

Measurement and Precision Positioning MICROMETER HEADS



MICROMETER HEADS

Mitutoyo started business in 1934 as a trailblazing micrometer manufacturer in Japan and celebrated the 80th anniversary of its foundation in October, 2014. Nowadays, Mitutoyo enjoys the confidence of many customers in various fields as a worldwide full-range manufacturer of precision measuring tools and instruments.

Mitutoyo has manufactured micrometer heads since its foundation and established the main production plant at Onomi in Kochi Prefecture in 1977. Designed to mount on measuring instruments and precision fixtures, micrometer heads are used for various purposes including measurement, adjustment and positioning. Recent developments in technology have seen the micrometer head widely utilized in precise feeding devices and cross-travel stages on laser instruments and manipulators, in addition to the usual duties on measurement jigs. In parallel with the application expansion, the customer's needs have increased. To meet customer demand, Mitutoyo provides standard micrometer heads with a choice of measuring range, stem type and body size. Furthermore, high-performance Digimatic Micrometer Head, 0.1mm spindle-pitch models (standard 0.5mm), etc., are now available for the new applications. Mitutoyo also provides customization services for special applications. Micrometer heads with customized spindle tips and precision leadscrews manufactured to customer specification can be supplied even in one-off quantities.



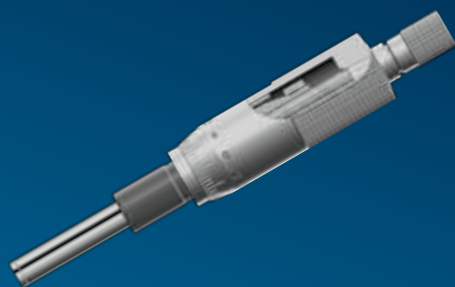
The main production plants for Mitutoyo micrometer heads are Kochi Mitutoyo Corporation Onomi Plant (started operation in 1977) on the upper reaches of the Shimanto River in Shikoku Tosa and Shiwa Production Department (started operation in 1979) in Higashi Hiroshima. Mitutoyo-brand products delivered through leading-edge technologies and facilities are renowned throughout the world as premier products, promoting a sense of confidence in every customer.



Shiwa Production Department



Kochi Mitutoyo Onomi Plant



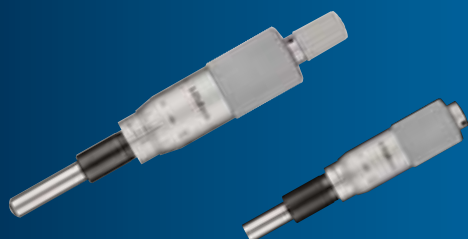
Selection GuidePage 8

Physical characteristics and sizes are listed to aid rapid selection for any particular application. 2D/3D CAD data on heads may be downloaded if required.



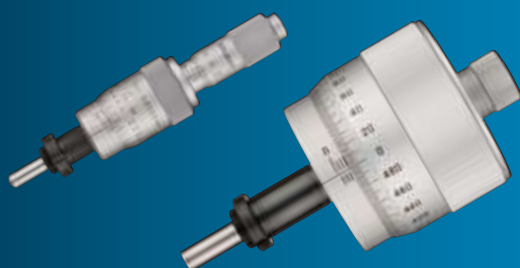
Digimatic headsPage 12

Digital readout heads that can output measurement data in Digimatic format to enable incorporation into a process control system. Models **MHN-MX** and **MXN** are waterproof to IP65 level.



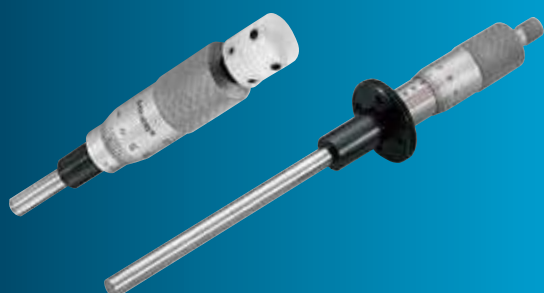
Standard headsPage 16

Standard analog heads offer a choice of measuring range, stem type and body size to suit almost any application.



High Function headsPage 32

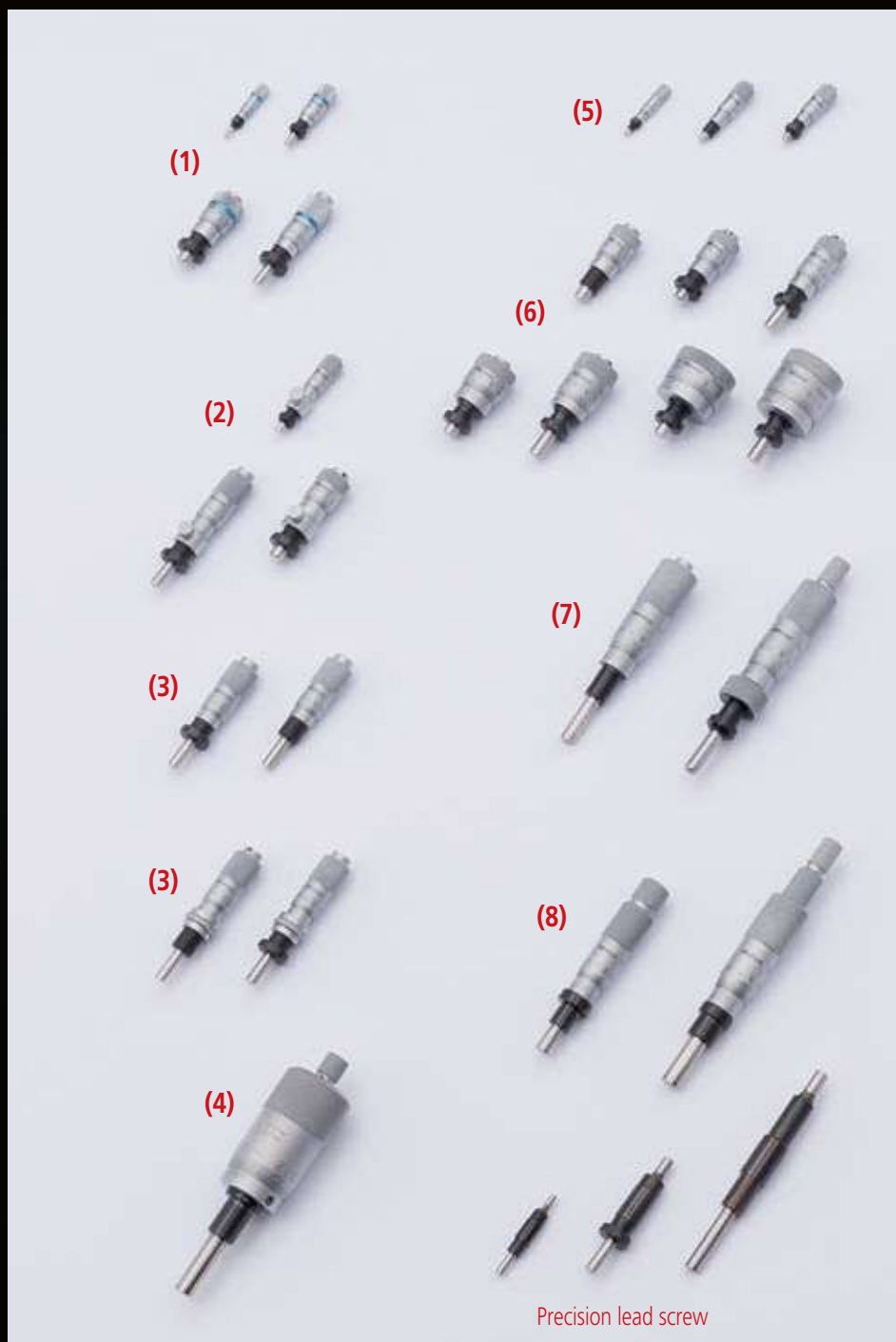
This type includes non-rotating spindle, quick-operating, fine-adjustment and locking-screw types.



Special Order heads.....Page 50

Small quantities of heads, even one-offs, can be supplied to meet a customer's specification of features such as type of spindle tip, thimble graduation, custom engraving, etc.

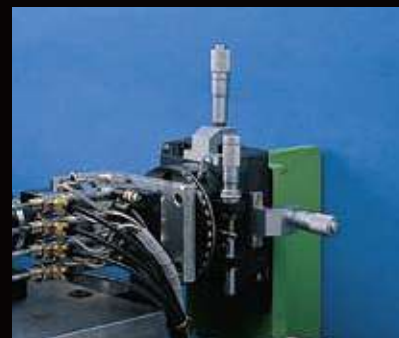
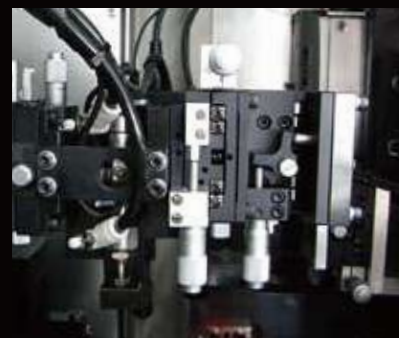
Micrometer Heads



Selection table

Measuring range	Main feature of head		Series	Page	
0 - 1mm/0- .02"	High-Function	Differential Screw Translator (Extra-Fine Feed) Type	110	32	
0 - 2.5mm/0- .05"	High-Function	Fine Spindle Feed of 0.25mm/rev (11)		32	
0 - 5mm/0- .2"	High-Function	Fine Spindle Feed of 0.1mm/rev (1)		33, 34	
	Standard	Ultra-small / Small Type (5)	16, 17		
0 - 6.5mm/0- .25"	Standard	Locking-screw Type (2)	148	36 - 38	
	High-Function	Fine Spindle Feed of 0.1mm/rev (1)		33, 34	
	High-Function	Ultra-small / Small Type		35	
	Standard	Ultra-small / Small Type (5)		16, 17	
	Short Body with Choice of Thimble Diameter (6)			18, 19	
	Large Thimble Type for Fine Feed (13)			41, 42	
0 - 10mm	High-Function	Large Thimble Type for Fine Feed (13)	152	41, 42	
0 - 13mm/0- .5"	Standard	Locking-screw Type (2)	148	36 -38	
	High-Function	Fine Spindle Feed of 0.25mm/rev	110	35	
		Fine Spindle Feed of 0.25mm/rev (11)		32	
		Short Body with Choice of Thimble Diameter (6)		148	18, 19
		Short Body with Choice of Thimble Diameter (3)			20, 21
	Standard	Short Body with Choice of Thimble Diameter	22, 23		
		Small Standard Type with Zero-adjustable Thimble (10)			

Precision lead screw



Measuring range	Main feature of head			Series	Page
0 - 15mm/0- .5"	High-Function	Non-rotating Spindle Type	(8)	153	39
	High-Function	Quick Spindle Feed of 1mm/rev	(4)	152	40
	Standard	Small Standard Type with Carbide-Tipped Spindle	(9)	149	24, 25
0 - 25mm/0- 1"	Digimatic			350	12 - 15
	High-Function	Non-rotating Spindle Type	(8)	153	39
		Quick Spindle Feed of 1mm/rev			40
		Large Thimble Type for Fine Feed		152	41, 42
		XY-Stage type	(14)		43
		Fine Graduation and High Accuracy		153	45
		Digit Counter type		250	45
	Standard	Medium-sized Standard Type	(7)	150	26-28
		Medium-sized Standard Type with 8mm diameter spindle		151	29-31
0 - 50mm/0- 2"	Digimatic		(15)	164	12-15
	High-Function	Quick Spindle Feed of 1mm/rev		152	40
		Large Thimble Type for Fine Feed			41, 42
		Non-rotating Spindle and Large Thimble		197	44
	Standard	Medium-sized Standard Type with 8mm diameter spindle	(12)	151	29-31

How to View This Catalog

Specify this number when ordering

Metric						
Order No.	Range	Accuracy	Stem dia.	Stem	Spindle end	Special features
150-192	0 - 25mm	±2μm	10mm	Plain	Flat (carbide tip)	Standard
150-191				W/ clamp nut		
150-209				Plain*		
150-210				W/ clamp nut*		
150-801				Plain	Spherical (SR4) (carbide tip)	Standard
150-802				W/ clamp nut		
150-821				Plain	Flat (carbide tip)	Reverse reading
150-822				W/ clamp nut		
150-190				Plain		
150-189				W/ clamp nut		
150-183**				Plain*	Flat (carbide tip)	W/vernier (0.001mm)
150-184				W/ clamp nut*		
150-196				Plain	Flat (carbide tip)	w/o ratchet stop
150-195				W/ clamp nut		
150-211				Plain*		
150-212				W/ clamp nut*		
150-219				Plain	Flat	Long spindle
150-220				W/ clamp nut		
150-803**				Plain*	Spherical (SR4) (carbide tip)	Standard
150-804**				W/ clamp nut*		
150-823**				Plain*	Flat (carbide tip)	Reverse reading
150-824**				W/ clamp nut*		
150-223**				Plain*	Flat	Long spindle
150-224**				W/ clamp nut*		

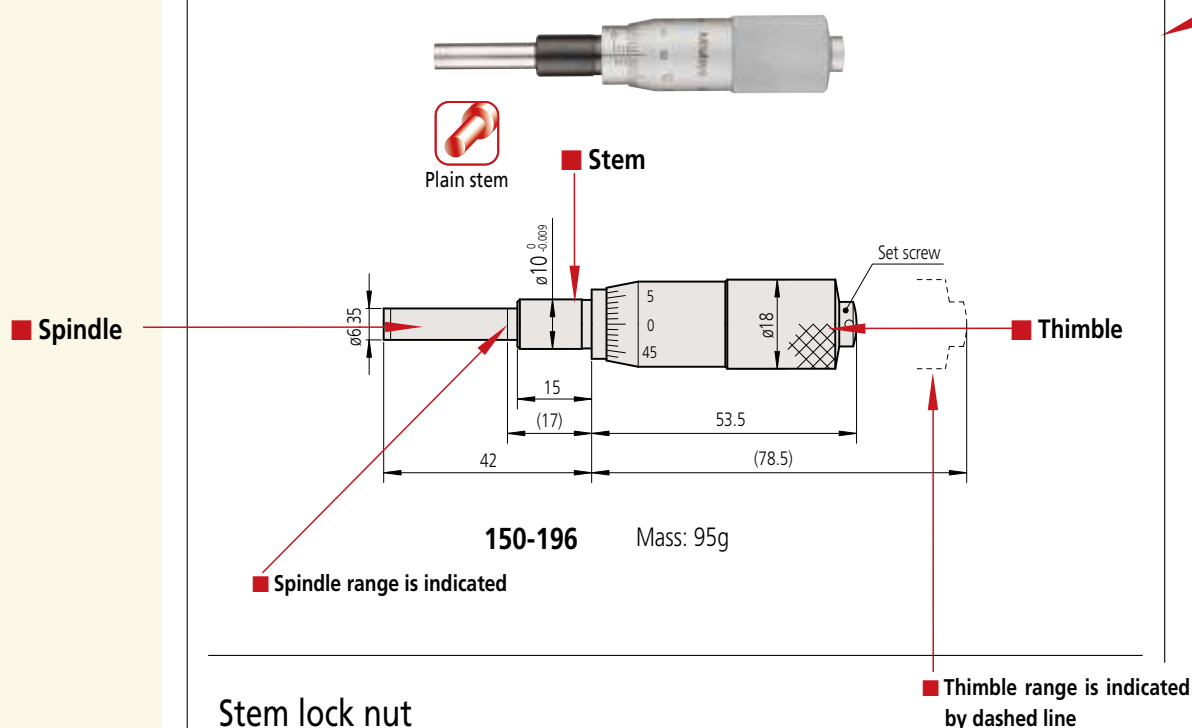
* with spindle lock ** made-to-order models

Inch						
Order No.	Range	Accuracy	Stem dia.	Stem	Spindle end	Special features
150-208	0 - 1"	±.0001"	.375"	Plain	Flat (carbide tip)	Standard
150-207				W/ clamp nut		
150-213**				Plain*		
150-214**				W/ clamp nut*		
150-811				Plain	Spherical (SR4) (carbide tip)	Standard
150-812				W/ clamp nut		
150-831				Plain	Flat (carbide tip)	Reverse graduation
150-832				W/ clamp nut		
150-206				Plain		
150-205**				W/ clamp nut		
150-215**				Plain*	Flat (carbide tip)	W/vernier (.0001")
150-216**				W/ clamp nut*		
150-198				Plain	Flat (carbide tip)	w/o ratchet stop
150-197				W/ clamp nut		
150-217**				Plain*		
150-218**				W/ clamp nut*		
150-221**				Plain	Flat	Long spindle
150-222**				W/ clamp nut		

* with spindle lock ** made-to-order models

DIMENSIONS

Plain stem



Mitutoyo

Series 150 Micrometer Heads

Medium-sized Standard Type

Most popular small micrometer heads with a measuring range of 25mm. The wide variety of models enables a good match to the application to be achieved.

SPECIFICATIONS

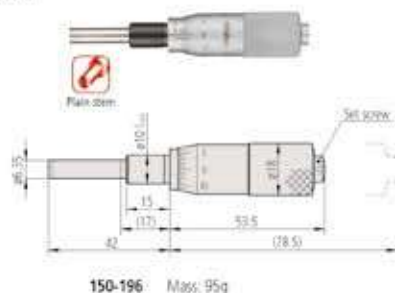
- Measuring range: 0 - 25mm
- Resolution: 0.01mm
(0.001mm for models with vernier)
- Accuracy: $\pm 2\mu\text{m}$
- Measuring face: Material: Alloy tool steel
(Only long spindle model is alloy tool steel)
Hardness: 90HRC or more
(Only long spindle model is 60HRC or more)
Lapped
- Scale finishing: Satin-chrome plated

Metric							Inch						
Order No.	Range	Accuracy	Spindle	Stem	Spindle end	Special feature	Order No.	Range	Accuracy	Spindle	Stem	Spindle end	Special feature
150-192				Plain			150-208				Plain		
150-191				W/ clamp nut	Flat		150-207				W/ clamp nut	Flat	
150-209				Plain*	(carbide tip)	Standard	150-213**				Plain*	(carbide tip)	Standard
150-210				W/ clamp nut*			150-214**				W/ clamp nut*		
150-801				Plain	Spencer (SA)		150-811				Plain	Spencer (SA)	
150-802				W/ clamp nut	(carbide tip)		150-812				W/ clamp nut	(carbide tip)	
150-821				Plain		Reverse reading	150-831				Plain		Reverse graduation
150-822				W/ clamp nut			150-832				W/ clamp nut		
150-190				Plain		W/vernier (0.001mm)	150-206	0 - 1"	$\pm 0.001"$	375"	Plain		W/vernier (0.001")
150-189				W/ clamp nut			150-205**				W/ clamp nut		
150-183**				Plain*	Flat		150-215**				Plain*	Flat	
150-184	0 - 25mm	$\pm 2\mu\text{m}$	10mm	W/ clamp nut*	(carbide tip)		150-216**				W/ clamp nut*	(carbide tip)	
150-196				Plain			150-198				Plain		
150-195				W/ clamp nut		w/o ratchet stop	150-197				W/ clamp nut		w/o ratchet stop
150-211				Plain*			150-217**				Plain*		
150-212				W/ clamp nut*			150-218**				W/ clamp nut*		
150-219				Plain	Flat	Long spindle	150-221**				Plain	Flat	Long spindle
150-220				W/ clamp nut			150-222**				W/ clamp nut		
150-803**				Plain*	Spencer (SA)	Standard							
150-804**				W/ clamp nut*	(carbide tip)								
150-823**				Plain*	Flat	Reverse reading							
150-824**				W/ clamp nut*	(carbide tip)								
150-223**				Plain*		Long spindle							
150-224**				W/ clamp nut*									

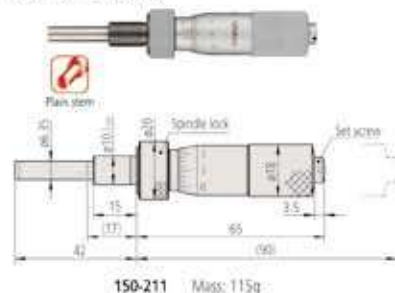
* with spindle lock ** made-to-order models

DIMENSIONS

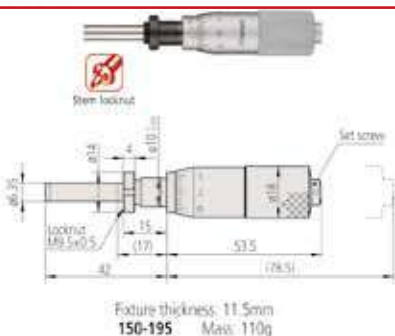
Plain stem



Plain stem and spindle lock



Stem locknut



Stem locknut and spindle lock



() : with spindle fully retracted

● CAD download service at Mitutoyo web site

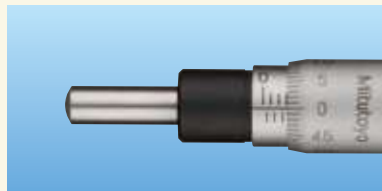
2D CAD data can be downloaded at our web site. For details, refer to page 10.

Selection Guide

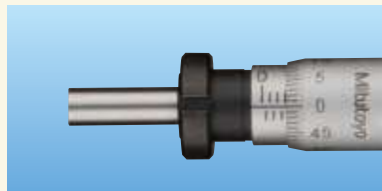
Key factors in selecting a micrometer head are the measuring range, spindle face, stem, graduations, thimble diameter, etc.

Stem

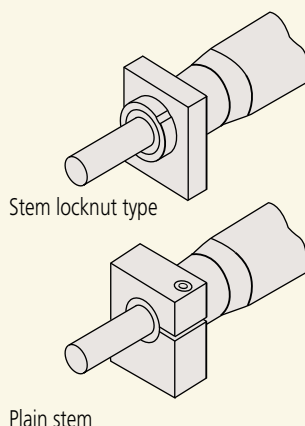
Plain stem



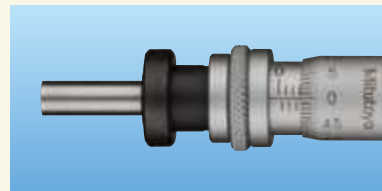
Stem locknut type



- 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.



Screw clamp

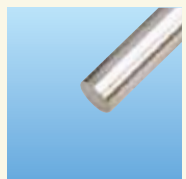


Clamp

- 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 Face

Flat face



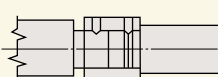
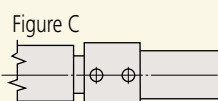
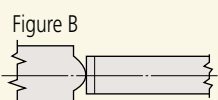
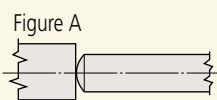
Spherical face



Anti-rotation device



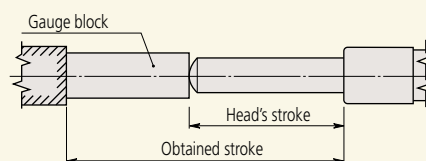
- A flat measuring face is often specified where a micrometer head is used in measurement applications.
- When a micrometer head is used as a feed device, a spherical face can minimize errors due to misalignment (Figure A). Alternatively, a flat face on the spindle can bear against a sphere, such as 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.



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.

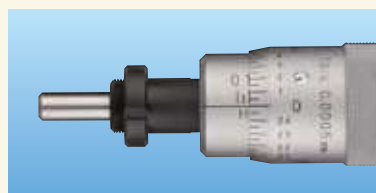
Figure D





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.

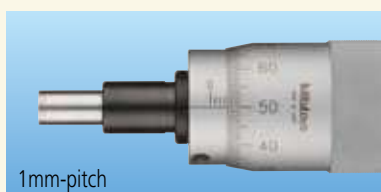


Ultra-fine Feed Applications

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

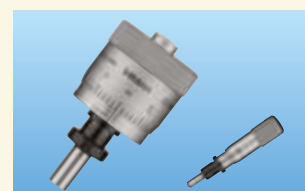
Spindle Thread Pitch

- 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.



Thimble Diameter

- The diameter of a thimble greatly affects its usability and the "fineness" of positioning. A small-diameter thimble allows quick positioning whereas a large-diameter thimble allows fine positioning and easy reading of the graduations. Some models combine the advantages of both features by mounting a coarse-feed thimble (speeder) on the large-diameter thimble.



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.



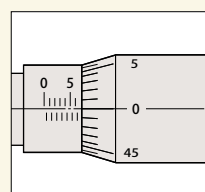
Micrometer head with constant-force device



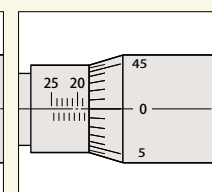
Micrometer head without constant-force device (no ratchet)

Graduation Styles

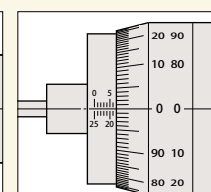
- Care is needed when taking a reading from a mechanical micrometer head, especially if the user is unfamiliar with the model.
- The "normal graduation" style, identical to that of an outside micrometer, is the standard. For this style the reading increases as the spindle retracts into the body.
- On the contrary, in the "reverse graduation" style the reading increases as the spindle advances out of the body.
- The "bidirectional graduation" style is intended to facilitate measurement in either direction by using black numerals for normal, and red numerals for reverse, operation.
- Micrometer heads with a mechanical or electronic digital display, which allow direct reading of a measurement value, are also available. These types are free from misreading errors. A further advantage is that the electronic digital display type can enable computer-based storage and statistical processing of measurement data.



Normal



Reverse



Bidirectional

CAD Data Download for Micrometer Heads

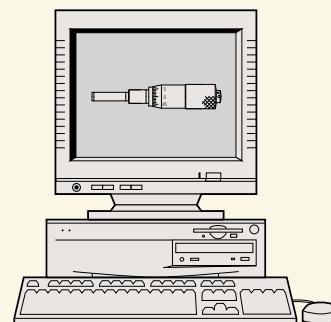
2D/3D CAD data files* of the micrometer heads described in this catalog are available for download from the Mitutoyo home page. The data is supplied in formats common to most CAD systems.

To download, access the "Micrometer Heads" section under "Product Information" and then follow the procedure given below.

2D geometric data: DXF

3D geometric data: IGS / STP

* For some models only 2D data files are available.



Mitutoyo home page <http://www.mitutoyo.co.jp>.

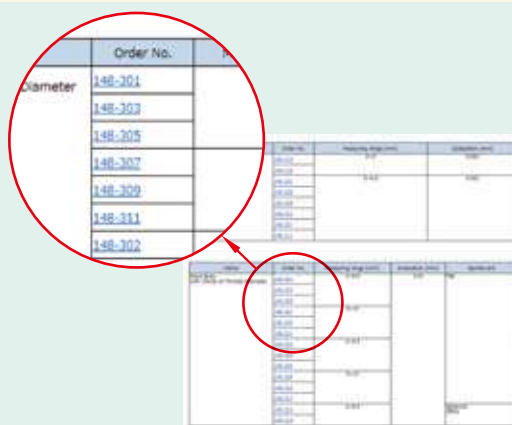
Downloading Procedure



1

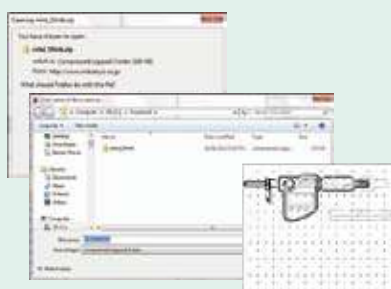
Page of product information list
Click the [2D-CAD Download] or [3D-CAD Download] button for the desired product.

2



A model listing window will open.
Click a desired one of products (blue-colored) in the tabulated list.

3



Specify the destination to save and then click the [Save] button.
The desired CAD data is downloaded to the specified destination.

* If a PC on WindowsXP SP2 is used, the 'Popup Block' function has been set by default. If this is the case, downloading may not be performed. Use the following method to temporarily disable popup block.

Downloading with WindowsXP SP2

Click on the CAD download link portion while holding down the [Ctrl] key on the keyboard. The popup block is temporarily disabled, thus enabling download of the data.

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● Digimatic heads

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● Standard heads

Lowest cost heads with a wide choice of stroke and size to suit almost any application. Stroke X Total length X Thimble Diameter (mm)

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● High Function heads

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• Large thimble type provides higher resolution and readability than standard types	41, 42
• Large thimble type with special graduation scheme and quick zero-setting ring to suit XY-stage operation	43
• 2X more range and feedrate than standard with non-rotating spindle for where twisting effect of spindle is undesirable	44
• Large thimble, non-rotating spindle type provides higher accuracy and resolution than standard types for high-accuracy applications	45
• Mechanical counter type for easy digital reading to 0.01mm resolution with graduated sleeve for finer work	45

Series 164/350 Digimatic Micrometer Heads

Data output and digital reading make this type ideal for integrating into SPC systems.

SPECIFICATIONS

- Measuring face
Material: Carbide tip
Hardness: 90HRA or more
Lapped
- Scale finishing: Satin-chrome plated
- Fixture thickness: 11.5mm (recommended)

The large-character LCD enables easy, error-free reading of measurements to 0.001mm resolution. The spindle feeds at the standard rate of 0.5mm/rev.

Metric							
Order No.	Range	Resolution	Accuracy**	Stem	Stem dia	Spindle end	Graduation features
164-163	0 - 50mm	—	±3µm	Plain	18mm	Flat (carbide tip)	—
350-251-30	0 - 25mm	0.001mm	±2µm	W/ clamp nut	10mm	Spherical (SR4) (carbide tip)	Standard
350-252-30				Plain			
350-253-30				W/ clamp nut			
350-254-30				Plain	12mm	Flat (carbide tip)	
350-281-30*				W/ clamp nut		Spherical (SR4) (carbide tip)	
350-282-30*				Plain		Flat	
350-283-30*				W/ clamp nut			
350-284-30*				Plain			
350-261-30*							

* IP65 dust/water protection type

** Excluding quantizing error

Inch/Metric							
Order No.	Range	Resolution	Accuracy**	Stem	Stem dia	Spindle end	Graduation features
164-164	0 - 2"		±.00015"	Plain	0.709"	Flat (carbide tip)	—
350-351-30	0 - 1"	.00005"/ 0.001mm	±.0001"	W/ clamp nut	0.375"	Spherical (SR4) (carbide tip)	Standard
350-352-30				Plain			
350-353-30				W/ clamp nut		Flat (carbide tip)	
350-354-30				Plain	0.5"		
350-381-30*				W/ clamp nut		Flat	
350-382-30*				Plain			
350-383-30*				W/ clamp nut			
350-384-30*				Plain			
350-361-30*							

* IP65 dust/water protection type

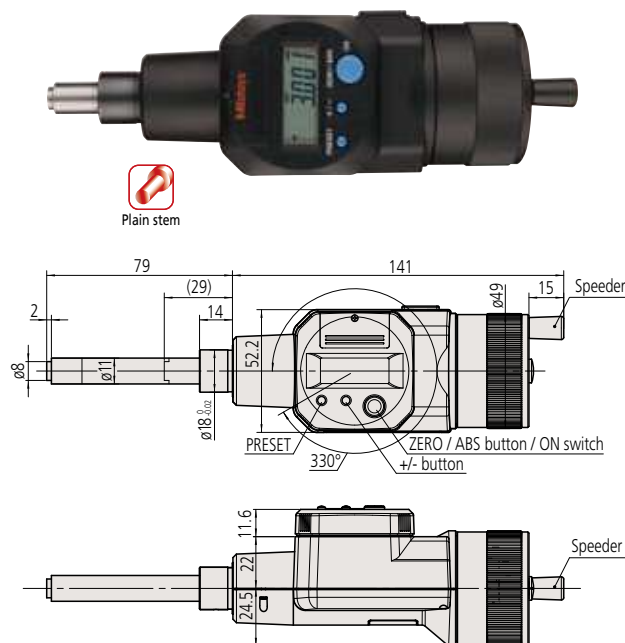
* Note: Stem diameter of IP65 type is 12mm.

** Excluding quantizing error

DIMENSIONS

Plain stem

Unit: mm



164-163 Rotatable display Mass: 490g

Electrical Specifications

	Series 164	Series 350
Power supply	SR44 (2 pcs.), Order No. 938882	SR44 (1 pc), Order No. 938882
Battery life	Approx. 1.8 years under normal use	Approx. 2.4 years under normal use
Scale type	Electromagnetic induction rotary encoder	
Quantizing error	±1 count	

() : with spindle fully retracted

IP Codes

Level 6: Dustproof.

No ingress of dust allowed.

Level 5: Protected against water jets.

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

Accuracy

Quantizing error: Excluding ± 1 count

Power supply for Series 350

SR44 (1 pc), Order No. 938882

(The supplied batteries are used for the monitor)

Power supply for Series 164

SR44 (2 pcs.), Order No. 938882

(The supplied batteries are used for the monitor)

Functions

Origin point setting (ABS measurement system): Resets the ABS origin at the current spindle position to the minimum value of the measuring range and switches to ABS mode.

Zero-setting (INC measurement system):

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

Data output:

Equipped with output port for transferring measurement data to a Statistical Process Control (SPC) and measurement system.

Auto power ON/OFF:

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

Error alarm:

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

Optional accessories

Connecting cables for Series 164

1m: 959149

2m: 959150

USB Input Tool Direct

USB-ITN-C (2m): 06ADV380C

Connecting cables for U-WAVE-T (for Series 164)

02AZD790C 160mm

For foot switch: 02AZE140C

Connecting cables for 350 series

1m: 05CZA662

2m: 05CZA663

USB Input Tool Direct

USB-ITN-B (2m): 06ADV380B

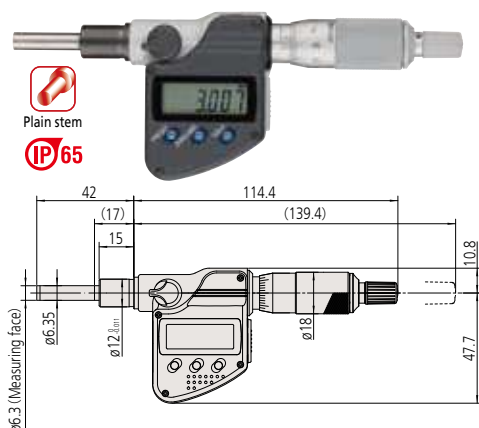
Connecting cables for U-WAVE-T (for Series 350)

02AZD790B 160mm

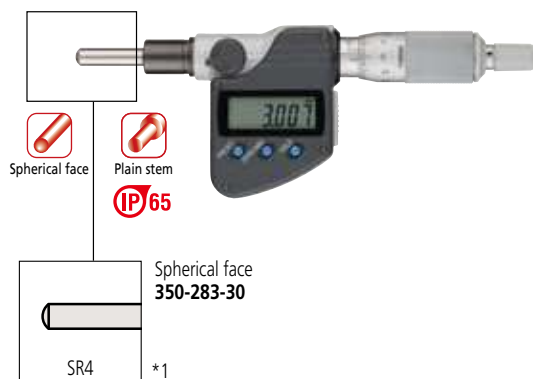
For foot switch: 02AZE140B

DIMENSIONS

Plain stem



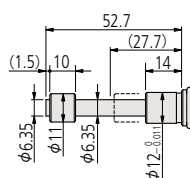
350-281-30 (Stem dia. 12mm, waterproof type) Mass: 230g



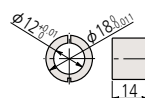
Spherical face
350-283-30

*1

Unit: mm



Equipped with a non-rotating device
350-261-30
(Stem dia. 12mm, waterproof type)
Mass: 235g



Bush (standard accessory)
350-261-30

*1 Other dimensions are the same as 350-281-30.
() : with spindle fully retracted

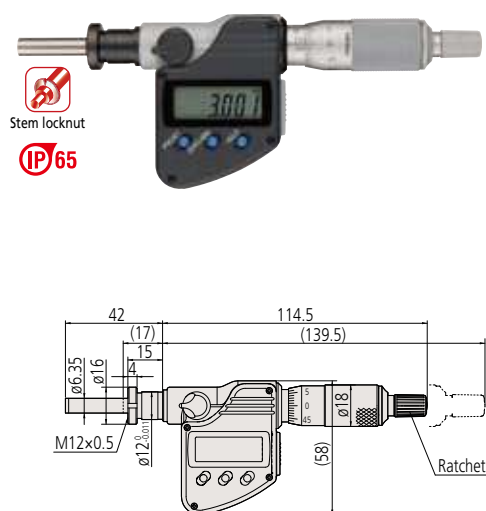
CAD download service at Mitutoyo web site

2D CAD data can be downloaded at our web site. For details, refer to page 10.

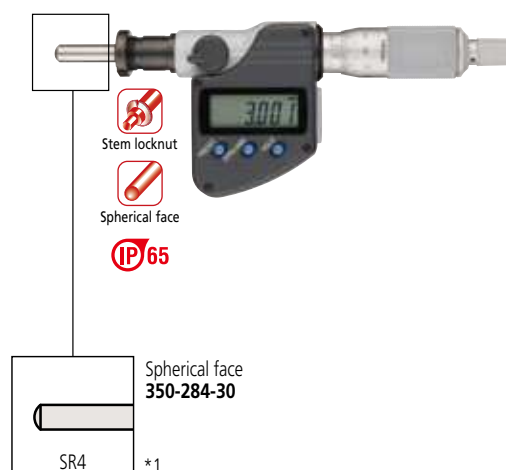
DIMENSIONS

Stem locknut

Unit: mm

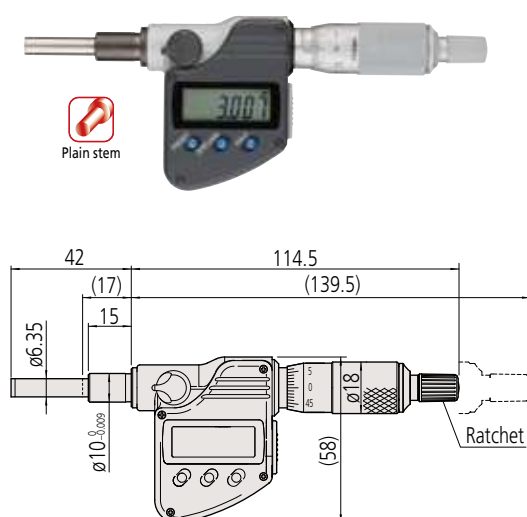


Fixture thickness: 11.5mm
350-282-30 (Stem dia. 12mm, equipped with locknut, waterproof type) Mass: 230g

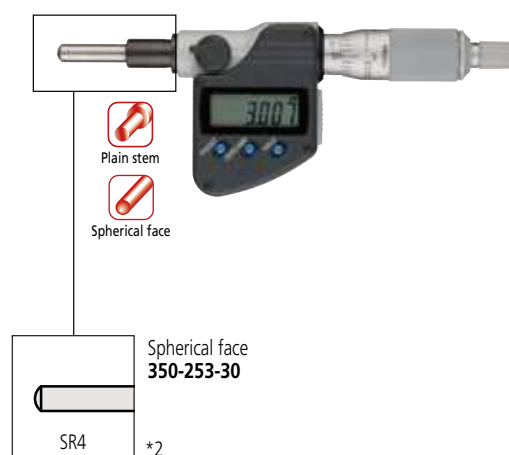


*1 Other dimensions are the same as **350-282-30**.
 (): with spindle fully retracted

Plain stem



350-251-30
 (Stem dia. 10mm, for general use) Mass: 230g



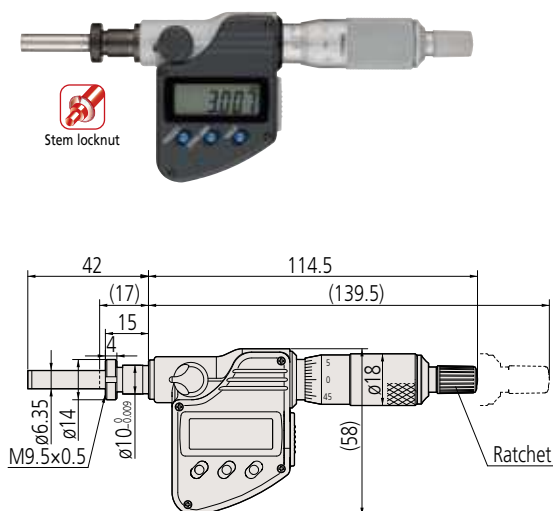
*2 Other dimensions are the same as **350-251-30**.
 (): with spindle fully retracted

● CAD download service at Mitutoyo web site

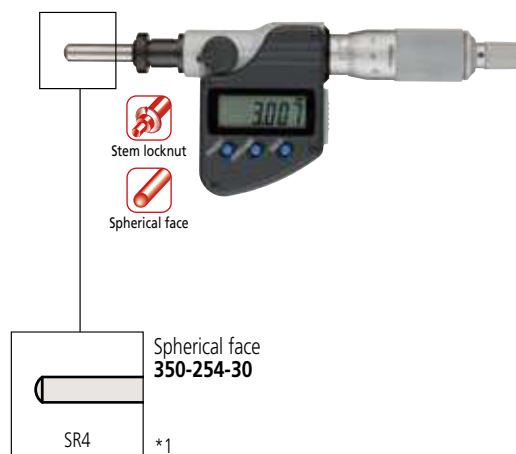
2D CAD data can be downloaded at our web site. For details, refer to page 10.

Stem locknut

Unit: mm



Fixture thickness: 11.5mm
350-252-30
 (Stem dia. 10mm, for general use) Mass: 230g



*1 Other dimensions are the same as **350-252-30**.
 (): with spindle fully retracted

Series 148 Micrometer Heads Small/Ultra-small Type

Miniature micrometer heads ideal for applications where space is extremely limited.

SPECIFICATIONS

- Measuring range: 0 - 5mm
0 - 6.5mm
- Resolution: 0.02mm
0.01mm
- Accuracy: $\pm 5\mu\text{m}$
- Measuring face: Material: Alloy tool steel
Hardness: 60HRC or more
Lapped
- Scale finishing: Satin-chrome plated

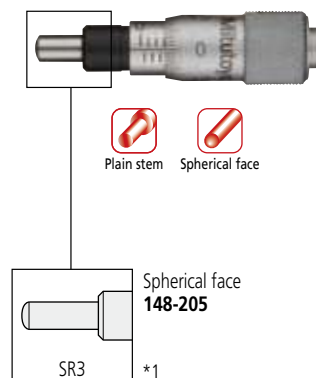
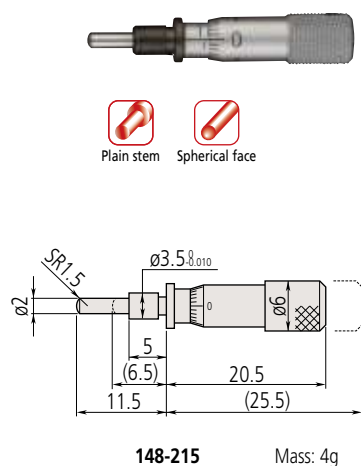
Metric						
Order No.	Range	Accuracy	Stem dia.	Stem	Spindle end	Graduation
148-215	0 - 5mm	±5μm	3.5mm	Plain	Spherical (SR1.5)	Standard
148-216				W/ clamp nut		
148-201	0 - 6.5mm		6mm	Plain	Flat	
148-203				W/ clamp nut		
148-205				Plain	Spherical (SR3)	
148-207				W/ clamp nut		
148-209				Plain	Flat	
148-211				W/ clamp nut		
Inch						
Order No.	Range	Accuracy	Stem dia.	Stem	Spindle end	Graduation
148-217	0 - .2"	±.00025"	.156"	Plain	Spherical (SR1.5)	Standard
148-218				W/ clamp nut		
148-202	0 - .25"		.25"	Plain	Flat	
148-204				W/ clamp nut		
148-206				Plain	Spherical (SR3)	
148-208				W/ clamp nut		
148-210*				Plain	Flat	
148-212*				W/ clamp nut		

* made-to-order models

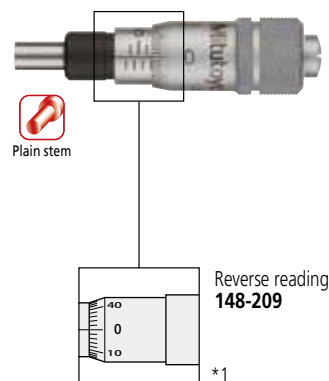
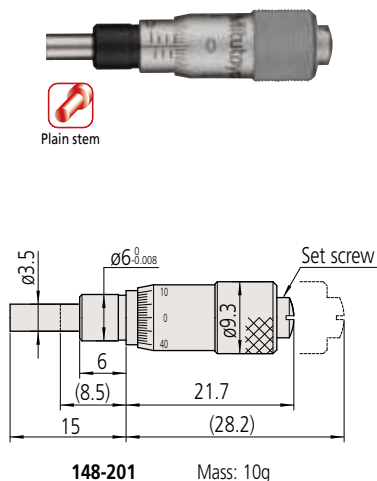
DIMENSIONS

Plain stem

Unit: mm



*1 Other dimensions are the same as 148-201.

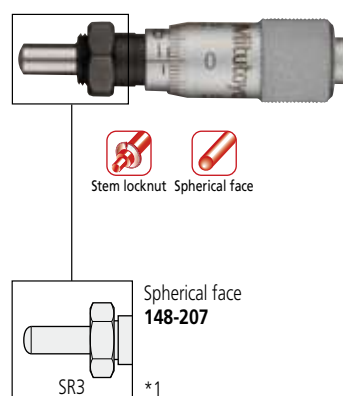
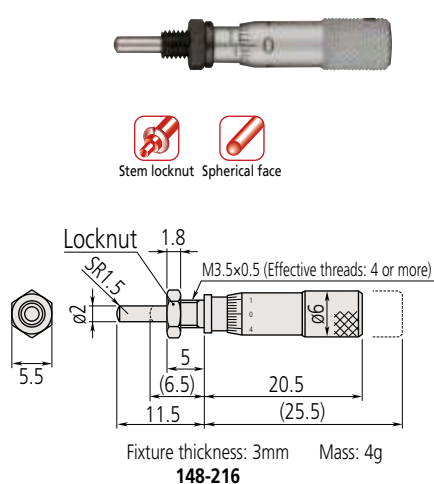


(): with spindle fully retracted

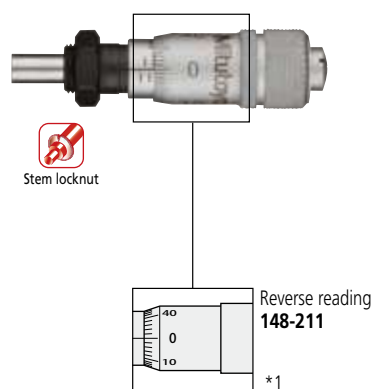
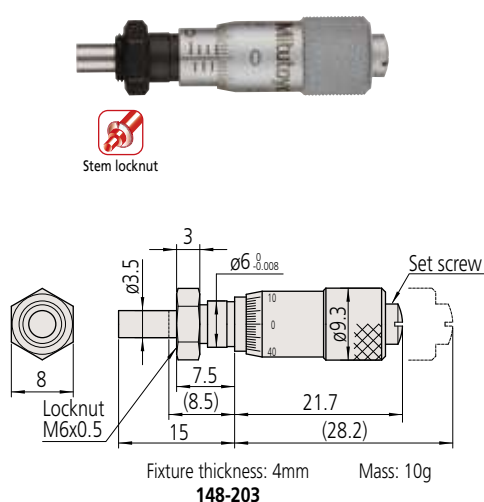
DIMENSIONS

Stem locknut

Unit: mm



*1 Other dimensions are the same as 148-203.



(): with spindle fully retracted

● CAD download service at Mitutoyo web site

2D CAD data can be downloaded at our web site. For details, refer to page 10.

Series 148 Micrometer Heads

Short Thimble with Choice of Diameter

The short thimble design with good stroke enables incorporation in equipment where space is limited. Three model variations offer a choice of thimble diameter for best match to the application.

SPECIFICATIONS

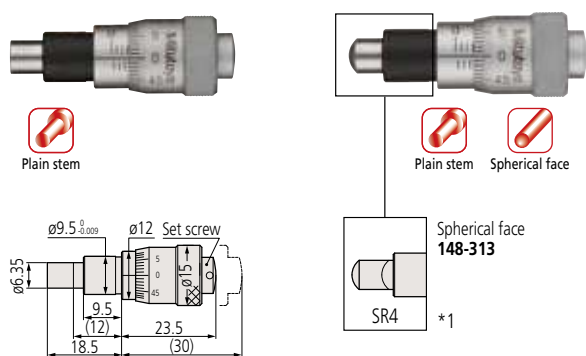
- Measuring range: 0 - 6.5mm
0 - 13mm
- Resolution: 0.01mm
- Accuracy: $\pm 2\mu\text{m}$
- Measuring face: Material: Alloy tool steel
Hardness: 60HRC or more
Lapped
- Scale finishing: Satin-chrome plated

Metric						
Order No.	Range	Accuracy	Stem dia.	Stem	Spindle end	Special features
148-301	0 - 6.5mm	$\pm 2\mu\text{m}$	9.5mm	Plain	Flat	15mm thimble dia.
148-302				W/ clamp nut		
148-303				Plain		20mm thimble dia.
148-304				W/ clamp nut	Spherical (SR4)	29mm thimble dia.
148-305				Plain		
148-306				W/ clamp nut		
148-313	0 - 13mm	$\pm 2\mu\text{m}$	9.5mm	Plain	Flat	15mm thimble dia.
148-314				W/ clamp nut		
148-307				Plain	Spherical (SR4)	20mm thimble dia.
148-308				W/ clamp nut		
148-309				Plain		29mm thimble dia.
148-310				W/ clamp nut		
148-311				Plain		
148-312				W/ clamp nut		

Inch						
Order No.	Range	Accuracy	Stem dia.	Stem	Spindle end	Special features
148-351	0 - .25"	$\pm .0001"$	.375"	Plain	Flat	.59" thimble dia.
148-352				W/ clamp nut		
148-353				Plain	Spherical	.79" thimble dia.
148-354				W/ clamp nut		
148-355				Plain		1.14" thimble dia.
148-356				W/ clamp nut	Flat	.59" thimble dia.
148-357	0 - .5"	$\pm .0001"$	.375"	Plain		
148-358				W/ clamp nut		.79" thimble dia.
148-359				Plain		
148-360				W/ clamp nut		1.14" thimble dia.
148-361				Plain		
148-362				W/ clamp nut		

DIMENSIONS

Plain stem



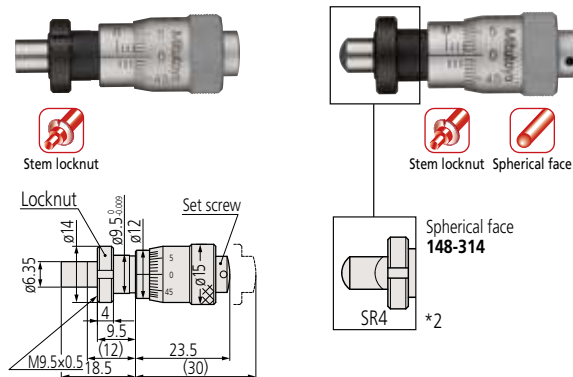
Mass: 26g

148-301 Thimble diameter: $\phi 15$

*1 Other dimensions are the same as 148-301.

Stem locknut

Unit: mm

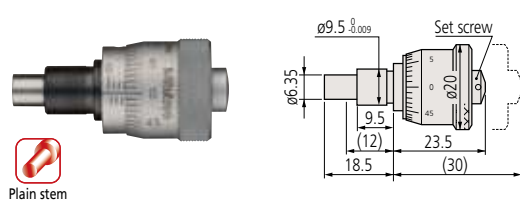


Fixture thickness : 6mm

Mass: 26g

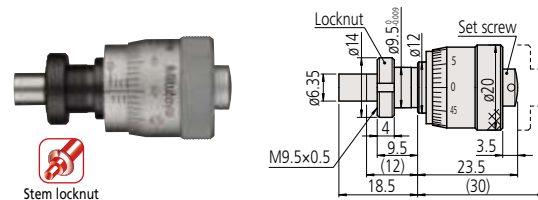
148-302 Thimble diameter: $\phi 15$

*2 Other dimensions are the same as 148-302.



Mass: 39g

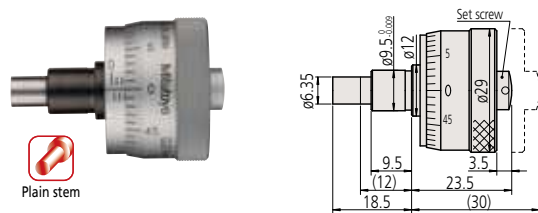
148-303 Thimble diameter: $\phi 20$



Fixture thickness : 6mm

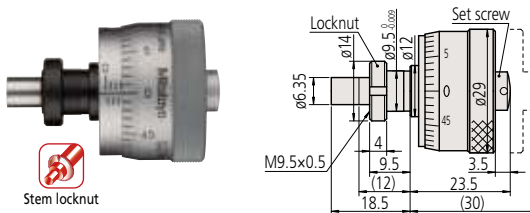
Mass: 39g

148-304 Thimble diameter: $\phi 20$



Mass: 71g

148-305 Thimble diameter: $\phi 29$



Fixture thickness : 6mm

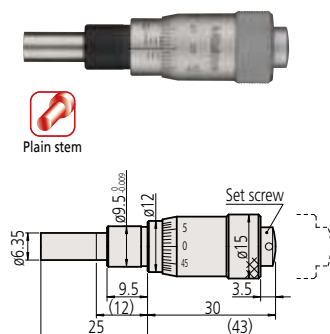
Mass: 71g

148-306 Thimble diameter: $\phi 29$

() : with spindle fully retracted

DIMENSIONS

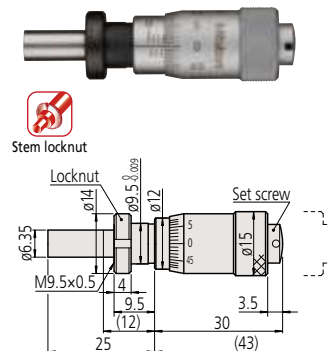
Plain stem



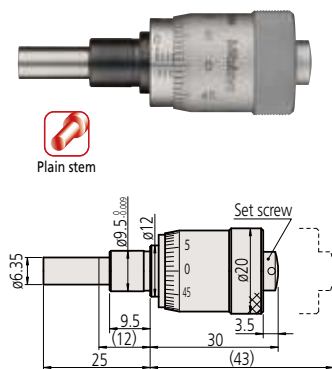
Mass: 35g
148-307 Thimble diameter: $\phi 15$

Stem locknut

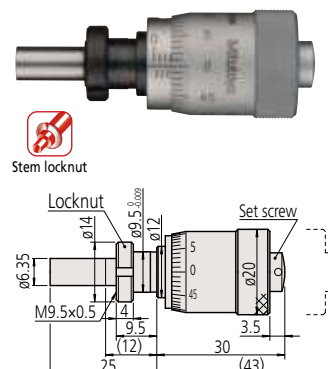
Unit: mm



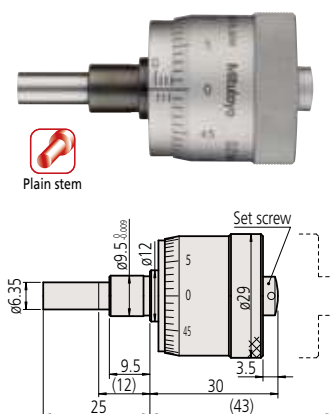
Fixture thickness : 6mm Mass: 35g
148-308 Thimble diameter: $\phi 15$



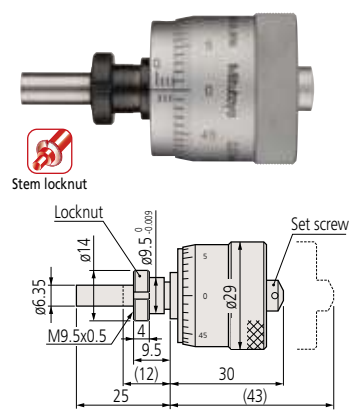
Mass: 55g
148-309 Thimble diameter: $\phi 20$



Fixture thickness : 6mm Mass: 55g
148-310 Thimble diameter: $\phi 20$



Mass: 103g
148-311 Thimble diameter: $\phi 29$



Fixture thickness : 6mm Mass: 103g
148-312 Thimble diameter: $\phi 29$

(): with spindle fully retracted

● CAD download service at Mitutoyo web site

2D CAD data can be downloaded at our web site. For details, refer to page 10.

Series 148 Micrometer Heads Small Standard Type

A small, popular, 13mm-stroke standard micrometer head offering many useful variations including a reverse reading option.

SPECIFICATIONS

- Measuring range: 0 - 13mm
- Resolution: 0.01mm
- Accuracy: $\pm 2\mu\text{m}$
- Measuring face: Material: Alloy tool steel
Hardness: 60HRC or more
Lapped
- Scale finishing: Satin-chrome plated

Metric						
Order No.	Range	Accuracy	Stem dia.	Stem	Spindle end	Graduation features
148-104	0 - 13mm	$\pm 2\mu\text{m}$	9.5mm	Plain	Flat	Standard
148-103				W/ clamp nut		
148-121				Plain*		
148-120				W/ clamp nut*		
148-801				Plain	Spherical (SR4)	
148-802				W/ clamp nut		
148-803				Plain*		
148-804				W/ clamp nut*		
148-821				Plain	Flat	Reverse reading
148-822				W/ clamp nut		
148-823				Plain*		
148-824				W/ clamp nut*		

* with spindle lock

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

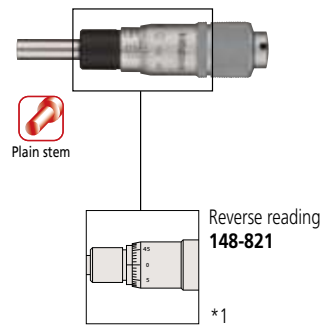
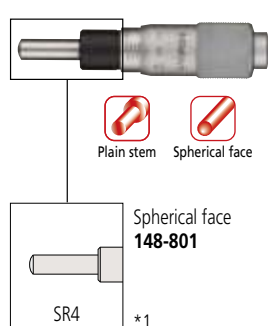
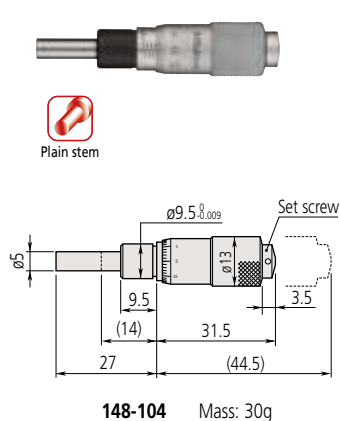
* with spindle lock

** made-to-order model

DIMENSIONS

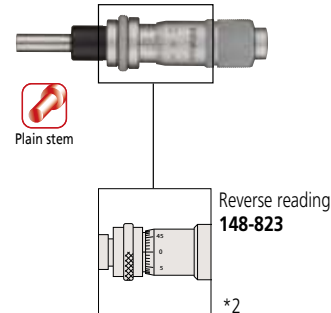
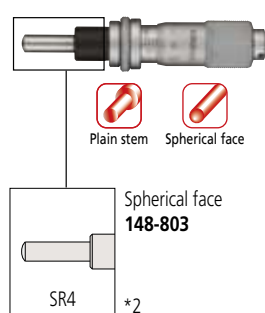
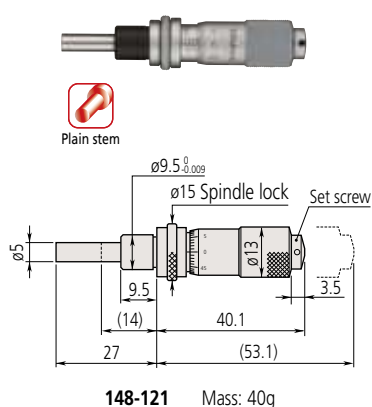
Plain stem

Unit: mm



*1 Other dimensions are the same as 148-104.

Plain stem and spindle lock

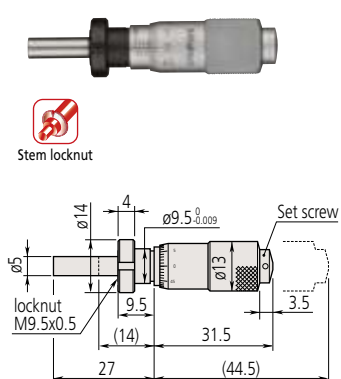


*2 Other dimensions are the same as 148-121.
(): with spindle fully retracted

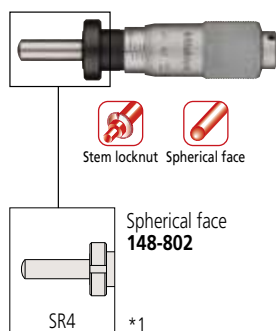
DIMENSIONS

Stem locknut

Unit: mm

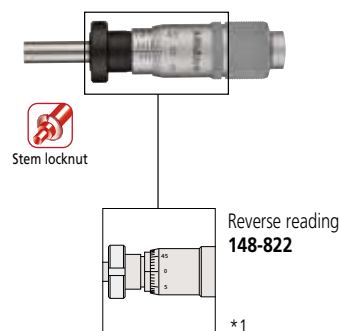


Fixture thickness: 6mm
148-103 Mass: 35g



Spherical face
148-802

*1

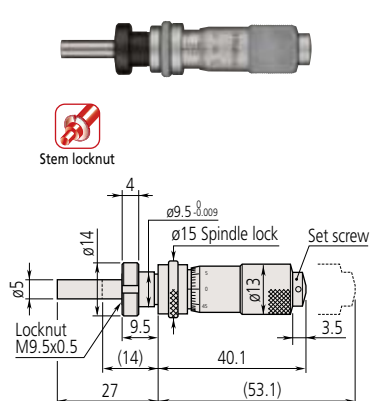


Reverse reading
148-822

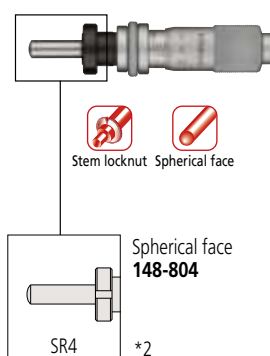
*1

*1 Other dimensions are the same as **148-103**.

Stem locknut and spindle lock

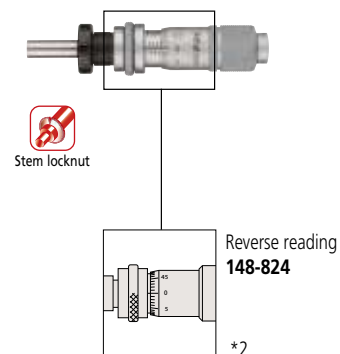


Fixture thickness: 6mm
148-120 Mass: 45g



Spherical face
148-804

*2



Reverse reading
148-824

*2

*2 Other dimensions are the same as **148-120**.
(): with spindle fully retracted

● CAD download service at Mitutoyo web site

2D CAD data can be downloaded at our web site. For details, refer to page 10.

Series 148 Micrometer Heads

Small Thimble Diameter Standard Type

A small, 13mm-stroke standard micrometer head with zero point adjustment on the thimble. Variations include a reverse reading option and an all-stainless-steel model.

SPECIFICATIONS

- Measuring range: 0 - 13mm
- Resolution: 0.01mm
- Accuracy: $\pm 2\mu\text{m}$
- Measuring face: Material: Alloy tool steel
Hardness: 60HRC or more
Lapped
- Scale finishing: Satin-chrome plated

Metric						
Order No.	Range	Accuracy	Stem dia.	Stem	Spindle end	Special features
148-503	0 - 13mm	$\pm 2\mu\text{m}$	9.5mm	Plain	Flat	Standard
148-513				W/ clamp nut		Stainless steel throughout
148-508				Plain*	Flat	Standard
148-506				W/ clamp nut*		
148-504				W/ clamp nut*	Spherical (SR4)	Standard
148-853				Plain		
148-854				W/ clamp nut*	Flat	Reverse reading
148-863				Plain		
148-864				W/ clamp nut*	Spherical (SR4)	Standard
148-518**				W/ clamp nut		
148-858**				W/ clamp nut	Flat	Reverse reading
148-866**				Plain*		
148-856**				Plain*	Spherical (SR4)	Standard
148-868**				W/ clamp nut		

* with spindle lock ** made-to-order models

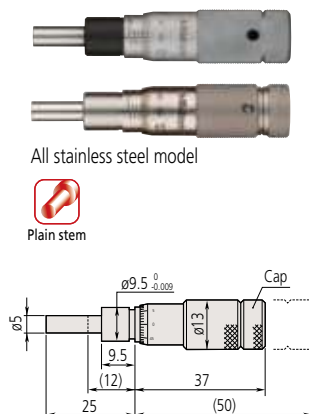
Inch						
Order No.	Range	Accuracy	Stem dia.	Stem	Spindle end	Special features
148-501	0 - .5"	$\pm .0001"$	.375"	Plain	Flat	Standard
148-511**				W/ clamp nut		Stainless steel throughout
148-507**				Plain*	Flat	Standard
148-505				W/ clamp nut*		
148-502				W/ clamp nut*	Spherical (SR4)	Standard
148-851				Plain		
148-852				W/ clamp nut*	Flat	Reverse reading
148-861				Plain		
148-862				W/ clamp nut*	Spherical (SR4)	Standard
				Plain*		
				W/ clamp nut*	Flat	Reverse reading
				Plain*		
				W/ clamp nut*	Spherical (SR4)	Standard
				Plain*		

* with spindle lock ** made-to-order models

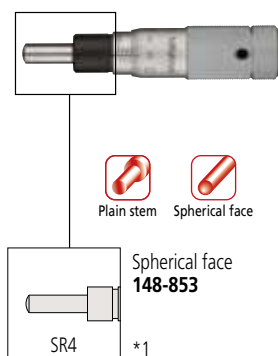
DIMENSIONS

Plain stem

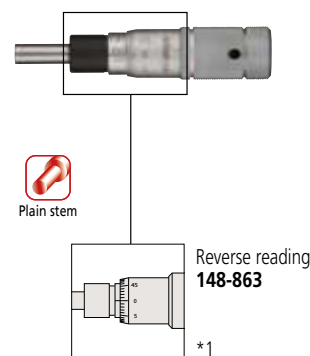
Unit: mm



148-503 Mass: 35g
148-513 All stainless steel model



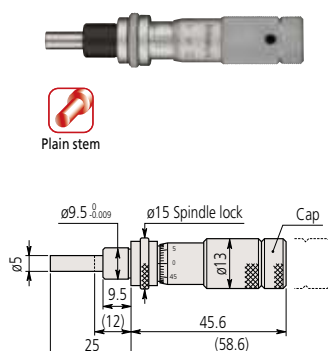
*1



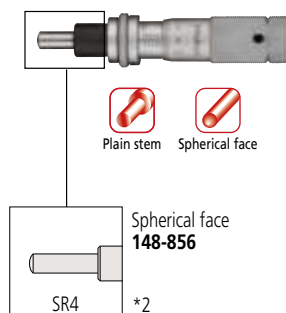
*1

*1 Other dimensions are the same as 148-503.

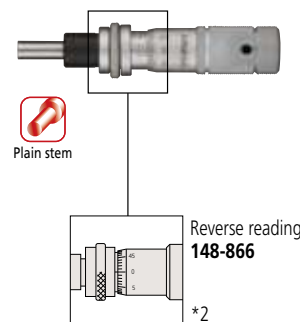
Plain stem and spindle lock



Mass: 35g
148-506 MHA1-13L



*2



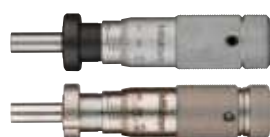
*2

*2 Other dimensions are the same as 148-506.
() : with spindle fully retracted

DIMENSIONS

Stem locknut

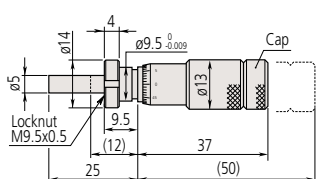
Unit: mm



All stainless steel model



Stem locknut



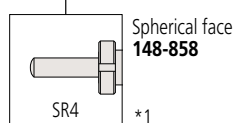
Fixture thickness: 6mm Mass: 40g

148-508

148-518 All stainless steel model



Stem locknut Spherical face

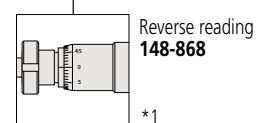


Spherical face
148-858

*1



Stem locknut



Reverse reading
148-868

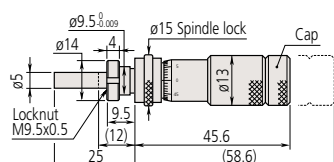
*1

*1 Other dimensions are the same as **148-508**.

Stem locknut and spindle lock

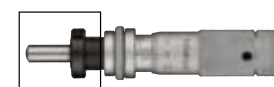


Stem locknut

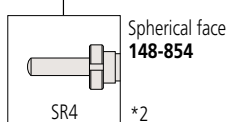


Fixture thickness: 6mm Mass: 40g

148-504

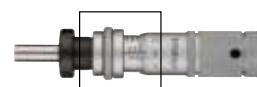


Stem locknut Spherical face

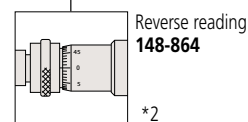


Spherical face
148-854

*2



Stem locknut



Reverse reading
148-864

*2

*2 Other dimensions are the same as **148-504**.
(): with spindle fully retracted

● CAD download service at Mitutoyo web site

2D CAD data can be downloaded at our web site. For details, refer to page 10.

Series 149 Micrometer Heads

Small Standard Type with Carbide-Tipped Spindle

A small, 15mm-stroke standard micrometer head featuring a carbide-tipped spindle and useful variations including a reverse reading option.

SPECIFICATIONS

- Measuring range: 0 - 15mm
- Resolution: 0.01mm
- Accuracy: $\pm 2\mu\text{m}$
- Measuring face: Material: Carbide tip
Hardness: 90HRA or more
Lapped
- Scale finishing: Satin-chrome plated

Metric						
Order No.	Range	Accuracy	Stem dia.	Stem	Spindle end	Graduation features
149-132	0 - 15mm	$\pm 2\mu\text{m}$	9.5mm	Plain	Flat (carbide tip)	Standard
149-131				W/ clamp nut		
149-183				Plain*		
149-184				W/ clamp nut*		
149-801				Plain	Spherical (SR4)(carbide tip)	Standard
149-802				W/ clamp nut		
149-821				Plain	Flat (carbide tip)	Reverse reading
149-822				W/ clamp nut		
149-803**				Plain*	Spherical (SR4)(carbide tip)	Standard
149-804**				W/ clamp nut*		
149-823**				Plain*	Flat (carbide tip)	Reverse reading
149-824**				W/ clamp nut*		

* with spindle lock ** made-to-order models

Inch						
Order No.	Range	Accuracy	Stem dia.	Stem	Spindle end	Graduation features
149-148	0 - .5"	$\pm .0001$ "	.375"	Plain	Flat (carbide tip)	Standard
149-147				W/ clamp nut		
149-185***				Plain*		
149-182				W/ clamp nut*		
149-811				Plain	Spherical (SR4)(carbide tip)	Standard
149-812				W/ clamp nut		
149-831**				Plain	Flat (carbide tip)	Reverse reading
149-832**				W/ clamp nut		
149-181**				Plain*	Flat (carbide tip)	Standard

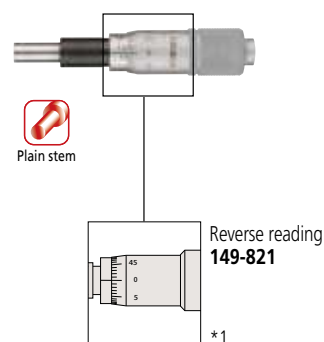
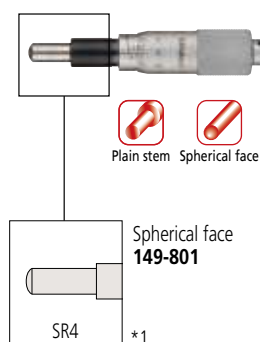
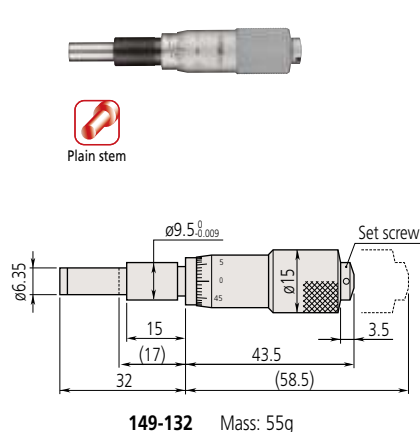
* with spindle lock ** made-to-order model

*** w/ratchet (149-181) is available

DIMENSIONS

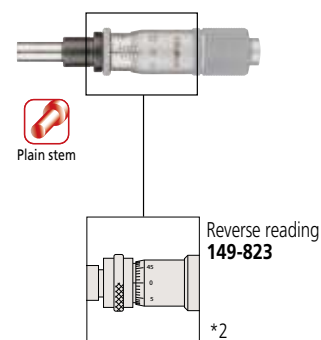
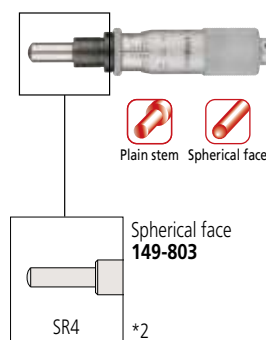
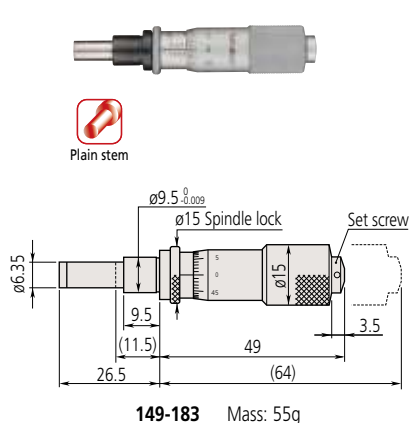
Plain stem

Unit: mm



*1 Other dimensions are the same as 149-132.

Plain stem and spindle lock

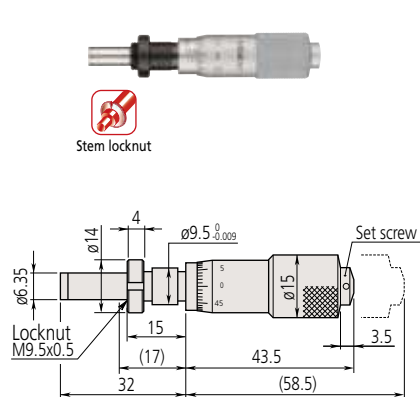


*2 Other dimensions are the same as 149-183.
() : with spindle fully retracted

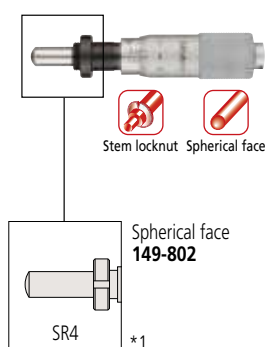
DIMENSIONS

Unit: mm

Stem locknut

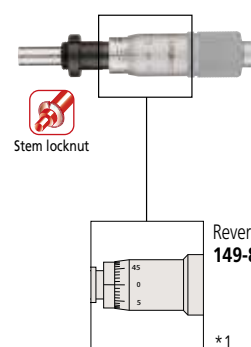


Fixture thickness: 11.5mm
149-131 Mass: 60g



Spherical face
149-802

*1

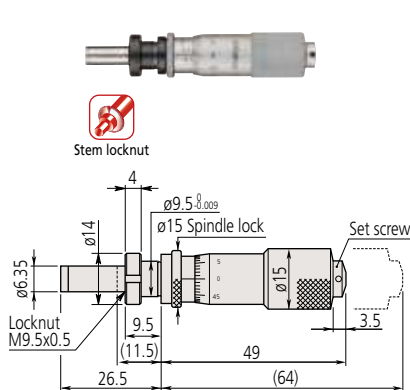


Reverse reading
149-822

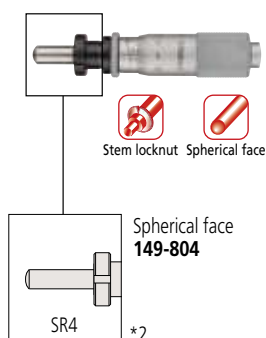
*1

*1 Other dimensions are the same as **149-131**.

Stem locknut and spindle lock

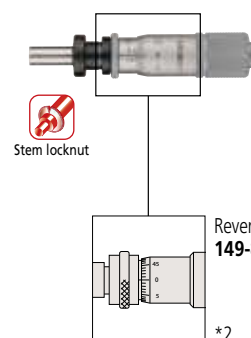


Fixture thickness: 6mm
149-184 Mass: 60g



Spherical face
149-804

*2



Reverse reading
149-824

*2

*2 Other dimensions are the same as **149-184**.
(): with spindle fully retracted

● CAD download service at Mitutoyo web site

2D CAD data can be downloaded at our web site. For details, refer to page 10.

Series 150 Micrometer Heads

Medium-sized Standard Type

Most popular small micrometer heads with a measuring range of 25mm. The wide variety of models enables a good match to the application to be achieved.

SPECIFICATIONS

- Measuring range: 0 - 25mm
- Resolution: 0.01mm
(0.001mm for models with vernier)
- Accuracy: $\pm 2\mu\text{m}$
- Measuring face: Material: Alloy tool steel
(Only long spindle model is alloy tool steel)
Hardness: 90HRC or more
(Only long spindle model is 60HRC or more)
Lapped
- Scale finishing: Satin-chrome plated

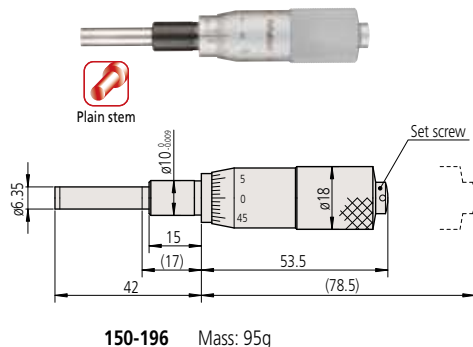
Metric							Inch							
Order No.	Range	Accuracy	Stem dia.	Stem	Spindle end	Special features	Order No.	Range	Accuracy	Stem dia.	Stem	Spindle end	Special features	
150-192	0 - 25mm	±2µm	10mm	Plain	Flat (carbide tip)	Standard	150-208	0 - 1 "	±.0001"	.375"	Plain	Flat (carbide tip)	Standard	
150-191				W/ clamp nut			150-207				W/ clamp nut			
150-209				Plain*			150-213**				Plain*			
150-210				W/ clamp nut*			150-214**				W/ clamp nut*			
150-801				Plain	Spherical (SR4) (carbide tip)		150-811				Plain	Spherical (SR4) (carbide tip)		
150-802				W/ clamp nut			150-812				W/ clamp nut			
150-821				Plain	Reverse reading		150-831				Plain	Reverse graduation		
150-822				W/ clamp nut			150-832				W/ clamp nut			
150-190				Plain			150-206				Plain			
150-189				W/ clamp nut			150-205**				W/ clamp nut	W/vernier (.0001")		
150-183**				Plain*	Flat (carbide tip)	W/vernier (0.001mm)	150-215**				W/ clamp nut*			
150-184				W/ clamp nut*			150-216**				W/ clamp nut*			
150-196				Plain			150-198				Plain	w/o ratchet stop		
150-195				W/ clamp nut			150-197				W/ clamp nut			
150-211				Plain*			150-217**				Plain*			
150-212				W/ clamp nut*			150-218**				W/ clamp nut*			
150-219				Plain	Flat	Long spindle	150-221**				Plain	Flat	Long spindle	
150-220				W/ clamp nut			150-222**				W/ clamp nut			
150-803**				Plain*	Spherical (SR4) (carbide tip)	Standard								
150-804**				W/ clamp nut*										
150-823**				Plain*	Flat (carbide tip)	Reverse reading								
150-824**				W/ clamp nut*										
150-223**				Plain*	Flat	Long spindle								
150-224**				W/ clamp nut*										

* with spindle lock ** made-to-order models

* with spindle lock ** made-to-order models

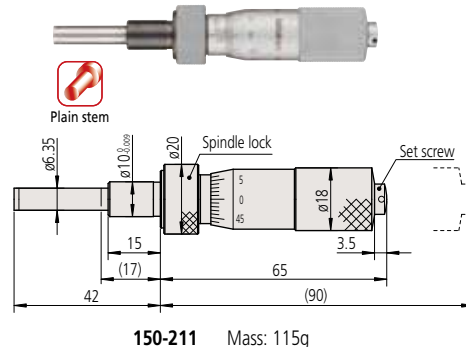
DIMENSIONS

Plain stem

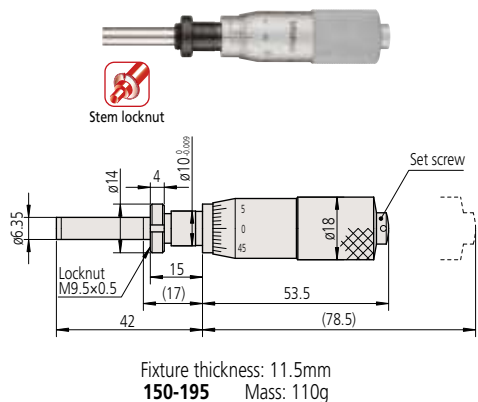


Plain stem and spindle lock

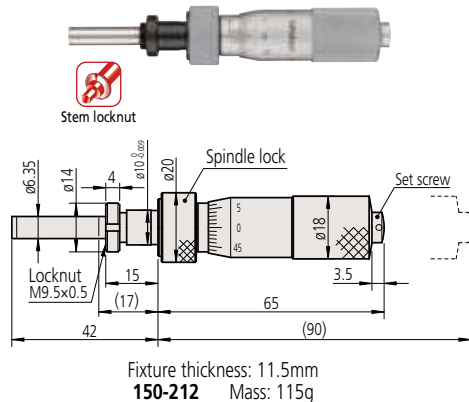
Unit: mm



Stem locknut



Stem locknut and spindle lock



(): with spindle fully retracted

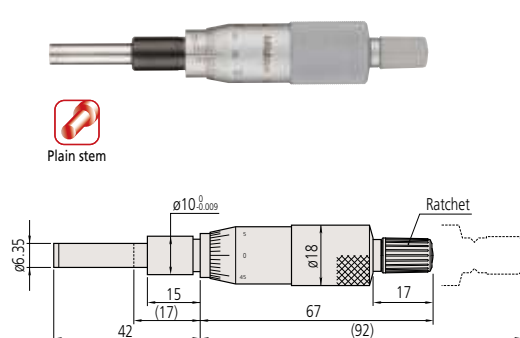
● CAD download service at Mitutoyo web site

2D CAD data can be downloaded at our web site. For details, refer to page 10.

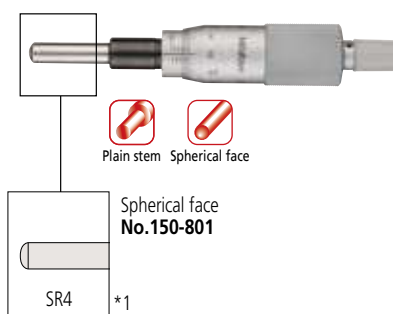
DIMENSIONS

Plain stem

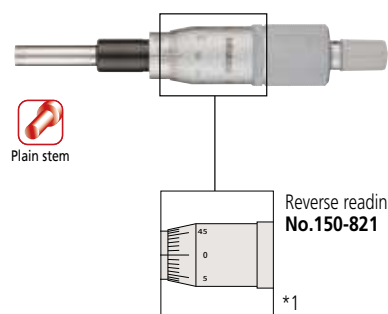
() : with spindle fully retracted Unit: mm



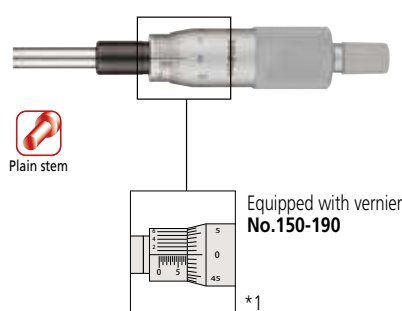
150-192 Mass: 95g



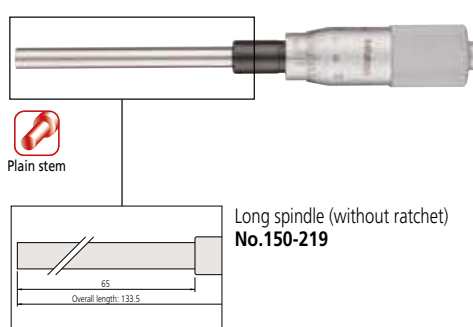
Spherical face
No.150-801



Reverse reading
No.150-821



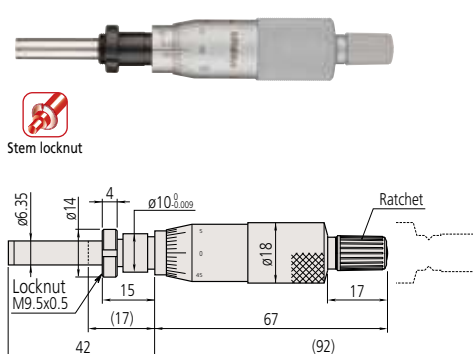
Equipped with vernier
No.150-190



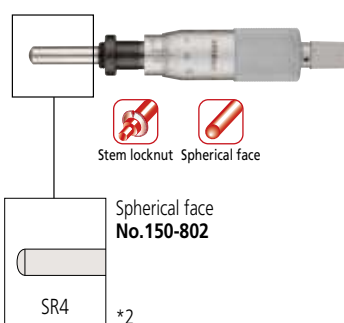
Long spindle (without ratchet)
No.150-219

*1 Other dimensions are the same as **150-192**.

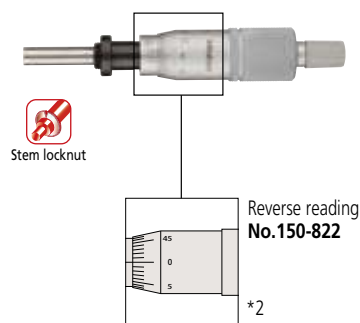
Stem locknut



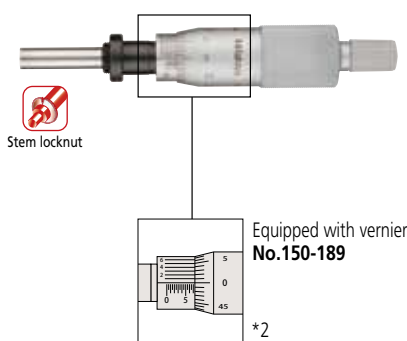
Fixture thickness: 11.5mm
150-191 Mass: 100g



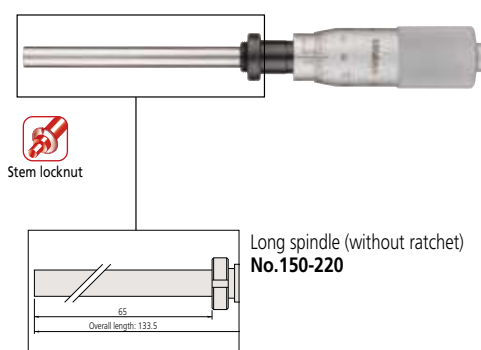
Spherical face
No.150-802



Reverse reading
No.150-822



Equipped with vernier
No.150-189



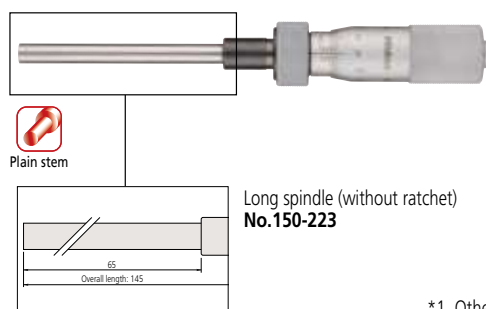
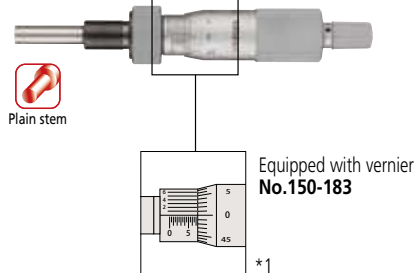
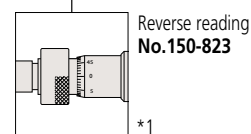
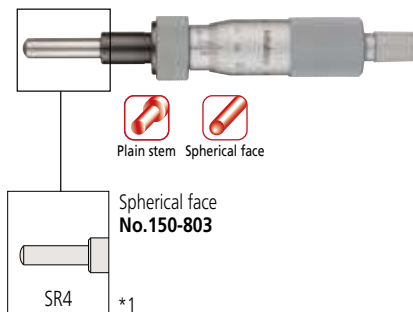
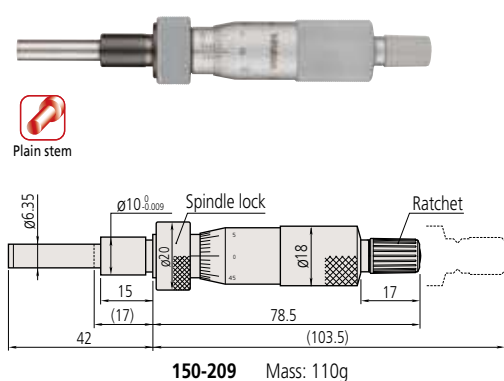
Long spindle (without ratchet)
No.150-220

*2 Other dimensions are the same as **150-191**.

DIMENSIONS

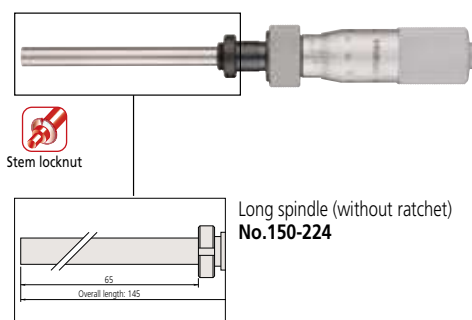
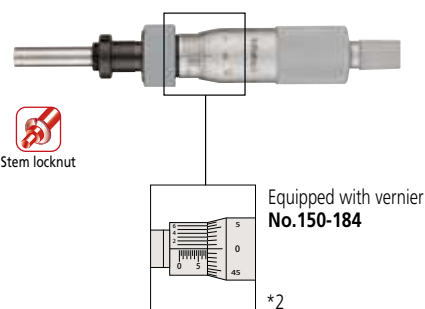
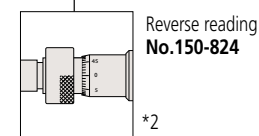
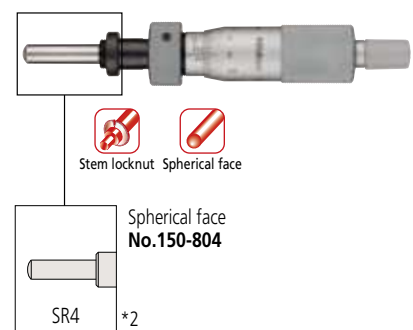
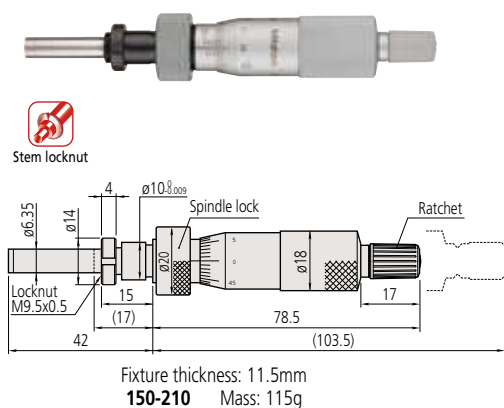
Plain stem and spindle lock

(): with spindle fully retracted Unit: mm



*1 Other dimensions are the same as 150-209.

Stem locknut and spindle lock



*2 Other dimensions are the same as 150-210.

● CAD download service at Mitutoyo web site

2D CAD data can be downloaded at our web site. For details, refer to page 10.

Series 151 Micrometer Heads

Medium-sized Standard Type
with 8mm diameter spindle

Micrometer heads with a spindle diameter of 8mm, which can sustain the most heavy-duty use among universal types.

SPECIFICATIONS

- Measuring range: 0 - 25mm, 0 - 50mm
- Resolution: 0.01mm
(0.001mm for models with vernier)
- Accuracy: $\pm 2\mu\text{m}$ (25mm range)
 $\pm 4\mu\text{m}$ (50mm range)
- Measuring face: Material: Carbide tip
Hardness: 90HRA or more
Lapped
- Scale finishing: Satin-chrome plated

Metric						
Order No.	Range	Accuracy	Stem dia.	Stem	Spindle end	Special features
151-224	0 - 25mm	$\pm 2\mu\text{m}$	12mm	Plain	Flat (carbide tip)	—
151-223				W/ clamp nut		
151-214**				Plain*		
151-213**				W/ clamp nut*		
151-222				Plain		
151-221				W/ clamp nut		
151-212**				Plain*		
151-211**				W/ clamp nut*		
151-227				Plain		
151-228				W/ clamp nut		
151-225				Plain*		
151-226				W/ clamp nut*		
151-256	0 - 50mm	$\pm 4\mu\text{m}$	12mm	Plain	Flat (carbide tip)	—
151-255				W/ clamp nut		
151-260				Plain		
151-259				W/ clamp nut		

* with spindle lock ** made-to-order models

Inch						
Order No.	Range	Accuracy	Stem dia.	Stem	Spindle end	Special features
151-240	0 - .1"	$\pm .0001"$	.5"	Plain	Flat (carbide tip)	—
151-239				W/ clamp nut		
151-238				Plain		
151-237				W/ clamp nut		
151-241**				Plain*		
151-242**				W/ clamp nut*		
151-243**				Plain*		
151-244**				W/ clamp nut*		
151-272				Plain		
151-271				W/ clamp nut		

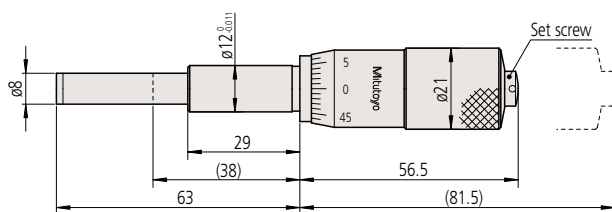
* with spindle lock ** made-to-order models

DIMENSIONS

Plain stem



Plain stem



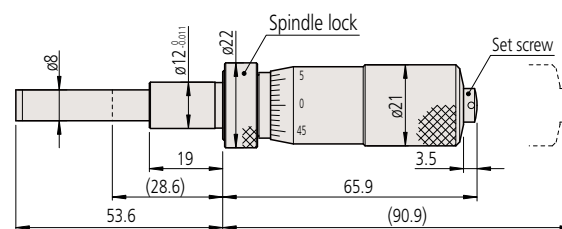
151-227 Mass: 150g

Plain stem and spindle lock

Unit: mm



Plain stem

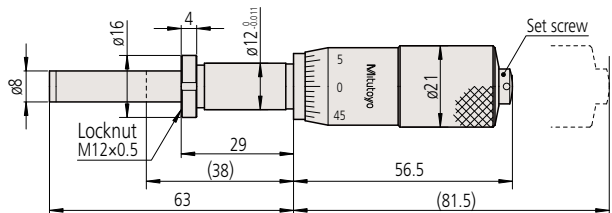


151-225 Mass: 165g

Stem locknut

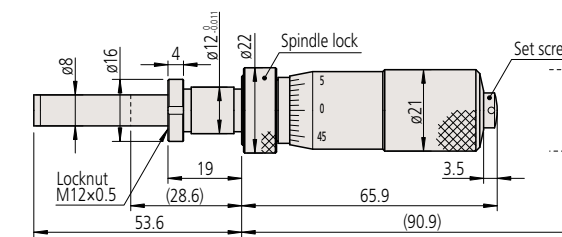


Stem locknut



Fixture thickness: 25.5mm
151-228 Mass: 155g

Stem locknut and spindle lock

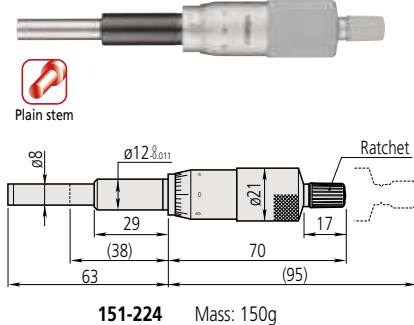


Fixture thickness: 15.5mm
151-226 Mass: 165g

() : With spindle fully retracted.

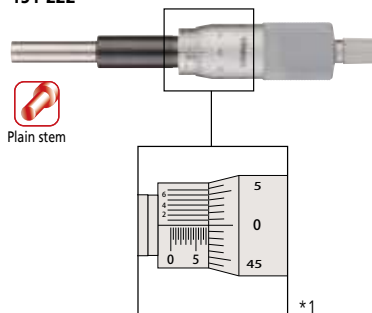
DIMENSIONS

Plain stem



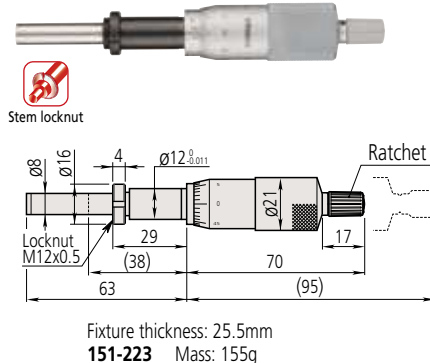
Equipped with vernier
151-222

Unit: mm

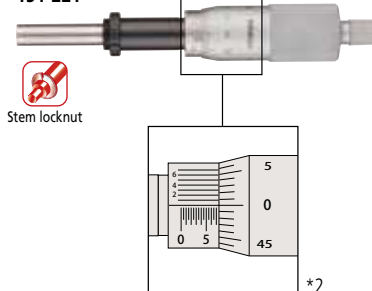


*1 Other dimensions are the same as 151-224.

Stem locknut

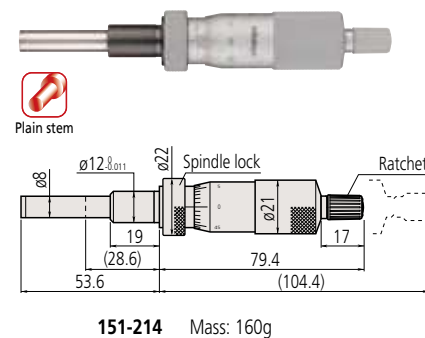


Equipped with vernier
151-221

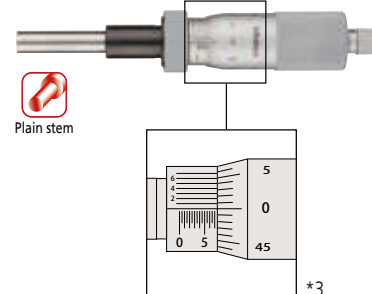


*2 Other dimensions are the same as 151-223.

Plain stem and spindle lock

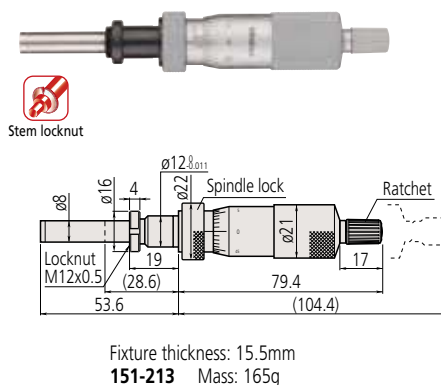


Equipped with vernier
151-212

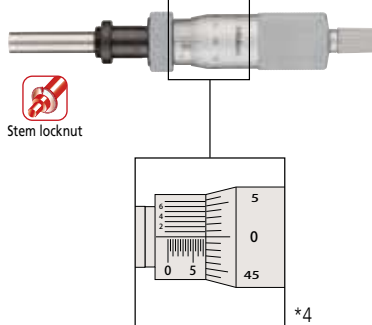


*3 Other dimensions are the same as 151-214.

Stem locknut and spindle lock



Equipped with vernier
151-211

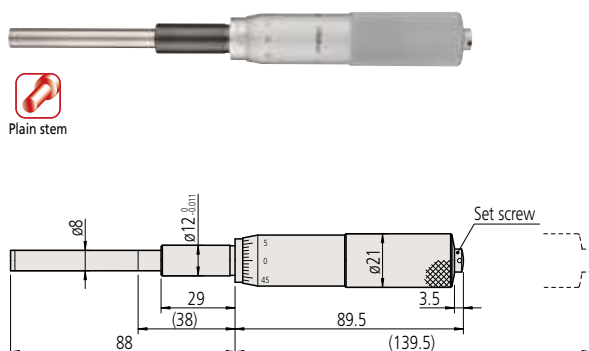


*4 Other dimensions are the same as 151-213.
(): With spindle fully retracted.

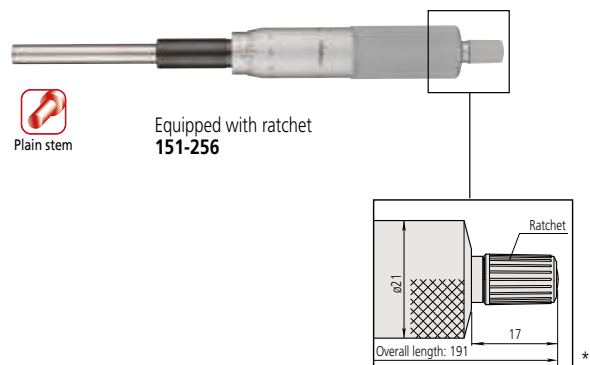
DIMENSIONS

Plain stem

Unit: mm



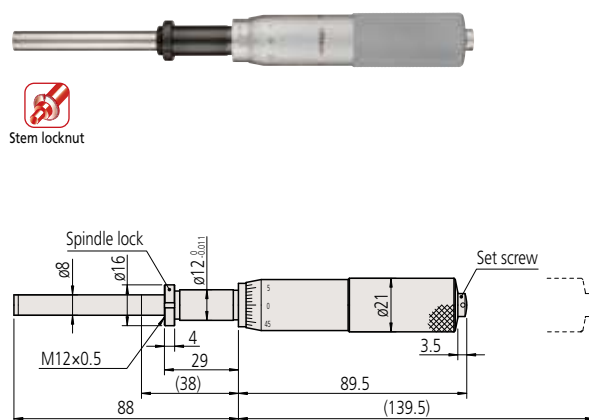
151-260 Mass: 240g



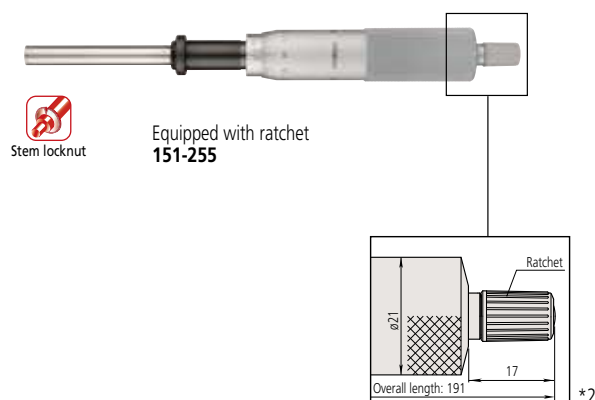
Equipped with ratchet
151-256

*1 Other dimensions are the same as **151-260**.

Stem locknut



Fixture thickness: 25.5mm
151-259 Mass: 250g



Equipped with ratchet
151-255

*2 Other dimensions are the same as **151-259**.
(): With spindle fully retracted.

● CAD download service at Mitutoyo web site

2D CAD data can be downloaded at our web site. For details, refer to page 10.

Series 110 Micrometer Heads

Differential Screw Thread
Translator (Extra-Fine Feed) Type

Provides 10-20X finer feed than standard heads.

Differential screw mechanisms enable ultra-fine feed and resolution for ultra-precise positioning and adjustment applications. The dual-thimble arrangement on 110-502/4 models provides coarse and fine adjustment on the same head.

SPECIFICATIONS

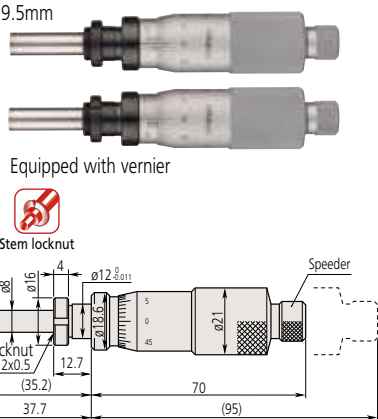
- Measuring face: Material: Carbide tip
(110-502/504 are hardened tool steel)
Hardness: 90HRC or more
(Only 110-502/504 are 60HRC or more)
Lapped
- Scale finishing: Satin-chrome plated
- Fixture thickness: 9.5mm (recommended)
(Only 110-502/504 are 11.5mm)

Metric												
Order No.	Range		Graduation		Accuracy**	Stem dia.	Stem	Spindle end	Graduation features			
110-101	0 - 2.5mm		0.001mm		±5µm/±1.5µm	12mm	w/ clamp nut	Flat (carbide tip)	Standard			
0.0001mm			Fine									
0.001mm			Standard									
0.0001mm			Fine									
0.001mm			Standard									
110-102	0 - 1mm		0.001mm		±3µm/±1.5µm		w/ clamp nut	Spherical (SR10) (carbide tip)	Fine			
0.0001mm			Standard									
0.001mm			Fine									
0.0001mm			Standard									
0.001mm			Fine									
110-105	0 - 0.2mm		0.0005mm		±3µm/±1.5µm	9.5mm		Spherical (SR3)	Dual scales;			
0.01mm			0.2mm fine-feed range									
0 - 13mm												

* made-to-order models ** Wide range / narrow range

DIMENSIONS

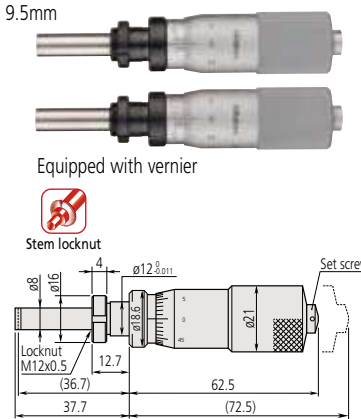
- Differential movement mechanism with double spindle.
- Non-rotating spindle.
- Fixture thickness: 9.5mm



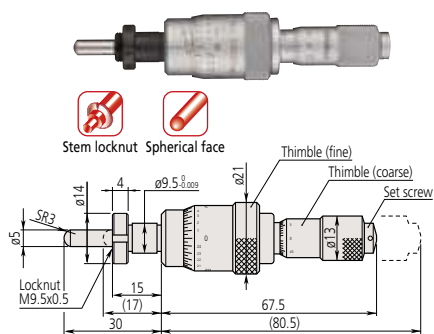
Fixture thickness: 9.5mm
110-101, 110-102 Equipped with vernier Mass: 150g

- Differential movement mechanism with double spindle.
- Non-rotating spindle.
- Fixture thickness: 9.5mm

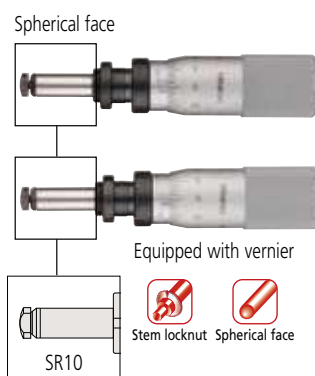
Unit: mm



Fixture thickness: 9.5mm
110-105, 110-106 Equipped with vernier Mass: 150g



Fixture thickness: 11.5mm
110-502 Dual thimble Mass: 95g



No. 110-107
No. 110-108 Equipped with vernier

(): with spindle fully retracted

- CAD download service at Mitutoyo web site

2D CAD data can be downloaded at our web site. For details, refer to page 10.

Series 148 Micrometer Heads

Fine Spindle Feed
of 0.1mm/rev

Provides 5X finer feed than standard heads.

The spindle thread of 0.1mm (0.5mm for standard types) per revolution enables very precise feeding and positioning. This type can also replace standard heads in many applications where space-saving is important (see diagram below). Stem diameter and range compatibility enables heads 148-142/43 and 148-342/43 to be drop-in replacements for the 0-6.5mm range Short Body heads (148-301/02/03/04/05/06/13/14 and inch equivalents) shown on page 18; similarly 148-242/43 for the 0-6.5mm range Small/Ultra-small heads (148-201/03/05/07/09/11) shown on pages 16/17; and 148-244/45 for the 0-5mm range Small/Ultra-small heads (148-215/6) shown on pages 16/17.

SPECIFICATIONS

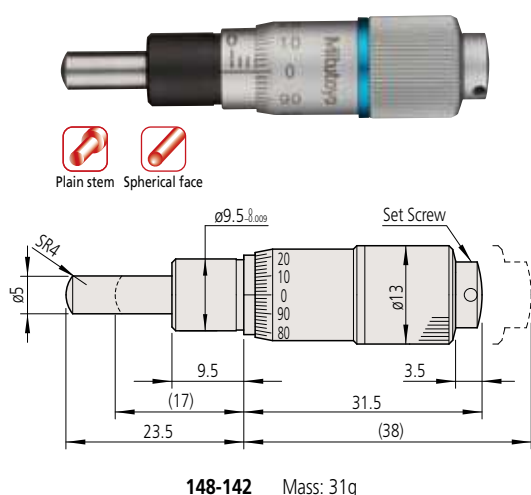
- Measuring face: Material: Alloy tool steel
Hardness: 60HRC or more
Lapped
- Fixture thickness: 6mm (148-142/143/342/343)
4mm (148-242/243/244/245)
- Scale finishing: Satin-chrome plated

Metric									
Order No.	Range	Graduation	Accuracy	Stem dia.	Stem	Spindle end	Spindle pitch	Special features	
148-142	0 - 6.5mm	0.002mm	±2µm	9.5mm	Plain	Spherical (SR4)	0.1mm	—	
148-143					w/ clamp nut				
148-342					Plain				
148-343					w/ clamp nut				
148-242	0 - 5mm	0.004mm	±5µm	6mm	Plain	Spherical (SR3)		Thicker & shorter thimble	
148-243					w/ clamp nut				
148-244					Plain				
148-245					w/ clamp nut				
				3.5mm	Plain	Spherical (SR1.5)		Small thimble diameter	
					w/ clamp nut				

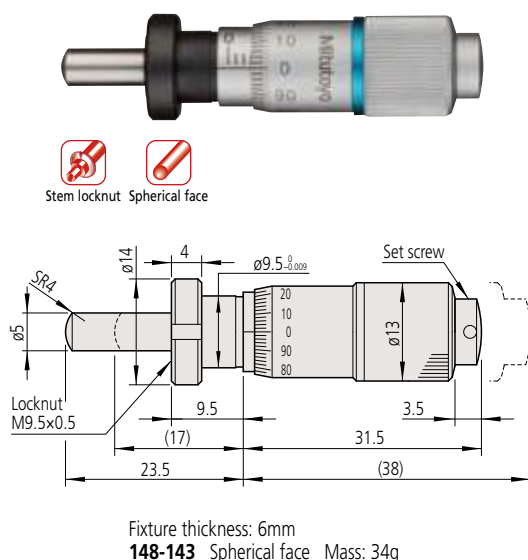
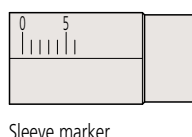
DIMENSIONS

Plain stem

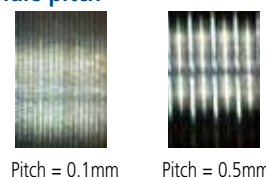
Unit: mm



Stem locknut

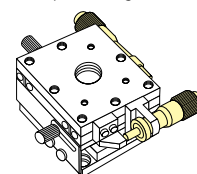


Spindle pitch

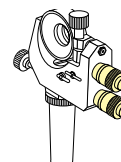


Applications

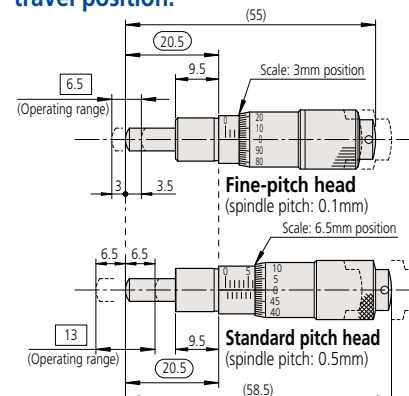
- Semiconductor-wafer positioning machinery and optical component alignment units, etc.
- Precision X-Y table positioning



- Precision adjustment of mirror in holder



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

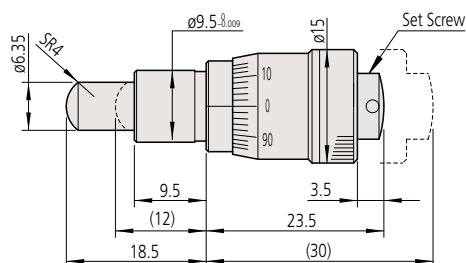


While the fine-pitch micrometer head has a measuring range of 6.5mm, the standard head has a larger range of 13mm.

When replacing a standard 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 otherwise completely interchangeable.

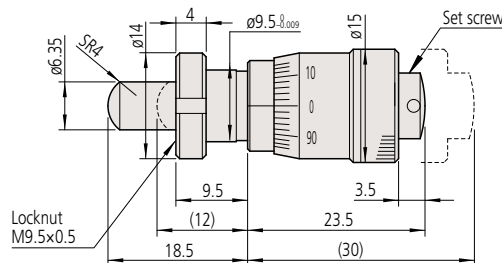
DIMENSIONS

Plain stem

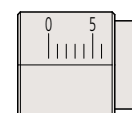


148-342 Mass: 29g

Stem locknut

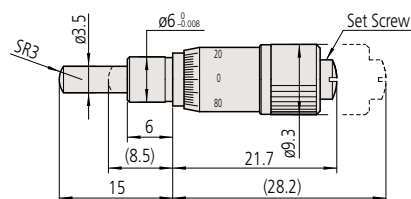


Fixture thickness: 6mm
148-343 Spherical face Mass: 31g



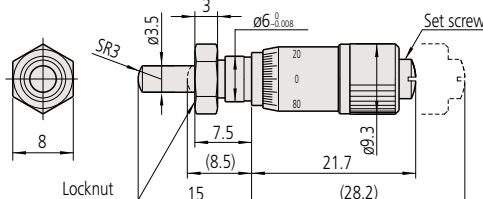
Sleeve marker

Plain stem



148-242 Mass: 10g

Stem locknut

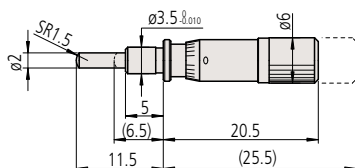


Fixture thickness: 4mm
148-243 Spherical face Mass: 10g



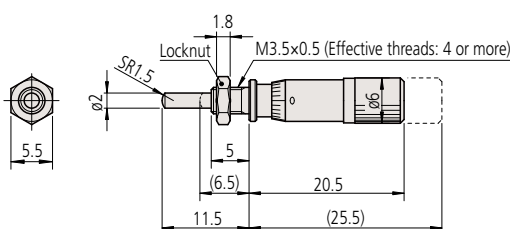
Sleeve marker

Plain stem



148-244 Mass: 4g

Stem locknut



Fixture thickness: 3mm
148-245 Spherical face Mass: 5g



Sleeve marker

Series 148 Micrometer Heads

Fine Spindle Feed
of 0.25mm/rev

Provides 2X finer feed than standard head types.

The 0.25mm pitch thread on the spindle provides a 2X finer feed than standard for precise positioning applications. Miniature design is also useful in reducing size of fixtures. Stem diameter and range compatibility enables heads **148-132/33** to be drop-in replacements for all the 0-13mm range Small Standard heads shown on pages 20/21, and Short Body heads (**148-307/08/09/10/11/12** and inch equivalents) shown on pages 18/19; similarly **148-322/23** for the 0-6.5mm range Short Body heads (**148-301/02/03/04/05/06/13/14** and inch equivalents) shown on page 18.

SPECIFICATIONS

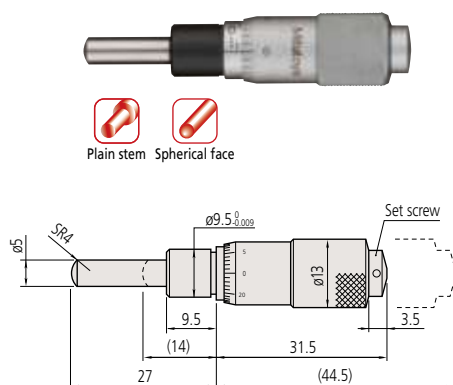
- Measuring face: Material: Alloy tool steel
Hardness: 60HRC or more
Lapped
- Scale finishing: Satin-chrome plated
- Fixture thickness: 6mm

Metric							
Order No.	Range	Graduation	Accuracy	Stem dia.	Stem	Spindle end	Spindle pitch
148-132	0 - 13mm	0.01mm	±2µm	9.5mm	Plain	Spherical (SR4)	0.25mm
148-133					w/ clamp nut		
148-322	0 - 6.5mm	0.01mm	±2µm	9.5mm	Plain	Spherical (SR4)	0.25mm
148-323					w/ clamp nut		

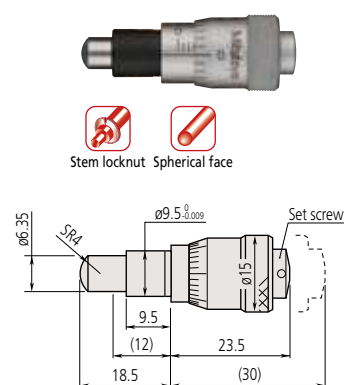
DIMENSIONS

Plain stem

Unit: mm

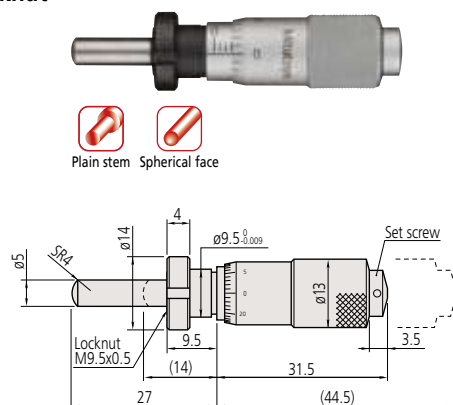


148-132 Mass: 30g

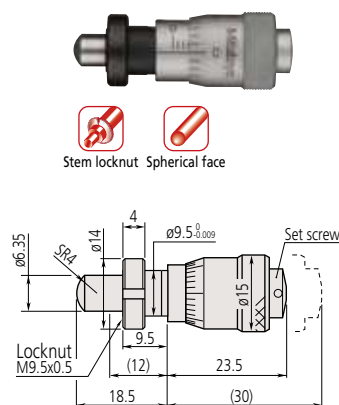


148-322 Mass: 30g

Stem locknut



Fixture thickness: 6mm
148-133 Mass: 35g



Fixture thickness: 6mm
148-323 Mass: 35g

(): with spindle fully retracted

CAD download service at Mitutoyo web site

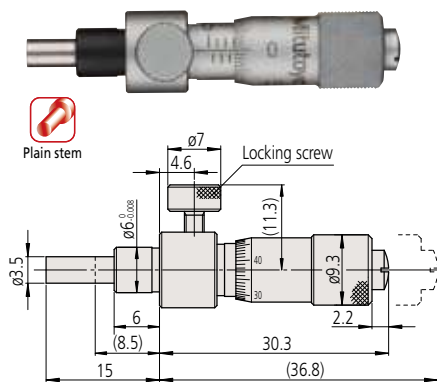
2D CAD data can be downloaded at our web site. For details, refer to page 10.

Series 148 Micrometer Heads Locking-screw Type

A conveniently positioned thumbscrew is provided for those applications where the spindle has to be frequently locked and unlocked.

DIMENSIONS

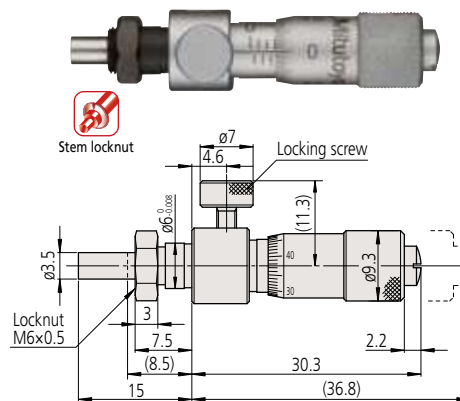
Plain stem



148-220 Mass: 16g

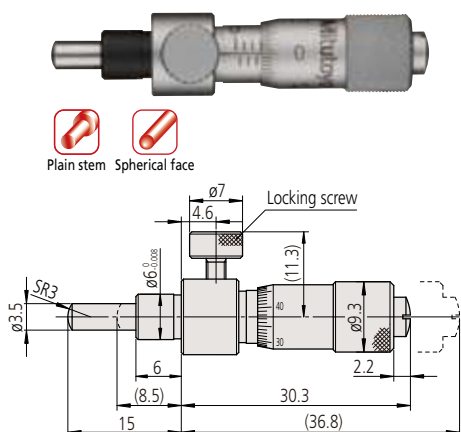
Stem locknut

Unit: mm



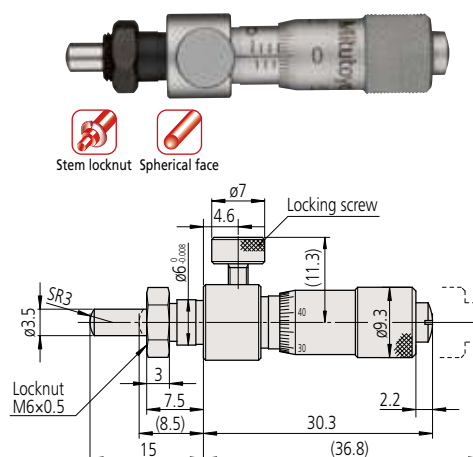
Fixture thickness: 4mm
148-221 Mass: 17g

Plain stem



Spherical face (SR3)
148-222 Mass: 16g

Stem locknut



Spherical face (SR3) Fixture thickness: 4mm
148-223 Mass: 17g

(): with spindle fully retracted

SPECIFICATIONS

Metric								
Order No.	Range	Graduation	Accuracy	Stem dia.	Stem	Spindle end	Graduation features	
148-220	0 - 6.5mm	0.01mm	±5μm	6mm	Plain	Flat	Standard	
148-221					W/ clamp nut	Spherical (SR3)		
148-222					Plain	Spherical (SR3)		
148-223					W/ clamp nut	Spherical (SR3)		
148-150	0 - 13mm	0.01mm	±2μm	9.5mm	Plain	Flat	Standard	
148-151					W/ clamp nut	Spherical (SR4)		
148-152					Plain	Spherical (SR4)		
148-153					W/ clamp nut	Spherical (SR4)		
148-316	0 - 6.5mm	0.01mm	±2μm	9.5mm	Plain	Flat	Standard	
148-317					W/ clamp nut	Spherical (SR4)		
148-318					Plain	Spherical (SR4)		
148-319					W/ clamp nut	Spherical (SR4)		

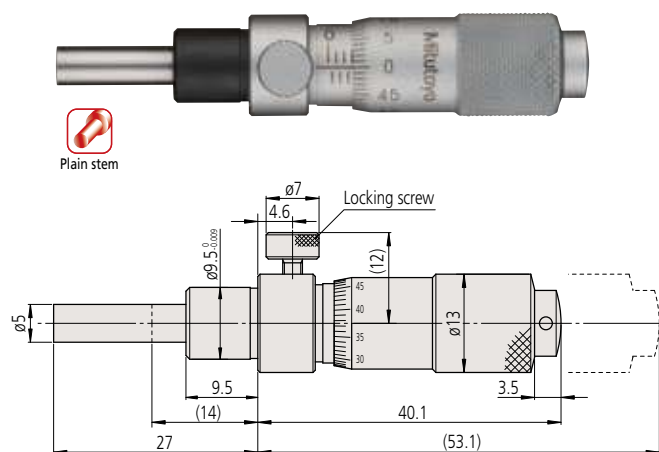
Inch								
Order No.	Range	Graduation	Accuracy	Stem dia.	Stem	Spindle end	Graduation features	
148-230	0 - .25"	.00025"	±.00025"	.25"	Plain	Flat	Standard	
148-231					W/ clamp nut	Spherical (SR3)		
148-232					Plain	Spherical (SR3)		
148-233					W/ clamp nut	Spherical (SR3)		
148-160	0 - .5"	.001"	±.0001"	.375"	Plain	Flat	Standard	
148-161					W/ clamp nut	Spherical (SR4)		
148-162					Plain	Spherical (SR4)		
148-163					W/ clamp nut	Spherical (SR4)		
148-326	0 - .25"	.001"	±.0001"	.375"	Plain	Flat	Standard	
148-327					W/ clamp nut	Spherical (SR4)		
148-328					Plain	Spherical (SR4)		
148-329					W/ clamp nut	Spherical (SR4)		



Secure spindle

DIMENSIONS

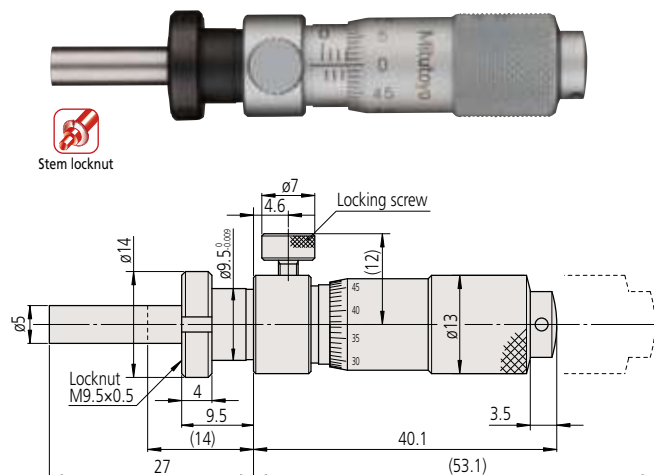
Plain stem



148-150 Mass: 40g

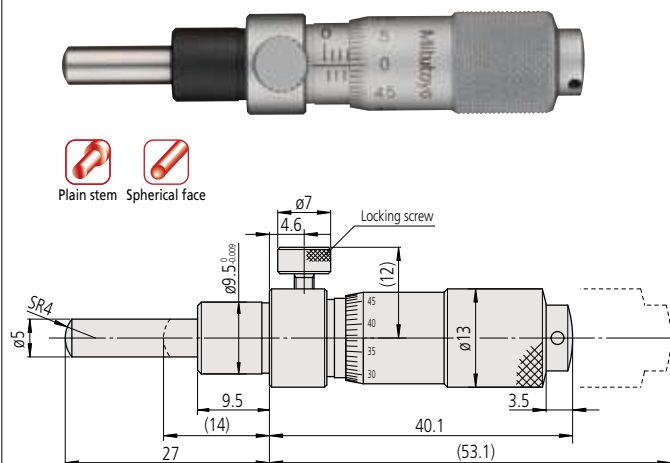
Stem locknut

Unit: mm



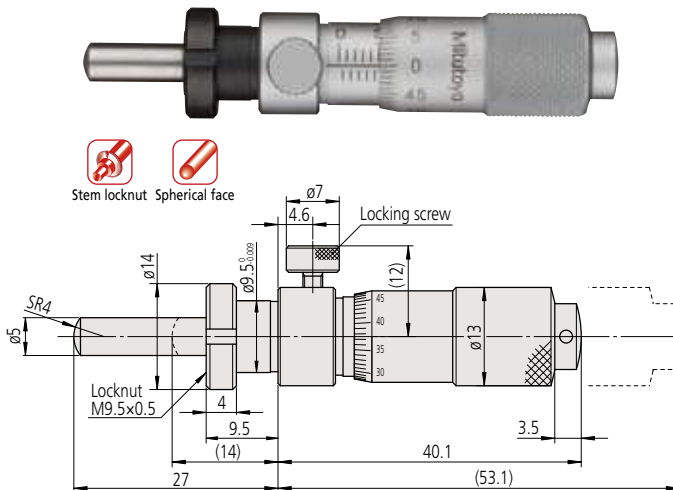
Fixture thickness: 6mm
148-151 Mass: 43g

Plain stem



Spherical face (SR4)
148-152 Mass: 40g

Stem locknut



Spherical face (SR4) Fixture thickness: 6mm
148-153 Mass: 43g

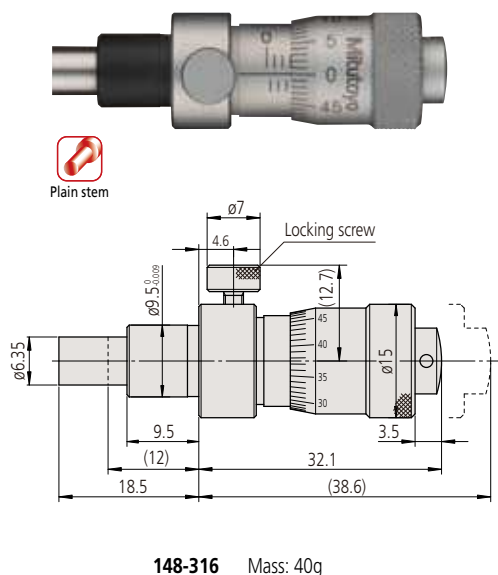
(): with spindle fully retracted

● CAD download service at Mitutoyo web site

2D CAD data can be downloaded at our web site. For details, refer to page 10.

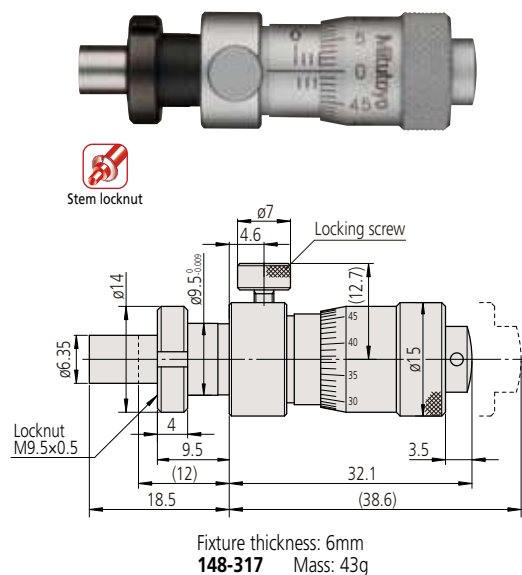
DIMENSIONS

Plain stem

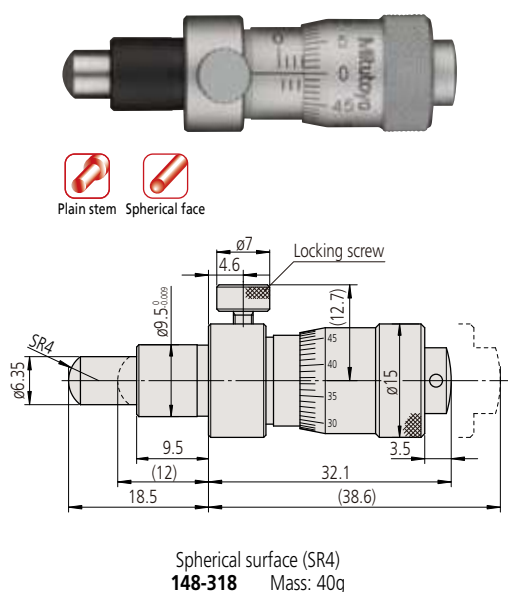


Stem locknut

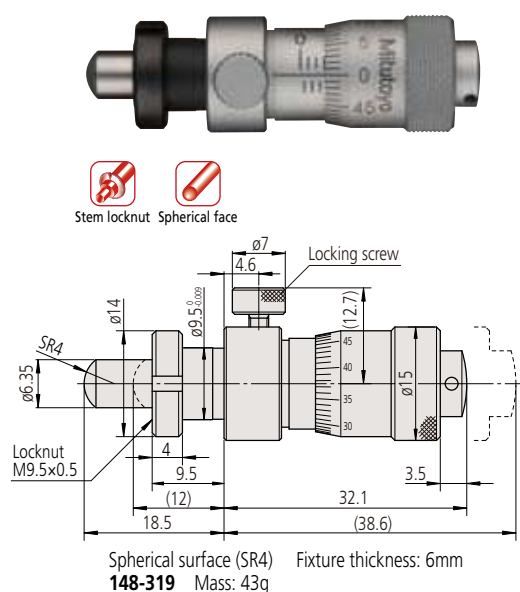
Unit: mm



Plain stem



Stem locknut



() : With spindle fully retracted.

● CAD download service at Mitutoyo web site

2D CAD data can be downloaded at our web site. For details, refer to page 10.

Series 153 Micrometer Heads

Non-rotating Spindle Type

Micrometer heads featuring a non-rotating spindle for delicate workpieces.

The non-rotating spindle design suits applications where the twisting effect of the standard spindle is undesirable because of the risk of damage to delicate or polished workpiece surfaces.

SPECIFICATIONS

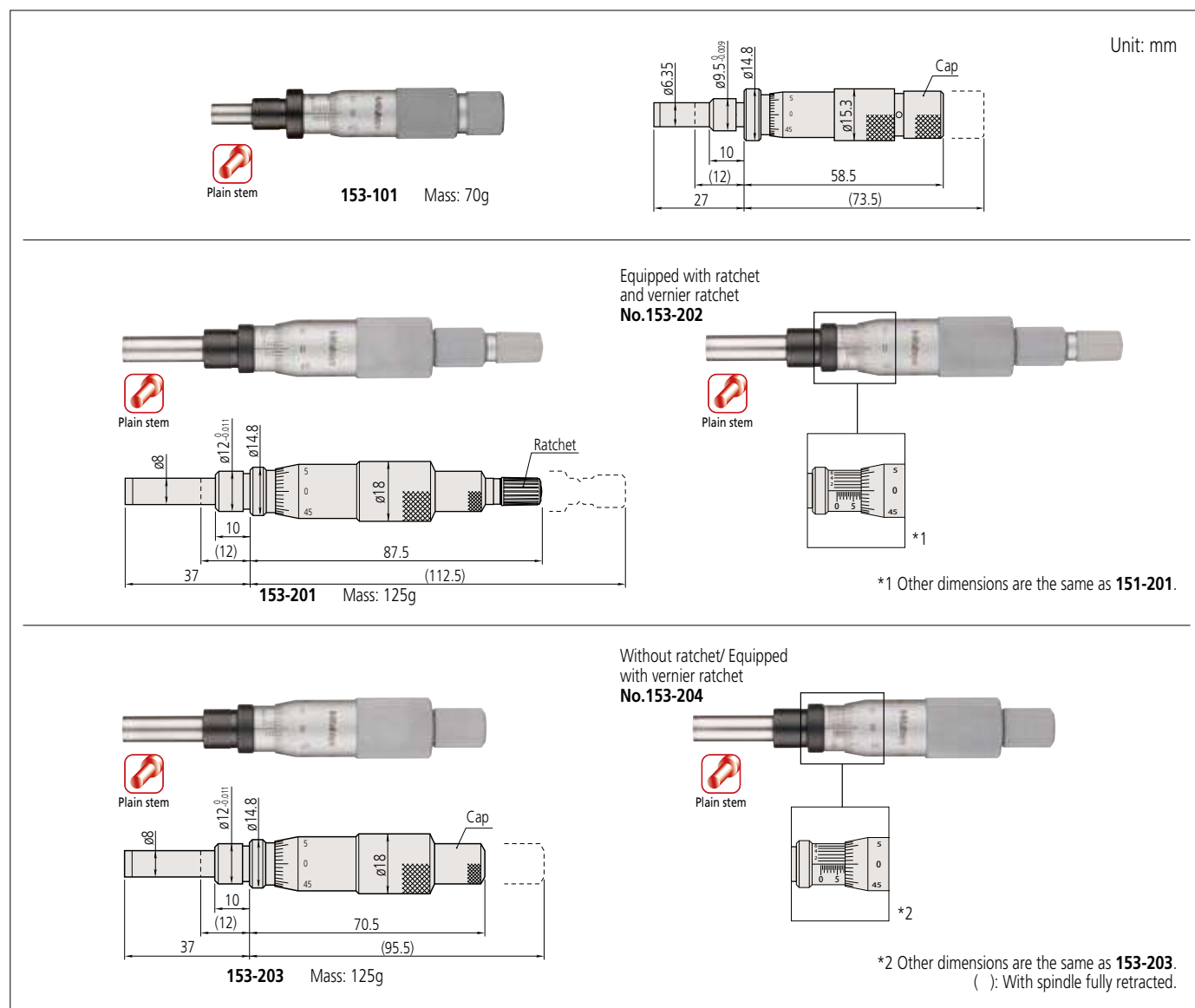
- Measuring face: Material: Carbide tip
Hardness: 90HRA or more
Lapped
- Scale finishing: Satin-chrome plated

Metric								
Order No.	Range	Graduation	Accuracy	Stem dia.	Stem	Spindle end	Spindle pitch	Graduation features
153-101	0 - 15mm	0.01mm	±3μm	9.5mm	Plain	Flat (carbide tip)	0.5mm	Standard
153-201*	0 - 25mm	0.001mm		12mm				w/ vernier (0.001mm)
153-202*		0.01mm						Standard
153-203		0.001mm						w/ vernier (0.001mm)
153-204								

Inch								
Order No.	Range	Graduation	Accuracy	Stem dia.	Stem	Spindle end	Spindle pitch	Special features
153-108**	0 - .5"	.001"	±.00015"	.375"	Plain	Flat (carbide tip)	.025"	w/ vernier (.0001")
153-205*	0 - 1"	.0001"		.5"				Standard
153-206*		.001"						w/ vernier (.0001")
153-207		.001"						Standard
153-208								w/ vernier (.0001")

* with ratchet stop ** made-to-order model

DIMENSIONS



● CAD download service at Mitutoyo web site

2D CAD data can be downloaded at our web site. For details, refer to page 10.

Series 152 Micrometer Heads

**Quick Spindle Feed
of 1mm/rev**

2X faster feedrate than standard provides quicker positioning.

The 1mm-pitch thread on the spindle provides a 2X faster feed than standard for applications needing quick positioning, and the simple scale avoids the possibility of making a 0.5mm reading error. The larger screw thread also provides greater load-bearing capacity than does a standard head, which is useful when the head is used as a stop.

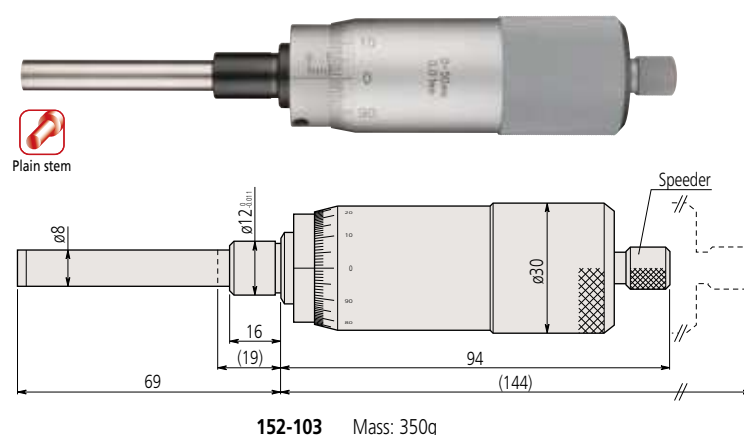
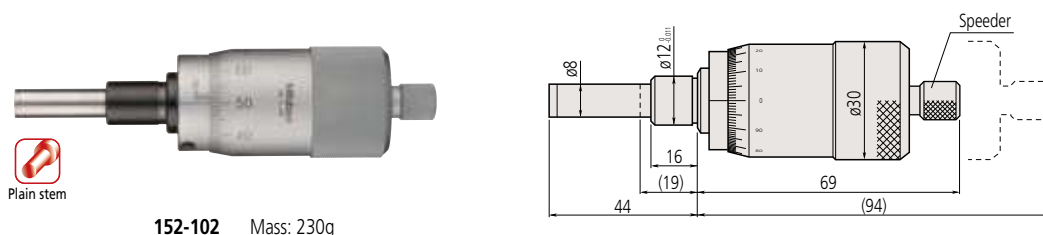
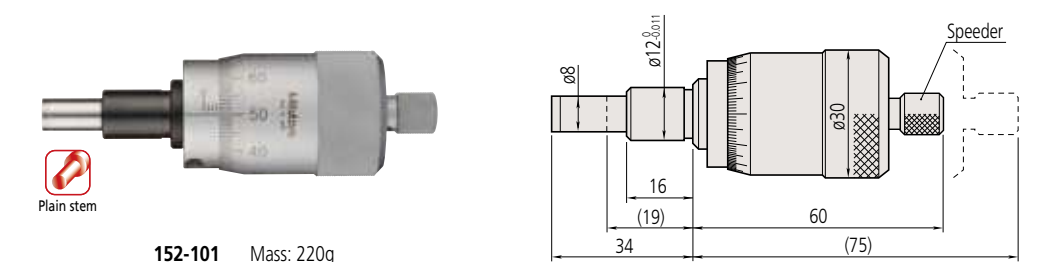
SPECIFICATIONS

- Measuring face: Material: Carbide tip
Hardness: 90HRC or more
Lapped
- Scale finishing: Satin-chrome plated

Metric								
Order No.	Range	Graduation	Accuracy	Stem dia.	Stem	Spindle end	Spindle pitch	
152-101	0 - 15mm	0.01mm	±2μm	12mm	Plain	Flat (carbide tip)	1mm	
152-102	0 - 25mm		±2μm					
152-103	0 - 50mm		±4μm					

DIMENSIONS

Unit: mm



(): With spindle fully retracted.

● CAD download service at Mitutoyo web site

2D CAD data can be downloaded at our web site. For details, refer to page 10.

Series 152 Micrometer Heads Large thimble type

Large thimble provides higher resolution and readability.

The use of a large-diameter thimble provides 5 times the resolution of standard types. Thanks to improvement in operability, even a small force rotates the thimble. The spindle feeds at the standard rate of 0.5mm/rev and the graduation schemes include a bidirectional option.

SPECIFICATIONS

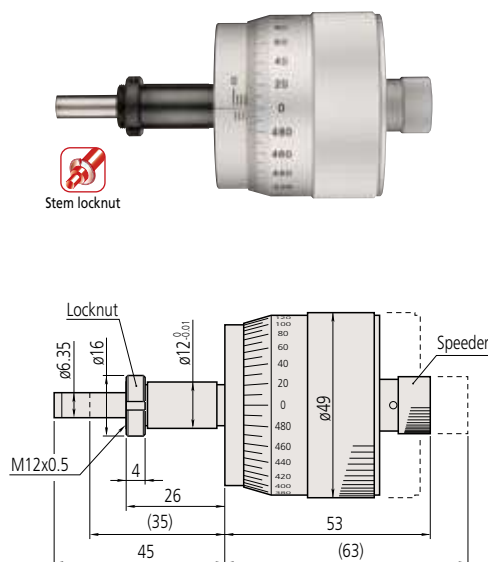
- Measuring face: Material: Carbide tip
Hardness: 90HRC or more
Lapped
- Scale finishing: White anodized aluminium
- Fixture thickness: 22.5mm(recommended)

Metric								
Order No.	Range	Graduation	Accuracy	Stem dia.	Stem	Spindle end	Spindle pitch	Graduation features
152-283	0 - 10mm	0.002mm	±2µm	12mm	w/ clamp nut	Flat (carbide tip)	0.5mm	Standard
152-332	0 - 25mm				plain			Bidirectional
152-348	0 - 50mm		±4µm					
152-380	0 - 50mm							

Inch								
Order No.	Range	Graduation	Accuracy	Stem dia.	Stem	Spindle end	Spindle pitch	Graduation features
152-372	0 - 1"	.0001"	±.0001"	.5"	w/ clamp nut	Flat (carbide tip)	.025"	Bidirectional
152-388	0 - 2"							

DIMENSIONS

Unit: mm



Fixture thickness: 22.5mm
152-283 Mass: 190g

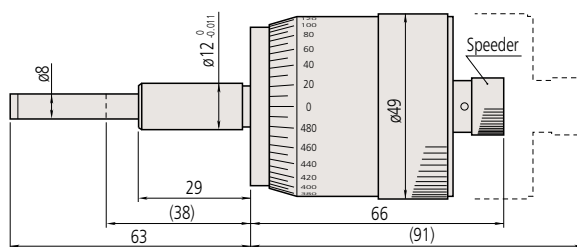
(): With spindle fully retracted.

● CAD download service at Mitutoyo web site

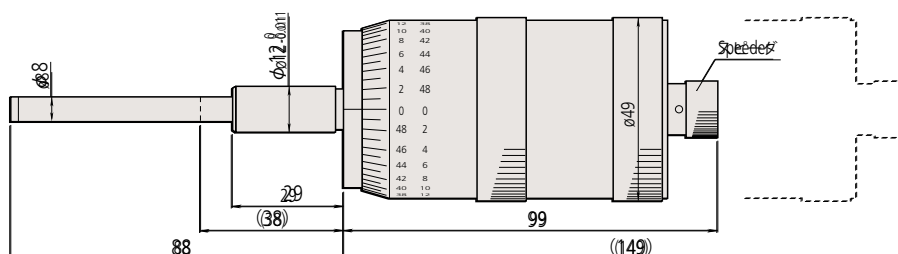
2D CAD data can be downloaded at our web site. For details, refer to page 10.

DIMENSIONS

Unit: mm



152-332 Bidirectional Mass: 310g
152-348 Bidirectional



152-380 Mass: 460g

(): with spindle fully retracted

Series 152 Micrometer Heads XY-Stage type

Micrometer heads developed specifically for XY stages.

A spindle pitch of 1mm allows quick feeding and positioning. The large thimble provides excellent readability and operability, with the bidirectional graduations being specifically arranged for reading from the same direction in XY-stage operation.

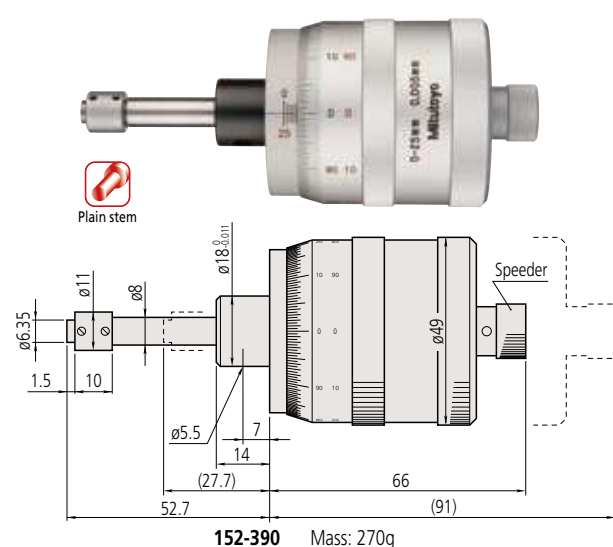
SPECIFICATIONS

- Measuring face: Material: Carbide tip
(152-389/390/391/392 are alloy tool steel)
Hardness: 90HRA or more
(152-389/390/391/392 are 60HRC or more)
Lapped
- Scale finishing: White anodized aluminium

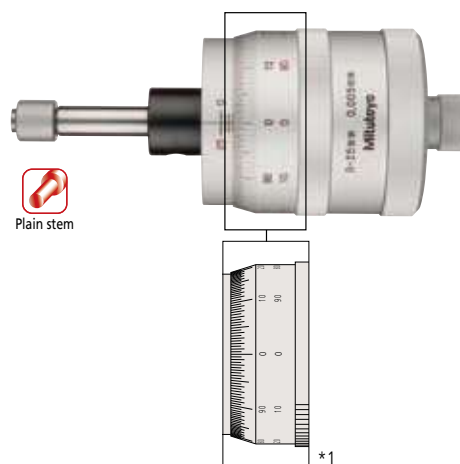
Metric							
Order No.	Range	Graduation	Accuracy	Stem dia.	Stem	Spindle pitch	Graduation features
152-390	0 - 25mm	0.005mm	±2µm	18mm	Plain	1mm	for X-axis, bidirectional
152-389		0.001mm Vernier graduation					for X-axis, with Vernier
152-402							
152-401							
Inch							
Order No.	Range	Graduation	Accuracy	Stem dia.	Stem	Spindle pitch	Graduation features
152-392	0 - 1 "	.0001 "	±.0001 "	.709 "	Plain	.025 "	for X-axis, bidirectional
152-391							

DIMENSIONS

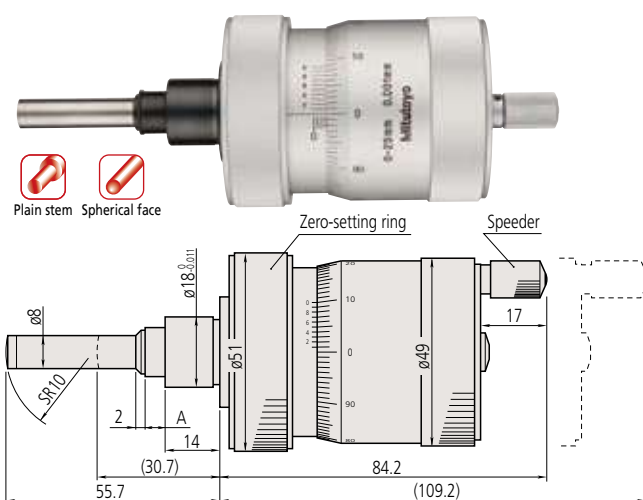
Unit: mm



- The thimble can be rotated to a better reading position while maintaining the spindle position.

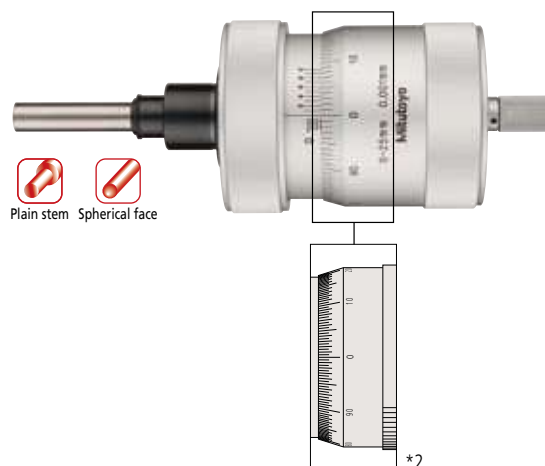


*1 Other dimensions are the same as 152-390.



Length of A: 0 to 6 A = 6 in the drawing above.

- The zero-setting ring allows spindle movement without thimble position change for easy zero setting.



*2 Other dimensions are the same as 152-402.
(): With spindle fully retracted.

CAD download service at Mitutoyo web site

2D CAD data can be downloaded at our web site. For details, refer to page 10.

Series 197

Micrometer Heads

Long Stroke

Non-rotating Spindle

Long stroke head with non-rotating spindle and large diameter thimble.

A large-diameter head offering twice the stroke and feedrate of standard heads for excellent operability combined with a non-rotating spindle to suit those applications where the twisting effect of the standard spindle is undesirable.

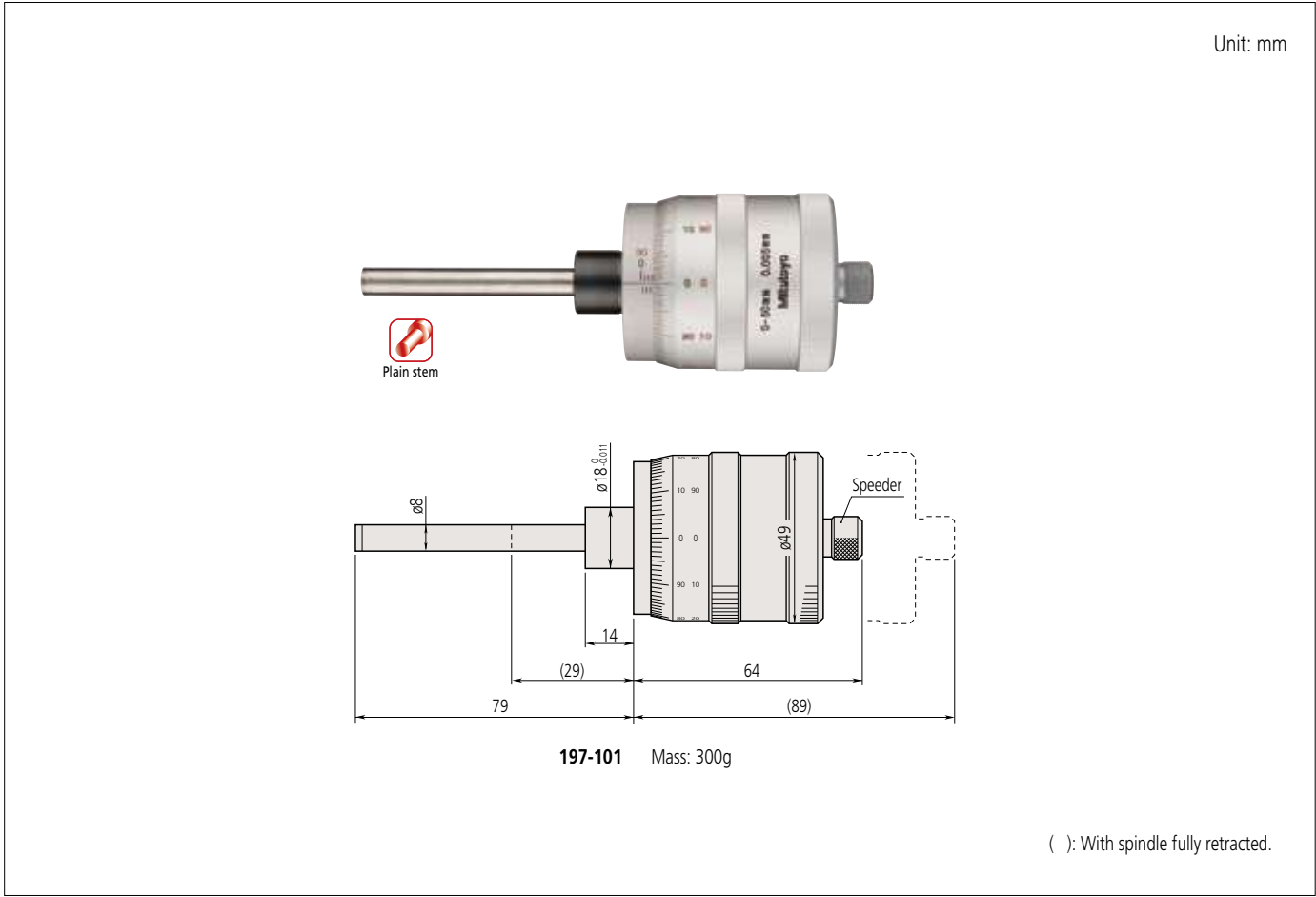
SPECIFICATIONS

- Measuring face: Material: Carbide tip
Hardness: 90HRA or more
Lapped
- Scale finishing: White anodized aluminium

Metric									
Order No.	Range	Graduation	Accuracy	Stem dia.	Stem	Spindle end	Spindle pitch	Graduation features	
197-101	0 - 50mm	0.005mm	±5µm	18mm	Plain	Flat (carbide tip)	1mm	Bidirectional	

Inch									
Order No.	Range	Graduation	Accuracy	Stem dia.	Stem	Spindle end	Spindle pitch	Graduation features	
197-201	0 - 2"	.0002"	±.0001"	.709"	Plain	Flat (carbide tip)	.05"	Bidirectional	

DIMENSIONS



● CAD download service at Mitutoyo web site

2D CAD data can be downloaded at our web site. For details, refer to page 10.

Series 153 Micrometer Heads

High Accuracy and Resolution

High-accuracy and high-resolution micrometer heads.

A large thimble, non-rotating spindle head that provides higher accuracy and resolution than standard types for high-accuracy applications. The spindle feeds at the standard rate of 0.5mm/rev and the graduation scheme is bidirectional.

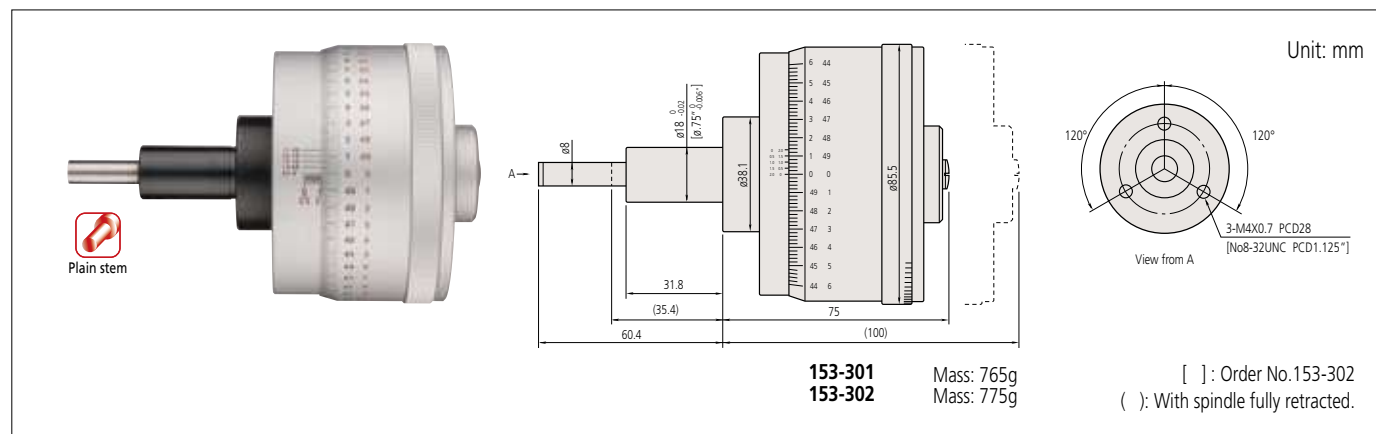
SPECIFICATIONS

- Measuring face: Material: Carbide tip
Hardness: 90HRA or more
Lapped
- Scale finishing: White anodized aluminium

Metric								
Order No.	Range	Graduation	Accuracy*	Stem dia.	Stem	Spindle end	Spindle pitch	Graduation features
153-301	0 - 25mm	0.0005mm	±1/±0.5µm	18mm	Plain	Flat (carbide tip)	0.5mm	Bidirectional
Inch								
Order No.	Range	Graduation	Accuracy*	Stem dia.	Stem	Spindle end	Spindle pitch	Graduation features
153-302	0 - 1"	.00001"	±.00005"/±.00003"	.75"	Plain	Flat (carbide tip)	.025"	Bidirectional

* Wide range / narrow range

DIMENSIONS



Series 250 Micrometer Heads

Digit Counter Type

A mechanical-digit display head.

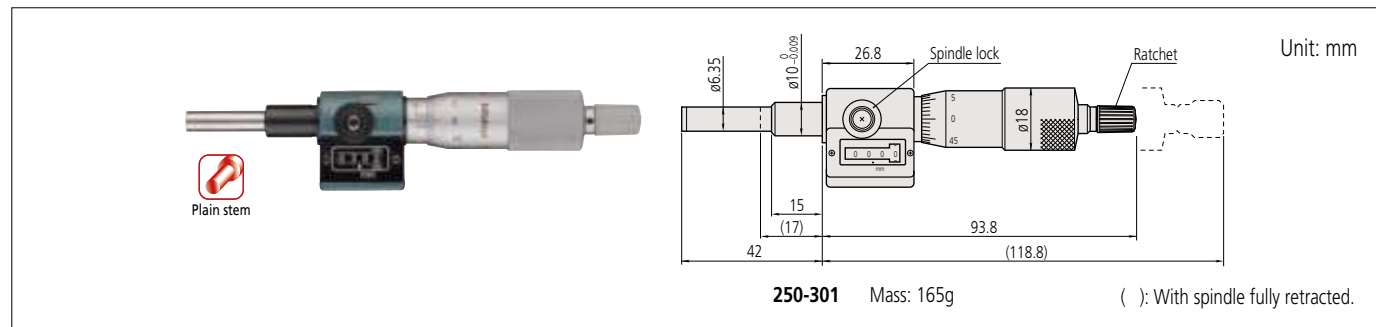
A mechanical counter type of head that offers easy digital reading with no battery needed. Counter resolution is 0.01mm and there is a graduated sleeve for finer work. The spindle feeds at the standard rate of 0.5mm/rev.

SPECIFICATIONS

- Measuring face: Material: Carbide tip
Hardness: 90HRC or more
Lapped
- Scale finishing: White anodized aluminium

Metric								
Order No.	Range	Graduation	Accuracy	Stem dia.	Stem	Spindle end	Spindle pitch	Graduation feature
250-301	0 - 25mm	0.01mm	±2µm	10mm	Plain	Flat (carbide tip)	0.5mm	—
Inch								
Order No.	Range	Graduation	Accuracy	Stem dia.	Stem	Spindle end	Spindle pitch	Graduation feature
250-312	0 - 1"	.0001"	±.0001"	.375"	Plain	Flat (carbide tip)	.025"	Vernier scale

DIMENSIONS

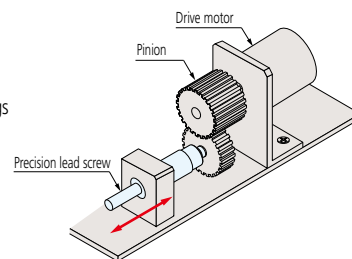


● CAD download service at Mitutoyo web site

2D CAD data can be downloaded at our web site. For details, refer to page 10.

Precision Leadscrews

- Mitutoyo manufactures simple and less expensive precision leadscrews for precise positioning mechanisms and fine-feed mechanisms, in addition to standard micrometer heads.
- Mitutoyo also manufactures leadscrews with special specifications, such as 0.25mm pitch, as well as those with the standard 0.5mm feed pitch and with dimensions and forms that meet customer's requirements.
- Durability: 100-thousand operations 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



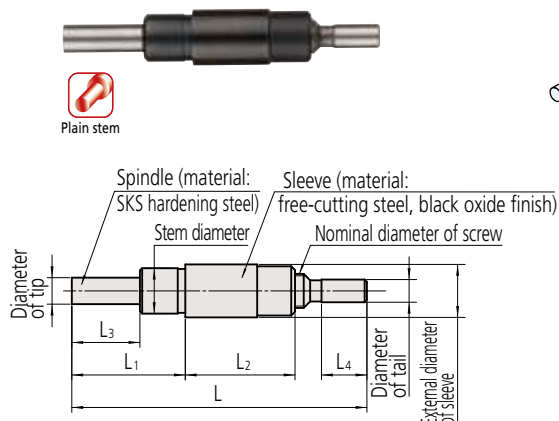
SPECIFICATIONS

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 ⁰ _{-0.008}	ø3.5	ø3 ⁰ _{-0.01}	M4.5 x 0.5	ø7	Hardened	10g	• AS type: Flat spindle tip without nut • BS type: Spherical spindle tip with nut
04AZA161	BS-6.5										11g	
04AZA162	AS-13	13		±2	ø9.5 ⁰ _{-0.009}	ø5	ø5 ⁰ _{-0.012}	M7.35 x 0.5	ø10.5		27g	
04AZA163	BS-13										30g	
04AZA164	AS-25	25		ø10 ⁰ _{-0.009}	ø6.35	ø6 ⁰ _{-0.015}	ø12	Carbide	61g			
04AZA165	BS-25								64g			

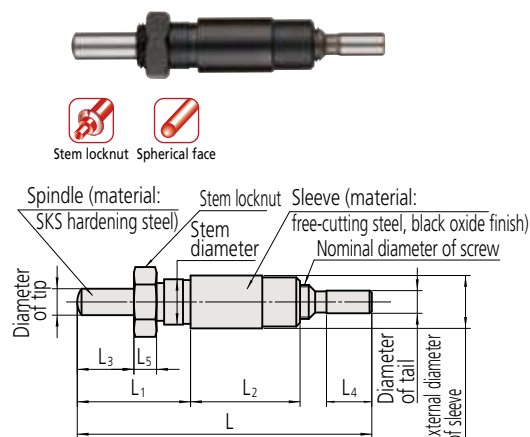
DIMENSIONS

Type AS: Plain stem

Unit: mm



Type BS: Stem with locknut



Order No.	L	L1	L2	L3	L4	L5
04AZA160	39	15	14.5	9	6	—
04AZA161	—	—	—	7.5	—	3
04AZA162	57.5	25	21.5	15.5	8	—
04AZA163	—	—	—	—	—	4
04AZA164	96.5	42	39.5	27	10	—
04AZA165	—	—	—	—	—	4

Micrometer Heads Mounting Fixtures

- Manufacturing 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 wide range of applications. These fixtures are made of nickel-plated cast iron.

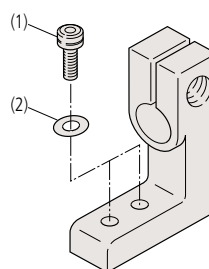
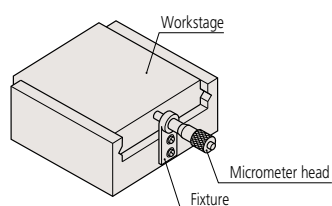


SPECIFICATIONS

Mounting hole size

Micrometer Head	Fixtures (Order No.)	Mounting hole size
148 Series	303560, 303562, 303564, 303566 303559, 303561, 303563, 303565	ø9.5×9.5 long for plain stem or stem locknut type micrometer heads
149 Series	303569, 303571, 303573, 303575 303568, 303570, 303572, 303574	ø9.5×15 long for plain stem or stem locknut type micrometer heads
150 Series	303579, 303581, 303583, 303585 303578, 303580, 303582, 303584	ø10×15 long for plain stem or stem locknut type micrometer heads

* Supplied with a socket head screw (M3 x 0.5 x 12) for fixtures to be used with a micrometer head without stem locknut (plain stem type micrometer head).



SPECIFICATIONS

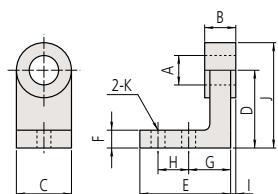
Recommended socket head screws for the fixtures

Fixtures (Order No.)	Socket head screw (1)	Washer (2)
303559, 303560, 303561, 303562, 303563, 303564, 303565, 303566	M3×0.5×8 M3×0.5×12	Small, Nominal dia.: 3 Small, Nominal dia.: 3
303568, 303569, 303570, 303571, 303572, 303573 303578, 303579, 303580, 303581, 303582, 303583	M4×0.7×10	Small, Nominal dia.: 4
303574, 303575 303584, 303585	M4×0.7×12	Small, Nominal dia.: 4

(): with spindle fully retracted

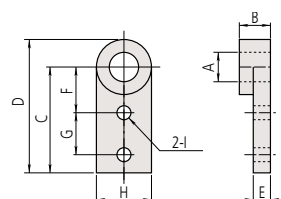
DIMENSIONS

Fixtures for micrometer heads with stem locknut



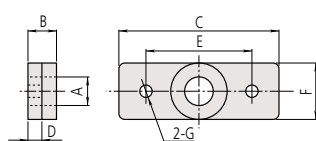
(Unit: mm)

Order No.	A	B	C	D	E	F	G	H	I	J	K
303559	ø9.5	6	15	20	24	5	11	8	0.5	27.5	ø3.4
303568	ø10	11.5	20	30	35	7	16	12	1.75	40	ø4.5
303578		ø10	20	30	35	7	16	12	1.75	40	ø4.5



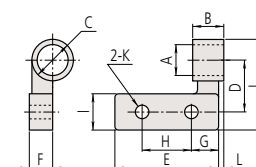
(Unit: mm)

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



(Unit: mm)

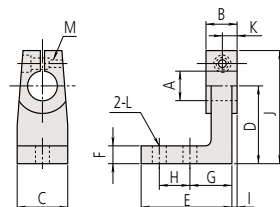
Order No.	A	B	C	D	E	F	G
303561	ø9.5	6	40	3.5	30	15	ø3.4
303570	ø10	11.5	60	5.5	40	20	ø4.5
303580		ø10	60	5.5	40	20	ø4.5



(Unit: mm)

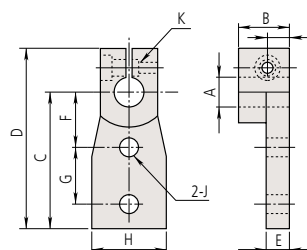
Order No.	A	B	C	D	E	F	G	H	I	J	K	L
303565	ø9.5	6	15	25	7.5	10	10	27.5	ø3.4	0.75		
303574	ø10	11.5	ø15	20	8.5	10	20	15	35	ø4.5	1.25	
303584		ø10	11.5	20	8.5	10	20	15	35	ø4.5	1.25	

Fixtures for plain stem type micrometer heads



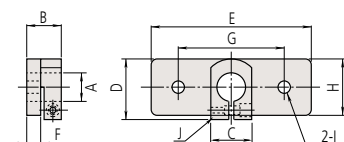
(Unit: mm)

Order No.	A	B	C	D	E	F	G	H	I	J	K	L	G
303560	ø9.5	9	15	20	23	5	11	8	1.5	3.25	4.5	ø3.4	M3x0.5
303569	ø10	14.5	20	30	35	7	16	12	3.25	4.25	7.25	ø4.5	
303579		ø10	14.5	20	30	35	7	16	12	3.25	4.25	7.25	



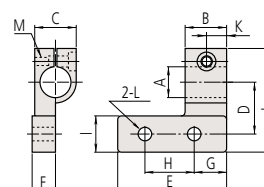
(Unit: mm)

Order No.	A	B	C	D	E	F	G	H	I	J	K
303564	ø9.5	9	30	4.25	4	15	10	15	4.5	ø3.4	M3x0.5
303573	ø10	14.5	30	5.25	6	18	15	20	7.25	ø4.5	
303583		ø10	14.5	30	5.25	6	18	15	20	7.25	



(Unit: mm)

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



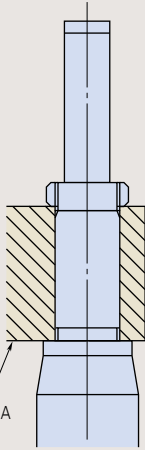
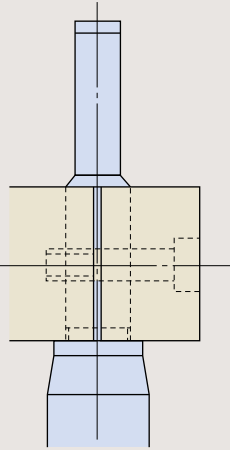
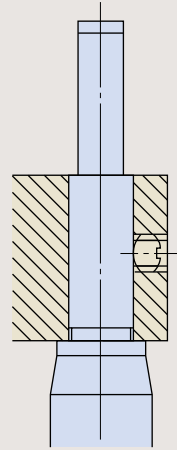
(Unit: mm)

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

Guidelines for Self-made Fixtures

A micrometer head should be mounted by the stem in an accurately machined hole using a clamping method that does not exert excessive force on the stem. There are three common mounting methods as shown below. Method 3 is not recommended. Adopt methods (1) or (2) wherever possible.

(Unit: mm)

Mounting method	(1) Clamp nut				(2) Split-body clamp				(3) Setscrew clamp			
Points to keep in mind												
	Face A											
Stem diameter	ø9.5	ø10	ø12	ø18	ø9.5	ø10	ø12	ø18	ø9.5	ø10	ø12	ø18
Mounting hole	G7				G7				H5			
Fitting tolerance	+0.005 to +0.020				+0.005 to +0.020				0 to +0.006			
Precautions	Care should be taken to make Face A square to the mounting hole. The stem can be clamped without any problem at squareness within 0.16/6.5.				Remove burrs generated on the wall of the mounting hole by the slitting operation.				M3x0.5 or M4x0.7 is an appropriate size for the setscrew. Use a brass plug under setscrew (if thickness of fixture allows) to avoid damaging stem.			

Maximum Loading Capacity on Micrometer Heads

The maximum loading capacity of a micrometer head depends mainly on the method of mounting and whether the loading is static or dynamic (used as a stop, for example). Therefore the maximum loading capacity of each model cannot be definitively specified. Therefore the maximum loading capacity of each model cannot be definitively specified in the unit of N (kgf). The loading limits recommended by Mitutoyo (at less than 100,000 revolutions if used for measuring within the guaranteed accuracy range) and the results of static load tests using a small micrometer head are given below.

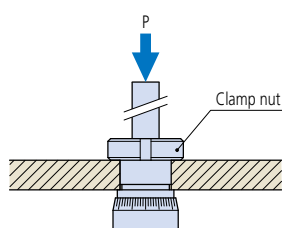
1. Recommended maximum loading limit

		Maximum loading limit
Standard type	spindle pitch: 0.5mm	Up to approx. 39.2N (4kgf)*
	Spindle pitch: 0.1mm/0.25mm	Up to approx. 19.6N (2kgf)
High-function type	Spindle pitch: 0.5mm	Up to approx. 39.2N (4kgf)
	Spindle pitch: 1.0mm	Up to approx. 58.8N (6kgf)
	Non-rotating spindle	Up to approx. 19.6N (2kgf)
	Series 110 micro-fine feed type (with a differential mechanism)	Up to approx. 19.6N (2kgf)

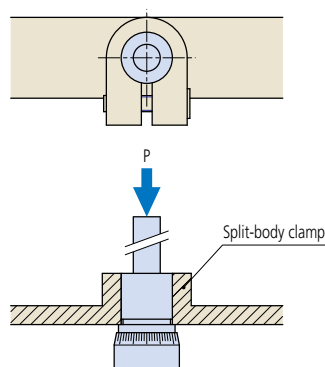
* Up to approx. 19.6N (2kgf) only for Ultra small models

2. Static load test for micrometer heads (using 148-104/148-103 for this test)

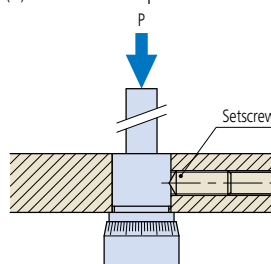
(1) Clamp nut



(2) Split-body clamp



(3) Setscrew clamp



Test method

Micrometer heads were set up as shown and the force at which the head was damaged or pushed out of the fixture when a static load was applied, in direction P, was measured. (In the tests no account was taken of the guaranteed accuracy range.)

Mounting method	Damaging / dislodging load*
(1) Clamp nut	Damage to the main unit will occur at 8.63 to 9.8kN (880 to 1000kgf).
(2) Split-body clamp	The main unit will be pushed out of the fixture at 0.69 to 0.98kN (70 to 100kgf).
(3) Setscrew clamp	Damage to the setscrew will occur at 0.69 to 1.08kN (70 to 110kgf).

* These load values should only be used as an approximate guide.

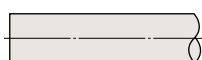
Custom-built Products (Product Example Introductions)

Micrometer heads have applications in many fields of science and industry and Mitutoyo offers a wide range of standard models to meet customers' needs. However, in those cases where the standard product is not suitable, Mitutoyo can custom build a head incorporating features better suited to your special application. Please feel free to contact Mitutoyo about the possibilities - even if only one custom-manufactured piece is required.



1. Spindle-end types

- Standard



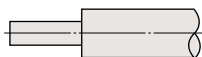
- Spherical



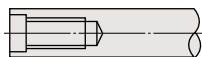
- Pointed



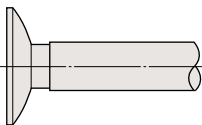
- Spline



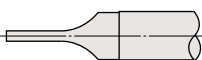
- Tapped



- Flanged



- Blade
(for non-rotating spindle type only)

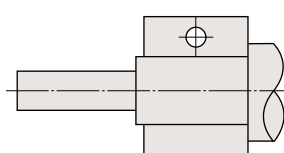
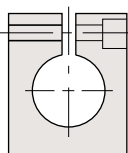


● Long spindle type is also available.
Please consult Mitutoyo.

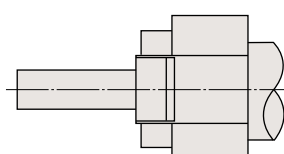
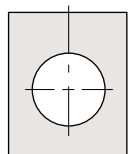
2. Stem types

A custom stem can be manufactured to suit the mounting fixture.

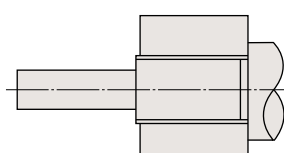
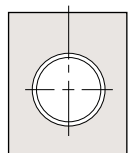
- Plain



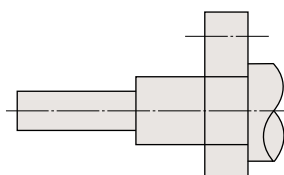
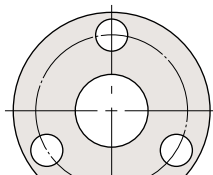
- Clamp nut



- Threaded



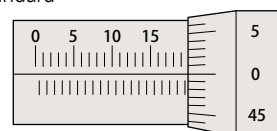
- Flanged



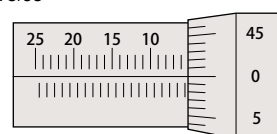
3. Scale graduation schemes

Various barrel and thimble scale graduation schemes, such as reverse and vertical, are available. Please consult Mitutoyo for ordering a custom scheme not shown here.

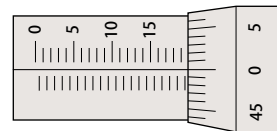
- Standard



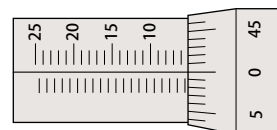
- Reverse



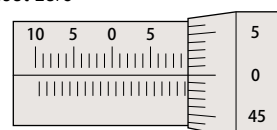
- Vertical



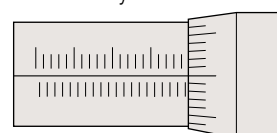
- Reverse vertical



- Offset zero



- Graduations only



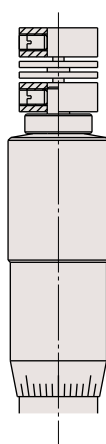
Customized micrometer heads can be offered even in one-off quantities.
Do not hesitate to contact your nearest Mitutoyo sales office for details.

4. Logo engraving

A specific logo can be engraved as required.

5. Motor Coupling

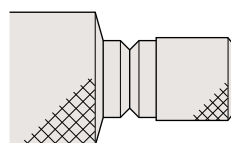
Couplings for providing motor drive to a head can be designed.



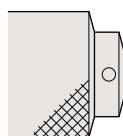
6. Thimble mounting

Thimble mounting methods including a ratchet, setscrew, and hex-socket head screw types are available.

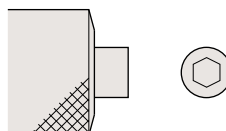
● Ratchet



● Setscrew



● Hex-socket head screw



7. Spindle-thread pitch

Pitches of 1mm for fast-feed applications or 0.25mm for fine-feed can be supplied as alternatives to the standard 0.5mm. Inch pitches are also supported. Please consult Mitutoyo for details.

8. Lubricant for spindle threads

Lubrication arrangements can be specified by the customer.

9. All-stainless construction

All components of a head can be manufactured in stainless steel.

10. Simple packaging

Large-quantity orders of micrometer heads can be delivered in simple packaging for OEM purposes.

11. Spindle and nut (Precision feed screw)

The spindle can be used as a precision feed screw. The nut is machined in accordance with the specified dimensions.

For details, refer to "Precision Feed Screws" on page 45.

12. Accuracy inspection certificate

An accuracy inspection certificate can be supplied at extra cost. For detailed information, contact the nearest Mitutoyo Sales Office.



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and Seismometers

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