / 0 - 1.2"	34.8	2.8	6.2	25	275
25 - 55mm / 1 - 2.2"	59.8	2.8	8.5	36	355
50 - 80mm / 2 - 3.2"	84.8	2.8	10.3	47	525
75 - 105mm / 3 - 4.2"	109.8	2.8	10.7	60	625

Unit: mm

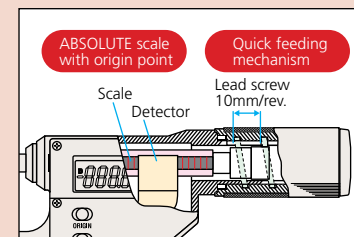


### Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: 0.001mm or .00005"/0.001mm  
 Flatness: 0.3μm / .000012"  
 Parallelism: 2μm / .00008" for models up to 80mm / 3.2"  
 3μm / .00012" for models up to 105mm / 4.2"  
 Measuring force: 5-10N  
 Measuring faces: Carbide tipped  
 Display: LCD  
 Battery: SR44 (1 pc.), 938882  
 Battery life: Approx. 3 years under normal use  
 (1 year for models over 30mm / 1.2")  
 Dust/Water protection level: IP54

### Function

Origin, Hold / Data, ON/OFF, Zero / ABS,  
 inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error



### Optional Accessories

- 937387: SPC cable (1m / 40")
- 965013: SPC cable (2m / 80")

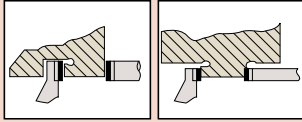


# Outside Micrometers

## SERIES 101

### Technical Data

Graduation: .0001"  
 Flatness: .000024"  
 Parallelism: .00008" for models up to 3"  
 .00012" for models over 3"  
 Measuring faces: Carbide tipped

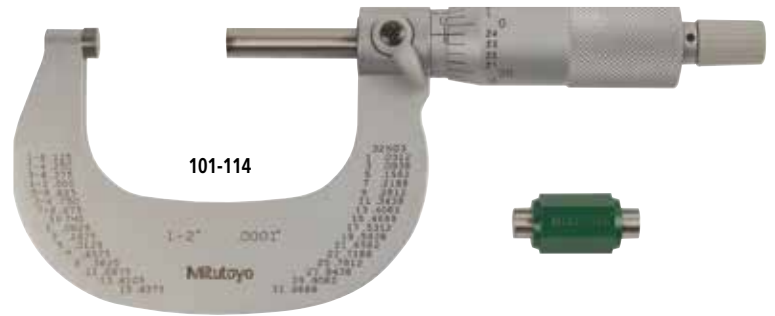


### FEATURES

- Satin chrome-finished frame, tapered (on the anvil side) for hard-to-reach places.
- With a standard bar except for 0 - 1" models.
- Supplied in fitted plastic case.



101-113



101-114

### SPECIFICATIONS

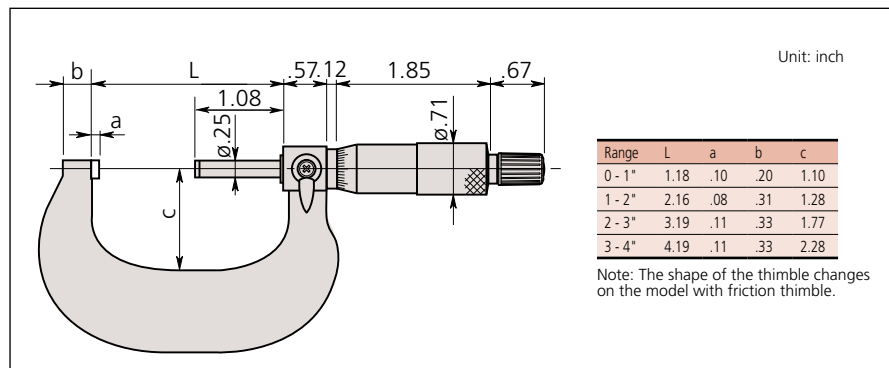
Inch		With friction thimble		
Range	Graduation	Order No.	Accuracy	Mass (g)
0 - 1"	.0001"	<b>101-117*</b>	±.0001"	180
1 - 2"	.0001"	<b>101-118*</b>	±.0001"	245

\*.0001" reading is obtained with vernier.

Inch		With ratchet stop		
Range	Graduation	Order No.	Accuracy	Mass (g)
0 - 1"	.0001"	<b>101-113*</b>	±.0001"	180
1 - 2"	.0001"	<b>101-114*</b>	±.0001"	245
2 - 3"	.0001"	<b>101-119*</b>	±.0001"	410
3 - 4"	.0001"	<b>101-120*</b>	±.00015"	550

\*.0001" reading is obtained with vernier.

### DIMENSIONS

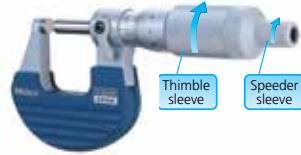


# Ratchet Thimble Micrometer

**SERIES 101, 102 — New smoother action ratchet thimble**

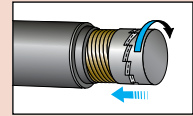
## FEATURES

- Ratchet function works both from the thimble and the speeder, allowing easy one-handed operation.
- Clearly audible ratchet operation for reassurance that measurement is being performed at constant, preset force.
- Provided with a Certificate of Inspection.
- With a standard bar except for 0 - 25mm and 0 - 1" models.
- Supplied in fitted plastic case.

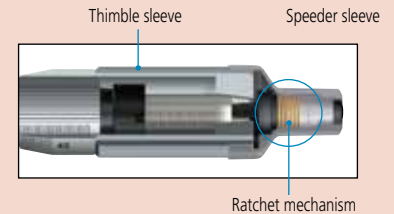


## Technical Data

Graduation: 0.01mm, 0.001mm, .001" or .0001"  
 Flatness: 0.6µm / .000024"  
 Parallelism: 2µm / .00008"  
 Measuring faces: Carbide tipped  
 Measuring force: 5-10N



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



## SPECIFICATIONS

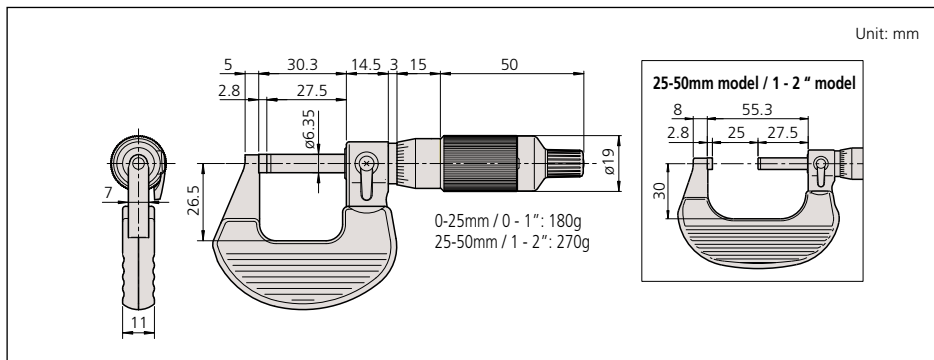
Metric			
Range	Graduation	Order No.	Accuracy
0 - 25mm	0.01mm	<b>102-701</b>	±2µm
0 - 25mm	0.001mm	<b>102-707*</b>	±2µm
25 - 50mm	0.01mm	<b>102-702</b>	±2µm
25 - 50mm	0.001mm	<b>102-708*</b>	±2µm

\*0.001mm reading is obtained with vernier.

Inch			
Range	Graduation	Order No.	Accuracy
0 - 1"	.001"	<b>101-711</b>	±.0001"
	.0001"	<b>101-717*</b>	±.0001"
	.0001"	<b>102-717*</b>	±.0001"
1 - 2"	.0001"	<b>102-718*</b>	±.0001"

\*.0001" reading is obtained with vernier.

## DIMENSIONS AND MASS





# Outside Micrometers

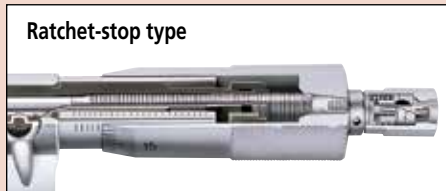
## SERIES 102

### FEATURES

- Heat-insulated frame, tapered (on the anvil side) for hard-to-reach places.
- With a standard bar except for 0 - 25mm model.
- A ratchet stop for a constant measuring force.
- Supplied in a fitted plastic case.

### Technical Data

Graduation: 0.01mm  
 Flatness: 0.3 $\mu$ m  
 Parallelism: 1 $\mu$ m for 25mm model  
                   3 $\mu$ m for models up to 100mm  
 Measuring faces: Carbide tipped



Ratchet-stop type



102-301

### SPECIFICATIONS

Metric — With ratchet stop			
Range	Graduation	Order No.	Accuracy
0 - 25mm	0.01mm	<b>102-301</b>	$\pm 2\mu$ m
25 - 50mm	0.01mm	<b>102-302</b>	$\pm 2\mu$ m
50 - 75mm	0.01mm	<b>102-303</b>	$\pm 2\mu$ m
75 - 100mm	0.01mm	<b>102-304</b>	$\pm 3\mu$ m

Metric — Micrometer set 0.01mm Graduation model		
Range	Order No.	Included in set
0 - 100mm (4 pcs/set)	<b>102-911-40</b>	<ul style="list-style-type: none"> <li>• 102-301</li> <li>• 102-302</li> <li>• 102-303</li> <li>• 102-304</li> <li>• 3 micrometer standards</li> </ul>

### DIMENSIONS AND MASS

Unit: mm

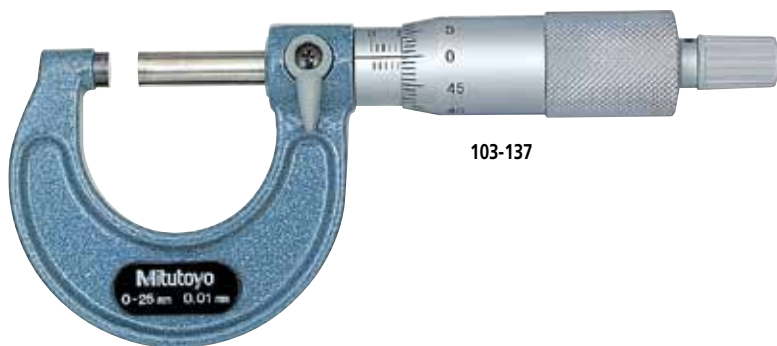
Range	L	a	b	c	d	Mass (g)
0 - 25mm	30.3	2.8	5	26	6.35	180
25 - 50mm	55.3	2.8	8	32	6.35	270
50 - 75mm	80.3	2.8	9	45	6.35	375
75 - 100mm	105.3	2.8	10	58	6.35	490

# Outside Micrometers

## SERIES 103

### FEATURES

- Hammertone, baked-enamel-finished frame.
- Ratchet stop for exact repetitive readings.
- With a standard bar except for 0-25mm model.



103-137



### Technical Data

Graduation: 0.01mm, 0.001mm  
 Flatness: 0.6 μm for models up to 300mm/12"  
 1 μm for models over 300mm/12"  
 Parallelism: (2+R/100)μm, R=max. range (mm)  
 Measuring faces: Carbide tipped

### SPECIFICATIONS

**Metric** With ratchet stop

Range	Order No.	Accuracy	Mass (g)
0 - 25mm	103-137	±2μm	175
	103-129*	±2μm	175
25 - 50mm	103-138	±2μm	215
	103-130*	±2μm	215
50 - 75mm	103-139-10	±2μm	315
75 - 100mm	103-140-10	±3μm	375
100 - 125mm	103-141-10	±3μm	515
125 - 150mm	103-142-10	±3μm	665
150 - 175mm	103-143-10	±4μm	720
175 - 200mm	103-144-10	±4μm	920
200 - 225mm	103-145-10	±4μm	1080
225 - 250mm	103-146-10	±5μm	1255
250 - 275mm	103-147-10	±5μm	1405
275 - 300mm	103-148-10	±5μm	1565
300 - 325mm	103-149	±6μm	1985
325 - 350mm	103-150	±6μm	2155
350 - 375mm	103-151	±6μm	2305
375 - 400mm	103-152	±7μm	2455
400 - 425mm	103-153	±7μm	2715
425 - 450mm	103-154	±7μm	2965
450 - 475mm	103-155	±8μm	3215
475 - 500mm	103-156	±8μm	3450

(Models with a range up to 1000mm are available.)

\*0.001mm reading is obtained with vernier.

### DIMENSIONS AND MASS

Up to 300mm / 12"

Over 300mm / 12"

Range	L	a	b	c
0 - 25mm / 0 - 1"	30.3	2.8	9	28
25 - 50mm / 1 - 2"	55.3	2.8	10	38
50 - 75mm / 2 - 3"	80.3	2.8	12	49
75 - 100mm / 3 - 4"	105.3	2.8	14	60
100 - 125mm / 4 - 5"	132.8	5.3	17	79
125 - 150mm / 5 - 6"	158.2	5.7	19	94
150 - 175mm / 6 - 7"	183.6	6.1	20	106
175 - 200mm / 7 - 8"	208.8	6.3	19	118
200 - 225mm / 8 - 9"	234.2	6.7	18	130
225 - 250mm / 9 - 10"	258	5.5	18	143
250 - 275mm / 10 - 11"	284	6.5	18	156
275 - 300mm / 11 - 12"	309	6.5	18	169

Range	L	a	b	c
300 - 325mm / 12-13"	353	18	28	187
325 - 350mm / 13-14"	378	18	28	199
350 - 375mm / 14-15"	403	18	28	212
375 - 400mm / 15-16"	428	18	28	224
400 - 425mm / 16-17"	453	18	28	236
425 - 450mm / 17-18"	478	18	28	248
450 - 475mm / 18-19"	503	18	28	261
475 - 500mm / 19-20"	528	18	28	273

**Metric** Micrometer set

Range	Order No.	Included in set	Mass (g)
0 - 75mm (3 pc. set)	103-927-10	103-137, 103-138, 103-139-10, 2 micrometer standards	750
0 - 150mm (6 pc. set)	103-913-50	103-137, 103-138, 103-139-10, 103-140-10, 103-141-10, 103-142-10, 5 micrometer standards	2260
150 - 300mm (6 pc. set)	103-915-10	103-143-10, 103-144-10, 103-145-10, 103-146-10, 103-147-10, 103-148-10, 6 micrometer standards	7695
0 - 300mm (12 pc. set)	103-914-50	All micrometers of 103-913-50 and 103-915-10 in one set, 11 micrometer standards	9300



# Outside Micrometers

## SERIES 103— Inch Models

### FEATURES

- Hammertone, baked-enamel-finished frame.
- Ratchet stop or friction thimble for exact repetitive readings.
- With a standard bar except for 0-1" model.



### Technical Data (Inch Model)

Accuracy: Refer to the list of specifications

Graduation: .001" or .0001"

Flatness: .000024" for models up to 12"  
.00004" for models over 12"

Parallelism: [.00008 + .00004 (L/4)]" L= max range (inch)

Measuring faces: Carbide tipped

### SPECIFICATIONS

**Inch** \_\_\_\_\_ With ratchet stop

Range	Graduation	Order No.	Accuracy	Mass (g)
0 - 1"	.001"	<b>103-177</b>	±.0001"	175
1 - 2"	.001"	<b>103-178</b>	±.0001"	215
2 - 3"	.001"	<b>103-179</b>	±.0001"	315
3 - 4"	.001"	<b>103-180</b>	±.00015"	375
4 - 5"	.001"	<b>103-181</b>	±.00015"	515
5 - 6"	.001"	<b>103-182</b>	±.00015"	665
6 - 7"	.001"	<b>103-183</b>	±.0002"	720
7 - 8"	.001"	<b>103-184</b>	±.0002"	920
8 - 9"	.001"	<b>103-185</b>	±.0002"	1080
9 - 10"	.001"	<b>103-186</b>	±.00025"	1255
10 - 11"	.001"	<b>103-187</b>	±.00025"	1405
11 - 12"	.001"	<b>103-188</b>	±.00025"	1565
12 - 13"	.001"	<b>103-189</b>	±.0003"	1985
13 - 14"	.001"	<b>103-190</b>	±.0003"	2155
14 - 15"	.001"	<b>103-191</b>	±.0003"	2305
15 - 16"	.001"	<b>103-192</b>	±.00035"	2455
16 - 17"	.001"	<b>103-193</b>	±.00035"	2715
17 - 18"	.001"	<b>103-194</b>	±.00035"	2965
18 - 19"	.001"	<b>103-195</b>	±.0004"	3215
19 - 20"	.001"	<b>103-196</b>	±.0004"	3450
20 - 21"	.001"	<b>103-197</b>	±.0004"	4060
21 - 22"	.001"	<b>103-198</b>	±.00045"	4080
22 - 23"	.001"	<b>103-199</b>	±.00045"	4500
23 - 24"	.001"	<b>103-200</b>	±.00045"	4525
24 - 25"	.001"	<b>103-201</b>	±.0005	4915
25 - 26"	.001"	<b>103-202</b>	±.0005"	4930
26 - 27"	.001"	<b>103-203</b>	±.0005"	5200
27 - 28"	.001"	<b>103-204</b>	±.00055"	5215
28 - 29"	.001"	<b>103-205</b>	±.00055"	5835
29 - 30"	.001"	<b>103-206</b>	±.00055"	5860
30 - 31"	.001"	<b>103-207</b>	±.0006"	6385
31 - 32"	.001"	<b>103-208</b>	±.0006"	6410
32 - 33"	.001"	<b>103-209</b>	±.0006"	6925
33 - 34"	.001"	<b>103-210</b>	±.00065"	6940
34 - 35"	.001"	<b>103-211</b>	±.00065"	7565
35 - 36"	.001"	<b>103-212</b>	±.00065"	7590
36 - 37"	.001"	<b>103-213</b>	±.0007"	8215
37 - 38"	.001"	<b>103-214</b>	±.0007"	8240
38 - 39"	.001"	<b>103-215</b>	±.0007"	8860
39 - 40"	.001"	<b>103-216</b>	±.00075"	8880

**Inch** \_\_\_\_\_ With friction thimble

Range	Graduation	Order No.	Accuracy	Mass (g)
0 - 1"	.0001"	<b>103-135*</b>	±.0001"	175
1 - 2"	.0001"	<b>103-136*</b>	±.0001"	215

\* .0001" Reading is obtained with vernier

**Inch** \_\_\_\_\_ With ratchet stop

Range	Graduation	Order No.	Accuracy	Mass (g)
0 - 1"	.0001"	<b>103-131*</b>	±.0001"	175
1 - 2"	.0001"	<b>103-132*</b>	±.0001"	215
2 - 3"	.0001"	<b>103-217*</b>	±.0001"	315
3 - 4"	.0001"	<b>103-218*</b>	±.00015"	375
4 - 5"	.0001"	<b>103-219*</b>	±.00015"	515
5 - 6"	.0001"	<b>103-220*</b>	±.00015"	665
6 - 7"	.0001"	<b>103-221*</b>	±.0002"	720
7 - 8"	.0001"	<b>103-222*</b>	±.0002"	920
8 - 9"	.0001"	<b>103-223*</b>	±.0002"	1080
9 - 10"	.0001"	<b>103-224*</b>	±.00025"	1255
10 - 11"	.0001"	<b>103-225*</b>	±.00025"	1405
11 - 12"	.0001"	<b>103-226*</b>	±.00025"	1565

\* .0001" Reading is obtained with vernier

**Inch** \_\_\_\_\_ With Tapered Frame and Ratchet Stop

Range	Graduation	Order No.	Accuracy	Mass (g)
0-1"	.001"	<b>103-259</b>	±.0001"	175
0-1"	.0001"	<b>103-260*</b>	±.0001"	175
1-2"	.0001"	<b>103-262*</b>	±.0001"	215

\* .0001" Reading is obtained with vernier

# Outside Micrometers

## SERIES 103 — Inch model set

Inch		Micrometer Set .001" Graduation Model	
Range	Order No.	Included in set	Mass (g)
0 - 3" (3pcs./set)	<b>103-929</b>	103-177, 103-178, 103-179, 2 Micrometer Standards	750
0 - 4" (4pcs./set)	<b>103-930</b>	103-177, 103-178, 103-179, 103-180, 3 Micrometer Standards	1600
0 - 6" (6pcs./set)	<b>103-904-10</b>	103-177, 103-178, 103-179, 103-180, 103-181, 103-182, 5 Micrometer Standards	2200
0 - 12" (12pcs./set)	<b>103-905-10</b>	103-177, 103-178, 103-179, 103-180, 103-181, 103-182, 103-183, 103-184, 103-185, 103-186, 103-187, 103-188, 11 Micrometer Standards	9000
6 - 12" (6pcs./set)	<b>103-906</b>	103-183, 103-184, 103-185, 103-186, 103-187, 103-188, 6 Micrometer Standards	7695



103-905-10

Inch		Micrometer Set .0001" Graduation Model	
Range	Order No.	Included in set	Mass (g)
0 - 3" (3pcs./set)	<b>103-922</b>	103-135, 103-136, 103-217, 2pcs. Micrometer Standards	705
0 - 4" (4pcs./set)	<b>103-931</b>	103-135, 103-136, 103-217, 103-218, 3pcs. Micrometer Standards	1600
0 - 6" (6pcs./set)	<b>103-907-40</b>	103-135, 103-136, 103-217, 103-218, 103-219, 103-220, 5 Micrometer Standards	2200
0 - 12" (12pcs./set)	<b>103-908-40</b>	103-135, 103-136, 103-217, 103-218, 103-219, 103-220, 103-221, 103-222, 103-223, 103-224, 103-225, 103-226, 11pcs. Micrometer Standards	9000
6 - 12" (6pcs./set)	<b>103-909</b>	103-221, 103-222, 103-223, 103-224, 103-225, 103-226, 6pcs. Micrometer Standards	6945



103-904-10



# Outside Micrometers

**SERIES 340, 104 — with Interchangeable Anvils, Inch model**

## FEATURES

- IP65 water/dust protection (Series 340\*).  
\*Models with a range up to 12" / 300mm.
- Wide measuring range with interchangeable anvils.
- With a ratchet stop for constant force.
- Supplied with zero-setting standards bar for each range.
- With SPC output (Series 340).
- Supplied in fitted wooden case.

## Technical Data

Accuracy:  $\pm[.00016" + .00004 (L/3)"]$  L = Max Range (Inch)  
 Resolution\*: .0001"/0.001mm  
 (340-351-30: .00005"/0.001mm)  
 Graduation\*\*: .001" (104-165: is .0001")  
 Flatness: .000024" for models up to 12"  
 .00004" for models over 12"  
 Parallelism: .00008" for models up to 3"  
 .00012" for models up to 6"  
 $\pm[.00008" + .00004 (L/4)"]$  L= Max range (inch)  
 Measuring faces: Carbide tipped (spindle only)  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years (1.8 years for models over 300mm) years under normal use  
 Dust/Water protection level\*: IP65 (up to 12" / 300mm)  
 \*Digital models \*\*Analog models

## Function of Digital Model

Zero / ABS, Data hold, Preset, Data output, inch/mm conversion (on inch/metric models only)  
 Function Lock, 2 Presets  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories for Digital Model

- 05CZA662:** SPC cable with data switch (40" / 1m)
  - 05CZA663:** SPC cable with data switch (80" / 2m)
  - 959149:** SPC cable Straight type (40"/1m)\*
  - 959150:** SPC cable Straight type (80"/2m)\*
  - 04AZB512:** SPC cable L-type (40"/1m)\*
  - 04AZB513:** SPC cable L-type (80"/2m)\*
- \* models over 300mm



## SPECIFICATIONS

Inch/Metric		Digital model		
Range	Resolution	Order No.	Mass (kg)	Remarks
0-6" / 0-152.4mm	.00005" / 0.001mm	<b>340-351-30</b>	0.96	with 6 anvils & 5 standards
6-12" / 152.4 - 304.8mm	.0001" / 0.001mm	<b>340-352-30</b>	1.88	with 6 anvils & 6 standards
12-18" / 304.8 - 457.2mm	.0001" / 0.001mm	<b>340-720</b>	4.75	with 6 anvils & 6 standards
18-24" / 457.2 - 609.6mm	.0001" / 0.001mm	<b>340-721</b>	6.62	with 6 anvils & 6 standards
24-30" / 609.6 - 762.0mm	.0001" / 0.001mm	<b>340-722</b>	10.06	with 6 anvils & 6 standards
30-36" / 762.0 - 914.4mm	.0001" / 0.001mm	<b>340-723</b>	11.98	with 6 anvils & 6 standards

Inch				
Range	Graduation	Order No.	Mass(kg)	Remarks
0-2"	.0001"	<b>104-165*</b>	0.32	with 1" anvil & 1 standard
0-6"	.001"	<b>104-137</b>	1.35	with 6 anvils & 5 standards
6-12"	.001"	<b>104-138</b>	2.65	with 6 anvils & 6 standards
12-16"	.001"	<b>104-152</b>	3.31	with 4 anvils & 4 standards
12-18"	.001"	<b>104-201</b>	4.69	with 6 anvils & 6 standards
16-20"	.001"	<b>104-153</b>	4.81	with 4 anvils & 4 standards
18-24"	.001"	<b>104-202</b>	6.51	with 6 anvils & 6 standards
20-24"	.001"	<b>104-154</b>	6.35	with 4 anvils & 4 standards
24-28"	.001"	<b>104-155</b>	7.72	with 4 anvils & 4 standards
24-30"	.001"	<b>104-203</b>	9.95	with 6 anvils & 6 standards
28-32"	.001"	<b>104-156</b>	9.08	with 4 anvils & 4 standards
30-36"	.001"	<b>104-204</b>	11.87	with 6 anvils & 6 standards
32-36"	.001"	<b>104-157</b>	10.41	with 4 anvils & 4 standards
36-40"	.001"	<b>104-158</b>	11.78	with 4 anvils & 4 standards
36-42"	.001"	<b>104-205</b>	13.68	with 6 anvils & 6 standards

\*.0001" reading is obtained with vernier.

# Outside Micrometers

**SERIES 340, 104 — with Interchangeable Anvils, Metric Model**



## FEATURES

- IP65 water/dust protection (Series 340\*).  
\*Models with a range up to 300mm.
- Wide measuring range with interchangeable anvils.
- With a ratchet stop for constant force.
- Supplied with zero-setting standards bar for each range.
- With SPC output (Series 340).
- Supplied in fitted wooden case.

### Digital model



## SPECIFICATIONS

**Metric** Digital model

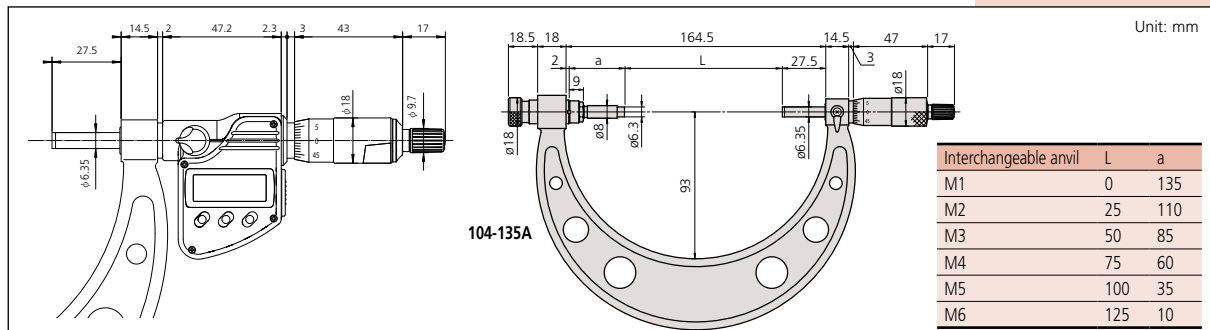
Range	Resolution	Order No.	Mass (kg)	Remarks
0 - 150mm	0.001mm	<b>340-251-30</b>	0.96	with 6 anvils & 5 standards
150 - 300mm	0.001mm	<b>340-252-30</b>	1.88	with 6 anvils & 6 standards
300 - 400mm	0.001mm	<b>340-520</b>	3.31	with 4 anvils & 4 standards
400 - 500mm	0.001mm	<b>340-521</b>	4.81	with 4 anvils & 4 standards
500 - 600mm	0.001mm	<b>340-522</b>	6.35	with 4 anvils & 4 standards
600 - 700mm	0.001mm	<b>340-523</b>	7.72	with 4 anvils & 4 standards
700 - 800mm	0.001mm	<b>340-524</b>	9.08	with 4 anvils & 4 standards
800 - 900mm	0.001mm	<b>340-525</b>	10.41	with 4 anvils & 4 standards
900 - 1000mm	0.001mm	<b>340-526</b>	11.78	with 4 anvils & 4 standards

**Metric**

Range	Graduation	Order No.	Mass (kg)	Remarks
0 - 50mm	0.01mm	<b>104-171*</b>	0.32	with 2 anvils & 1 standard
0 - 100mm	0.01mm	<b>104-139A</b>	0.79	with 4 anvils & 3 standards
0 - 150mm	0.01mm	<b>104-135A</b>	1.35	with 6 anvils & 5 standards
50 - 150mm	0.01mm	<b>104-161A</b>	1.35	with 4 anvils & 4 standards
100 - 200mm	0.01mm	<b>104-140A</b>	1.38	with 4 anvils & 4 standards
150 - 300mm	0.01mm	<b>104-136A</b>	2.65	with 6 anvils & 6 standards
200 - 300mm	0.01mm	<b>104-141A</b>	2.22	with 4 anvils & 4 standards
300 - 400mm	0.01mm	<b>104-142A</b>	3.31	with 4 anvils & 4 standards
400 - 500mm	0.01mm	<b>104-143A</b>	4.81	with 4 anvils & 4 standards
500 - 600mm	0.01mm	<b>104-144A</b>	6.35	with 4 anvils & 4 standards
600 - 700mm	0.01mm	<b>104-145A</b>	7.72	with 4 anvils & 4 standards
700 - 800mm	0.01mm	<b>104-146A</b>	9.08	with 4 anvils & 4 standards
800 - 900mm	0.01mm	<b>104-147A</b>	10.41	with 4 anvils & 4 standards
900 - 1000mm	0.01mm	<b>104-148A</b>	11.78	with 4 anvils & 4 standards

\*The frame is in a heat-insulated cover.

## DIMENSIONS



### Technical Data

Accuracy:  $\pm(4+R/75)\mu\text{m}$ , R=max. range (mm)  
 Resolution\*: 0.001mm  
 Graduation\*\*\*: 0.01mm  
 Flatness: 0.6 $\mu\text{m}$  for models up to 300mm  
 1 $\mu\text{m}$  for models over 300mm  
 Parallelism: 2 $\mu\text{m}$  for models up to 75mm  
 3 $\mu\text{m}$  for models up to 150mm  
 (2+R/100) $\mu\text{m}$  for models over 150mm, R=max. range (mm)

Measuring faces: Carbide tipped (spindle only)  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years (1.8 years for models over 300mm) years under normal use  
 Dust/Water protection level\*: IP65 (up to 300mm)  
 \*Digital models \*\*Analog models

### Function of Digital Model

Zero / ABS, Data hold, Preset, Data output, inch/mm conversion (on inch/metric models only)  
 Function Lock, 2 Presets  
 Alarm: Low voltage, Counting value composition error

### Optional Accessories for Digital Model

**05CZA662**: SPC cable with data switch (40" / 1m)  
**05CZA663**: SPC cable with data switch (80" / 2m)  
**959149**: SPC cable Straight type (40"/1m)\*  
**959150**: SPC cable Straight type (80"/2m)\*  
**04AZB512**: SPC cable L-type (40"/1m)\*  
**04AZB513**: SPC cable L-type (80"/2m)\*  
 \* models over 300mm



# Outside Micrometers

## SERIES 105 — with Extension Anvil Collars

### Technical Data

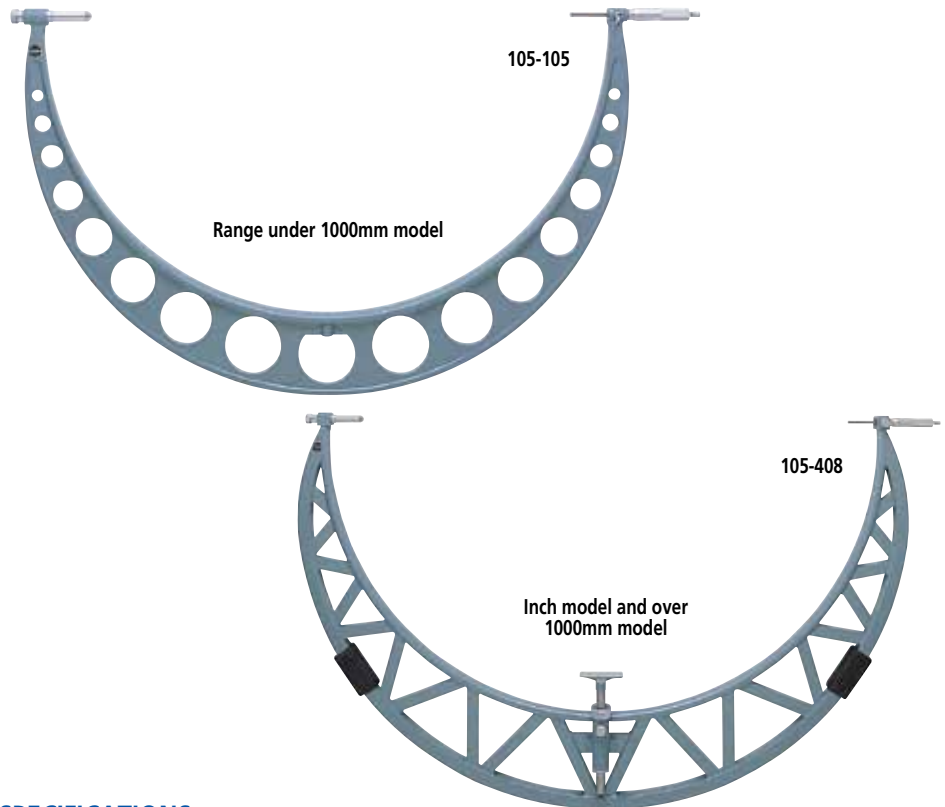
Accuracy:  $\pm(6+R/75)\mu\text{m}$ , R=max. range (mm)  
 Graduation: .001" / 0.01mm  
 Flatness: .000052" / 1.3 $\mu\text{m}$   
 Parallelism: [.00016" + .00004 (L/4)"] L=max. range (inch)  
 (2+R/100) $\mu\text{m}$ , R=max. range (mm)  
 Measuring faces: Carbide tipped

### Extension anvil collar



### FEATURES

- Wide measuring range with extension anvil collars.
- 50mm spindle stroke.
- With ratchet stop for constant force.
- Supplied with zero-setting standards bar for each range.
- Square and round pipes are combined for light weight and rigid frame (for models over 1000mm range).
- Workpiece stopper (for models over 1000mm range).
- Supplied in a fitted wooden case.



### SPECIFICATIONS

Metric			
Range	Order No.	Extension collars	Mass (kg)
500 - 600mm	<b>105-103</b>	50mm	5.53
600 - 700mm	<b>105-104</b>	50mm	6.35
700 - 800mm	<b>105-105</b>	50mm	7.17
800 - 900mm	<b>105-106</b>	50mm	7.99
900 - 1000mm	<b>105-107</b>	50mm	8.81
1000 - 1100mm	<b>105-408</b>	50mm	6.37
1100 - 1200mm	<b>105-409</b>	50mm	7.08
1000 - 1200mm	<b>105-418</b>	50mm, 100mm	13.77
1200 - 1300mm	<b>105-410</b>	50mm	7.79
1300 - 1400mm	<b>105-411</b>	50mm	8.50
1200 - 1400mm	<b>105-419</b>	50mm, 100mm	15.77
1400 - 1500mm	<b>105-412</b>	50mm	9.21
1500 - 1600mm	<b>105-413</b>	50mm	10.17
1400 - 1600mm	<b>105-420</b>	50mm, 100mm	17.91
1600 - 1700mm	<b>105-414</b>	50mm	11.13
1700 - 1800mm	<b>105-415</b>	50mm	12.09
1600 - 1800mm	<b>105-421</b>	50mm, 100mm	20.80
1800 - 1900mm	<b>105-416</b>	50mm	13.05
1900 - 2000mm	<b>105-417</b>	50mm	14.01
1800 - 2000mm	<b>105-422</b>	50mm, 100mm	22.76

Inch			
Range	Order No.	Extension collars	Mass (kg)
40 - 44"	<b>105-428</b>	2"	10.0
44 - 48"	<b>105-429</b>	2"	10.9
48 - 52"	<b>105-430</b>	2"	11.4
52 - 56"	<b>105-431</b>	2"	11.9
56 - 60"	<b>105-432</b>	2"	12.6
60 - 64"	<b>105-433</b>	2"	13.2
64 - 68"	<b>105-434</b>	2"	14.1
68 - 72"	<b>105-435</b>	2"	14.9
72 - 76"	<b>105-436</b>	2"	15.8
76 - 80"	<b>105-437</b>	2"	16.7

# Outside Micrometers

## SERIES 406 — Non-Rotating Spindle Type



### FEATURES

- With a standard bar except for 0 - 1" / 0 - 25mm model.
- With SPC output.
- Supplied in a fitted plastic case.
- Non-slip grip finish

### Technical Data

Accuracy: Refer to the list of specifications  
 Resolution: .00005"/0.001mm or 0.001mm  
 Flatness: 0.3µm / .000012"  
 Parallelism: .00012"/3µm for models up to 3"/75mm  
 .00016"/4µm for 4"/100mm models  
 Measuring faces: Carbide tipped  
 Display: LCD  
 Battery: SR44 (1 pc.), **938882**  
 Battery life: Approx. 2.4 years under normal use

### Function of Digital Model

Origin-set, Zero / ABS, Data hold, Data output, inch/mm conversion (on inch/metric models only)  
 Function lock  
 Alarm: Low voltage, Counting value composition error

### Optional Accessories for Digital Model

- 05CZA662:** SPC cable with data switch (40" / 1m)
- 05CZA663:** SPC cable with data switch (80" / 2m)

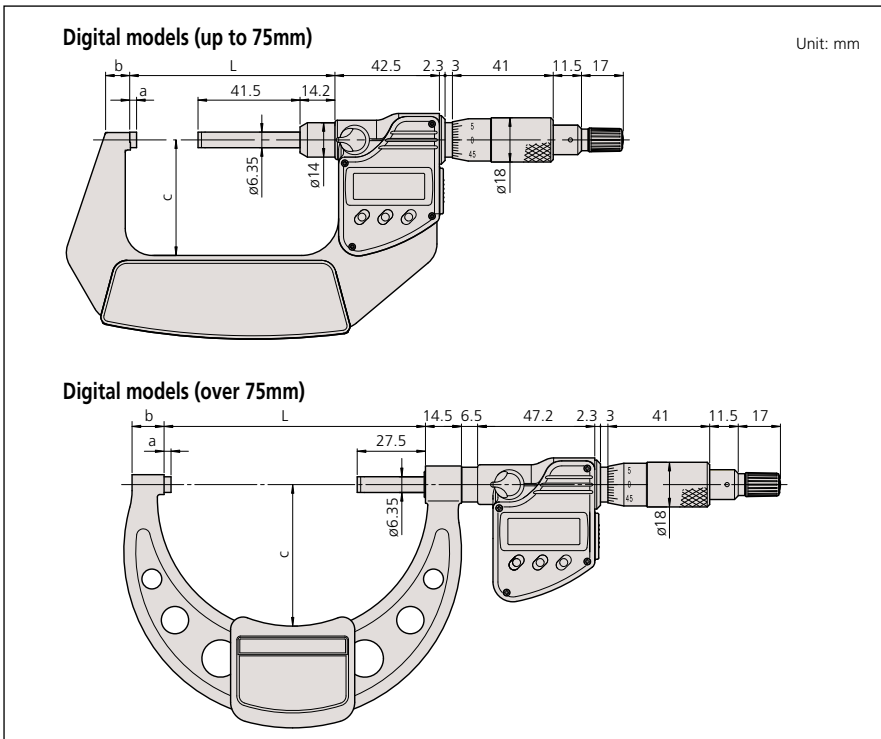


### SPECIFICATIONS

Metric		Digital model with ratchet stop	
Range	Resolution	Order No.	Accuracy
0 - 25mm	0.001mm	<b>406-250-30</b>	±3µm
25 - 50mm	0.001mm	<b>406-251-30</b>	±3µm
50 - 75mm	0.001mm	<b>406-252-30</b>	±3µm
75 - 100mm	0.001mm	<b>406-253-30</b>	±4µm

Inch/Metric		Digital model with ratchet stop	
Range	Resolution	Order No.	Accuracy
0 - 1"/0 - 25.4mm	.00005"/0.001mm	<b>406-350-30</b>	±.00015"
1 - 2"/25.4 - 50.8mm	.00005"/0.001mm	<b>406-351-30</b>	±.00015"
2 - 3"/50.8 - 72.6mm	.00005"/0.001mm	<b>406-352-30</b>	±.00015"
3 - 4"/76.2 - 101.6mm	.00005"/0.001mm	<b>406-353-30</b>	±.0002"

### DIMENSIONS AND MASS



# Outside Micrometers

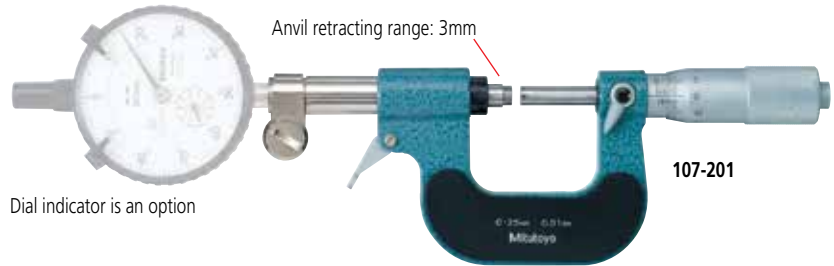
## SERIES 107

### FEATURES

- Uses dial indicator for direct go/no-go judgment for mass-produced parts.
- Anvil retracting trigger for quick measurement.
- With a standard bar except for 0 - 25mm models.
- Supplied in fitted plastic case.

### Technical Data

Graduation: 0.01mm (thimble)  
 Flatness: 0.6 $\mu$ m  
 Parallelism: (2+R/100) $\mu$ m, R=max. range (mm)  
 Measuring faces: Carbide tipped



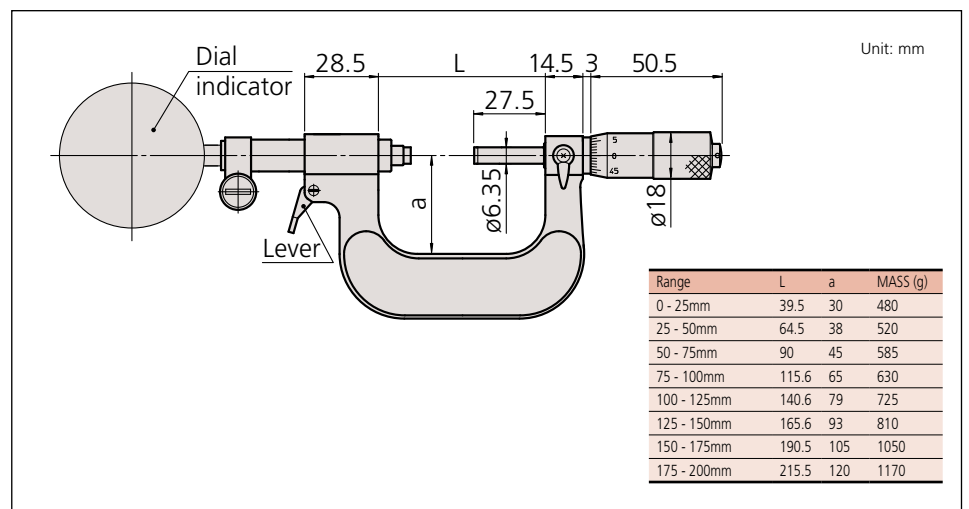
Dial indicator is an option

### SPECIFICATIONS

#### Metric

Range	Graduation	Order No.	Accuracy
0 - 25mm	0.01mm	<b>107-201</b>	$\pm 2\mu$ m
25 - 50mm	0.01mm	<b>107-202</b>	$\pm 2\mu$ m
50 - 75mm	0.01mm	<b>107-203</b>	$\pm 2\mu$ m
75 - 100mm	0.01mm	<b>107-204</b>	$\pm 3\mu$ m
100 - 125mm	0.01mm	<b>107-205</b>	$\pm 3\mu$ m
125 - 150mm	0.01mm	<b>107-206</b>	$\pm 3\mu$ m
150 - 175mm	0.01mm	<b>107-207</b>	$\pm 4\mu$ m
175 - 200mm	0.01mm	<b>107-208</b>	$\pm 4\mu$ m

### DIMENSIONS AND MASS



# Spline Micrometers

**SERIES 331, 111**



## FEATURES

- IP65 water/dust protection (Series 331).
- The anvil and spindle have a small diameter for measuring splined shafts, slots, and keyways.
- Non-slip grip finish (digital models)
- With ratchet stop for constant force.
- With SPC output (Series 331).
- With a standard bar except 0-1" and 0-25mm model.
- Supplied in fitted plastic case.



## SPECIFICATIONS

Metric		Digital model			
Range	Resolution	Order No.	Accuracy	Remarks	Mass (g)
0 - 25mm	0.001mm	331-251-30	±2µm	Type A	330
		331-261-30	±2µm	Type B	330
25 - 50mm	0.001mm	331-252-30	±2µm	Type A	470
		331-262-30	±2µm	Type B	470
50 - 75mm	0.001mm	331-253-30	±2µm	Type A	625
		331-263-30	±2µm	Type B	625
75 - 100mm	0.001mm	331-254-30	±3µm	Type A	565
		331-264-30	±3µm	Type B	565

Metric					
Range	Graduation	Order No.	Accuracy	Remarks	Mass (g)
0 - 25mm	0.01mm	111-115	±3µm	Type A	205
		111-215	±3µm	Type B	205
25 - 50mm	0.01mm	111-116	±3µm	Type A	305
		111-117	±3µm	Type A	370
50 - 75mm	0.01mm	111-118	±4µm	Type A	500
		111-119	±4µm	Type A	655
125 - 150mm	0.01mm	111-120	±4µm	Type A	710
		111-121	±5µm	Type A	900
175 - 200mm	0.01mm	111-122	±5µm	Type A	1040

Inch/Metric		Digital model			
Range	Resolution	Order No.	Accuracy	Remarks	Mass (g)
0 - 1" / 0 - 25.4mm	.00005" / 0.001mm	331-351-30	±.0001"	Type A	330
		331-361-30	±.0001"	Type B	330
1 - 2" / 25.4-50.8mm	.00005" / 0.001mm	331-352-30	±.0001"	Type A	470
		331-362-30	±.0001"	Type B	470
2 - 3" / 50.8-76.2mm	.00005" / 0.001mm	331-353-30	±.0001"	Type A	625
		331-363-30	±.0001"	Type B	625
3 - 4" / 76.2-101.6mm	.00005" / 0.001mm	331-354-30	±.00015"	Type A	565
		331-364-30	±.00015"	Type B	565

Inch					
Range	Graduation	Order No.	Accuracy	Remarks	Mass (g)
0 - 1"	.0001"	111-166*	±.00015"	Type A	205

\*.0001" reading is obtained with vernier.

## Technical Data

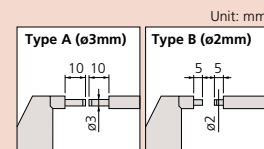
Accuracy: Refer to the list of specifications  
 Resolution\*: .00005"/0.001mm or 0.001mm  
 Graduation\*\*: .0001" or 0.01mm, .001"  
 Flatness: .000012" / 0.3µm  
 Parallelism: (2+R/100)µm, R=max. range (mm) [0.00008" + .00004" (L/4")]  
 L = max. range (inch)  
 Measuring faces: Carbide tipped  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years under normal use  
 Dust/Water protection level\*: IP65  
 \*Digital models \*\*Analog models

## Function of Digital Model

Origin-set, Zero-setting, Data hold, Data output, inch/mm conversion (on inch/metric models only)  
 Function lock  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories for Digital Model

**05CZA662**: SPC cable with data switch (40" / 1m)  
**05CZA663**: SPC cable with data switch (80" / 2m)



## DIMENSIONS

**Models up to 75mm**

**Digital model**

**Models over 75mm**

**Digital model**

Unit: mm

Range	L	a	b	c
0 - 25mm	58.2 (55.3)	17.5 (17.8)	7.3 (10)	32 (38)
25 - 50mm	83.2 (80.3)	17.5 (17.8)	10.1 (12)	47 (49)
50 - 75mm	108.2 (105.3)	20.3 (17.8)	11.5 (14)	60 (60)
75 - 100mm	132.8 (132.8)	20.3 (20.3)	16.7 (17)	76.5 (79)



# Point Micrometers

**SERIES 342, 142, 112**

## Technical Data

Accuracy: Refer to the list of specifications.  
 Resolution\*: .00005" / 0.001mm or 0.001mm  
 Graduation\*\*\*: .001" or 0.01mm  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years under normal use  
 Dust/Water protection level\*: IP65  
 \*Digital models \*\*Analog models

## Function of Digital Model

Origin-set, Zero / ABS, Data hold,  
 inch/mm conversion (on inch/metric models only)  
 Function lock  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories for Digital Model

**05CZA662:** SPC cable with data switch (40" / 1m)  
**05CZA663:** SPC cable with data switch (80" / 2m)

## FEATURES

- IP65 water/dust protection (Series 342).
- Pointed spindle and anvil for measuring the web thickness of drills, small grooves, keyways, and other hard-to-reach dimensions.
- 15 degree and 30 degree measuring points are available.
- Non-slip grip finish (digital models).
- The measuring points have approximately 0.3mm / .012" radius.
- With ratchet stop for constant force.
- With SPC output (Series 342).
- With digit counter (Series 142).
- With a standard bar except 0 - 1" and 0 - 25mm model.
- Supplied in fitted plastic case.



342-351-30



112-201



Tip angle: 15° (R0.3mm)



Tip angle: 30° (R0.3mm)



## SPECIFICATIONS

Metric		Digital model (with carbide tip)				
Range	Resolution	Order No.	Accuracy	Point	Mass (g)	
0 - 25mm	0.001mm	342-251-30	±2µm	15°	330	
		342-261-30	±2µm	30°	330	
25 - 50mm	0.001mm	342-252-30	±2µm	15°	470	
		342-262-30	±2µm	30°	470	
50 - 75mm	0.001mm	342-253-30	±2µm	15°	625	
		342-263-30	±2µm	30°	625	
75 - 100mm	0.001mm	342-254-30	±3µm	15°	565	
		342-264-30	±3µm	30°	565	

Inch/Metric		Digital model (with carbide tip)				
Range	Resolution	Order No.	Accuracy	Point	Mass (g)	
0 - 1" / 0 - 25.4mm	.00005" / 0.001mm	342-351-30	±.0001"	15°	330	
		342-361-30	±.0001"	30°	330	
1" - 2" / 25.4 - 50.8mm	.00005" / 0.001mm	342-352-30	±.0001"	15°	470	
		342-362-30	±.0001"	30°	470	
2" - 3" / 50.8 - 76.2mm	.00005" / 0.001mm	342-353-30	±.0001"	15°	625	
		342-363-30	±.0001"	30°	625	
3" - 4" / 76.2 - 101.6mm	.00005" / 0.001mm	342-354-30	±.00015"	15°	565	
		342-364-30	±.00015"	30°	565	

Metric		Mechanical Counter Model				
Range	Graduation	Order No.	Accuracy	Point	Mass (g)	
0 - 25mm	0.01mm	142-153*	±3µm	15°	260	
		142-201*	±3µm	30°	260	

Inch		Mechanical Counter Model				
Range	Graduation	Order No.	Accuracy	Point	Mass (g)	
0 - 1"	.001"	142-177*	±.00015"	15°	260	
		142-225*	±.00015"	30°	260	

\*The points don't have carbide tips.

\*The points don't have carbide tips.

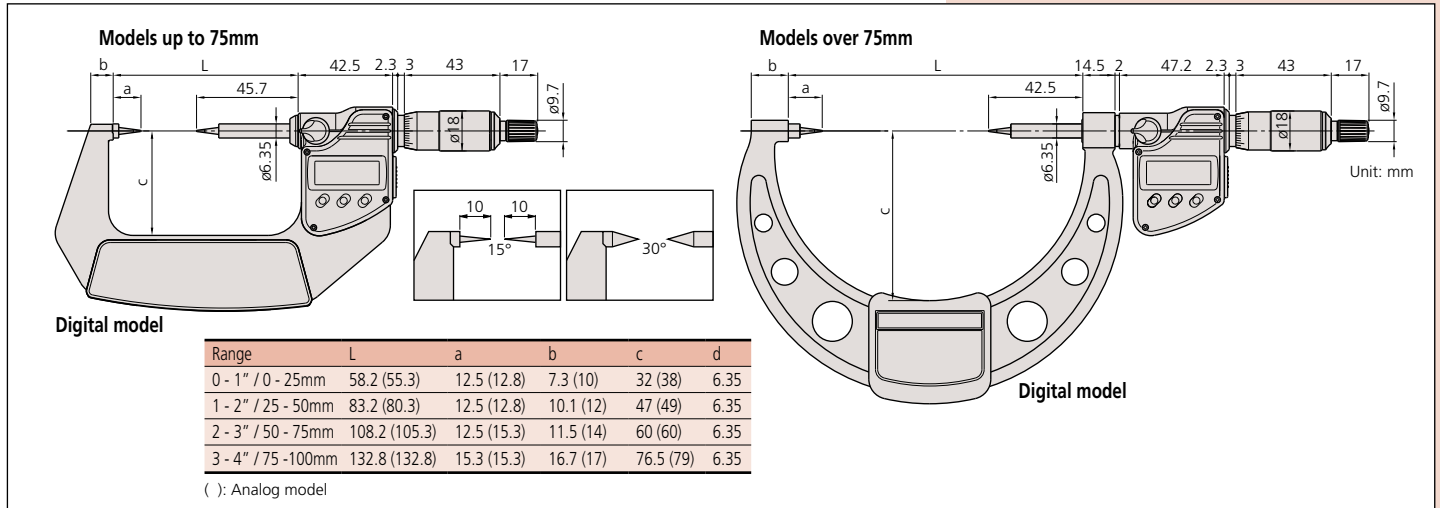
Metric						
Range	Graduation	Order No.	Accuracy	Point	Mass (g)	
0 - 25mm	0.01mm	112-165	±3µm	15°	205	
		112-153*	±3µm	15°	205	
		112-213	±3µm	30°	205	
		112-201*	±3µm	30°	205	
25 - 50mm	0.01mm	112-166	±3µm	15°	305	
		112-154*	±3µm	15°	305	
		112-214	±3µm	30°	305	
		112-202*	±3µm	30°	305	
50 - 75mm	0.01mm	112-167	±3µm	15°	370	
		112-155*	±3µm	15°	370	
		112-215	±3µm	30°	370	
		112-203*	±3µm	30°	370	
75 - 100mm	0.01mm	112-168	±4µm	15°	500	
		112-156*	±4µm	15°	500	
		112-216	±4µm	30°	500	
		112-204*	±4µm	30°	500	

Inch						
Range	Graduation	Order No.	Accuracy	Point	Mass (g)	
0 - 1"	.001"	112-189	±.00015"	15°	205	
		112-177*	±.00015"	15°	205	
		112-237	±.00015"	30°	205	
		112-225*	±.00015"	30°	205	
1 - 2"	.001"	112-190	±.00015"	15°	305	
		112-178*	±.00015"	15°	305	
		112-238	±.00015"	30°	305	
		112-226*	±.00015"	30°	305	
2 - 3"	.001"	112-191	±.00015"	15°	370	

\*The points don't have carbide tips.

\*The points don't have carbide tips.

## DIMENSIONS



# Crimp Height Micrometers

**SERIES 342, 142, 112 — Point Spindle and Blade Anvil**

## FEATURES

- IP54/65 water/dust protection (Series 342).
- Measures the height of crimp contacts.
- With ratchet stop for constant force.
- Non-slip grip finish (digital models)
- With SPC output (Series 342).
- With digit counter (Series 142).
- Supplied in fitted plastic case.



## SPECIFICATIONS

Metric Digital model					
Range	Resolution	Order No.	Accuracy	Mass (g)	
0 - 20mm	0.001mm	<b>342-271-30</b>	±3µm	270	

Metric Quickmike type					
Range	Resolution	Order No.	Accuracy	Mass (g)	
0 - 15mm	0.001mm	<b>342-451</b>	±3µm	275	

Metric Mechanical counter model					
Range	Graduation	Order No.	Accuracy	Mass (g)	
0 - 25mm	0.01mm	<b>142-402</b>	±3µm	200	
0 - 25mm	0.001mm	<b>142-403*</b>	±3µm	200	

Inch/Metric Digital model					
Range	Resolution	Order No.	Accuracy	Mass (g)	
0 - 0.8" / 0 - 20mm	.00005" / 0.001mm	<b>342-371-30</b>	±0.0015"	270	

Metric					
Range	Graduation	Order No.	Accuracy	Mass (g)	
0 - 25mm	0.01mm	<b>112-401</b>	±3µm	165	

\* 0.001mm reading is obtained with vernier.



## Technical Data

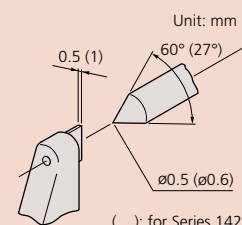
Accuracy: Refer to the list of specifications  
 Resolution\*: .00005" / 0.001mm or 0.001mm  
 Graduation\*\*: 0.01mm  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years under normal use  
 (3 years: Quickmike type)  
 Dust/Water protection level\*: IP65 / IP54  
 \*Digital models \*\*Analog models

## Function of Digital Model

Origin-set, Zero / ABS (342-271 342-371), Data hold, Data output,  
 inch/mm conversion (on inch/metric models only)  
 Function lock  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories for Digital Model

- 05CZA662**: SPC cable with data switch (40" / 1m)
- 05CZA663**: SPC cable with data switch (80" / 2m)
- 937387**: SPC cable for Quickmike type (40" / 1m)
- 965013**: SPC cable for Quickmike type (80" / 2m)



( ) : for Series 142



# V-Anvil Micrometers

**SERIES 314, 114 — 3 Flutes and 5 Flutes**

## FEATURES

- Measures the outside diameter of cutting tools (such as taps, reamers, end mills) with an odd number of flutes.
- With ratchet stop for constant force.
- Supplied with setting standard.
- Non-slip grip finish (digital models).
- V-anvils with a centerline groove are available. They are useful for measuring pitch diameters of taps which have a small diameter by using single-wire method.
- With SPC output (Series 314).
- Supplied in fitted plastic case.

### Technical Data

Accuracy: Refer to the list of specifications  
 Resolution\*: .00005" / 0.001mm or 0.001mm  
 Graduation\*\*: .001" or .0001", 0.01mm  
 Flatness (spindle/anvil):  
 Analog model: .000024" / 0.6μm, .00005" / 1.3μm  
 Digital Model: .000012" / 0.3μm, .00004" / 1μm  
 Spindle face: Carbide tipped  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years under normal use  
 \*Digital models \*\*Analog models

### Function of Digital Model

Zero / ABS, Data hold, Data output, Preset, inch/mm conversion (on inch/metric models only)  
 Function lock, 2 Presets  
 Alarm: Low voltage, Counting value composition error

### Optional Accessories for Digital Model

**05CZA662**: SPC cable with data switch (40" / 1m)  
**05CZA663**: SPC cable with data switch (80" / 2m)



314-351-30



114-121

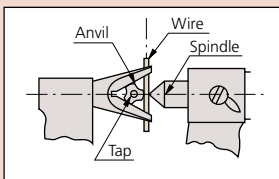


114-202



114-204

### Pitch Diameter Measurement of Tap by Single-wire Method Inch/Metric



## SPECIFICATIONS

**Metric** Digital model for 3 flutes cutting head

Range	Resolution	Order No.	Accuracy	Remarks	Setting Standard	Mass (g)
1 - 15mm	0.001mm	<b>314-251-30</b>	±4μm	w/Groove	ø5mm	275
		<b>314-261-30</b>	±4μm	—	ø5mm	275
10 - 25mm	0.001mm	<b>314-252-30</b>	±4μm	w/Groove	ø10mm	410
		<b>314-262-30</b>	±4μm	—	ø10mm	410
25 - 40mm	0.001mm	<b>314-253-30</b>	±5μm	—	ø25mm	465

**Inch/Metric** Digital model for 3 flutes cutting head

Range	Resolution	Order No.	Accuracy	Remarks	Setting Standard	Mass (g)
.05 - .6" / 1.27 - 15.24mm	.00005" / 0.001mm	<b>314-351-30</b>	±.0002"	w/Groove	ø.2"	275
		<b>314-361-30</b>	±.0002"	—	ø.2"	275
.4" - 1" / 10.16 - 25.4mm	.00005" / 0.001mm	<b>314-352-30</b>	±.0002"	w/Groove	ø.4"	410
		<b>314-362-30</b>	±.0002"	—	ø.4"	410
1" - 1.6" / 25.4 - 40.64mm	.00005" / 0.001mm	<b>314-353-30</b>	±.00025"	—	ø 1"	465

## SPECIFICATIONS

### Metric For 3 flutes cutting head

Range	Graduation	Order No.	Accuracy	Setting Standard	Remarks	Mass (g)
1 - 15mm	0.01mm	<b>114-101</b>	±4μm	ø5mm	w/Groove	120
		<b>114-161</b>	±4μm	ø5mm	—	120
10 - 25mm	0.01mm	<b>114-102</b>	±4μm	ø10mm	w/Groove	280
		<b>114-162</b>	±4μm	ø10mm	—	280
2.3 - 25mm	0.01mm	<b>114-204*</b>	±4μm	ø5mm	—	290
25 - 40mm	0.01mm	<b>114-103</b>	±5μm	ø25mm	—	400
40 - 55mm	0.01mm	<b>114-104</b>	±6μm	ø40mm	—	465
55 - 70mm	0.01mm	<b>114-105</b>	±6μm	ø55mm	—	675
70 - 85mm	0.01mm	<b>114-106</b>	±7μm	ø70mm	—	910

\*Carbide-tipped anvil

### Metric For 5 flutes cutting head

Range	Graduation	Order No.	Accuracy	Setting Standard	Remarks	Mass (g)
5 - 25mm	0.01mm	<b>114-121</b>	±4μm	ø5mm	w/Groove	255
		<b>114-165</b>	±4μm	ø5mm	—	255
2.3 - 25mm	0.01mm	<b>114-137*</b>	±4μm	ø5mm	—	220
25 - 45mm	0.01mm	<b>114-122</b>	±5μm	ø25mm	—	400
45 - 65mm	0.01mm	<b>114-123</b>	±6μm	ø55mm	—	540
65 - 85mm	0.01mm	<b>114-124</b>	±7μm	ø70mm	—	760

\*Carbide-tipped anvil

### Inch For 3 flutes cutting head

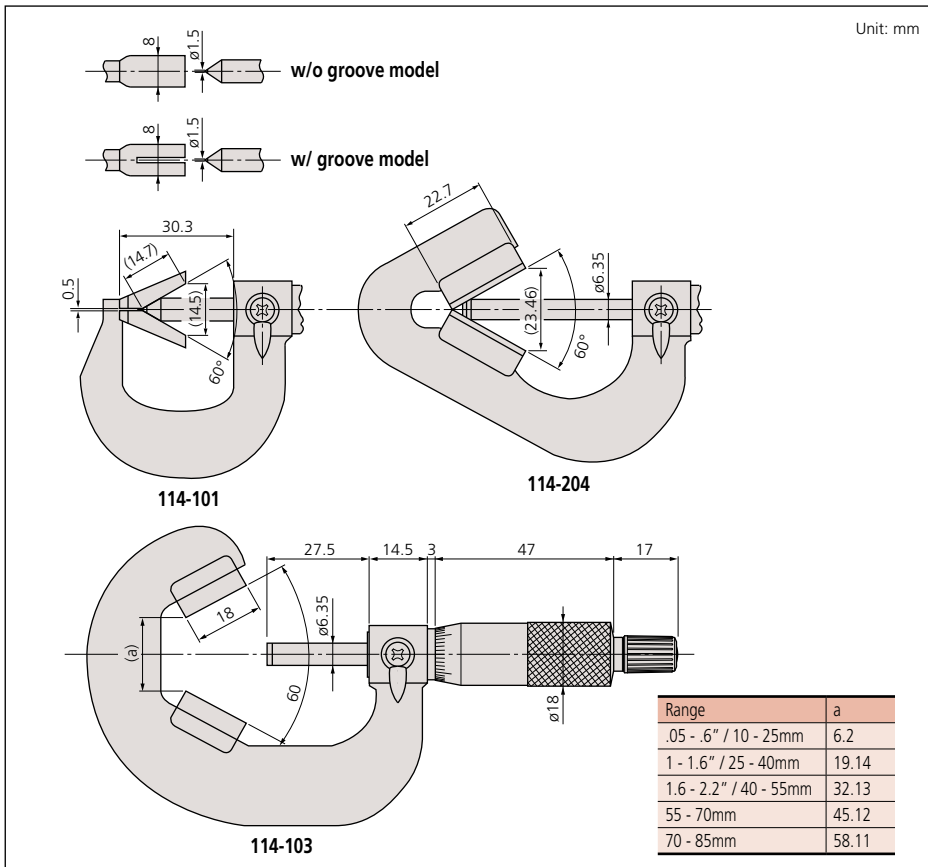
Range	Graduation	Order No.	Accuracy	Setting Standard	Mass (g)
.05 - .6"	.001"	<b>114-163</b>	±.0002"	ø.2"	120
.09 - 1"	.0001"	<b>114-202*</b>	±.0002"	ø.2"	280
1 - 1.6"	.001"	<b>114-113</b>	±.00025"	ø1"	400
1.6 - 2.2"	.001"	<b>114-114</b>	±.0003"	ø1.6"	465

\*Carbide-tipped anvil and .0001" reading is obtained with vernier.

### Inch For 5 flutes cutting head

Range	Graduation	Order No.	Accuracy	Setting Standard	Mass (g)
.09 - 1"	.0001"	<b>114-135</b>	±.0002"	ø.2"	255

## DIMENSIONS





# Limit Micrometers

## SERIES 113

### FEATURES

- Can be used as a go/no-go gage by setting the upper and lower limits.
- Provided with a standard bar for 25mm - 50mm model.
- Supplied in fitted plastic case.



### Technical Data

Graduation: 0.01mm  
 Flatness: 0.6μm  
 Parallelism: (3+R/100)μm, R=max. range (mm)  
 Measuring faces: Carbide tipped



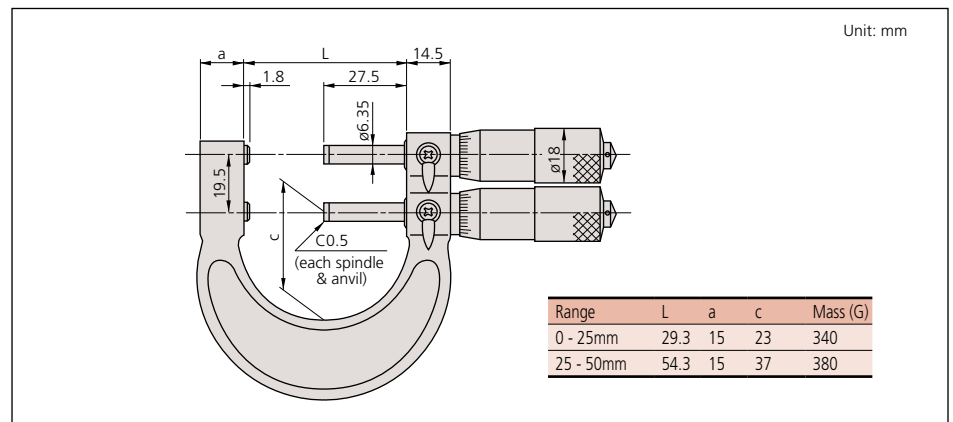
113-102

### SPECIFICATIONS

Metric

Range	Graduation	Order No.	Accuracy
0 - 25mm	0.01mm	<b>113-102</b>	±3μm
25 - 50mm	0.01mm	<b>113-103</b>	±3μm

### DIMENSIONS AND MASS



# Pana Micrometers

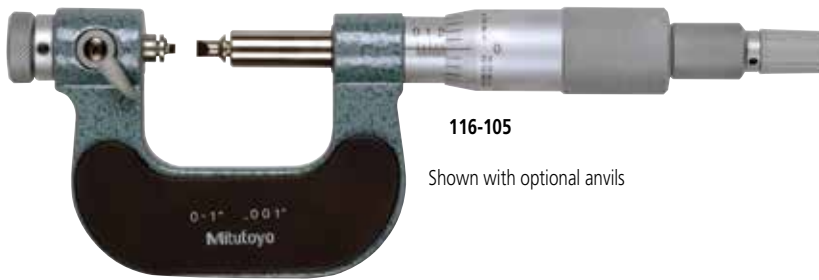
## SERIES 116 — Interchangeable Anvil Type

### FEATURES

- Non-rotating spindle with optional seven interchangeable anvils (flat, spline, spherical, point, knife-edge, disk and blade) for a wide range of applications.
- Interchangeable anvils (pair) are optional.
- With a standard bar except 0-1" and 0 - 25 mm model.
- V-anvils and conical spindle tips (matching pair) for screw thread measurement are also available.
- With ratchet stop for constant force.



116-101



116-105

Shown with optional anvils

### SPECIFICATIONS

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

Inch			
Range	Graduation	Order No.	Accuracy
0 - 1"	.001"	116-105	±.0002"
1" - 2"	.001"	116-106	±.0002"

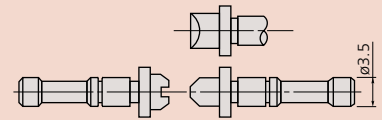
### Technical Data

Graduation: .001" or 0.01mm  
Spindle feed error: .00012" / 3μm

### Optional Accessories

Interchangeable V-anvil and conical spindle tip set:  
For Metric/Unified screw

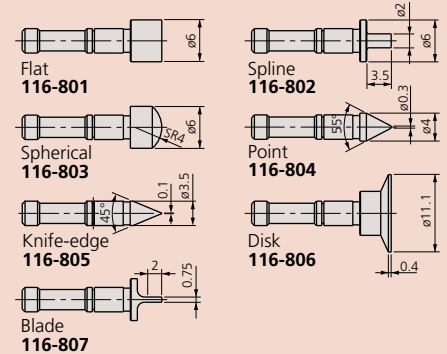
Order No.	Assortment of anvils and tips
116-830	0.4 - 0.5mm/64 - 48TPI (116-831) 0.6 - 0.9mm/44 - 28TPI (116-832) 1 - 1.75mm/24 - 14TPI (116-833) 2 - 3mm/13 - 9TPI (116-834) 3.5 - 5mm/8 - 5TPI (116-835) 5.5 - 7mm/4.5 - 3.5TPI (116-836)



116-830

### Interchangeable anvils set

Order No.	Assortment of anvils
116-800	Flat anvils (116-801) Spline anvils (116-802) Spherical anvils (116-803) Point anvils (116-804) Knife-edge anvils (116-805) Disk anvils (116-806) Blade anvils (116-807)





# Spherical Face Micrometers

**SERIES 395, 295, 115**

## Technical Data

Accuracy: Refer to the list of specifications  
 Flatness: .000024" / 0.6µm  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years under normal use  
 Dust/Water protection level\*: IP65  
 \*Digital models \*\*Analog models

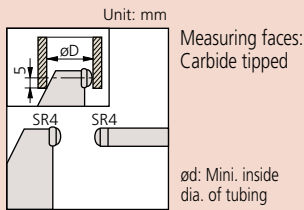
## Function of Digital Model

Origin-set, Zero / ABS, Data hold, Data output,  
 inch/mm conversion (on inch/metric models only)  
 Function lock  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories for Digital Model

**05CZA662**: SPC cable with data switch (40" / 1m)  
**05CZA663**: SPC cable with data switch (80" / 2m)

Spherical anvil-spindle type



## FEATURES

- IP65 water/dust protection (Series 395).
- Designed to measure the wall thickness of various tubing.
- With ratchet stop for constant force.
- With SPC output (Series 395).
- Non-slip grip finish (digital models).
- With digit counter (Series 295).
- With a standard bar except 0 -1" and 0 - 25mm model.
- Supplied in fitted plastic case.



115-153



395-371-30



## SPECIFICATIONS

Metric Digital model with spherical anvil					
Range	Resolution	Order No.	Accuracy	Remarks	Mass (g)
0 - 25mm	0.001mm	395-251-30 <sup>S-F</sup>	±2µm	D: 15mm	270
		395-271-30 <sup>S-S</sup>	±2µm	D: 15mm	270
25 - 50mm	0.001mm	395-252-30 <sup>S-F</sup>	±2µm	D: 15mm	330
		395-272-30 <sup>S-S</sup>	±2µm	D: 15mm	330
50 - 75mm	0.001mm	395-253-30 <sup>S-F</sup>	±2µm	D: 19mm	470
		395-273-30 <sup>S-S</sup>	±2µm	D: 19mm	470
75 - 100mm	0.001mm	395-254-30 <sup>S-F</sup>	±3µm	D: 20mm	625
		395-274-30 <sup>S-S</sup>	±3µm	D: 20mm	625

S-F: Spherical anvil and flat spindle  
 S-S: Spherical anvil and spherical spindle

Metric Mechanical counter model with spherical anvil					
Range	Graduation	Order No.	Accuracy	Remarks	Mass (g)
0 - 25mm	0.01mm	295-115 <sup>S-F</sup>	±3µm	D: 10mm	220
		295-215 <sup>S-S</sup>	±3µm	D: 10mm	220

S-F: Spherical anvil and flat spindle  
 S-S: Spherical anvil and spherical spindle

Metric With spherical anvil					
Range	Graduation	Order No.	Accuracy	Remarks	Mass (g)
0 - 25mm	0.01mm	115-115 <sup>S-F</sup>	±3µm	D: 10mm	180
		115-215 <sup>S-S</sup>	±3µm	D: 10mm	180
25 - 50mm	0.01mm	115-116 <sup>S-F</sup>	±3µm	D: 11mm	240
		115-216 <sup>S-S</sup>	±3µm	D: 11mm	240
50 - 75mm	0.01mm	115-117 <sup>S-F</sup>	±3µm	D: 17mm	315
		115-217 <sup>S-S</sup>	±3µm	D: 17mm	315
75 - 100mm	0.01mm	115-118 <sup>S-F</sup>	±4µm	D: 18mm	375
		115-218 <sup>S-S</sup>	±4µm	D: 18mm	375

S-F: Spherical anvil and flat spindle  
 S-S: Spherical anvil and spherical spindle

Inch/Metric Digital model with spherical anvil					
Range	Resolution	Order No.	Accuracy	Remarks	Mass (g)
0 - 1" / 0 - 25.4mm	.00005" / 0.001mm	395-351-30 <sup>S-F</sup>	±.0001"	D: .59"	270
		395-371-30 <sup>S-S</sup>	±.0001"	D: .59"	270
1" - 2" / 25.4 - 50.8mm	.00005" / 0.001mm	395-352-30 <sup>S-F</sup>	±.0001"	D: .59"	330
		395-372-30 <sup>S-S</sup>	±.0001"	D: .59"	330
2" - 3" / 50.8 - 76.2mm	.00005" / 0.001mm	395-353-30 <sup>S-F</sup>	±.0001"	D: .75"	470
		395-373-30 <sup>S-S</sup>	±.0001"	D: .75"	470
3" - 4" / 76.2 - 101.6mm	.00005" / 0.001mm	395-354-30 <sup>S-F</sup>	±.00015"	D: .79"	625
		395-374-30 <sup>S-S</sup>	±.00015"	D: .79"	625

S-F: Spherical anvil and flat spindle  
 S-S: Spherical anvil and spherical spindle

Inch Mechanical counter model with spherical anvil					
Range	Graduation	Order No.	Accuracy	Remarks	Mass (g)
0 - 1"	.0001"	295-153 <sup>S-F*</sup>	±.00015"	D: .40"	220
		295-253 <sup>S-S*</sup>	±.00015"	D: .40"	220

S-F: Spherical anvil and flat spindle  
 S-S: Spherical anvil and spherical spindle  
 \*.0001" reading is obtained with vernier.

Inch With spherical anvil					
Range	Graduation	Order No.	Accuracy	Remarks	Mass (g)
0 - 1"	.0001"	115-153 <sup>S-F*</sup>	±.00015"	D: .40"	180
0 - 1"	.0001"	115-253 <sup>S-S*</sup>	±.00015"	D: .40"	180
1 - 2"	.001"	115-242 <sup>S-S</sup>	±.00015"	D: .44"	240
2 - 3"	.001"	115-243 <sup>S-S</sup>	±.00015"	D: .67"	315

S-F: Spherical anvil and flat spindle  
 S-S: Spherical anvil and spherical spindle  
 \*.0001" reading is obtained with vernier.

# Tube Micrometers

**SERIES 395, 295, 115— Spherical and Cylindrical Anvils**



## FEATURES

- IP65 water/dust protection (Series 395).
- Designed to measure the wall thickness of various tubing.
- The Tube Micrometers have two combinations of measuring faces (carbide-tipped): spherical-flat type.
- With ratchet stop for constant force.
- With SPC output (Series 395).
- With digit counter (Series 295).
- With a standard bar except 0 - 1" and 0 - 25mm model.
- Supplied in fitted plastic case.
- Non-slip grip finish (digital models).

## Technical Data

Accuracy: Refer to the list of specifications.  
 Flatness: .000024" / 0.6µm  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years under normal use  
 Dust/Water protection level\*: IP65  
 \*Digital models

## Function of Digital Model

Origin-set, Zero / ABS, Data hold, Data output, inch/mm conversion (on inch/metric models only)  
 Function lock  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories for Digital Model

**05CZA662:** SPC cable with data switch (40" / 1m)  
**05CZA663:** SPC cable with data switch (80" / 2m)

## Pin Anvil Type



395-261-30



Type A



Type B



Type C



Type D

## SPECIFICATIONS

Metric — Digital model with cylindrical anvil					
Range	Resolution	Order No.	Accuracy	Remarks	Mass (g)
0 - 25mm	0.001mm	395-261-30	±3µm	Type A	270
		395-262-30	±3µm	Type B	270
		395-263-30	±3µm	Type C	310
		395-264-30	±3µm	Type D	310

Inch/Metric — Digital model with cylindrical anvil					
Range	Resolution	Order No.	Accuracy	Remarks	Mass (g)
0 - 1" / 0 - 25.4mm	.00005" / 0.001mm	395-362-30	±.00015"	Type B	270
		395-363-30	±.00015"	Type C	310
		395-364-30	±.00015"	Type D	310

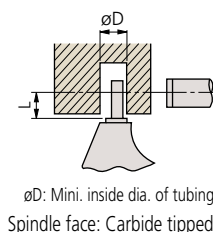
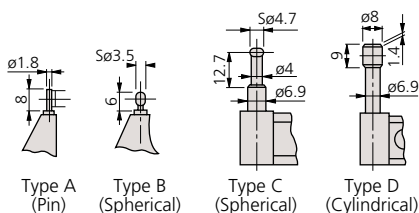
Metric — Mechanical counter model					
Range	Graduation	Order No.	Accuracy	Remarks	Mass (g)
0 - 25mm	0.01mm	295-302	±3µm	Type A	210

Inch — Mechanical counter model					
Range	Graduation	Order No.	Accuracy	Remarks	Mass (g)
0 - 1"	.0001"	295-313	±.00015"	Type C	210
		295-314	±.00015"	Type D	210

Metric — With cylindrical anvil					
Range	Graduation	Order No.	Accuracy	Remarks	Mass (g)
0 - 25mm	0.01mm	115-302	±3µm	Type A	180
		115-308	±3µm	Type B	180
		115-315	±3µm	Type C	180
		115-316	±3µm	Type D	180
25 - 50mm	0.01mm	115-303	±3µm	Type A	240
		115-309	±3µm	Type B	240

Inch — With cylindrical anvil					
Range	Graduation	Order No.	Accuracy	Remarks	Mass (g)
0 - 1"	.0001"	115-305	±.00015"	Type A	180
		115-313*	±.00015"	Type C	180
		115-314*	±.00015"	Type D	180

\*.0001" reading is obtained with vernier.



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



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### Technical Data

Accuracy: Refer to the list of specifications.  
 Resolution\*: .00005"/0.001mm or 0.001mm  
 Graduation\*\*\*: .0001" or 0.01mm  
 Spindle face: Carbide tipped  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years under normal use  
 Dust/Water protection level\*: IP65  
 \*Digital models \*\*Analog models

### Function of Digital Model

Origin-set, Zero / ABS, Data hold, Data output,  
 inch/mm conversion (on inch/metric models only)  
 Function Lock  
 Alarm: Low voltage, Counting value composition error

### Optional Accessories

- 05CZA662:** SPC cable with data switch (40" / 1m)\*
- 05CZA663:** SPC cable with data switch (80" / 2m)\*
- 201218:** V-anvil
- 950758:** Disc. anvil for 1" / 25m models

\*Only for digital models.

### Applications



Using flat anvil (201216)



With the disc. anvil (950758) Shown above, the Uni-Mike is used as a height micrometer.

# "Uni-Mike"

## SERIES 317, 117 — Interchangeable Anvil Type

### FEATURES

- IP65 water/dust protection (Series 317).
- Measures tubing thickness, shoulder-edge distance, rivet head height, etc. with interchangeable anvils (flat anvil, rod anvil, V-anvil).
- Supplied with Flat Anvil (**201216**) and Rod Anvil: .118"/ø3mm dia. rod anvil (**201217**) for 0-1"/0-25mm models, .197"/ø5mm (**201379**) for 1-2" / 25-50mm model.
- With special Disk Anvils. The Uni-Mike is used as a height micrometer. The disks have a lapped, mirror surface.
- With a standard bar except 0-1" and 0-25mm model.
- Supplied in fitted plastic case.
- Non-slip grip finish (digital models)



317-351-30



117-107

### SPECIFICATIONS

**Metric** Digital model with ratchet stop

Range	Resolution	Order No.	Accuracy	Mass (g)
0 - 25mm	0.001mm	<b>317-251-30</b>	±4µm	335
25 - 50mm	0.001mm	<b>317-252-30</b>	±4µm	360

Excluding quantizing error

**Inch/Metric** Digital model with friction thimble

Range	Resolution	Order No.	Accuracy	Mass (g)
0 - 1" / 0 - 25.4mm	.00005" / 0.001mm	<b>317-351-30</b>	±.0002"	340
1 - 2" / 25.4 - 50.8mm	.00005" / 0.001mm	<b>317-352-30</b>	±.0002"	365

Excluding quantizing error

**Metric** With ratchet stop

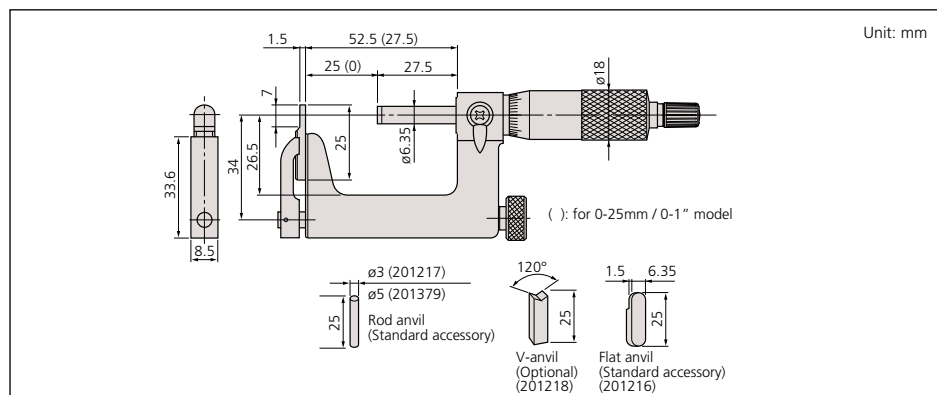
Range	Graduation	Order No.	Accuracy	Mass (g)
0 - 25mm	0.01mm	<b>117-101</b>	±4µm	255
25 - 50mm	0.01mm	<b>117-102</b>	±4µm	320

**Inch** With friction thimble

Range	Graduation	Order No.	Accuracy	Mass (g)
0 - 1"	.0001"	<b>117-107*</b>	±.0002"	255
1 - 2"	.0001"	<b>117-108*</b>	±.0002"	320

\*.0001" reading is obtained with vernier.

### DIMENSIONS



# Sheet Metal Micrometers

**SERIES 389, 119, 118**

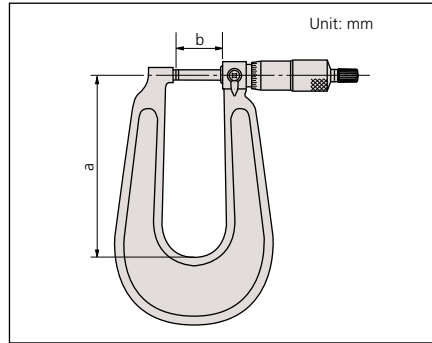


## FEATURES

- Measures thickness of sheet metal, paper, plastic and rubber parts.
- With ratchet stop for constant force.
- With a standard bar except for 0 - 1" / 0 - 25mm model.
- IP65 water/dust protection (Series 389\*).
- Supplied in fitted plastic case.
- Non-slip grip finish (digital models).



## DIMENSIONS



## SPECIFICATIONS

Metric		Digital model			
Range	Resolution	Order No.	Accuracy	a/b	
0 - 25mm	0.001mm	<b>389-251-30</b>	±4µm	160/27.5mm	
0 - 25mm	0.001mm	<b>389-261-30<sup>S-F</sup></b>	±4µm	160/27.5mm	
0 - 25mm	0.001mm	<b>389-271-30<sup>S-S</sup></b>	±4µm	160/27.5mm	
0 - 25mm	0.001mm	<b>389-514</b>	±5µm	330/35mm	
25 - 50mm	0.001mm	<b>389-252-30</b>	±4µm	165/27.5mm	
25 - 50mm	0.001mm	<b>389-262-30<sup>S-F</sup></b>	±4µm	165/27.5mm	
25 - 50mm	0.001mm	<b>389-272-30<sup>S-S</sup></b>	±4µm	165/27.5mm	

S-F: Spherical anvil and flat spindle  
S-S: Spherical anvil and spherical spindle

Inch/Metric		Digital model			
Range	Resolution	Order No.	Accuracy	a/b	
0 - 1" / 0 - 25.4mm	.00005" / 0.001mm	<b>389-351-30</b>	±.0002"	6.3"/1.08"	
		<b>389-361-30<sup>S-F</sup></b>	±.0002"	6.3"/1.08"	
		<b>389-371-30<sup>S-S</sup></b>	±.0002"	6.3"/1.08"	
		<b>389-714</b>	±.00025"	13"/1.38"	
1 - 2" / 25.4 - 50.8mm	.00005" / 0.001mm	<b>389-352-30</b>	±.0002"	6.5"/1.08"	
		<b>389-362-30<sup>S-F</sup></b>	±.0002"	6.5"/1.08"	
		<b>389-372-30<sup>S-S</sup></b>	±.0002"	6.5"/1.08"	

S-F: Spherical anvil and flat spindle  
S-S: Spherical anvil and spherical spindle

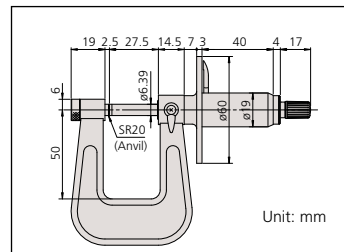
Metric		Dial reading model			
Range	Graduation	Order No.	Accuracy	a/b	
0 - 25mm	0.01mm	<b>118-101</b>	±4µm	110/27.5mm	
0 - 25mm	0.01mm	<b>118-102</b>	±4µm	160/27.5mm	
0 - 25mm	0.01mm	<b>118-114<sup>S-F</sup></b>	±4µm	160/27.5mm	
0 - 25mm	0.01mm	<b>118-118<sup>S-S</sup></b>	±4µm	160/27.5mm	
0 - 25mm	0.01mm	<b>118-103</b>	±5µm	330/35mm	
25 - 50mm	0.01mm	<b>118-110</b>	±4µm	165/27.5mm	

S-F: Spherical anvil and flat spindle  
S-S: Spherical anvil and spherical spindle

Inch		Dial reading model			
Range	Graduation	Order No.	Accuracy	a/b	
0 - 1"	.0001"	<b>118-129</b>	±.0002"	6.3"/1.08"	
		<b>118-116<sup>S-F</sup></b>	±.0002"	6.3"/1.08"	
		<b>118-120<sup>S-S</sup></b>	±.0002"	6.3"/1.08"	
		<b>118-107</b>	±.00025"	13"/1.38"	
1" - 2"	.001"	<b>118-112</b>	±.0002"	6.5"/1.08"	

S-F: Spherical anvil and flat spindle  
S-S: Spherical anvil and spherical spindle  
\*.0001" reading is obtained with vernier.

## DIMENSIONS AND MASS



## Metric Dial reading model

Range	Graduation	Order No.	Accuracy	Throat
0 - 25mm	0.01mm	<b>119-202<sup>S-F</sup></b>	±4µm	50mm

S-F: Spherical anvil and flat spindle



## Technical Data

Accuracy: Refer to the list of specifications  
Resolution\*: .00005"/0.001mm or 0.001mm  
Graduation\*\*: 0.01mm, .001" or .0001"  
Flatness: .000024" / 0.6µm for models with 6" / 150mm throat  
.00004" / 1µm for models with 12" / 300mm throat  
Parallelism: .00012" / 3µm  
Measuring faces: Carbide tipped  
Display\*: LCD  
Battery\*: SR44 [1 pc. (2 pcs.: **389-514** and **389-714**), **938882**]  
Battery life\*: Approx. 2.4 years under normal use (1.8 years: **389-514** and **389-714**)  
Dust/Water protection level\*: IP65  
\*Digital models \*\*Analog models

## Function of Digital Model

Origin-set, Zero-setting, Data hold, Data output, inch/mm conversion (on inch/metric models only)  
Function lock  
Alarm: Low voltage, Counting value composition error

## Optional Accessories for Digital Model

- 05CZA662**: SPC cable with data switch (40" / 1m)
- 05CZA663**: SPC cable with data switch (80" / 2m)
- 04AZB512**: SPC cable for **389-514/389-714** (40" / 1m)
- 04AZB513**: SPC cable for **389-514/389-714** (80" / 2m)

## Anvil-Spindle Combinations



Standard, Flat-Flat



Spherical-Flat (S-F)



Spherical-Spherical (S-S)

The Series 119 is provided with a dial for making easy and quick readings.



## Technical Data

Accuracy: Refer to the list of specifications  
 Resolution\*: .00005"/0.001mm or 0.001mm  
 Graduation\*\*: .0001" or 0.01mm  
 Parallelism: .00012" / 3µm for models up to 3" / 75mm  
 (3+R/100)µm for models over 75mm,  
 R=max. range (mm) .00016" for 4" models  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years under normal use  
 \*Digital models \*\*Analog models

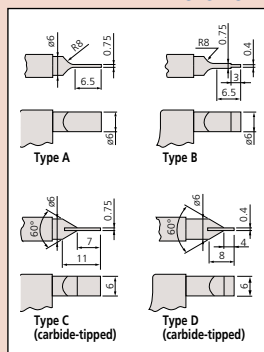
## Function of Digital Model

Origin-set, Zero / ABS, Data hold, Data output,  
 inch/mm conversion (on inch/metric models only)  
 Function lock  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories for Digital Model

**05CZA662**: SPC cable with data switch (1m / 40")  
**05CZA663**: SPC cable with data switch (2m / 80")  
**937387**: SPC cable for Quickmike type (1m / 40")  
**965013**: SPC cable for Quickmike type (2m / 80")

## TYPE AND DIMENSIONS



# Blade Micrometers

## SERIES 422,122 — Non-Rotating Spindle Type

### FEATURES

- The anvil and the spindle have a blade for measuring the groove diameter of shafts, keyways and other hard-to-reach areas.
- With ratchet stop for constant force.
- Non-slip grip finish (digital models).
- Speedy spindle feed of .4"/10mm /rev. (Quickmike type).
- With a standard bar except 0 - 1" and 0 -25mm model.
- Supplied in fitted plastic case.

### Quickmike type



422-421



422-330-30



122-125



**ABSOLUTE**  
 Analog System Powered by MITSUBISHI

## SPECIFICATIONS

Metric Digital model					
Range	Resolution	Order No.	Accuracy	Remarks	Mass (g)
0 - 25mm	0.001mm	422-230-30	±3µm	Type A	365
		422-260-30	±3µm	Type B	365
		422-270-30	±3µm	Type C	365
		422-271-30	±3µm	Type D	365
25 - 50mm	0.001mm	422-231-30	±3µm	Type A	565
		422-261-30	±3µm	Type B	565
50 - 75mm	0.001mm	422-232-30	±3µm	Type A	465
75 - 100mm	0.001mm	422-233-30	±4µm	Type A	580

Metric Quickmike type				
Range	Resolution	Order No.	Accuracy	Mass (g)
0 - 30mm	0.001mm	422-411	±3µm	350
25 - 55mm	0.001mm	422-412	±3µm	490

Metric					
Range	Graduation	Order No.	Accuracy	Remarks	Mass (g)
0 - 25mm	0.01mm	122-101	±3µm	Type A	260
		122-111	±3µm	Type B	260
		122-161	±3µm	Type C	275
		122-141	±3µm	Type D	275
25 - 50mm	0.01mm	122-102	±3µm	Type A	300
		122-112	±3µm	Type B	300
		122-162	±3µm	Type C	315
		122-142	±3µm	Type D	315
50 - 75mm	0.01mm	122-103	±3µm	Type A	360
75 - 100mm	0.01mm	122-104	±4µm	Type A	525
100 - 125mm	0.01mm	122-105	±4µm	Type A	670
125 - 150mm	0.01mm	122-106	±4µm	Type A	775
150 - 175mm	0.01mm	122-107	±5µm	Type A	950
175 - 200mm	0.01mm	122-108	±5µm	Type A	1140

Inch/Metric Digital model					
Range	Resolution	Order No.	Accuracy	Remarks	Mass (g)
0 - 1" / 0 - 25.4mm	.00005" / 0.001mm	422-330-30	±.00015"	Type A	365
		422-360-30	±.00015"	Type B	365
		422-370-30	±.00015"	Type C	365
		422-371-30	±.00015"	Type D	365
1 - 2" / 25.4 - 50.8mm	.00005" / 0.001mm	422-331-30	±.00015"	Type A	565
		422-361-30	±.00015"	Type B	565
2 - 3" / 50.8 - 76.2mm	.00005" / 0.001mm	422-332-30	±.00015"	Type A	465
3 - 4" / 76.2 - 101.6mm	.00005" / 0.001mm	422-333-30	±.0002"	Type A	580

Inch/Metric Quickmike type					
Range	Resolution	Order No.	Accuracy	Remarks	Mass (g)
0 - 1.2" / 0 - 30.48mm	.00005" / 0.001mm	422-421	±.00015"	Type A	350
1 - 2.2" / 25.4 - 55.88mm	.00005" / 0.001mm	422-422	±.00015"	Type A	490

Inch					
Range	Graduation	Order No.	Accuracy	Remarks	Mass (g)
0 - 1"	.0001"	122-125	±.00015"	Type A	260
		122-135	±.00015"	Type B	260
		122-151	±.00015"	Type D	275
1 - 2"	.0001"	122-126	±.00015"	Type A	300
2 - 3"	.0001"	122-127	±.00015"	Type A	360
3 - 4"	.0001"	122-128	±.0002"	Type A	525

# Disk Micrometers

## SERIES 323, 223, 123 - Rotating Spindle



### FEATURES

- Diameter of measuring disk: .787" / 20mm.
- .028" / 0.7mm (1mm: models over 100mm) edge thickness to enter narrow recesses.
- With ratchet stop for constant force.
- Non-slip grip finish (digital models).
- With a standard bar except for 0 - 1" / 0 - 25mm model.
- With SPC output (Series 323).
- The Series 223 is provided with a mechanical digit counter for quick reading of measurements.
- Supplied in fitted plastic case. (Over 100mm models supplied wooden cases).



123-125



323-350-30



123-103



223-125

### SPECIFICATIONS

#### Metric Digital model

Range	Resolution	Order No.	Accuracy	Mass (g)
0 - 25mm	0.001mm	323-250-30	±4µm	290
25 - 50mm	0.001mm	323-251-30	±4µm	355
50 - 75mm	0.001mm	323-252-30	±6µm	555
75 - 100mm	0.001mm	323-253-30	±6µm	610

#### Metric Mechanical counter model

Range	Graduation	Order No.	Accuracy	Mass (g)
0 - 25mm	0.01mm	223-101	±4µm	260
25 - 50mm	0.01mm	223-102	±4µm	290

#### Metric

Range	Graduation	Order No.	Accuracy	Mass (g)
0 - 25mm	0.01mm	123-101	±4µm	200
		123-113*	±4µm	230
		123-114*	±4µm	270
25 - 50mm	0.01mm	123-102	±4µm	250
		123-115*	±6µm	320
50 - 75mm	0.01mm	123-103	±6µm	300
		123-116*	±6µm	390
75 - 100mm	0.01mm	123-104	±6µm	375
100 - 125mm	0.01mm	123-105	±7µm	520
125 - 150mm	0.01mm	123-106	±7µm	570
150 - 175mm	0.01mm	123-107	±8µm	730
175 - 200mm	0.01mm	123-108	±8µm	890
200 - 225mm	0.01mm	123-109	±8µm	1000
225 - 250mm	0.01mm	123-110	±9µm	1200
250 - 275mm	0.01mm	123-111	±9µm	1410
275 - 300mm	0.01mm	123-112	±9µm	1680

\*The measuring disks have carbide tips.  
Note: The disk diameter of models over 100mm is 30mm.

#### Inch/Metric Digital model

Range	Resolution	Order No.	Accuracy	Mass (g)
0 - 1" / 0 - 25.4mm	.00005" / 0.001mm	323-350-30	±.0002"	290
1 - 2" / 25.4 - 50.8mm	.00005" / 0.001mm	323-351-30	±.0002"	355
2 - 3" / 50 - 76.2mm	.00005" / 0.001mm	323-352-30	±.0003"	555
3 - 4" / 76.2 - 101.6mm	.00005" / 0.001mm	323-353-30	±.0003"	610

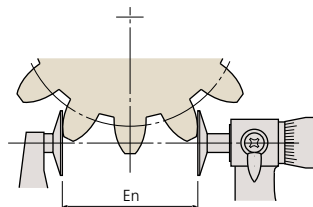
#### Inch Mechanical counter model

Range	Graduation	Order No.	Accuracy	Mass (g)
0 - 1"	.001"	223-125	±.0002"	260

#### Inch

Range	Graduation	Order No.	Accuracy	Mass (g)
0 - 1"	.001"	123-125	±.0002"	200
1 - 2"	.001"	123-126	±.0002"	250
2 - 3"	.001"	123-127	±.0003"	300
3 - 4"	.001"	123-128	±.0003"	375

### Root tangent length of gear (En)



Note: Root tangent length measurement is not available for some types of gears.

### Technical Data

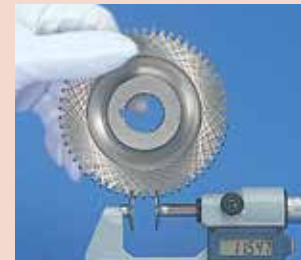
Accuracy: Refer to the list of specifications  
Resolution\*: .00005" / 0.001mm or 0.001mm  
Graduation\*\*: .001" or 0.01mm  
Flatness: .00004" / 1µm for models up to 4" / 100mm  
.000063" / 1.6µm for models over 4" / 100mm  
Parallelism: .00016" / 4µm for models up to 2" / 50mm  
.00024" for models up to 4"  
(4+R/50)µm for models up to 100mm  
(5+R/75)µm for models over 100mm, R=max. range (mm)  
Measurable module: 0.5-6 (0.7-11: models over 100mm)  
Display\*: LCD  
Battery\*: SR44 (1 pc.), 938882  
Battery life\*: Approx. 2.4 years under normal use  
\*Digital models \*\*Analog models

### Function of Digital Model

Origin-set, Zero / ABS, Data hold, Data output, inch/mm conversion (on inch/metric models only)  
Function lock  
Alarm: Low voltage, Counting value composition error

### Optional Accessories for Digital Model

- 05CZA662: SPC cable with data switch (40" / 1m)
- 05CZA663: SPC cable with data switch (80" / 2m)

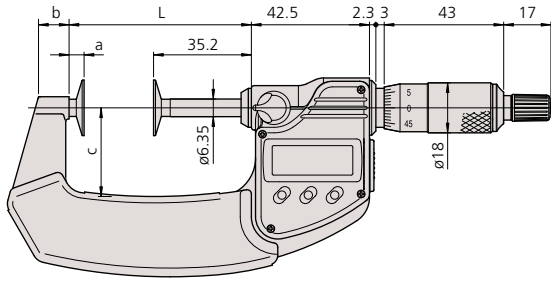




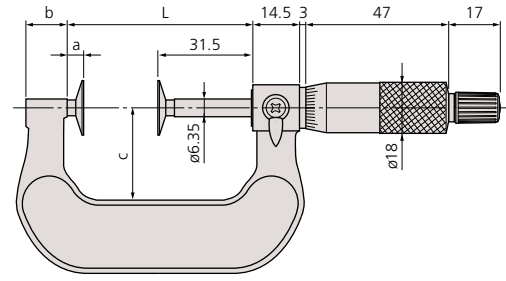
## DIMENSIONS

Unit: mm

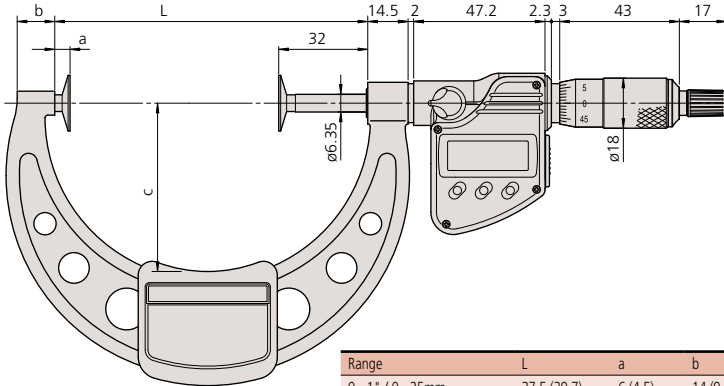
### Digital models up to 75mm



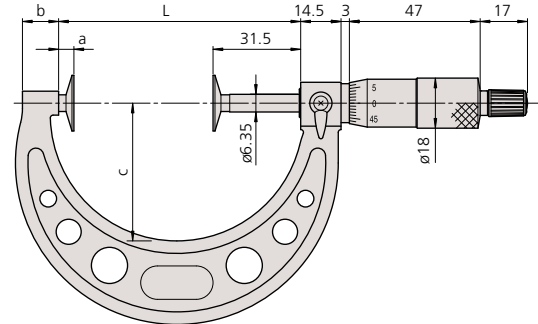
### Analog models up to 50mm



### Digital models up to 75mm

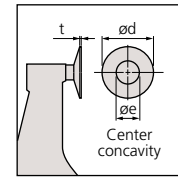


### Analog over 50mm



Range	L	a	b	c	ød	øe	t
0 - 1" / 0 - 25mm	37.5 (39.7)	6 (4.5)	14 (9.2)	25 (25.4)	20	8 (9.8)	0.7
1 - 2" / 25 - 50mm	62.5 (65.6)	6 (5.4)	14 (11)	32 (31.9)	20	8 (9.8)	0.7
2 - 3" / 50 - 75mm	87 (90.7)	5.5 (5.5)	11 (12.2)	49 (50)	20	8 (9.8)	0.7
3 - 4" / 75 - 100mm	112 (112.5)	5.5 (5.5)	11 (13.5)	63 (60.5)	20	8 (9.8)	0.7
4 - 5" / 100 - 125mm	137.5	6	12	79	30	12	1
5 - 6" / 125 - 150mm	162.5	6	15	94	30	12	1
6 - 7" / 150 - 175mm	187.5	6	16	106	30	12	1
7 - 8" / 175 - 200mm	212.5	6	15	118	30	12	1
8 - 9" / 200 - 225mm	237.5	6	14	130	30	12	1
9 - 10" / 225 - 250mm	262.5	6	14	143	30	12	1
10 - 11" / 250 - 275mm	287.5	6	15	156	30	12	1
11 - 12" / 275 - 300mm	312.5	6	15	169	30	12	1

Data in ( ) applies to those with carbide tipped disks.

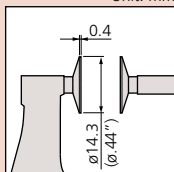


### Technical Data

Graduation: .001" or 0.01mm  
 Flatness: .00004" / 1µm  
 Parallelism: .00012" / 3µm  
 Measuring Force: 8.02 ±0.8N  
 53.9KPa ±4.9 KPa



Unit: mm



( ) : Inch model

# Paper Thickness Micrometers

**SERIES 169 — Non-Rotating Spindle Type Designed for Paper Thickness Measurement**

### FEATURES

- Non-rotating spindle.
- With ratchet stop for constant force.
- Supplied in fitted plastic case.

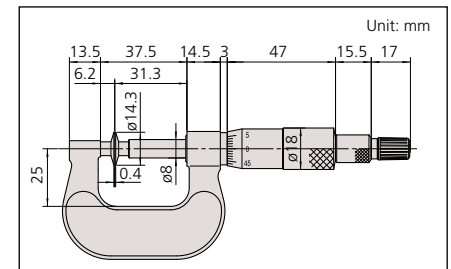


169-101

### SPECIFICATIONS

Metric				
Range	Graduation	Order No.	Accuracy	Mass (g)
0 - 25mm	0.01mm	169-101	±4µm	230g

### DIMENSIONS



Unit: mm

Inch				
Range	Graduation	Order No.	Accuracy	Mass (g)
0 - 1"	.001"	169-103	±.0002"	230g

# Disk Micrometers

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



### FEATURES

- The Disk Micrometer is designed to easily measure root tangent length of spur gears and helical gears.
- Non-rotating spindle eliminates torque on workpiece.
- With standard bar except 0 - 15mm, 0 - .6" 0 - 25mm, 0 - 1", 0 - 30mm & 0 - 1.2" model.
- Speedy spindle feed of 10mm/rev. (Quickmike type).
- Diameter of measuring disk: .787" / 20mm
- With ratchet stop for constant force.
- With SPC output (Series 369).
- Supplied in fitted plastic case.
- Non-slip grip finish (digital models).



369-350-30



Quickmike type  
369-421

### Quickmike type with adjustable measuring force



227-221



169-201



### Technical Data

Accuracy: Refer to the list of specifications  
 Resolution\*: .00005" / 0.001mm or 0.001mm  
 Graduation\*\*: .001" or 0.01mm  
 Flatness: .00004" / 1µm  
 Parallelism: 4µm / .00016" for models up to 2" / 50mm  
 6µm / .00024" for models over 2" / 50mm  
 Measurable module: 0.5-6  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years under normal use  
 (1 year: Quickmike type, 3 years: Quickmike type with fine-loading)  
 Series 227: Refer to page B-6 for more information.  
 \*Digital models \*\*Analog models

### Function of Digital Model

Origin-set, Zero / ABS, Data hold, Data output, inch/mm conversion (on inch/metric models only)  
 Function lock  
 Alarm: Low voltage, Counting value composition error

### Optional Accessories for Digital Model

- 05CZA662**: SPC cable with data switch (40" / 1m)
- 05CZA663**: SPC cable with data switch (80" / 2m)
- 937387**: SPC cable for Quickmike type (40" / 1m)
- 965013**: SPC cable for Quickmike type (80" / 2m)

### SPECIFICATIONS

Metric		Digital model	
Range	Resolution	Order No.	Accuracy
0 - 25mm	0.001mm	<b>369-250-30</b>	±4µm
25 - 50mm	0.001mm	<b>369-251-30</b>	±4µm
50 - 75mm	0.001mm	<b>369-252-30</b>	±6µm
75 - 100mm	0.001mm	<b>369-253-30</b>	±6µm

Inch/Metric		Digital model	
Range	Resolution	Order No.	Accuracy
0 - 1" / 0 - 25.4mm	.00005" / 0.001mm	<b>369-350-30</b>	±.0002"
1 - 2" / 25.4 - 50.8mm	.00005" / 0.001mm	<b>369-351-30</b>	±.0002"
2 - 3" / 50.8 - 76.2mm	.00005" / 0.001mm	<b>369-352-30</b>	±.0003"
3 - 4" / 76.2 - 101.6mm	.00005" / 0.001mm	<b>369-353-30</b>	±.0003"

Metric		Quickmike type	
Range	Resolution	Order No.	Accuracy
0 - 30mm	0.001mm	<b>369-411</b>	±4µm
25 - 55mm	0.001mm	<b>369-412</b>	±4µm

Inch/Metric		Quickmike type	
Range	Resolution	Order No.	Accuracy
0 - 1.2" / 0 - 30.48mm	.00005" / 0.001mm	<b>369-421</b>	±.0002"
1 - 2.2" / 25.4 - 55.88mm	.00005" / 0.001mm	<b>369-422</b>	±.0002"

Metric		Quickmike type with adjustable measuring force		
Range	Resolution	Order No.	Accuracy	Measuring force
0 - 10mm	0.001mm	<b>227-223</b>	±4µm	2N - 10N
0 - 15mm	0.001mm	<b>227-221</b>	±4µm	0.5N - 2.5N

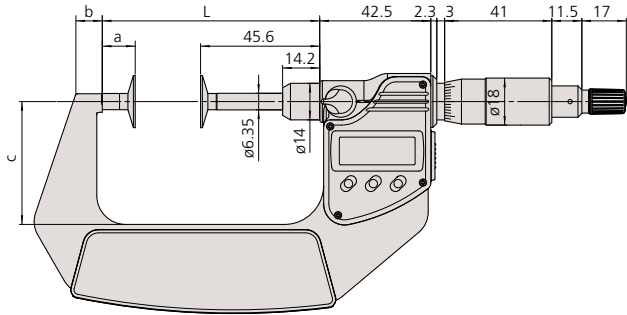
Metric			
Range	Graduation	Order No.	Accuracy
0 - 25mm	0.01mm	<b>169-201</b>	±4µm
25 - 50mm	0.01mm	<b>169-202</b>	±4µm
50 - 75mm	0.01mm	<b>169-205</b>	±6µm
75 - 100mm	0.01mm	<b>169-207</b>	±6µm

Inch			
Range	Graduation	Order No.	Accuracy
0 - 1"	.001"	<b>169-203</b>	±.0002"
1 - 2"	.001"	<b>169-204</b>	±.0002"
2 - 3"	.001"	<b>169-206</b>	±.0003"
3 - 4"	.001"	<b>169-208</b>	±.0003"

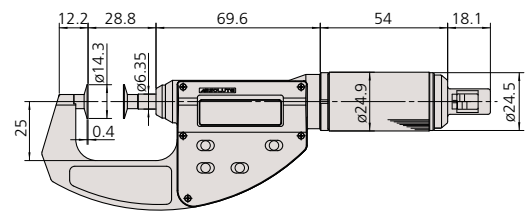
# DIMENSIONS AND MASS

Unit: mm

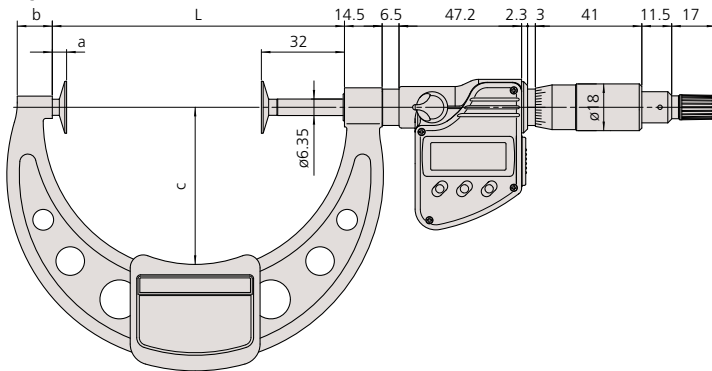
## Digital models up to 75mm



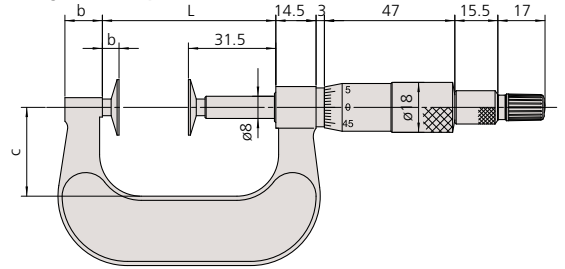
## Adjustable measuring force type



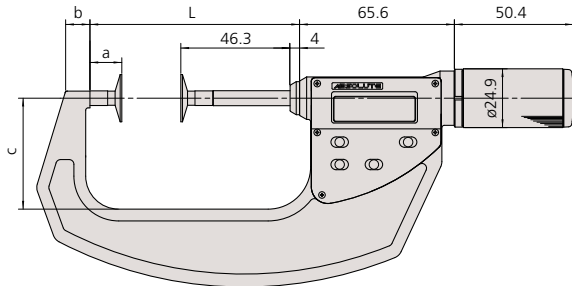
## Digital models over 75mm



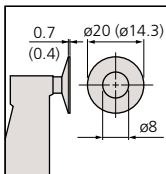
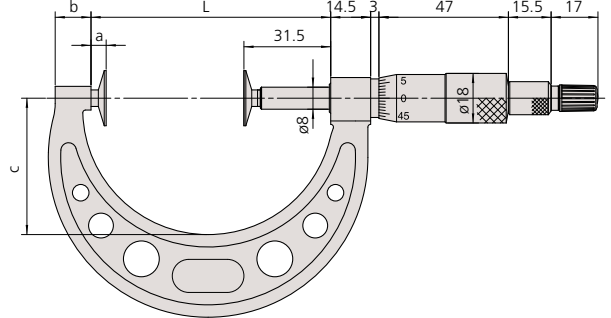
## Analog models up to 50mm



## Quickmike type



## Analog models over 50mm



( ): Adjustable measuring force type

### Digital model

Range	L	a	b	c	Mass (g)
0 - 25mm / 0 - 1"	58.5	12.9	7	32	340
25 - 50mm / 1 - 2"	83.5	12.9	9.8	47	480
50 - 75mm / 2 - 3"	108.5	12.9	11.2	60	635
75 - 100mm / 3 - 4"	112.5	5.5	13.5	60.5	475
0 - 30mm* / 0 - 1.2"	63.8	13.5	8.5	36	360
25 - 55mm* / 1 - 2.2"	88.8	13.5	10.3	47	490

\*Quickmike type

### Analog model

Range	L	a	b	c	Mass (g)
0 - 25mm / 0 - 1"	37.5	6	13.5	25	230
25 - 50mm / 1 - 2"	62.5	6	13.5	32	280
50 - 75mm / 2 - 3"	87	5.5	13	49.5	315
75 - 100mm / 3 - 4"	112	5.5	13	63.5	400

# Gear Tooth Micrometers

## SERIES 324, 124 — Interchangeable Ball Anvil-Spindle Tip Type



### FEATURES

- IP65 water/dust protection (Series 324).
- Measures over-pin diameter of gears with precision steel (carbide) ball-tipped measuring faces.
- With a standard bar except 0 - 25mm and 0 - 1" model
- Non-slip grip finish (digital models)
- Interchangeable ball anvil-spindle tips for various gear modules (0.5 - 5.25) are optional.
- With Ratchet Stop for constant force.
- With SPC output (Series 324).
- Supplied in fitted plastic case (Models over 150mm have wooden case).



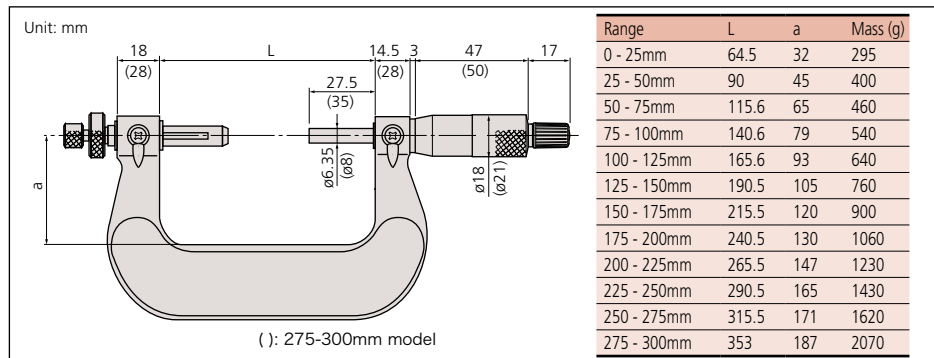
### SPECIFICATIONS

Metric Digital model				
Range	Resolution	Order No.	Accuracy	Mass (g)
0 - 25mm	0.001mm	<b>324-251-30</b>	±4µm	400
25 - 50mm	0.001mm	<b>324-252-30</b>	±4µm	490
50 - 75mm	0.001mm	<b>324-253-30</b>	±4µm	530
75 - 100mm	0.001mm	<b>324-254-30</b>	±5µm	600

Inch/Metric Digital model				
Range	Resolution	Order No.	Accuracy	Mass (g)
0 - 1" / 0 - 25mm	.00005" / 0.001mm	<b>324-351-30</b>	±.0002"	400
1 - 2" / 25 - 50mm	.00005" / 0.001mm	<b>324-352-30</b>	±.0002"	490
2 - 3" / 50 - 75mm	.00005" / 0.001mm	<b>324-353-30</b>	±.0002"	530
3 - 4" / 75 - 100mm	.00005" / 0.001mm	<b>324-354-30</b>	±.00025"	600

Metric				
Range	Graduation	Order No.	Accuracy	Mass (g)
0 - 25mm	0.01mm	<b>124-173</b>	±4µm	295
25 - 50mm	0.01mm	<b>124-174</b>	±4µm	400
50 - 75mm	0.01mm	<b>124-175</b>	±4µm	460
75 - 100mm	0.01mm	<b>124-176</b>	±5µm	540
100 - 125mm	0.01mm	<b>124-177</b>	±5µm	640
125 - 150mm	0.01mm	<b>124-178</b>	±5µm	760
150 - 175mm	0.01mm	<b>124-179</b>	±6µm	900
175 - 200mm	0.01mm	<b>124-180</b>	±6µm	1060
200 - 225mm	0.01mm	<b>124-181</b>	±6µm	1230
225 - 250mm	0.01mm	<b>124-182</b>	±7µm	1430
250 - 275mm	0.01mm	<b>124-183</b>	±7µm	1620
275 - 300mm	0.01mm	<b>124-195</b>	±7µm	2070

### DIMENSIONS AND MASS



### Technical Data

Accuracy: Refer to the list of specifications  
 Resolution\*: 0.001mm or .00005" / 0.001mm  
 Graduation\*\*: 0.01mm  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years under normal use  
 Dust/Water protection level\*: IP65  
 \*Digital models \*\*Analog models

### Function of Digital Model

Zero / ABS, Data hold, Data output, Preset, inch/mm conversion (on inch/metric models only)  
 Function Lock, 2 Presets  
 Alarm: Low voltage, Counting value composition error

### Optional Accessories

**05CZA662**: SPC cable with data switch (1m / 40")\*  
**05CZA663**: SPC cable with data switch (2m / 80")\*  
 \*Only for digital models



### Interchangeable ball anvil-spindle tip set:

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

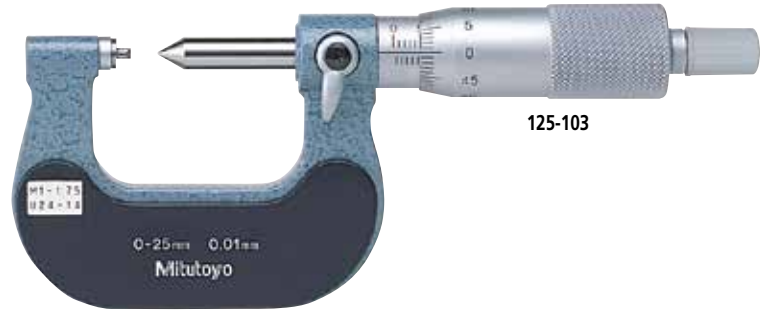
\*Carbide-tipped type

# Screw Thread Micrometers

## SERIES 125

### FEATURES

- Provided with a 60 degree V-anvil and conical spindle for easily measuring pitch diameters of metric or unified screw threads.
- With ratchet stop for constant force.
- With a standard bar for zero point adjustment except 0 - 25mm model.
- Supplied in fitted plastic case.



### Technical Data

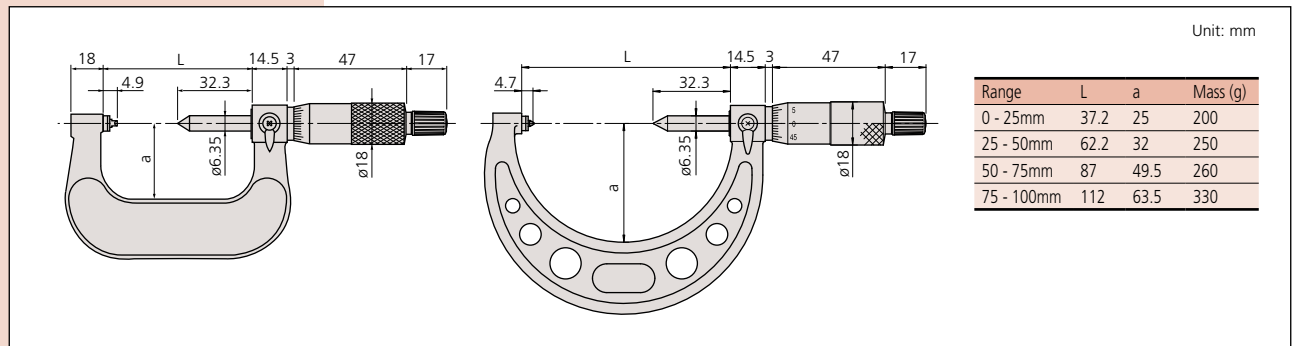
Accuracy:  $\pm(2+R/75)\mu\text{m}$ , R=max. range (mm)  
 Graduation: 0.01mm  
 Spindle feed error: 3 $\mu\text{m}$



### SPECIFICATIONS

Metric			
Range	Graduation	Order No.	Screw to be measured (Metric/Unified)
0 - 25mm	0.01mm	<b>125-101</b>	0.4 - 0.5mm/64 - 48TPI
		<b>125-102</b>	0.6 - 0.9mm/44 - 28TPI
		<b>125-103</b>	1 - 1.75mm/24 - 14TPI
		<b>125-104</b>	2 - 3mm/13 - 9TPI
		<b>125-105</b>	3.5 - 5mm/8 - 5TPI
25 - 50mm	0.01mm	<b>125-106</b>	0.4 - 0.5mm/64 - 48TPI
		<b>125-107</b>	0.6 - 0.9mm/44 - 28TPI
		<b>125-108</b>	1 - 1.75mm/24 - 14TPI
		<b>125-109</b>	2 - 3mm/13 - 9TPI
		<b>125-110</b>	3.5 - 5mm/8 - 5TPI
50 - 75mm	0.01mm	<b>125-111</b>	0.6 - 0.9mm/44 - 28TPI
		<b>125-112</b>	1 - 1.75mm/24 - 14TPI
		<b>125-113</b>	2 - 3mm/13 - 9TPI
		<b>125-114</b>	3.5 - 5mm/8 - 5TPI
		<b>125-115</b>	5.5 - 7mm/4.5 - 3.5TPI
75 - 100mm	0.01mm	<b>125-116</b>	0.6 - 0.9mm/44 - 28TPI
		<b>125-117</b>	1 - 1.75mm/24 - 14TPI
		<b>125-118</b>	2 - 3mm/13 - 9TPI
		<b>125-119</b>	3.5 - 5mm/8 - 5TPI
		<b>125-120</b>	5.5 - 7mm/4.5 - 3.5TPI

### DIMENSIONS AND MASS



# Screw Thread Micrometers

**SERIES 326, 126 — Interchangeable Anvil-Spindle Tip Type**



## FEATURES

- IP65 water/dust protection (Series 326).
- 60 degree or 55 degree V-anvil and conical spindle (interchangeable) are optional, which are made of high-grade steel, hardened and precision ground.
- With ratchet stop for constant force.
- With SPC output (Series 326).
- With a standard bar except 0 - 25mm and 0 - 1" model.
- Supplied in fitted plastic case.
- Non-slip grip finish (digital models).



**126-125**  
Shown with optional anvils



**326-351-30**  
**IP65**

## SPECIFICATIONS

Metric		Digital model		
Range	Resolution	Order No.	Accuracy	Mass (g)
0 - 25mm	0.001mm	<b>326-251-30</b>	±4µm	350
25 - 50mm	0.001mm	<b>326-252-30</b>	±4µm	380
50 - 75mm	0.001mm	<b>326-253-30</b>	±4µm	470
75 - 100mm	0.001mm	<b>326-254-30</b>	±5µm	510

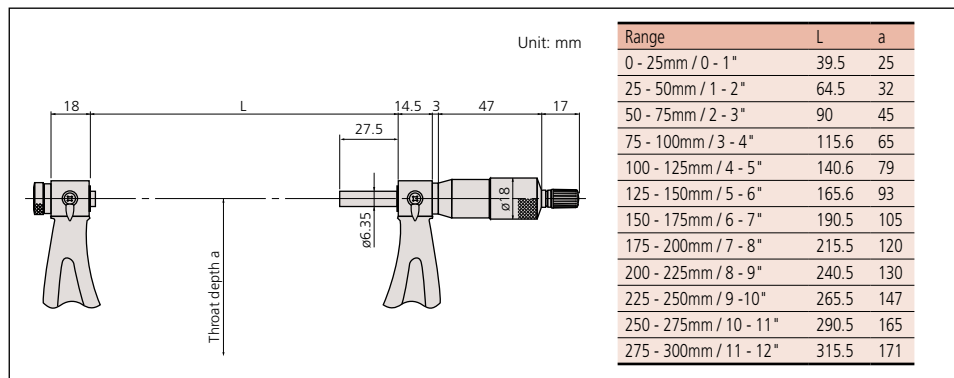
Inch/Metric		Digital model		
Range	Resolution	Order No.	Accuracy	Mass (g)
0 - 1" / 0 - 25.4mm	.00005" / 0.001mm	<b>326-351-30</b>	±.0002"	350
1 - 2" / 25.4 - 50.8mm	.00005" / 0.001mm	<b>326-352-30</b>	±.0002"	380
2 - 3" / 50.8 - 76.2mm	.00005" / 0.001mm	<b>326-353-30</b>	±.0002"	470
3 - 4" / 76.2 - 101.6mm	.00005" / 0.001mm	<b>326-354-30</b>	±.00025"	510

Metric				
Range	Graduation	Order No.	Accuracy	Mass (g)
0 - 25mm	0.01mm	<b>126-125</b>	±4µm	240
25 - 50mm	0.01mm	<b>126-126</b>	±4µm	290
50 - 75mm	0.01mm	<b>126-127</b>	±4µm	390
75 - 100mm	0.01mm	<b>126-128</b>	±5µm	450
100 - 125mm	0.01mm	<b>126-129</b>	±5µm	530
125 - 150mm	0.01mm	<b>126-130</b>	±5µm	620
150 - 175mm	0.01mm	<b>126-131</b>	±6µm	730
175 - 200mm	0.01mm	<b>126-132</b>	±6µm	860
200 - 225mm	0.01mm	<b>126-133</b>	±6µm	1,030
225 - 250mm	0.01mm	<b>126-134</b>	±7µm	1,200
250 - 275mm	0.01mm	<b>126-135</b>	±7µm	1,370
275 - 300mm	0.01mm	<b>126-136</b>	±7µm	1,540

Inch				
Range	Graduation	Order No.	Accuracy	Mass (g)
0 - 1"	.001"	<b>126-137</b>	±.0002"	240
1 - 2"	.001"	<b>126-138</b>	±.0002"	290
2 - 3"	.001"	<b>126-139</b>	±.0002"	390
3 - 4"	.001"	<b>126-140</b>	±.00025"	450
4 - 5"	.001"	<b>126-141</b>	±.00025"	530
5 - 6"	.001"	<b>126-142</b>	±.00025"	620
6 - 7"	.001"	<b>126-143</b>	±.0003"	730

Inch With anvil set (126 - 800)				
Range	Graduation	Order No.	Accuracy	Mass (g)
0 - 1"	.001"	<b>126-901</b>	±.0002"	240
1 - 2"	.001"	<b>126-902</b>	±.0002"	290
2 - 3"	.001"	<b>126-903</b>	±.0002"	390
3 - 4"	.001"	<b>126-904</b>	±.00025"	450
4 - 5"	.001"	<b>126-905</b>	±.00025"	530
5 - 6"	.001"	<b>126-906</b>	±.00025"	620

## DIMENSIONS



## Technical Data

Resolution\*: 0.001mm or .00005"/0.001mm  
 Graduation\*\*: 0.01mm or .001"  
 Spindle feed error: 3µm / .00012"  
 Display\*: LCD  
 Battery\*: SR44 (1 pc.), **938882**  
 Battery life\*: Approx. 2.4 years under normal use  
 Dust/Water protection level\*: IP65  
 \*Digital models \*\*Analog models

## Function of Digital Model

Zero / ABS, Data hold, Data output, 2 Presets, Function Lock.  
 inch/mm conversion (on inch/metric models only)  
 Alarm: Low voltage, Counting value composition error

## Optional Accessories

**05CZA662**: SPC cable with data switch (1m / 40")\*  
**05CZA663**: SPC cable with data switch (2m / 80")\*  
 \*Only for digital models  
 (See page B-51.): Standard for screw thread micrometer



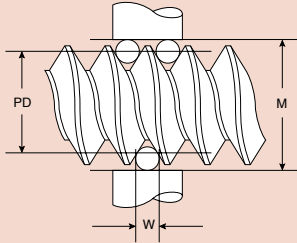
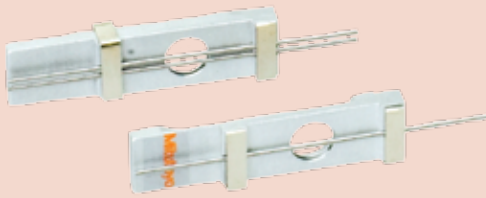
Anvil-spindle tip set:

Applications	Set Order No.	Tip Information		
		Threads Per Inch	Pitch (mm)	Individual Order No.
Metric Screw, Unified screw (60° threads)	<b>126-800</b>	64-48 (M1)	0.4-0.5	<b>126-801</b>
		44-28 (M2)	0.6-0.9	<b>126-802</b>
		24-14 (M3)	1-1.75	<b>126-803</b>
		13-9 (M4)	2-3	<b>126-804</b>
		8-5 (M5)	3.5-5	<b>126-805</b>
		4.5-3.5 (M6)	5.5-7	<b>126-806</b>
Whitworth Screw (55° threads)	<b>126-810</b>	60-48	-	<b>126-811</b>
		48-40	-	<b>126-812</b>
		40-32	-	<b>126-813</b>
		32-24	-	<b>126-814</b>
		24-18	-	<b>126-815</b>
		18-14	-	<b>126-816</b>
		14-10	-	<b>126-817</b>
		10-7	-	<b>126-818</b>
		7-4.5	-	<b>126-819</b>
		4.5-3.5	-	<b>126-820</b>

Features: 60 degree or 55 degree V-anvil and conical spindle (interchangeable) are optional, which are made of high-grade special steel, hardened and precision ground.  
 Storage box included.

# 3-Wire Thread Measuring System

Individual Holder and Wire Set



- PD = Pitch Diameter
- M = Measurement over wires
- W = Wire diameter
- C = Constant
- C = .86603 x Pitch (inches) -3W
- P.D. = M-C
- W = .57735 x P

## Applications

- Measure set of thread plug gages and working thread plug gages.
- Monitor the wear on working thread plug gages.
- Monitor and control pitch diameter variation during thread fabrication.
- Reduce measurement time to a fraction of the time normally taken using the traditional three wire method.
- Use in conjunction with go/no-go thread ring gages to control thread size to the most demanding specifications.
- Determine out of roundness and taper that may exist in threaded parts.
- Applications for preplating and post plating thread measurement.

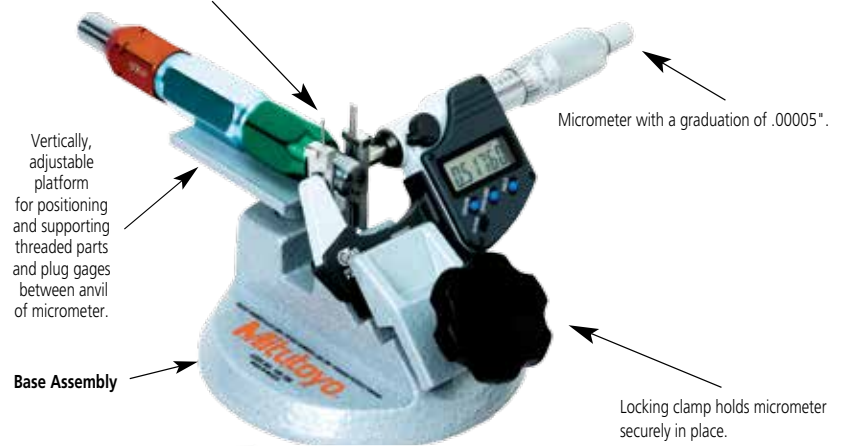
## Tolerance of Wires:

- Diameter +/- .000010"
- Roundness +/- .000010"
- Surface finish 2 micro inches AA, lapped.
- Hardness HRC 59-64
- Certification of accuracy included.
- Traceable to NIST.
- Meets or exceeds all ANSI and ISO specs.

## FEATURES

- Fast and accurate method of thread measuring available for use with micrometer

Wire holders and 3 thread measuring wires assembled for each thread pitch.



## INCH STANDARD HOLDERS AND WIRES SETS

Order No. <sup>1,2</sup>	Threads Per Inch	Thread Measuring Wire Diameter
64AAA201	120	.00481
64AAA202	100	.00577
64AAA203	95	.00601
64AAA204	90	.00642
64AAA205	80	.00722
64AAA206	72	.00802
64AAA207	64	.00902
64AAA208	56	.01031
64AAA209	50	.01155
64AAA210	48	.01203
64AAA211	44	.01312
64AAA212	40	.01443
64AAA213	36	.01604
64AAA214	32	.01804
64AAA215	30	.01925
64AAA216	28	.02062
64AAA217	27	.02138
64AAA218	26	.02221
64AAA219	24	.02406
64AAA220	22	.02624
64AAA221	20	.02887
64AAA222	18	.03208
64AAA223	16	.03608
64AAA224	14	.04124
64AAA225	13	.04441
64AAA226	12	.04811
64AAA227	11.5	.05020
64AAA228	11	.05249
64AAA229	10	.05774
64AAA230	9	.06415
64AAA231	8	.07217
64AAA232	7.5	.07698
64AAA233	7	.08248
64AAA234	6	.09623
64AAA235	5.5	.10497
64AAA236	5	.11547

<sup>1</sup> For 6.35mm Spindle Diameter holder only, add "H" suffix to Order No. (i.e. 64AAA201H)

<sup>2</sup> For 8mm Spindle Diameter holder only, add "H8" suffix to Order No. (i.e. 64AAA201H8)

Compatible with micrometers with 0.25" anvils & spindles.

Stand Assembly  
Order No. 156-106

## METRIC HOLDERS AND WIRES SETS

Order No. <sup>1</sup>	Pitch	mm Diameter	Inch Diameter
64AAA251	.2mm	.1155	.00455
64AAA252	.225mm	.1299	.00511
64AAA253	.25mm	.1443	.00568
64AAA254	.30mm	.1732	.00682
64AAA255	.35mm	.2021	.00796
64AAA256	.40mm	.2309	.00909
64AAA257	.45mm	.2598	.01023
64AAA258	.50mm	.2887	.01137
64AAA259	.55mm	.3175	.01250
64AAA260	.60mm	.3464	.01364
64AAA261	.70mm	.4041	.01591
64AAA262	.75mm	.4330	.01705
64AAA263	.80mm	.4619	.01818
64AAA264	.85mm	.4907	.01932
64AAA265	.90mm	.5196	.02046
64AAA266	1.00mm	.5774	.02273
64AAA267	1.25mm	.7217	.02841
64AAA268	1.50mm	.8660	.03410
64AAA269	1.75mm	1.0104	.03978
64AAA270	2.00mm	1.1547	.04546
64AAA271	2.50mm	1.4434	.05683
64AAA272	3.00mm	1.7321	.06819
64AAA273	3.50mm	2.0207	.07956
64AAA274	4.00mm	2.3094	.09092

<sup>1</sup> For 6.35mm Spindle Diameter holder only, add "H" suffix to Order No. (i.e. 64AAA201H)

# Can Seam Micrometers

## SERIES 147

### FEATURES

- Measures the width, height, and depth of can seams.
- Three types of micrometers are available for: steel cans, aluminum cans and sprayer cans.
- Supplied in fitted carton.



147-103

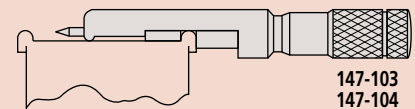
### SPECIFICATIONS

Metric			
Range	Graduation	Order No.	Remarks
0 - 13mm	0.01mm	147-103	for steel cans
		147-105	for aluminum cans
		147-202	for sprayer cans

Inch			
Range	Graduation	Order No.	Remarks
0 - .5"	.001"	147-104	for steel cans
		147-106	for aluminum cans
		147-201	for sprayer cans

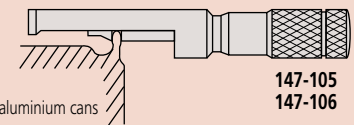
### Technical Data

Accuracy:  $\pm 0.0012"$  /  $\pm 3\mu\text{m}$   
 Graduation:  $.001"$  /  $0.01\text{mm}$



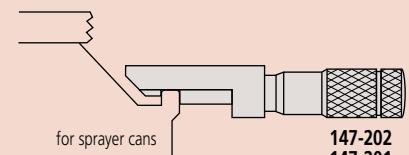
for cans  
(for depth measurements up to 5mm)

147-103  
147-104



for aluminium cans

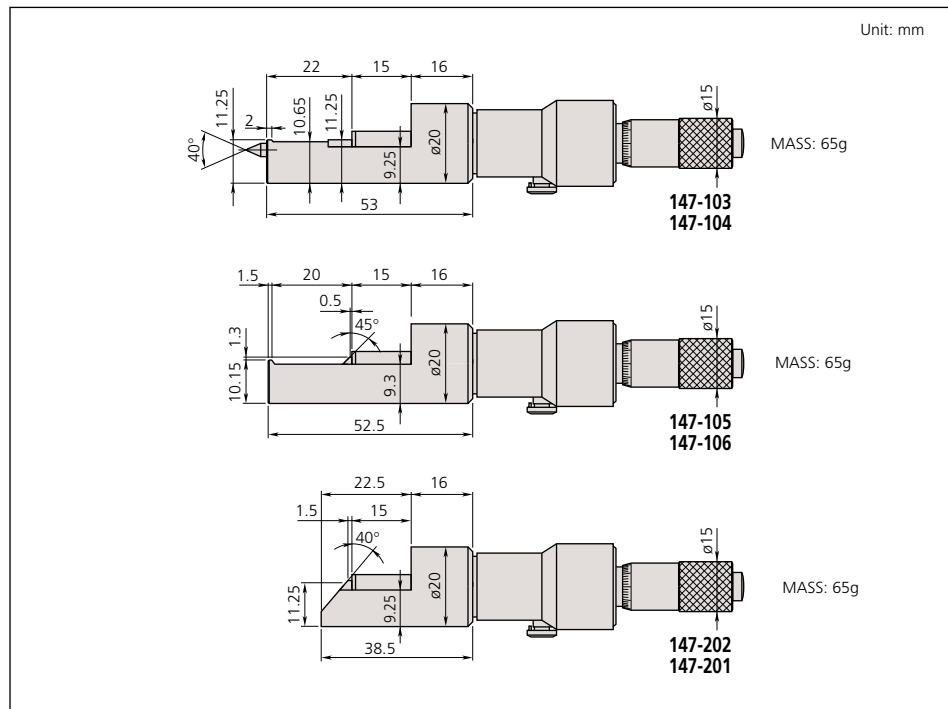
147-105  
147-106



for sprayer cans

147-202  
147-201

### DIMENSIONS AND MASS





# Hub Micrometers

## SERIES 147

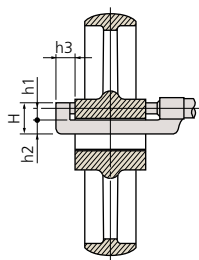
### Technical Data

Accuracy: Refer to the list of specifications  
 Graduation: 0.01mm / .001"  
 Flatness: 0.6µm / .000024"  
 Parallelism: (2+R/100)µm, R=max. range (mm)  
 [.00008" + .00004" (L/4)]", L = Max. range (inch)  
 Measuring faces: Carbide tipped



### FEATURES

- Measures hub thickness and shoulders inside a bore.
- With ratchet stop for constant force.
- With a standard bar except for 0 - 1" / 0 - 25mm model.
- Supplied in fitted plastic case.



Unit: mm

Range	h1	h2	h3	H	Mass (g)
0 - 1" / 0 - 25mm	6	8.5	13.5	17.5	135
1 - 2" / 25 - 50mm	6.5	11	14	20.5	150
3 - 4" / 50 - 75mm	6.5	11	13	20.5	170
4 - 5" / 75 - 100mm	6.5	11	13	20.5	185

### SPECIFICATIONS

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

Inch			
Range	Graduation	Order No.	Accuracy
0 - 1"	.001"	147-351	±.0001"
1 - 2"	.001"	147-352	±.0001"
2 - 3"	.001"	147-353	±.0001"
3 - 4"	.001"	147-354	±.00015"

# Wire Micrometers

## SERIES 147

### FEATURES

- Designed for measuring wire thickness.
- Also used to measure the diameter of a small ball.
- Supplied in fitted plastic case.



### SPECIFICATIONS

Metric				
Range	Graduation	Order No.	Accuracy	Mass (g)
0 - 10mm	0.01mm	147-401	±3µm	65

Inch				
Range	Graduation	Order No.	Accuracy	Mass (g)
0 - .4"	.0001"	147-402*	±.00015"	65

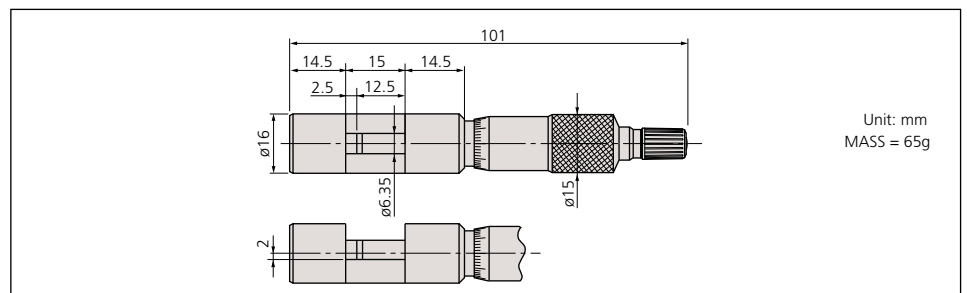
\*.0001" reading is obtained with vernier.

### Technical Data

Graduation: .0001" or 0.01mm  
 Flatness: .000024" / 0.6µm  
 Parallelism: .00005" / 1.3µm  
 Measuring faces: Carbide tipped



### DIMENSIONS AND MASS



Unit: mm  
 MASS = 65g

# Digital Outside Micrometers

## SERIES 193

### FEATURES

- Mechanical digit counter with 0.01mm or .001" reading for quick and error-free reading.
- With a standard bar except for 0-25mm / 0 - 1" model.
- Supplied in fitted plastic case.



193-211

### SPECIFICATIONS

**Metric** \_\_\_\_\_ With ratchet stop

Range	Graduation	Order No.	Accuracy
0 - 25mm	0.01mm	<b>193-101</b>	±2μm
	0.001mm	<b>193-111*</b>	±2μm
25 - 50mm	0.01mm	<b>193-102</b>	±2μm
	0.001mm	<b>193-112*</b>	±2μm
50 - 75mm	0.01mm	<b>193-103</b>	±2μm
	0.001mm	<b>193-113*</b>	±2μm
75 - 100mm	0.01mm	<b>193-104</b>	±3μm
	0.001mm	<b>193-114*</b>	±3μm

\*0.001mm reading is obtained with vernier.

**Metric** \_\_\_\_\_ Micrometer sets

Range	Order No.	Included in set
0 - 75mm (3 pcs./set)	<b>193-901</b>	• <b>193-101, 193-102, 193-103</b> • 2 micrometer standards
0 - 75mm (3 pcs./set)	<b>193-915</b>	• <b>193-111, 193-112, 193-113,</b> • 2 micrometer standards
0 - 100mm (4 pcs./set)	<b>193-902</b>	• <b>193-101, 193-102, 193-103,</b> <b>193-104</b> • 3 micrometer standards
0 - 100mm (4 pcs./set)	<b>193-916</b>	• <b>193-111, 193-112, 193-113,</b> <b>193-114</b> • 3 micrometer standards

**Inch** \_\_\_\_\_ With friction thimble

Range	Graduation	Order No.	Accuracy
0 - 1"	.0001"	<b>193-211*</b>	±.0001"
1 - 2"	.0001"	<b>193-212*</b>	±.0001"

\*.0001" reading is obtained with vernier.

**Inch** \_\_\_\_\_ With ratchet stop

Range	Graduation	Order No.	Accuracy
2 - 3"	.0001"	<b>193-213*</b>	±.0001"
3 - 4"	.0001"	<b>193-214*</b>	±.00015"

\*.0001" reading is obtained with vernier.

**Inch** \_\_\_\_\_ Micrometer sets

Range	Order No.	Included in set
0 - 3" (3 pcs./set)	<b>193-923</b>	• <b>193-211, 193-212, 193-213</b> • 2 micrometer standards

### Technical Data

Counter reading: 0.01mm or .001"  
 Graduation: 0.01mm, 0.001mm, .001" or .0001"  
 Flatness: 0.6μm / .000024"  
 Parallelism: (2+R/100)μm, R=max. range (mm)  
 [.00008" + .00004" (L/4)]", L= max. range (inch)  
 Measuring faces: Carbide tipped



193-916

### DIMENSIONS AND MASS

**Models up to 100mm / 4"**

Unit: mm

Range	L	a	b	c	Mass (g)
0 - 25mm / 0 - 1"	30	2.5	5	26	224
25 - 50mm / 1 - 2"	55	2.5	8	32	275
50 - 75mm / 2 - 3"	80	2.5	9	45	379
75 - 100mm / 3 - 4"	105	2.5	9	57	489

Note: The shape of the thimble changes on the model with friction thimble.

# Indicating Micrometers

## SERIES 510

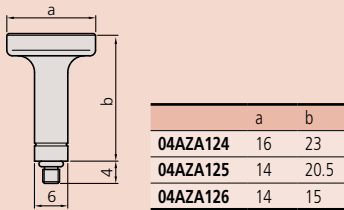
### Technical Data

Spindle feed error:  $3\mu\text{m} / .00012''$   
 Dial indication accuracy:  $1\mu\text{m} / .00004''$   
 Dispersion of indication:  $0.4\mu\text{m} / .00002''$   
 Graduation:  $0.001\text{mm}$  or  $.0001''$   
 Dial reading:  $0.001\text{mm}$  or  $.00005''$   
 Flatness:  $0.3\mu\text{m} / .000012''$   
 Parallelism:  $0.6\mu\text{m} / .000024''$  for models up to  $50\text{mm} / 2''$   
 $1\mu\text{m} / .00004''$  for models over  $50\text{mm} / 2''$   
 Measuring force: 5 - 10N (500 - 1000gf)  
 Measuring faces: Carbide tipped

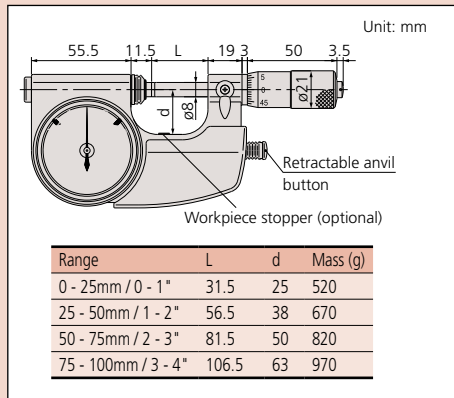
### Optional Accessories

- 04AZA124:**  $\phi 16\text{mm} / \phi .63''$  workpiece stopper (not available for  $25\text{mm} / 1''$  model)
- 04AZA125:**  $\phi 14\text{mm} / \phi .55''$  workpiece stopper
- 04AZA126:**  $\phi 14\text{mm} / \phi .55''$  workpiece stopper

Unit: mm



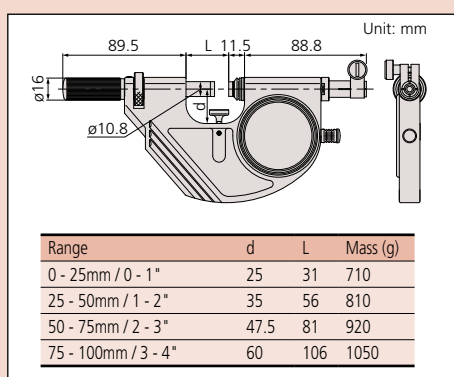
### DIMENSIONS AND MASS



### Technical Data

Flatness:  $0.3\mu\text{m} / .000012''$   
 Parallelism:  $0.6\mu\text{m} / .000024''$  for models up to  $50\text{mm} / 2''$   
 $1\mu\text{m} / .00004''$  for models over  $50\text{mm} / 2''$   
 Measuring force: 5 - 10N (500 - 1000gf)  
 Measuring faces: Carbide tipped

### DIMENSIONS AND MASS



### FEATURES

- Retractable anvil with indicator for three-wire measurements of pitch diameter of precision screws and parallelism measurements.
- With a standard bar except for 0 - 25mm / 0 - 1" model.
- IP protection level: 54
- Supplied in fitted plastic case.



### SPECIFICATIONS

Metric			
Range	Graduation	Order No.	Indicating range
0 - 25mm	0.001mm	<b>510-121*</b> <b>510-141</b>	$\pm 0.060\text{mm}$
25 - 50mm	0.001mm	<b>510-122</b>	$\pm 0.060\text{mm}$
50 - 75mm	0.001mm	<b>510-123</b>	$\pm 0.060\text{mm}$
75 - 100mm	0.001mm	<b>510-124</b>	$\pm 0.060\text{mm}$

\*Retractable anvil button on the right side.

Inch			
Range	Graduation	Order No.	Indicating range
0 - 1"	.00005"	<b>510-131*</b> <b>510-151</b>	$\pm .0023''$
1 - 2"	.00005"	<b>510-132</b>	$\pm .0023''$
2 - 3"	.00005"	<b>510-133</b>	$\pm .0023''$
3 - 4"	.00005"	<b>510-134</b>	$\pm .0023''$

\*Retractable anvil button on the right side.

# Snap Meters

## SERIES 523

### FEATURES

- Various types of indicators, LVDTs and linear gages can be selected according to the measurement applications.
- Supplied in fitted plastic case.

Indicator is optional.



### SPECIFICATIONS

Metric			Gage stem dia 8mm
Range	Order No.	Anvil movement	
0 - 25mm	<b>523-141</b>	2mm	
25 - 50mm	<b>523-142</b>	2mm	
50 - 75mm	<b>523-143</b>	2mm	
75 - 100mm	<b>523-144</b>	2mm	

Inch			Gage stem dia 3/8"
Range	Order No.	Anvil movement	
0 - 1"	<b>523-151</b>	.078"	
1 - 2"	<b>523-152</b>	.078"	
2 - 3"	<b>523-153</b>	.078"	
3 - 4"	<b>523-154</b>	.078"	

# Dial Snap Meters

## SERIES 523

### FEATURES

- Direct go/no-go judgment for mass-produced parts.
- Spindle diameter: .425" / 10.8mm
- IP protection level: 54
- Supplied in fitted plastic case.



523-131

### SPECIFICATIONS

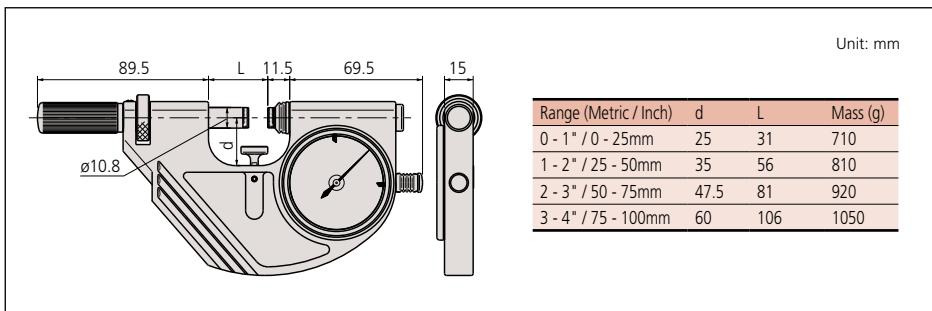
#### Metric

Range	Graduation	Order No.	Indicating range
0 - 25mm	0.001mm	<b>523-121</b>	±0.060mm
25 - 50mm	0.001mm	<b>523-122</b>	±0.060mm
50 - 75mm	0.001mm	<b>523-123</b>	±0.060mm
75 - 100mm	0.001mm	<b>523-124</b>	±0.060mm

#### Inch

Range	Graduation	Order No.	Indicating range
0 - 1"	.00005"	<b>523-131</b>	±.0023"
1 - 2"	.00005"	<b>523-132</b>	±.0023"
2 - 3"	.00005"	<b>523-133</b>	±.0023"
3 - 4"	.00005"	<b>523-134</b>	±.0023"

### DIMENSIONS AND MASS



### Technical Data

Dial indication accuracy: .00005" / 1µm

Indication repeatability: .00002" / 0.4µm

Dial reading: .00005" or 0.001mm

Flatness: .000012" / 0.3µm

Parallelism: .000024" / 0.6µm for models up to 2" / 50mm

.00004" / 1µm for models over 2" / 50mm

Measuring force: 5 - 10N (500 - 1000gf)

Measuring faces: Carbide tipped



# Groove Micrometers

## SERIES 146

### FEATURES

- Flanged spindle for measuring width, depth and location of grooves inside/outside bores, and tubes.
- Provided with two types of graduations for inside and outside measurements.
- Non-rotating spindle type has two-directional ratchet stop. (Measuring force: 0.7 - 1.2N)



### SPECIFICATIONS

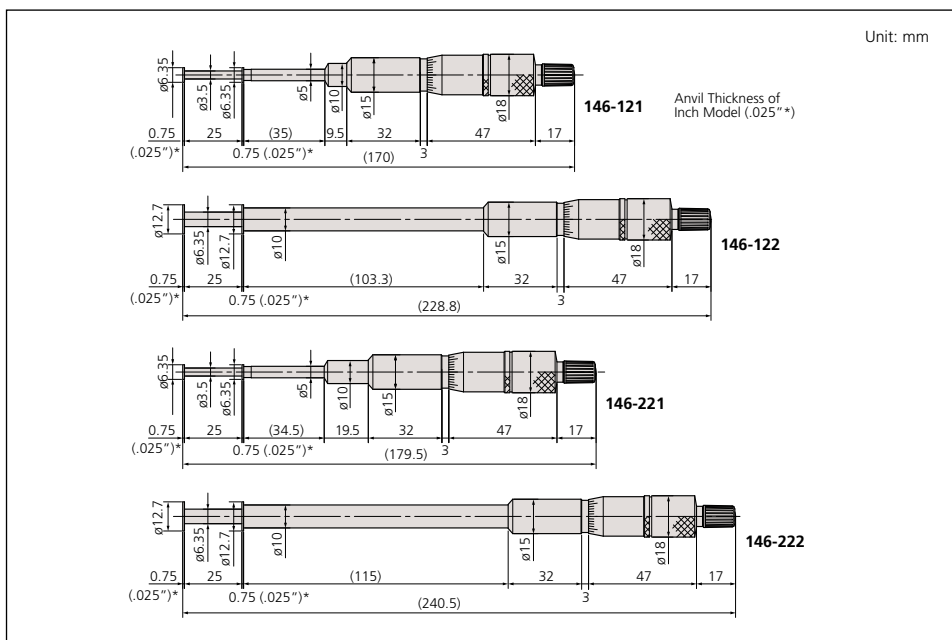
Metric  Rotating spindle type					
Range Outside	Range Inside	Graduation	Order No.	Flange	Mass (g)
0 - 25mm	1.6 - 26.5mm	0.01mm	146-121	ø6.35mm	135
			146-122	ø12.7mm	185
25 - 50mm	26.5 - 51.5mm	0.01mm	146-123	ø12.7mm	175
50 - 75mm	51.5 - 76.5mm	0.01mm	146-124	ø12.7mm	165
75 - 100mm	76.5 - 101.5mm	0.01mm	146-125	ø12.7mm	160

Inch  Rotating spindle type					
Range Outside	Range Inside	Graduation	Order No.	Flange	Mass (g)
0 - 1"	.055" - 1.05"	.001"	146-131	ø.25"	135
			146-132	ø.5"	185
1" - 2"	1.05" - 2.05"	.001"	146-133	ø.5"	175
2" - 3"	2.05" - 3.05"	.001"	146-134	ø.5"	165
3" - 4"	3.05" - 4.05"	.001"	146-135	ø.5"	160

Metric  Non-rotating spindle type					
Range Outside	Range Inside	Graduation	Order No.	Flange	Mass (g)
0 - 25mm	1.6 - 26.5mm	0.01mm	146-221	ø6.35mm	135
			146-222	ø12.7mm	185
25 - 50mm	26.5 - 51.5mm	0.01mm	146-223	ø12.7mm	175
50 - 75mm	51.5 - 76.5mm	0.01mm	146-224	ø12.7mm	165
75 - 100mm	76.5 - 101.5mm	0.01mm	146-225	ø12.7mm	160

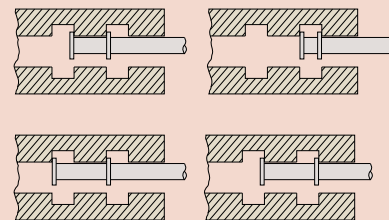
Inch  Non-rotating spindle type					
Range Outside	Range Inside	Graduation	Order No.	Flange	Mass (g)
0 - 1"	.055" - 1.05"	.001"	146-231	ø.25"	135
			146-232	ø.5"	185
1" - 2"	1.05" - 2.05"	.001"	146-233	ø.5"	175
2" - 3"	2.05" - 3.05"	.001"	146-234	ø.5"	165
3" - 4"	3.05" - 4.05"	.001"	146-235	ø.5"	160

### DIMENSIONS



### Technical Data

Accuracy:  $\pm .0004"$  /  $\pm 10\mu\text{m}$   
 Parallelism:  $.0004"$  /  $10\mu\text{m}$



# Small Hole Gage Set

## SERIES 154

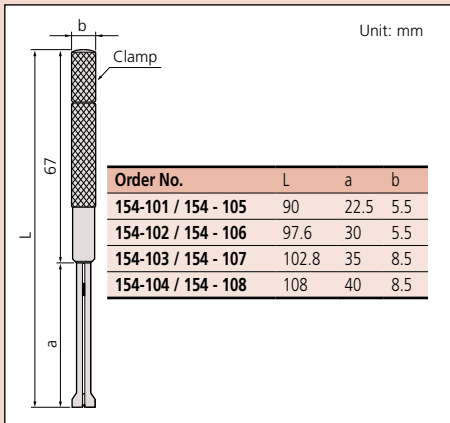
### FEATURES

- Used with an outside micrometer for measuring inside diameter of bores.
- 4 sizes of gages are supplied in a fitted pouch.
- Extra long for gaging deep and shallow holes, slots and similar workpieces.
- Gaging surface is fully hardened to ensure long tool life.



154-901

### DIMENSIONS



### SPECIFICATIONS

Metric		
Total range	Set Order No.	Assortment of gages
ø3 - 13mm (4-gage set)	154-902	ø3 - 5mm gage (154-101)
		ø5 - 7.5mm gage (154-102)
		ø7.5 - 10mm gage (154-103)
		ø10 - 13mm gage (154-104)

Inch		
Total range	Set Order No.	Assortment of gages
.125" - .5" DIA. (4-gage set)	154-901	.125" - .2" DIA. gage (154-105)
		.2" - .3" DIA. gage (154-106)
		.3" - .4" DIA. gage (154-107)
		.4" - .5" DIA. gage (154-108)

# Telescoping Gage Set

## SERIES 155

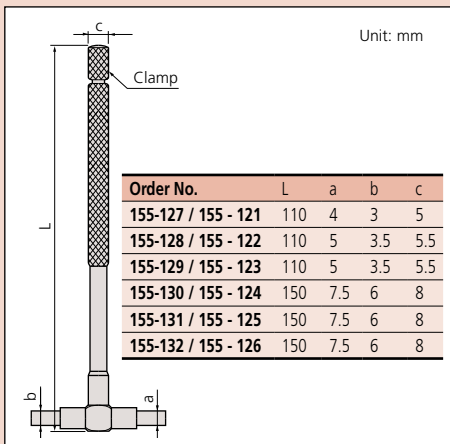
### FEATURES

- Spring-loaded plunger expands within the bore (or groove), allowing determination of the internal diameter (or groove width).
- With a knurled clamp.
- Supplied in a fitted pouch.



155-903

### DIMENSIONS



### SPECIFICATIONS

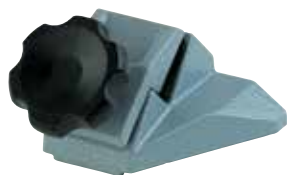
Metric		
Total range	Set Order No.	Included in set
8 - 150mm (6-gage set)	155-905	8 - 12.7mm gage (155-127)
		12.7 - 19mm gage (155-128)
		19 - 32mm gage (155-129)
		32 - 54mm gage (155-130)
		54 - 90mm gage (155-131)
		90 - 150mm gage (155-132)

Inch		
Total range	Set Order No.	Included in set
.313 - 6" (6-gage set)	155-903	.313" - .5" gage (155-121)
		.5" - .75" gage (155-122)
		.75" - 1.25" gage (155-123)
		1.25" - 2.125" gage (155-124)
		2.125" - 3.5" gage (155-125)
		3.5" - 6" gage (155-126)
.50 - 6" (5-gage set)	155-904	155-122, 155-123, 155-124, 155-125, 155-126
.315 - 2.125" (4-gage set)	155-907	155-121, 155-122, 155-123, 155-124

# Micrometer Stands

## SERIES 156

These stands are designed to allow bench-top use with hand micrometers or other gages.



156-105-10



156-106



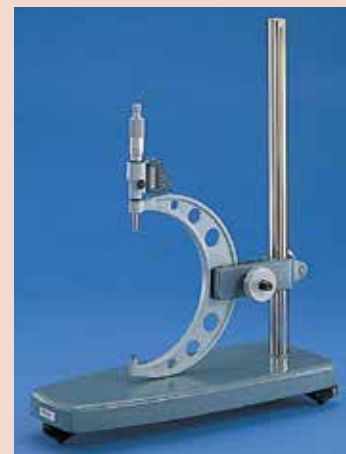
156-101-10



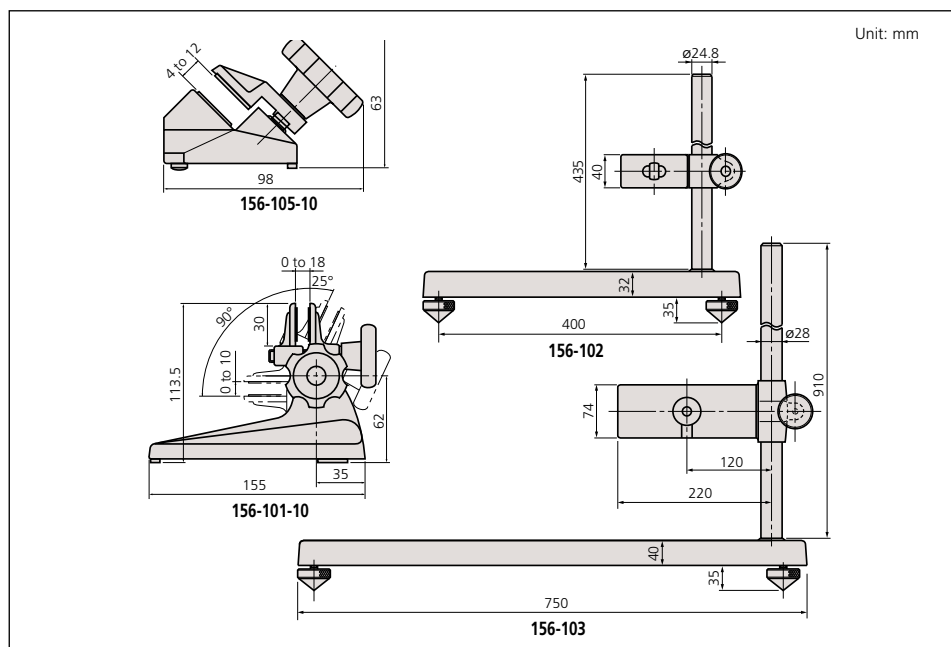
156-102

### SPECIFICATIONS

Micrometer ranges	Order No.	Remarks
0-1" / 0-25mm, 1-2" / 25-50mm	156-105-10	Fixed angle type
Up to 4" / 100mm	156-101-10	Adjustable angle type
5-12" / 125-300mm	156-102	Vertical type
12-40" / 300-1000mm	156-103	Vertical type
0-1" / 0-25mm 1-2" / 25-50mm	156-106	Fixed angle with platform



### DIMENSIONS





# Color Ratchet & Color Speeder

## Color ratchet



### SPECIFICATIONS

Order No.	Color
985056	Black
985061	Red
985081	Blue
985071	Yellow
985076	Green
985066	Brown
04GZA241*	Gray
04GZA239**	Gray
04GZA243***	Gray

\*for Series 293 digital model  
 \*\* up to 300mm / 12"  
 \*\*\* over 300mm / 12"

## Color Speeder for Ratchet Thimble Micrometer



### SPECIFICATIONS

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

### Technical Data

Tip length: metric type: 10mm  $\pm 5\mu\text{m}$   
 inch type: .5"  $\pm .0002$ "

Spindle Dia: <sup>1</sup>.250" / 6.35mm  
<sup>1</sup>Spindle diameter for 101469  
 (.250" ball) is .315" / 8mm



To measure odd workpieces, several convenient anvil attachments are prepared by Mitutoyo. Among them the most often used one is the ball attachment.

The ball attachments are hardened steel balls with .200" and .250" diameters which are placed on the .250" and .315" diameter anvils, respectively, by rubber caps. With these attachments, regular micrometers can measure cylindrical wall thickness, but, .200" or .250" must be subtracted from the readings.

Other attachments shown here are either .500" or 10mm in length. The added amount must be subtracted from the reading.

## Spindle Attachment Tip

Ball	Spline	Comparator	Blade	Knife-edge	Disk
101468 (.200" ball dia.) 101469 (.250" ball dia.)	208062* 208098	208063* 208099	208064* 208100	208065* 208101	208066* 208102

### DIMENSIONS

Order No.	Dimension
208098 208062*	
208099 208063*	
208100 208064*	

Order No.	Dimension
208101 208065*	
208102 208066*	

\* metric type

## Micrometer Oil

207000 (30ml)



Mitutoyo

# Optical Parallels

## SERIES 157

### FEATURES

- Designed to inspect parallelism and flatness of measuring faces of micrometers.
- Each set consists of 4 thicknesses.
- Supplied in fitted wooden case.



### SPECIFICATIONS

Metric		
Range of micrometer to be checked	Order No.	Assortment of parallels (Thickness of parallel)
0-25mm	<b>157-903</b>	12.00mm (157-101) 12.12mm (157-102) 12.25mm (157-103) 12.37mm (157-104)
25-50mm	<b>157-904</b>	25.00mm (157-105) 25.12mm (157-106) 25.25mm (157-107) 25.37mm (157-108)

Inch		
Range of micrometer to be checked	Order No.	Assortment of parallels (Thickness of parallel)
0-1"	<b>157-901</b>	.5000" (157-109) .5062" (157-110) .5125" (157-111) .5187" (157-112)
1-2"	<b>157-902</b>	1.0000" (157-113) 1.0062" (157-114) 1.0125" (157-115) 1.0187" (157-116)

# Optical Flats

## SERIES 158

### FEATURES

- Used for inspecting the flatness of micrometer's or gage block's measuring faces with high accuracy.
- Supplied in fitted wooden case.



### SPECIFICATIONS

Metric		
Flatness	Order No.	Diameter/Thickness
0.2µm	<b>158-117</b>	45mm/12mm
	<b>158-119</b>	60mm/15mm
0.1µm	<b>158-118</b>	45mm/12mm
	<b>158-120</b>	60mm/15mm

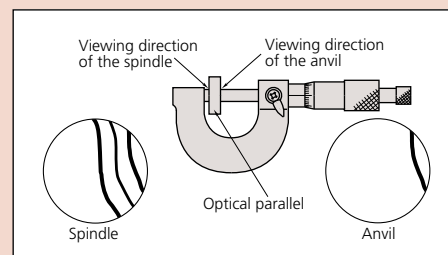
Inch		
Flatness	Order No.	Diameter/Thickness
.000004"	<b>158-122</b>	1.8"/.5"
	<b>158-124</b>	2.4"/.6"

### Technical Data

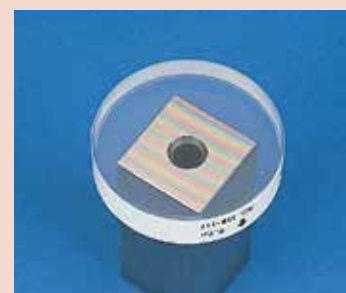
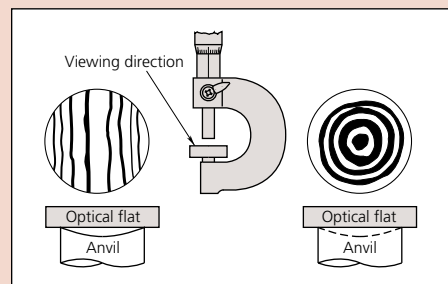
Flatness: .000004" / 0.1µm  
Parallelism: .000008" / 0.2µm  
Diameter: 1.18" / 30mm

### Parallelism check between measuring faces by means of interference fringe produced by an optical parallel.

The parallelism between the measuring faces can be determined as follows—place the optical parallel to the anvil and observe the number of interference fringes produced on the spindle side under the measuring force of the micrometers.  
The parallelism is about 1µm (0.32µm x 3 = 0.96µm). Fringe on the anvil side must not be more than one.



### Flatness check of measuring faces using interference fringe pattern produced by an optical flat.



## Technical Data

Flatness: 0.3µm / .000012"  
 Parallelism: 2µm / .00008"



# Micrometer Standards

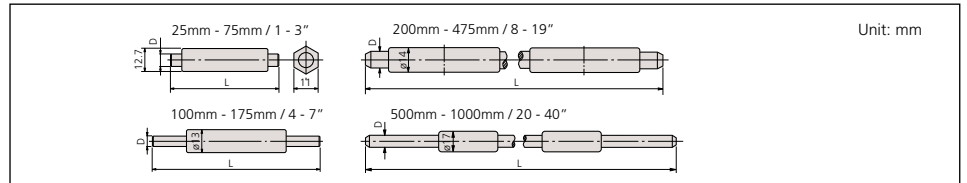
## SERIES 167

### FEATURES

- Used for the zero point setting of outside micrometers.
- Flat and lapped measuring faces.
- Heat insulating handle to prevent expansion due to body temperature.
- Supplied in fitted carton up to 500mm / 20" and wooden case for over 525mm / 21" length.



### DIMENSION



### SPECIFICATIONS

Metric			
Length (L)	Order No.	Diameter (D)	Accuracy
25mm	167-101	6.35mm	±1.5µm
50mm	167-102	6.35mm	±2.0µm
75mm	167-103	6.35mm	±2.5µm
100mm	167-104	7.9mm	±3µm
125mm	167-105	7.9mm	±3.5µm
150mm	167-106	7.9mm	±4µm
175mm	167-107	7.9mm	±4.5µm
200mm	167-108	9.4mm	±5.0µm
225mm	167-109	9.4mm	±5.5µm
250mm	167-110	9.4mm	±6.0µm
275mm	167-111	9.4mm	±6.5µm
300mm	167-112	9.4mm	±7µm
325mm	167-113	9.4mm	±7.5µm
350mm	167-114	9.4mm	±8µm
375mm	167-115	9.4mm	±8.5µm
400mm	167-116	9.4mm	±9µm
425mm	167-117	9.4mm	±9.5µm
450mm	167-118	9.4mm	±1.0µm
475mm	167-119	9.4mm	±10.5µm
500mm	167-120	11.9mm	±11µm
525mm	167-121	11.9mm	±11.5µm
550mm	167-122	11.9mm	±12µm
575mm	167-123	11.9mm	±12.5µm
600mm	167-124	11.9mm	±13µm
625mm	167-125	11.9mm	±13.5µm
650mm	167-126	11.9mm	±14µm
675mm	167-127	11.9mm	±14.5µm
700mm	167-128	11.9mm	±15µm
725mm	167-129	11.9mm	±15.5µm
750mm	167-130	11.9mm	±16µm
775mm	167-131	11.9mm	±16.5µm
800mm	167-132	11.9mm	±17µm
825mm	167-133	11.9mm	±17.5µm
850mm	167-134	11.9mm	±18µm
875mm	167-135	11.9mm	±18.5µm
900mm	167-136	11.9mm	±19µm
925mm	167-137	11.9mm	±19.5µm
950mm	167-138	11.9mm	±20µm
975mm	167-139	11.9mm	±20.5µm
1000mm	167-140	11.9mm	±21µm

Inch			
Length (L)	Order No.	Diameter (D)	Accuracy
1"	167-141	.25"	±.00005"
2"	167-142	.25"	±.0001"
3"	167-143	.25"	±.0001"
4"	167-144	.31"	±.0001"
5"	167-145	.31"	±.00015"
6"	167-146	.31"	±.00015"
7"	167-147	.31"	±.00015"
8"	167-148	.37"	±.00015"
9"	167-149	.37"	±.0002"
10"	167-150	.37"	±.0002"
11"	167-151	.37"	±.0002"
12"	167-152	.37"	±.00025"
13"	167-153	.37"	±.00025"
14"	167-154	.37"	±.00025"
15"	167-155	.37"	±.00025"
16"	167-156	.37"	±.00025"
17"	167-157	.37"	±.00025"
18"	167-158	.37"	±.00025"
19"	167-159	.37"	±.0003"
20"	167-160	.47"	±.0003"
21"	167-161	.47"	±.0003"
22"	167-162	.47"	±.0003"
23"	167-163	.47"	±.0003"
24"	167-164	.47"	±.0003"
25"	167-165	.47"	±.00035"
26"	167-166	.47"	±.00035"
27"	167-167	.47"	±.00035"
28"	167-168	.47"	±.00035"
29"	167-169	.47"	±.00035"
30"	167-170	.47"	±.00035"
31"	167-171	.47"	±.00035"
32"	167-172	.47"	±.00035"
33"	167-173	.47"	±.00035"
34"	167-174	.47"	±.00035"
35"	167-175	.47"	±.00035"
36"	167-176	.47"	±.00035"
37"	167-177	.47"	±.0004"
38"	167-178	.47"	±.0004"
39"	167-179	.47"	±.0004"
40"	167-180	.47"	±.0004"

Inch			
Length (L)	Order No.	Diameter (D)	Accuracy
41"	167-405	.47"	.0004"
42"	167-406	.47"	.0004"
43"	167-407	.47"	.0004"
44"	167-408	.47"	.0004"
45"	167-409	.47"	.0004"
46"	167-410	.47"	.0004"
47"	167-411	.47"	.0004"
48"	167-412	.47"	.0004"
49"	167-413	.47"	.0004"
50"	167-414	.47"	.0004"
51"	167-415	.47"	.0004"
52"	167-416	.47"	.0004"
53"	167-417	.47"	.0004"
54"	167-418	.47"	.0004"
55"	167-419	.47"	.0004"
56"	167-420	.47"	.0004"
57"	167-421	.47"	.0004"
58"	167-422	.47"	.0004"
59"	167-423	.47"	.0004"
60"	167-424	.47"	.0004"
61"	167-425	.47"	.0004"
62"	167-426	.47"	.0004"
63"	167-427	.47"	.0004"
64"	167-428	.47"	.0004"
65"	167-429	.47"	.0004"
66"	167-430	.47"	.0004"
67"	167-431	.47"	.0004"
68"	167-432	.47"	.0004"
69"	167-433	.47"	.0004"
70"	167-434	.47"	.0004"
71"	167-435	.47"	.0004"
72"	167-436	.47"	.0004"
73"	167-437	.47"	.0004"
74"	167-438	.47"	.0004"
75"	167-439	.47"	.0004"
76"	167-440	.47"	.0004"
77"	167-441	.47"	.0004"
78"	167-442	.47"	.0004"
79"	167-443	.47"	.0004"

### Micrometer Standards Set

Inch		
Order No.	Size	Remarks
167-912*	1"-5"	5 pcs. Set (167-141, 142, 143, 144, 145)
167-913*	1"-11"	11 pcs. Set (167-141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151)

Metric		
Order No.	Size	Remarks
167-902*	25-125mm	5 pcs. Set (167-101, 102, 103, 104, 105)
167-903*	25-275mm	11 pcs. Set (167-101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111)

\*Supplied with fitted carrying case

# Standards for Screw Thread Micrometers

## SERIES 167 — 60 degree and 55 degree

### FEATURES

- Specially designed for the zero point setting of screw thread micrometers.
- Supplied in fitted carton.



167-264 (60°)



167-262 (60°)

### SPECIFICATIONS

Metric			
Length	Order No.	Thread angle	Accuracy
25mm	167-261	60°	±4μm
	167-272	55°	±4μm
50mm	167-262	60°	±5μm
	167-273	55°	±5μm
75mm	167-263	60°	±6μm
	167-274	55°	±6μm
100mm	167-264	60°	±7μm
	167-275	55°	±7μm
125mm	167-265	60°	±8μm
	167-276		±8μm
150mm	167-266	60°	±9μm
	167-277		±9μm
175mm	167-267	60°	±10μm
	167-278		±10μm
200mm	167-268	60°	±11μm
	167-279		±11μm
225mm	167-269	60°	±12μm
	167-280		±12μm
250mm	167-270	60°	±13μm
	167-281		±13μm
275mm	167-271	60°	±14μm
	167-282		±14μm

Inch			
Length	Order No.	Thread angle	Accuracy
1"	167-294	60°	±.00015"
	167-283	55°	±.00015"
2"	167-295	60°	±.0002"
	167-284	55°	±.0002"
3"	167-296	60°	±.00025"
	167-285	55°	±.00025"
4"	167-297	60°	±.0003"
	167-286	55°	±.0003"
5"	167-298	60°	±.00035"
	167-287	55°	±.00035"
6"	167-299	60°	±.0004"
	167-288	55°	±.0004"

### Technical Data

Thread angle: 55° or 60°  
Angle Accuracy: ±2°

# Standards for V-Anvil Micrometers

## SERIES 167

### FEATURES

- Specially designed for the zero point setting of V-anvil micrometers.
- Supplied in fitted carton.



167-329

### SPECIFICATIONS

Metric			
Diameter	Order No.	Type	Accuracy
5mm	167-327	Plug	±2μm
10mm	167-328	Plug	±2μm
25mm	167-329	Plug	±2μm
40mm	167-330	Ring	±3μm
55mm	167-331	Ring	±3μm
70mm	167-332	Ring	±3μm
85mm	167-333	Ring	±3μm

Inch			
Diameter	Order No.	Type	Accuracy
.2"	167-337	Plug	±.0001"
.4"	167-338	Plug	±.0001"
1"	167-339	Plug	±.0001"
1.6"	167-340	Ring	±.00015"
2.2"	167-341	Ring	±.00015"
2.8"	167-342	Ring	±.00015"
3.4"	167-343	Ring	±.00015"

# Tool Kits

The Digimatic Tool Kits include Mitutoyo's highly popular 0-1" / 0-25mm Digimatic Micrometer (choose ratchet or friction type) and 0-6" / 0-150mm Digimatic Caliper with Absolute Encoder. The case is made of handsome, solid mahogany and has space for gage batteries. The micrometer spanner is a supplied accessory.

Order No. 64PKA068A (Inch Tool Kit)	
Item No.	Description
103-135	Outside Micrometer (Friction Thimble Type) (Range: 0-1", Graduation: .0001")
505-742	Dial Caliper (Range: 0-6", Dial Graduation: .001")
182-204	6" Full-Flexible Rule (3R)
64PPP932	Mahogany Case



64PKA068A

Order No. 64PKA069A (Inch Tool Kit)	
Item No.	Description
103-135	Outside Micrometer (Friction Thimble Type) (Range: 0-1", Graduation: .0001")
182-202	6" Full-Flexible Rule (16R)
513-518T	Test Indicator Set (Range: .04", Graduation: .001")
505-742	675 Dial Caliper (Range: 0-6", Dial Graduation: .001")
050501	Mahogany Case



64PKA069A

The basic measuring instruments recommended for vocational students and machinist apprentices are supplied in this kit.

Order No. 64PKA070A (Inch Tool Kit)	
Item No.	Description
101-117	Outside Micrometer (Friction Thimble Type) (Range: 0-1", Graduation: .0001")
129-132	Depth Micrometer (with 6 pcs rods) (Range: 0-6", Graduation: .001")
182-202	Full-Flexible Rule (16R)
505-742	Dial Caliper (Range: 0-6", Graduation: .001")
050503	Mahogany Case



64PKA070A

For operations where depth measurements are a primary concern, this kit is ideal for measuring depths to 6", in addition to providing the tools for regular precision measurements.

Order No. 64PKA071B (Inch Tool Kit)	
Item No.	Description
103-922	Outside Micrometer Set (3 pcs) (Range: 0-3", Graduation: .0001")
141-208	Inside Micrometer (with 6 pcs rods)
180-905B	Combination Set (4R)
182-202	Full-Flexible Rule (16R)
513-518T	Test Indicator Set (Range: .04", Graduation: .001")
505-742	Dial Caliper (Range: 0-6", Dial Graduation: .001")
2416S	Dial Indicator (Range: 1.0", Graduation: .001")
7010S	Magnetic Stand
050504	Mahogany Case



64PKA071B

Most every routine inspection assignment can be completed with the eight high-quality Mitutoyo precision measuring instruments provided in this deluxe kit.

# Tool Kits



64PKA080B

Order No. 64PKA080B (Inch Tool Kit)	
Item No.	Description
182-102	6" Steel Rule (16R)
103-177	Micrometer (Ratchet Thimble) (Range 0-1", Graduation .001")
505-740	Dial Caliper (Range: 0-6", Dial Graduation: .001")
64PPP932	Mahogany Case



64PKA073B

Order No. 64PKA073B (Tool Kit Lite)	
Item No.	Description
182-102	6" Steel Rule (16R)
700-113-10	0 - 6" / 0 - 150mm MyCal Lite (Resolution: .001" / 0.1mm)
293-831-30	0 - 1" / 0 - 25.4mm MDC Lite (Ratchet Stop) (Resolution: .00005" / 0.001mm)
64PPP932	Mahogany Case



64PKA076B

Order No. 64PKA076B (Digimatic Tool Kit)	
Item No.	Description
293-340-30	Digimatic Micrometer (Ratchet Stop Type) (Range: 0 - 1" / 0 - 25.4mm, LCD Resolution: .00005" / 0.001mm)
500-196-30	Digimatic Caliper with Absolute Encoder (Range: 0 - 6" / 0 - 150mm, LCD Resolution: .0005" / 0.001mm)
64PPP932	Mahogany Case

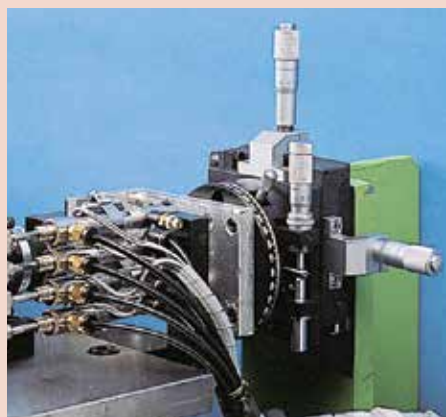
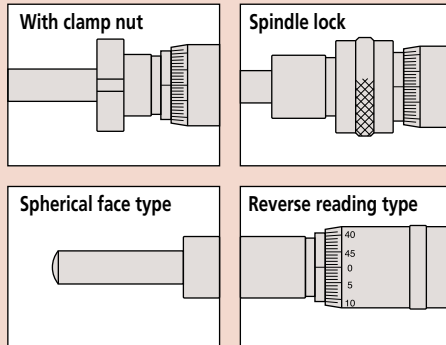


64PKA077B

Order No. 64PKA077B (Digimatic Tool Kit)	
Item No.	Description
293-348-30	Digimatic Micrometer (Friction Thimble Type) (Range: 0 - 1" / 0 - 25.4mm, LCD Resolution: .00005" / 0.001mm)
500-196-30	Digimatic Caliper with Absolute Encoder (Range: 0 - 6" / 0 - 150mm, LCD Resolution: .0005" / 0.001mm)
64PPP932	Mahogany Case

# Micrometer Head Selection Guide

## Variety of Specifications



The table below provides an outline of Mitutoyo micrometer heads for each series so you can locate the pages to refer to select the micrometer head most appropriate to your specific application. When selecting consider the following points:

- Dimensions
- Graduation/resolution and accuracy
- With or without spindle lock
- With or without clamping nut
- Normal or reverse reading
- With or without ratchet stop

## SELECTION TABLE

Range	Series	Remarks	Page
0 - 1mm	110	Differential screw translator (extra-fine feeding) type	B-69
0 - 2.5mm	110	Differential screw translator (extra-fine feeding) type	B-69
0 - 5mm	148	Ultra-small type	B-60
0 - 6.5mm	148	Fine spindle feeding of 0.1mm/rev.	B-58
	148	Fine spindle feeding of 0.25mm/rev.	B-59
	148	Small type	B-60
	148	Large thimble diameter for easy reading	B-61
0 - 10mm	152	Fine-feeding type	B-68
0 - 13mm	148	Common type in small size	B-62
	148	Spindle feeding of 0.25mm/rev.	B-59
	148	Zero-adjustable thimble type	B-63
	148	Large thimble diameter for easy reading	B-61
	110	Differential screw translator (extra-fine feeding) type	B-69
0 - 15mm	149	with carbide-tipped spindle type	B-64
	153	Non-rotating spindle type	B-67
	152	Quick spindle feeding of 1mm/rev.	B-68
0 - 25mm	350	Compact digital type	B-57
	150	Common type in middle size	B-65
	153	Non-rotating spindle type	B-67
	153	Fine graduation type	B-71
	151	Heavy-duty type (ø8mm spindle)	B-66
	152	Quick spindle feeding of 1mm/rev.	B-68
	152	Fine feeding type	B-68
	152	for XY-stage	B-70
	250	with digit counter type	B-73
0 - 50mm	164	Digital type	B-56
	151	Heavy-duty type (ø8mm spindle)	B-66
	152	Quick spindle feeding of 1mm/rev.	B-68
	152	Fine-feeding type	B-68
	197	Non-rotating spindle and large thimble	B-71

# Digimatic Micrometer Heads

## SERIES 164

### FEATURES

- The display can be rotated up to 330° for easy reading in any position.
- Non-rotating spindle imparts no torque on the workpiece.



164-164

### SPECIFICATIONS

Metric				Inch/Metric			
Range	Order No.	Accuracy	Mass (g)	Range	Order No.	Accuracy	Mass (g)
0 - 50mm	164-163	±3µm	490	0 - 2" / 0 - 50.8mm	164-164	±.00015"	490

### Technical Data

Accuracy: Refer to the list of specifications.

Resolution: 0.001mm or .00005"/0.001mm

Display: LCD

Battery: SR44 (2 pcs.), **938882**

Battery life: 1.8 years

### Function

Zero-setting, Data hold, Data output, Preset, inch/mm conversion (on inch/metric models only)

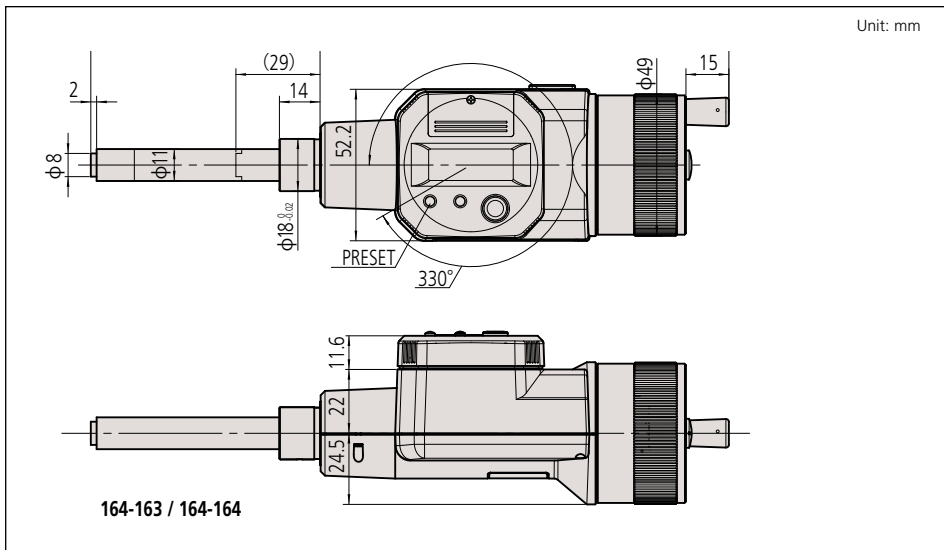
Alarm: Low voltage, Counting value composition error

### Optional Accessories

**959149:** SPC cable (1m / 40")

**959150:** SPC cable (2m / 80")

### DIMENSIONS







# Digimatic Micrometer Heads

## SERIES 350

### FEATURES

- Equipped with digital display and output.
- 350 series IP65 models: the Digimatic output port enables inclusion in a statistical process control or networked measurement system.

Measuring force: 5 - 10N

### Non-rotating device

350-261-30, 350-361-30

The non-rotating device provides no radial torsion on the workpiece surface so that workpiece wear and deformation are minimized.



### Technical Data

Accuracy\* ±2µm Metric model  
±.0001" Inch / Metric model

Resolution: 0.001mm or .00005"/0.001mm

Display: LCD

Battery: SR44 (1 pc) 938882

Battery life: Approx. 2.4 years under normal use

Dust/Water protection level: IP65

350-281-30, 350-282-30, 350-283-30, 350-284-30, 350-261-30  
350-381-30, 350-382-30, 350-383-30, 350-384-30, 350-361-30

### Function

Preset, inch/mm conversion (on inch/metric models only)

Function Lock, 2 Presets

Alarm: Low voltage, Counting value composition error

### Optional Accessories

05CZA662: SPC cable with data switch (1m / 40")

05CZA663: SPC cable with data switch (2m / 80")



350-251-30



350-281-30

### SPECIFICATIONS

#### Metric

Range	Order No.	Stem	Spindle face	Stem dia.	Remarks
0 - 25mm	350-251-30	Plain	Flat (carbide tip)	10mm	
0 - 25mm	350-252-30	w/ clamp nut	Flat (carbide tip)	10mm	
0 - 25mm	350-253-30	Plain	Spherical (SR4)	10mm	
0 - 25mm	350-254-30	w/ clamp nut	Spherical (SR4)	10mm	
0 - 25mm	350-281-30	Plain	Flat (carbide tip)	12mm	IP65
0 - 25mm	350-282-30	w/ clamp nut	Flat (carbide tip)	12mm	IP65
0 - 25mm	350-283-30	Plain	Spherical (SR4)	12mm	IP65
0 - 25mm	350-284-30	w/ clamp nut	Spherical (SR4)	12mm	IP65
0 - 25mm	350-261-30*	Plain	Flat	12mm	IP65

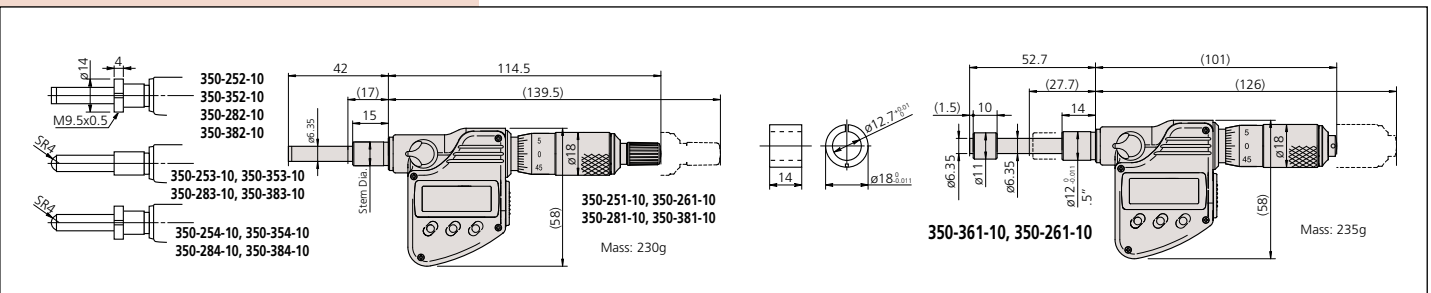
\*with non-rotating device and 18mm stem bushing.

#### Inch/Metric

Range	Order No.	Stem	Spindle face	Stem dia.	Remarks
0 - 1" / 0-25.4mm	350-351-30	Plain	Flat (carbide tip)	.375"	
0 - 1" / 0-25.4mm	350-352-30	w/ clamp nut	Flat (carbide tip)	.375"	
0 - 1" / 0-25.4mm	350-353-30	Plain	Spherical (SR4)	.375"	
0 - 1" / 0-25.4mm	350-354-30	w/ clamp nut	Spherical (SR4)	.375"	
0 - 1" / 0-25.4mm	350-381-30	Plain	Flat (carbide tip)	.5"	IP65
0 - 1" / 0-25.4mm	350-382-30	w/ clamp nut	Flat (carbide tip)	.5"	IP65
0 - 1" / 0-25.4mm	350-383-30	Plain	Spherical (SR4)	.5"	IP65
0 - 1" / 0-25.4mm	350-384-30	w/ clamp nut	Spherical (SR4)	.5"	IP65
0 - 1" / 0-25.4mm	350-361-30*	Plain	Flat	.5"	IP65

\*with non-rotating device and 18mm stem bushing.

### DIMENSIONS AND MASS

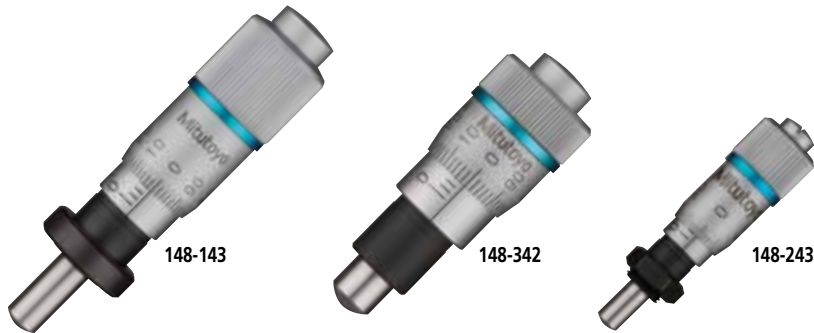


# Micrometer Heads

## SERIES 148 — Fine Spindle Feeding of 0.1mm/rev

### FEATURES

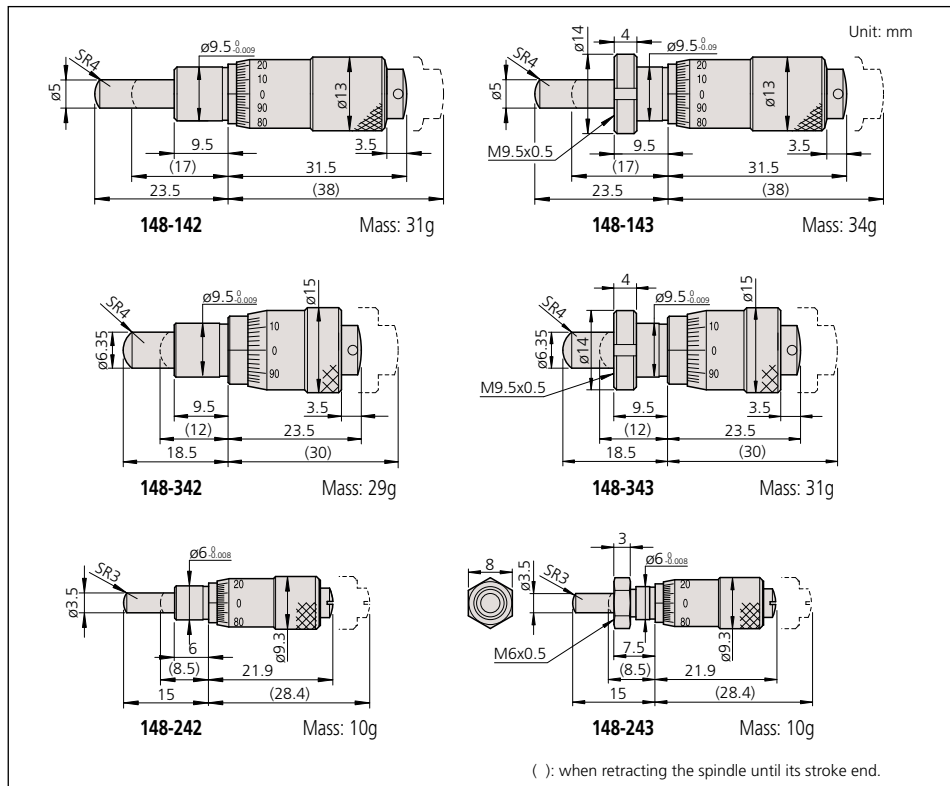
- Fine spindle feeding of just 0.1mm/rev for extra-fine adjustment and positioning.
- External dimensions are compatible with conventional 0.5mm pitch heads.



### SPECIFICATIONS

Metric						
Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Remarks
0 - 6.5mm	148-142	±2μm	9.5mm	Plain	Spherical (SR4)	—
0 - 6.5mm	148-143	±2μm	9.5mm	w/clamp nut	Spherical (SR4)	—
0 - 6.5mm	148-342	±2μm	9.5mm	Plain	Spherical (SR4)	Thicker & shorter thimble
0 - 6.5mm	148-343	±2μm	9.5mm	w/clamp nut	Spherical (SR4)	Thicker & shorter thimble
0 - 6.5mm	148-242	±5μm	6mm	Plain	Spherical (SR3)	Small thimble diameter
0 - 6.5mm	148-243	±5μm	6mm	w/clamp nut	Spherical (SR3)	Small thimble diameter

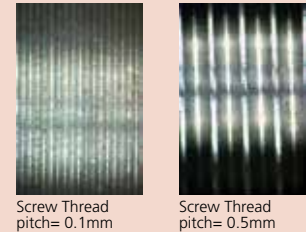
### DIMENSIONS AND MASS



### Technical Data

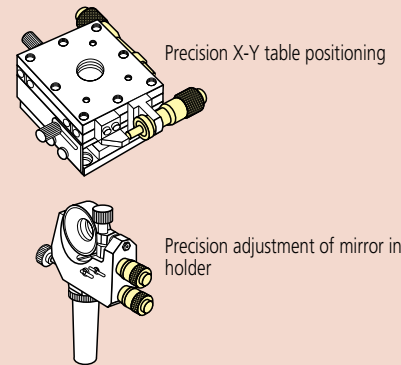
Graduations: 0.002mm  
 Spindle pitch: 0.1mm  
 Spindle face: Spherical of SKS3 (more than HRC60), lapped surface  
 Scale surface: Hard-chrome plating  
 Fixture thickness for clamp nut: 6mm (148-243: 4mm)

### Spindle pitch

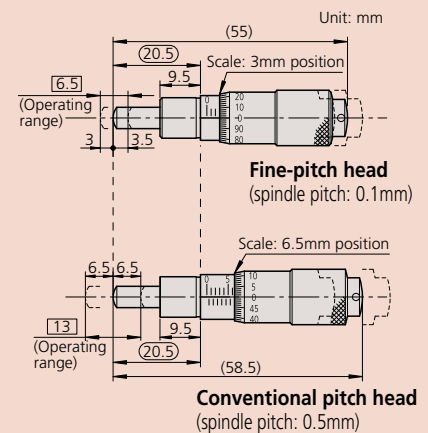


### Applications

Semiconductor wafer positioning machinery and optical component alignment units, etc.



Comparison of mounting dimensions between a standard fine-pitch head and a standard conventional pitch head at the mid-range travel position.



While the fine-pitch micrometer head has a measuring range of 6.5mm, the conventional head has a larger range of 13mm. When replacing a conventional head, the fine-pitch type can use the common range in the middle of the spindle travel. The standard and compact types of fine-pitch head are completely interchangeable.

# Micrometer Heads

**SERIES 148 — Fine Spindle Feeding of 0.25 mm / rev**

## Technical Data

Graduations: 0.01mm  
 Spindle pitch: 0.25mm  
 Spindle face: Spherical of SKS3 (more than HRC60), lapped surface  
 Scale surface: Hard-chrome plating  
 Fixture thickness for clamp nut: 6mm

## FEATURES

- Fine spindle feeding of just 0.25mm/rev for fine adjustment and positioning.



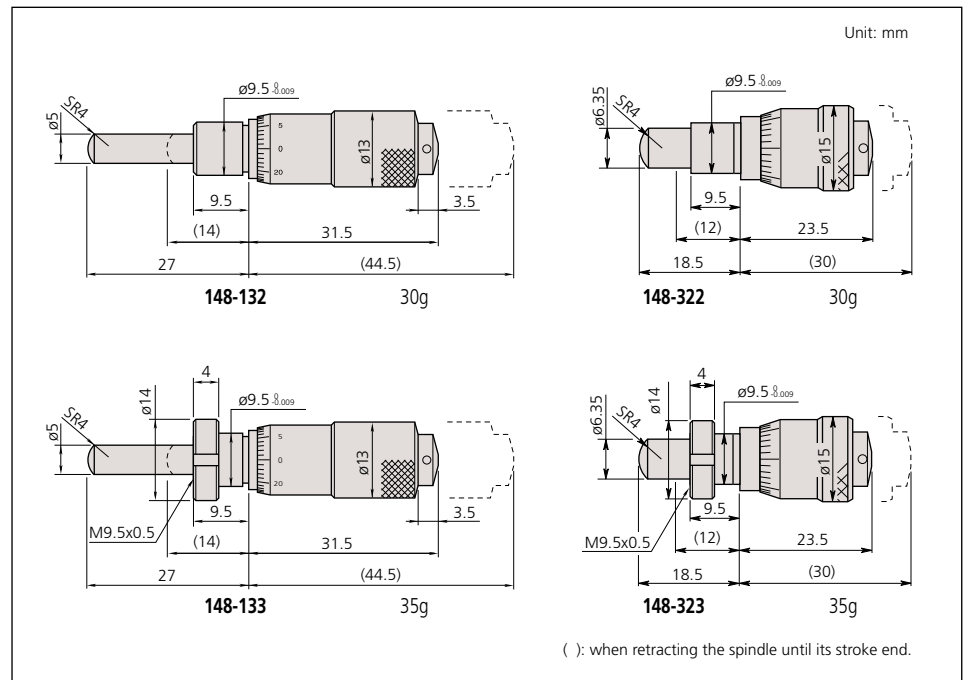
148-132

## SPECIFICATIONS

### Metric

Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face
0 - 13mm	<b>148-132</b>	2μm	9.5mm	Plain	Spherical (SR4)
0 - 13mm	<b>148-133</b>	2μm	9.5mm	w/clamp nut	Spherical (SR4)
0 - 6.5mm	<b>148-322</b>	2μm	9.5mm	Plain	Spherical (SR4)
0 - 6.5mm	<b>148-323</b>	2μm	9.5mm	w/ clamp nut	Spherical (SR4)

## DIMENSIONS AND MASS



# Micrometer Heads

## SERIES 148 — Ultra-Small/Small Type

### FEATURES

- Miniature micrometer heads for ease of incorporating into machines.



### Technical Data

Graduations: 0.02mm (148-215, 148-216), 0.01mm or .001"  
 Spindle pitch: 0.5mm  
 Spindle face: Flat or spherical of SKS3 (more than HRC60), lapped surface  
 Scale surface: Hard-chrome plating  
 Fixture thickness for clamp nut: 3mm (148-216, 148-218), 4mm

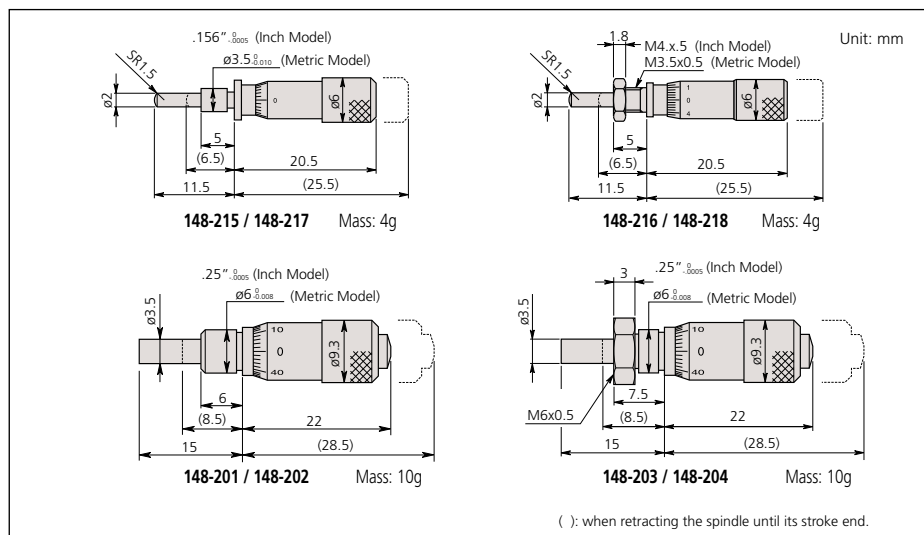
### SPECIFICATIONS

Metric						
Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Remarks
0 - 5mm	148-215	±5μm	3.5mm	Plain	Spherical (SR1.5)	—
0 - 5mm	148-216	±5μm	3.5mm	w/clamp nut	Spherical (SR1.5)	—
0 - 6.5mm	148-201	±5μm	6mm	Plain	Flat	—
0 - 6.5mm	148-203	±5μm	6mm	w/clamp nut	Flat	—
0 - 6.5mm	148-205	±5μm	6mm	Plain	Spherical (SR3)	—
0 - 6.5mm	148-207	±5μm	6mm	w/clamp nut	Spherical (SR3)	—
6.5 - 0 mm	148-209	±5μm	6mm	Plain	Flat	Reverse reading
6.5 - 0 mm	148-211	±5μm	6mm	w/ clamp nut	Flat	Reverse reading

Inch						
Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Remarks
0 - .2"	148-217	±5μm	.156"	Plain	Spherical (SR1.5)	—
0 - .2"	148-218	±5μm	.156"	w/clamp nut	Spherical (SR1.5)	—
0 - .25"	148-202	±5μm	.25"	Plain	Flat	—
0 - .25"	148-204	±5μm	.25"	w/clamp nut	Flat	—
0 - .25"	148-206	±5μm	.25"	Plain	Spherical (SR3)	—
0 - .25"	148-208	±5μm	.25"	w/clamp nut	Spherical (SR3)	—
.25 - 0"	148-210	±5μm	.25"	Plain	Flat	Reverse reading
.25 - 0"	148-212	±5μm	.25"	w/ clamp nut	Flat	Reverse reading



### DIMENSIONS AND MASS



# Micrometer Heads

## SERIES 148 — Large Thimble Diameter for Easy Reading

### FEATURES

- Easy reading due to the large thimble diameter. (Three types of thimble diameters can be selected.)

### SPECIFICATIONS

#### Metric

Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Thimble Dia.
0 - 6.5mm	<b>148-301</b>	±2μm	9.5mm	Plain	Flat	15mm
0 - 6.5mm	<b>148-302</b>	±2μm	9.5mm	w/clamp nut	Flat	15mm
0 - 6.5mm	<b>148-303</b>	±2μm	9.5mm	Plain	Flat	20mm
0 - 6.5mm	<b>148-304</b>	±2μm	9.5mm	w/clamp nut	Flat	20mm
0 - 6.5mm	<b>148-305</b>	±2μm	9.5mm	Plain	Flat	29mm
0 - 6.5mm	<b>148-306</b>	±2μm	9.5mm	w/clamp nut	Flat	29mm
0 - 13mm	<b>148-307</b>	±2μm	9.5mm	Plain	Flat	15mm
0 - 13mm	<b>148-308</b>	±2μm	9.5mm	w/clamp nut	Flat	15mm
0 - 13mm	<b>148-309</b>	±2μm	9.5mm	Plain	Flat	20mm
0 - 13mm	<b>148-310</b>	±2μm	9.5mm	w/clamp nut	Flat	20mm
0 - 13mm	<b>148-311</b>	±2μm	9.5mm	Plain	Flat	29mm
0 - 13mm	<b>148-312</b>	±2μm	9.5mm	w/ clamp nut	Flat	29mm

#### Inch

Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Thimble Dia.
0 - .25"	<b>148-351</b>	±.0001"	.375"	Plain	Flat	.59"
0 - .25"	<b>148-352</b>	±.0001"	.375"	w/clamp nut	Flat	.59"
0 - .25"	<b>148-353</b>	±.0001"	.375"	Plain	Flat	.79"
0 - .25"	<b>148-354</b>	±.0001"	.375"	w/clamp nut	Flat	.79"
0 - .25"	<b>148-355</b>	±.0001"	.375"	Plain	Flat	1.14"
0 - .25"	<b>148-356</b>	±.0001"	.375"	w/clamp nut	Flat	1.14"
0 - .5"	<b>148-357</b>	±.0001"	.375"	Plain	Flat	.59"
0 - .5"	<b>148-358</b>	±.0001"	.375"	w/clamp nut	Flat	.59"
0 - .5"	<b>148-359</b>	±.0001"	.375"	Plain	Flat	.79"
0 - .5"	<b>148-360</b>	±.0001"	.375"	w/clamp nut	Flat	.79"
0 - .5"	<b>148-361</b>	±.0001"	.375"	Plain	Flat	1.14"
0 - .5"	<b>148-362</b>	±.0001"	.375"	w/ clamp nut	Flat	1.14"



148-301



148-303

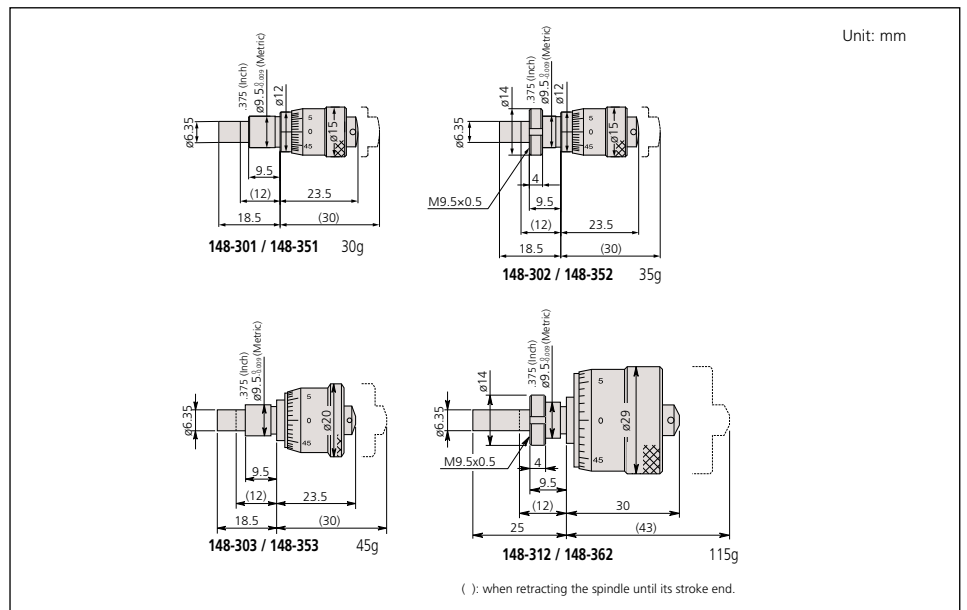


148-305

### Technical Data

Graduations: 0.01mm or .001"  
 Spindle pitch: 0.5mm or .025"  
 Spindle face: Flat of SKS3 (more than HRC60),  
 lapped surface  
 Scale surface: Hard-chrome plating  
 Fixture thickness for clamp nut: 6mm

### DIMENSIONS AND MASS



# Micrometer Heads

## SERIES 148 — Common Type in Small Size

### SPECIFICATIONS

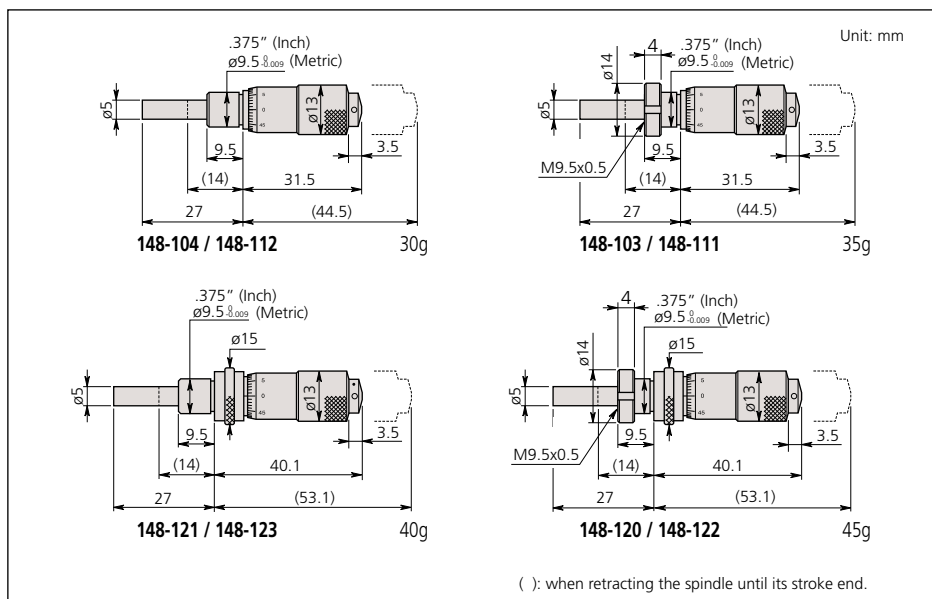
Metric						
Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Remarks
0 - 13mm	148-104	±2μm	9.5mm	Plain	Flat	—
0 - 13mm	148-103	±2μm	9.5mm	w/clamp nut	Flat	—
0 - 13mm	148-121	±2μm	9.5mm	Plain*	Flat	—
0 - 13mm	148-120	±2μm	9.5mm	w/clamp nut*	Flat	—
0 - 13mm	148-801	±2μm	9.5mm	Plain	Spherical (SR4)	—
0 - 13mm	148-802	±2μm	9.5mm	w/clamp nut	Spherical (SR4)	—
0 - 13mm	148-803	±2μm	9.5mm	Plain*	Spherical (SR4)	—
0 - 13mm	148-804	±2μm	9.5mm	w/clamp nut*	Spherical (SR4)	—
13mm - 0	148-821	±2μm	9.5mm	Plain	Flat	Reverse reading
13mm - 0	148-822	±2μm	9.5mm	w/clamp nut	Flat	Reverse reading
13mm - 0	148-823	±2μm	9.5mm	Plain*	Flat	Reverse reading
13mm - 0	148-824	±2μm	9.5mm	w/ clamp nut*	Flat	Reverse reading

\*with spindle lock

Inch						
Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Remarks
0 - .5"	148-112	±.0001"	.375"	Plain	Flat	—
0 - .5"	148-111	±.0001"	.375"	w/clamp nut	Flat	—
0 - .5"	148-123	±.0001"	.375"	Plain*	Flat	—
0 - .5"	148-122	±.0001"	.375"	w/clamp nut*	Flat	—
0 - .5"	148-811	±.0001"	.375"	Plain	Spherical (SR4)	—
0 - .5"	148-812	±.0001"	.375"	w/clamp nut	Spherical (SR4)	—
0 - .5"	148-813	±.0001"	.375"	Plain*	Spherical (SR4)	—
0 - .5"	148-814	±.0001"	.375"	w/clamp nut*	Spherical (SR4)	—
.5" - 0	148-831	±.0001"	.375"	Plain	Flat	Reverse reading
.5" - 0	148-832	±.0001"	.375"	w/clamp nut	Flat	Reverse reading
.5" - 0	148-833	±.0001"	.375"	Plain*	Flat	Reverse reading
.5" - 0	148-834	±.0001"	.375"	w/ clamp nut*	Flat	Reverse reading

\*with spindle lock

### DIMENSIONS AND MASS



148-103



148-104



148-121



148-120

### Technical Data

Graduations: 0.01mm or .001"

Spindle pitch: 0.5mm

Spindle face: Flat or spherical of SKS3 (more than HR60), lapped surface

Scale surface: Hard-chrome plating

Fixture thickness for clamp nut: 6mm

# Micrometer Heads

## SERIES 148 — Common Type in Small Size with Zero-Adjustable Thimble

### FEATURES

- The thimble can be set to zero at any position by loosening the set screw.

### SPECIFICATIONS

#### Metric

Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Remarks
0 - 13mm	<b>148-503</b>	±2μm	9.5mm	Plain	Flat	—
0 - 13mm	<b>148-513</b>	±2μm	9.5mm	Plain	Flat	Stainless steel throughout
0 - 13mm	<b>148-508</b>	±2μm	9.5mm	w/clamp nut	Flat	—
0 - 13mm	<b>148-506</b>	±2μm	9.5mm	Plain*	Flat	—
0 - 13mm	<b>148-504</b>	±2μm	9.5mm	w/clamp nut*	Flat	—
0 - 13mm	<b>148-853</b>	±2μm	9.5mm	Plain	Spherical (SR4)	—
0 - 13mm	<b>148-854</b>	±2μm	9.5mm	w/clamp nut*	Spherical (SR4)	—
13mm - 0	<b>148-863</b>	±2μm	9.5mm	Plain	Flat	Reverse reading
13mm - 0	<b>148-864</b>	±2μm	9.5mm	w/ clamp nut*	Flat	Reverse reading

\*with spindle lock

#### Inch

Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Remarks
0 - .5"	<b>148-501</b>	±.0001"	.375"	Plain	Flat	—
0 - .5"	<b>148-511</b>	±.0001"	.375"	Plain	Flat	Stainless steel throughout
0 - .5"	<b>148-507</b>	±.0001"	.375"	w/clamp nut	Flat	—
0 - .5"	<b>148-505</b>	±.0001"	.375"	Plain*	Flat	—
0 - .5"	<b>148-502</b>	±.0001"	.375"	w/clamp nut*	Flat	—
0 - .5"	<b>148-851</b>	±.0001"	.375"	Plain	Spherical (SR4)	—
0 - .5"	<b>148-852</b>	±.0001"	.375"	w/clamp nut*	Spherical (SR4)	—
.5" - 0	<b>148-861</b>	±.0001"	.375"	Plain	Flat	Reverse reading
.5" - 0	<b>148-862</b>	±.0001"	.375"	w/ clamp nut*	Flat	Reverse reading

\*with spindle lock



### Technical Data

Graduations: 0.01mm or .001"

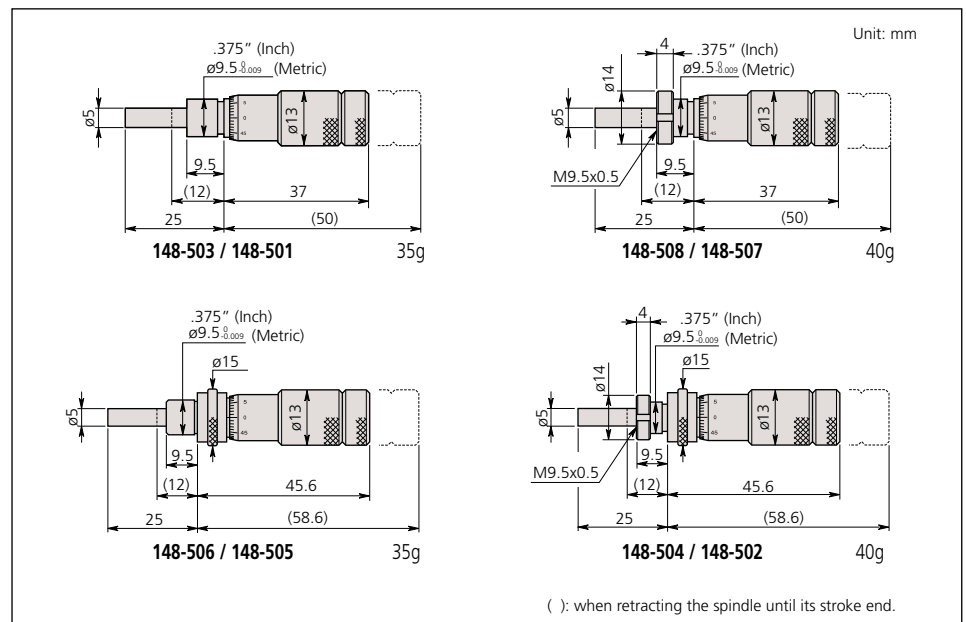
Spindle pitch: 0.5mm

Spindle face: Flat or spherical of SKS3 (more than HRC60), lapped surface

Scale surface: Hard-chrome plating

Fixture thickness for clamp nut: 6mm

### DIMENSIONS AND MASS



# Micrometer Heads

## SERIES 149 — Common Type in Small Size with Carbide-tipped Spindle

### FEATURES

- Carbide-tipped measuring face.

### SPECIFICATIONS

#### Metric

Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Remarks
0 - 15mm	<b>149-132</b>	±2μm	9.5mm	Plain	Flat (carbide tip)	—
0 - 15mm	<b>149-131</b>	±2μm	9.5mm	w/clamp nut	Flat (carbide tip)	—
0 - 15mm	<b>149-183</b>	±2μm	9.5mm	Plain*	Flat (carbide tip)	With spindle lock
0 - 15mm	<b>149-184</b>	±2μm	9.5mm	w/clamp nut*	Flat (carbide tip)	With spindle lock
0 - 15mm	<b>149-801</b>	±2μm	9.5mm	Plain	Spherical (SR4)	—
0 - 15mm	<b>149-802</b>	±2μm	9.5mm	w/clamp nut	Spherical (SR4)	—
15mm - 0	<b>149-821</b>	±2μm	9.5mm	Plain	Flat (carbide tip)	Reverse reading
15mm - 0	<b>149-822</b>	±2μm	9.5mm	w/ clamp nut	Flat (carbide tip)	Reverse reading

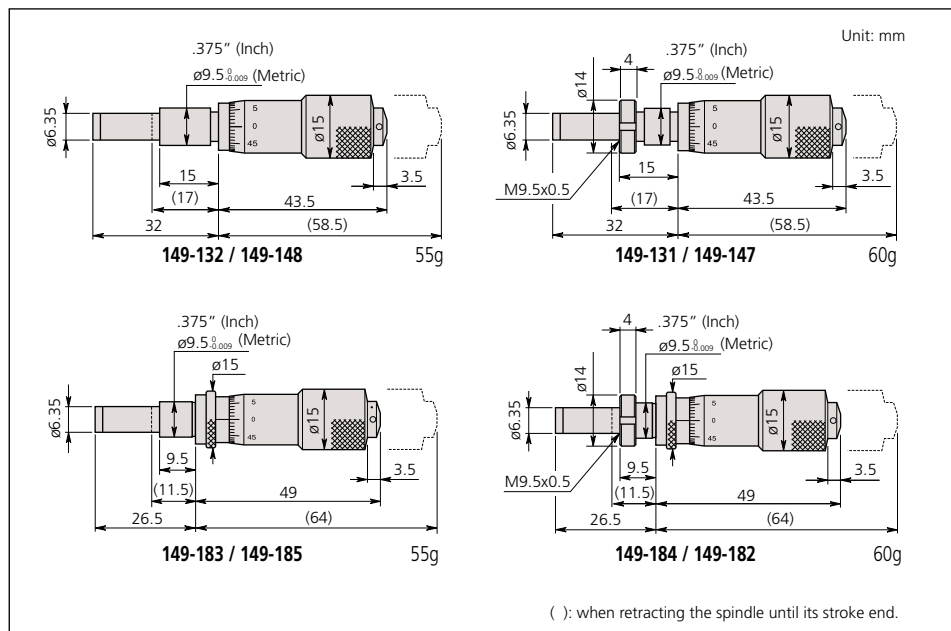
\*with spindle lock.

#### Inch

Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Remarks
0 - .5"	<b>149-148</b>	±.0001"	.375"	Plain	Flat (carbide tip)	—
0 - .5"	<b>149-147</b>	±.0001"	.375"	w/clamp nut	Flat (carbide tip)	—
0 - .5"	<b>149-185</b>	±.0001"	.375"	Plain*	Flat (carbide tip)	With spindle lock
0 - .5"	<b>149-182</b>	±.0001"	.375"	w/clamp nut*	Flat (carbide tip)	With spindle lock
0 - .5"	<b>149-811</b>	±.0001"	.375"	Plain	Spherical (SR4)	—
0 - .5"	<b>149-812</b>	±.0001"	.375"	w/clamp nut	Spherical (SR4)	—
.5" - 0	<b>149-831</b>	±.0001"	.375"	Plain	Flat (carbide tip)	Reverse reading
.5" - 0	<b>149-832</b>	±.0001"	.375"	w/ clamp nut	Flat (carbide tip)	Reverse reading

\*with spindle lock.

### DIMENSIONS AND MASS



### Technical Data

Graduations: 0.01mm or .001"

Spindle pitch: 0.5mm

Spindle face: Flat with carbide tip (more than HRA90) or spherical, lapped surface

Scale surface: Hard-chrome plating

Fixture thickness for clamp nut: 6mm

(149-131, 149-147: 11.5mm)



# Micrometer Heads

## SERIES 150 — Common Type in Middle Size

### FEATURES

- Ratchet stop for constant force.
- Long spindle type is available for a variety of applications.
- Carbide-tipped measuring face.

### SPECIFICATIONS

#### Metric

Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Remarks
0 - 25mm	<b>150-192</b>	±2μm	10mm	Plain	Flat (carbide tip)	—
0 - 25mm	<b>150-191</b>	±2μm	10mm	w/clamp nut	Flat (carbide tip)	—
0 - 25mm	<b>150-209</b>	±2μm	10mm	Plain*	Flat (carbide tip)	—
0 - 25mm	<b>150-210</b>	±2μm	10mm	w/clamp nut*	Flat (carbide tip)	—
0 - 25mm	<b>150-801</b>	±2μm	10mm	Plain	Spherical (SR4)	—
0 - 25mm	<b>150-802</b>	±2μm	10mm	w/clamp nut	Spherical (SR4)	—
0 - 25mm	<b>150-821</b>	±2μm	10mm	Plain	Flat (carbide tip)	Reverse reading
0 - 25mm	<b>150-822</b>	±2μm	10mm	w/clamp nut	Flat (carbide tip)	Reverse reading
0 - 25mm	<b>150-190</b>	±2μm	10mm	Plain	Flat (carbide tip)	w/ vernier (0.001mm)
0 - 25mm	<b>150-189</b>	±2μm	10mm	w/clamp nut	Flat (carbide tip)	w/ vernier (0.001mm)
0 - 25mm	<b>150-196</b>	±2μm	10mm	Plain*	Flat (carbide tip)	w/ vernier (.0001mm)
0 - 25mm	<b>150-195</b>	±2μm	10mm	w/clamp nut*	Flat (carbide tip)	w/ vernier (.0001mm)
0 - 25mm	<b>150-211</b>	±2μm	10mm	Plain*	Flat (carbide tip)	w/o ratchet stop
0 - 25mm	<b>150-212</b>	±2μm	10mm	w/clamp nut*	Flat (carbide tip)	w/o ratchet stop
0 - 25mm	<b>150-219</b>	±2μm	10mm	Plain	Flat	Long spindle
0 - 25mm	<b>150-220</b>	±2μm	10mm	w/ clamp nut	Flat	Long spindle

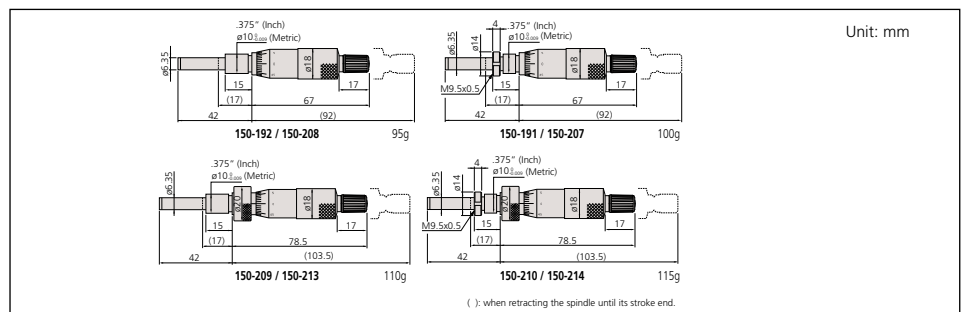
\*with spindle lock

#### Inch

Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Remarks
0 - 1"	<b>150-208</b>	±.0001"	.375"	Plain	Flat (carbide tip)	—
0 - 1"	<b>150-198</b>	±.0001"	.375"	Plain	Flat (carbide tip)	w/o ratchet stop
0 - 1"	<b>150-207</b>	±.0001"	.375"	w/clamp nut	Flat (carbide tip)	—
0 - 1"	<b>150-197</b>	±.0001"	.375"	w/clamp nut	Flat (carbide tip)	w/o ratchet stop
0 - 1"	<b>150-213</b>	±.0001"	.375"	Plain*	Flat (carbide tip)	—
0 - 1"	<b>150-214</b>	±.0001"	.375"	w/clamp nut*	Flat (carbide tip)	—
0 - 1"	<b>150-811</b>	±.0001"	.375"	Plain	Spherical (SR4)	—
0 - 1"	<b>150-812</b>	±.0001"	.375"	w/clamp nut	Spherical (SR4)	—
0 - 1"	<b>150-831</b>	±.0001"	.375"	Plain	Flat (carbide tip)	Reverse reading
0 - 1"	<b>150-832</b>	±.0001"	.375"	w/clamp nut	Flat (carbide tip)	Reverse reading
0 - 1"	<b>150-206</b>	±.0001"	.375"	Plain	Flat (carbide tip)	w/ vernier (.0001")
0 - 1"	<b>150-205</b>	±.0001"	.375"	w/clamp nut	Flat (carbide tip)	w/ vernier (.0001")
0 - 1"	<b>150-215</b>	±.0001"	.375"	Plain*	Flat (carbide tip)	w/ vernier (.0001")
0 - 1"	<b>150-216</b>	±.0001"	.375"	w/clamp nut*	Flat (carbide tip)	w/ vernier (.0001")
0 - 1"	<b>150-217</b>	±.0001"	.375"	Plain*	Flat (carbide tip)	w/o ratchet stop
0 - 1"	<b>150-218</b>	±.0001"	.375"	w/clamp nut*	Flat (carbide tip)	w/o ratchet stop
0 - 1"	<b>150-221</b>	±.0001"	.375"	Plain	Flat	Long spindle
0 - 1"	<b>150-222</b>	±.0001"	.375"	w/ clamp nut	Flat	Long spindle

\*with spindle lock

### DIMENSIONS AND MASS



150-801



150-191

### Technical Data

Graduations: 0.01mm, 0.001mm, .001" or .0001"  
 Spindle pitch: 0.5mm  
 Spindle face: Flat with carbide tip\* (more than HRA90) or spherical, lapped surface  
 \*Long spindle type: SKS3 (more than HRC60)  
 Scale surface: Hard-chrome plating  
 Fixture thickness for clamp nut: 11.5mm

# Micrometer Heads

## SERIES 151 — Common Type in Middle Size with 8mm Diameter Spindle

### FEATURES

- 8mm diameter spindle for heavy-duty use.
- Ratchet stop for constant force.
- Carbide-tipped measuring face.

### SPECIFICATIONS

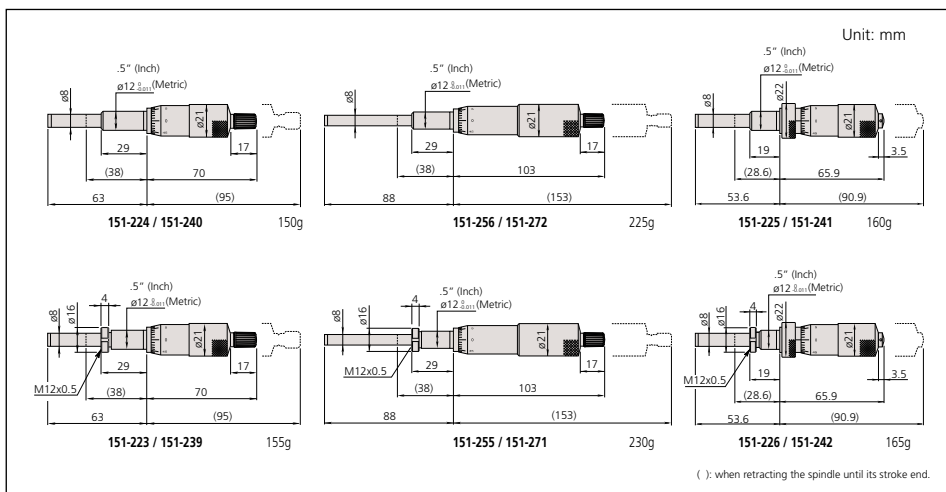
Metric						
Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Remarks
0 - 25mm	151-224	±2µm	12mm	Plain	Flat (carbide tip)	—
0 - 25mm	151-223	±2µm	12mm	w/clamp nut	Flat (carbide tip)	—
0 - 25mm	151-214	±2µm	12mm	Plain*	Flat (carbide tip)	—
0 - 25mm	151-213	±2µm	12mm	w/clamp nut*	Flat (carbide tip)	—
0 - 25mm	151-222	±2µm	12mm	Plain	Flat (carbide tip)	w/ vernier (0.001mm)
0 - 25mm	151-221	±2µm	12mm	w/clamp nut	Flat (carbide tip)	w/ vernier (0.001mm)
0 - 25mm	151-212	±2µm	12mm	Plain*	Flat (carbide tip)	w/ vernier (0.001mm)
0 - 25mm	151-211	±2µm	12mm	w/clamp nut*	Flat (carbide tip)	w/ vernier (0.001mm)
0 - 25mm	151-227	±2µm	12mm	Plain	Flat (carbide tip)	w/o ratchet stop
0 - 25mm	151-228	±2µm	12mm	w/clamp nut	Flat (carbide tip)	w/o ratchet stop
0 - 25mm	151-225	±2µm	12mm	Plain*	Flat (carbide tip)	w/o ratchet stop
0 - 25mm	151-226	±2µm	12mm	w/clamp nut*	Flat (carbide tip)	w/o ratchet stop
0 - 50mm	151-256	±4µm	12mm	Plain	Flat (carbide tip)	—
0 - 50mm	151-255	±4µm	12mm	w/clamp nut	Flat (carbide tip)	—
0 - 50mm	151-260	±4µm	12mm	Plain	Flat (carbide tip)	w/o ratchet stop
0 - 50mm	151-259	±4µm	12mm	w/ clamp nut	Flat (carbide tip)	w/o ratchet stop

\*with spindle lock

Inch						
Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Remarks
0 - 1"	151-240	±.0001"	.5"	Plain	Flat (carbide tip)	—
0 - 1"	151-239	±.0001"	.5"	w/clamp nut	Flat (carbide tip)	—
0 - 1"	151-238	±.0001"	.5"	Plain	Flat (carbide tip)	w/ vernier (.0001")
0 - 1"	151-237	±.0001"	.5"	w/clamp nut	Flat (carbide tip)	w/ vernier (.0001")
0 - 1"	151-243**	±.0001"	.5"	Plain*	Flat (carbide tip)	w/ vernier (.0001")
0 - 1"	151-244**	±.0001"	.5"	w/clamp nut*	Flat (carbide tip)	w/ vernier (.0001")
0 - 1"	151-241	±.0001"	.5"	Plain*	Flat (carbide tip)	w/o ratchet stop
0 - 1"	151-242	±.0001"	.5"	w/clamp nut*	Flat (carbide tip)	w/o ratchet stop
0 - 2"	151-272	±.0002"	.5"	Plain	Flat (carbide tip)	—
0 - 2"	151-271	±.0002"	.5"	w/clamp nut	Flat (carbide tip)	—

\*with spindle lock \*\*with ratchet stop

### DIMENSIONS AND MASS



### Technical Data

Graduations: 0.01mm, 0.001mm, .001" or .0001"  
 Spindle pitch: 0.5mm  
 Spindle face: Flat with carbide tip (more than HRA90), lapped surface  
 Scale surface: Hard-chrome plating  
 Fixture thickness for clamp nut: 25.5mm

# Micrometer Heads

## SERIES 153 — Non-rotating Spindle Type

### FEATURES

- Carbide-tipped measuring face.
- Non-rotating spindle.

### SPECIFICATIONS

#### Metric

Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Remarks
0 - 15mm	<b>153-101</b>	±3μm	9.5mm	Plain	Flat (carbide tip)	w/ vernier (0.001mm)
0 - 25mm	<b>153-201*</b>	±3μm	12mm	Plain	Flat (carbide tip)	—
0 - 25mm	<b>153-202*</b>	±3μm	12mm	Plain	Flat (carbide tip)	w/ vernier (0.001mm)
0 - 25mm	<b>153-203</b>	±3μm	12mm	Plain	Flat (carbide tip)	—
0 - 25mm	<b>153-204</b>	±3μm	12mm	Plain	Flat (carbide tip)	w/ vernier (0.001mm)

\*with ratchet stop

#### Inch

Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Remarks
0 - .5"	<b>153-108</b>	±.00015"	.375"	Plain	Flat (carbide tip)	w/ vernier (.0001")
0 - 1"	<b>153-205*</b>	±.00015"	.5"	Plain	Flat (carbide tip)	—
0 - 1"	<b>153-206*</b>	±.00015"	.5"	Plain	Flat (carbide tip)	w/ vernier (.0001")
0 - 1"	<b>153-207</b>	±.00015"	.5"	Plain	Flat (carbide tip)	—
0 - 1"	<b>153-208</b>	±.00015"	.5"	Plain	Flat (carbide tip)	w/ vernier (.0001")

\*with ratchet stop



### Technical Data

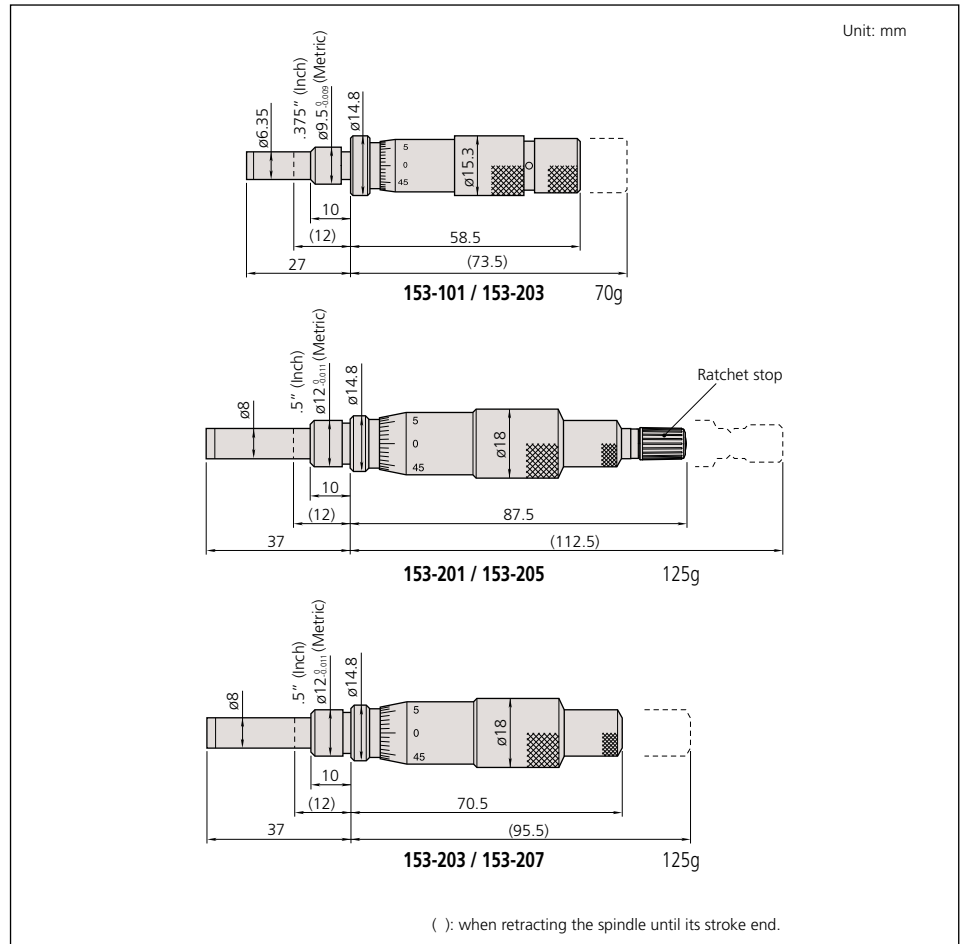
Graduations: 0.01mm, 0.001mm, .001" or .0001"

Spindle pitch: 0.5mm

Spindle face: Flat with carbide tip (more than HRA90), lapped surface

Scale surface: Hard-chrome plating

### DIMENSIONS AND MASS



# Micrometer Heads

## SERIES 152 — Quick Spindle Feeding of 1mm/rev.

### FEATURES

- Quick spindle feeding of 1mm/rev.
- Carbide-tipped measuring face.



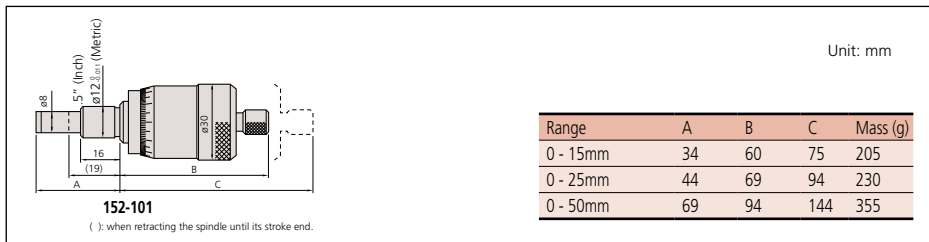
152-102

### SPECIFICATIONS

#### Metric

Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Remarks
0 - 15mm	152-101	±2μm	12mm	Plain	Flat (carbide tip)	—
0 - 25mm	152-102	±2μm	12mm	Plain	Flat (carbide tip)	—
0 - 50mm	152-103	±4μm	12mm	Plain	Flat (carbide tip)	—

### DIMENSIONS AND MASS



# Micrometer Heads

## SERIES 152 — Large Thimble Type for Fine Feeding

### FEATURES

- The large diameter thimble for fine adjustment and positioning.
- Carbide-tipped measuring face.

### SPECIFICATIONS

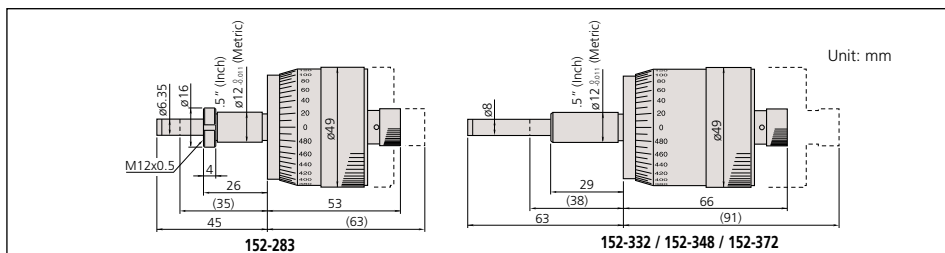
#### Metric

Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Remarks
0 - 10mm	152-283	±2μm	12mm	w/clamp nut	Flat (carbide tip)	—
0 - 25mm	152-332	±2μm	12mm	Plain	Flat (carbide tip)	—
0 - 25mm	152-348	±2μm	12mm	Plain	Flat (carbide tip)	Bidirectional graduation
0 - 50mm	152-380	±4μm	12mm	Plain	Flat (carbide tip)	Bidirectional graduation

#### Inch

Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Remarks
0 - 1"	152-372	±.0001"	.5"	Plain	Flat (carbide tip)	Bidirectional graduation
0 - 2"	152-388	±.0002"	.5"	Plain	Flat (carbide tip)	Bidirectional graduation

### DIMENSIONS AND MASS



### Technical Data

Graduations: 0.01mm

Spindle pitch: 1mm

Spindle face: Flat with carbide tip (more than HRA90), lapped surface

Scale surface: Hard-chrome plating



152-283

### Technical Data

Graduations: 0.002mm or .0001"

Spindle pitch: 1mm

Spindle face: Flat with carbide tip (more than HRA90), lapped surface

Scale surface: White anodized aluminum

Fixture thickness for clamp nut: 22.5mm

# Micrometer Heads

## SERIES 110 — Differential Screw Translator (Extra-Fine Feeding) Type

### FEATURES

- Differential movements of spindle threads and units allow fine spindle feeding (0.05mm/rev\*), resulting in high-resolution measurements.

\*110-502, 110-504: 0.025mm/rev / .001"/rev (fine feeding)

- Carbide-tipped measuring face.
- Non-rotating spindle.

### SPECIFICATIONS

#### Metric

Range	Order No.	Graduation	Accuracy*	Stem dia.	Stem	Spindle face
0 - 1mm	<b>110-105</b>	0.001mm	±3 / ±1.5µm	12mm	w/clamp nut	Flat (carbide tip)
0 - 1mm	<b>110-106</b>	0.0001mm	±3 / ±1.5µm	12mm	w/clamp nut	Flat (carbide tip)
0 - 1mm	<b>110-107</b>	0.001mm	±3 / ±1.5µm	12mm	w/clamp nut	Flat (carbide tip)
0 - 1mm	<b>110-108</b>	0.0001mm	±3 / ±1.5µm	12mm	w/clamp nut	Flat (carbide tip)
0 - 2.5mm	<b>110-101</b>	0.001mm	±3 / ±1.5µm	12mm	w/clamp nut	Spherical (SR8)
0 - 2.5mm	<b>110-102</b>	0.0001mm	±3 / ±1.5µm	12mm	w/clamp nut	Spherical (SR8)
0 - 13mm	<b>110-502*</b>	0.0005mm 0.01mm	±3 / ±1.5µm	9.5mm	w/clamp nut	Spherical (SR3)

\* Narrow range (within 1 rev.): 0.2mm

#### Inch

Range	Order No.	Graduation	Accuracy*	Stem dia.	Stem	Spindle face
0 - .02"	<b>110-115</b>	.00005"	±.00015" / ±.00006"	.5"	w/clamp nut	Flat (carbide tip)
0 - .02"	<b>110-116</b>	.000005"	±.00015" / ±.00006"	.5"	w/clamp nut	Flat (carbide tip)
0 - .02"	<b>110-117</b>	.00005"	±.00015" / ±.00006"	.5"	w/clamp nut	Flat (carbide tip)
0 - .02"	<b>110-118</b>	.000005"	±.00015" / ±.00006"	.5"	w/clamp nut	Flat (carbide tip)
0 - .05"	<b>110-111</b>	.00005"	±.0002" / ±.00006"	.5"	w/clamp nut	Spherical (SR8)
0 - .05"	<b>110-112</b>	.000005"	±.0002" / ±.00006"	.5"	w/clamp nut	Spherical (SR8)
0 - .5"	<b>110-504*</b>	.00002" .001"	±.00015" / ±.00006"	.375"	w/clamp nut	Spherical (SR3)

\* Narrow range (within 1 rev.): .006"

### Technical Data

Graduations: 0.001mm, 0.0005mm, 0.0001mm, .00005" or .00002", .000005"

Spindle pitch: 0.05mm or 0.025mm

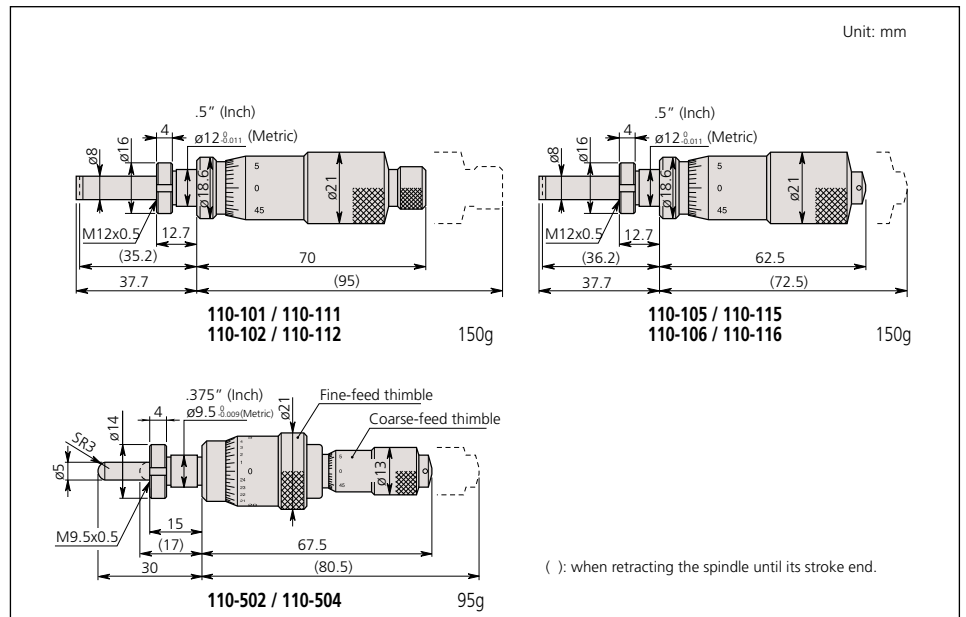
Spindle face: Flat with carbide tip (more than HRA90) or spherical, lapped surface

Scale surface: Hard-chrome plating

Fixture thickness for clamp nut: 9.5mm (11.5mm\*)

\*110-502, 110-504

### DIMENSIONS AND MASS



# Micrometer Heads

## SERIES 152 — for XY-Stage

### FEATURES

#### 152-390, 152-389, 152-391, 152-392

- Non-rotating device is attached to the spindle tip.
- Floating thimble allows easy zero setting at any spindle position.
- Bidirectional graduation for easy reading in both directions.

#### 152-401, 152-402

- Adjustable spindle can be moved with the thimble and held at any position, allowing easy zero-setting.

### SPECIFICATIONS

Metric						
Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Remarks
0 - 25mm	<b>152-390</b>	$\pm 2\mu\text{m}$	18mm	Plain	Flat (hardened) with non-rotating device	for X-axis, bidirectional grad.
0 - 25mm	<b>152-389</b>	$\pm 2\mu\text{m}$	18mm	Plain		for Y-axis, bidirectional grad.
0 - 25mm	<b>152-402*</b>	$\pm 2\mu\text{m}$	18mm	Plain	Spherical with carbide tip (SR10)	for X-axis, with vernier
0 - 25mm	<b>152-401*</b>	$\pm 2\mu\text{m}$	118mm	Plain		for Y-axis, with vernier

\*0.001mm reading is obtained with vernier

### Inch

Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Remarks
0 - 1"	<b>152-392</b>	$\pm .0001"$	.709"	Plain	Flat (hardened) with non-rotating device	for X-axis, Bidirectional grad.
0 - 1"	<b>152-391</b>	$\pm .0001"$	.709"	Plain		for Y-axis, Bidirectional grad.



152-390

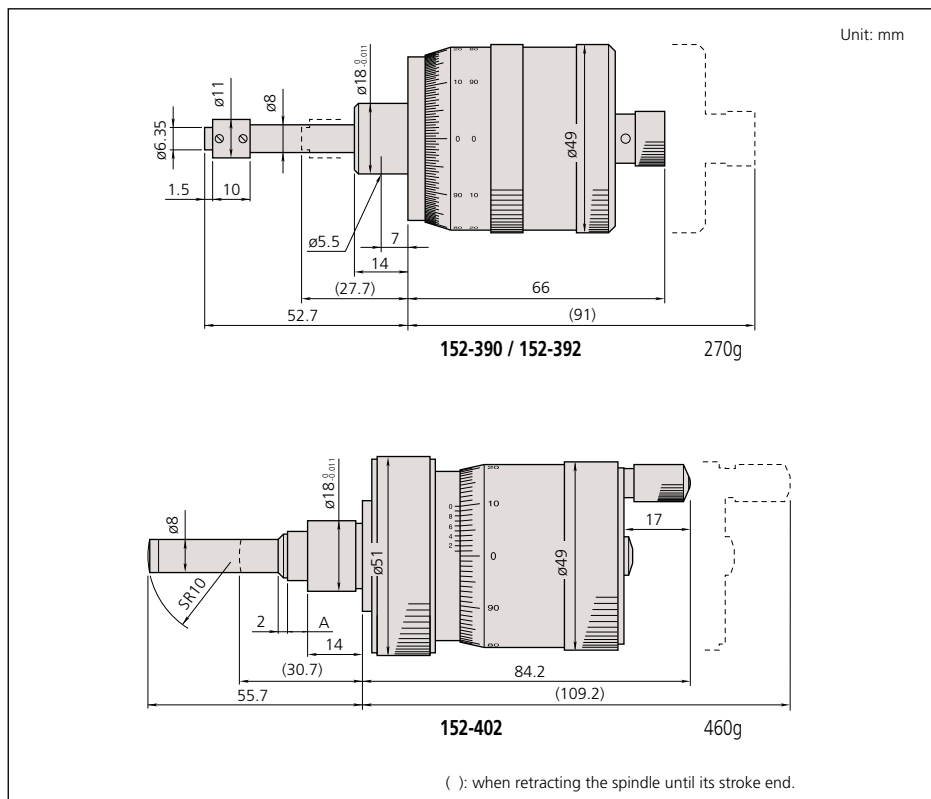
### Technical Data

Graduations: 0.005mm, 0.001mm\*  
\*vernier reading

Spindle pitch: 1mm

Spindle face: Flat (hardened) or spherical with carbide tip (more than HRA90), lapped surface  
Scale surface: White anodized aluminum

### DIMENSIONS AND MASS



# Micrometer Heads

## SERIES 197 — Non-rotating Spindle and Large Thimble



197-101

### Technical Data

Graduations: 0.005mm or .0002"  
 Spindle pitch: 1mm  
 Spindle face: Flat with carbide tip (more than HRA90), lapped surface  
 Scale surface: White anodized aluminum

### FEATURES

- Large thimble micrometer head with non-rotating spindle.
- Floating thimble allows easy zero setting at any spindle position.
- Bidirectional graduation for easy reading in both directions.
- Dual-spindle mechanism for quick feeding of 1mm/rev.
- Carbide-tipped measuring face.

### SPECIFICATIONS

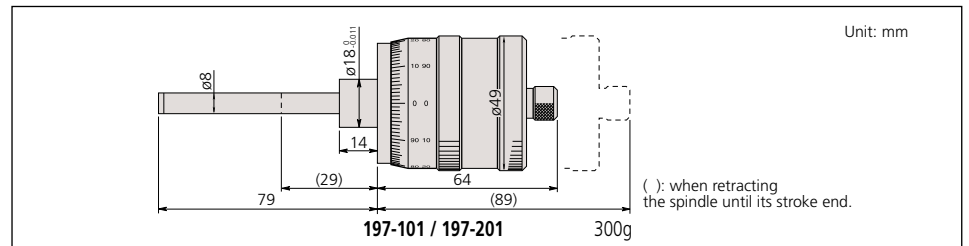
#### Metric

Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Remarks
0 - 50mm	197-101	±5µm	18mm	Plain	Flat (carbide tip)	Bidirectional graduation

#### Inch

Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Remarks
0 - 2"	197-201	±.0002"	.709"	Plain	Flat (carbide tip)	Bidirectional graduation

### DIMENSION AND MASS



153-301

### Technical Data

Graduations: 0.0005mm or .00001"  
 Spindle pitch: 0.5mm  
 Spindle face: Flat with carbide tip (more than HRA90), lapped surface  
 Scale surface: White anodized aluminum

# Micrometer Heads

## SERIES 153 — Fine Graduation and High Accuracy

### FEATURES

- Fine graduation and high-resolution model.
- Large thimble micrometer head with non-rotating spindle.
- Bidirectional graduation for easy reading in both directions.
- Carbide-tipped measuring face.

### SPECIFICATIONS

#### Metric

Range	Order No.	Accuracy*	Stem dia.	Stem	Spindle face	Remarks
0 - 25mm	153-301	±1 / ±0.5µm	18mm	Plain	Flat (carbide tip)	Bidirectional graduation

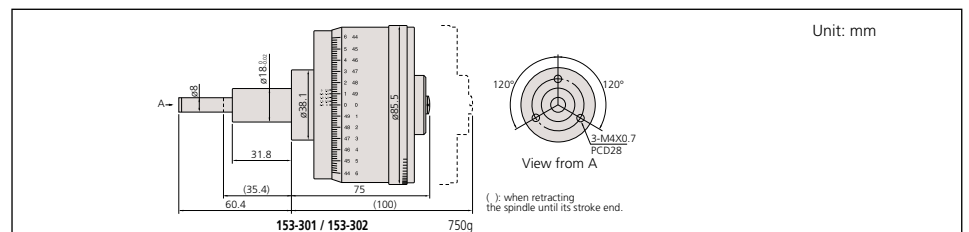
\*Wide range / narrow range

#### Inch

Range	Order No.	Accuracy*	Stem dia.	Stem	Spindle face	Remarks
0 - 1"	153-302	±.00004" / ±.00002"	.709"	Plain	Flat (carbide tip)	Bidirectional graduation

\*Wide range / narrow range

### DIMENSIONS AND MASS



# Micrometer Heads

## SERIES 250 — with Digit Counter

### FEATURES

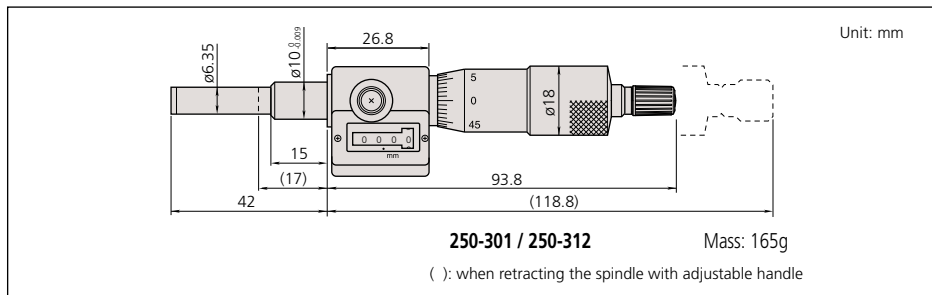
- Digit counter for easy reading of spindle movement.
- Carbide-tipped measuring face.
- Ratchet stop for constant force.

### SPECIFICATIONS

Metric						
Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Remarks
0 - 25mm	<b>250-301</b>	±2µm	10mm	Plain	Flat (carbide tip)	—

Inch						
Range	Order No.	Accuracy	Stem dia.	Stem	Spindle face	Remarks
0 - 1"	<b>250-312</b>	±.0001"	.375"	Plain	Flat (carbide tip)	w / vernier (.0001")

### DIMENSIONS AND MASS



250-301

### Technical Data

Graduations: 0.01mm or .0001"  
 Spindle pitch: 0.5mm  
 Spindle face: Flat with carbide tip (more than HRA90), lapped surface  
 Scale surface: Hard-chrome plating

# Micro Jack

## SERIES 7

### FEATURES

- Used for accurate leveling of machines, surface plates and other precision instruments.
- Easy adjustment under heavy load.

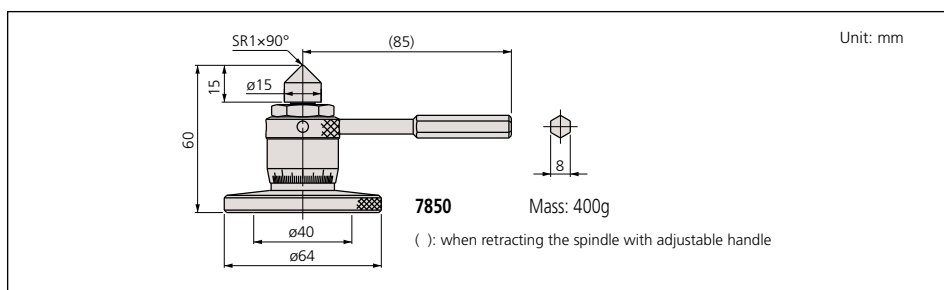


7850

### SPECIFICATIONS

Metric				
Range	Order No.	Graduation	Max. Load	Remarks
60 - 75mm	<b>7850</b>	0.01mm	400kg	adjustable handle

### DIMENSIONS AND MASS



### Technical Data

Graduations: 0.01mm

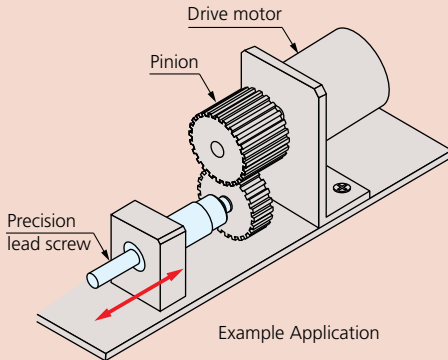




# Precision Lead Screw

## Technical Data

- Durability: 100,000 cycles are guaranteed (use condition: 4 kg load; 2 kg for AS-6.5 and BS-6.5)
- Main applications
  - Precision feed stages
  - Fine adjustment of optical elements (mirrors, prisms)
  - Fiber optic centering devices
  - Various assembly and adjustment jigs



## FEATURES

- Mitutoyo manufactures simple and economical precision lead screws for precise positioning mechanisms and fine-feed mechanisms, in addition to the conventional micrometer heads.
- Mitutoyo also manufactures screws with special specifications, such as 0.25 mm pitch, as well as those with the standard 0.5 mm feed pitch and with dimensions and forms that meet customer's requirements.



## SPECIFICATIONS

Order No.	Model	Stroke (mm)	Feed pitch (mm)	Feed accuracy (μm)	Stem diameter (mm)	Tip diameter (mm)	Tail diameter (mm)	Screw nominal diameter	Sleeve diameter (mm)	Measuring face	Mass	Others
04AZA160	AS-6.5	6.5	0.5	±5	ø6 <sup>0</sup> <sub>-0.008</sub>	ø3.5	ø3 <sup>0</sup> <sub>-0.01</sub>	M4.5 x 0.5	ø7	Hardened	10g	<ul style="list-style-type: none"> <li>• AS type: Flat spindle tip without nut</li> <li>• BS type: Spherical spindle tip with nut</li> </ul>
04AZA161	BS-6.5										11g	
04AZA162	AS-13	13		±2	ø9.5 <sup>0</sup> <sub>-0.009</sub>	ø5	ø5 <sup>0</sup> <sub>-0.012</sub>	M7.35 x 0.5	ø10.5	Carbide	27g	
04AZA163	BS-13										30g	
04AZA164	AS-25	25		ø10 <sup>0</sup> <sub>-0.009</sub>	ø6.35	ø6 <sup>0</sup> <sub>-0.015</sub>	ø6	M7.35 x 0.5	ø12	Carbide	61g	
04AZA165	BS-25										64g	

## DIMENSIONS

Unit: mm

### Type A: Straight type

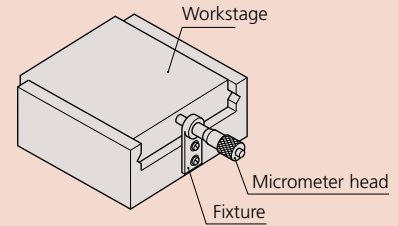
### Type B: Stem with nut

Order No.	L	L1	L2	L3	L4	L5
04AZA160	39	15	14.5	9	6	—
04AZA161	39	15	14.5	7.5	6	3
04AZA162	57.5	25	21.5	15.5	8	—
04AZA163	57.5	25	21.5	15.5	8	4
04AZA164	98.5	42	39.5	27	10	—
04AZA165	98.5	42	39.5	27	10	4

# Fixtures for Micrometer Heads

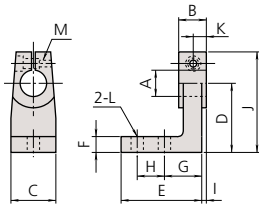
## FEATURES

- The act of fabricating brackets to mount micrometer heads for each particular application can be laborious and costly. Mitutoyo offers various types of fixtures for micrometer heads to meet a range of applications. These fixtures are made of nickel-plated cast iron.
- There are two types of fixtures for micrometer heads--with or without clamping nut on the stem.

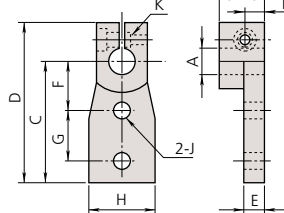


## DIMENSIONS: Fixtures for plain-stem type micrometer heads

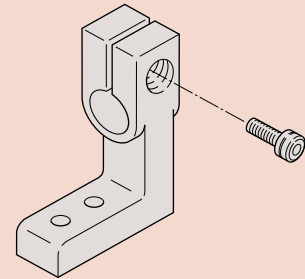
Unit: mm



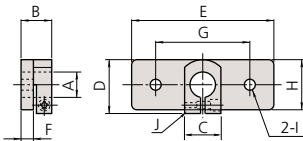
Order No.	303560	303569	303579
A	ø9.5	ø9.5	ø10
B	9	14.5	14.5
C	14.5	19.5	19.5
D	20	30	30
E	23	35	35
F	5	7	7
G	11	16	16
H	8	12	12
I	1.5	3.25	3.25
J	32.5	42.5	42.5
K	4.5	7.25	7.25
L	ø3.4	ø4.5	ø4.5
M	M3x0.5	M3x0.5	M3x0.5



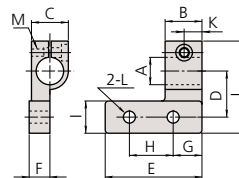
Order No.	303564	303573	303583
A	ø9.5	ø9.5	ø10
B	9	14.5	14.5
C	30	40	40
D	42.5	52.5	52.5
E	4	6	6
F	15	18	18
G	10	15	15
H	15	20	20
I	4.5	7.25	7.25
J	ø3.4	ø4.5	ø4.5
K	M3x0.5	M3x0.5	M3x0.5



**Note:** Supplied with a socket head screw (M3x0.5x12mm) for the fixtures to be used with a micrometer head without clamp nut (plain stem type micrometer head).



Order No.	303562	303571	303581
A	ø9.5	ø9.5	ø10
B	9	14.5	14.5
C	15	15	15
D	20	22.5	22.5
E	40	60	60
F	3	5	5
G	30	40	40
H	15	20	20
I	ø3.4	ø4.5	ø4.5
J	M3x0.5	M3x0.5	M3x0.5

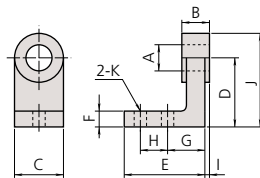


Order No.	303566	303575	303585
A	ø9.5	ø9.5	ø10
B	9	14.5	14.5
C	15	15	15
D	15	20	20
E	25	40	40
F	8.5	8.5	8.5
G	7.5	10	10
H	10	20	20
I	10	15	15
J	32.5	40	40
K	4.5	7.25	7.25
L	ø3.4	ø4.5	ø4.5
M	M3x0.5	M3x0.5	M3x0.5

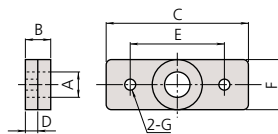
# Fixtures for Micrometer Heads



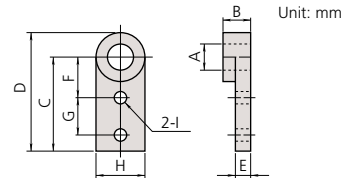
## DIMENSIONS: Fixtures for micrometer heads with clamp nut



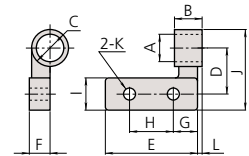
Order No.	303559	303568	303578
A	ø9.5	ø9.5	ø10
B	6	11.5	11.5
C	14.5	19.5	19.5
D	20	30	30
E	24	35	35
F	5	7	7
G	11	16	16
H	8	12	12
I	0.5	1.75	1.75
J	27.5	40	40
K	ø3.4	ø4.5	ø4.5



Order No.	303561	303570	303580
A	ø9.5	ø9.5	ø10
B	6	11.5	11.5
C	40	60	60
D	3.5	5.5	5.5
E	30	40	40
F	15	20	20
G	ø3.4	ø4.5	ø4.5

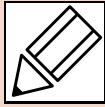


Order No.	303563	303572	303582
A	ø9.5	ø9.5	ø10
B	6	11.5	11.5
C	30	40	40
D	37.5	50	50
E	4.5	6.5	6.5
F	15	18	18
G	10	15	15
H	15	20	20
I	ø3.4	ø4.5	ø4.5



Order No.	303565	303574	303584
A	ø9.5	ø9.5	ø10
B	6	11.5	11.5
C	ø15	ø15	ø15
D	15	20	20
E	25	40	40
F	8.5	8.5	8.5
G	7.5	10	10
H	10	20	20
I	10	15	15
J	27.5	35	35
K	ø3.4	ø4.5	ø4.5
L	0.75	1.25	1.25

# Quick Guide to Precision Measuring Instruments



## Micrometer Heads

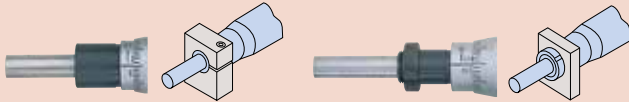
### Key Factors in Selection

Key factors in selecting a micrometer head are the measuring range, spindle face, stem, graduations, thimble diameter, etc.

#### Stem

Plain stem

Stem locknut type

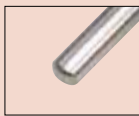


- The stem used to mount a micrometer head is classified as a "plain type" or "clamp nut type" as illustrated above. The stem diameter is manufactured to a nominal Metric or Imperial size with an h6 tolerance.
- The clamp nut stem allows fast and secure clamping of the micrometer head. The plain stem has the advantage of wider application and slight positional adjustment in the axial direction on final installation, although it does require a split-fixture clamping arrangement or adhesive fixing.
- General-purpose mounting fixtures are available as optional accessories.

#### Measuring Face



Flat face

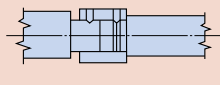
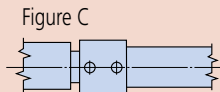
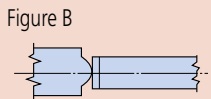
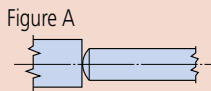


Spherical face



Anti-rotation device

- A flat measuring face is often specified where a micrometer head is used in measurement applications.
- When a micrometer head is used as a feed device, a spherical face can minimize errors due to misalignment (Figure A). Alternatively, a flat face on the spindle can bear against a sphere, such as a carbide ball (Figure B).
- A non-rotating spindle type micrometer head or one fitted with an anti-rotation device on the spindle (Figure C) can be used if a twisting action on the workpiece must be avoided.
- If a micrometer head is used as a stop then a flat face both on the spindle and the face it contacts provides durability.



#### Non-Rotating Spindle

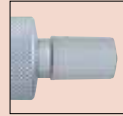
- A non-rotating spindle type head does not exert a twisting action on a workpiece, which may be an important factor in some applications.

#### Spindle Thread Pitch

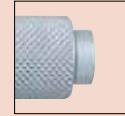
- The standard type head has 0.5mm pitch.
- 1mm-pitch type: quicker to set than standard type and avoids the possibility of a 0.5mm reading error. Excellent load-bearing characteristics due to larger screw thread.
- 0.25mm or 0.1mm-pitch type  
This type is the best for fine-feed or fine-positioning applications.

#### Constant-force Device

- A micrometer head fitted with a constant-force device (ratchet or friction thimble) is recommended for measurement applications.
- If using a micrometer head as a stop, or where saving space is a priority, a head without a ratchet is probably the best choice.



Micrometer head with constant-force device



Micrometer head without constant-force device (no ratchet)

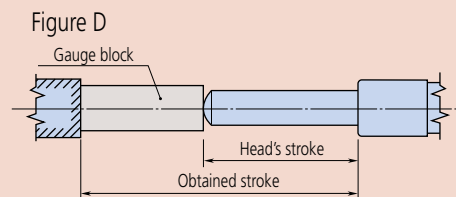
#### Spindle Lock

- If a micrometer head is used as a stop it is desirable to use a head fitted with a spindle lock so that the setting will not change even under repeated shock loading.



#### Measuring Range (Stroke)

- When choosing a measuring range for a micrometer head, allow an adequate margin in consideration of the expected measurement stroke. Six stroke ranges, 5 to 50mm, are available for standard micrometer heads.
- Even if an expected stroke is small, such as 2mm to 3mm, it will be cost effective to choose a 25mm-stroke model as long as there is enough space for installation.
- If a long stroke of over 50mm is required, the concurrent use of a gauge block can extend the effective measuring range. (Figure D)



- In this guide, the range (or stroke end) of the thimble is indicated by a dashed line. For stroke ends, consider the thimble as moving to the position indicated by the line when designing the jig.

#### Ultra-fine Feed Applications

- Dedicated micrometer heads are available for manipulator applications, etc., which require ultra-fine feed or adjustment of spindle.